NUCLEAR POWER BUSINESS UNIT
CALCULATION REVIEW AND APPROVAL

NIMS	Calculation # 96-0272
FILE I744	Number of Pages 4

Title of Calculation: Instrument ~~Uncertainty~~ Associated with Flow Instrumentation used for IT-11 SFP Cooling Pump In-service Test

☑ Original Calculation ☑ QA-Scope

☐ Revised Calculation. Revision # _____

☐ Superseding Calculation. Supersedes Calculation # _____

Modification #	Description:
N/A	

Other References:

Prepared By:	Date:
	12/10/96

This Calculation has been reviewed in accordance with NP 7.2.4. The review was accomplished by one or a combination of the following (as checked):

____ A review of a representative sample of repetitive calculations.

✓ A detailed review of the original calculation.

✓ A review of the calculation against a similar calculation previously performed.

____ A review by an alternate, simplified, or approximate method of calculation.

Comments:

Reviewed By:	Date:	Approved By:	Date:
	12/11/96		12/12/96

A. Purpose: The purpose of this calculation is to determine the instrument uncertainty associated with the flow instrumentation used for the performance of the spent fuel pool cooling pump inservice test (IT-11).

B. References

1. PBNP Inservice Test, IT-11, "Spent Fuel Pool Cooling Pumps", Revision 9, October 4, 1996.
2. Barton Model 200 Differential Pressure Indicator Instruction Manual
3. PBNP Instrumentation and Control Procedures ICP 4.19 Data Sheet 21, Revision 28, May 23, 1996.
4. "Process/Industrial Instruments and Controls Handbook", Fourth Edition, Douglas M. Considine, McGRAW-HILL, INC.
5. DG-I01 "Instrument Setpoint Methodology", Revision 1, September 12, 1995.
6. PBNP Instrumentation and Control Procedures ICP 8.9 Data Sheet 5, Revision 8, January 16, 1996.

C. Assumptions

1. The temperature effect on the instrumentation will be assumed to be negligible as the indicators are calibrated and used in essentially the same temperature environment.

2. The measuring and test equipment (M&TE) uncertainty for the flow instrument was calculated from uncertainties associated with test instruments which were used for calibration in the recent past. It is assumed that test instruments of similar accuracy are always used.

3. Uncertainties associated with drift of an instrument have been assumed to be equal to the calibration setting tolerance of the instrument. This assumption is based on a review of recent documentation of instrument calibrations which have shown that as-found values are typically within the tolerance allowed by the calibration procedure.

4. It is assumed that dial indicators can be read accurately to one-half of their smallest division/increment.

D. Inputs

The inservice test (IST) for the spent fuel pool pumps is performed per IT-11. The IST currently adjusts P-12A and P-12B differential pressure to 23 psid by throttling SF-11 and SF-12 respectively. The loop flow is recorded from FI-652 at the combined heat exchanger discharge to the spent fuel pool. [Reference 1]

For this calculation, the total uncertainty associated with the flow instrumentation (FI-652 & FE-652) used to perform the IST must be taken into account. Error contributors to this total uncertainty include:

- Instrument Accuracy
- Calibration Setting Tolerance
- Drift
- Indicator Readability
- M&TE Uncertainty

1. Instrument Uncertainties for FI-652 (discharge differential pressure flow indicator, Barton Model 200). The flow indicator has a range of 0-2700 gpm which corresponds to a full scale differential pressure input range of 0-200" H_2O. [Reference 3]

   a. Instrument accuracy; Performance specifications for the Barton Model 200 meter show an accuracy ±0.5% of full scale differential pressure (0-200" H_2O) [Reference 2]. FI-652 measures differential pressure, therefore the uncertainties given in Reference 2 are associated with the differential pressure reading. The following method was used to convert the uncertainty seen in the differential pressure reading to an uncertainty in flow.

   $Q = \text{Constant}\,(dP)^{1/2}$ (Equation 1, See Reference 5 - Appendix C)

   Q = Volumetric flow rate

   dP = Differential Pressure measured across the orifice

   Using Equation 1 recognizing that a dP of 200" is expected with a flow rate of 2700 gpm, solve for the constant:

   $2700\ \text{gpm} = \text{Constant}(200")^{1/2}$

   Constant = 190.92

   Uncertainty: 0.5% of full scale differential pressure (200") = ±1"

   The dP @ 2700 gpm plus uncertainty = 201"

   Using Equation 1 this dP corresponds to a flowrate of:

   $Q = 190.92(201")^{1/2} = 2706.8\ \text{gpm}$

   The corresponding uncertainty in gpm = 2706.8 gpm - 2700 gpm = ±6.8 gpm

b. Calibration Setting Tolerance; The as-left tolerance for the instrument is ±27 gpm. [Reference 3]
c. Drift; ± 27 gpm (See Assumption C.3)
d. Indicator Readability; The minor division of FI-652 is 20 gpm, therefore it will conservatively be assumed that the instrument can be read accurately to within ±10 gpm. (See Assumption C.4)
e. M&TE; Test instrument TI-206 was used to calibrate FI-652. The uncertainty associated with the test instrument TI-206 will be calculated via the SRSS method including the calibration instrument setting tolerance ±0.25" [Reference 6], assumed instrument accuracy of ±0.25", indicator readibility of ±0.01", and an M&TE of ±0.1% of range of TI-206 (0-250") or ± 0.25". (See Assumption C.2)

$$M\&TE = \pm\sqrt{(0.25")^2 + (0.25")^2 + (0.01")^2 + (0.25")^2}$$

$$M\&TE = \pm\ 0.43\ "$$

Following the process used in Section D.1.a, the uncertainty defined above is:

Uncertainty = 0.43"

The dP @ 2700 gpm plus uncertainty = 200" + 0.43" = 200.43"

Using Equation 1 this dP corresponds to a flowrate of:

$Q = 190.92(200.43")^{1/2} = 2703$ gpm

The corresponding uncertainty in gpm = 2703 gpm - 2700 gpm = ±3 gpm

2. Uncertainties for FE-652 (flow orifice associated with FI-652)
The nominal accuracy for a flow orifice is ±0.6% [Reference 4] of maximum flow (2700 gpm) or ± 16.2 gpm.

E. Calculation

1. The uncertainties of the instrumentation described in the input section will be combined using a systematic method established in Reference 5. Reference 5 also provides the basis for identifying, quantifying, and characterizing the error effects which must be considered in the development of an instrument uncertainty calculation. This methodology does not determine the maximum uncertainty possible, but rather determines the best estimate uncertainty. The best estimate or realistic approach combines independent and random uncertainties using the statistical square root sum of squares (SRSS) method. Non-random or directional uncertainties would be combined algebraically (straight sum) according to their sign with the results of the SRSS

computation. However, this calculation does not contain any directional uncertainties.

Total Uncertainty associated with FI-652 & FE-652 (see Sections D.1 & D.2)

$$U_{652} = \pm\sqrt{(6.8)^2 + (27)^2 + (27)^2 + (10)^2 + (3)^2 + (16.2)^2}$$

$$U_{652} = \pm 43.3 \text{ gpm}$$

F. Results

A best estimate total uncertainty associated with the flow instrumentation (FI-652 & FE-652) used for the performance of the spent fuel pool cooling pump inservice test (IT-11) was determined to be ± 43.3 gpm.

CR 96 - 416

OPERABILITY DETERMINATION

1. Degraded or potentially nonconforming equipment:

   Spent Fuel Pool Cooling Pumps (P-12 A & B)

2. Safety function(s) performed:

   The SFP cooling system is required to remove decay heat from the fuel assemblies stored in the SFP pool. The pumps are required to provide design flow to the SFP heat exchangers (HX-13A & B) so that they can remove the decay heat being generated in the pool..

3. Circumstances of potential nonconformance, including possible failure mechanisms:

   Condition Report 96-416 identified a potential concern for adequacy of the IST program to ensure that pumps meet design basis as well as ASME Section XI requirements. This evaluation supports determination of operability pending completion of detailed analysis.

4. Requirement or commitment established for the equipment, and why it may not be met:

   FSAR Section 9.3 Table 9.3-3 lists the design flow rate to the SFP heat exchangers as 1250 gpm, and the design rated flow of the pumps as 1250 gpm.

   FSAR Section 9.3 states that one train of SFP cooling is capable of removing 23.9 million btu/hour and maintaining SFP temperature at or below 145F.

   NRC SER Transmitted April 4, 1979 states " we agree with WEPCO that for any of the postulated accidents the SFP outlet temperature will not go above 145F. This is an acceptable temperature."

   The most limiting condition for the spent fuel pool cooling system is determined in calculation 96-090. This is with a full core offload of 23.9 million BTU/hr heat load and at a service water temperature of 75 F. Calculation 96-090 shows that, 1239.4 gpm SFP side flow with 75 F service water and 23.9 million btu/hr heat load in the pool is adequate to maintain pool temperature at or below 145F.

   IST acceptance criteria: P-12A, 1250 gpm at 22.82 psid to 25.03 psid,

   P-12B, 1250 gpm at 22.10 psid to 24.30 psid

   IST acceptance criteria may not be conservative when compared to design basis criteria.

5. How and when the potentially nonconforming equipment was first discovered:

   This generic concern was first identified in June 1996 as a specific concern for safety injection pump acceptance criteria from ASME Section XI versus design requirements

6. Basis for declaring affected equipment operable:

   The IST tests performed under IT-011 sets the required flow at 1250 gpm and measures the differential pressure developed. P-12A & B are both operating at 1250 gpm and within the ASME acceptance criteria for developed head (see attached data and pump curves). The pumps are tested at 1250 gpm while lined up from the pool through the heat exchanger and back to the pool. This is the normal lineup and the required lineup under worst case conditions of design core offload and maximum service water temperature. The IST testing shows that the pumps provide 1250 gpm of flow which is above the required calculated flow of 1239.4 gpm. The 1239.4 gpm of flow was derived from the heat exchanger data sheets which lists the required flow as 620,000 lb/hr. The test data indicates that the pumps meet the IST requirements and are above the design basis requirement of 1239.4 gpm and thus the pumps are determined to be operable.

   Note: the differential pressure or head developed is not critical in that as long as 1250 gpm is provided to the SFP heat exchangers the design basis has been met. The differential pressure determined by the test provides information to show if pump performance is degrading.

PUMP	TEST FLOW	RECENT TESTED DP	ASME XI ACTION RANGE

P12A	1250 gpm	24 psid	22.1 - 25.2 psid
P12B	1250 gpm	23 psid	21.4 - 24.5 psid

Prepared By: _____ Date: 10/1/96

Approved By: _____ Date: 10/1/96
RES Manager

Reviewed By: _____ Date: 10/1/96

PRESSURE TEST

Pump Reference Values and Limits

Pump#: P12B IT-011

Date Established: 6/25/91
Entered By:

Reference Values

Reference Pressure: 23.80 psig Flow: 1250.00 gpm

Reference Vibration	Motor End		Pump End	
Vertical:	.021 ips	Vertical:	.024 ips
Horizontal:	.040 ips	Horizontal:	.033 ips
Axial:	.028 ips		

Acceptable Range

Pressure: 22.10 psig to 24.30 psig

Vibration	Motor End		Pump End	
Vertical: ≤	.053 ips	Vertical: ≤	.060 ips
Horizontal: ≤	.100 ips	Horizontal: ≤	.083 ips
Axial: ≤	.070 ips		

Alert Range

Low Pressure: 21.40 psig to 22.10 psig
High Pressure: 24.30 psig to 24.50 psig

Vibration	Motor End		Pump End	
Vertical:	.053 ips to .126 ips	Vertical:	.060 ips to .144 ips
Horizontal:	.100 ips to .240 ips	Horizontal:	.083 ips to .198 ips
Axial:	.070 ips to .168 ips		

Required Action Range

Low Pressure: 21.40 psig
High Pressure: 24.50 psig

Vibration	Motor End		Pump End	
Vertical: >	.126 ips	Vertical: >	.144 ips
Horizontal: >	.240 ips	Horizontal: >	.198 ips
Axial: >	.168 ips		

Comment: VIBRATION CHANGED FROM DISPL TO VEL - BEARING TEMP. DELETED (REF PRR-7,8) 6/3/92. REF VALUES ESTABLISHED WITH P12A DISCH VALVE CLOSED

Pump: P12B

Test: 011

sure Test

		Vibrations (ips)						
Test Date	Diff P	Vert Inbd	Horz Inbd	Axial	Vert Outbd	Horz Outbd	Int	Remarks
11/10/95	24	.046	.070	.024	.036	.052	LEH	ROUTINE SURVEILLANCE
2/09/96	21	.039	.074	.037	.043	.061	LEH	ROUTINE SURVEILLANCE
3/21/96	24	.028	.030	.025	.019	.025	LEH	INCREASED FREQ, P12B
5/05/96	24	.039	.039	.044	.035	.040	LEH	ROUTINE SURVEILLANCE
8/07/96	23	.040	.041	.054	.030	.033	LRD	ROUTINE SURVEILLANCE

$$\frac{23\ PSID}{.43} = 53.4\ Ft_{H_2O}$$

PRESSURE TEST

Pump Reference Values and Limits

Date Established: 2/23/90

Pump#: P12A IT-011 Entered By:

Reference Values

Reference Pressure: 24.52 psig Flow: 1250.00 gpm

Reference Vibration	Motor End	Pump End
Vertical:	.030 ips	.022 ips
Horizontal:	.030 ips	.030 ips
Axial:	.046 ips	

Acceptable Range

Pressure: 22.82 psig to 25.03 psig

Vibration	Motor End	Pump End
Vertical: ≤	.075 ips	.055 ips
Horizontal: ≤	.075 ips	.075 ips
Axial: ≤	.115 ips	

Alert Range

Low Pressure: 22.10 psig to 22.82 psig

High Pressure: 25.03 psig to 25.20 psig

Vibration	Motor End	Pump End
Vertical:	.075 ips to .180 ips	.055 ips to .132 ips
Horizontal:	.075 ips to .180 ips	.075 ips to .180 ips
Axial:	.115 ips to .276 ips	

Required Action Range

Low Pressure: 22.10 psig

High Pressure: 25.20 psig

Vibration	Motor End	Pump End
Vertical: >	.180 ips	.132 ips
Horizontal: >	.180 ips	.180 ips
Axial: >	.276 ips	

Comment: VIBRATION CHANGED FROM DISPL TO VEL - BEARING TEMP. DELETED REF PRR-7,8) 6/3/92. DELTA P BASED ON P12B DISCHARGE VALVE CLOSED

Pump: P12A

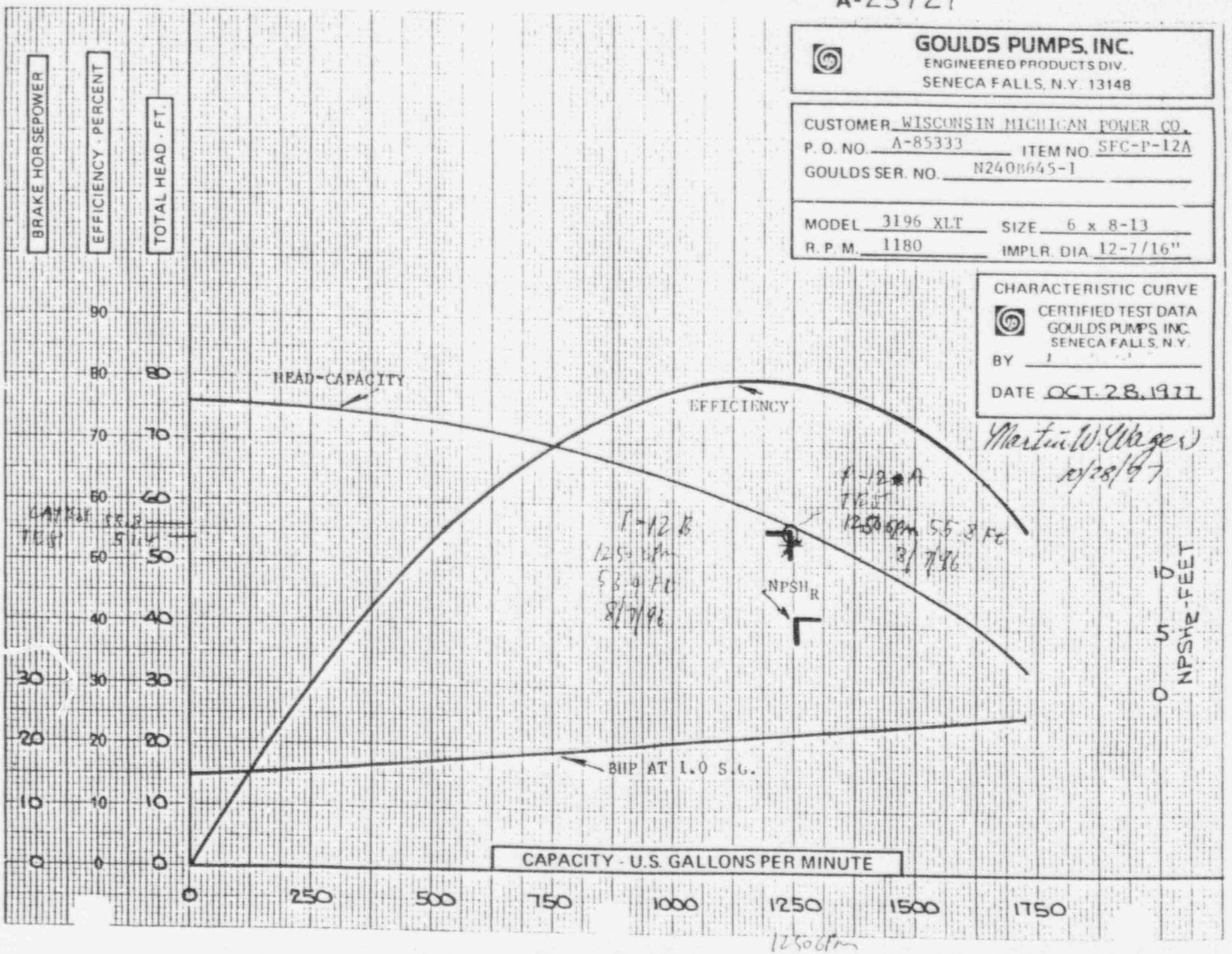
Test: 011

sure Test

		Vibrations (ips)						
Test Date	Diff P	Vert Inbd	Horz Inbd	Axial	Vert Outbd	Horz Outbd	Int	Remarks
8/07/96	24	.035	.035	.043	.031	.025	LRD	ROUTINE SURVEILLANCE

24 psid = 55.8 ft_{H_2O}

A-23721


GOULDS PUMPS, INC.
ENGINEERED PRODUCTS DIV.
SENECA FALLS, N.Y. 13148
CUSTOMER WISCONSIN MICHIGAN POWER CO.
P. O. NO. A-85333 ITEM NO. SFC-P-12A
GOULDS SER. NO. N240B645-1
MODEL 3196 XLT SIZE 6 x 8-13
R. P. M. 1180 IMPLR. DIA 12-7/16"
CHARACTERISTIC CURVE
CERTIFIED TEST DATA
GOULDS PUMPS, INC.
SENECA FALLS, N.Y.
BY
DATE OCT. 28, 1977
Martin W. Unger
10/28/77
BRAKE HORSEPOWER
EFFICIENCY - PERCENT
TOTAL HEAD - FT.
HEAD-CAPACITY
EFFICIENCY
BHP AT 1.0 S.G.
NPSH$_R$
NPSH - FEET
CAPACITY - U.S. GALLONS PER MINUTE
0
250
500
750
1000
1250
1500
1750
90
80
70
60
50
40
30
20
10
0

SPENT FUEL PIT COOLING

Safety Function:

The spent fuel pit cooling system is designed to provide long-term cooling for spent fuel and components in the pit.

NOTE: This system is included as a result of a past internal commitment. It does not necessarily reflect the IST scope definition presented in IWV-1100 or IWP-1100 since there is no specified accident (in the strict definition of the word) for which mitigation is required. The spent fuel pit cooling pumps are supplied electric power from an emergency source except that they do not automatically restart in the event of loss and recovery of the respective electric busses. Loss of cooling to the spent fuel pit generally does not present an acute problem. Assuming forced cooling is lost with an initial temperature of 120 °F and a complete reactor core stored in the pit (worst probable inventory conditions) 11.15 hours will elapse before complete SFP inventory boil-off occurs. (Ref. NEPB-86-479)

Components:

P-012A&B (110E018, Sh 4)
Spent Fuel Pit Cooling Water Pumps

These pumps circulate water from the spent fuel pits through the spent fuel pit heat exchangers to remove decay heat from fuel stored in the pits.

Test Requirement: IWP-3000

SF-00009A and 00010A (110E018, Sh 4)
Spent Fuel Pit Cooling Pump Discharge Check Valves

These valves open to provide flowpaths from the spent fuel pit cooling water pumps to the spent fuel pit heat exchanger and close to prevent reverse flow through an idle pump. In the event of excessive leakage through the valve associated with an idle pump, the result would be reduced cooling capacity of the operating system, potentially below the design minimum. Thus, these valves should be subjected to a functional leak test.

Test Requirement: CV-O CV-C SLT-B

CALCULATION 96-0185
ATTACHMENT 1 PAGE 1 OF 1

STONE & WEBSTER ENGINEERING CORPORATION
TUBULAR HEAT EXCHANGER DATA

1	Client	WISCONSIN MICHIGAN POWER COMPANY						
2	Project and Location	POINT BEACH NUCLEAR POWER PLANT-UNITS 1&2					Date 3-15-77	By RM
3	Service	SPENT FUEL POOL HEAT EXCHANGERS					Mark No SEC-HX-13A,B	
4	Horiz. Size 36-240		Vert. Type TEMA BEU ✓				Installation Horiz.	X
5	TWO Batteries Each Consisting of ONE		Parallel Banks of ONE		Shells in Series			
6	2946 Sq.Ft.per Shell	ONE	Shells per Battery 2946		Sq.Ft.per Battery			
7	PERFORMANCE OF ONE BATTERY							
8		SHELL SIDE				TUBE SIDE		
9	Fluid Circulated	SERVICE WATER (1)				SPENT FUEL POOL WATER (2)		
10	Total Fluid Entering	MW 620,000 ✓			lb/hr	MW 620,000 ✓		lb/hr
11	Vapor	MW			lb/hr	MW		lb/hr
12	Liquid	MW 620,000 ✓			lb/hr	MW		lb/hr
13	Steam				lb/hr	MW 620,000 ✓		lb/hr
14	Noncondensables	MW			lb/hr	MW		lb/hr
15	Density & Viscosity	62.23 lb/ft³ at	77	Fb .896	cP at 77 F	61.92 lb/ft³ at	108	Fb .625 cP at 108 F
16	Sp.Ht. & Bubble Point	1.0 at	77	Fb	F	1.0 at	108	Fb F
17	Therm. Conductivity	.351 BTU/hr-ft-F at	77		F	.367 BTU/hr-ft-F at	108	F
18	Therm. Cond. & Viscosity	BTU/hr-ft-F &		cP at	F	BTU/hr-ft-F &		cP at F
19	Sp.Ht. & Dew Point	at		Fb	F	at		Fb F
20	Fluid Vap. & Cond.	MW			lb/hr	MW		lb/hr
21	Steam Cond.				lb/hr			lb/hr
22	Latent Heat	BTU/lb at			F	BTU/lb at		F
23	Temp. In & Out	65 ✓ Fb		90 ✓	F	120 ✓ Fb		95 ✓ F
24	Operating Pressure	40			psig at sat. temp	25		psig at sat. temp
25	No. Passes & Velocity	1 &	2.904 ✓		ft/sec	2 &	2.942	ft/sec
26	Pressure Drop	Max 10 psi	Calc.	9.55	psi	Max 5 psi	Calc.	2.066 psi
27	Sensible Heat BTU/hr	15.5 x 10⁶				15.5 x 10⁶		
28								
29	Latent Heat BTU/hr							
30								
31	Total Duty BTU/hr	15.5 x 10⁶ ✓				15.5 x 10⁶		
32	Film Rates & Fouling Factors	h 892		f .0015 ✓		h 911		f .0005 ✓
33	LMTD 30.0 MTD corr. 26.13	Overall Btu/hr-ft²-F Clean 375.7		Service 212.2		Surface: Calculated 2795 ✓		sq.ft. Supplied 2946 sq.ft.
34		CONSTRUCTION						
35	Pressure Design & Test	100 psig		150 psig		150 psig		225 psig
36	Design Temp.	100 F				200 F		
37	Tubes: No. per Shell 375-U ✓	Length 240 (STR)		OD 3/4 ✓		BWG 20 ✓	Pitch 1.0 ✓	△ □ ◇
38	Materials: Tubes SA-688 TYPE 304 ✓	Shell C.S. SA-515-70				35	Thickness 5/8"	
39	Channel (Bonnet) SS304-SA240	Gasket 1/16" Compressed Asb.				Channel Cover		
40	Shell Cover C.S.SA515-70	Flange		Floating Head		Gasket		
41	Tube Sheets: Stationary SS304-SA240	Thick	Floating					Thick
42	Cross Baffles C.S. SA-36	Thick Type Segmental		No. 19	Cut 25% Vert.	Spacing 12.0"		
43	Long Baffles C.S. SA-36	Thick Type Impingement					No. One	
44	Tube Supports	Thick Type				Spacing		
45	Corrosion Allowance: Shell Side 1/8 on C.S.	Tube Side 0				Stress Relieved (SR)		Reinforcement (R)
46	Code Requirements ASME III, CL.3	TEMA Class R		Weight: Each Shell		Bundle Only	Pair of Baffles	
47	Nozzles	Shell: No.Size & Rating		Tube: No.Size & Rating		Sketch		
48	Inlet	8"-150#R.F.		8"-150# R.F.		See Drawing D-4714		
49	Outlet	8"-150#R.F.		8"-150# R.F.				
50	Drain	3/4"-3000# S.W.		3/4"-3000#S.W.				
51	Vent	3/4"-3000# S.W.		(2)3/4"-3000#S.W.				
52	R.V.	3/4"-150# R.F.						
53	Remarks: (1) Lake Michigan Water							
54	(2) Demineralized Water w/2000 PPM Boric							
55	acid PH 4.0 to 7.0							
56	(3) Tubes welded to tubesheets							
57	(4) Maximum Overall length is 24'-6 13/16"							
58	(5) Exchangers designed for 330F water							
59	on the shell side							
60	Revisions 1.	2.	3.					

ST-11-825

we

INTERNAL CORRESPONDENCE

PBM 97-0036

To:

From:

Date: January 17, 1997

Subject: NRC 96EC ACTION #40
U2R22 RESTART ITEM #10

Copy To:

File

A review of the IST stroke time acceptance criteria for all of the valves in the IST program has been completed. This review consisted of three phases as described below.

The first phase of the review was completed by NPTS, Inc. A list of all of the valves in the IST program was generated along with applicable preliminary design times. A total of 191 valves were listed for Unit 1 and common and 144 valves were listed for Unit 2. The source of the preliminary design time was also listed along with the current IST acceptance range. In cases in which a design time could not be found, the design time was assumed to be the same as what the original purchase order specification called out. The Unit 1 and common and Unit 2 valve lists are attached to this memo (Attachment 1). This completed the first phase of this project.

The second phase of this project involved comparing the preliminary valve design times with the current IST acceptance range and actual valve performance data. In some cases, the current IST acceptance criteria exceeded the preliminary design time but the actual valve performance was within the design time. In other cases, both the actual performance time of the valve and the IST acceptance criteria times exceeded the preliminary design time. None of the valves in this category had preliminary design time requirements from Tech Specs or the FSAR. In both of the above cases, further analysis of the valve design time was completed. All valves in which the preliminary design time was a stroke rate based on the valve diameter (i.e., 12"/minute) were also analyzed. There were 13 valves for Unit 2 in which the actual performance data and acceptance criteria exceeded the preliminary design time, 10 valves for Unit 2 had IST acceptance criteria which exceeded the preliminary design time but the actual valve performance was within the preliminary design time, and 12 valves for Unit 2 needed further analysis due to the preliminary design basis time being a stroke rate based on valve diameter. Two additional valves from Unit 1 which were not already included in the Unit 2 valve analysis were required to be analyzed due to the IST acceptance criteria exceeding the preliminary design basis time. Two common valves required further analysis due to the actual valve performance and acceptance criteria exceeding the preliminary design time.

The third phase of this project was to further evaluate the valves in which discrepancies were identified from phase two. This phase was completed by the design basis group with preliminary reviews by system engineering. A total of 86 valves including Unit 1, Unit 2 and common were evaluated to determine the stroke time performance requirement and basis. This number is greater than the total from the paragraph above due to some valves that were analyzed had similar functions to other valves in which there was not a discrepancy (i.e. MS-2015 has the same function as MS-2016 therefore design stroke times are equivalent). Attachment 2 is a list of the valves that were analyzed with the stroke time performance requirement and basis. Attachment 3 is a discussion of CIV closure times referenced in Attachment 2. The results from Attachment 2 were compared to the current IST acceptance criteria and the valves actual performance. The only required action generated from this list was to change the upper limit in the shut direction for valves 1/2SW-2880 to 16.5 seconds. This action has been completed. A condition report documenting the potential for these valves to exceed the design basis time is being submitted. Also discovered from this review was that RHR core deluge valve 1SI-852A had not been tested since 1994. This valve is supposed to be stroke tested every refueling outage. A condition report with action items to follow has been issued documenting this finding. All of the other valves identified from phase two are performing within the stroke time requirements and have IST acceptance criteria within the required stroke time.

The actions completed above should enable NRC commitment NRC 96EC Action #40 and Unit 2 restart issue U2R22 Restart Item #10 to be closed out. However, all of the valves in the IST program which were not further analyzed by the design basis group (phase 3) should be evaluated. This evaluation should be completed in order to prevent future questions if a valve would fall outside of its preliminary design time. This could occur due to normal valve degradation or valve maintenance. I strongly recommend that this effort continue.

cah

Attachments:

Attachment 1: Unit 1 and common, Unit 2 valve lists produced by NPTS, Inc
Attachment 2: Valves identified as potentially being outside of required design basis stroke times.
Attachment 3: DBD group response to Brad Fromm question on the basis for CIV closure times.

03:27 PM,
01/17/97

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
AF-00026	BT-C	MANUAL	6	NONE	NONE REQ'D	MANUAL	1P-29 Suction
AF-00039	BT-C	MANUAL	4	NONE	NONE REQ'D	MANUAL	1P-38A Suction
AF-00052	BT-C	MANUAL	4	NONE	NONE REQ'D	MANUAL	1P-38B Suction
AF-04000	BT-C	DBD Sec 4.5.1	3	15 Nom	17.7 - 24		1B S/G AFW Isolation
AF-04001	BT-C	DBD Sec 4.5.1	3	15 Nom	18.7 - 25.3		1A S/G AFW Isolation
AF-04002	BT-C	M-181	1	NONE	9.98 - 16.64	AIR	1P-29 Mini-flow
AF-04002	BT-O	M-181	1	NONE	1.4 - 4.19	AIR	1P-29 Mini-flow
AF-04006	BT-O	DBD 4.6.1	6	30 Nom	24.03 - 32.51		1P-29 Service Water Supply
AF-04007	BT-C	M-181	1	NONE	4.94 - 14.9	AIR	P-38A Mini-flow
AF-04007	BT-O	M-181	1	NONE	1.5 - 4.5	AIR	P-38A Mini-flow
AF-04009	BT-O	DBD Sec 4.6.1	4	30 Nom	24.88 - 33.66		P-38A Service Water Supply
AF-04012	BT-O	M-181	3	NONE	8.28 - 13.8	AIR	P-38A Pressure Control
AF-04014	BT-C	M-181	1	NONE	3.63 - 10.89	AIR	P-38B Mini-flow
AF-04014	BT-O	M-181	1	NONE	1.14 - 3.4	AIR	P-38B Mini-flow
AF-04016	BT-O	DBD Sec4.6.1	4	30 Nom	<40		P-38B Service Water Supply

Attachment 1

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
AF-04019	BT-O	M-181	3	NONE	4.46 - 13.4	AIR	P-38B Presssure Control
AF-04021	BT-C	DBD Sec 4.4.1	3	15 Nom 45 Max	16.01 - 21.65		AFW to 1A S/G
AF-04021	BT-O	DBD Sec 4.4.1	3	15 Nom 45 Max	15.84 - 21.44		AFW to 1A S/G
AF-04023	BT-C	DBD Sec 4.4.1	3	15 Nom 45 Max	15.62 - 21.14		AFW to 1A S/G
AF-04023	BT-O	DBD Sec 4.4.1	3	15 Nom 45 Max	15.55 - 21.02		AFW to 1A S/G
CC-00719	BT-C	DBD Sec 3.8.1 & G676258	6	<= 10 & 10 to 120 O/C	8.86 - 11.98		Containment CCW Supply
CC-00738A	BT-O	DBD Sec 3.8.1 & G676258	10	<= 120 & 120/120 OC	44.46 - 60.16		RHR Cooling Water Supply
CC-00738B	BT-O	DBD Sec 3.8.1 & G676258	10	<= 120 & 120/120 OC	43.88 - 59.36		RHR Cooling Water Supply
CC-00754A	BT-C	DBD Sec 3.8.1 & G676258	4	<= 10 & 10/10 O/C	6.7 - 11.18		RCP Cooling Water Supply
CC-00754B	BT-C	DBD Sec 3.8.1 & G676258	4	<= 10 & 10/10 O/C	6.82 - 11.36		RCP Cooling Water Supply
CC-00759A	BT-C	DBD Sec 3.8.1 & G676258 Page 7/20 #	4	<= 10 & 10/10 C/O 60 Sec Max	7.15 - 11.91		RCP Cooling Water Return
CC-00759B	BT-C	DBD Sec 3.8.1 & G676258 Page 7/20 #	4	<= 10 & 10/10 C/O 60 Sec Max	7.27 - 12.11		RCP Cooling Water Return
CC-00769	BT-C	W 676270 / DBD-02 #	2	NONE / No Time	4.5	AIR	Excess Letdown HX Clg Wtr Supply

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
CCW-LW-63	BT-C	PB Spec 540 / DBD-02	6	< 10 Sec / 10	1.62 - 4.85	AIR	CCW Supply to Radwaste
CCW-LW-64	BT-C	PB Spec 540 / DBD-02	6	< 10 Sec / 10	1.63 - 4.89	AIR	CCW Supply to Radwaste
CV-00112B	BT-O	DBD Sec 3.35.1 & G676258	4	10 & 10/10 O/C	7.4 - 12.34		RWST to Charging Pump
CV-00112C	BT-C	DBD Sec 3.35.1 & G676258	4	10 & 10/10 O/C	7.27 - 12.11		VCT to Charging Pump
CV-00142	BT-O	W 676270 Page 6/30 Modulalting Valve	3	NONE	2.1 - 6.3	AIR	Charging Flow Control
CV-00313	BT-C	W 676258 #	3	10/10 O/C	10.17 - 13.77		RCP Seal Water Return
CV-00313A	BT-C	WE Spec 109 Appx A #	3	Open 10 Max - Close 5 Max	9.83 - 16.39	AIR	RCP Seal Water Return
CV-00350	BT-O	W 676258	2	10/10 O/C	7.12 - 11.86		Emergency Boration
CV-00371	BT-C	W 676270 Page 5/30 #	2	NONE	0 - 2	AIR	RCS Letdown Isolaltion
CV-00371A	BT-C	WE Spec 109 Appx A #	2	Open 10 Max - Close 5 Max	OP 4.54 - 13.64 CL 4 - 12.02	AIR	RCS Letdown Isolation
CV-01296	BT-C	W 676279 Page 5/30 #	2	NONE	2	AIR	Aux Charging Isolaltion
CV-01296	BT-O	W 676279 Page 5/30 #	2	NONE	2	AIR	Aux Charging Isolaltion
DA-03057A	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	AIR	EDG Starting Valve

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
DA-03057B	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	AIR	EDG Starting Valve
DA-03058A	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	AIR	EDG Starting Valve
DA-03058B	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	AIR	EDG Starting Valve
DA-06316A	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Start Air Relay
DA-06316B	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Start Air Relay
DA-06317A	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Start Air Relay
DA-06317B	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Start Air Relay
DA-06318A-S	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Starting Motor Pinion Engage
DA-06318B-S	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Starting Motor Pinion Engage
DA-06319A-S	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Starting Motor Pinion Engage
DA-06319B-S	BT-O	No individual valve test - VRR 17 & 25	0.375	NONE	NONE	SOLENOID	EDG Starting Motor Pinion Engage
DA-06356A	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-03 South Bank Pressure Regulator

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
DA-06356B	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-03 North Bank Pressure Regulator
DA-06357A	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-04 South Bank Pressure Regulator
DA-06357B	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-04 North Bank Pressure Regulator
DA-06364A	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-03 South Bank Starting Air Starter
DA-06364B	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-03 North Bank Starting Air Starter
DA-06365A	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-04 South Bank Starting Air Starter
DA-06365B	BT-O	No individual valve test - VRR 17 & 25		NONE	NONE	SKID	G-04 North Bank Starting Air Starter
FO-03930	BT-C	M-91	1	No Time	6.85 - 11.41		EDG Day Tank T31A Inlet
FO-03930	BT-O	M-91	1	No Time	7.56 - 12.6		EDG Day Tank T31A Inlet
FO-03931	BT-C	M-91	1	No Time	6.38 - 10.64		EDG Day Tank T31B Inlet
FO-03931	BT-O	M-91	1	No Time	6.65 - 11.09		EDG Day Tank T31B Inlet
H2-V-04	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Purge Discharge
H2-V-05	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Purge Discharge

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
H2-V-12	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Service Air Supply
H2-V-13	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Service Air Supply
H2-V-19	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Alternate Vent
H2-V-20	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Alternate Vent
H2-V-22	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Supply Drain
H2-V-23	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post-Accident Supply Drain
IA-03047	BT-C	DBD Sec 3.7.3 #	2	~ 5	.94 - 2.82	AIR	Instrument Air to Containment
IA-03048	BT-C	DBD Sec 3.7.3 #	2	~ 5	1.11 - 3.65	AIR	Instrument Air to Containment
IA-06310	BT-EE	No Stroke Time Req's - BT-EE	0.25	NONE	NONE REQ'D	NO TIME	PORV 430 Nitrogen Supply Regulator
IA-06311	BT-EE	No Stroke Time Req's - BT-EE	0.25	NONE	NONE REQ'D	NO TIME	PORV 431C Nitrogen Supply Regulator
MS-02015	BT-C	WE PB-584	6	30	20.65 - 34.41	AIR	Main Steam Atmospheric Steam Dump
MS-02015	BT-O	WE PB-584	6	30	4.06 - 12.18	AIR	Main Steam Atmospheric Steam Dump
MS-02016	BT-C	WE PB-584	6	30	16.39 - 27.31	AIR	Main Steam Atmospheric Steam Dump

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
MS-02016	BT-O	WE PB-584	6	30	4.38 - 13.12	AIR	Main Steam Atmospheric Steam Dump
MS-02017	BT-C	M-87 Spec 5.6.1 #	30	<= 4	5	AIR	Main Steam Isolation
MS-02017A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02018	BT-C	M-87 Spec 5.6.1 #	30	<= 4	5	AIR	Main Steam Isolation
MS-02018A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02019	BT-O	DBD Sec 4.7.1 Op ~ 50, DB Close Unknown	3	21 Nom	18.27 - 24.71		AFW Steam Supply
MS-02019	BT-C	DBD Sec 4.7.1 Op ~ 50, DB Close Unknown	3	21 Nom	18.59 - 25.15		AFW Steam Supply

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
MS-02020	BT-O, BT-C	DBD Sec 4.7.1 Op ~ 50, DB Close Unknown	3	21 Nom	19.06 - 25.78		AFW Steam Supply
MS-02020	BT-C	DBD Sec 4.7.1 Op ~ 50, DB Close Unknown	3	21 Nom	19.51 - 26.39		AFW Steam Supply
MS-02082	BT-C	(TURBINE OVERSPEED TRIP)	3	NONE	NONE		Main Steam to AFW Pump
MS-02083	BT-C	M-181 #	0.75	NONE	0-2	AIR	S/G Sample Isolation
MS-02084	BT-C	M-181 #	0.75	NONE	0-2	AIR	S/G Sample Isolation
MS-02090	BT-O	DBD Sec 4.15.2 Open Max 2	1	0-2	0-2	AIR	SW to AFW Pump P-029
MS-05958	BT-C	WE Spec 109, Appx A #	2	5 MAX	15	AIR	S//G Blowdown Isolation
MS-05959	BT-C	WE Spec 109, Appx A #	2	5 MAX	15	AIR	S//G Blowdown Isolation
RC-00430	BT-C	W 676270	2	NONE	0 - 2.3	AIR	Power Operated Relief
RC-00430	BT-O	W 676270	2	NONE	0 - 2.3	AIR	Power Operated Relief
RC-00431C	BT-C	W 676270	2	NONE	0 - 2.3	AIR	Power Operated Relief
RC-00431C	BT-O	W 676270	2	NONE	0 - 2.3	AIR	Power Operated Relief
RC-00508	BT-C	DBD Sec 4.8.4 #	2	<= 15	3.06 - 9.18	AIR	PRT Fill Line Isolation
RC-00515	BT-C	DBD Sec 4.14.4	3	120	15.32 - 20.72		PORV Block Valve

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
RC-00516	BT-C	DBD Sec 4.14.4	3	120	15.36 - 20.78		PORV Block Valve
RC-00538	BT-C	DBD Sec 4.10.4 #	0.375	<= 15	3.58 - 10.76	AIR	PRT Sample
RC-00539	BT-C	DBD Sec 4.10.4 #	0.375	<= 15	4.74 - 14.24	AIR	PRT Sample
RC-00570A	BT-O	SOLENOID	1	NONE	NONE	SOLENOID	RX Vessel Vent
RC-00570B	BT-O	SOLENOID	1	NONE	NONE	SOLENOID	RX Vessel Vent
RC-00575A	BT-O	SOLENOID	1	NONE	NONE	SOLENOID	RX Vess/Pressurizer Vent
RC-00575B	BT-O	SOLENOID	1	NONE	NONE	SOLENOID	RX Vess/Pressurizer Vent
RC-00580A	BT-O	SOLENOID	1	NONE	NONE	SOLENOID	Pressurizer Vent
RC-00580B	BT-O	SOLENOID	1	NONE	NONE	SOLENOID	Pressurizer Vent
RC-00595	BT-C	MANUAL #	0.75	NONE	NONE	MANUAL	PRT Nitrogen Supply
RH-00700	BT-C	W 676258	10	120	8.69 - 11.75		RHR Loop Isolation
RH-00700	BT-O	W 676258	10	120	8.98 - 12.16		RHR Loop Isolation
RH-00701	BT-C	W 676258 #	10	120	88.54 - 119-78		RHR Loop Isolation
RH-00701	BT-O	W 676258 #	10	120	92.4 - 125.01		RHR Loop Isolation

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
RH-00704A	BT-C	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00704A	BT-O	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00704B	BT-C	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00704B	BT-O	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00720	BT-C	W 676258 #	10	120	92.78 - 125.52		RHR Rerurn to RCS
RH-00720	BT-O	W 676258 #	10	120	96.17 - 130.11		RHR Rerurn to RCS
RM-03200A	BT-C	M-181 #	1	NONE	4.5	AIR	Containment Atmosphere Sample Return
RM-03200B	BT-C	M-181 #	1	NONE	4.5	AIR	Containment Atmosphere Sample Supply
RM-03200C	BT-C	M-181 #	1	NONE	4.5	AIR	Containment Atmosphere Sample Supply
RS-SA-09	BT-C	AIR	3	NONE	4.07 - 12.21	AIR	Radwaste Steam Supply
SC-00951	BT-C	W 676270 #	0.375	NONE	10.27 - 17.12	AIR	Pressurizer Steam Sample
SC-00953	BT-C	W 676270 #	0.375	NONE	3.32 - 9.94	AIR	Pressurizer Liquid Sample
SC-00955	BT-C	W 676270 #	0.375	NONE	3.54 - 10.64	AIR	Hot Leg Sample

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
SC-00959	BT-C	W 676270	0.375	NONE	8.24 - 13.73	AIR	RHR Sample
SC-00966A	BT-C	W 676270 #	0.375	NONE	3.09 - 9.27	AIR	Pressurizer Steam Sample
SC-00966B	BT-C	W 676270 #	0.375	NONE	3.78 - 11.34	AIR	Pressurizer Liquid Sample
SC-00966C	BT-C	W 676270 #	0.375	NONE	3.96 - 11.88	AIR	Hot Leg Sample
SI-00834A	BT-C	W 676270	1	NONE	0-2	AIR	SIS Accumulator Vent
SI-00834A	BT-O	W 676270	1	NONE	0-2	AIR	SIS Accumulator Vent
SI-00834B	BT-C	W 676270	1	NONE	0-2	AIR	SIS Accumulator Vent
SI-00834B	BT-O	W 676270	1	NONE	0-2	AIR	SIS Accumulator Vent
SI-00836A	BT-O		2	NONE	9.23 - 15.39	AIR	NaOH Supply
SI-00836B	BT-O		2	NONE	8.52 - 14.2	AIR	NaOH Supply
SI-00841A	BT-C	W 676258	10	1"/SECOND	8 62 - 11.66		SIS Accumulator Discharge
SI-00841B	BT-C	W 676258	10	1"/SECOND	9.08 - 12.28		SIS Accumulator Discharge
SI-00846	BT-C	W 676270 #	1	NONE	0-2	AIR	Accumulator Nitrogen Supply
SI-00850A	BT-C	W 676258 **Revised Design Time**	10	NONE	3.28 - 9.84		Containment Sump Hydraulic Isolation

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
SI-00850A	BT-O	W 676258 **Revised Design Time**	10	NONE	3.28 - 9.84		Containn ent Sump Hydraul:c Isolation
SI-00850B	BT-C	W 676258 **Revised Design Time**	10	NONE	3.12 - 9.35		Containment Sump Hydraulic Isolation
SI-00850B	BT-O	W 676258 **Revised Design Time**	10	NONE	2.98 - 8.93		Containment Sump Hydraulic Isolation
SI-00851A	BT-C	W 676258 Page 15 Rev 3#	10	10/10 O/C	88.02 - 119.08		Containment Sump Isolation
SI-00851A	BT-O	W 676258 Page 15 Rev 3#	10	10/10 O/C	88.63 - 119.91		Containment Sump Isolation
SI-00851B	BT-C	W 676258 Page 15 Rev 3#	10	10/10 O/C	86.55 - 117.09		Containment Sump Isolation
SI-00851B	BT-O	W 676258 Page 15 Rev 3#	10	10/10 O/C	88.59 - 119.85		Containment Sump Isolation
SI-00852A	BT-C	W 676258 Page 15 Rev 3#	6	10/10 O/C	7.18 - 11.98		RHR Low Head Core Deluge
SI-00852A	BT-O	W 676258 Page 15 Rev 3#	6	10/10 O/C	7.43 - 12.39		RHR Low Head Core Deluge
SI-00852B	BT-C	W 676258 Page 15 Rev 3#	6	10/10 O/C	7.12 - 11.88		RHR Low Head Core Deluge
SI-00852B	BT-O	W 676258 Page 15 Rev 3#	6	10/10 O/C	7.45 - 12.41		RHR Low Head Core Deluge
SI-00856A	BT-C	W 676258 Rev 2 Page 16	10	12"/Minute O/C	90.42 - 120		RHR Pump Suction
SI-00856B	BT-C	W 676258 Rev 2 Page 16	10	12"/Minute O/C	87.55 - 118.45		RHR Pump Suction
SI-00857A	BT-O	MANUAL G676258	6	10/120 O/C	NONE REQ'D	MANUAL	RHR to SIS Pump Suction

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
SI-00857B	BT-O	MANUAL G676258	6	10/120 O/C	NONE REQ'D	MANUAL	RHR to SIS Pump Suction
SI-00860A	BT-O	W 676258 Rev 2 Page 18	6	1"/Second	9.69 - 13.11		CS Pump 1-P14A Discharge
SI-00860B	BT-O	W 676258 Rev 2 Page 18	6	1"/Second	9.78 - 13.22		CS Pump 1-P14A Discharge
SI-00860C	BT-O	W 676258 Rev 2 Page 18	6	1"/Second	10.24 - 13.86		CS Pump 1-P14B Discharge
SI-00860D	BT-O	W 676258 Rev 2 Page 18	6	1"/Second	9.84 - 13.32		CS Pump 1-P14B Discharge
SI-00866A	BT-C	W 676258 #	4	12"/MINUTE	47.06 - 65.02		SIS Pump Discharge
SI-00866A	BT-O	W 676258 #	4	12"/MINUTE	48.3 - 65.34		SIS Pump Discharge
SI-00866B	BT-C	W 676258 #	4	12"/MINUTE	48.45 - 65.55		SIS Pump Discharge
SI-00866B	BT-O	W 676258 #	4	12"/MINUTE	49.3 - 66.7		SIS Pump Discharge
SI-00870A	BT-C	W 676258	6	12"/MINUTE	8.64 - 11.7		RWST to CS Pump P14A
SI-00870A	BT-O	W 676258	6	12"/MINUTE	8.86 - 11.98		RWST to CS Pump P14A
SI-00870B	BT-C	W 676258	6	12"/MINUTE	8.92 - 12.06		RWST to CS Pump P14B
SI-00870B	BT-O	W 676258	6	12"/MINUTE	8.95 - 12.11		RWST to CS Pump P14B
SI-00871A	BT-C	W 676258	6	12"/MINUTE	7.38 - 12.3		RHR to CS Pump 14A

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
SI-00871A	BT-O	W 676258	6	12"/MINUTE	8.63 - 11.67		RHR to CS Pump 14A
SI-00871B	BT-C	W 676258	6	12"/MINUTE	7.37 - 12.29		RHR to CS Pump 14B
SI-00871B	BT-O	W 676258	6	12"/MINUTE	7.39 - 12.31		RHR to CS Pump 14B
SI-00878A	BT-C	W 676258	2	10	6.23 - 10.39		RX Vessel Safety Injection
SI-00878A	BT-O	W 676258	2	10	7.04 - 11.76		RX Vessel Safety Injection
SI-00878B	BT-C	W 676258	2	10	6.76 - 11.27		SIS Loop Injection
SI-00878B	BT-O	W 676258	2	10	8.51 - 11.51		SIS Loop Injection
SI-00878C	BT-C	W 676258	2	10	6.5 - 10.82		RX Vessel Safety Injection
SI-00878C	BT-O	W 676258	2	10	6.65 - 11.09		RX Vessel Safety Injection
SI-00878D	BT-C	W 676258	2	10	6.91 - 11.51		SIS Loop Injection
SI-00878D	BT-O	W 676258	2	10	7.26 - 12.1		SIS Loop Injection
SI-00896A	BT-C	W 676258 Rev 2 Page 20	6	12"/MINUTE	8.92 - 12.06		SIS Pump Suction
SI-00896B	BT-C	W 676258 Rev 2 Page 20	6	12"/MINUTE	9.35 - 12.65		SIS Pump Suction
SI-00897A	BT-C	W 676270	2	NONE	.9 - 2.72	AIR	SIS Test Line Return
SI-00897B	BT-C	W 676270	2	NONE	1.19 - 3.57	AIR	SIS Test Line Return

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
SI-00957	BT-C	W 676270	1	NONE	10.58 - 17.64	AIR	N2 Supply Vent/Relief
SI-00957	BT-O	W 676270	1	NONE	2 - 6	AIR	N2 Supply Vent/Relief
SW-00286	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW 1HX-12A Inlet
SW-00290	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW HX-12C Inlet
SW-00296	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW 2HX-12D Inlet
SW-00307	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW 2HX-12D Outlet
SW-00315	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW HX-12C Outlet
SW-00322	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW 1HX-12A Outlet
SW-00346	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW HX-12B Inlet
SW-00360	BT-O	MANUAL	12	NONE	NONE	MANUAL	CCW HX-12B Outlet
SW-02816	BT-C	DBD Sec 4.12.2	6	30 Nom	21.34 - 28.88		Service Bldg HVAC Cooling Isolation
SW-02818	BT-O	DBD Sec 4.8.2	3	15	< 35.96		Cable Spreading Room Cooler Supply
SW-02819	BT-O	DBD Sec 4.8.2	3	15	<36.24		Control Room Cooler Supply
SW-02838	BT-O	DBD 4.13.2	4	None Established	1.42 - 4.23	AIR	G02 EDG HX Outlet
SW-02839	BT-O	DBD 4.13.2	4	None Established	1.39 - 4.17	AIR	G01 EDG HX Outlet

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
SW-02869	BT-C	DBD 4.10.2 (48.79 - 66.01 Open)	14	60 Nom	49.21 - 66.57		SW Header (West) Isolation
SW-02870	BT-C	DBD 4.10.2 (49.78 - 67.A34 Open)	14	60 Nom	49.92 - 67.54		SW Header (West) Isolation
SW-02880	BT-C	DBD 4.11.3 (12.68 - 17.16 Open)	6	15 Nom	12.65 - 17.11		Turb Hall Coolers Inlet
SW-02890	BT-C	DBD 4.7.1 (65.22 - 88.24 Open)	24	80 Nom	65.35 - 88.41		SW Header Cross-tie
SW-02891	BT-C	DBD 4.7.1 (63.07 - 85.32 Open)	24	80 Nom	63.12 - 85.4		SW Header Cross-tie
SW-02907	BT-O	DBD Sec 4.9.3	12	30 Nom	23.61 - 31.95		Containment Cooling Emerg Flow
SW-02908	BT-O	DBD Sec 4.9.3	12	30 Nom	23.66 - 32.02		Containment Cooling Emerg Flow
SW-02930A	BT-C	DBD Sec 4.12.2	8	Not Spec	14.44 - 19.54		SFP Cooler Supply
SW-02930B	BT-C	DBD Sec 4.12.2	8	Not Spec	16.2 - 21.02		SFP Cooler Supply
SW-LW-61	BT-C	S&W PBS-18 Page 17/33	8	NONE	2.76 - 8.3	AIR	BDE/Vent Cond Inlet
SW-LW-62	BT-C	S&W PBS-18 Page 17/33	8	NONE	3.48 - 10.42	AIR	BDE/Vent Cond Outlet
VNPSE-03212	BT-C	DBD 3.17.2 #	36	10 Nom	10	AIR	Containment Purge Exhaust
VNPSE-03213	BT-C	DBD 3.17.2 #	36	10 Nom	10	AIR	Containment Purge Exhaust
VNPSE-03244	BT-C	DBD 3.17.2 #	36	10 Nom	10	AIR	Containmemt Purge Supply

UNIT 1 AND COMMON VALVES WITH STROKE TIMES

After re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	ISI TIME	SPECIAL	FUNCTION
VNPSE-03245	BT-C	DBD 3.17.2 #	36	10 Nom	10	AIR	Containmemt Purge Supply
WG-01786	BT-C	W 676270 #	1	NONE	4.68 - 14.06	AIR	RCDT Vent
WG-01787	BT-C	W 676270 #	1	NONE	4.42 - 13.26	AIR	RCDT Vent
WG-01788	BT-C	W 676270 #	0.75	NONE	2.62 - 7.86	AIR	RCDT Sample
WG-01789	BT-C	W 676270 #	0.75	NONE	2.2 - 6.6	AIR	RCDT Sample
WL-01003A	BT-C	W 676270 #	3	NONE	15.89 - 26.49	AIR	RCDT Pump Suction
WL-01003B	BT-C	W 676270 #	3	NONE	15.52 - 25.88	AIR	RCDT Pump Suction
WL-01698	BT-C	W 676270 #	2	NONE	1.48 - 4.46	AIR	RCDT to 19' Sump
WL-01721	BT-C	W 676270 #	3	NONE	23.71 - 39.51	AIR	RCDT Pumps Suction Control
WL-01723	BT-C	W 676270 #	3	NONE	15.15 - 25.85	AIR	Cont Sump Drain
WL-01728	BT-C	W 676270 #	3	NONE	14.27 - 23.79	AIR	Cont Sump Drain

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
AF-00064	BT-C	MANUAL VALVE	6	NONE	NONE	MANUAL	2P-29 Suction
AF-04000	BT-C	DBD	3	15 NOM	16.34 - 22.13		2B S/G AFW Isol
AF-04001	BT-C	DBD	3	15 NOM	17 - 21		2A S/G SFW Isol
AF-04002	BT-C	M181	1	NONE	4.17-12.5	AOV	2P-29 Mini-flow
AF-04002	BT-O	M181	1	NONE	1.49-4.47	AOV	2P-29 Mini-flow
AF-04006	BT-O	DBD	6	30 N	27.06-36.6		2P-29 Ser Wtr Sup
AF-04020	BT-C	DBD	3	15-45	16.15-21.85		AFW TO 2B S/G
AF-04020	BT-O	DBD	3	15-45	15.67-21.21		AFW TO 2B S/G
AF-04022	BT-C	DBD	3	15-45	15.76-21-32		AFW TO 2A S/G
AF-04022	BT-O	DBD	3	15-45	15.27-20.67		AFW TO 2A S/G
CC-00719	BT-C	DBD & G676258	6	<=10 &10 to 120 O/C	9.34-12.64		Cont CCW Sup
CC-00738A	BT-O	DBD & G676258	10	<=10 &10 to 120 O/C	44.88-60.72		RHR Cooling Wtr Sup
CC-00738B	BT-O	DBD & G676258	10	<=10 &10 to 120 O/C	45.67-61.79		RHR Cooling Wtr Sup
CC-00754A	BT-C	DBD & W676258 p5/17	4	<=10 & 10/10 O/C	6.38-10.62		RCP Clg Water Sup
CC-00754B	BT-C	DBD & W676258 p5/17	4	<=10 & 10/10 O/C	7.39-12.31		RCP Clg Water Sup
CC-00759A	BT-C	DBD #	4	<=10	6.93-11.55		RCP Clg Water Ret

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
CC-00759B	BT-C	DBD #	4	<=10	6.64-11.08		RCP Clg Water Ret
CC-00769	BT-C	W676270 p12/30 #	2	NONE	4.5	AOV	Ex LD HX Clg Wtr Ret
CV-00112B	BT-O	DBD & G676258	4	10 & 10/10 O/C	7.13-11.89		RWST to Chg Pump
CV-00112C	BT-C	DBD & G676258	4	10 & 10/10 O/C	7.21-12.01		VCT to Chg Pump
CV-00142	BT-O	W676270 p6/30	3	AIR MODULATIN G	1.84-5.54	AOV	Charging Flow Cont
CV-00313	BT-C	W6762598 #	3	10/10 O/C	10.09-13.65		RCP Seal Wtr Ret
CV-00313A	BT-C	WE SPEC109 Appx-A OPEN 10max #	4	5 max	9.52-15.88	AOV	RCP Seal Wtr Ret
CV-00350	BT-O	W676258 p2/17	2	10/10 O/C	7.38-12.3		Emerg Boration
CV-00371	BT-C	W676270 p5/30 #	2	NONE	0-2	AOV	RCS Letdown Iso
CV-00371A	BT-C	WE Spec109 Appx-A OPEN 10 max #	2	5 max	8.62-14.38	AOV	RCS Letdown Iso
CV-01296	BT-C	W676270 p5/30 #	2	NONE	.99 - 2.97	AOV	Aux Charging Isolation
CV-01296	BT-O	W676270 p5/30 #	2	NONE	.82 - 2.46	AOV	Aux Charging Isolation
H2-V-04	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Purge Disch
H2-V-05	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Purge Disch

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
H2-V-12	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Svc Air Sup
H2-V-13	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Svc Air Sup
H2-V-19	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Alt Vent
H2-V-20	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Alt Vent
H2-V-22	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Sup Drain
H2-V-23	BT-O	MANUAL #	2	NONE	NONE	MANUAL	Post Accident Sup Drain
IA-03047	BT-C	DBD #	2	~5	1.18-3.56	AOV	Inst Air to Cont
IA-03048	BT-C	DBD #	2	~5	1.06-3.24	AOV	Inst Air to Cont
IA-06342	BT-EE	NO TIMING REQUIRED	0.25	NO TIME	NO TIME	NO TIME	PORV 430 Nit Sup Reg
IA-06343	BT-EE	NO TIMING REQUIRED	0.25	NO TIME	NO TIME	NO TIME	PORV 431C Nit Sup Reg
MS-02015	BT-C	WE PB-584	6	NONE	20.48-34.14	AOV	MS Atmos Stm Dump
MS-02015	BT-O	WE PB-584	6	NONE	4.55-13.65	AOV	MS Atmos Stm Dump
MS-02016	BT-C	WE PB-584	6	NONE	20.48-34.12	AOV	MS Atmos Stm Dump
MS-02016	BT-O	WE PB-584	6	NONE	8.09-13.49	AOV	MS Atmos Stm Dump
MS-02017	BT-C	M-87 & TS 14.4.7 #	30	4 & 5	5	AOV	Main Steam Isolation
MS-02017A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
MS-02017A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot
MS-02017D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2017 Air Pilot

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
MS-02018	BT-C	M-87 & TS 15.4.7 #	30	4 & 5	5	AOV	Main Steam Isolation
MS-02018A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018A-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018B-S	BT-PV	SOLENOID	0.75	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018C-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02018D-S	BT-PV	SOLENOID	1	NONE	NONE	SOLENOID	MSIV 2018 Air Pilot
MS-02019	BT-C	DBD & M-91	3	UNK &15	19.01-25.73		AFW Steam Supply

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
MS-02019	BT-O	DBD	3	21 NOM, 50 MAX	20.28-27.44		AFW Steam Supply
MS-02020	BT-C	DBD & M-91	3	UNK & 15	NONE		AFW Steam Supply
MS-02020	BT-O	DBD	3	21 NOM, 50 MAX	30		AFW Steam Supply
MS-02082	BT-C	(AUX FEED TURB OVERSPEED TRIP)	3	NONE	NONE		Main Steam to AFW Pump
MS-02083	BT-C	M-181 #	0.75	NONE	1.86-5.56	AOV	S/G Sample Isol
MS-02084	BT-C	M-181 #	3	NONE	1.02-3.06		SG Sample Isolation
MS-02090	BT-O	DBD	1	2 MAX	0-2	AOV	SW to AFW Pump P-029
MS-05958	BT-C	WE SP-109 #	2	5 MAX	2.76-8.28	AOV	S/G Blowdown Isolation
MS-05959	BT-C	WE SP-109 #	2	5 MAX	2.64-7.94	AOV	S/G Blowdown Isolation
RC-00430	BT-C	W676270 p1/30	2	NONE	0-2	AOV	Power Operated Relief
RC-00430	BT-O	W676270 p1/30	2	NONE	0-2	AOV	Power Operated Relief
RC-00431C	BT-C	W676270 p1/30	2	NONE	0-2.3	AOV	Power Operated Relief
RC-00431C	BT-O	W676270 p1/30	2	NONE	0-2.3	AOV	Power Operated Relief
RC-00508	BT-C	DBD #	2	<= 15	2.67-8.01	AOV	PRT Fill Line Iso
RC-00515	BT-C	DBD & G676258	3	120 & 120/120 O/C	15.85-21.45		PORV Block Valve
RC-00516	BT-C	DBD & G676258	3	120 & 120/120 O/C	18.81-25.45		PORV Block Valve

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
RC-00538	BT-C	DBD #	0.375	<= 15	4.03-12.08	AOV	PRT Sample
RC-00539	BT-C	DBD #	0.375	<= 15	15	AOV	PRT Sample
RC-00570A	BT-O	SOLENOID	1	NONE	0 - 2	SOLENOID	RX Vessel Vent
RC-00570B	BT-O	SOLENOID	1	NONE	0 - 2	SOLENOID	RX Vessel Vent
RC-00575A	BT-O	SOLENOID	1	NONE	0 - 2	SOLENOID	RX Vess/Press Vent
RC-00575B	BT-O	SOLENOID	1	NONE	0 - 2	SOLENOID	RX Vess/Press Vent
RC-00580A	BT-O	SOLENOID	1	NONE	0 - 2	SOLENOID	Pressurizer Vent
RC-00580B	BT-O	SOLENOID	1	NONE	0 - 2	SOLENOID	Pressurizer Vent
RC-00595	BT-C	MANUAL	0.75	NONE	NONE	MANUAL	PRT Nitrogen Supply
RH-00700	BT-C	W 676258	10	120	8.87 - 12.01		RHR Loop Isolation
RH-00700	BT-O	W 676258	10	120	8.97-12.13		RHR Loop Isolation
RH-00701	BT-C	W 676258 #	10	120	95.7-129.48		RHR Loop Isolation
RH-00701	BT-O	W 676258 #	10	120	98.29-132.98		RHR Loop Isolation
RH-00704A	BT-C	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00704A	BT-O	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00704B	BT-C	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00704B	BT-O	MANUAL	8	NONE	NONE	MANUAL	RHR Pump Suction
RH-00720	BT-C	W 676258 #	10	120	88.66-119.95		RHR Return to RCS
RH-00720	BT-O	W 676258 #	10	120	95.35-129.01		RHR Return to RCS

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
RM-03200A	BT-C	M-181 #	1	NONE	4.5	AOV	Cont Atmos Samp Retr
RM-03200B	BT-O	M-181 #	1	NONE	4.5	AOV	Cont Atmos Samp Sup
RM-03200C	BT-C	M-181 #	1	NONE	4.5	AOV	Cont Atmos Samp Sup
RS-SA-10	BT-C		3	NONE	15	AOV	Radwaste Steam Supply
SC-00951	BT-C	W 676270 #	0.375	NONE	4.34-13.02	AOV	Press Stm Sample
SC-00953	BT-C	W 676270 #	0.375	NONE	3.23-9.69	AOV	Press Liq Sample
SC-00955	BT-C	W 676270 #	0.375	NONE	4.44-13.34	AOV	Hot Leg Sample
SC-00959	BT-C	W 676270 #	0.375	NONE	4.34-13.04	AOV	RHR Sample
SC-00966A	BT-C	W 676270 #	0.375	NONE	3.04-9.14	AOV	Press Stm Sample
SC-00966B	BT-C	W 676270 #	0.375	NONE	4.54-13.62	AOV	Press Stm Sample
SC-00966C	BT-C	W 676270 #	0.375	NONE	8.09-13.49	AOV	Hot Leg Sample
SI-00834A	BT-C	W 676270	1	NONE	.78-2.34	AOV	SIS Accum Vent
SI-00834A	BT-O	W 676270	1	NONE	1.04-3.1	AOV	SIS Accum Vent
SI-00834B	BT-C	W 676270	1	NONE	0-2	AOV	SIS Accum Vent
SI-00834B	BT-O	W 676270	1	NONE	1-2.99	AOV	SIS Accum Vent
SI-00836A	BT-O	W 676270	2	NONE	20	AOV	NaOH Supply
SI-00836B	BT-O	W 676270	2	NONE	20	AOV	NaOH Supply
SI-00841A	BT-C	W 676258	10	1"/SEC O/C	7.4-12.32		SIS Accum Disch
SI-00841B	BT-C	W 676258	10	1"/SEC O/C	8.88-12.02		SIS Accum Disch

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
SI-00846	BT-C	W 676270 #	1	NONE	0-2	AOV	Accum Nitrogen Supply
SI-00850A	BT-C	W 676258	10	NONE	3.42-10.26		Containment Sump Hydraulic Isolation
SI-00850A	BT-O	W 676258	10	NONE	3.37-10.1		Containment Sump Hydraulic Isolation
SI-00850B	BT-C	W 676258	10	NONE	2.99-8.96		Containment Sump Hydraulic Isolation
SI-00850B	BT-O	W 676258	10	NONE	4.02-12.06		Containment Sump Hydraulic Isolation
SI-00851A	BT-C	W 676258 #	10	12"/MINUTE	89.24-120		Cont Sump Isolation
SI-00851A	BT-O	W 676258 #	10	12"/MINUTE	89.26-120		Cont Sump Isolation
SI-00851B	BT-C	W 676258 #	10	12"/MINUTE	89.22-120		Cont Sump Isolaltion
SI-00851B	BT-O	W 676258 #	10	12"/MINUTE	90.45-120		Cont Sump Isolation
SI-00852A	BT-O	W 676258	6	10/10 O/C	8.89-12.03		RHR/LH Core Deluge
SI-00852B	BT-O	W 676258	6	10/10 O/C	8.56-11.58		RHR/LH Core Deluge
SI-00856A	BT-C	W 676258	10	120/120 O/C	89.03-120		RHR Pump Suction
SI-00856B	BT-C	W 676258	10	120/120 O/C	86.53-117.07		RHR Pump Suction
SI-00857A	BT-O	MANUAL	6	NONE	NONE	MANUAL	RHR to SIS Pump Suction
SI-00857B	BT-O	MANUAL	6	NONE	NONE	MANUAL	RHR to SIS Pump Suction
SI-00860A	BT-O	W 676258	6	10/10 O/C	10.01-13.55		CS Pump 1-P14A Disch
SI-00860B	BT-O	W 676258	6	10/10 O/C	15		CS Pump 1-P14A Disch
SI-00860C	BT-O	W 676258	6	10/10 O/C	10		CS Pump 1-P14A Disch

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
SI-00860D	BT-O	W 676258	6	10/10 O/C	10.5-14.23		CS Pump 1-P14A Disch
SI-00866A	BT-C	W 676258	4	12"/MINUTE O/C	46.16-62.44		SIS Pump Disch
SI-00866A	BT-O	W 676258 #	4	12"/MINUTE O/C	46.5-62.9		SIS Pump Disch
SI-00866B	BT-C	W 676258 #	4	12"/MINUTE O/C	47.76-64.62		SIS Pump Disch
SI-00866B	BT-O	W 676258 #	4	12"/MINUTE O/C	46.72-63.2		SIS Pump Disch
SI-00870A	BT-C	W 676258	6	12"/MINUTE O/C	8.97-12.13		RWST to CS Pump P14A
SI-00870A	BT-O	W 676258	6	12"/MINUTE O/C	9.11-12.33		RWST to CS Pump P14A
SI-00870B	BT-C	W 676258	6	12"/MINUTE O/C	9.2-12.44		RWST to CS Pump P14B
SI-00870B	BT-O	W 676258	6	12"/MINUTE O/C	9.04-12.24		RWST to CS Pump P14B
SI-00871A	BT-C	W 676258	6	12"/MINUTE O/C	NONE		RWST to CS Pump P14A
SI-00871A	BT-O	W 676258	6	12"/MINUTE O/C	15		RWST to CS Pump P14A
SI-00871B	BT-C	W 676258	6	12"/MINUTE O/C	7.09-11.81		RWST to CS Pump P14B

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
SI-00871B	BT-O	W 676258	6	12"/MINUTE O/C	7.47-12.45		RWST to CS Pump P14B
SI-00878A	BT-C	W 676258	2	10/10 O/C	6.87-11.45		RX Vessel Safety Inj
SI-00878A	BT-O	W 676258	2	10/10 O/C	7-11.66		RX Vessel Safety Inj
SI-00878B	BT-C	W 676258	2	10/10 O/C	7.16-11.94		SIS Loop Injection
SI-00878B	BT-O	W 676258	2	10/10 O/C	7.14-11.9		SIS Loop Injection
SI-00878C	BT-C	W 676258	2	10/10 O/C	6.66-11.1		RX Vessel Safety Inj
SI-00878C	BT-O	W 676258	2	10/10 O/C	6.8-11.32		RX Vessel Safety Inj
SI-00878D	BT-C	W 676258	2	10/10 O/C	6.8-11.34		SIS Loop Injection
SI-00878D	BT-O	W 676258	2	10/10 O/C	6.8-11.34		SIS Loop Injection
SI-00896A	BT-C	W 676258	6	12"/MINUTE O/C	8.81-11.93		SIS Pump Suction
SI-00896B	BT-C	W 676258	6	12"/MINUTE O/C	7.33-12.21		SIS Pump Suction
SI-00897A	BT-C	W 676270	2	NONE	.78-2.34	AOV	SIS Test Line Return
SI-00897B	BT-C	W 676270	2	NONE	.88-2.62	AOV	SIS Test Line Return
SI-00957	BT-C	W 676270	1	NONE	2.2-6.6	AOV	N2 Supply Vent/Rel
SI-00957	BT-O	W 676270	1	NONE	1.78-5.34	AOV	N2 Supply Vent/Rel
SW-02817	BT-C	M-91	6	15	12.8 - 17.32		WT Service Water Inlet
SW-02880	BT-C	DBD	6	15	12.21 - 16.51		Turb Hall Clrs In

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
SW-02907	BT-O	DBD	12	30	23.26 - 31.46		Cont Clr Emerg Flow
SW-02908	BT-O	DBD	12	30	22.14 - 29.96		Cont Clr Emerg Flow
VNPSE-03212	BT-C	DBD #	36	10	10	AOV	Cont Purge Exhaust
VNPSE-03213	BT-C	DBD #	36	10	10	AOV	Cont Purge Exhaust
VNPSE-03244	BT-C	DBD #	36	10	10	AOV	Cont Purge Supply
VNPSE-03245	BT-C	DBD #	36	10	10	AOV	Cont Purge Supply
WG-01786	BT-C	W 676270 #	1	NONE	5.04 - 15.11	AOV	RCDT Vent
WG-01787	BT-C	W 676270 #	1	NONE	4.24 - 12.74	AOV	RCDT Vent
WG-01788	BT-C	W 676270 #	1	NONE	1.74 - 5.2	AOV	RCDT Sample
WG-01789	BT-C	W 676270 #	1	NONE	1.89 - 5.67	AOV	RCDT Sample
WL-01698	BT-C	W 676270 #	2	NONE	3.29 - 9.87	AOV	RCDT to El-19' Sump
WL-01721	BT-C	W 676270 #	3	NONE	16.82 - 28.04	AOV	RCDT Pumps Suct Con
WL-01723	BT-C	W 676270 #	3	NONE	21.74 - 36.24	AOV	Containment Sump
WL-01728	BT-C	W 676270 #	3	NONE	20.04 - 33.4	AOV	Containment Sump
WL-01003A	BT-C	W 676281 #	3	NONE	14.14 - 23.58	AOV	RCDT Pump Suction
WL-01003B	BT-C	W 676281 #	3	NONE	13.43 - 22.39	AOV	RCDT Pump Suction

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
ZZZ-AF-00064	BT-C	ZZZ's have been dropped from program	6			MANUAL	2P-29 Suction
ZZZ-AF-04000	BT-C	ZZZ's have been dropped from program	3			DELETED	2B S/G AFW Isol
ZZZ-AF-04001	BT-C	ZZZ's have been dropped from program	3			DELETED	2A S/G SFW Isol
ZZZ-AF-04002	BT-C	ZZZ's have been dropped from program	1			AOV	2P-29 Mini-flow
ZZZ-AF-04002	BT-O	ZZZ's have been dropped from program	1			AOV	2P-29 Mini-flow
ZZZ-AF-04006	BT-O	ZZZ's have been dropped from program	6			DELETED	2P-29 Ser Wtr Sup
ZZZ-CV-00384B	BT-C	ZZZ's have been dropped from program	2			MANUAL	Charging Line HCV Outlet Valve
ZZZ-MS-02019	BT-C	ZZZ's have been dropped from program	3			DELETED	AFW Steam Supply

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
ZZZ-MS-02019	BT-O	ZZZ's have been dropped from program	3			DELETED	AFW Steam Supply
ZZZ-MS-02020	BT-C	ZZZ's have been dropped from program	3			DELETED	AFW Steam Supply
ZZZ-MS-02020	BT-O	ZZZ's have been dropped from program	3			DELETED	AFW Steam Supply
ZZZ-MS-02082	BT-C	ZZZ's have been dropped from program	3			DELETED	Main Steam to AFW Pump
ZZZ-MS-02082	BT-O	ZZZ's have been dropped from program	3			DELETED	Main Steam to AFW Pump
ZZZ-MS-02082	BT-O	ZZZ's have been dropped from program	3			DELETED	Main Steam to AFW Pump
ZZZ-MS-02090	BT-O	ZZZ's have been dropped from program	1			AOV	SW to AFW Pump P-029
ZZZ-SI-00825A	BT-O	G676258	12	1"/Sec O/C		DELETED	SIS Pump Suction
ZZZ-SI-00825B	BT-O	G676258	12	1"/Sec O/C		DELETED	SIS Pump Suction

Unit 2 Valves with Stroke Times

After Re-review of Westinghouse Spec G676258

VALVE	TEST	DESIGN SOURCE	SIZE	DESIGN TIME	IST TIME	SPECIAL	FUNCTION
ZZZ-SI-00826A	BT-C	G676258	12	1"/Sec O/C		DELETED	SIS Pump Suction
ZZZ-SI-00826A	BT-O	G676258	12	1"/Sec O/C		DELETED	SIS Pump Suction
ZZZ-SI-00826B	BT-C	G676258	8	1"/Sec O/C		DELETED	SISPump Redundant Suc
ZZZ-SI-00826B	BT-O	G676258	8	1"/Sec O/C		DELETED	SISPump Redundant Suc
ZZZ-SI-00826C	BT-C	G676258	8	1"/Sec O/C		DELETED	SISPump Redundant Suc
ZZZ-SI-00826C	BT-O	G676258	8	1"/Sec O/C		DELETED	SISPump Redundant Suc

Attachment 2 Pg 1 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
CC-719	This normally open valve shall provide remote-manual isolation of the RCP and excess letdown heat exchanger cooling water supply header to preclude leakage of CCW to the containment in the event that the CCW lines located inside the missile barrier (RCP cooling water lines) are ruptured as a consequence of a LOCA. CC-719 provides the necessary redundancy to remote-manual isolation valves CC-754A,B to ensure isolation of the break and thereby preserve CCW system integrity for long-term cooling of safety related loads. [WCAP-13938, 1/7/94]	SR	None	See Note 1 below, remote-manual (no automatic signal to close) valves have no required stroke time to accomplish their function.
CV-112B	This normally closed valve shall automatically open on low VCT level to provide a flowpath from the RWST to the charging pumps. [WCAP-13644, dated 3/93]	Non SR	See Basis	Exact time basis is not well defined. Original design provision was such that CV-112C did not start to close until CV-112B left its fully closed position to ensure a continuous suction source [WCAP-13644, Sections 4.3.3.E.6 and 5.6.2.5.3.D], and did not consider valve stroke time. If stroke times are considered, this valve should only need to be partially open (exact % open unknown) when CV-112C is fully closed to provide a continuous suction source. Current IST acceptance range appears to be adequate.

Pg. 2 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
CV-112C	This normally open valve shall automatically close on low VCT level to prevent drawing VCT gas into the charging pumps. [WCAP-13644, dated 3/93]	Non SR	<1 minute	An exact time basis is not well defined. Original design allowed a two minute delay to transfer to the RWST [W calculation RFS-W-168] however, this only considered one operating charging pump. Current stroke time requirement is evaluated as follows: Emergency makeup is provided from RWST at 4% VCT level [STPT 5.5]. At 4% indicated VCT level, >200 gallons remain in VCT from tank level book [from TLB-4, VCT has 200 gallons @ ≈ 1% VCT level]. 3 charging pumps operating at full design flow (181.5 gpm) therefore require > 1 minute to fully drain VCT. CV-112C shutting in less than 1 minute prevents gas from being drawn to charging pumps for all possible charging pump lineups.
CV-313 CV-313A	These normally open valves perform a containment isolation function for the excess letdown/RCP seal water return line. The valves automatically close on a containment isolation (T) signal during a LOCA. [FSAR Section 5.2]	SR	None	Refer to DBD Group Response to the Brad Fromm question on the technical basis for containment isolation valve closure times.
CV-350	This normally closed valve provides remote-manual capability for the operator to borate the RCS from the Boric Acid Storage Tanks during normal plant operation.	Non-SR	None	See Note 1 below; remote-manual (no automatic signal to close) valves have no required stroke time to accomplish their function.
CV-371A	This normally open valve performs a containment isolation function for the CVCS letdown line. The valve automatically closes on a containment isolation (T) signal during a LOCA. [FSAR Section 5.2]	SR	None	Refer to DBD Group Response to the Brad Fromm question on the technical basis for containment isolation valve closure times.
MS-5958 MS-5959	These normally open valves perform a containment isolation function for the steam generator blowdown line from each SG. The valves automatically close on a containment isolation (T) signal during a LOCA. [FSAR Section 5.2]	SR See Note 2	None	Refer to DBD Group Response to the Brad Fromm question on the technical basis for containment isolation valve closure times.

Pg 3 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
SI-852A,B	These normally closed valves shall open automatically to permit low-head safety injection into the RCS for accident mitigation. [WCAP-14205, 12/2/94]	SR	≤ 21.7 seconds	The large break LOCA accident (FSAR Section 14.3.2) was recently evaluated for increased safety injection delay times by Westinghouse (WEP-97-500, 1/10/97). The low head safety injection delay time was increased to 23.7 seconds and is made up of the following components: 2 seconds for SI signal processing, 7 seconds for sequencer plus uncertainty delay, and 14.7 seconds for the RHR pump start to full speed [CR 97-0073]. The SI-852A,B valves receive an SI signal and will begin to open after the SI signal processing delay (2 seconds). Therefore the valves must be fully open in ≤ 21.7 seconds.
SI-860A,B,C,D	These normally closed valves shall open automatically following accidents requiring containment spray to permit spray flow to the containment in support of containment cooling and the control of containment airborne radioactivity. [WCAP-14205, 12/2/94]	SR	≤ 16.5 seconds	The Containment Integrity Evaluation, FSAR Section 14.3.4, assumes that containment spray is actuated 60 seconds after event initiation. This assumption was questioned via CR 96-1486, which resulted in an evaluation of containment spray actuation time. The valve will receive a signal to open at the same time the pump time delay relay receives (TDR-18) receives the signal. The SI-860 valves stroke times must therefore be ≤ 16.5 seconds (the sum of TDR-18 delay of 11.5 seconds plus the pump acceleration delay) to be conservative with respect to the evaluation in CR 96-1486.

Pg 4 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
SI-841A,B	These normally open valves shall remain open during the SI injection phase to permit the flow of borated accumulator water into the RCS for accident mitigation. [WCAP-14205, 12/2/94]	SR	None	These valves do not have to stroke in order to perform their SR function.
	SI-841A,B shall open automatically following accidents requiring accumulator injection to permit flow of borated water into the RCS. Closure of SI-841A,B is permitted for a limited period (LCO) during power operation. [WCAP-14205, 12/2/94]	Non SR	None	This N function does not impose a stroke time pe ance requirement. Technical Specific...on 15.3.3.A.2.a allows one accumulator to be isolated or otherwise inoperable for periods of up to one hour.
SI-850A,B	These normally closed valves shall provide remote-manual actuation from the main control board to establish post-accident long-term recirculation from the sump. [WCAP-14205, 12/2/94]	SR	None	See Note 1 below; remote-manual (no automatic signal to open) valves have no required stroke time to accomplish their function.
SI-851A,B	These normally closed valves shall provide remote-manual actuation from the main control board to establish post-accident long-term recirculation from the sump. [WCAP-14205, 12/2/94]	SR	None	See Note 1 below; remote-manual (no automatic signal to open) valves have no required stroke time to accomplish their function.
	These normally closed valves perform a containment isolation function for the containment sump recirculation lines. They shall provide remote-manual isolation of an outside-containment leak during the SI recirculation phase. [FSAR Section 5.2]	SR	None	Refer to DBD Group Response to the Brad Fromm question on the technical basis for containment isolation valve closure times.
SI-866A,B	None. These normally open valves shall remain open during the SI injection and long-term recirculation phases to permit the flow of borated water into the RCS for accident mitigation. [WCAP-14205, 12/2/94]	SR	None	These valves do not have to stroke in order to perform their SR function.

Pg 5 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
SI-870A,B	These normally open valves shall provide remote-manual actuation from the main control board to isolate the RWST from sump recirculation water during the transition from the SI injection phase to the post-accident long-term recirculation phase. [WCAP-14205, 12/2/94]	SR	None	See Note 1 below; remote-manual (no automatic signal to close) valves have no required stroke time to accomplish their function.
SI-871A,B	These normally closed valves shall provide remote-manual actuation from the main control board during the transition between the SI injection phase and the post-accident long-term recirculation phase to permit alignment of the containment spray pump suction to the discharge of the RHR pump to support continued delivery of spray flow to the containment. [WCAP-14205, 12/2/94]	Non SR	None	See Note 1 below; remote-manual (no automatic signal to open) valves have no required stroke time to accomplish their function.
SI-896A,B	These normally open valves shall provide remote-manual isolation of the RWST from sump recirculation water during the transition from the SI injection phase to the post-accident long-term recirculation phase. [WCAP-14205, 12/2/94]	SR	None	See Note 1 below; remote-manual (no automatic signal to close) valves have no required stroke time to accomplish their function.
CC-754A,B	These normally open valves shall provide remote-manual isolation of RCP cooling water supply lines in order to preclude leakage of CCW to the containment in the event that the CCW lines located inside the missile barrier (RCP cooling water lines) are ruptured as a consequence of a LOCA. CC-754A,B provide the necessary redundancy to remote-manual isolation valves CC-719 to ensure isolation of the break and thereby preserve CCW system integrity for long-term cooling of safety related loads. [WCAP-13938, 1/7/94]	SR	None	See Note 1 below, remote-manual (no automatic signal to close) valves have no required stroke time to accomplish their function.

Pg 6 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
CC-759A,B	These normally open valves shall serve as containment isolation valves and provide remote-manual isolation of the RCP cooling water return lines outside containment following accidents in order to preclude the release of radioactivity to the environment. [FSAR Section 5.2]	SR	None	Refer to DBD Group Response to the Brad Fromm question on the technical basis for containment isolation valve closure times.
	These normally open valves shall provide remote-manual isolation of RCP cooling water return lines in order to prevent outleakage of CCW in the event that the CCW lines located inside the missile barrier are ruptured as a consequence of a LOCA. Check valve CC-745 provides the necessary redundancy to ensure isolation. [WCAP-13938, 1/7/94]	SR	None	See Note 1 below; remote-manual (no automatic signal to close) valves have no required stroke time to accomplish their function
	These normally open valves shall provide remote-manual isolation of RCP cooling water return lines in order to preclude leakage of high pressure radioactive fluid outside of containment as a result of a thermal barrier rupture. [IST Background Document]	SR	None	See Note 1 below; remote-manual (no automatic signal to close) valves have no required stroke time to accomplish their function
RH-701	Valve RH-701 shall serve as a containment isolation valve and shall provide remote manual isolation of the RHR supply line to limit the release of potentially radioactive materials to the environment following accidents. [FSAR Section 5.2]	SR	None	Refer to DBD Group Response to the Brad Fromm question on the technical basis for containment isolation valve closure times.
	This valve shall provide means to initiate RHR system operation remotely from the main control board during plant cooldown and subsequently isolate RHR from the RCS during plant heatup. [WCAP-14301, 5/16/94]	Non SR	None	See Note 1 below; remote-manual (no automatic signal to close or open) valves have no required stroke time to accomplish their function.

Pg 7 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
RH-720	This valve shall serve as a containment isolation valve and shall provide remote manual isolation of the RHR return line to limit the release of potentially radioactive materials to the environment following accidents. [FSAR Section 5.2]	SR	None	Refer to DBD Group Response to the Brad Fromm question on the technical basis for containment isolation valve closure times.
	This valve shall provide the means to initiate RHR operation remotely from the main control room during plant cooldown and subsequently isolate the RHR system from the RCS during plant heatup. [WCAP-14301, 5/16/94]	Non SR	None	See Note 1 below; remote-manual (no automatic signal to close or open) valves have no required stroke time to accomplish their function.
SI-878B,D	None. These normally open valves shall remain open during the SI injection and long-term recirculation phases to permit the flow of borated water into the RCS for accident mitigation. [WCAP-14205, 12/2/94]	SR	None	These valves do not have to stroke in order to perform their SR function
SI-878A,C	These normally closed valves shall provide remote-manual actuation from the main control board during the post-accident long-term recirculation phase within 4 hours after a SBLOCA accident. This allows realignment of the safety injection system permitting simultaneous injection into both the cold legs and the vessel as an added safeguard against the potential for boron precipitation. [EOP 1.2, WCAP-14205, 12/2/94]	SR	None	See Note 1 below; remote-manual (no automatic signal to open) valves have no required stroke time to accomplish their function

Pg 8 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
2SW-2880	This normally open valve shall automatically close when less than 4 of 6 service water pumps start following a Unit 2 accident, to isolate non-essential Unit 2 Turbine Building users and provide sufficient flow to safety-related heat exchangers. [DBD-12, Rev. 0, Section 4.11]	SR	≤16 1/2 seconds	The service water (SW) hydraulic model is a steady-state model that requires all valves to be in their final position within 60 seconds. 60 seconds is the time at which full heat removal is assumed in the containment integrity analysis [CR 96-1486]. To meet the containment integrity accident analysis and the assumptions in SW hydraulic models related to the SW System response during the injection phase of a LOCA (i.e, Calculation 96-117), the stroke time of 2SW-2880 must be ≤ 16.5 seconds based on the following: 1/2 seconds - time for containment pressure to reach SI signal setpoint 2 seconds - signal processing delay 10 seconds - EDG start time delay 31 1/2 seconds - acceptance limit for TDR-20 based on "as-found" limits in ICP 5.58 *16 1/2 seconds - valve stroke time* 60 seconds
1SW-2880	This normally open valve shall automatically close when less than 4 of 6 service water pumps start following Unit 1 accident, to isolate non-essential Unit 1 Turbine Building users and provide sufficient flow to safety-related heat exchangers. [DBD-12, Rev. 0, Section 4.11]	SR	≤16 1/2 seconds	Basis is similar to 2SW-2880 to achieve valve closure within 60 seconds, except no specific calculation exists which requires valve operation under power failure conditions.

Pg 9 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
SW-2818	This valve shall automatically open upon startup of the cable spreading room chiller, to provide cooling water to the cable spreading room condensers.	Non SR	See Basis	The cable spreading room chiller is almost always loaded during normal operation, therefore, this valve is typically "open" and not required to change position. A design basis stroke time limit has not been defined for this valve, however, if one were developed it would be based on preventing a high refrigerant pressure trip on initial startup of the chiller unit. Current IST limits for this valve are considered acceptable since operating experience has demonstrated that (1) delays in the A/C unit in achieving operating temperature, and (2) the significant flow that occurs when the MOV is partially open have prevented this trip from occurring.
SW-2819	This valve shall automatically open upon startup of the control room chiller, to provide cooling water to the control room condensers.	Non SR	See Basis	The control room chiller is almost always loaded during normal operation, therefore, this valve is typically "open" and not required to change position. A design basis stroke time limit has not been defined for this valve, however, if one were developed it would be based on preventing a high refrigerant pressure trip on initial startup of the chiller unit. Current IST limits for this valve are considered acceptable since operating experience has demonstrated that (1) delays in the A/C unit in achieving operating temperature, and (2) the significant flow that occurs when the MOV is partially open have prevented this trip from occurring.

Pg 10 of 11

Equipment ID	Functions Related to Stroke Requirements	Function Classification	Stroke Time Performance Requirement	Basis for Stroke Time Performance Requirement
MS-2015 MS-2016	These valves shall be capable of being manually opened (remote or locally) to cool down the RCS during a Steam Generator Tube Rupture event coincident with loss of offsite power. [FSAR Section 14.2.4]	SR	None	See Note 1 below; remote-manual (no automatic signal to open) valves have no required stroke time to accomplish their function
	These valves shall be capable of remote-manual operation during routine reactor shutdown to remove decay heat and maintain hot shutdown (or cooldown to RHR entry conditions). [FSAR Section 10.2]	Non SR	None	See Note 1 below; remote-manual (no automatic signal to open) valves have no required stroke time to accomplish their function
	These valves shall automatically open at a preset SG pressure during load rejection events, to supplement the condenser steam dump valve function and minimize lifting the steam generator code safety valves. Note that the atmospheric steam dump valves are asssumed not to operate for the Loss of Load licensing basis analysis. [FSAR Section 14.1.9]	Non SR	≤ 20 seconds	Westinghouse Steam Systems Criteria (PBW-WMP-992 date 11/8/68) gave a stroke criterion for "Steam generator power relief valves". The criterion was "the relief valves shall be of the modulating type, with a maximum full stroke time of twenty seconds."

Pg. 11 of 11

Footnotes:

1. Valves equipped with remote-manual operators (i.e. no automatic signals) do not have a minimum required stroke time to accomplish their function. The basis for this conclusion is that the time necessary to re-position a manual valve includes the valve movement plus the time needed for plant operator recognition, decision, and action. Placing a specific limit on a manual valve's stroke time is unnecessary, without also imposing specific time limits on the operator actions leading up to the valve movement; such operator action time limits for manual valves do not exist.

2. The SG blowdown lines are closed inside containment, and provide an adequate passive containment barrier during LOCA without the need for isolation valves; the blowdown valve isolation function is currently under review in the Design Basis Document Program, and the classification of this function may change to non-safety-related in the future.

Attachment 3 Pg 1 of 7

Response to Design Basis Question on Containment Isolation Valve (CIV) Closure Times

Question — What is the real design basis number for PBNP containment isolation valve closure times? Ten (10) seconds is mentioned for air-operated valves in FSAR Table 7.5-1 for EQ requirements. Sixty (60) seconds is mentioned in CHAMPS. What do we take credit for and what do we need?

Response

Based on the lack of containment isolation closure time requirements in accident analyses or in the FSAR, no specific limits exist for containment isolation closure times.

The following sources were searched to reach this conclusion:

1. PSARs for Unit 1 and Unit 2

   No statements that addressed CIV closure times were found in either unit PSAR or in our response to AEC questions on the PSAR.

2. FSAR Section 5.2, Containment Isolation System

   This FSAR section describes containment isolation criteria, penetration configurations, and containment isolation valves. Although this is the logical place to find information on CIV closure times, closure times are not mentioned in the text, tables, or figures.

3. FSAR Section 6.2, Safety Injection System

   Page 6.2-22 states: *"For those valves which must function on a safety injection signal, fast operators are provided to allow for reaching design flow within 10 seconds."*. Based on its location in the SIS section of the FSAR, this capability statement specifically applies to valves that establish safety injection flow (not the containment isolation function). The statement is also supported by an FSAR reference to an IST valve stroke time analysis specifically for achieving SI flow[1]. This FSAR section does not address either the containment isolation function or any corresponding valve closure time limits.

4. FFDSAR Section 6.2, Safety Injection System

   The original FFDSAR also included a capability statement for 10-second valve operating time, but in a different context than the current FSAR: *"For those valves which must function on a safety injection signal, 10 second operators are provided."*. Although this statement is in the SIS section of the FFDSAR, it could be interpreted to include all

---

[1] Letter VPNPD-90-310/NRC-90-064, "Guidance on IST Program, Generic Letter 89-04 Follow-up", dated June 28, 1990

valves that receive an SI signal (not just SI valves). The statement is mentioned for two reasons:

1) SI is the signal that isolates containment isolation valves, and

2) If taken out of context, this sentence could have been misinterpreted as a licensing commitment to provide containment isolation valves with 10-second operators (since CIVs receive an SI signal) and require CIVs to close within 10 seconds.

This misinterpretation may have occurred (see next item).

5. FSAR Table 7.5-1, General Operating Time Requirements for Environmental Qualification of Electrical Equipment

FSAR Table 7.5-1 is a table of EQ requirements. The table includes a column labeled "Time to Operate" for various electrical equipment. The table defines Time to Operate as the time after an accident in which it is expected that the item will have completed its safety function. Under the Table 7.5-1 heading Valve Operators, the entry **"Air Operated Containment Isolation"** has a corresponding Time to Operate of **10 seconds**[2]. It has been suggested that this EQ Time to Operate is the same as the required CIV closure time.

The following points attempt to explain why the EQ Time to Operate is not the same as the required CIV closure time:

a. Table 7.5-1 is titled as an EQ requirements table for ELECTRICAL equipment. The air solenoid is the only electrical valve component associated with closing a typical air-operated CIV. Air-operated CIVs are designed to fail closed either when air is removed from their actuator or when power is removed from their air solenoid. To perform its function, the solenoid must deenergize on an SI signal and vent the air operator to close the valve. Once the actuator vent path is established through the solenoid, the solenoid has completed its function. From discussions with John Hinck, the EQ requirements in this table only apply to the air solenoid and its deenergize-to-vent function. As mechanical components, the air actuator and valve body are outside the EQ program scope. 10 seconds is sufficient time for a solenoid to "drop out" to its vent position after being deenergized by an (SI) signal. Once deenergized, the solenoid will remain in the vent position under a harsh environment. The 10-second EQ time applies only to solenoid operation, and does not represent the total time it takes to close the isolation valve.

b. Table 7.5-1 was added to the FSAR in 1984. Before that time, the EQ Time to Operate information was found in the FFDSAR, under the WE response to AEC question 6.4 (Table Q 6.4-1). Instead of specifically mentioning containment isolation valves, the FFDSAR table contained a more general entry "Air Operated Isolation Valves" with a "10 seconds after signal" operating time[3]. A footnote stated that environmental testing was not required because all in-containment

---

[2] Footnote 2 in Table 7.5-1 exempts the purge supply and exhaust valves from the 10-second time and lists their time to operate as 60 seconds.

[3] FFDSAR page Q 6.4-7 dated April 20, 1970

air-operated isolation valves fail in the closed position.

The important point about the FFDSAR table is that in the context of the original AEC question response, "10 seconds after signal" resembles the Section 6.2 statement "For those valves which must function on an SI signal, 10-second operators are provided". As stated earlier, this last statement was specifically addressing valves in the SI flow train, not containment isolation valves.

Since 10-second valves are not discussed elsewhere in the FFDSAR, it appears that the response to AEC Question 6.4 incorrectly translated a SI valve capability statement in FFDSAR Section 6.2 into an EQ operating requirement for all air-operated valves. Although this is speculation, it seems like a reasonable guess, because the AEC question was specifically directed at FFDSAR Section 6 and the only place the FFDSAR mentioned 10 seconds was related to SI valve operation in Section 6.2.

Evidence that the overall stroke time for containment isolation valves was not limited to 10 seconds is found on FFDSAR page 7.5-10, which contained the following statement under Environmental Capability:

> *The expected length of time that equipment will be required to function following an accident is ...*
>
> *e. Air and motor operated containment isolation valves (operation completed in first five minutes after accident).*

Since this statement coexisted with the AEC Question 6.4 response[4], it seems clear that the 10-second operating time in the table was intended to apply only to the air solenoid, and was not intended as a CIV closure time requirement.

c. Table 7.5-1 Footnote 2 was added in 1992, and contains what appears to be a legitimate valve closure time requirement for the purge supply and exhaust valves. However, the 60-second time limit in Footnote 2 only applies to a fuel handling accident, which is a non-EQ event. Since fuel handling accidents do not create harsh EQ environments, including this footnote in an EQ Time to Operate table is inappropriate. The table was apparently a convenient place in the FSAR to put a closure time limit for these valves, although closing these valves within 60 seconds has nothing to do with environmental qualification. (See later discussion on the origin of the generic 60-second closure time limit and see Conclusion #1 for the validity of a 60-second closure limit for purge supply and exhaust valves)

6. FSAR Sections 14.2.1 and 14.3.5

From a design standpoint, the logical source of any CIV closure time requirements is the offsite dose analyses. These FSAR sections cover the offsite dose consequences of a fuel handling accident and a LOCA, respectively. There is no mention in either section of an assumed CIV closure time for establishing containment integrity. The limiting fuel handling accident is assumed to occur in the spent fuel pool area, so containment isolation/integrity is not involved in the limiting fuel handling accident offsite dose

---

[4] This statement also appears in the first version of the AEC Question 6.4 response dated January 16, 1970. The statement was replaced by Table Q 6.4-1 in the second version dated March 13, 1970.

analysis. Although MSSM 89-20 Attachment A stated that there is a 60-second containment isolation time limit in FSAR Section 14.2.1, no such time limit was found in the current FSAR. A review of FSAR changes indicates that a purge isolation time limit has never been stated in FSAR Section 14.2.1.

For the LOCA analysis, the analysis assumes a "buttoned up" containment throughout the accident (i.e., no puff of radioactivity escapes before containment integrity/isolation is achieved). Carl Onesti confirmed that CIV closure times are not modeled in the LOCA offsite dose analysis. The analysis assumes that no direct release paths exist through open containment penetrations to the outside atmosphere throughout the LOCA event. From a CIV closure time standpoint, this assumption amounts to saying that *any* closure time would be acceptable provided containment integrity is achieved before radioactivity releases occur through any (non-essential) penetration. Based on the maximum containment leakage rate assumed in the dose analysis and the torturous path that containment radioactivity must take to escape through an open penetration before isolation occurs, it is expected that the offsite dose analysis will be insensitive to CIV closure time.

7. CHAMPS 2

The data sheets for some containment isolation valves in CHAMPS 2 contain a note implying a 60-second closure time limit, based on NRC Standard Review Plan 6.2.4. As discussed below, the SRP 60-second value is only guidance, and there is no known PBNP commitment to meet the SRP guidance.

8. Current Licensing Basis Database

The CLB database was searched for information on CIV closure times. Keywords searched for included "Containment Isolation" and "Isolation Valve". No licensing documents were found that require CIV closure within any time limit.

CONCLUSION #1:

Based on lack of specific CIV closure time assumptions in the offsite dose analyses and lack of CIV closure time criteria in the FSAR and other licensing documents, it can be reasonably concluded that no specific design requirements exist for PBNP containment isolation valve closure times.

The 60-second closure time for purge supply and exhaust valves in FSAR Table 7.5-1 is a current licensing commitment. However, no design basis has been found requiring these valves to close within 60 seconds. The offsite dose analysis for a fuel handling accident inside containment[5] assumes the entire radioactivity inventory from the damaged fuel assembly was released from containment to the environment during the accident. The calculation took no credit for purge isolation to limit the radioactivity release, and in fact showed no purge isolation was necessary to achieve acceptable offsite dose consequences. Therefore, based on the calculation assumptions and results, a 60-second purge valve closure time is not a PBNP design requirement to limit offsite dose.

---

[5] Calculation N-90-078, Site Boundary Whole Body and Thyroid Dose following a Fuel Handling Accident, dated 11/7/90

The remaining discussion addresses closure time guidance found in the NRC Standard Review Plan and ANS-56.2, and valve stroke time limits in the In-Service Testing (IST) program.

1. Standard Review Plan Section 6.2.4

The SRP contains guidance for NRC reviewers of licensee Safety Analysis Reports. Section 6.2.4 covers containment isolation review guidance. This section defines containment isolation valve closure time as the time it takes for a power-operated valve to be in the fully closed position after the actuator power has reached [or been removed from] the operator assembly; it does not include the time to reach actuation signal setpoints or instrument time delays. The SRP suggests two closure time limits, as follows:

- *For lines which provide an open path from the containment to the environs; e.g. the containment purge and vent lines, isolation valve closure times on the order of 5 seconds or less may be necessary. The closure times of these valves should be established on the basis of minimizing the release of containment atmosphere to the environs, to mitigate the offsite radiological consequences, and assure that emergency core cooling system (ECCS) effectiveness is not degraded by a reduction in the containment backpressure. Analysis ... should be provided to justify the selected valve closure time.*

- *In general, valve closure times should be less than one minute, regardless of valve size.*

It is apparent from this wording that the five second and one minute closure times are guidance, not hard requirements. Since Point Beach is not committed to meet the SRP guidance, these numbers have no direct bearing on the CIV closure times for PBNP, other than as a licensing perspective on how containment isolation is reviewed for newer plants.

The SRP wording also shows how closure times are related to the dose analyses. Without specific isolation time assumptions in the dose analyses, it is unreasonable to assign an arbitrary requirement for valves to close within one minute.

Attached is a memo describing a 1988 conversation with NRC personnel about the origin of the one minute guideline in SRP 6.2.4.

2. ANS-56.2-1984, Containment Isolation Provisions for Fluid Systems After a LOCA

This standard does not apply to the Point Beach design. However, Section 4.4.4 of the standard is titled **Valve Closure Time**, and provides insight into more recent industry criteria developed for CIV closure times, as follows:

> *The objective to establishing valve closure times should be to limit the release of radioactivity from the containment. ...*
>
> *In general, power-operated valves three and one-half inches to 12 inches in diameter should be closed at least within a time determined by dividing the nominal valve diameter by 12 inches per minute. ... Valves three inches and less should generally close within 15 seconds. All valves larger than 12 inches in diameter should close within one minute unless an accident radiation dose ...*

calculation is performed to show under accident conditions that the longer closure times do not result in radiation releases significant enough that accident dose allowances are exceeded. ...

In determining appropriate valve closure times, consideration shall be given to time delays due to instrument and control delay times as well as valve motive power delay times. ...

3. IST Valve Stroke Time Limits

Containment isolation valve stroke times are periodically measured as part of the In-Service Testing (IST) program. An increase in valve stroke time may indicate stem friction or actuator problems, which could lead to valve binding. The stroke time limits established for IST are intended to detect performance degradation, and are not necessarily related to any absolute CIV closure time requirements.

IST stroke time limits are typically established using actual valve times. An initial timing test establishes a baseline stroke time. The IST acceptance limits are based on adding margin (+ and -) to the baseline time. The margin allows for some normal variation; when a stroke time falls outside the margin, some action is needed to correct the problem causing the increased stroke time, to stop further degradation.

If a valve operating time requirement exists (e.g. SI flow established within 10 seconds), the requirement is an upper limit on valve operation. However, when no specific valve requirement is known to exist, then the IST stroke time criteria have no connection with any required closure (or opening) time.

Since there is no known CIV closure time requirement, the stroke time limits for Containment Isolation Valves covered by the IST program are based only on detecting valve degradation, not on a CIV closure time requirement.

CONCLUSION #2

The guidance in SRP 6.2.4 and the valve stroke times in the IST program are not sources of any specific CIV closure time requirements for Point Beach. However, the one-minute SRP guideline may be useful for assessing valve stroke times for "reasonableness".

MEMORANDUM

TO:

FROM:

DATE: 10/31/88

SUBJECT: SRP 6.2.4

I discussed the question regarding SRP 6.2.4-9 paragraph 5 with an NRC technical reviewer and an assistant director.

A reviewer in the Mechanical Engineering Branch, indicated that he had been performing reviews of Containment Systems for several years and was not aware of the basis for the one-minute valve closure time guidance in SRP section 6.2.4. He considers the one-minute value as general guidance and not an acceptance criteria except in certain cases. When queried whether the basis for the one-minute closure time might be related to an ISI requirement the reviewer was certain that was not the case. In fact he noted personal knowledge of plants with valve closure times of up to 200 seconds and one plant of 240 seconds in their Technical Specifications. He indicated that in conducting his reviews he closely evaluates lines with direct pathways to the environment to assure that closure times for these lines are minimized to mitigate the offsite radiological consequences, as discussed in paragraph (n) on page 6.2.4-6 of the SRP. He also noted that closure times can become a review consideration where ECCS effectiveness could be degraded by a reduction in containment backpressure. In cases where ECCS analysis may be affected, the Reactor Systems Branch would review the analysis and provide input to the containment systems reviewer. Except in situations where there is an analytical basis for closure times or where there is a direct path to the environment, there is no firm guidance or value that is clearly unacceptable given proper justification.

The question was also directed through an A/D to a Director, who had spent considerable time in the review of Containment Systems. Recollections were that there was possibly some basis for the one minute valve closure in a Technical Information Document (TID), perhaps TID-14844. Nevertheless, based on transport phenomenon and dispersion considerations, as a general rule, if the containment was sealed in on the order of one minute, other elements of the offsite dose calculations were generally acceptable.

These discussions suggest that the one-minute closure time is general guidance for containment systems unless lines communicate directly with the environment such as the Containment Purge or those of sufficient size that could adversely affect ECCS or other accident analysis. Otherwise valve closure times in excess of one-minute which are properly justified could clearly be acceptable as evidenced by precedence.

****
* Trkid: NRC 96EC *
* Action Number: 43 *
****

Responsible Person:
Urgency: DONE
Work Priority: 99

RESTART ITEM #11

Activity Pending is: DONE ASSOCIATED WITH A COMMITMENT

----------TITLE AND TASK DESCRIPTION----------

NRC 09/12/96 Enforcement Conference

IST: Review all installed instrumentation used in the IST program. (1) Identify all installed instruments used within the IST program. (2) Review performance of these instruments over the past 3 years. (3) Review the suitability of the installed instrumentation for use in the IST program. (4) Review all IST data for the past year for adverse trends.

----------DATES----------

Source Record: 11/13/96	******* Evaluation *********	****** Correction ******
Commitment: 03/31/97	Eval Due:	Corr Act Due: 03/31/97
Action Create: 11/14/96	Orig Eval Due:	Orig CA Due: 03/31/97
Action Closed: 01/23/97	Eval Done:	Corr Act Done: 01/22/97

----------PEOPLE----------

Responsible for Overall Action: NMS
Responsible for Current Pending Activity:
Issue Manager:
Initiator:
Punchlist Administrator:

----------UPDATE----------

(11/18/96 DPH) Issued purchase requisition to NPTS to provide review of scoping of present IST program. Included in the review: List all inservice tests and the instrumentation used in the test. Trends seen in tests for last 24 months. Trends seen in instrumentation for last 36 months. Suitability of the instrumentation used in the IST program. Issued report on NPTS findings. NPTS made 17 recommendations for improvements to the present IST program and associated instrumentation. Initiated 17 NUTRK items based on the recommendations and had them assigned to I+C, IPE and SE groups. Drafted new NP - NP 7.1.4. Sent copy to SDB and CJN for review and comment.

(11/19/96 WAH) Set Work Priority to 27. Initial prioritization. Same as EWR 96-114.

(12/05/96 DPH) Delivered IST instrumentation review to clerical and requested that it be inserted into plant file system under IST.

(12/17/96 DPH) NPTS report accomplishing items 1-3 dated 9/28/96 was received 10/1/96. My review was finished on 10/26/96. 17 NUTRK items were issued under EWR 96-114 and assigned to I+C, IPE and various system engineers in site engineering. Item # 4 which deals with assessing pump data, was re-assigned to Craig Neuser as item #11 on the PBNP startup commitment list.

(01/03/97 DPH) Passed to for acceptance of work.

(01/03/97 WAH) Passed to for Verification.
Purchase requisition 10000781 was issued to NPTS to provide a review of the scoping of the present IST program. This request was entered in August of 1996 with a due date of September 30, 1996. Report was received on October 1, 1996 and review was complete October 26, 1996. NPTS made 17 recommendations for improvements to the IST program and associated instrumentation. 17 NUTRK items were initiated based on the report and assigned to I+C and various site engineering personnel under EWR 96-114. The report was put into the plant filing system under IST. This satisfies items 1-3. Item number 4 which deals with assessing pump performance data was assigned to as item #11 on the PBNP startup commitment list. There are no further actions required and this item may be closed.

(01/07/97 JAP) Returned to for additional work.
This item can not please closed out to the unit 2 restart list because the list is not entered into NUTRK as a commitment.

Please complete the IST review as requested. If needed transfer this item to C

(01/07/97 WAH) Changed Responsible Person: From (DPH) to (CJN)

Changed Responsible Group: From (IPE) To (ISE).. Reassigned to Craig Neuser for completion of action #4 of the described actions. Other three items have been completed by

(01/08/97 FAF) Changed the Due Date from: << BLANK >> to 03/31/97

(01/19/97 CJN) Passed to for acceptance of work.

(01/22/97 PWH) Passed to for Verification.
Review of all IST pump hydraulic data over the past year for adverse trends has been completed. Several negative trends were identified, however, the corrective actions have already been completed in all cases. No new action items are needed based on this review. The following paragraphs identify the adverse trend and the corrective action completed.

Safety injection pumps 1P-15B and 2P-15A exhibited inconsistent differential pressure measurements. Calibration records indicated a problem with the respective pumps discharge pressure indicator. Modifications 96-049 (U1) and 96-050 (U2) replaced all of the SI pumps discharge pressure indicators with a more reliable indicator. No further action is necessary.

RHR pumps 2P-010A/B differential pressure measurements had been approximately 10 psid lower since maintenance was done on common flow element 2FE-660 in 1992. Work order 96-03159 revealed the flow element was installed backwards following the 1992 maintenance. The flow element was corrected and differential pressure measurements are again consistent with pre 1992 results. No further action is necessary.

Flow measurements for service water pump P-32E have increased due to the pump being rebuilt. No further action is necessary.

Auxiliary feedwater pumps 1P-029, P-38A and P-38B showed a one time decrease in measured pump differential pressure. This step change can be attributed to a change in test methodology. Differential pressure is now measured at the design flow of each respective pump in lieu of pump recirculation. No further action is required.

Component cooling water pumps 2P-011A/B showed a one time decrease in measured pump differential pressure. This step change can be attributed to a change in test methodology. Differential pressure is now measured at a pump flow of 3500 gpm versus the old value of 2600 gpm. No further action is required.

Cable spreading room and control room chill water pumps P-111A/B and P-112A/B had some minor fluctuations of measured pump differential pressure (1.5 psid). Although these fluctuations are very small they are being mentioned because they have caused several pumps to be declared inoperable or place on IST increased surveillance testing. These recent occurances were caused by the very small IST acceptance range, not because of the instrumentation. The differential pressure of P-111A/B is 21 psid and P-112A/B is 24.5 psid. Pre and post instrumentation calibrations further conclude that the involved instruments are acceptable. No further action is required.

Boric acid transfer pump 2P-004A had a decreasing trend for measured differential pressure. This was due to pump degradation. The pump was rebuilt per WO 96-05180. No further action is required.

No other pumps in the IST program exhibited any negative hydraulic performance trends. This action item may be closed out.

(01/23/97 JAP) Passed to for Final Close Out.
Item is complete.

(01/23/97 FAF) PLA Closure of Item.

----------REFERENCES----------

IR 96-003	IR 96-006	
EWR 96-108	IR 96-011	
WO 96-03159	MR 96-049	
MR 96-050		

----------MISCELLANEOUS----------

Originating Agency: System: XX
NRC Open Item Number: NRC Status: O
Related Outages:
Engineering Work Type: None Specified

NRC CC #43

IST INSTRUMENTATION REVIEW 1/20/97

NPTS was tasked with the review of instrumentation used in the IST program. The final report was received on October 1, 1996. The scope of the project is as follows.

SCOPE IDENTIFICATION

- Identify all IST-related procedures
- Identify all in-scope instrumentation
- Document instrument information

CALIBRATION HISTORY

- Run equipment history report from MRLIN
- Document all out-of-calibration incidents and any adverse trends
- Screen IT's for adverse trends

ASME APPLICABILITY

- Compare actual instrument range/accuracy to ASME requirements

HUMAN FACTORS

- Determine readability of instruments

Attached is the recommendations from the NPTS report (labeled ITEM A). This report contains all the discussion leading up to the recommendations on pages 11 through 13. My comments and recommended owners of the action items are noted on the left in red ink. Included in the package is "ATTACHMENT 1" which should be forwarded to I&C for their use in recommendation A (review/update CHAMPS records). Also included in the package is "ATTACHMENT 2". This attachment should be included with each action item along with a copy of "ITEM A" for their guidance.

It is my recommendation that the following action items be generated as child items to EWR 96-114.

ACTION ITEM #	GROUP/ PERSON	DESCRIPTION FROM ITEM "A"
1	I&C	Recommendation A
2	SEJ	Recommendation B - turbine driven AFW pmp TC's
3	JAS	Recommendation B - service water pump ammeters
4	BDO	Recommendation B - charging pump oil press. gauges
5	IPE	Recommendation C - analyze 1&2 PI-653A&B
6	I&C	Recommendation D - portable instrument accuracy
7	I&C	Recommendation E - cal. procedure IR1 frequency

Note: See attached matrix for correlation between recommendations and EWR 96-114 action items.

1/22/97

ACTION ITEM #	GROUP/ PERSON	DESCRIPTION FROM ITEM "A"
8	I&C	Recommendation F - PI-6354&55 add to procedure
9	JAS	Recommendation F - P-32A - P32F ammeters, cal. & CHAMPS id
10	BDM	Recommendation F - 1&2 FI-3087
4	BDO	Recommendation F - charging pmp oil press gauges CHAMPS id
11	SB	Recommendation F - SI pmp ammeters, cal & CHAMPS id
12	I&C	Recommendation F - PI-5976&77 add to cal. procedure
13	I&C	Recommendation F - TI-665 add to cal. procedure
14	IPE	Recommendation G & H - evaluate instrumentation suitability
15	I&C	Recommendation I, J & K
16	BDO	Recommendation L - evaluate full scale range discrepancy FT-128
17	JRZ	Recommendation L - evaluate full scale range discrepancy FT-619
16	BDO	Recommendation M - consider using PPCS in IT-21 vs indicator
17	JRZ	Recommendation M - consider using PPCS in IT-22 vs indicator

dph/10-26-96

CROSS-MATRIX FOR ENFORCEMENT CONFERENCE COMMITMENT ITEM NUMBER 43 AND ENGINEERING WORK REQUEST NUMBER 96-114

NRC 96EC Action Item Number 43 Recommendation	EWR 96-114 Action Item Number
A	9
B	1O
B	11
B	12
C	13
D	14
E	15
F	12
F	16
F	17
F	18
F	19
F	20
F	21
G	22
H	22
I	23
J	23
K	23
L	24
L	25
M	24
M	25

John A. Palmer

January 22, 1997

TO:
FROM:
DATE: **09/28/96**
SUBJECT: **IST Instrumentation Review Final Report**

The review of IST instrumentation consisted of several main processes including: scope identification, calibration history review, ASME Section XI test trending, verification of instrumentation applicability, and identification of human factors concerns. The following is a synopsis of each of these processes, concluding with recommendations:

I) Scope Identification

The focus of this review was to identify concerns associated with the instrumentation used in the performance of ASME Section XI Pump & Valve Testing. Therefore, the objective of the scope identification was to determine which instruments (installed and portable) are being used in the ASME Section XI In-Service Tests (IT's). The criteria for inclusion of the instrumentation in the scope was that it is used to determine a quantitative parameter and the data from it is recorded in the IT. Thus, if a prerequisite to the IT states that "RCS pressure must be greater than 500#", the RCS pressure instrumentation would not be included in the scope of this review. A further breakdown of the scope was performed in order to identify the instrumentation which is used to verify the various pump & valve ASME requirements (suction/differential pressure, flow rate, speed, vibration, valve timing). Thus, the installed instrumentation scope consists of two types of IST instrumentation: ASME-Required Instrumentation and Supporting Instrumentation.

Each ASME Section XI IT was reviewed line-by-line and the instrumentation identified was documented (reference attachment 1). If the indicator identified is a part of an instrumentation loop, the portions of the associated loop which are applicable for the indication were identified and included in the scope. Also, data from previous ASME Section XI IT's was reviewed to identify the portable test equipment used in the tests. The following information was identified for the in-scope instrumentation and documented in Attachments 2, 3:

- Instrument ID
- Instrument loop designation (if applicable)
- ASME required? (Yes/No)
- Calibration procedure/frequency
- Reference value (only for ASME-required instruments)
- Required instrument full-scale range (only for ASME-required instruments)
- Actual instrument full-scale range
- Required instrument accuracy (only for ASME-required instruments)
- Actual instrument accuracy
- Loop accuracy (if applicable)

Additionally, the following information was identified and documented in Attachment 4:

- Actual instrument accuracy
- ASME required? (Yes/No)
- Indicator readability (only for ASME-required instruments)
- Indicator scale divisions (only for ASME-required instruments)
- Instrument ID
- Manufacturer/Model#

Attachment 5 identifies the ASME Section XI Pump IT's and the associated ASME required instrumentation.

The following sources were utilized to accurately identify the above information:

- CHAMPS database
- Instrument Calibration Procedures (ICP's)
- Instrument vendor manuals
- Plant drawings
- Plant walk-downs

It should be noted that some of the instrumentation information was not identified during the review process. The designation "UNK" is used in the attachments to denote this. It will be recommended that the CHAMPS database equipment record for each of the IST instruments be reviewed/updated to ensure that it is complete and accurate. Additionally, there were no CHAMPS database records identified for the following components:

- PB1,2 Turbine Driven Aux Feedwater Pump turbine & pump bearing temperature thermocouples
- Service Water Pump Motor Ammeters
- PB1/2 Charging Pump Oil Pressure gauges

It will be recommended to assign component ID's to these components and generate the CHAMPS database records for them.

II) Calibration History

An equipment history report was run from the Maintenance Rule/License Renewal program (MRLIN) for all of the in-scope plant-installed instrumentation. A manual search of the CHAMPS Equipment History database was performed for the portable instrumentation. The scope of this search includes failure incidents which were identified in the previous 36 months. All out-of-calibration (OOC) incidents were documented and the As-Found data was recorded in order to identify any adverse trends (reference attachments 6, 7). An instrument was identified as potentially exhibiting an adverse trend if it met one or both of the following criteria:

- Instrument had three or more failure incidents of any kind
- Instrument had two consecutive OOC conditions with the drift in the same direction AND was OOC in the last calibration check

The following is a discussion of the results of this calibration history search:

A) ASME-Required Instrumentation

The following potential concerns were identified and should be investigated further:

1) Unit 2 Boric Acid Transfer Pumps Discharge Pressure Indicator (PI-00108)

Three OOC incidents were identified for this instrument over the past 3 years.

2) P-12A SFP Cooling Pump Suction Pressure Indicator (PI-00658A)

Two consecutive OOC - LOW incidents were identified for this instrument including the last calibration check. The instrument was found to be 0.2 - 0.3 psi LOW in 3/95 and 0.3 - 0.5 psi LOW in 3/96.

3) SI Pump Discharge Pressure Indicators (PB1,2 PI-00913A, B)

Several failure incidents were identified for these instruments as follows:

- 16 Out-of-Calibration incidents
- 2 "Gauge Failure" incidents

Two Condition Reports were identified associated with failures of these indicators (reference CR 96-453, 96-756) and EWR 96-107 was initiated to evaluate replacing the instruments. The recommendation from the EWR evaluation is to replace the existing local pressure gauges with digital (Red Lion) displays.

4) Unit 2 P-014B CS Pump Suction Pressure Indicator (PI-00933D)

Two OOC incidents and two "Gauge Failure" incidents were identified for this instrument over the past 3 years.

5) Unit 2 RC Loop A Intermediate Leg Wide Range Pressure Transmitter (PT-00420A)

Four OOC incidents were identified for this instrument over the past 3 years.

No PM program tasks were identified for the following ASME-Required instruments:

PB0 FI-03905 ***
PB0 FI-03928 ***
PB0 FI-03929 ***
PB0 PI-03973A
PB0 PI-03973B
PB0 PI-03974A
PB0 PI-03974B

A calibration check task with a 1A2 frequency was recommended for PI-03973A, PI-03973B, PI-03974A, and PI-03974B in the DISPLAYS Component Maintenance Program (CMP 6.5).

It will be recommended that calibration check tasks with a IR1 frequency (every refueling outage) be added for FI-03905, FI-03928, and FI-03929.

*** The CHAMPS database lists "ICP-06.069" and "ICP-06.070" as procedures for FI-03928 and FI-03929 respectively. These procedures could not be located and do not show up in the ICP index. Therefore, these procedure references are assumed to be invalid.

It should be noted that each of these instruments had calibration stickers on them with the following calibration dates:

PB0 FI-03905	6/21/94
PB0 FI-03928	6/21/94
PB0 FI-03929	6/21/94
PB0 PI-03973A	2/26/94
PB0 PI-03973B	2/26/94
PB0 PI-03974A	2/26/94
PB0 PI-03974B	2/26/94

B) Supporting Instrumentation

For the Supporting Instrumentation, all out-of-calibration (OOC) incidents were documented (reference attachment 7). The following potential concerns were identified and should be investigated further:

1) SI Accumulator Level Instruments (PB1,2 LC/LT-00934, 935, 938, 939)

Several failure incidents were identified for these instruments as follows:

- 9 "Subcomponent Part Failure" incidents
- 8 "Air in Sensing Line" incidents
- 6 "Out-of-Calibration" incidents
- 2 "Instrument Failure" incidents

Several Condition Reports associated with failures of the SI Accumulator Level instrumentation (reference CR 94-175, CR 94-373, CR 95-296, CR 95-307, CR 95-316) have been previously identified during the generation of the TRANSDUCERS CMP 8.6). The main concerns identified have been (1) power supply is undersized and (2) the microprocessor loses bits which cause indication spikes and spurious level alarms. As a result of these concerns, EWR 95-010 has been initiated recommending replacement of this instrumentation with Rosemount 3051C Smart D/P Transmitters and digital indicating controllers.

2) Unit 2 P-015B SI Pump Discharge Flow Transmitter FT-00924

Four OOC incidents were identified for this instrument over the past 3 years.

3) Unit 2 P-029 AFP Pump Discharge Flow Transmitter FT-04002

3 OOC incidents were identified for this instrument over the past 3 years.

No PM program tasks were identified for the following IST support instruments:

PB0 PI-06354B ***
PB0 PI-06354D ***
PB0 PI-06355B ***
PB0 PI-06355D ***
PB0 LE-03992A
PB0 LE-03992B
PB0 LIT-03992A
PB0 LIT-03992B
PB0 P-032A-M Ammeter (No CHAMPS ID)
PB0 P-032B-M Ammeter (No CHAMPS ID)
PB0 P-032C-M Ammeter (No CHAMPS ID)
PB0 P-032D-M Ammeter (No CHAMPS ID)
PB0 P-032E-M Ammeter (No CHAMPS ID)
PB0 P-032F-M Ammeter (No CHAMPS ID)
PB1 FI-03087
PB2 FI-03087
PB1 P-002A Oil Pressure Gauge (No CHAMPS ID)
PB1 P-002B Oil Pressure Gauge (No CHAMPS ID)
PB1 P-002C Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002A Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002B Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002C Oil Pressure Gauge (No CHAMPS ID)
PB1 P-015A-M-AM1
PB1 P-015B-M-AM1

PB2 P-015A-M-AM1
PB2 P-015B-M-AM1
PB1 PI-05976
PB1 PI-05977
PB2 PI-05976
PB2 PI-05977
PB0 TI-00665

A calibration check task with a IR1 (every refueling outage) was recommended for LE-03992A, B in the TRANSDUCERS Component Maintenance Program (CMP 8.6).

A calibration check task with a IM2 (every 18 months) was recommended for LIT-03992A, B in the TRANSMITTERS Component Maintenance Program (CMP 6.1).

It will be recommended that calibration check tasks with a IR1 frequency be added for the following components:

PB0 PI-06354B ***
PB0 PI-06354D ***
PB0 PI-06355B ***
PB0 PI-06355D ***
PB0 P-032A-M Ammeter (No CHAMPS ID)
PB0 P-032B-M Ammeter (No CHAMPS ID)
PB0 P-032C-M Ammeter (No CHAMPS ID)
PB0 P-032D-M Ammeter (No CHAMPS ID)
PB0 P-032E-M Ammeter (No CHAMPS ID)
PB0 P-032F-M Ammeter (No CHAMPS ID)
PB1 FI-03087
PB2 FI-03087
PB1 P-002A Oil Pressure Gauge (No CHAMPS ID)
PB1 P-002B Oil Pressure Gauge (No CHAMPS ID)
PB1 P-002C Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002A Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002B Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002C Oil Pressure Gauge (No CHAMPS ID)
PB1 P-015A-M-AM1
PB1 P-015B-M-AM1
PB2 P-015A-M-AM1
PB2 P-015B-M-AM1
PB1 PI-05976
PB1 PI-05977
PB2 PI-05976
PB2 PI-05977
PB0 TI-00665

*** The CHAMPS database lists "ICP-06.069" and "ICP-06.070" as procedures for PI-06354B, D and PI-06355B, D respectively. These procedures could not be located and do not show up in the ICP index. Therefore, these procedure references are assumed to be invalid.

C) Portable Instrumentation

No multiple failure incidents were identified for the in-scope portable instrumentation.

III) ASME Section XI Test Trends

Data recorded for the ASME Pump IT's was reviewed to identify potential adverse trends associated with the ASME-Required instrumentation. The As-Found data for the past 24 months for this instrumentation was imported from Paradox tables and recorded in Excel files. Graphs were then generated in an effort to identify any potential adverse instrumentation trends (reference attachment 8). The following is a discussion of the instrument trends for each IT:

- IT - 1 (Unit 1 Safety Injection Pumps)

  A potential adverse trend is indicated for P-015B SI Pump Discharge Pressure Indicator PI-00913B. Reference Section II.A.1 above for discussion of this instrument.

  NOTES:

  IT-1 gives the component ID "FI-00659". Per the CHAMPS database, the component ID is "FIT-00659".

- IT - 2 (Unit 2 Safety Injection Pumps)

  A potential adverse trend is indicated for P-015A SI Pump Discharge Pressure Indicator PI-00913A. Reference Section II.A.1 above for discussion of this instrument.

  NOTES:

  IT-2 gives the component ID "FI-00659". Per the CHAMPS database, the component ID is "FIT-00659".

- IT - 3 (Unit 1 Residual Heat Removal Pumps)

  A potential concern is indicated for P-010A RHR Pump Suction Pressure Indicator PI-00653A. After tracking lock-step with P-010B RHR Pump Suction Pressure Indicator PI-00653B for six consecutive quarterly IT's, PI-00653A's indicated pressure *decreased* approximately 8% from 4/22/96 to 7/1/96 while PI-00653B's indicated pressure *increased* less than 1%. I believe this indicates a potential adverse drift in PI-00653A and this indicator should be checked out prior to the next performance of IT-3.

  NOTES:

  (1) RHR Pump flow rate is adjusted during the IT and not recorded. Thus, FIT-00660 is not trended.
  (2) IT-3 gives the component ID "FI-00660". Per the CHAMPS database, the component ID is "FIT-00660".

- IT - 4 (Unit 2 Residual Heat Removal Pumps)

  No adverse trends are indicated for the Unit 2 RHR Pump IST instrumentation.

  NOTES:

  (1) RHR Pump flow rate is adjusted during the IT and not recorded. Thus, FIT-00660 is not trended.
  (2) IT-4 gives the component ID "FI-00660". Per the CHAMPS database, the component ID is "FIT-00660".

- IT - 5 (Unit 1 Containment Spray Pumps)

  One data point (12/4/94) for P-014A CS Pump Suction Pressure Indicator PI-00933C was found to be significantly higher than expected. However, the indicator has not shown any additional abnormalities in the six performances of IT-5 since that time and thus no adverse trends are currently indicated.

  NOTES:

  (1) CS Pump flow rate is adjusted during the IT and not recorded. Thus, FIT-00661 is not trended.
  (2) IT-5 gives the component ID "FI-00661". Per the CHAMPS database, the component ID is "FIT-00661".

- IT - 6 (Unit 2 Containment Spray Pumps)

  One data point (11/28/95) for P-014B CS Pump Suction Pressure Indicator PI-00933D was found to be significantly higher than expected. A work order was written for this incident and it was determined that the indicator was out-of-calibration and unable to be re-calibrated (see previous section II.A.3 for cal history discussion). The gauge was replaced and the indicator has read satisfactorily during the two performances of IT-6 since that time. No adverse trends are currently indicated.

  NOTES:

  (1) CS Pump flow rate is adjusted during the IT and not recorded. Thus, FIT-00661 is not trended.
  (2) IT-6 gives the component ID "FI-00661". Per the CHAMPS database, the component ID is "FIT-00661".

- IT - 7 (Service Water Pumps)

  No instrumentation trends were generated for the SW Pump IST instrumentation (reference NOTES below).

  NOTES:

  (1) SW pumps discharge pressure is adjusted during the IT. Thus, PI-02815, PI-02846, PI-02847, PI-02848, PI-02849, PI-02850 are not trended.
  (2) Forebay Level varies considerably between tests. Thus, Forebay Level instrumentation is not trended.
  (3) Not enough SW pump flow rate (header flow) instrumentation (FI-04459A, B) data points identified to trend.
  (4) EWR 96-168 identified a concern with the reliability of the SW Pump Discharge Pressure gauges and the inaccuracies associated with reading the SW Header Flow Rate indicators (indicators "jump around"). The discharge pressure gauges are planned to be replaced with better quality (and more accurate) gauges. The flow rate indicators will be upgraded to increase the damping to make the indicators easier to obtain an accurate reading.

- IT - 8A (Unit 1 Turbine Driven Aux Feedwater Pump)

  No adverse trends are indicated for the Unit 1 Turbine Driven Aux Feedwater Pump IST instrumentation.

  NOTES:

  (1) P-029 suction pressure (PI-04013A) varies with CST level/temp and thus is not trended.
  (2) IT-8A gives the component ID "FI-04049". Per the CHAMPS database, the component ID is "FIT-04049".

- IT - 9A (Unit 2 Turbine Driven Aux Feedwater Pump)

  No adverse trends are indicated for the Unit 2 Turbine Driven Aux Feedwater Pump IST instrumentation.

  NOTES:

  (1) P-029 suction pressure (PI-04013A) varies with CST level/temp and thus is not trended.
  (2) IT-9A gives the component ID "FI-04049". Per the CHAMPS database, the component ID is "FIT-04049".

- IT - 10 (Motor Driven Aux Feedwater Pumps)

  No adverse trends are indicated for the Motor Driven Aux Feedwater Pump IST instrumentation.

  NOTES:

  (1) Not enough AFP flow rate instrumentation (FIT-04050A, B) data points identified to trend.
  (5) IT-10 gives the component ID's "FI-04050A" and "FI-04050B". Per the CHAMPS database, the component ID's are "FIT-04050A" and FIT-04050B".

- IT - 11 (SFP Cooling Pumps)

  The trend graphs for the SFP Cooling Pump Discharge Pressure Indicators PI-00631A, B reflect a fairly erratic pattern of data points and it is unclear whether any adverse trends are indicated for these gauges. Considering the minimal failure history identified for these gauges (one out-of-calibration incident identified), it is unlikely that these graphs reflect an adverse trend.

  It should be noted that the trend graphs for the suction pressure indicators (PI-00658A, B), taken separately, also vary considerably. However, when compared to each other it can be seen that they track each other fairly well. Since these gauges measure the pressure in essentially the same line, this makes sense and thus no adverse trends are indicated.

  NOTES:

  SFP Cooling Pump flow rate is adjusted during the IT. Thus, FI-00652 is not trended.

- IT - 12 (Unit 1 Component Cooling Water Pumps)

  No adverse trends are indicated for the Unit 1 Component Cooling Water Pumps IST instrumentation.

  NOTES:

  Component Cooling Pump flow rate is adjusted during the IT. Thus, FI-00619 is not trended.

- IT - 13 (Unit 2 Component Cooling Water Pumps)

  A potential adverse trend is indicated for the Unit 2 Component Cooling Water Pumps Suction Pressure Indicators PI-00692A, B. These indicators, due to their location, should indicate approximately the same pressure. As indicated on the graphs, this was the case for the tests run from 9/94 to 2/96 where the gauges remained within an average of 4% of each other. However, during the performance of the 2/14/96 test, these indicators indicated approximately 15% different and on the performance of the 6/2/96 test, these indicators indicated approximately 9% differe This may indicate a drift concern for either one, or both, of these gauges. It is recommended that these gauges be checked prior to the next performance of IT-13.

  NOTES:

  Component Cooling Pump flow rate is adjusted during the IT. Thus, FI-00619 is not trended.

- IT - 14 (Fuel Oil Transfer Pumps)

  No adverse trends are indicated for the Fuel Oil Transfer Pumps IST instrumentation.

  NOTES:

  (1) Not enough DG Fuel Oil Transfer Pump P-206A, P-207A flow rate instrumentation (FI-03905) data points identified to trend.
  (2) Not enough DG Fuel Oil Transfer Pump P-206A, P-207A discharge pressure instrumentation (PI-03973A, PI-03974A) data points identified to trend.

- IT - 15 (Chilled Water Recirc Pumps)

  No adverse trends are indicated for the Chilled Water Recirc Pumps IST instrumentation.

- IT - 17 (Unit 1 Boric Acid Transfer Pumps)

  One data point (6/15/96) was identified as being considerably higher than average for Unit 1 Boric Acid Transfer Pumps Suction Pressure Indicator PI-00184. The gauge read satisfactorily on the next (and last) performance of IT-17. No adverse trends are currently indicated.

  Two consecutive data points (3/16/96, 5/3/96) were considerably lower than average for Unit 1 Boric Acid Transfer Pumps Discharge Pressure Indicator PI-00108. A work order was written for this condition (9604948) and the gauge was found to be out-of-calibration low and failed. The gauge was replaced and has indicated satisfactorily for the three performances of IT-17 since. No adverse trends are currently indicated.

  NOTES:

  (1) Boric Acid Transfer Pump flow rate is adjusted during the IT. Thus, FT-00185 is not trended.
  (2) PI-00108 and PI-00184 are currently calibrated in ICP 6.41 which is performed every 3 years (3A2). It will be recommended that the calibration check frequency of these gauges be changed to annually (1A2) which would be in keeping with the other IST instrumentation.

- IT - 18 (Unit 2 Boric Acid Transfer Pumps)

  Fairly erratic data points were identified for both the Unit 2 Boric Acid Transfer Pumps Discharge and Suction Pressure Indicators PI-00108 and PI-00184.

  PI-00108 has been previously identified as having an adverse failure history. A recommendation will be made to evaluate this instrument, in light of the failure history data identified in the IST instrumentation review, to determine the appropriate course of action. This gauge is currently calibrated in ICP 6.41 which is performed every 3 years (3A2). It will be recommended that the calibration check frequency of this gauge be changed to annually (1A2) which would be in keeping with the other IST instrumentation.

  PI-00184 was identified in Condition Report 96-485 as not having been calibrated for approximately 3 1/2 years. It was subsequently found to be OOC (reference WO 9607883). Action 1 of the CR calls for an evaluating the possibility of using Perma-Cal gauges within the Boric Acid Transfer system. This gauge is currently calibrated in ICP 6.41 which is performed every 3 years (3A2). It will be recommended that the calibration check frequency of this gauge be changed to annually (1A2) which would be in keeping with the other IST instrumentation.

  NOTES:

  Boric Acid Transfer Pump flow rate is adjusted during the IT. Thus, FT-00185 is not trended.

- IT - 21 (Unit 1 Charging Pumps)

  No adverse trends are indicated for the Unit 1 Charging Pumps IST instrumentation.

- IT - 22 (Unit 2 Charging Pumps)

  No adverse trends are indicated for the Unit 2 Charging Pumps IST instrumentation.

IV) Instrumentation Applicability

A comparison was made between the actual accuracy of the ASME-Required instrumentation and the accuracy requirements of ASME Section XI. No discrepancies were noted.

A comparison was made between the actual full-scale range of the ASME-Required indicators and the range requirements of ASME Section XI. The following potential discrepancies were noted and should be investigated further:

(1) HX-2 Regenerative Heat Exchanger Inlet Flow Indicators (PB1/2 FI-00128)

The most conservative (lowest) values of reference flow for these indicators are 42.8 gpm for Unit 1 (1P-002B) and 42 gpm for Unit 2 (2P-002C). This gives the maximum allowed values of full-scale range (3X reference) for the indicators of 128.4 gpm for Unit 1 and 126 gpm for Unit 2. The actual full-scale range for these indicators is 140 gpm. Therefore, these indicators do not meet the ASME requirement for full-scale range.

(2) HX-12A/B Component Cooling Heat Exchanger Return Flow Indicators (PB1/2 FI-00619)

The most conservative (lowest) values of reference flow for these indicators are 2583 gpm for Unit 1 (1P-011B) and 2600 gpm for Unit 2 (2P-011B). This gives the maximum allowed values of full-scale range (3X reference) for the indicators of 7749 gpm for Unit 1 and 7800 gpm for Unit 2. The actual full-scale range for these indicators is 8000 gpm. Therefore, these indicators do not meet the ASME requirement for full-scale range.

V) I&C Human Factors

The instrumentation full-scale range and scale divisions was documented for each of the ASME-Required indicators in order to determine the "readability" of the instrument. It is assumed that the indicator can be read accurately to one-half of the smallest division. A "readability accuracy" was calculated for each ASME-Required indicator simply by dividing the full-scale range of the instrument into one-half of the smallest division/increment. If this "readability accuracy" was reasonable, compared to the indicators instrument accuracy, then it was considered acceptable. No adverse conditions were noted.

In addition to the instrument full-scale range and scale divisions, the physical location and instrument size was noted in order to determine if any conditions exist which may hamper the accurate reading/recording of the required information. No adverse conditions were noted.

The following instrumentation loops contain control room indicators which are used to verify ASME Section XI Pump IST requirements:

- HX-2 Regenerative Heat Exchanger Inlet Flow (PB1/2 FI-00128)
- RC Loop A Intermediate Leg Wide Range Pressure (PB1/2 PT-00420A)

The HX-2 Regenerative Heat Exchanger Inlet Flow instrumentation loop using the control room indicator gives a loop accuracy of approximately 1.601% (indicator accuracy of 1.5%, transmitter accuracy of 0.25% and signal conditioner accuracy of 0.5%). The RC Loop A Intermediate Leg Wide Range Pressure instrumentation loop using the control room indicator gives a loop accuracy of approximately 1.871% (indicator accuracy of 1.5%, transmitter accuracy of 1.0% and signal conditioner accuracy of 0.5%). Both of these loops output to computer points which have an accuracy of approximately 0.025%. The HX-2 Regenerative Heat Exchanger Inlet Flow instrumentation loop consisting of the transmitter, signal conditioner and computer point has an overall accuracy of 0.560% which is nearly three times more accurate than the indicator loop. The RC Loop A Intermediate Leg Wide Range Pressure instrumentation loop consisting of the transmitter, signal conditioner and computer point has an overall accuracy of 1.118%. In order to take advantage of the improved accuracy, it will be recommended to consider the use of the computer point in lieu of the control room indicators for these loops in their respective IT's.

VI) Recommendations

A. Review/update CHAMPS database equipment records for each of the IST instruments to ensure that they are complete and accurate.

B. Assign component ID's and generate the CHAMPS database records for the following components:

- PB1,2 Turbine Driven Aux Feedwater Pump turbine & pump bearing temperature thermocouples
- Service Water Pump Motor Ammeters
- PB1/2 Charging Pump Oil Pressure gauges

C. Identify the accuracy of ASME-Required instruments PB1/2 PI-00653A/B (need manufacturer/model#) to determine if they meet ASME requirements (gauges not walked down; they are located in a locked high radiation area).

D. Identify the accuracy of the following ASME-Required portable instrumentation to determine if they meet ASME requirements (accuracy not identified during review):

- Palomar Technology Model 6101 Microlog Vibration Data Collector
- Cronus & Cole-Parmer Stopwatches

E. Add calibration check tasks with a IR1 frequency (every refueling outage) for the following components:

PB0 FI-03905
PB0 FI-03928
PB0 FI-03929

F. Add calibration check tasks with a IR1 frequency (every refueling outage) for the following components:

PB0 PI-06354B ***
PB0 PI-06354D ***
PB0 PI-06355B ***
PB0 PI-06355D ***
PB0 P-032A-M Ammeter (No CHAMPS ID)
PB0 P-032B-M Ammeter (No CHAMPS ID)
PB0 P-032C-M Ammeter (No CHAMPS ID)
PB0 P-032D-M Ammeter (No CHAMPS ID)
PB0 P-032E-M Ammeter (No CHAMPS ID)
PB0 P-032F-M Ammeter (No CHAMPS ID)
PB1 FI-03087
PB2 FI-03087
PB1 P-002A Oil Pressure Gauge (No CHAMPS ID)
PB1 P-002B Oil Pressure Gauge (No CHAMPS ID)
PB1 P-002C Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002A Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002B Oil Pressure Gauge (No CHAMPS ID)
PB2 P-002C Oil Pressure Gauge (No CHAMPS ID)
PB1 P-015A-M-AM1
PB1 P-015B-M-AM1
PB2 P-015A-M-AM1
PB2 P-015B-M-AM1
PB1 PI-05976
PB1 PI-05977
PB2 PI-05976
PB2 PI-05977
PB0 TI-00665

G. Evaluate the following ASME-Required Instrumentation, in light of the failure history data identified in the IST instrumentation review, to determine the appropriate course of action:

- Unit 2 Boric Acid Transfer Pumps Discharge Pressure Indicator PI-00108
- P-12A SFP Cooling Pump Suction Pressure Indicator PI-00658A
- Unit 2 P-014B CS Pump Suction Pressure Indicator PI-00933D
- Unit 2 RC Loop A Intermediate Leg Wide Range Pressure Transmitter PT-00420A

ATTACHMENT 1
IST Instrumentation & Associated IT

Unit	Comp ID	Loop	IT
PB0	DPIS-02936	N/A	12, 13
PB0	DPIS-02937	N/A	12, 13
PB0	DPIS-02938	N/A	12, 13
PB0	E/I-03510	3510	7
PB0	FI-00636	N/A	530, 530A, 530B, 535, 535A, 535B
PB0	FI-00652	N/A	11
PB0	FI-03905	N/A	14
PB0	FI-03928	N/A	14
PB0	FI-03929	N/A	14
PB0	FI-04007	4007	10, 290, 295
PB0	FI-04014	4014	10, 290, 295
PB0	FI-04459A	N/A	7
PB0	FI-04459B	N/A	7
PB0	FI-04666	N/A	15
PB0	FI-04667	N/A	15
PB0	FIT-04050A	N/A	10, 290, 295
PB0	FIT-04050B	N/A	10, 290, 295
PB0	FIT-04459A	N/A	7
PB0	FIT-04459B	N/A	7
PB0	FM-04007A	4007	10, 290, 295
PB0	FM-04007B	4007	10, 290, 295
PB0	FM-04014A	4014	10, 290, 295
PB0	FM-04014B	4014	10, 290, 295
PB0	FT-04007	4007	10, 290, 295
PB0	FT-04014	4014	10, 290, 295
PB0	G-01-API-1	N/A	100
PB0	G-01-API-2	N/A	100
PB0	G-02-API-1	N/A	100
PB0	G-02-API-2	N/A	100
PB0	LE-03992A	3992A	14
PB0	LE-03992B	3992B	14
PB0	LI-00171	171	17, 18
PB0	LI-04038	4038	290, 295
PB0	LI-04039	4039	290, 295
PB0	LIT-03992A	3992A	14
PB0	LIT-03992B	3992B	14
PB0	LM-00171	171	17, 18
PB0	LM-04038-1	4038	290, 295
PB0	LM-04039-1	4039	290, 295
PB0	LT-00171	171	17, 18
PB0	LT-04038	4038	290, 295
PB0	LT-04039	4039	290, 295
PB0	P-032A-M Ammeter	N/A	7
PB0	P-032B-M Ammeter	N/A	7
PB0	P-032C-M Ammeter	N/A	7
PB0	P-032D-M Ammeter	N/A	7

PB0	P-032E-M Ammeter	N/A	7
PB0	P-032F-M Ammeter	N/A	7
PB0	P-038A Inboard Pump Bearing Temp TC	2000	8, 8A, 10
PB0	P-038A Outboard Pump Bearing Temp TC	2000	8, 8A, 10
PB0	P-038B Inboard Pump Bearing Temp TC	2000	8, 8A, 10
PB0	P-038B Outboard Pump Bearing Temp TC	2000	8, 8A, 10
PB0	PI-00631A	N/A	11
PB0	PI-00631B	N/A	11
PB0	PI-00651	N/A	530, 530A, 530B, 535, 535A, 535B
PB0	PI-00658A	N/A	11
PB0	PI-00658B	N/A	11
PB0	PI-02815	N/A	7
PB0	PI-02844	2844	7
PB0	PI-02845	2845	7
PB0	PI-02846	N/A	7
PB0	PI-02847	N/A	7
PB0	PI-02848	N/A	7
PB0	PI-02849	N/A	7
PB0	PI-02850	N/A	7
PB0	PI-03973A	N/A	14
PB0	PI-03973B	N/A	14
PB0	PI-03974A	N/A	14
PB0	PI-03974B	N/A	14
PB0	PI-04010A	N/A	10, 290, 295
PB0	PI-04011	N/A	290, 295
PB0	PI-04012	4012	10
PB0	PI-04017A	N/A	10, 290, 295
PB0	PI-04018	N/A	290, 295
PB0	PI-04019	4019	10
PB0	PI-04741	N/A	15
PB0	PI-04742	N/A	15
PB0	PI-04743	N/A	15
PB0	PI-04744	N/A	15
PB0	PI-04745	N/A	15
PB0	PI-04746	N/A	15
PB0	PI-04747	N/A	15
PB0	PI-04748	N/A	15
PB0	PI-06354B	N/A	100
PB0	PI-06354D	N/A	100
PB0	PI-06355B	N/A	100
PB0	PI-06355D	N/A	100
PB0	PM-02844-1	2844	7
PB0	PM-02845-1	2845	7
PB0	PT-02844	2844	7
PB0	PT-02845	2845	7
PB0	PT-04012	4012	10
PB0	PT-04019	4019	10
PB0	T3510 (PPCS)	3510	7
PB0	TI-00633A	N/A	11
PB0	TI-00633B	N/A	11

PB[illegible]	[illegible]565	N/A	11
PB0	[illegible]045	N/A	8A, 9A, 10, 290, 295
PB0	TI-04046	N/A	8, 9A, 10, 290, 295
PB1	E/I-03598	3598	7
PB1	F619 (PPCS)	619	12
PB1	FI-00115	N/A	21
PB1	FI-00116	N/A	21
PB1	FI-00128	128	21
PB1	FI-00619	619	12
PB1	FI-00626	626	3A, 750
PB1	FI-00924	924	760
PB1	FI-00925	925	760
PB1	FI-00928	928	3A, 750
PB1	FI-00930	930	5
PB1	FI-03087	N/A	110
PB1	FI-04002	4002	8A, 290
PB1	FI-04036	4036	8A, 9A, 10, 290, 295
PB1	FI-04037	4037	8A, 9A, 10, 290, 295
PB1	FIT-00659	N/A	1, 520A
PB1	FIT-00660	N/A	3, 520A
PB1	FIT-00661	N/A	5
PB1	FIT-00930	930	5
PB1	FIT-04049	N/A	8, 8A, 290
PB1	FM-00128	128	21
PB1	FM-00626	626	3A, 750
PB1	FM-00924-2	924	760
PB1	FM-00925-2	925	760
PB1	FM-00928-2	928	3A, 750
PB1	FM-04002A	4002	8A, 290
PB1	FM-04002B	4002	8A, 290
PB1	FM-04036A	4036	8A, 9A, 10, 290, 295
PB1	FM-04036B	4036	8A, 9A, 10, 290, 295
PB1	FM-04037A	4037	8A, 9A, 10, 290, 295
PB1	FM-04037B	4037	8A, 9A, 10, 290, 295
PB1	FT-00128	128	21
PB1	FT-00185	N/A	17, 730
PB1	FT-00619	619	12
PB1	FT-00626	626	3A, 750
PB1	FT-00924	924	760
PB1	FT-00925	925	760
PB1	FT-00928	928	3A, 750
PB1	FT-04002	4002	8A, 290
PB1	FT-04036	4036	8A, 9A, 10, 290, 295
PB1	FT-04037	4037	8A, 9A, 10, 290, 295
PB1	L3598 (PPCS)	3598	7
PB1	LI-00172	172	17
PB1	LI-00934	934	1, 520A
PB1	LI-00935A	935	1
PB1	LI-00938	938	1, 520A
PB1	LI-00939A	939	1

PB1	LI-00972	972	760
PB1	LM-00172	172	17
PB1	LM-00972-1	972	760
PB1	LT-00172	172	17
PB1	LT-00972	972	760
PB1	LT-03598	3598	7
PB1	LT/LC-00934	934	1
PB1	LT/LC-00935	935	1
PB1	LT/LC-00938	938	1
PB1	LT/LC-00939	939	1
PB1	P-002A Oil Press Gauge	N/A	21
PB1	P-002B Oil Press Gauge	N/A	21
PB1	P-002C Oil Press Gauge	N/A	21
PB1	P-015A-M-AM1	N/A	1, 760
PB1	P-015B-M-AM1	N/A	1, 760
PB1	P-029 Inboard Pump Bearing Temp TC	2000	8, 8A, 10
PB1	P-029 Inboard Turbine Bearing Temp TC	2000	8, 8A, 10
PB1	P-029 Outboard Pump Bearing Temp TC	2000	8, 8A, 10
PB1	P-029 Outboard Turbine Bearing Temp TC	2000	8, 8A, 10
PB1	P2289 (PPCS)	2289	300
PB1	P2290 (PPCS)	2290	300
PB1	PI-00108	N/A	17
PB1	PI-00139	139	21, 730
PB1	PI-00184	N/A	17
PB1	PI-00420A	420	21
PB1	PI-00468	468	8A, 9A, 10, 90, 290, 295
PB1	PI-00478	478	8A, 9A, 10, 90, 290, 295
PB1	PI-00617A	N/A	12
PB1	PI-00617B	N/A	12
PB1	PI-00628	628	520A, 530, 530A
PB1	PI-00629	629	520A, 530, 530B
PB1	PI-00653A	N/A	3, 40, 520A
PB1	PI-00653B	N/A	3, 40, 520A
PB1	PI-00655A	N/A	3
PB1	PI-00655B	N/A	3
PB1	PI-00692A	N/A	12
PB1	PI-00692B	N/A	12
PB1	PI-00913A	N/A	1
PB1	PI-00913B	N/A	1
PB1	PI-00922	922	520A, 520B, 530B, 760
PB1	PI-00923	923	530A, 760
PB1	PI-00933A	N/A	5
PB1	PI-00933B	N/A	5
PB1	PI-00933C	N/A	5
PB1	PI-00933D	N/A	5
PB1	PI-00974	N/A	1, 760
PB1	PI-04004	N/A	290
PB1	PI-04005	4005	8, 8A
PB1	PI-04013A	N/A	8, 8A, 290
PB1	PI-04458	N/A	8, 8A

PB1	PI-05976	N/A	280, 280A
PB1	PI-05977	N/A	280, 280A
PB1	PM-00420A-1	420	21
PB1	PM-00468A	468	8A, 9A, 10, 90, 290, 295
PB1	PM-00468B	468	8A, 9A, 10, 90, 290, 295
PB1	PM-00478A	478	8A, 9A, 10, 90, 290, 295
PB1	PM-00478B	478	8A, 9A, 10, 90, 290, 295
PB1	PT-00139	139	21, 730
PB1	PT-00420A	420	21
PB1	PT-00468	468	8A, 9A, 10, 90, 290, 295
PB1	PT-00478	478	8A, 9A, 10, 90, 290, 295
PB1	PT-00628	628	520A, 530, 530A
PB1	PT-00629	629	520A, 530, 530B
PB1	PT-00922	922	520A, 520B, 530B, 760
PB1	PT-00923	923	530A, 760
PB1	PT-02289	2289	300
PB1	PT-02290	2290	300
PB1	PT-04005	4005	8, 8A
PB1	T2104 (PPCS)	2104	300
PB1	T2105 (PPCS)	2105	300
PB1	TE-00140	140	21
PB1	TE-00622	622	3
PB1	TE-00623	623	3
PB1	TE-02104	2104	300
PB1	TE-02105	2105	300
PB1	TE-03510	3510	7
PB1	TI-00140	140	21
PB1	TI-00622A	622	3
PB1	TI-00623A	623	3
PB1	TI-00960	N/A	1, 5, 760
PB1	TM-00140	140	21
PB1	TM-00622	622	3
PB1	TM-00622-2	622	3
PB1	TM-00623	623	3
PB1	TM-00623-2	623	3
PB1	TR-2000B	2000	8, 8A, 10
PB2	E/I-03598	3598	7
PB2	F619 (PPCS)	619	13
PB2	FI-00115	N/A	22
PB2	FI-00116	N/A	22
PB2	FI-00128	128	22
PB2	FI-00619	619	13
PB2	FI-00626	626	4A, 755
PB2	FI-00924	924	765
PB2	FI-00925	925	765
PB2	FI-00928	928	4A, 755
PB2	FI-00930	930	6
PB2	FI-03087	N/A	115
PB2	FI-04002	4002	9A, 295
PB2	FI-04036	4036	8A, 9A, 10, 290, 295

PB2	FI-04037	4037	8A, 9A, 10, 290, 295
PB2	FIT-00659	N/A	2, 525A
PB2	FIT-00660	N/A	4, 525A
PB2	FIT-00661	N/A	6
PB2	FIT-00930	930	6
PB2	FIT-04049	N/A	9A, 295
PB2	FM-00128	128	22
PB2	FM-00626	626	4A, 755
PB2	FM-00924-2	924	765
PB2	FM-00925-2	925	765
PB2	FM-00928-2	928	4A, 755
PB2	FM-04002A	4002	9A, 295
PB2	FM-04002B	4002	9A, 295
PB2	FM-04036A	4036	8A, 9A, 10, 290, 295
PB2	FM-04036B	4036	8A, 9A, 10, 290, 295
PB2	FM-04037A	4037	8A, 9A, 10, 290, 295
PB2	FM-04037B	4037	8A, 9A, 10, 290, 295
PB2	FT-00128	128	22
PB2	FT-00185	N/A	18, 735
PB2	FT-00619	619	13
PB2	FT-00626	626	4A, 755
PB2	FT-00924	924	765
PB2	FT-00925	925	765
PB2	FT-00928	928	4A, 755
PB2	FT-04002	4002	9A, 295
PB2	FT-04036	4036	8A, 9A, 10, 290, 295
PB2	FT-04037	4037	8A, 9A, 10, 290, 295
PB2	L3598 (PPCS)	3598	7
PB2	LI-00172	172	18
PB2	LI-00934	934	2, 525A
PB2	LI-00935A	935	2
PB2	LI-00938	938	2, 525A
PB2	LI-00939A	939	2
PB2	LI-00972	972	765
PB2	LM-00172	172	18
PB2	LM-00972-1	972	765
PB2	LT-00172	172	18
PB2	LT-00972	972	765
PB2	LT-03598	3598	7
PB2	LT/LC-00934	934	2
PB2	LT/LC-00935	935	2
PB2	LT/LC-00938	938	2
PB2	LT/LC-00939	939	2
PB2	P-002A Oil Press Gauge	N/A	22
PB2	P-002B Oil Press Gauge	N/A	22
PB2	P-002C Oil Press Gauge	N/A	22
PB2	P-015A-M-AM1	N/A	2, 765
PB2	P-015B-M-AM1	N/A	2, 765
PB2	P-029 Inboard Pump Bearing Temp TC	2000	8, 8A, 10
PB2	P-029 Inboard Turbine Bearing Temp TC	2000	8, 8A, 10

[illegible]	P-029 Outboard Pump Bearing Temp TC	2000	8, 8A, 10
[illegible]	P-029 Outboard Turbine Bearing Temp TC	2000	8, 8A, 10
[illegible]	P2289 (PPCS)	2289	305
PB2	P2290 (PPCS)	2290	305
PB2	PI-00108	N/A	18
PB2	PI-00139	139	22, 735
PB2	PI-00184	N/A	18
PB2	PI-00420A	420	22
PB2	PI-00468	468	8A, 9A, 10, 95, 290, 295
PB2	PI-00478	478	8A, 9A, 10, 95, 290, 295
PB2	PI-00617A	N/A	13
PB2	PI-00617B	N/A	13
PB2	PI-00628	628	525A, 535, 535A
PB2	PI-00629	629	525A, 535, 535B
PB2	PI-00653A	N/A	4, 45, 525A
PB2	PI-00653B	N/A	4, 45, 525A
PB2	PI-00655A	N/A	4
PB2	PI-00655B	N/A	4
PB2	PI-00692A	N/A	13
PB2	PI-00692B	N/A	13
PB2	PI-00913A	N/A	2
PB2	PI-00913B	N/A	2
PB2	PI-00922	922	525A, 525B, 535B, 765
PB2	PI-00923	923	535A, 765
PB2	PI-00933A	N/A	6
PB2	PI-00933B	N/A	6
PB2	PI-00933C	N/A	6
PB2	PI-00933D	N/A	6
PB2	PI-00974	N/A	2, 765
PB2	PI-04004	N/A	295
PB2	PI-04005	4005	9A
PB2	PI-04013A	N/A	9A, 295
PB2	PI-04458	N/A	9A
PB2	PI-05976	N/A	285, 285A
PB2	PI-05977	N/A	285, 285A
PB2	PM-00420A-1	420	22
PB2	PM-00468A	468	8A, 9A, 10, 95, 290, 295
PB2	PM-00468B	468	8A, 9A, 10, 95, 290, 295
PB2	PM-00478A	478	8A, 9A, 10, 95, 290, 295
PB2	PM-00478B	478	8A, 9A, 10, 95, 290, 295
PB2	PT-00139	139	22, 735
PB2	PT-00420A	420	22
PB2	PT-00468	468	8A, 9A, 10, 95, 290, 295
PB2	PT-00478	478	8A, 9A, 10, 95, 290, 295
PB2	PT-00628	628	525A, 535, 535A
PB2	PT-00629	629	525A, 535, 535B
PB2	PT-00922	922	525A, 525B, 535B, 765
PB2	PT-00923	923	535A, 765
PB2	PT-02289	2289	305
PB2	PT-02290	2290	305

PB2	PT-04005	4005	9A
PB2	T2104 (PPCS)	2104	305
PB2	T2105 (PPCS)	2105	305
PB2	TE-00140	140	22
PB2	TE-00622	622	4
PB2	TE-00623	623	4
PB2	TE-02104	2104	305
PB2	TE-02105	2105	305
PB2	TE-03510	3510	7
PB2	TI-00140	140	22
PB2	TI-00622A	622	4
PB2	TI-00623A	623	4
PB2	TI-00960	N/A	2, 6, 765
PB2	TM-00140	140	22
PB2	TM-00622	622	4
PB2	TM-00622-2	622	4
PB2	TM-00623	623	4
PB2	TM-00623-2	623	4
PB2	TR-2000B	2000	9A

ATTACHMENT 2
Installed IST Instrumentation

Unit	Comp ID	Loop	ASME Required Y/N	Cal Procedure	Freq	Reference Value (RV)	Max F.S. Range (3X RV)	F.S. Range (FSR)	Required Accuracy (%)	Actual Accuracy (%)	Loop Accuracy (%)
PB1	**FI-00128**	**128**	**Y**	**1ICP-04.032-1**	**1A2**	**42.8 GPM**	**128.4 GPM**	**140 GPM**	**2.0 (L)**	**1.5**	**1.601**
PB2	**FI-00128**	**128**	**Y**	**2ICP-04.032-1**	**1A2**	**42 GPM**	**126 GPM**	**140 GPM**	**2.0 (L)**	**1.5**	**1.601**
PB1	FM-00128	128	Y	1ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-00128	128	Y	2ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-00128	128	Y	1ICP-04.003-4	1A2	N/A	N/A	N/A	N/A	0.25	N/A
PB2	FT-00128	128	Y	2ICP-04.003-4	1A2	N/A	N/A	N/A	N/A	0.25	N/A
PB1	PI-00139	139	N	ICP 6.21	IM2	N/A	N/A	100 PSI	N/A	1.5	1.581
PB2	PI-00139	139	N	ICP 6.21	IM2	N/A	N/A	100 PSI	N/A	1.5	1.581
PB1	PT-00139	139	N	ICP 6.21	IM2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-00139	139	N	ICP 6.21	IM2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	TE-00140	140	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	TE-00140	140	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	TI-00140	140	N	ICP 6.21	IM2	N/A	N/A	300 F	N/A	1.5	UNK
PB2	TI-00140	140	N	ICP 6.21	IM2	N/A	N/A	300 F	N/A	1.5	UNK
PB1	TM-00140	140	N	ICP 6.21	IM2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	TM-00140	140	N	ICP 6.21	IM2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	LI-00171	171	N	ICP 4.16	1A2	N/A	N/A	100 %	N/A	1.5	1.658
PB0	LM-00171	171	N	ICP 4.16	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	LT-00171	171	N	ICP 4.16	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	LI-00172	172	N	ICP 4.16	1A2	N/A	N/A	100 %	N/A	1.5	1.658
PB2	LI-00172	172	N	ICP 4.16	1A2	N/A	N/A	100 %	N/A	1.5	1.658
PB1	LM-00172	172	N	ICP 4.16	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	LM-00172	172	N	ICP 4.16	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	LT-00172	172	N	ICP 4.16	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	LT-00172	172	N	ICP 4.16	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	P-029 Inboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	P-029 Inboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	P-029 Inboard Turbine Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A

PB2	P-029 Inboard Turbine Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	P-029 Outboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	P-029 Outboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	P-029 Outboard Turbine Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	P-029 Outboard Turbine Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB0	P-038A Inboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB0	P-038A Outboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB0	P-038B Inboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB0	P-038B Outboard Pump Bearing Temp TC	2000	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	TR-02000B	2000	N	ICP 5.43	1A2	N/A	N/A	250 F	N/A	0.25	UNK
PB2	TR-02000B	2000	N	ICP 5.43	1A2	N/A	N/A	250 F	N/A	0.25	UNK
PB1	T2104 (PPCS)	2104	N	1ICP 5.32	1A2	N/A	N/A	450 F	N/A	0.025	UNK
PB2	T2104 (PPCS)	2104	N	2ICP 5.32	1A2	N/A	N/A	450 F	N/A	0.025	UNK
PB1	TE-02104	2104	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	TE-02104	2104	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	T2105 (PPCS)	2105	N	1ICP 5.32	1A2	N/A	N/A	450 F	N/A	0.025	UNK
PB2	T2105 (PPCS)	2105	N	2ICP 5.32	1A2	N/A	N/A	450 F	N/A	0.025	UNK
PB1	TE-02105	2105	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	TE-02105	2105	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	P2289 (PPCS)	2289	N	ICP 5.53	1A2	N/A	N/A	1600 PSIG	N/A	0.025	0.501
PB2	P2289 (PPCS)	2289	N	ICP 5.53	1A2	N/A	N/A	1600 PSIG	N/A	0.025	0.501
PB1	PT-02289	2289	N	ICP 5.53	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-02289	2289	N	ICP 5.53	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	P2290 (PPCS)	2290	N	ICP 5.53	1A2	N/A	N/A	1600 PSIG	N/A	0.025	0.501

PB2	P2290 (PPCS)	2290	N	ICP 5.53	1A2	N/A	N/A	1600 PSIG	N/A	0.025	0.501
PB1	PT-02290	2290	N	ICP 5.53	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-02290	2290	N	ICP 5.53	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	PI-02844	2844	N	2ICP-06.050	1A2	N/A	N/A	150 PSIG	N/A	1.5	1.658
PB0	PM-02844-1	2844	N	2ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	PT-02844	2844	N	ICP-06.059	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	PI-02845	2845	N	1ICP-06.050	1A2	N/A	N/A	150 PSIG	N/A	1.5	1.658
PB0	PM-02845-1	2845	N	1ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	PT-02845	2845	N	ICP-06.059	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	E/I-03510	3510	N	ICP 6.29	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	T3510 (PPCS)	3510	N	ICP 6.29	1A2	N/A	N/A	100 F	N/A	0.025	UNK
PB1	TE-03510	3510	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	TE-03510	3510	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	**E/I-03598**	**3598**	**Y**	**ICP 6.42**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**
PB2	**E/I-03598**	**3598**	**Y**	**ICP 6.42**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**
PB1	**L3598 (PPCS)**	**3598**	**Y**	**ICP 6.42**	**1A2**	**N/A**	**N/A**	**243"**	**N/A**	**0.025**	**1.000**
PB2	**L3598 (PPCS)**	**3598**	**Y**	**ICP 6.42**	**1A2**	**N/A**	**N/A**	**243"**	**N/A**	**0.025**	**1.000**
PB1	**LT-03598**	**3598**	**Y**	**ICP 6.42**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**1.0**	**N/A**
PB2	**LT-03598**	**3598**	**Y**	**ICP 6.42**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**1.0**	**N/A**
PB0	LE-03992A	3992A	N	NONE	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB0	LIT-03992A	3992A	N	NONE	N/A	N/A	N/A	100%	N/A	0.1	UNK
PB0	LE-03992B	3992B	N	NONE	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB0	LIT-03992B	3992B	N	NONE	N/A	N/A	N/A	100%	N/A	0.1	UNK
PB1	FI-04002	4002	N	1ICP-04.032-1	1A2	N/A	N/A	400 GPM	N/A	1.5	1.732
PB2	FI-04002	4002	N	2ICP-04.032-1	1A2	N/A	N/A	400 GPM	N/A	1.5	1.732
PB1	FM-04002A	4002	N	1ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-04002A	4002	N	2ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FM-04002B	4002	N	1ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-04002B	4002	N	2ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-04002	4002	N	1ICP-04.003-5	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FT-04002	4002	N	2ICP-04.003-5	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	**PI-04005**	**4005**	**Y**	**1ICP-04.010-2**	**1A2**	**N/A**	**N/A**	**1600 PSIG**	**2.0 (L)**	**1.5**	**1.581**
PB2	**PI-04005**	**4005**	**Y**	**2ICP-04.010-2**	**1A2**	**N/A**	**N/A**	**1600 PSIG**	**2.0 (L)**	**1.5**	**1.581**
PB1	**PT-04005**	**4005**	**Y**	**1ICP-04.010-2**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**
PB2	**PT-04005**	**4005**	**Y**	**2ICP-04.010-2**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**
PB0	FI-04007	4007	N	ICP 13.8	1A2	N/A	N/A	300 GPM	N/A	1.5	1.820
PB0	FM-04007A	4007	N	ICP 13.8	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	FM-04007B	4007	N	ICP 13.8	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	FT-04007	4007	N	ICP 13.8	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB0	**PI-04012**	**4012**	**Y**	**ICP 13.8**	**1A2**	**N/A**	**N/A**	**1600 PSIG**	**2.0 (L)**	**1.5**	**1.581**
PB0	**PT-04012**	**4012**	**Y**	**ICP 13.8**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**

PB0	FI-04014	4014	N	ICP 13.8	1A2	N/A	N/A	300 GPM	N/A	1.5	1.820
PB0	FM-04014A	4014	N	ICP 13.8	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	FM-04014B	4014	N	ICP 13.8	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	FT-04014	4014	N	ICP 13.8	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB0	**PI-04019**	**4019**	**Y**	**ICP 13.8**	**1A2**	**N/A**	**N/A**	**1600 PSIG**	**2.0 (L)**	**1.5**	**1.581**
PB0	**PT-04019**	**4019**	**Y**	**ICP 13.8**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**
PB1	FI-04036	4036	N	1ICP-04.032-1	1A2	N/A	N/A	500 GPM	N/A	1.5	1.820
PB2	FI-04036	4036	N	2ICP-04.032-1	1A2	N/A	N/A	500 GPM	N/A	1.5	1.820
PB1	FM-04036A	4036	N	1ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-04036A	4036	N	2ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FM-04036B	4036	N	1ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-04036B	4036	N	2ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-04036	4036	N	1ICP-04.006-3	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB2	FT-04036	4036	N	2ICP-04.006-3	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB1	FI-04037	4037	N	1ICP-04.032-1	1A2	N/A	N/A	500 GPM	N/A	1.5	1.820
PB2	FI-04037	4037	N	2ICP-04.032-1	1A2	N/A	N/A	500 GPM	N/A	1.5	1.820
PB1	FM-04037A	4037	N	1ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-04037A	4037	N	2ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FM-04037B	4037	N	1ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-04037B	4037	N	2ICP-04.032-1	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-04037	4037	N	1ICP-04.006-3	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB2	FT-04037	4037	N	2ICP-04.006-3	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB0	LI-04038	4038	N	ICP-13.009-2	1A2	N/A	N/A	21 FT	N/A	1.5	1.750
PB0	LM-04038-1	4038	N	ICP-13.009-2	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	LT-04038	4038	N	ICP-13.009-1	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB0	LI-04039	4039	N	ICP-13.009-2	1A2	N/A	N/A	21 FT	N/A	1.5	1.750
PB0	LM-04039-1	4039	N	ICP-13.009-2	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	LT-04039	4039	N	ICP-13.009-1	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB1	**PI-00420A**	**420**	**Y**	**ICP 13.4**	**1A2**	**N/A**	**N/A**	**3000 PSIG**	**2.0 (L)**	**1.5**	**1.871**
PB2	**PI-00420A**	**420**	**Y**	**ICP 13.4**	**1A2**	**N/A**	**N/A**	**3000 PSIG**	**2.0 (L)**	**1.5**	**1.871**
PB1	**PM-00420A-1**	**420**	**Y**	**ICP 13.4**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**
PB2	**PM-00420A-1**	**420**	**Y**	**ICP 13.4**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.5**	**N/A**
PB1	**PT-00420A**	**420**	**Y**	**1ICP-04.004-1**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**1.0**	**N/A**
PB2	**PT-00420A**	**420**	**Y**	**2ICP-04.004-1**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**1.0**	**N/A**
PB0	**FI-04459A**	**4459A**	**Y**	**ICP 6.57**	**1A2**	**6000 GPM**	**18000 GPM**	**10000 GPM**	**2.0 (L)**	**0.1**	**0.269**
PB0	**FI-04459B**	**4459A**	**Y**	**ICP 6.57**	**1A2**	**6000 GPM**	**18000 GPM**	**10000 GPM**	**2.0 (L)**	**0.1**	**0.269**
PB0	**FIT-04459A**	**4459A**	**Y**	**ICP 6.57**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.25**	**N/A**
PB0	**FIT-04459B**	**4459B**	**Y**	**ICP 6.57**	**1A2**	**N/A**	**N/A**	**N/A**	**N/A**	**0.25**	**N/A**
PB1	PI-00468	468	N	ICP 4.1E	1A2	N/A	N/A	1400 PSIG	N/A	1.5	1.732
PB2	PI-00468	468	N	ICP 4.1E	1A2	N/A	N/A	1400 PSIG	N/A	1.5	1.732
PB1	PM-00468A	468	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A

PB2	PM-00468A	468	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PM-00468B	468	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PM-00468B	468	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PT-00468	468	N	1ICP-04.004-2	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-00468	468	N	2ICP-04.004-2	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PI-00478	478	N	ICP 4.1E	1A2	N/A	N/A	1400 PSIG	N/A	1.5	1.732
PB2	PI-00478	478	N	ICP 4.1E	1A2	N/A	N/A	1400 PSIG	N/A	1.5	1.732
PB1	PM-00478A	478	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PM-00478A	478	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PM-00478B	478	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PM-00478B	478	N	ICP 4.1E	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PT-00478	478	N	1ICP-04.004-2	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-00478	478	N	2ICP-04.004-2	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	**F619 (PPCS)**	**619**	**Y**	**1ICP-06.068**	**1A2**	**2583 GPM**	**7749 GPM**	**8000 GPM**	**2.0 (L)**	**0.025**	**0.501**
PB2	**F619 (PPCS)**	**619**	**Y**	**2ICP-06.068**	**1A2**	**2600 GPM**	**7800 GPM**	**8000 GPM**	**2.0 (L)**	**0.025**	**0.501**
PB1	**FI-00619**	**619**	**Y**	**1ICP-06.068**	**1A2**	**2583 GPM**	**7749 GPM**	**8000 GPM**	**2.0 (L)**	**1.5**	**1.581**
PB2	**FI-00619**	**619**	**Y**	**2ICP-06.068**	**1A2**	**2600 GPM**	**7800 GPM**	**8000 GPM**	**2.0 (L)**	**1.5**	**1.581**
PB1	FT-00619	619	Y	1ICP-06.068	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FT-00619	619	Y	2ICP-06.068	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	TE-00622	622	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB2	TE-00622	622	N	N/A	N/A	N/A	N/A	N/A	N/A	UNK	N/A
PB1	TI-00622A	622	N	ICP-06.050	1A2	N/A	N/A	350 F	N/A	1.5	UNK
PB2	TI-00622A	622	N	ICP-06.050	1A2	N/A	N/A	350 F	N/A	1.5	UNK
PB1	TM-00622	622	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	TM-00622	622	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	TM-00622-2	622	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	TM-00622-2	622	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	TE-00623	623	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	UNK	N/A
PB2	TE-00623	623	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	UNK	N/A
PB1	TI-00623A	623	N	ICP-06.050	1A2	N/A	N/A	350 F	N/A	1.5	UNK
PB2	TI-00623A	623	N	ICP-06.050	1A2	N/A	N/A	350 F	N/A	1.5	UNK
PB1	TM-00623	623	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	TM-00623	623	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	TM-00623-2	623	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	TM-00623-2	623	N	ICP-06.050	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FI-00626	626	N	ICP 4.19	1A2	N/A	N/A	4000 GPM	N/A	1.5	1.658
PB2	FI-00626	626	N	ICP 4.19	1A2	N/A	N/A	4000 GPM	N/A	1.5	1.658
PB1	FM-00626	626	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-00626	626	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-00626	626	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FT-00626	626	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A

PB1	PI-00628	628	N	ICP 4.19	1A2	N/A	N/A	600 PSIG	N/A	1.5	1.581
PB2	PI-00628	628	N	ICP 4.19	1A2	N/A	N/A	600 PSIG	N/A	1.5	1.581
PB1	PT-00628	628	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-00628	628	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PI-00629	629	N	ICP 4.19	1A2	N/A	N/A	600 PSIG	N/A	1.5	1.581
PB2	PI-00629	629	N	ICP 4.19	1A2	N/A	N/A	600 PSIG	N/A	1.5	1.581
PB1	PT-00629	629	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-00629	629	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PI-00922	922	N	ICP 4.19	1A2	N/A	N/A	2000 PSIG	N/A	1.5	1.581
PB2	PI-00922	922	N	ICP 4.19	1A2	N/A	N/A	2000 PSIG	N/A	1.5	1.581
PB1	PT-00922	922	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-00922	922	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	PI-00923	923	N	ICP 4.19	1A2	N/A	N/A	2000 PSIG	N/A	1.5	1.581
PB2	PI-00923	923	N	ICP 4.19	1A2	N/A	N/A	2000 PSIG	N/A	1.5	1.581
PB1	PT-00923	923	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	PT-00923	923	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FI-00924	924	N	ICP 4.19	1A2	N/A	N/A	1500 GPM	N/A	1.5	1.732
PB2	FI-00924	924	N	ICP 4.19	1A2	N/A	N/A	1500 GPM	N/A	1.5	1.732
PB1	FM-00924-2	924	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-00924-2	924	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-00924	924	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.25	N/A
PB2	FT-00924	924	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.25	N/A
PB1	FI-00925	925	N	ICP 4.19	1A2	N/A	N/A	1500 GPM	N/A	1.5	1.732
PB2	FI-00925	925	N	ICP 4.19	1A2	N/A	N/A	1500 GPM	N/A	1.5	1.732
PB1	FM-00925-2	925	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-00925-2	925	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-00925	925	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.25	N/A
PB2	FT-00925	925	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.25	N/A
PB1	FI-00928	928	N	ICP 4.19	1A2	N/A	N/A	2500 GPM	N/A	1.5	1.835
PB2	FI-00928	928	N	ICP 4.19	1A2	N/A	N/A	2500 GPM	N/A	1.5	1.835
PB1	FM-00928-2	928	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	FM-00928-2	928	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	FT-00928	928	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB2	FT-00928	928	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.75	N/A
PB1	FI-00930	930	N	ICP 6.17	1A2	N/A	N/A	50 GPM	N/A	1.5	1.803
PB2	FI-00930	930	N	ICP 6.17	1A2	N/A	N/A	50 GPM	N/A	1.5	1.803
PB1	FIT-00930	930	N	ICP 6.17	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB2	FIT-00930	930	N	ICP 6.17	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB1	LI-00934	934	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB2	LI-00934	934	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB1	LT/LC-00934	934	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A

PB2	LT/LC-00934	934	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB1	LI-00935A	935	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB2	LI-00935A	935	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB1	LT/LC-00935	935	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB2	LT/LC-00935	935	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB1	LI-00938	938	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB2	LI-00938	938	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB1	LT/LC-00938	938	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB2	LT/LC-00938	938	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB1	LI-00939A	939	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB2	LI-00939A	939	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.803
PB1	LT/LC-00939	939	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB2	LT/LC-00939	939	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	1.0	N/A
PB1	LI-00972	972	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.658
PB2	LI-00972	972	N	ICP 4.13	1A2	N/A	N/A	100 %	N/A	1.5	1.658
PB1	LM-00972-1	972	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	LM-00972-1	972	N	ICP 4.13	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB1	LT-00972	972	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB2	LT-00972	972	N	ICP 4.19	1A2	N/A	N/A	N/A	N/A	0.5	N/A
PB0	1P-032A-M Ammeter	N/A	N	NONE	N/A	N/A	N/A	600 Amps	N/A	UNK	N/A
PB0	1P-032B-M Ammeter	N/A	N	NONE	N/A	N/A	N/A	600 Amps	N/A	UNK	N/A
PB0	1P-032C-M Ammeter	N/A	N	NONE	N/A	N/A	N/A	600 Amps	N/A	UNK	N/A
PB0	1P-032D-M Ammeter	N/A	N	NONE	N/A	N/A	N/A	600 Amps	N/A	UNK	N/A
PB0	1P-032E-M Ammeter	N/A	N	NONE	N/A	N/A	N/A	600 Amps	N/A	UNK	N/A
PB0	1P-032F-M Ammeter	N/A	N	NONE	N/A	N/A	N/A	600 Amps	N/A	UNK	N/A
PB0	DPIS-02936	N/A	N	ICP 6.6	IM2	N/A	N/A	15 PSID	N/A	0.5	N/A
PB0	DPIS-02937	N/A	N	ICP 6.6	IM2	N/A	N/A	15 PSID	N/A	0.5	N/A
PB0	DPIS-02938	N/A	N	ICP 6.6	IM2	N/A	N/A	15 PSID	N/A	0.5	N/A
PB1	**FI-00115**	**N/A**	**Y**	**1ICP-04.003-7**	**1A2**	**N/A**	**N/A**	**20 GPM**	**2.0**	**0.5**	**N/A**
PB2	**FI-00115**	**N/A**	**Y**	**2ICP-04.003-7**	**1A2**	**N/A**	**N/A**	**20 GPM**	**2.0**	**0.5**	**N/A**
PB1	**FI-00116**	**N/A**	**Y**	**1ICP-04.003-7**	**1A2**	**N/A**	**N/A**	**20 GPM**	**2.0**	**0.5**	**N/A**
PB2	**FI-00116**	**N/A**	**Y**	**2ICP-04.003-7**	**1A2**	**N/A**	**N/A**	**20 GPM**	**2.0**	**0.5**	**N/A**
PB0	FI-00636	N/A	N	ICP 6.15	IM2	N/A	N/A	100 GPM	N/A	0.5	N/A
PB0	**FI-00652**	**N/A**	**Y**	**ICP 4.19**	**1A2**	**1250 GPM**	**3750 GPM**	**2700 GPM**	**2.0**	**0.5**	**N/A**
PB1	FI-03087	N/A	N	NONE	N/A	N/A	N/A	UNK	N/A	UNK	N/A

PB2	FI-03087	N/A	N	NONE	N/A	N/A	N/A	UNK	N/A	UNK	N/A
PB0	FI-03905	N/A	Y	NONE	N/A	43.5 GPM	130.5 GPM	60 GPM	2.0	0.5	N/A
PB0	FI-03928	N/A	Y	NONE	N/A	37 GPM	111 GPM	60 GPM	2.0	0.5	N/A
PB0	FI-03929	N/A	Y	NONE	N/A	41.5 GPM	124.5 GPM	60 GPM	2.0	0.5	N/A
PB0	FI-04666	N/A	Y	ICP-06.062	1A2	117.5 GPM	352.5 GPM	140 GPM	2.0	0.5	N/A
PB0	Fi-04667	N/A	Y	ICP-06.062	1A2	101 GPM	303 GPM	110 GPM	2.0	0.5	N/A
PB1	FIT-00659	N/A	Y	ICP 6.17	1A2	400 GPM	1200 GPM	1071 GPM	2.0	0.25	N/A
PB2	FIT-00659	N/A	Y	ICP 6.17	1A2	400 GPM	1200 GPM	1071 GPM	2.0	0.25	N/A
PB1	FIT-00660	N/A	Y	ICP 6.17	1A2	1560 GPM	4680 GPM	2086 GPM	2.0	0.25	N/A
PB2	FIT-00660	N/A	Y	ICP 6.17	1A2	1560 GPM	4680 GPM	2086 GPM	2.0	0.25	N/A
PB1	FIT-00661	N/A	Y	ICP 6.17	1A2	1200 GPM	3600 GPM	1674 GPM	2.0	0.25	N/A
PB2	FIT-00661	N/A	Y	ICP 6.17	1A2	1200 GPM	3600 GPM	1674 GPM	2.0	0.25	N/A
PB1	FIT-04049	N/A	Y	1ICP-04.003-5	1A2	126 GPM	378 GPM	120 GPM	2.0	0.25	N/A
PB2	FIT-04049	N/A	Y	2ICP-04.003-5	1A2	125.5 GPM	376.5 GPM	120 GPM	2.0	0.25	N/A
PB0	FIT-04050A	N/A	Y	ICP 13.8	1A2	86.5 GPM	259.5 GPM	120 GPM	2.0	0.25	N/A
PB0	FIT-04050B	N/A	Y	ICP 13.8	1A2	88.3 GPM	264.9 GPM	120 GPM	2.0	0.25	N/A
PB1	FT-00185	N/A	Y	N/A	N/A	40 GPM	120 GPM	100 GPM	2.0	0.5	N/A
PB2	FT-00185	N/A	Y	N/A	N/A	40 GPM	120 GPM	100 GPM	2.0	0.5	N/A
PB0	G-01-API-1	N/A	N	ICP-13.007A-1	2A2	N/A	N/A	300 PSIG	N/A	UNK	N/A
PB0	G-01-API-2	N/A	N	ICP-13.007A-1	2A2	N/A	N/A	300 PSIG	N/A	UNK	N/A
PB0	G-02-API-1	N/A	N	ICP-13.007A-1	2A2	N/A	N/A	300 PSIG	N/A	UNK	N/A
PB0	G-02-API-2	N/A	N	ICP-13.007A-1	2A2	N/A	N/A	300 PSIG	N/A	UNK	N/A
PB2	P-002A Oil Press Gauge	N/A	N	NONE	N/A	N/A	N/A	60 PSIG	N/A	1.0	N/A
PB1	P-002A Oil Press Gauge	N/A	N	NONE	N/A	N/A	N/A	60 PSIG	N/A	UNK	N/A
PB2	P-002B Oil Press Gauge	N/A	N	NONE	N/A	N/A	N/A	60 PSIG	N/A	1.0	N/A
PB1	P-002B Oil Press Gauge	N/A	N	NONE	N/A	N/A	N/A	60 PSIG	N/A	UNK	N/A
PB1	P-002C Oil Press Gauge	N/A	N	NONE	N/A	N/A	N/A	60 PSIG	N/A	UNK	N/A
PB2	P-002C Oil Press Gauge	N/A	N	NONE	N/A	N/A	N/A	100 PSIG	N/A	UNK	N/A
PB1	P-015A-M-AM1	N/A	N	NONE	N/A	N/A	N/A	UNK	N/A	1.5	N/A
PB2	P-015A-M-AM1	N/A	N	NONE	N/A	N/A	N/A	UNK	N/A	1.5	N/A
PB1	P-015B-M-AM1	N/A	N	NONE	N/A	N/A	N/A	UNK	N/A	1.5	N/A
PB2	P-015B-M-AM1	N/A	N	NONE	N/A	N/A	N/A	UNK	N/A	1.5	N/A
PB2	PI-00108	N/A	Y	ICP 6.41	3A2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB1	PI-00108	N/A	Y	ICP 6.41	3A2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB1	PI-00184	N/A	Y	ICP 6.41	3A2	N/A	N/A	160 PSIG	2.0	0.33	N/A

PB2	PI-00184	N/A	Y	ICP 6.41	3A2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB1	PI-00617A	N/A	Y	ICP 6.15	IM2	N/A	N/A	200 PSIG	2.0	0.5	N/A
PB2	PI-00617A	N/A	Y	ICP 6.15	IM2	N/A	N/A	200 PSIG	2.0	0.5	N/A
PB1	PI-00617B	N/A	Y	ICP 6.15	IM2	N/A	N/A	200 PSIG	2.0	0.5	N/A
PB2	PI-00617B	N/A	Y	ICP 6.15	IM2	N/A	N/A	200 PSIG	2.0	0.5	N/A
PB0	PI-00631A	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	0.5	N/A
PB0	PI-00631B	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	0.5	N/A
PB0	PI-00651	N/A	N	ICP 6.15	IM2	N/A	N/A	160 PSIG	N/A	0.5	N/A
PB1	PI-00653A	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	UNK	N/A
PB2	PI-00653A	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	UNK	N/A
PB1	PI-00653B	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	UNK	N/A
PB2	PI-00653B	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	UNK	N/A
PB1	PI-00655A	N/A	Y	ICP 4.19	1A2	N/A	N/A	400 PSIG	2.0	0.25	N/A
PB2	PI-00655A	N/A	Y	ICP 4.19	1A2	N/A	N/A	400 PSIG	2.0	0.25	N/A
PB1	PI-00655B	N/A	Y	ICP 4.19	1A2	N/A	N/A	400 PSIG	2.0	0.25	N/A
PB2	PI-00655B	N/A	Y	ICP 4.19	1A2	N/A	N/A	400 PSIG	2.0	0.25	N/A
PB0	PI-00658A	N/A	Y	ICP 4.19	1A2	N/A	N/A	15 PSIG	2.0	0.5	N/A
PB0	PI-00658B	N/A	Y	ICP 4.19	1A2	N/A	N/A	15 PSIG	2.0	0.5	N/A
PB1	PI-00692A	N/A	Y	ICP 6.15	IM2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB2	PI-00692A	N/A	Y	ICP 6.15	IM2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB1	PI-00692B	N/A	Y	ICP 6.15	IM2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB2	PI-00692B	N/A	Y	ICP 6.15	IM2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB1	PI-00913A	N/A	Y	ICP 4.19	1A2	N/A	N/A	1500 PSIG	2.0	0.5	N/A
PB2	PI-00913A	N/A	Y	ICP 4.19	1A2	N/A	N/A	1500 PSIG	2.0	0.5	N/A
PB1	PI-00913B	N/A	Y	ICP 4.19	1A2	N/A	N/A	1500 PSIG	2.0	0.5	N/A
PB2	PI-00913B	N/A	Y	ICP 4.19	1A2	N/A	N/A	1500 PSIG	2.0	0.5	N/A
PB1	PI-00933A	N/A	Y	ICP 6.17	1A2	N/A	N/A	600 PSIG	2.0	0.5	N/A
PB2	PI-00933A	N/A	Y	ICP 6.17	1A2	N/A	N/A	600 PSIG	2.0	0.5	N/A
PB1	PI-00933B	N/A	Y	ICP 6.17	1A2	N/A	N/A	600 PSIG	2.0	0.5	N/A
PB2	PI-00933B	N/A	Y	ICP 6.17	1A2	N/A	N/A	600 PSIG	2.0	0.5	N/A
PB1	PI-00933C	N/A	Y	ICP 6.17	1A2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB2	PI-00933C	N/A	Y	ICP 6.17	1A2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB1	PI-00933D	N/A	Y	ICP 6.17	1A2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB2	PI-00933D	N/A	Y	ICP 6.17	1A2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB1	PI-00974	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB2	PI-00974	N/A	Y	ICP 4.19	1A2	N/A	N/A	60 PSIG	2.0	0.25	N/A
PB0	PI-02815	N/A	Y	ICP 6.6	IM2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-02846	N/A	Y	ICP 6.6	IM2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-02847	N/A	Y	ICP 6.6	IM2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-02848	N/A	Y	ICP 6.6	IM2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-02849	N/A	Y	ICP 6.6	IM2	N/A	N/A	160 PSIG	2.0	0.5	N/A

PB0	PI-02850	N/A	Y	ICP 6.6	IM2	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-03973A	N/A	Y	NONE	N/A	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-03973B	N/A	Y	NONE	N/A	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-03974A	N/A	Y	NONE	N/A	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB0	PI-03974B	N/A	Y	NONE	N/A	N/A	N/A	160 PSIG	2.0	0.5	N/A
PB1	PI-04004	N/A	N	1ICP-04.010-2	1A2	N/A	N/A	1500 PSIG	N/A	0.5	N/A
PB2	PI-04004	N/A	N	2ICP-04.010-2	1A2	N/A	N/A	1500 PSIG	N/A	0.5	N/A
PB0	PI-04010A	N/A	Y	ICP 13.8	1A2	N/A	N/A	30 PSIG	2.0	0.5	N/A
PB0	PI-04011	N/A	Y	ICP 13.8	1A2	N/A	N/A	1500 PSIG	2.0	0.5	N/A
PB1	PI-04013A	N/A	Y	1ICP-04.006-3	1A2	N/A	N/A	30 PSIG	2.0	0.5	N/A
PB2	PI-04013A	N/A	Y	2ICP-04.006-3	1A2	N/A	N/A	30 PSIG	2.0	0.5	N/A
PB0	PI-0401 /A	N/A	Y	ICP 13.8	1A2	N/A	N/A	30 PSIG	2.0	0.5	N/A
PB0	PI-04018	N/A	N	ICP 13.8	1A2	N/A	N/A	1500 PSIG	N/A	0.5	N/A
PB1	PI-04458	N/A	N	ICP 6.6	IM2	N/A	N/A	100 PSI	N/A	0.5	N/A
PB2	PI-04458	N/A	N	ICP 6.6	IM2	N/A	N/A	100 PSI	N/A	0.5	N/A
PB0	PI-04741	N/A	Y	ICP-06.062	1A2	N/A	N/A	30 PSIG	2.0	1.0	N/A
PB0	PI-04742	N/A	Y	ICP-06.062	1A2	N/A	N/A	60 PSIG	2.0	0.5	N/A
PB0	PI-04743	N/A	Y	ICP-06.062	1A2	N/A	N/A	30 PSIG	2.0	1.0	N/A
PB0	PI-04744	N/A	Y	ICP-06.062	1A2	N/A	N/A	60 PSIG	2.0	0.5	N/A
PB0	PI-04745	N/A	Y	ICP-06.062	1A2	N/A	N/A	15 PSIG	2.0	0.5	N/A
PB0	PI-04746	N/A	Y	ICP-06.062	1A2	N/A	N/A	60 PSIG	2.0	0.5	N/A
PB0	PI-04747	N/A	Y	ICP-06.062	1A2	N/A	N/A	15 PSIG	2.0	0.5	N/A
PB0	PI-04748	N/A	Y	ICP-06.062	1A2	N/A	N/A	60 PSIG	2.0	1.0	N/A
PB1	PI-05976	N/A	N	NONE	N/A	N/A	N/A	160 PSIG	N/A	UNK	N/A
PB2	PI-05976	N/A	N	NONE	N/A	N/A	N/A	160 PSIG	N/A	UNK	N/A
PB1	PI-05977	N/A	N	NONE	N/A	N/A	N/A	160 PSIG	N/A	UNK	N/A
PB2	PI-05977	N/A	N	NONE	N/A	N/A	N/A	160 PSIG	N/A	UNK	N/A
PB0	PI-06354B	N/A	N	NONE	N/A	N/A	N/A	400 PSIG	N/A	0.5	N/A
PB0	PI-06354D	N/A	N	NONE	N/A	N/A	N/A	400 PSIG	N/A	0.5	N/A
PB0	PI-06355B	N/A	N	NONE	N/A	N/A	N/A	400 PSIG	N/A	0.5	N/A
PB0	PI-06355D	N/A	N	NONE	N/A	N/A	N/A	400 PSIG	N/A	0.5	N/A
PB0	TI-00633A	N/A	N	ICP 6.41	3A2	N/A	N/A	200 F	N/A	1.0	N/A
PB0	TI-00633B	N/A	N	ICP 6.41	3A2	N/A	N/A	200 F	N/A	1.0	N/A
PB0	TI-00665	N/A	N	NONE	N/A	N/A	N/A	UNK	N/A	UNK	N/A
PB1	TI-00960	N/A	N	ICP 4.19	1A2	N/A	N/A	130 F	N/A	1.0	N/A
PB2	TI-00960	N/A	N	ICP 4.19	1A2	N/A	N/A	130 F	N/A	1.0	N/A
PB0	TI-04045	N/A	N	ICP 13.8	1A2	N/A	N/A	250 F	N/A	1.0	N/A
PB0	TI-04046	N/A	N	ICP 13.8	1A2	N/A	N/A	250 F	N/A	1.0	N/A

ATTACHMENT 3

Portable Equipment Used in ASME Section XI Testing

Comp ID	Cal Procedure	Freq	Required Accuracy (%)	Actual Accuracy (%)
ICTI-210	ICP 8.77	1A2	5.0	UNK
ICTI-211	ICP 8.77	1A2	5.0	UNK
ICTI-212	ICP 8.77	1A2	5.0	UNK
MCDT-001	N/A	N/A	2.0	0.035
MCDT-002	N/A	N/A	2.0	0.035
MCST-001	ICP 8.32	1A2	2.0	+/- 1 RPM
OPSDT-001	N/A	N/A	2.0	0.035
OPSDT-002	N/A	N/A	2.0	0.035
OPSML-001	ICP 8.77	1A2	5.0	1.0
OPSSW-001	ICP-08.001	1A2	N/A	UNK
OPSSW-002	ICP-08.001	1A2	N/A	UNK
OPSSW-003	ICP-08.001	1A2	N/A	UNK
OPSSW-004	ICP-08.001	1A2	N/A	UNK
OPSSW-005	ICP-08.001	1A2	N/A	UNK
OPSSW-006	ICP-08.001	1A2	N/A	UNK
OPSSW-007	ICP-08.001	1A2	N/A	UNK
OPSSW-008	ICP-08.001	1A2	N/A	UNK
OPSSW-009	ICP-08.001	1A2	N/A	UNK
OPSSW-010	ICP-08.001	1A2	N/A	UNK
OPSSW-011	ICP-08.001	1A2	N/A	UNK

ATTACHMENT 4
Installed IST Instrumentation

Unit	Comp ID	ASME Req Y/N	Mfr	Model #	Inst Accuracy (%)	Increments (I)	Readability Accuracy in % (.5I/FSR)
PB0	1P-032A-M Ammeter	N	WEST	TYPE KA-241	UNK	N/A	N/A
PB0	1P-032B-M Ammeter	N	WEST	TYPE KA-241	UNK	N/A	N/A
PB0	1P-032C-M Ammeter	N	WEST	TYPE KA-241	UNK	N/A	N/A
PB0	1P-032D-M Ammeter	N	WEST	TYPE KA-241	UNK	N/A	N/A
PB0	1P-032E-M Ammeter	N	WEST	TYPE KA-241	UNK	N/A	N/A
PB0	1P-032F-M Ammeter	N	WEST	TYPE KA-241	UNK	N/A	N/A
PB0	DPIS-02936	N	BARTON	277	0.5	N/A	N/A
PB0	DPIS-02937	N	BARTON	289A	0.5	N/A	N/A
PB0	DPIS-02938	N	BARTON	277	0.5	N/A	N/A
PB0	E/I-03510	Y	FOXBOR	M/693A	0.5	N/A	N/A
PB1	E/I-03598	Y	FOXBOR	M/693A	0.5	N/A	N/A
PB2	E/I-03598	Y	FOXBOR	M/693A	0.5	N/A	N/A
PB1	F619 (PPCS)	Y	N/A	N/A	0.025	N/A	N/A
PB2	F619 (PPCS)	Y	N/A	N/A	0.025	N/A	N/A
PB1	FI-00115	Y	BARTON	200	0.5	0.2 GPM (0 - 10 GPM)/0.1 GPM (10 - 20 GPM)	0.5/0.25
PB2	FI-00115	Y	BARTON	200	0.5	0.2 GPM (0 - 10 GPM)/0.1 GPM (10 - 20 GPM)	0.5/0.25
PB1	FI-00116	Y	BARTON	200	0.5	0.2 GPM (0 - 10 GPM)/0.1 GPM (10 - 20 GPM)	0.5/0.25
PB2	FI-00116	Y	BARTON	200	0.5	0.2 GPM (0 - 10 GPM)/0.1 GPM (10 - 20 GPM)	0.5/0.25
PB1	FI-00128	Y	WEST	252	1.5	2 GPM	0.7
PB2	FI-00128	Y	WEST	252	1.5	2 GPM	0.7
PB1	FI-00619	Y	WEST	252	1.5	200 GPM	1.25
PB2	FI-00619	Y	WEST	252	1.5	200 GPM	1.25

PB1	FI-00626	N	WEST	HX-252	1.5	N/A	N/A
PB2	FI-00626	N	WEST	HX-252	1.5	N/A	N/A
PB0	FI-00636	N	BARTON	200	0.5	N/A	N/A
PB0	**FI-00652**	**Y**	**BARTON**	**200**	**0.5**	**UNK**	**UNK**
PB1	FI-00924	N	WEST	HX-252	1.5	N/A	N/A
PB2	FI-00924	N	WEST	HX-252	1.5	N/A	N/A
PB1	FI-00925	N	WEST	HX-252	1.5	N/A	N/A
PB2	FI-00925	N	WEST	HX-252	1.5	N/A	N/A
PB2	FI-00928	N	SIGMA	1151	1.5	N/A	N/A
PB1	FI-00928	N	WEST	HX-252	1.5	N/A	N/A
PB1	FI-00930	N	WEST	HX-252	1.5	N/A	N/A
PB2	FI-00930	N	WEST	HX-252	1.5	N/A	N/A
PB1	FI-03087	N	UNK	UNK	UNK	N/A	N/A
PB2	FI-03087	N	UNK	UNK	UNK	N/A	N/A
PB0	**FI-03905**	**Y**	**BARTON**	**226**	**0.5**	**0.5 PSI**	**0.4**
PB0	**FI-03928**	**Y**	**BARTON**	**226**	**0.5**	**0.5 PSI**	**0.4**
PB0	**FI-03929**	**Y**	**BARTON**	**226**	**0.5**	**0.5 PSI**	**0.4**
PB1	FI-04002	N	WEST	252	1.5	N/A	N/A
PB2	FI-04002	N	WEST	252	1.5	N/A	N/A
PB0	FI-04007	N	WEST	252	1.5	N/A	N/A
PB0	FI-04014	N	WEST	252	1.5	N/A	N/A
PB1	FI-04036	N	WEST	HX-252	1.5	N/A	N/A
PB2	FI-04036	N	WEST	HX-252	1.5	N/A	N/A
PB1	FI-04037	N	WEST	HX-252	1.5	N/A	N/A
PB2	FI-04037	N	WEST	HX-252	1.5	N/A	N/A
PB0	**FI-04459A**	**Y**	**NEWPRT**	**558A**	**0.1**	**1 GPM**	**N/A**
PB0	**FI-04459B**	**Y**	**NEWPRT**	**558A**	**0.1**	**1 GPM**	**N/A**
PB0	**FI-04666**	**Y**	**BARTON**	**227A**	**0.5**	**4.0 GPM (0 - 60 GPM)/2.0 GPM (60 - 140 GPM)**	**1.4/0.7**
PB0	**FI-04667**	**Y**	**BARTON**	**227A**	**0.5**	**2.0 GPM (0 - 50 GPM)/1.0 GPM (50 - 100 GPM)**	**0.9/0.45**
PB1	**FIT-00659**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB2	**FIT-00659**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB1	**FIT-00660**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB2	**FIT-00660**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB1	**FIT-00661**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB2	**FIT-00661**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**

PB1	FIT-00930	N	FISHP	1401	1.0	N/A	N/A
PB2	FIT-00930	N	FISHP	1401	1.0	N/A	N/A
PB1	**FIT-04049**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB2	**FIT-04049**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB0	**FIT-04050A**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB0	**FIT-04050B**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB0	**FIT-04459A**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB0	**FIT-04459B**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB1	**FM-00128**	**Y**	**FOXBOR**	**66AC**	**0.5**	**N/A**	**N/A**
PB2	**FM-00128**	**Y**	**FOXBOR**	**66AC**	**0.5**	**N/A**	**N/A**
PB1	FM-00626	N	FOXBOR	66AC	0.5	N/A	N/A
PB2	FM-00626	N	FOXBOR	66AC	0.5	N/A	N/A
PB1	FM-00924-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB2	FM-00924-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB1	FM-00925-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB2	FM-00925-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB1	FM-00928-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB2	FM-00928-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB1	FM-04002A	N	FOXBOR	M/66AC	0.5	N/A	N/A
PB2	FM-04002A	N	FOXBOR	M/66AC	0.5	N/A	N/A
PB1	FM-04002B	N	FOXBOR	M/66BC	0.5	N/A	N/A
PB2	FM-04002B	N	FOXBOR	M/66BC	0.5	N/A	N/A
PB0	FM-04007A	N	FOXBOR	M/66A	0.5	N/A	N/A
PB0	FM-04007B	N	FOXBOR	M/66B	0.5	N/A	N/A
PB0	FM-04014A	N	FOXBOR	M/66A	0.5	N/A	N/A
PB0	FM-04014B	N	FOXBOR	M/66B	0.5	N/A	N/A
PB1	FM-04036A	N	FOXBOR	M/66AC	0.5	N/A	N/A
PB2	FM-04036A	N	FOXBOR	M/66AC	0.5	N/A	N/A
PB1	FM-04036B	N	FOXBOR	M/66BC	0.5	N/A	N/A
PB2	FM-04036B	N	FOXBOR	M/66BC	0.5	N/A	N/A
PB1	FM-04037A	N	FOXBOR	M/66AC	0.5	N/A	N/A
PB2	FM-04037A	N	FOXBOR	M/66AC	0.5	N/A	N/A
PB1	FM-04037B	N	FOXBOR	M/66BC	0.5	N/A	N/A
PB2	FM-04037B	N	FOXBOR	M/66BC	0.5	N/A	N/A
PB1	**FT-00128**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB2	**FT-00128**	**Y**	**ROSEMT**	**1151**	**0.25**	**N/A**	**N/A**
PB1	**FT-00185**	**Y**	**ROSEMT**	**8712**	**0.5**	**N/A**	**N/A**
PB2	**FT-00185**	**Y**	**ROSEMT**	**8712**	**0.5**	**N/A**	**N/A**
PB1	**FT-00619**	**Y**	**FOXBOR**	**N-E13DM**	**0.5**	**N/A**	**N/A**
PB2	**FT-00619**	**Y**	**FOXBOR**	**N-E13DM**	**0.5**	**N/A**	**N/A**
PB1	FT-00626	N	FOXBOR	N-E13DM	0.5	N/A	N/A

PB2	FT-00626	N	FOXBOR	N-E13DM	0.5	N/A	N/A
PB1	FT-00924	N	ROSEMT	1154	0.25	N/A	N/A
PB2	FT-00924	N	ROSEMT	1154	0.25	N/A	N/A
PB1	FT-00925	N	ROSEMT	1154	0.25	N/A	N/A
PB2	FT-00925	N	ROSEMT	1154	0.25	N/A	N/A
PB1	FT-00928	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB2	FT-00928	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB1	FT-04002	N	FOXBOR	N-E13DM	0.5	N/A	N/A
PB2	FT-04002	N	FOXBOR	N-E13DM	0.5	N/A	N/A
PB0	FT-04007	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB0	FT-04014	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB1	FT-04036	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB2	FT-04036	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB1	FT-04037	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB2	FT-04037	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB0	G-01-API-1	N	USGAGE	2941	UNK	N/A	N/A
PB0	G-01-API-2	N	USGAGE	2941	UNK	N/A	N/A
PB0	G-02-API-1	N	USGAGE	2941	UNK	N/A	N/A
PB0	G-02-API-2	N	USGAGE	2941	UNK	N/A	N/A
PB1	**L3598 (PPCS)**	**Y**	**N/A**	**N/A**	**0.025**	**N/A**	**N/A**
PB2	**L3598 (PPCS)**	**Y**	**N/A**	**N/A**	**0.025**	**N/A**	**N/A**
PB0	LE-03992A	N	DREXEL	700-1-24	UNK	N/A	N/A
PB0	LE-03992B	N	DREXEL	700-1-24	UNK	N/A	N/A
PB0	LI-00171	N	WEST	252	1.5	N/A	N/A
PB2	LI-00172	N	WEST	252	1.5	N/A	N/A
PB1	LI-00172	N	WEST	VX-252	1.5	N/A	N/A
PB2	LI-00934	N	SIGMA	1251	1.5	N/A	N/A
PB1	LI-00934	N	WEST	VX-252	1.5	N/A	N/A
PB1	LI-00935A	N	SIGMA	1251	1.5	N/A	N/A
PB2	LI-00935A	N	SIGMA	1251	1.5	N/A	N/A
PB2	LI-00938	N	SIGMA	1251	1.5	N/A	N/A
PB1	LI-00938	N	WEST	VX-252	1.5	N/A	N/A
PB1	LI-00939A	N	SIGMA	1251	1.5	N/A	N/A
PB2	LI-00939A	N	SIGMA	1251	1.5	N/A	N/A
PB1	LI-00972	N	SIGMA	1251	1.5	N/A	N/A
PB2	LI-00972	N	SIGMA	1251	1.5	N/A	N/A
PB0	LI-04038	N	SIGMA	1251	1.5	N/A	N/A
PB0	LI-04039	N	SIGMA	1251	1.5	N/A	N/A
PB0	LIT-03992A	N	DREXEL	508-47-6	0.1	N/A	N/A
PB0	LIT-03992B	N	DREXEL	508-47-6	0.1	N/A	N/A
PB0	LM-00171	N	FOXBOR	66BC	0.5	N/A	N/A

PB1	LM-00172	N	FOXBOR	66BC	0.5	N/A	N/A
PB2	LM-00172	N	FOXBOR	66BC	0.5	N/A	N/A
PB1	LM-00972-1	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB2	LM-00972-1	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB0	LM-04038-1	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB0	LM-04039-1	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB0	LT-00171	N	FOXBOR	N-E13DM	0.5	N/A	N/A
PB1	LT-00172	N	FOXBOR	N-E13DM	0.5	N/A	N/A
PB2	LT-00172	N	FOXBOR	N-E13DM	0.5	N/A	N/A
PB1	LT-00972	N	FOXBOR	N-E11DM	0.5	N/A	N/A
PB2	LT-00972	N	FOXBOR	N-E11DM	0.5	N/A	N/A
PB1	**LT-03598**	**Y**	**E/H**	**UNK**	**1.0**	**N/A**	**N/A**
PB2	**LT-03598**	**Y**	**E/H**	**UNK**	**1.0**	**N/A**	**N/A**
PB0	LT-04038	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB0	LT-04039	N	FOXBOR	N-E13DM	0.75	N/A	N/A
PB2	LT/LC-00934	N	MAGNET	82-4021	1.0	N/A	N/A
PB1	LT/LC-00934	N	MAGNET	82-4021-313	1.0	N/A	N/A
PB2	LT/LC-00935	N	MAGNET	82-4021	1.0	N/A	N/A
PB1	LT/LC-00935	N	MAGNET	82-4021-313	1.0	N/A	N/A
PB2	LT/LC-00938	N	MAGNET	82-4021	1.0	N/A	N/A
PB1	LT/LC-00938	N	MAGNET	82-4021-313	1.0	N/A	N/A
PB2	LT/LC-00939	N	MAGNET	82-4021	1.0	N/A	N/A
PB1	LT/LC-00939	N	MAGNET	82-4021-313	1.0	N/A	N/A
PB1	P-002A Oil Press Gauge	N	ASHCT	UNK	UNK	N/A	N/A
PB2	P-002A Oil Press Gauge	N	MCDANIEL CONTROLS	Model T	1.0	N/A	N/A
PB1	P-002B Oil Press Gauge	N	ASHCT	UNK	UNK	N/A	N/A
PB2	P-002B Oil Press Gauge	N	MCDANIEL CONTROLS	Model T	1.0	N/A	N/A
PB1	P-002C Oil Press Gauge	N	ASHCT	UNK	UNK	N/A	N/A
PB2	P-002C Oil Press Gauge	N	ASHCT	UNK	UNK	N/A	N/A
PB1	P-015A-M-AM1	N	WEST	252	1.5	N/A	N/A
PB2	P-015A-M-AM1	N	WEST	252	1.5	N/A	N/A
PB1	P-015B-M-AM1	N	WEST	252	1.5	N/A	N/A
PB2	P-015B-M-AM1	N	WEST	252	1.5	N/A	N/A
PB1	P-029 Inboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB2	P-029 Inboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB1	P-029 Inboard Turbine Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB2	P-029 Inboard Turbine Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A

PB1	P-029 Outboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB2	P-029 Outboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB1	P-029 Outboard Turbine Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB2	P-029 Outboard Turbine Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB0	P-038A Inboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB0	P-038A Outboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB0	P-038B Inboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB0	P-038B Outboard Pump Bearing Temp TC	N	UNK	UNK	UNK	N/A	N/A
PB1	P2289 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB2	P2289 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB1	P2290 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB2	P2290 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB2	**PI-00108**	**Y**	**ASHCT**	**1379SS**	**0.5**	**2 PSI**	**0.6**
PB1	**PI-00108**	**Y**	**PRMCAL**	**111**	**0.5**	**2 PSI**	**0.6**
PB1	PI-00139	N	WEST	252	1.5	N/A	N/A
PB2	PI-00139	N	WEST	252	1.5	N/A	N/A
PB1	**PI-00184**	**Y**	**ASHCT**	**45**	**0.33**	**1 PSI**	**0.3**
PB2	**PI-00184**	**Y**	**ASHCT**	**50-200SS**	**0.5**	**1 PSI**	**0.3**
PB1	**PI-00420A**	**Y**	**SIGMA**	**1151**	**1.5**	**50 PSI**	**0.8**
PB2	**PI-00420A**	**Y**	**SIGMA**	**1151**	**1.5**	**50 PSI**	**0.8**
PB1	PI-00468	N	WEST	252	1.5	N/A	N/A
PB2	PI-00468	N	WEST	252	1.5	N/A	N/A
PB1	PI-00478	N	WEST	252	1.5	N/A	N/A
PB2	PI-00478	N	WEST	252	1.5	N/A	N/A
PB1	**PI-00617A**	**Y**	**ASHCT**	**1379SS**	**0.5**	**2 PSI**	**0.5**
PB2	**PI-00617A**	**Y**	**ASHCT**	**1379SS**	**0.5**	**2 PSI**	**0.5**
PB1	**PI-00617B**	**Y**	**ASHCT**	**1379SS**	**0.5**	**2 PSI**	**0.5**
PB2	**PI-00617B**	**Y**	**ASHCT**	**1379SS**	**0.5**	**2 PSI**	**0.5**
PB1	PI-00628	N	WEST	HX-252	1.5	N/A	N/A
PB2	PI-00628	N	WEST	HX-252	1.5	N/A	N/A
PB1	PI-00629	N	WEST	HX-252	1.5	N/A	N/A
PB2	PI-00629	N	WEST	HX-252	1.5	N/A	N/A
PB0	**PI-00631A**	**Y**	**ASHCT**	**DURAGAUGE**	**0.5**	**0.5 PSI**	**0.4**

PB0	PI-00631B	Y	ASHCT	DURAGAUGE	0.5	0.5 PSI	0.4
PB0	PI-00651	N	ASHCT	1379SS	0.5	N/A	N/A
PB1	PI-00653A	Y	Locked Hi Rad	UNK	UNK	UNK	UNK
PB2	PI-00653A	Y	Locked Hi Rad	UNK	UNK	UNK	UNK
PB1	PI-00653B	Y	Locked Hi Rad	UNK	UNK	UNK	UNK
PB2	PI-00653B	Y	Locked Hi Rad	UNK	UNK	UNK	UNK
PB1	PI-00655A	Y	PRMCAL	101	0.25	2 PSI	0.3
PB2	PI-00655A	Y	PRMCAL	101	0.25	2 PSI	0.3
PB1	PI-00655B	Y	ASHCT	DURAGAUGE	0.5	5 PSI	0.6
PB2	PI-00655B	Y	PRMCAL	101	0.25	2 PSI	0.3
PB0	PI-00658A	Y	ASHCT	DURAGAUGE	0.5	0.1 PSI	0.3
PB0	PI-00658B	Y	ASHCT	DURAGAUGE	0.5	0.1 PSI	0.3
PB1	PI-00692A	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB2	PI-00692A	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB1	PI-00692B	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB2	PI-00692B	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB1	PI-00913A	Y	ASHCT	1379SS	0.5	10 PSI	0.3
PB2	PI-00913A	Y	ASHCT	1379SS	0.5	10 PSI	0.3
PB1	PI-00913B	Y	ASHCT	1379SS	0.5	10 PSI	0.3
PB2	PI-00913B	Y	ASHCT	1379SS	0.5	10 PSI	0.3
PB1	PI-00922	N	WEST	HX-252	1.5	N/A	N/A
PB2	PI-00922	N	WEST	HX-252	1.5	N/A	N/A
PB1	PI-00923	N	WEST	HX-252	1.5	N/A	N/A
PB2	PI-00923	N	WEST	HX-252	1.5	N/A	N/A
PB1	PI-00933A	Y	ASHCT	1379SS	0.5	5 PSI	0.4
PB2	PI-00933A	Y	ASHCT	1379SS	0.5	5 PSI	0.4
PB1	PI-00933B	Y	ASHCT	1379SS	0.5	5 PSI	0.4
PB2	PI-00933B	Y	ASHCT	1379SS	0.5	5 PSI	0.4
PB1	PI-00933C	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB2	PI-00933C	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB1	PI-00933D	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB2	PI-00933D	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB1	PI-00974	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB2	PI-00974	Y	PRMCAL	101	0.25	0.2 PSI	0.2
PB0	PI-02815	Y	ASHCT	DURAGAUGE	0.5	2 PSI	0.6
PB0	PI-02844	N	SIGMA	1151	1.5	N/A	N/A
PB0	PI-02845	N	SIGMA	1151	1.5	N/A	N/A
PB0	PI-02846	Y	ASHCT	DURAGAUGE	0.5	2 PSI	0.6
PB0	PI-02847	Y	ASHCT	DURAGAUGE	0.5	1 PSI	0.3
PB0	PI-02848	Y	ASHCT	DURAGAUGE	0.5	2 PSI	0.6
PB0	PI-02849	Y	ASHCT	DURAGAUGE	0.5	2 PSI	0.6

PB0	PI-02850	Y	ASHCT	DURAGAUGE	0.5	2 PSI	0.6
PB0	PI-03973A	Y	PRMCAL	111	0.5	2 PSI	0.3
PB0	PI-03973B	Y	PRMCAL	111	0.5	2 PSI	0.3
PB0	PI-03974A	Y	PRMCAL	111	0.5	2 PSI	0.3
PB0	PI-03974B	Y	PRMCAL	111	0.5	2 PSI	0.3
PB1	PI-04004	N	ASHCT	DURAGAUGE	0.5	N/A	N/A
PB2	PI-04004	N	ASHCT	DURAGAUGE	0.5	N/A	N/A
PB1	PI-04005	Y	WEST	252	1.5	50	1.6
PB2	PI-04005	Y	WEST	252	1.5	50	1.6
PB0	PI-04010A	Y	ASHCT	DURAGAUGE	0.5	0.2 PSI	0.3
PB0	PI-04011	Y	PRMCAL	111	0.5	10 PSI	0.3
PB0	PI-04012	Y	WEST	252	1.5	50	1.6
PB1	PI-04013A	Y	ASHCT	DURAGAUGE	0.5	0.2 PSI	0.3
PB2	PI-04013A	Y	ASHCT	DURAGAUGE	0.5	0.5 PSI	0.8
PB0	PI-04017A	Y	ASHCT	DURAGAUGE	0.5	0.2 PSI	0.3
PB0	PI-04018	N	ASHCT	DURAGAUGE	0.5	N/A	N/A
PB0	PI-04019	Y	WEST	252	1.5	50	1.6
PB1	PI-04458	N	ASHCT	DURAGAUGE	0.5	N/A	N/A
PB2	PI-04458	N	ASHCT	DURAGAUGE	0.5	N/A	N/A
PB0	PI-04741	Y	ASHCT	DA1009	1.0	0.5	0.8
PB0	PI-04742	Y	MCDANIEL CONTROLS	Model T	1.0	1.0	0.8
PB0	PI-04743	Y	ASHCT	DA1009	1.0	0.5	0.8
PB0	PI-04744	Y	MCDANIEL CONTROLS	Model T	1.0	1.0	0.8
PB0	PI-04745	Y	MCDANIEL CONTROLS	Model T	1.0	0.25	0.8
PB0	PI-04746	Y	MCDANIEL CONTROLS	Model T	1.0	1.0	0.8
PB0	PI-04747	Y	MCDANIEL CONTROLS	Model T	1.0	0.25	0.8
PB0	PI-04748	Y	ASHCT	DA1009	1.0	1.0	0.3
PB2	PI-05976	N	ASHCT	UNK	UNK	N/A	N/A
PB1	PI-05976	N	UNK	UNK	UNK	N/A	N/A
PB2	PI-05977	N	ASHCT	UNK	UNK	N/A	N/A
PB1	PI-05977	N	UNK	UNK	UNK	N/A	N/A
PB0	PI-06354B	N	PRMCAL	111	0.5	N/A	N/A
PB0	PI-06354D	N	PRMCAL	111	0.5	N/A	N/A
PB0	PI-06355B	N	PRMCAL	111	0.5	N/A	N/A
PB0	PI-06355D	N	PRMCAL	111	0.5	N/A	N/A
PB1	PM-00420A-1	Y	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB2	PM-00420A-1	Y	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB1	PM-00468A	N	FOXBOR	66RC	0.5	N/A	N/A
PB2	PM-00468A	N	FOXBOR	66RC	0.5	N/A	N/A
PB1	PM-00468B	N	FOXBOR	66BC	0.5	N/A	N/A
PB2	PM-00468B	N	FOXBOR	66BC	0.5	N/A	N/A

PB1	PM-00478A	N	FOXBOR	66RC	0.5	N/A	N/A
PB2	PM-00478A	N	FOXBOR	66RC	0.5	N/A	N/A
PB1	PM-00478B	N	FOXBOR	66BC	0.5	N/A	N/A
PB2	PM-00478B	N	FOXBOR	66BC	0.5	N/A	N/A
PB0	PM-02844-1	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB0	PM-02845-1	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB1	PT-00139	N	FOXBOR	611GM	0.5	N/A	N/A
PB2	PT-00139	N	FOXBOR	611GM	0.5	N/A	N/A
PB1	**PT-00420A**	**Y**	**FOXBOR**	**N-E11GH**	**1.0**	**N/A**	**N/A**
PB2	**PT-00420A**	**Y**	**FOXBOR**	**N-E11GH**	**1.0**	**N/A**	**N/A**
PB1	PT-00468	N	FOXBOR	N-E11GH	0.5	N/A	N/A
PB2	PT-00468	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB1	PT-00478	N	FOXBOR	N-E11GH	0.5	N/A	N/A
PB2	PT-00478	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB1	PT-00628	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB2	PT-00628	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB1	PT-00922	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB2	PT-00922	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB1	PT-00923	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB2	PT-00923	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB1	PT-02289	N	FOXBOR	611GM	0.5	N/A	N/A
PB2	PT-02289	N	FOXBOR	611GM	0.5	N/A	N/A
PB1	PT-02290	N	FOXBOR	611GM	0.5	N/A	N/A
PB2	PT-02290	N	FOXBOR	611GM	0.5	N/A	N/A
PB0	PT-02844	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB0	PT-02845	N	FOXBOR	N-E11GM	0.5	N/A	N/A
PB1	**PT-04005**	**Y**	**FOXBOR**	**611GM**	**0.5**	**N/A**	**N/A**
PB2	**PT-04005**	**Y**	**FOXBOR**	**611GM**	**0.5**	**N/A**	**N/A**
PB0	**PT-04012**	**Y**	**FOXBOR**	**611GM**	**0.5**	**N/A**	**N/A**
PB0	**PT-04019**	**Y**	**FOXBOR**	**611GM**	**0.5**	**N/A**	**N/A**
PB1	T2104 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB2	T2104 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB1	T2105 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB2	T2105 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB1	T3510 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB2	T3510 (PPCS)	N	N/A	N/A	0.025	N/A	N/A
PB1	TE-00140	N	FOXBOR	DB-13U	UNK	N/A	N/A
PB2	TE-00140	N	FOXBOR	DB-13U	UNK	N/A	N/A
PB1	TE-00622	N	CONAX	7102	UNK	N/A	N/A
PB2	TE-00622	N	CONAX	7102	UNK	N/A	N/A
PB1	TE-00623	N	CONAX	7102	UNK	N/A	N/A

PB2	TE-00623	N	CONAX	7102	UNK	N/A	N/A
PB1	TE-02104	N	UNK	21-2C43	UNK	N/A	N/A
PB2	TE-02104	N	UNK	21-2C43	UNK	N/A	N/A
PB1	TE-02105	N	UNK	21-2C43	UNK	N/A	N/A
PB2	TE-02105	N	UNK	21-2C43	UNK	N/A	N/A
PB1	TE-03510	N	UNK	UNK	UNK	N/A	N/A
PB2	TE-03510	N	UNK	UNK	UNK	N/A	N/A
PB1	TI-00140	N	WEST	252	1.5	N/A	N/A
PB2	TI-00140	N	WEST	252	1.5	N/A	N/A
PB1	TI-00622A	N	SIGMA	1151	1.5	N/A	N/A
PB2	TI-00622A	N	SIGMA	1151	1.5	N/A	N/A
PB1	TI-00623A	N	SIGMA	1151	1.5	N/A	N/A
PB2	TI-00623A	N	SIGMA	1151	1.5	N/A	N/A
PB0	TI-00633A	N	ASHCT	UNK	1.0	N/A	N/A
PB0	TI-00633B	N	ASHCT	UNK	1.0	N/A	N/A
PB0	TI-00665	N	UNK	UNK	UNK	N/A	N/A
PB1	TI-00960	N	ASHCT	UNK	1.0	N/A	N/A
PB2	TI-00960	N	ASHCT	UNK	1.0	N/A	N/A
PB0	TI-04045	N	ASHCT	UNK	1.0	N/A	N/A
PB0	TI-04046	N	ASHCT	UNK	1.0	N/A	N/A
PB1	TM-00140	N	FOXBOR	694AC	0.5	N/A	N/A
PB2	TM-00140	N	FOXBOR	694AC	0.5	N/A	N/A
PB1	TM-00622	N	FOXBOR	N-2AI-P2V	0.5	N/A	N/A
PB2	TM-00622	N	FOXBOR	N-2AI-P2V	0.5	N/A	N/A
PB1	TM-00622-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB2	TM-00622-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB1	TM-00623	N	FOXBOR	N-2AI-P2V	0.5	N/A	N/A
PB2	TM-00623	N	FOXBOR	N-2AI-P2V	0.5	N/A	N/A
PB1	TM-00623-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB2	TM-00623-2	N	FOXBOR	N-2AO-VAI	0.5	N/A	N/A
PB1	TR-02000B	N	YEW	4088	0.25	N/A	N/A
PB2	TR-02000B	N	YEW	4088	0.25	N/A	N/A

ATTACHMENT 5
ASME Pump Test Instrumentation

IT	Pump	Speed	Suction Pressure	Discharge Pressure (for DP)	Flow Rate	Vibration	Bearing Temp	Comments
1 (2)	P-015A	-	PI-00974	PI-00913A	FIT-00659	PORT	-	IT has "FI-00659"
	P-015B	-	PI-00974	PI-00913B	FIT-00659	PORT	-	
3 (4)	P-010A	-	PI-00653A	PI-00655A	FIT-00660	PORT	-	IT has "FI-00660"
	P-010B	-	PI-00653B	PI-00655B	FIT-00660	PORT	-	
5 (6)	P-014A	-	PI-00933C	PI-0933A	FIT-00661	PORT	-	IT has "FI-00661"
	P-014B	-	PI-00933D	PI-0933B	FIT-00661	PORT	-	
7	P-032A	-	-	PI-02846	FI-04459A	PORT	-	LT-03598 (PPCS) used in DP calcs; ASME required
	P-032B	-	-	PI-02847	FI-04459A	PORT	-	
	P-032C	-	-	PI-02848	FI-04459A	PORT	-	
	P-032D	-	-	PI-02815	FI-04459B	PORT	-	
	P-032E	-	-	PI-02849	FI-04459B	PORT	-	
	P-032F	-	-	PI-02850	FI-04459B	PORT	-	
8A (9A)	P-029	PORT	PI-04013A	PI-04005	FIT-04049	PORT	TR-2000B	IT has "FI-04049" Bearing temp not ASME required
10	P-038A	-	PI-04010A	PI-04012	FIT-04050A	PORT	TR-2000B	IT has "FI-04050A,B" Bearing temp not ASME required
	P-038B	-	PI-04017A	PI-04019	FIT-04050B	PORT	TR-2000B	IT has "FI-04050A,B" Bearing temp not ASME required
11	P-012A	-	PI-00658A	PI-00631A	FI-00652	PORT	-	
	P-012B	-	PI-00658B	PI-00631B	FI-00652	PORT	-	
12 (13)	P-011A	-	PI-00692A	PI-00617A	F619 OR FI-00619	PORT	-	
	P-011B	-	PI-00692B	PI-00617B	F619 OR FI-00619	PORT	-	
14	P-206A	-	-	PI-03973A	FI-03905	PORT	-	
	P-206B	-	-	PI-03973B	FI-03928	PORT	-	

	P-207A	-	-	PI-03974A	FI-03905	PORT	-	
	P-207B	-	-	PI-03974B	FI-03929	PORT	-	
15	P-111A	-	PI-04745	PI-04746	FI-04667	PORT	-	
	P-111B	-	PI-04747	PI-04748	FI-04667	PORT	-	
	P-112A	-	PI-04741	PI-04742	FI-04666	PORT	-	
	P-112B	-	PI-04743	PI-04744	FI-04666	PORT	-	
17 (18)	P-004A	-	PI-00184	PI-00108	FT-00185	PORT	-	
	P-004B	-	PI-00184	PI-00108	FT-00185	PORT	-	
21 (22)	P-002A	PORT	PI-00139	PI-00420A	FI-00128; FI-00115; FI-00116	PORT	-	Discharge pressure not ASME required
	P-002B	PORT	PI-00139	PI-00420A	FI-00128; FI-00115; FI-00116	PORT	-	
	P-002C	PORT	PI-00139	PI-00420A	FI-00128; FI-00115; FI-00116	PORT	-	

ATTACHMENT 6

Previous 36 Month Failure History for ASME Section XI Required Instrumentation

(Shaded Components Indicates Multiple Failure Incidents)

Unit	Comp ID	Loop	# of OOC	Work Order	Date	Failure Type	As-Found Conditions
PB0	FI-00652	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-03905	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-03928	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-03929	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-04459A	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-04459B	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-04666	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-04667	N/A	1	9410869	941220	OOC	7 gpm LOW @ 2 points
PB0	**FIT-04050A**	**N/A**	2	9505881	950615	**OOC**	**0.7 gpm LOW @ 59.8 gpm**
PB0	FIT-04050A	N/A		9605321	960517	**OOC**	**None identified**
PB0	FIT-04050B	N/A	-	9511573	951031	Loose display connectors	N/A
PB0	FIT-04459A	N/A	-	NONE	N/A	N/A	N/A
PB0	FIT-04459B	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-00631A	N/A	1	9601939	960328	OOC	0.5 psi LOW @ 20 psi
PB0	PI-00631B	N/A	-	NONE	N/A	N/A	N/A
PB0	**PI-00658A**	**N/A**	2	9502308	950303	**OOC**	**0.2 - 0.3 psi LOW**
PB0	PI-00658A	N/A		9601939	960328	**OOC**	**0.3 - 0.5 psi LOW @ 5, 10 psi**
PB0	PI-00658B	N/A	1	9502308	950303	OOC	0.5 psi LOW @ 3 points
PB0	PI-02815	N/A	-	NONE	N/A	N/A	N/A
PB0	**PI-02846**	**N/A**	1	936045	931111	Loose needle	N/A
PB0	PI-02846	N/A		9606541	960619	**OOC**	**6 psi HIGH**
PB0	PI-02847	N/A	-	9509532	950919	Gauge broken	N/A
PB0	PI-02848	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-02849	N/A	1	9608293	960809	OOC	Zero shift
PB0	PI-02850	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-03973A	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-03973B	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-03974A	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-03974B	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-04010A	N/A	-	NONE	N/A	N/A	N/A
PB0	**PI-04011**	**N/A**	2	9403152	940721	**OOC**	**40 - 50 psi HIGH @ all points**
PB0	PI-04011	N/A		9505881	950615	**OOC**	**45 - 50 psi HIGH @ all points**
PB0	PI-04012	4012	-	NONE	N/A	N/A	N/A
PB0	**PI-04017A**	N/A	2	9403152	940721	**OOC**	**0.2 psi HIGH @ 15 psi**
PB0	PI-04017A	N/A		9605331	960628	**OOC**	**0.3 - 0.8 psi LOW**

PB0	PI-04019	4019	-	NONE	N/A	N/A	N/A
PB0	PI-04741	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-04742	N/A	-	9409477	941122	Gauge overranged	N/A
PB0	PI-04743	N/A	-	9500650	950120	Needle fell off	N/A
PB0	PI-04744	N/A	1	9410135	941103	OOC	N/A
PB0	**PI-04745**	N/A	2	9410869	941220	**OOC**	**0.3, 1.5 psi HIGH @ 2 points**
PB0	PI-04745	N/A		9508200	950808	**OOC**	**0.3 psi LOW @ 7.5 psi**
PB0	PI-04746	N/A	1	9410970	941219	OOC	None identified
PB0	**PI-04747**	N/A	2	0052378	931207	**OOC**	**0.3 psi HIGH @ 14 psi**
PB0	PI-04747	N/A		9508200	950808	**OOC**	**0.3 - 0.5 psi LOW @ all points**
PB0	PI-04748	N/A	-	NONE	N/A	N/A	N/A
PB0	**PT-04012**	4012	2	9403152	940721	**OOC**	**0.22 - 0.25 ma HIGH @ all points**
PB0	PT-04012	4012		9605331	960628	**OOC**	**0.31 - 0.38 ma HIGH @ all points**
PB0	PT-04019	4019	-	NONE	N/A	N/A	N/A
PB1	E/I-03598	3598	-	NONE	N/A	N/A	N/A
PB1	F619 (PPCS)	619	-	NONE	N/A	N/A	N/A
PB1	FI-00115	N/A	-	NONE	N/A	N/A	N/A
PB1	FI-00116	N/A	-	NONE	N/A	N/A	N/A
PB1	FI-00128	128	-	NONE	N/A	N/A	N/A
PB1	FI-00619	619	-	NONE	N/A	N/A	N/A
PB1	FIT-00659	N/A	-	NONE	N/A	N/A	N/A
PB1	FIT-00660	N/A	-	NONE	N/A	N/A	N/A
PB1	FIT-00661	N/A	-	NONE	N/A	N/A	N/A
PB1	FIT-04049	N/A	-	NONE	N/A	N/A	N/A
PB1	FM-00128	128	-	NONE	N/A	N/A	N/A
PB1	**FT-00128**	128	2	9403771	940607	**OOC**	**None identified**
PB1	FT-00128	128		9502517	950330	**OOC**	**0.21 - 0.29 ma HIGH @ 3 points**
PB1	FT-00185	N/A	-	NONE	N/A	N/A	N/A
PB1	FT-00619	619	1	9501884	950301	OOC	0.4 - 0.5ma LOW
PB1	L3598 (PPCS)	3598	-	NONE	N/A	N/A	N/A
PB1	LT-03598	3598	-	NONE	N/A	N/A	N/A
PB1	P2289 (PPCS)	2289	-	NONE	N/A	N/A	N/A
PB1	PI-00108	N/A	1	9604948	960506	OOC	None identified
PB1	PI-00184	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00420A	420	-	NONE	N/A	N/A	N/A
PB1	PI-00617A	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00617B	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00653A	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00653B	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00655A	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00655B	N/A	-	NONE	N/A	N/A	N/A

PB1	PI-00692A	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00692B	N/A	-	NONE	N/A	N/A	N/A
PB1	**PI-00913A**	**N/A**	**3**	9504121	950406	**OOC; Failed**	**None identified**
PB1	PI-00913A	N/A		9601939	960328	**OOC**	**65 - 100 psi LOW @ all points**
PB1	PI-00913A	N/A		9606093	960619	**OOC**	**None identified**
PB1	**PI-00913B**	**N/A**	**4**	0054506	940331	**OOC**	**25 psi LOW @ 5 points**
PB1	PI-00913B	N/A		9504122	950406	**OOC**	**Zero shift**
PB1	PI-00913B	N/A		9601939	960328	**OOC**	**10 psi HIGH @ all points**
PB1	PI-00913B	N/A		9606092	960619	**OOC**	**None identified**
PB1	PI-00933A	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00933B	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-00933C	N/A	1	9512587	951227	OOC	0.5 psi HIGH @ 0 psig
PB1	PI-00933D	N/A	1	0052697	931221	OOC	0.2 psi HIGH @ all points
PB1	PI-00974	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-04005	4005	-	NONE	N/A	N/A	N/A
PB1	PI-04013A	N/A	1	0054516	940418	OOC	2 psi LOW @ 4 points
PB1	PM-00420A-1	420	-	NONE	N/A	N/A	N/A
PB1	PT-00420A	420	-	NONE	N/A	N/A	N/A
PB1	PT-04005	4005	-	NONE	N/A	N/A	N/A
PB2	E/I-03598	3598	-	NONE	N/A	N/A	N/A
PB2	F619 (PPCS)	619	-	NONE	N/A	N/A	N/A
PB2	FI-00115	N/A	-	NONE	N/A	N/A	N/A
PB2	FI-00116	N/A	-	NONE	N/A	N/A	N/A
PB2	FI-00128	128	-	9412218	941229	Static on meter	N/A
PB2	FI-00619	619	-	NONE	N/A	N/A	N/A
PB2	FIT-00659	N/A	-	NONE	N/A	N/A	N/A
PB2	FIT-00660	N/A	-	NONE	N/A	N/A	N/A
PB2	FIT-00661	N/A	-	NONE	N/A	N/A	N/A
PB2	FIT-04049	N/A	1	0049642	931014	OOC	0.09ma LOW @ 4 points
PB2	FM-00128	128	-	NONE	N/A	N/A	N/A
PB2	FT-00128	128	-	926347	931029	Xmtr drifts; replaced	N/A
PB2	FT-00185	N/A	-	NONE	N/A	N/A	N/A
PB2	FT-00619	619	-	NONE	N/A	N/A	N/A
PB2	L3598 (PPCS)	3598	-	NONE	N/A	N/A	N/A
PB2	LT-03598	3598	-	NONE	N/A	N/A	N/A
PB2	**PI-00108**	**N/A**	**3**	9509527	951003	**OOC**	**10 psi HIGH**
PB2	PI-00108	N/A		9604950	960506	**OOC**	**None identified**
PB2	PI-00108	N/A		9607883	960730	**OOC**	**None identified**
PB2	PI-00184	N/A	1	9607883	960730	OOC	None identified
PB2	PI-00420A	420	-	NONE	N/A	N/A	N/A
PB2	PI-00617A	N/A	-	NONE	N/A	N/A	N/A

PB2	PI-00617B	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-00653A	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-00653B	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-00655A	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-00655B	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-00692A	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-00692B	N/A	-	NONE	N/A	N/A	N/A
PB2	**PI-00913A**	N/A	6	0049632	930922	**OOC**	**90 - 96 psi HIGH @ all points**
PB2	PI-00913A	N/A		9407525	940922	**OOC**	**35 - 45 psi HIGH @ all points**
PB2	PI-00913A	N/A		9509116	950929	**OOC**	**5 psi HIGH @ 5 points**
PB2	PI-00913A	N/A		9602066	960227	**OOC**	**100 psi LOW**
PB2	PI-00913A	N/A		9604543	960425	**OOC**	**100 psi LOW; Zero shift**
PB2	PI-00913A	N/A		9606094	960619	**OOC**	**None identified**
PB2	PI-00913A	N/A		9607297	960712	Gauge failed	N/A
PB2	**PI-00913B**	N/A	3	0049632	930922	**OOC**	**8 - 10 psi HIGH @ all points**
PB2	PI-00913B	N/A		9407525	940922	**OOC**	**13 - 19 psi LOW @ all points**
PB2	PI-00913B	N/A		9605183	960619	**OOC**	**None identified**
PB2	PI-00933A	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-00933B	N/A	-	NONE	N/A	N/A	N/A
PB2	**PI-00933C**	N/A	2	0055326	940506	**OOC**	**HIGH @ all points**
PB2	PI-00933C	N/A		9504793	950530	**OOC**	**0.5 psi HIGH @ all points**
PB2	**PI-00933D**	N/A	2	9504793	950530	**OOC**	**1.9 - 2.1 psi HIGH @ all points**
PB2	PI-00933D	N/A		9511502	951024	Gauge broken	N/A
PB2	PI-00933D	N/A		9512774	951201	**OOC; gauge broken**	**None identified**
PB2	PI-00974	N/A	-	NONE	N/A	N/A	
PB2	PI-04005	4005	-	NONE	N/A	N/A	N/A
PB2	PI-04013A	N/A	-	NONE	N/A	N/A	N/A
PB2	PM-00420A-1	420	-	NONE	N/A	N/A	N/A
PB2	**PT-00420A**	420	4	0049643	931007	**OOC**	**0.1 ma HIGH @ 2 points**
PB2	PT-00420A	420		9407536	941001	**OOC**	**0.15 ma LOW to 0.13 ma HIGH**
PB2	PT-00420A	420		9505922	950613	**OOC**	**80 - 100 psi LOW @ 2 points**
PB2	PT-00420A	420		9509218	951012	**OOC**	**0.1 - 0.12 ma HIGH @ 2 points**
PB2	PT-04005	4005	-	NONE	N/A	N/A	N/A

ATTACHMENT 7

Previous 36 Month Failure History for ASME Section XI Supporting Instrumentation

(Shaded Components Indicates Multiple Failure Incidents)

Unit	Comp ID	Loop	# of OOC	Work Order	Date	Failure Type	As-Found Conditions
PB0	1P-032A-M Ammeter	N/A	-	NONE	N/A	N/A	N/A
PB0	1P-032B-M Ammeter	N/A	-	NONE	N/A	N/A	N/A
PB0	1P-032C-M Ammeter	N/A	-	NONE	N/A	N/A	N/A
PB0	1P-032D-M Ammeter	N/A	-	NONE	N/A	N/A	N/A
PB0	1P-032E-M Ammeter	N/A	-	NONE	N/A	N/A	N/A
PB0	1P-032F-M Ammeter	N/A	-	NONE	N/A	N/A	N/A
PB0	DPIS-02936	N/A	-	NONE	N/A	N/A	N/A
PB0	DPIS-02937	N/A	-	NONE	N/A	N/A	N/A
PB0	DPIS-02938	N/A	1	931053	930302	OOC	None identified
PB0	E/I-03510	3510	1	9403150	940610	OOC	0.4 - 0.61ma LOW, zero shift
PB0	FI-00636	N/A	-	NONE	N/A	N/A	N/A
PB0	FI-04007	4007	-	NONE	N/A	N/A	N/A
PB0	FI-04014	4014	-	NONE	N/A	N/A	N/A
PB0	FM-04007A	4007	-	NONE	N/A	N/A	N/A
PB0	FM-04007B	4007	-	NONE	N/A	N/A	N/A
PB0	FM-04014A	4014	-	NONE	N/A	N/A	N/A
PB0	FM-04014B	4014	-	NONE	N/A	N/A	N/A
PB0	FT-04007	4007	-	NONE	N/A	N/A	N/A
PB0	FT-04014	4014	-	NONE	N/A	N/A	N/A
PB0	G-01-API-1	N/A	-	NONE	N/A	N/A	N/A
PB0	G-01-API-2	N/A	-	NONE	N/A	N/A	N/A
PB0	G-02-API-1	N/A	-	NONE	N/A	N/A	N/A
PB0	G-02-API-2	N/A	-	NONE	N/A	N/A	N/A
PB0	LE-03992A	3992A	-	NONE	N/A	N/A	N/A
PB0	LE-03992B	3992B	-	NONE	N/A	N/A	N/A
PB0	LI-00171	171	-	NONE	N/A	N/A	N/A
PB0	LI-04038	4038	-	NONE	N/A	N/A	N/A
PB0	LI-04039	4039	-	NONE	N/A	N/A	N/A
PB0	LIT-03992A	3992A	-	NONE	N/A	N/A	N/A
PB0	LIT-03992B	3992B	-	NONE	N/A	N/A	N/A
PB0	LM-00171	171	-	NONE	N/A	N/A	N/A
PB0	LM-04038-1	4038	-	NONE	N/A	N/A	N/A
PB0	LM-04039-1	4039	-	NONE	N/A	N/A	N/A
PB0	LT-00171	171	-	NONE	N/A	N/A	N/A
PB0	LT-04038	4038	1	9512763	960111	OOC	0.09 - 0.13ma LOW @ 16, 20ma

PB0	LT-04039	4039	-	NONE	N/A	N/A	N/A
PB0	P-038A Inboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB0	P-038A Outboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB0	P-038B Inboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB0	P-038B Outboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB0	PI-00651	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-02844	2844	-	NONE	N/A	N/A	N/A
PB0	PI-02845	2845	-	NONE	N/A	N/A	N/A
PB0	PI-04018	N/A	1	9605331	960628	OOC	20 psi HIGH
PB0	PI-06354B	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-06354D	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-06355B	N/A	-	NONE	N/A	N/A	N/A
PB0	PI-06355D	N/A	-	NONE	N/A	N/A	N/A
PB0	PM-02844-1	2844	-	NONE	N/A	N/A	N/A
PB0	PM-02845-1	2845	-	NONE	N/A	N/A	N/A
PB0	PT-02844	2844	-	NONE	N/A	N/A	N/A
PB0	PT-02845	2845	1	0052988	940104	OOC	0.1ma LOW @ 4 points
PB0	T3510 (PPCS)	3510	-	NONE	N/A	N/A	N/A
PB0	TI-00633A	N/A	-	NONE	N/A	N/A	N/A
PB0	TI-00633B	N/A	-	NONE	N/A	N/A	N/A
PB0	TI-00665	N/A	-	NONE	N/A	N/A	N/A
PB0	TI-04045	N/A	-	NONE	N/A	N/A	N/A
PB0	TI-04046	N/A	-	NONE	N/A	N/A	N/A
PB1	1P-002A Oil Press Gauge	N/A	-	NONE	N/A	N/A	N/A
PB1	1P-002B Oil Press Gauge	N/A	-	NONE	N/A	N/A	N/A
PB1	1P-002C Oil Press Gauge	N/A	-	NONE	N/A	N/A	N/A
PB1	FI-00626	626	-	NONE	N/A	N/A	N/A
PB1	FI-00924	924	-	NONE	N/A	N/A	N/A
PB1	FI-00925	925	-	NONE	N/A	N/A	N/A
PB1	FI-00928	928	-	NONE	N/A	N/A	N/A
PB1	FI-00930	930	-	NONE	N/A	N/A	N/A
PB1	FI-03087	N/A	-	NONE	N/A	N/A	N/A
PB1	FI-04002	4002	-	NONE	N/A	N/A	N/A
PB1	FI-04036	4036	-	NONE	N/A	N/A	N/A
PB1	FI-04037	4037	-	NONE	N/A	N/A	N/A
PB1	FIT-00930	930	-	NONE	N/A	N/A	N/A
PB1	FM-00626	626	-	NONE	N/A	N/A	N/A

PB1	FM-00924-2	924	-	NONE	N/A	N/A	N/A
PB1	FM-00925-2	925	-	NONE	N/A	N/A	N/A
PB1	FM-00928-2	928	-	NONE	N/A	N/A	N/A
PB1	FM-04002A	4002	-	NONE	N/A	N/A	N/A
PB1	FM-04002B	4002	-	NONE	N/A	N/A	N/A
PB1	FM-04036A	4036	-	NONE	N/A	N/A	N/A
PB1	FM-04036B	4036	-	NONE	N/A	N/A	N/A
PB1	**FM-04037A**	4037	2	9502523	950328	**OOC**	**0.21 ma HIGH @ 20 ma**
PB1	FM-04037A	4037		9602053	960409	**OOC**	**0.31 ma LOW @ 30 ma**
PB1	FM-04037B	4037	-	NONE	N/A	N/A	N/A
PB1	FT-00626	626	1	9601939	960328	OOC	None identified
PB1	FT-00924	924	-	NONE	N/A	N/A	N/A
PB1	FT-00925	925	-	NONE	N/A	N/A	N/A
PB1	FT-00928	928	-	NONE	N/A	N/A	N/A
PB1	FT-04002	4002	1	9602035	960411	OOC	0.22ma @ 10ma
PB1	FT-04036	4036	1	9502519	950328	OOC	0.37ma HIGH @ 2 points
PB1	FT-04037	4037	-	NONE	N/A	N/A	N/A
PB1	LI-00172	172	-	NONE	N/A	N/A	N/A
PB1	LI-00934	934	1	9601934	960312	OOC	3% LOW @ 100%
PB1	LI-00935A	935	-	NONE	N/A	N/A	N/A
PB1	LI-00938	938	-	NONE	N/A	N/A	N/A
PB1	LI-00939A	939	-	NONE	N/A	N/A	N/A
PB1	LI-00972	972	-	NONE	N/A	N/A	N/A
PB1	LM-00172	172	-	NONE	N/A	N/A	N/A
PB1	LM-00972-1	972	-	NONE	N/A	N/A	N/A
PB1	LT-00172	172	-	NONE	N/A	N/A	N/A
PB1	LT-00972	972	-	NONE	N/A	N/A	N/A
PB1	LT/LC-00934	934	-	9602844	960326	Subcomponent Part Failure	N/A
PB1	**LT/LC-00935**	935	1	9505418	950515	Subcomponent Part Failure	N/A
PB1	LT/LC-00935	935		9601933	960404	**OOC**	**1.4% HIGH @ 25%**
PB1	**LT/LC-00938**	938	0	9500887	950131	Subcomponent Part Failure	N/A
PB1	LT/LC-00938	938		9602845	960326	Subcomponent Part Failure	N/A
PB1	LT/LC-00939	939	1	9502435	950405	OOC	1.5% LOW @ 0%; 1.5% HIGH @ 25%
PB1	P-015A-M-AM1	N/A	-	NONE	N/A	N/A	N/A
PB1	P-015B-M-AM1	N/A	-	NONE	N/A	N/A	N/A
PB1	P-029 Inboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB1	P-029 Inboard Turbine Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB1	P-029 Outboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A

PB1	P-029 Outboard Turbine Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB1	P2289 (PPCS)	2289	-	NONE	N/A	N/A	N/A
PB1	P2290 (PPCS)	2290	-	NONE	N/A	N/A	N/A
PB1	PI-00139	139	-	NONE	N/A	N/A	N/A
PB1	PI-00468	468	-	NONE	N/A	N/A	N/A
PB1	**PI-00478**	**478**	2	0054481	940411	**OOC**	**20 psi LOW @ 1400 psi**
PB1	PI-00478	**478**		9601925	960405	**OOC**	**20 psi LOW @ 1400 psi**
PB1	PI-00628	628	-	NONE	N/A	N/A	N/A
PB1	PI-00629	629	-	NONE	N/A	N/A	N/A
PB1	PI-00922	922	-	NONE	N/A	N/A	N/A
PB1	PI-00923	923	-	NONE	N/A	N/A	N/A
PB1	PI-04004	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-04458	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-05976	N/A	-	NONE	N/A	N/A	N/A
PB1	PI-05977	N/A	-	NONE	N/A	N/A	N/A
PB1	PM-00468A	468	-	NONE	N/A	N/A	N/A
PB1	PM-00468B	468	-	NONE	N/A	N/A	N/A
PB1	PM-00478A	478	-	NONE	N/A	N/A	N/A
PB1	PM-00478B	478	-	NONE	N/A	N/A	N/A
PB1	**PT-00139**	139	2	0053700	940217	**OOC**	**0.4 ma LOW @ all points**
PB1	PT-00139	139		9507866	950821	**OOC**	**HIGH @ all points**
PB1	PT-00468	468	-	NONE	N/A	N/A	N/A
PB1	**PT-00478**	**478**	0	9602732	960308	Air in sensing line	N/A
PB1	PT-00478	**478**		9603305	960322	Subcomponent Part Failure	N/A
PB1	PT-00628	628	-	NONE	N/A	N/A	N/A
PB1	PT-00922	922	-	NONE	N/A	N/A	N/A
PB1	PT-00923	923	-	NONE	N/A	N/A	N/A
PB1	PT-02289	2289	-	NONE	N/A	N/A	N/A
PB1	PT-02290	2290	-	NONE	N/A	N/A	N/A
PB1	T2104 (PPCS)	2104	-	NONE	N/A	N/A	N/A
PB1	T2105 (PPCS)	2105	-	NONE	N/A	N/A	N/A
PB1	TE-00140	140	-	NONE	N/A	N/A	N/A
PB1	TE-00622	622	-	NONE	N/A	N/A	N/A
PB1	TE-00623	623	-	NONE	N/A	N/A	N/A
PB1	TE-02104	2104	-	NONE	N/A	N/A	N/A
PB1	TE-02105	2105	-	NONE	N/A	N/A	N/A
PB1	TE-03510	3510	-	NONE	N/A	N/A	N/A
PB1	TI-00140	140	-	NONE	N/A	N/A	N/A
PB1	TI-00622A	622	-	NONE	N/A	N/A	N/A
PB1	TI-00623A	623	-	NONE	N/A	N/A	N/A

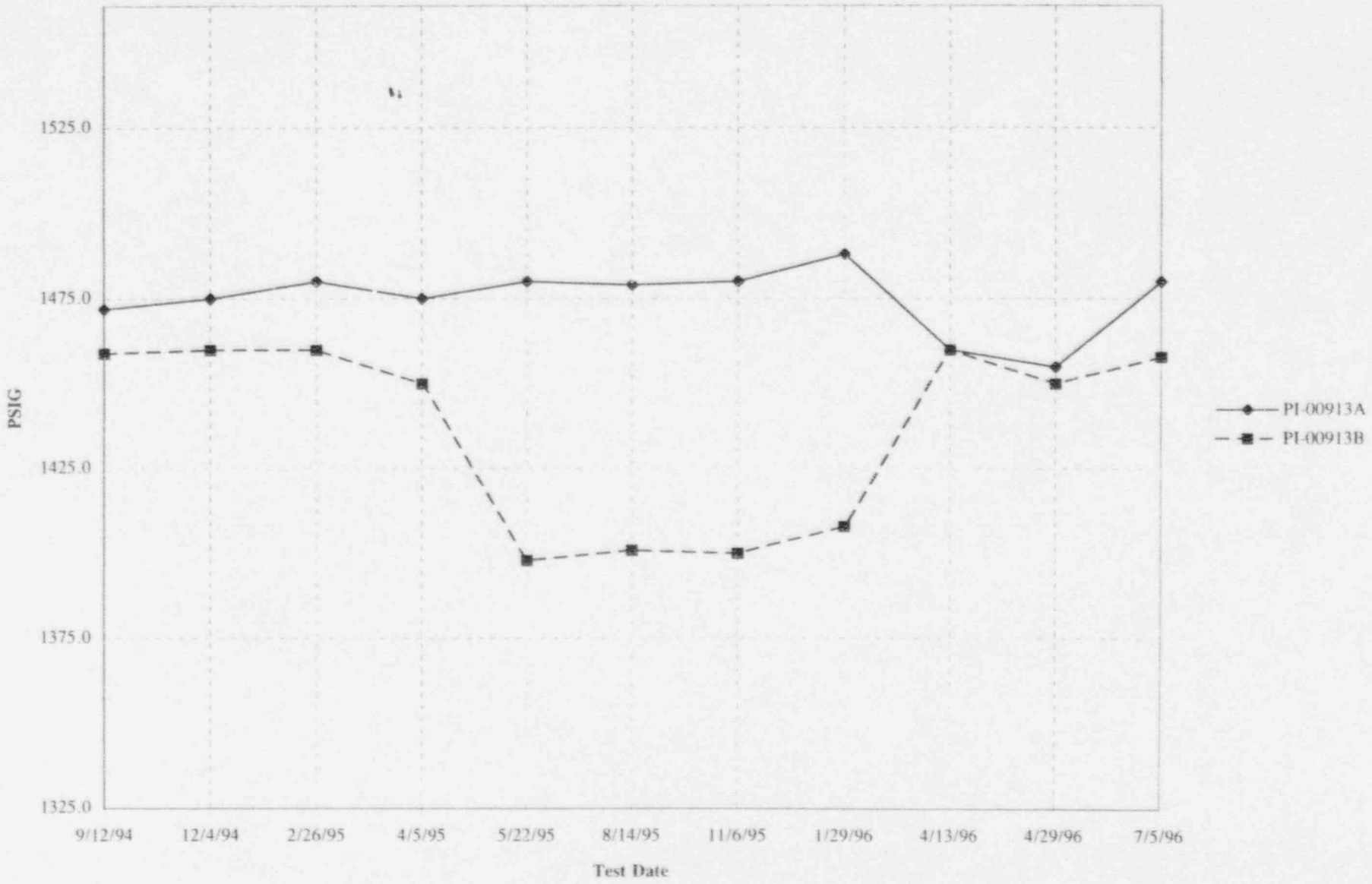
PB1	TI-00960	N/A	2	9502308	950303	OOC	2 - 3 Degrees F HIGH
PB1	TI-00960	N/A		9601939	960328	OOC	2 - 2.8 Degrees F LOW @ all points
PB1	TM-00140	140	1	9507866	950821	OOC	0.32 - 0.43ma HIGH @ 4 points
PB1	TM-00622	622	-	NONE	N/A	N/A	N/A
PB1	TM-00622-2	622	-	NONE	N/A	N/A	N/A
PB1	TM-00623	623	-	NONE	N/A	N/A	N/A
PB1	TM-00623-2	623	-	NONE	N/A	N/A	N/A
PB1	TR-2000B	2000	-	941092	940509	Subcomponent Part Failure	N/A
PB2	1P-002A Oil Press Gauge	N/A	-	NONE	N/A	N/A	N/A
PB2	1P-002B Oil Press Gauge	N/A	-	NONE	N/A	N/A	N/A
PB2	1P-002C Oil Press Gauge	N/A	-	NONE	N/A	N/A	N/A
PB2	FI-00626	626	-	9408660	941004	Meter internal contamination	N/A
PB2	FI-00924	924	-	NONE	N/A	N/A	N/A
PB2	FI-00925	925	-	NONE	N/A	N/A	N/A
PB2	FI-00928	928	-	NONE	N/A	N/A	N/A
PB2	FI-00930	930	-	NONE	N/A	N/A	N/A
PB2	FI-03087	N/A	-	NONE	N/A	N/A	N/A
PB2	FI-04002	4002	-	NONE	N/A	N/A	N/A
PB2	FI-04036	4036	-	NONE	N/A	N/A	N/A
PB2	FI-04037	4037	-	NONE	N/A	N/A	N/A
PB2	FIT-00930	930	2	935032	930917	OOC	None identified
PB2	FIT-00930	930		9504793	950530	OOC	1.3ma LOW @ 20ma
PB2	FM-00626	626	-	NONE	N/A	N/A	N/A
PB2	FM-00924-2	924	-	NONE	N/A	N/A	N/A
PB2	FM-00925-2	925	-	NONE	N/A	N/A	N/A
PB2	FM-00928-2	928	-	NONE	N/A	N/A	N/A
PB2	FM-04002A	4002	-	NONE	N/A	N/A	N/A
PB2	FM-04002B	4002	-	NONE	N/A	N/A	N/A
PB2	FM-04036A	4036	-	NONE	N/A	N/A	N/A
PB2	FM-04036B	4036	-	NONE	N/A	N/A	N/A
PB2	FM-04037A	4037	-	NONE	N/A	N/A	N/A
PB2	FM-04037B	4037	-	NONE	N/A	N/A	N/A
PB2	FT-00626	626	1	0049632	930922	OOC	0.25ma LOW @ 50ma
PB2	FT-00924	924	4	935436	931013	OOC	Zero shift
PB2	FT-00924	924		9407525	940922	OOC	0.13 - 0.18 ma LOW @ all points
PB2	FT-00924	924		9509116	950929	OOC	0.09 ma LOW @ 2 upper points
PB2	FT-00924	924		9512934	951209	OOC	Zero shift
PB2	FT-00925	925	-	NONE	N/A	N/A	N/A
PB2	FT-00928	928	1	0049632	930922	OOC	0.14ma LOW @ 20ma
PB2	FT-04002	4002	3	0049642	931014	OOC	0.3 - 0.5 ma LOW @ 4 points
PB2	FT-04002	4002		9407535	941011	OOC	0.24 - 0.35 ma HIGH @ 3 points

PB2	FT-04002	4002		9509214	950124	**OOC**	**0.25 ma HIGH @ 30 ma**
PB2	FT-04036	4036	1	9407535	941011	OOC	0.44 - 0.53ma LOW @ all points
PB2	FT-04037	4037	1	9407535	941011	OOC	0.6 - 0.7ma LOW @ all points
PB2	LI-00172	172	-	NONE	N/A	N/A	N/A
PB2	LI-00934	934	-	NONE	N/A	N/A	N/A
PB2	LI-00935A	935	-	NONE	N/A	N/A	N/A
PB2	LI-00938	938	-	NONE	N/A	N/A	N/A
PB2	**LI-00939A**	939	2	0049626	930915	**OOC**	**3% LOW @ 100%**
PB2	LI-00939A	939		9406676	940822	**OOC**	**4% LOW @ 100%**
PB2	LI-00972	972	-	NONE	N/A	N/A	N/A
PB2	LM-00172	172	-	NONE	N/A	N/A	N/A
PB2	LM-00972-1	972	-	NONE	N/A	N/A	N/A
PB2	LT-00172	172	1	9509113	950921	OOC	0.24 - 0.44 HIGH @ 3 points
PB2	LT-00972	972	-	NONE	N/A	N/A	N/A
PB2	**LT/LC-00934**	934	1	932478	930604	LT/LC failed	N/A
PB2	LT/LC-00934	934		9509110	951117	**OOC**	**1.3 - 2.5% LOW @ 3 points**
PB2	LT/LC-00934	934		9513053	951220	Air in sensing line	N/A
PB2	LT/LC-00934	934		9600811	960124	Air in Sensing Line	N/A
PB2	LT/LC-00934	934		9605868	960603	Air in sensing line	N/A
PB2	LT/LC-00934	934		9606993	960628	Subcomponent part failure	N/A
PB2	LT/LC-00934	934		9607050	960703	Air in sensing line	N/A
PB2	**LT/LC-00935**	935	1	9401807	940420	Subcomponent part failure	N/A
PB2	LT/LC-00935	935		9408287	941029	Subcomponent part failure	N/A
PB2	LT/LC-00935	935		9509110	951117	**OOC**	**1.9%, 2.49% LOW @ 2 upper points**
PB2	LT/LC-00935	935		9605869	960603	Air in sensing line	N/A
PB2	LT/LC-00935	935		9607051	960703	Air in sensing line	N/A
PB2	**LT/LC-00938**	938	1	935028	931124	Subcomponent part failure	N/A
PB2	LT/LC-00938	938		9509110	951117	**OOC**	**1.1%, 2.1% LOW @ 2 mid-points**
PB2	LT/LC-00938	938		9600253	960109	Subcomponent part failure	N/A
PB2	LT/LC-00938	938		9605870	960603	Air in sensing line	N/A
PB2	**LT/LC-00939**	939	1	935007	930930	LT/LC failed	N/A
PB2	LT/LC-00939	939		9509110	951117	**OOC**	**1.1%, 2.8% LOW @ 2 mid-points**
PB2	LT/LC-00939	939		9605871	960603	Air in sensing line	N/A
PB2	P-015A-M-AM1	N/A	-	NONE	N/A	N/A	N/A
PB2	P-015B-M-AM1	N/A	-	NONE	N/A	N/A	N/A
PB2	P-029 Inboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB2	P-029 Inboard Turbine Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB2	P-029 Outboard Pump Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A

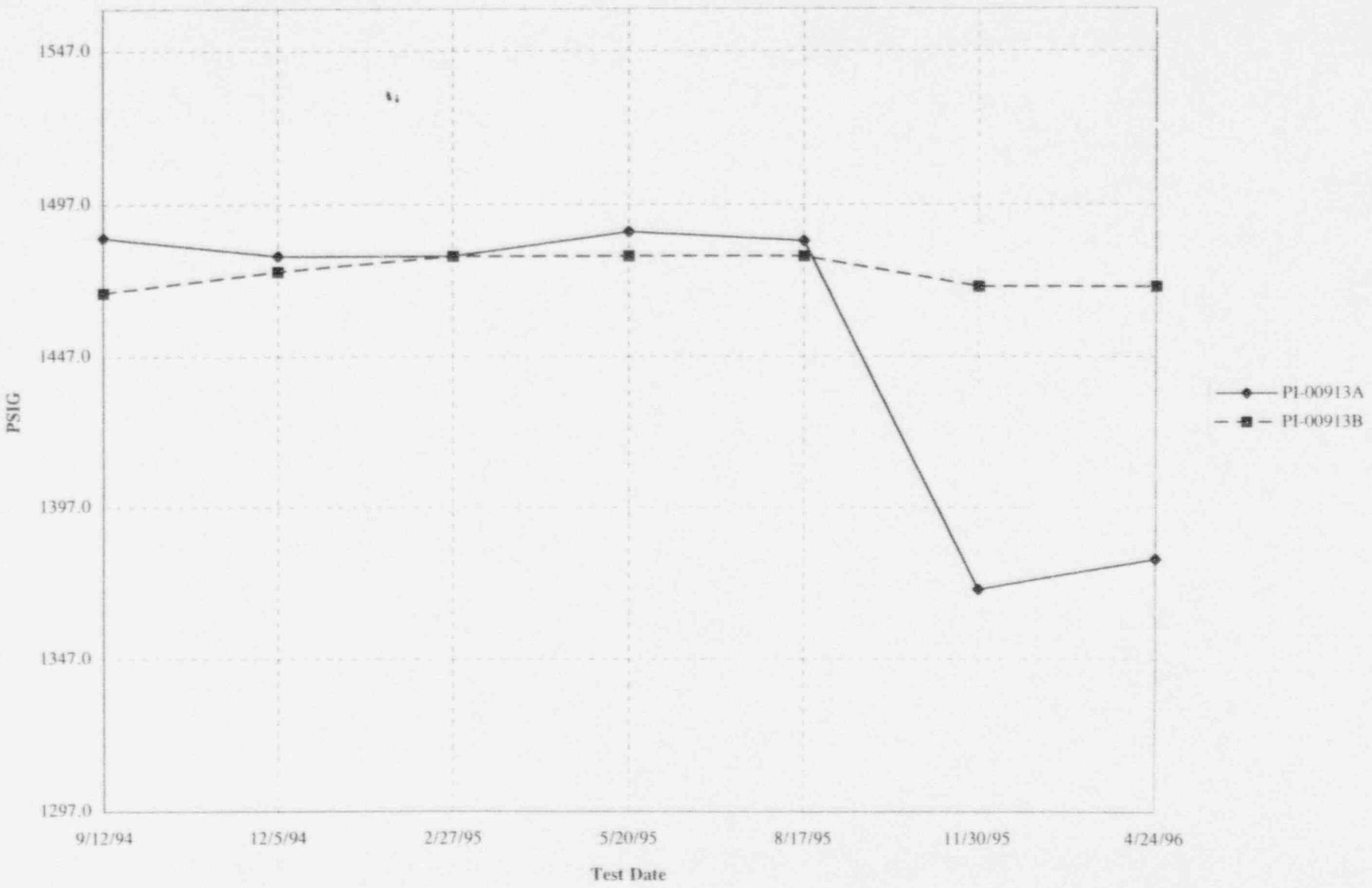
PB2	P-029 Outboard Turbine Bearing Temp TC	2000	-	NONE	N/A	N/A	N/A
PB2	P2289 (PPCS)	2289	-	NONE	N/A	N/A	N/A
PB2	P2290 (PPCS)	2290	-	NONE	N/A	N/A	N/A
PB2	PI-00139	139	-	NONE	N/A	N/A	N/A
PB2	PI-00468	468	-	NONE	N/A	N/A	N/A
PB2	PI-00478	478	-	NONE	N/A	N/A	N/A
PB2	PI-00628	628	-	NONE	N/A	N/A	N/A
PB2	PI-00629	629	-	NONE	N/A	N/A	N/A
PB2	PI-00922	922	-	NONE	N/A	N/A	N/A
PB2	**PI-00923**	923	2	0049632	930922	**OOC**	**0.27 - 0.48 ma HIGH@ 3 points**
PB2	PI-00923	923		9511215	951017	**OOC**	**Zero shift**
PB2	PI-04004	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-04458	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-05976	N/A	-	NONE	N/A	N/A	N/A
PB2	PI-05977	N/A	-	NONE	N/A	N/A	N/A
PB2	PM-00468A	468	-	NONE	N/A	N/A	N/A
PB2	PM-00468B	468	-	NONE	N/A	N/A	N/A
PB2	PM-00478A	478	1	9509102	951016	OOC	Lead time 0.11 secs. LOW
PB2	PM-00478B	478	-	NONE	N/A	N/A	N/A
PB2	PT-00139	139	1	0054142	940404	OOC	0.3ma HIGH @ 2 upper points
PB2	PT-00468	468	-	NONE	N/A	N/A	N/A
PB2	PT-00478	478	-	NONE	N/A	N/A	N/A
PB2	PT-00628	628	-	NONE	N/A	N/A	N/A
PB2	PT-00922	922	-	NONE	N/A	N/A	N/A
PB2	PT-00923	923	-	9510800	951024	Subcomponent part failure	N/A
PB2	PT-02289	2289	-	NONE	N/A	N/A	N/A
PB2	PT-02290	2290	-	NONE	N/A	N/A	N/A
PB2	T2104 (PPCS)	2104	-	NONE	N/A	N/A	N/A
PB2	T2105 (PPCS)	2105	-	NONE	N/A	N/A	N/A
PB2	TE-00140	140	-	NONE	N/A	N/A	N/A
PB2	TE-00622	622	-	NONE	N/A	N/A	N/A
PB2	TE-00623	623	-	NONE	N/A	N/A	N/A
PB2	TE-02104	2104	-	NONE	N/A	N/A	N/A
PB2	TE-02105	2105	-	NONE	N/A	N/A	N/A
PB2	TE-03510	3510	-	NONE	N/A	N/A	N/A
PB2	TI-00140	140	-	NONE	N/A	N/A	N/A
PB2	TI-00622A	622	-	NONE	N/A	N/A	N/A
PB2	TI-00623A	623	-	NONE	N/A	N/A	N/A
PB2	TI-00960	N/A	-	NONE	N/A	N/A	N/A
PB2	TM-00140	140	-	NONE	N/A	N/A	N/A

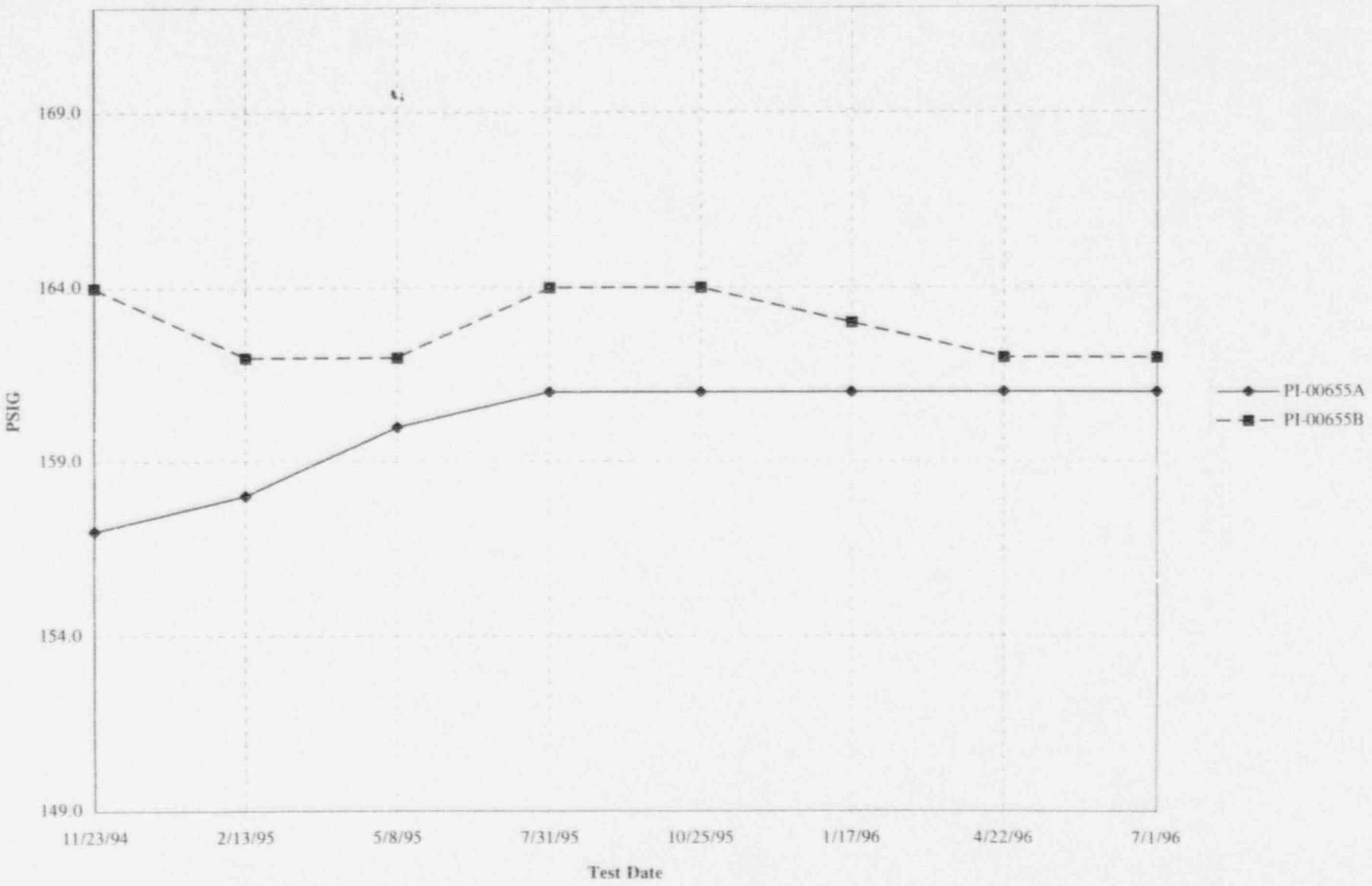
PB2	TM-00622	622	-	NONE	N/A	N/A	N/A
PB2	TM-00622-2	622	-	NONE	N/A	N/A	N/A
PB2	TM-00623	623	-	NONE	N/A	N/A	N/A
PB2	TM-00623-2	623	-	NONE	N/A	N/A	N/A
PB2	TR-2000B	2000	-	NONE	N/A	N/A	N/A

ATTACHMENT 8 - PB1 PI-00913A, B

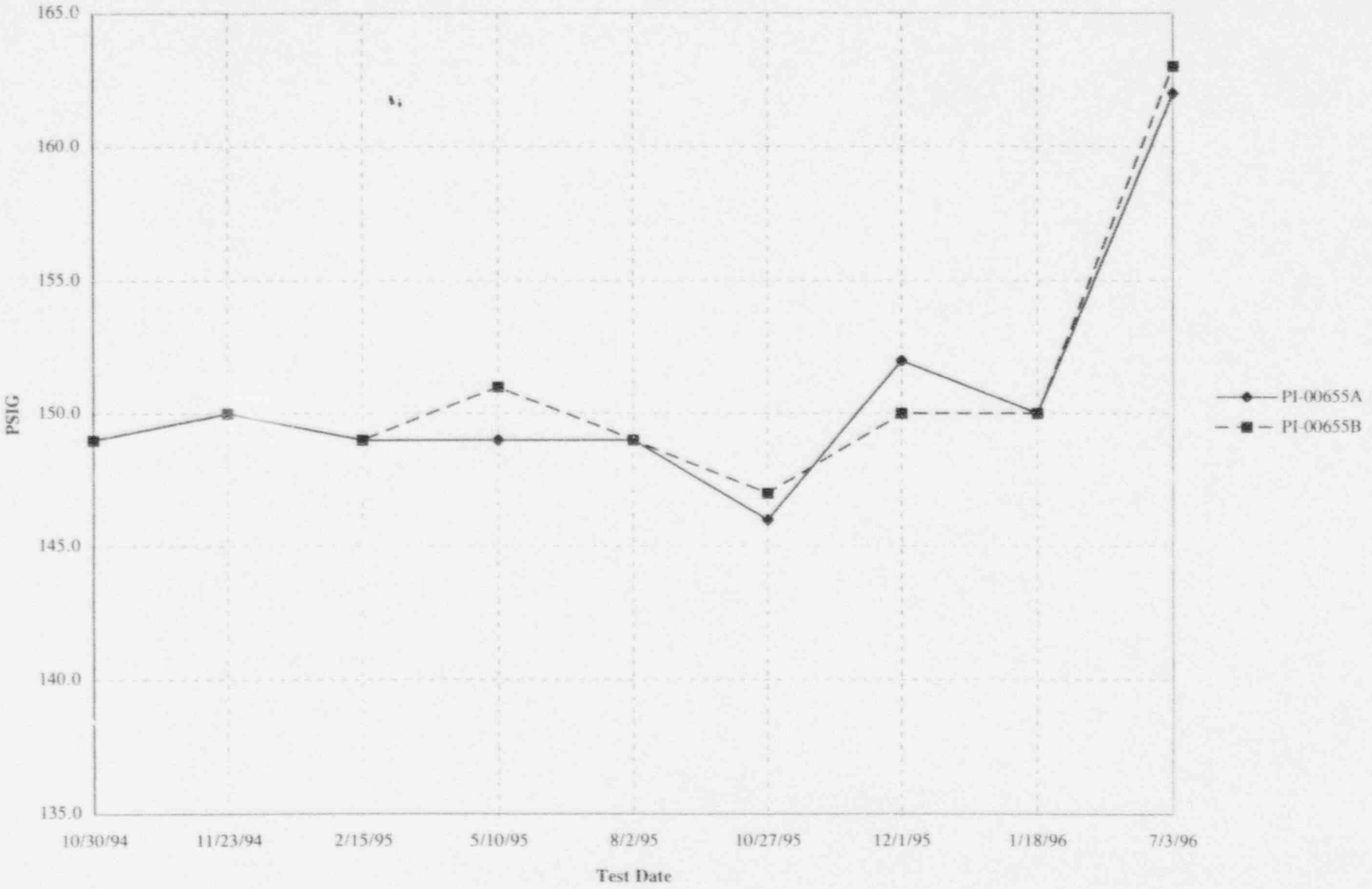


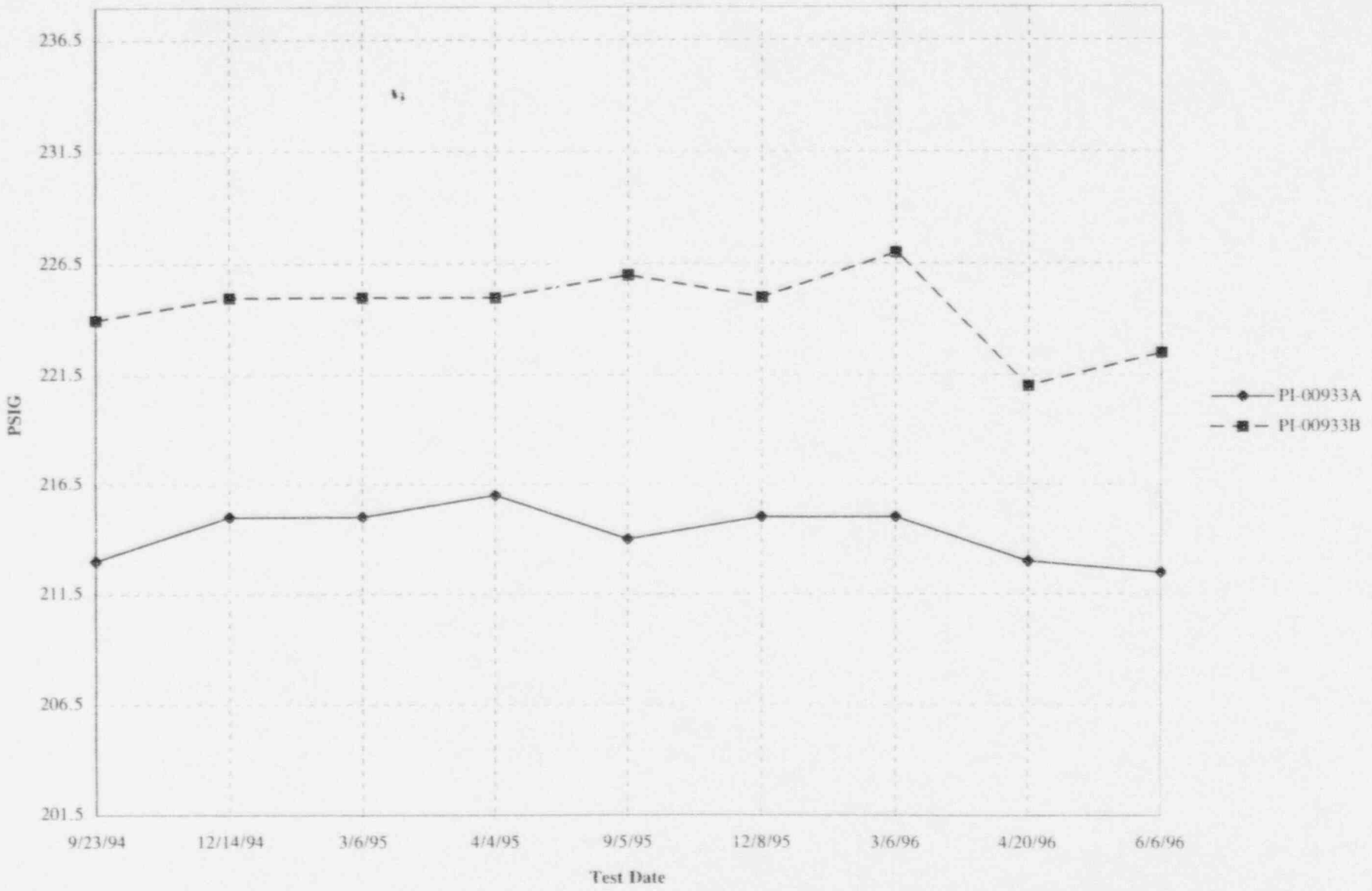
ATTACHMENT 8 - PB2 PI-00913A, B



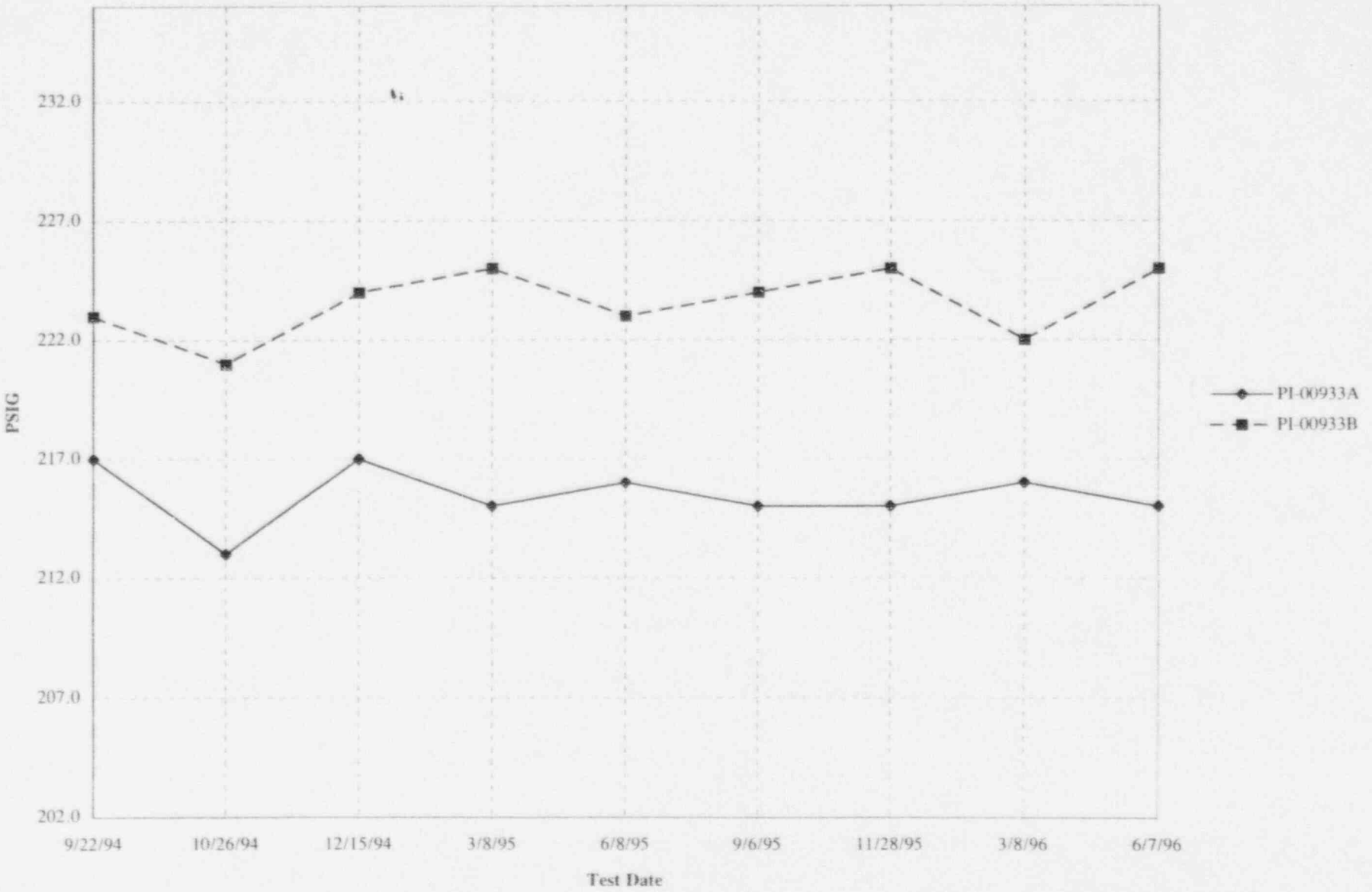

169.0
164.0
159.0
154.0
149.0
PSIG
11/23/94
2/13/95
5/8/95
7/31/95
10/25/95
1/17/96
4/22/96
7/1/96
Test Date
PI-00655A
PI-00655B

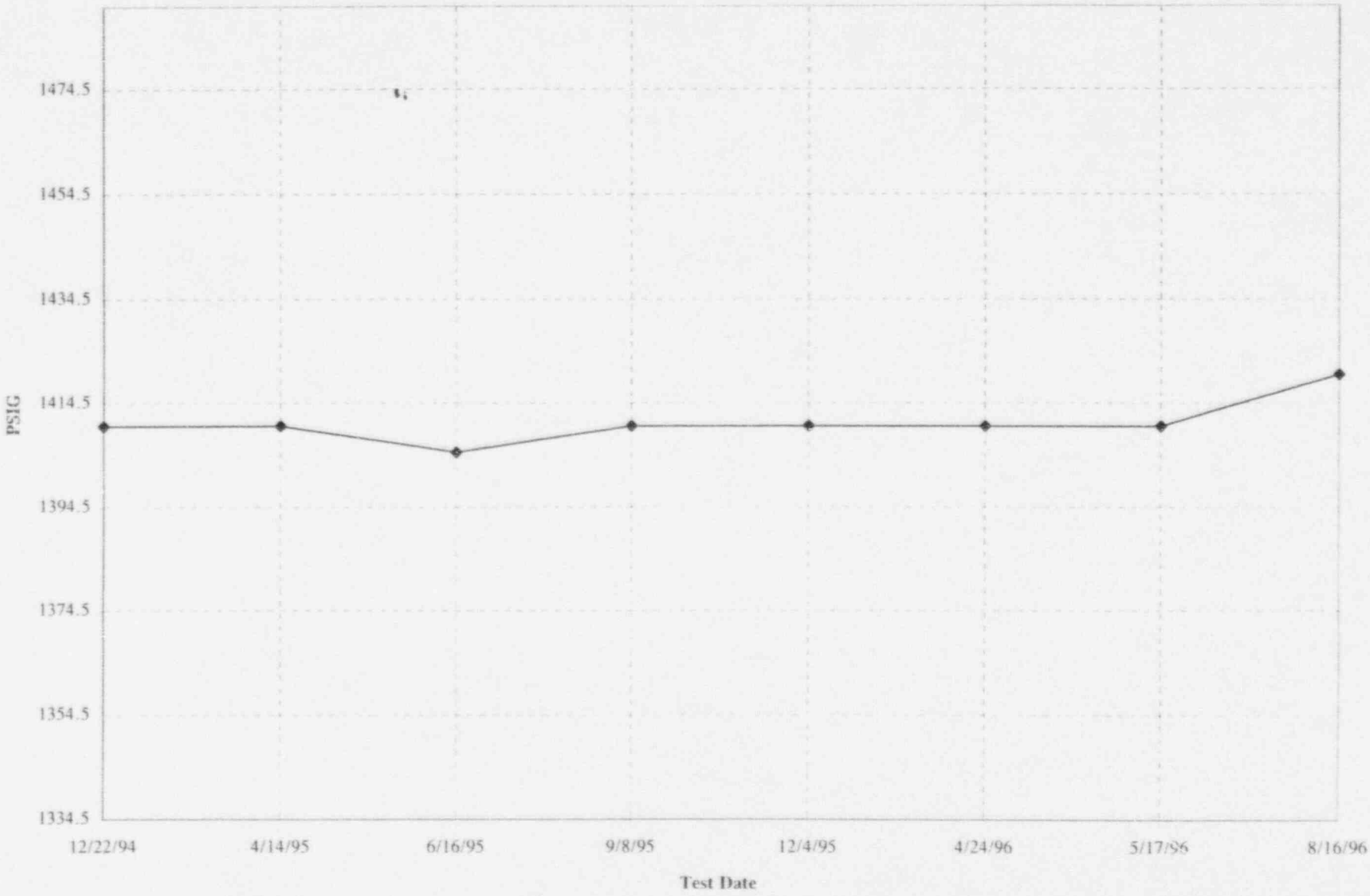
ATTACHMENT 8 - PB2 PI-00655A, B

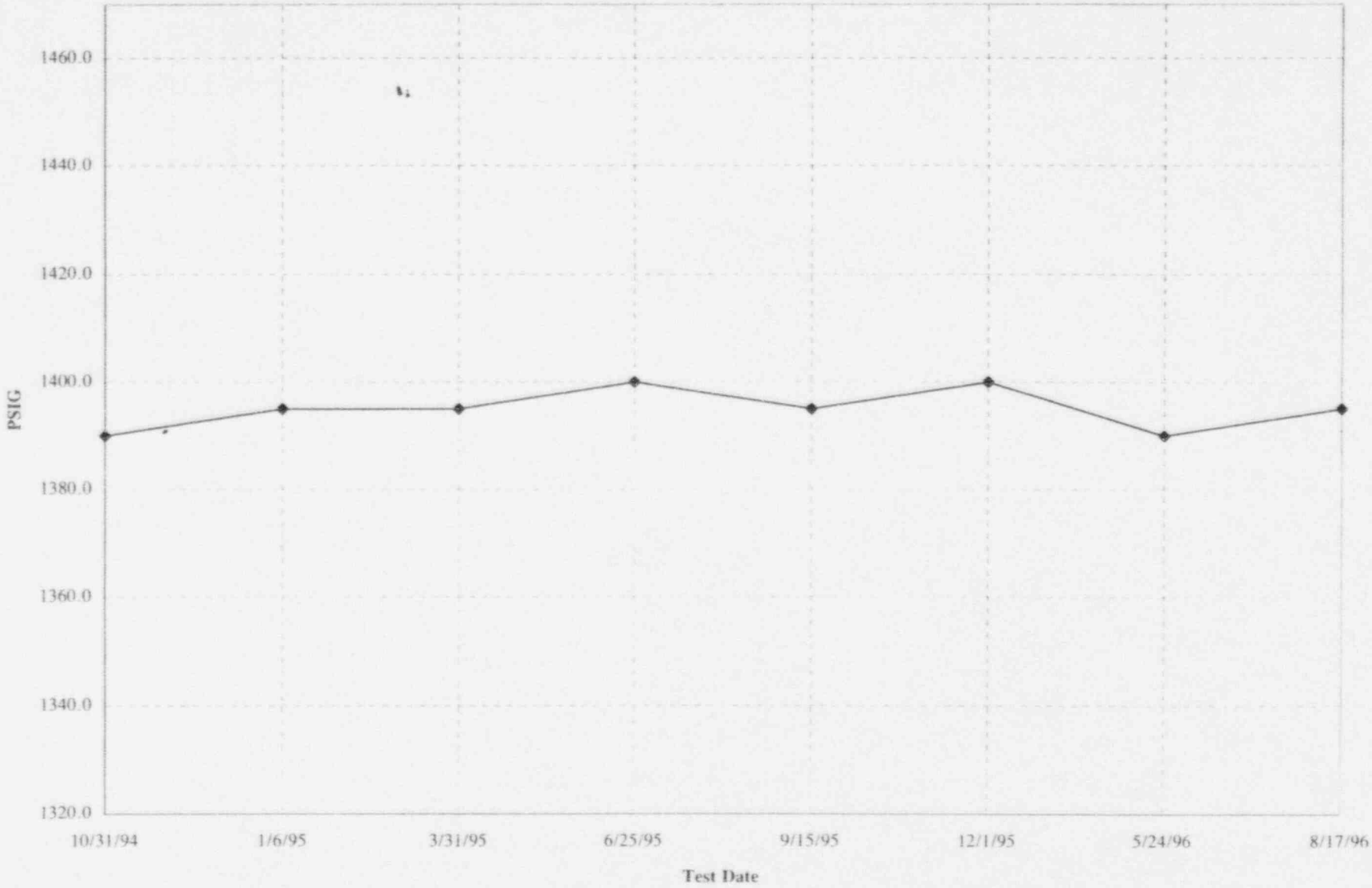



236.5
231.5
226.5
221.5
216.5
211.5
206.5
201.5
PSIG
9/23/94
12/14/94
3/6/95
4/4/95
9/5/95
12/8/95
3/6/96
4/20/96
6/6/96
Test Date
PI-00933A
PI-00933B

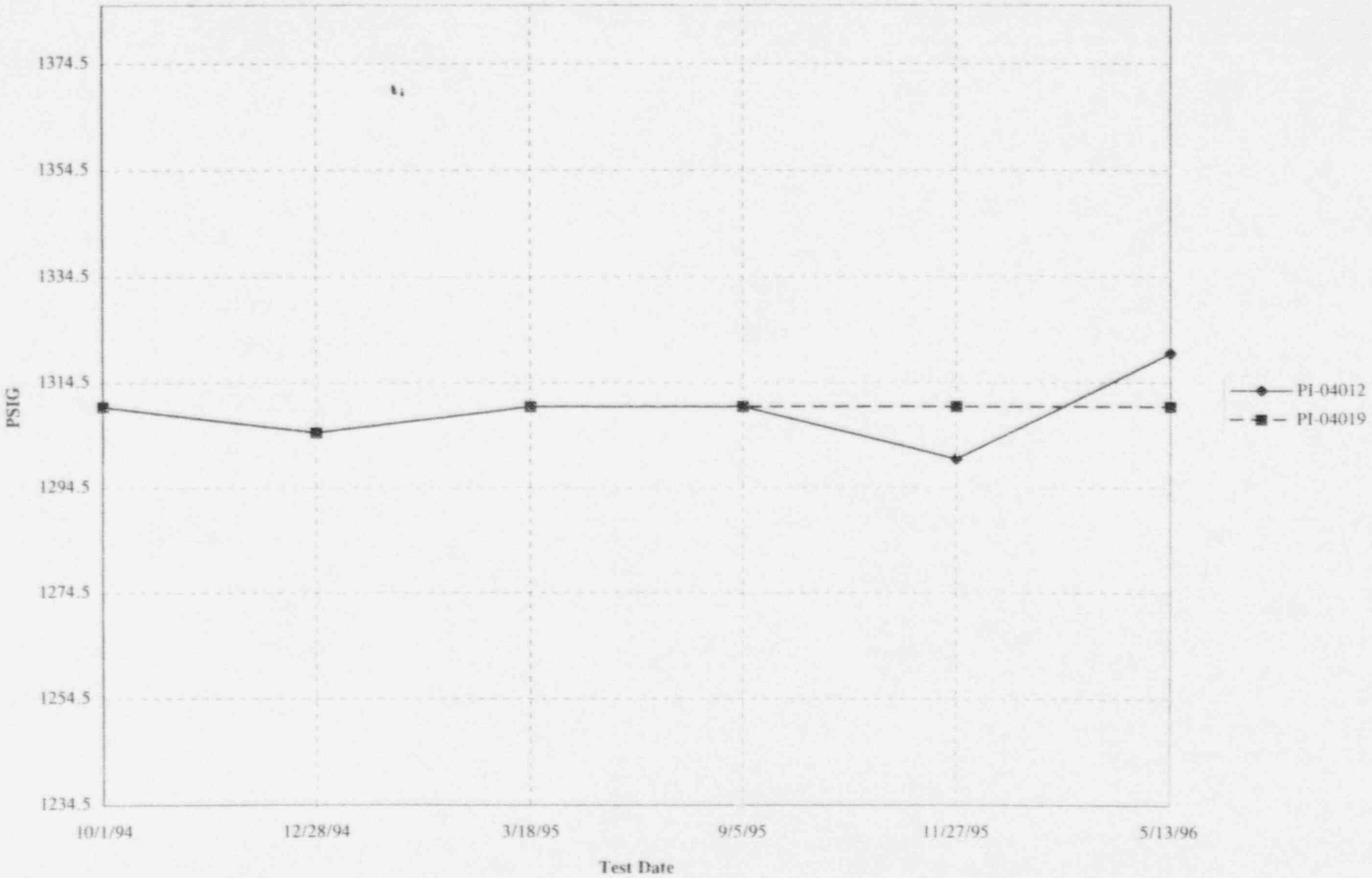
ATTACHMENT 8 - PB2 PI-00933A, B



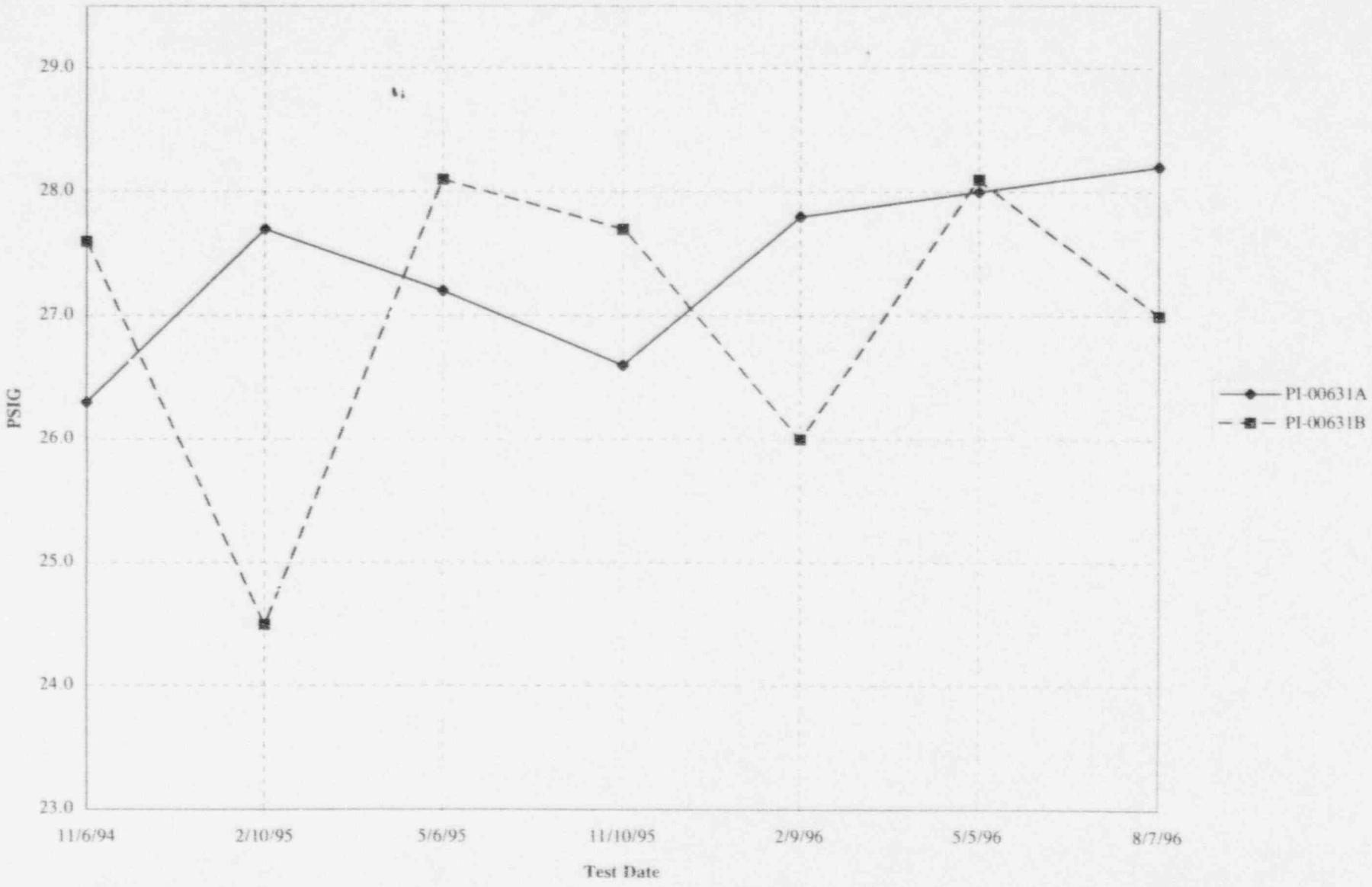

1474.5
1454.5
1434.5
1414.5
1394.5
1374.5
1354.5
1334.5
PSIG
12/22/94
4/14/95
6/16/95
9/8/95
12/4/95
4/24/96
5/17/96
8/16/96
Test Date


1460.0
1440.0
1420.0
1400.0
1380.0
1360.0
1340.0
1320.0
PSIG
10/31/94
1/6/95
3/31/95
6/25/95
9/15/95
12/1/95
5/24/96
8/17/96
Test Date

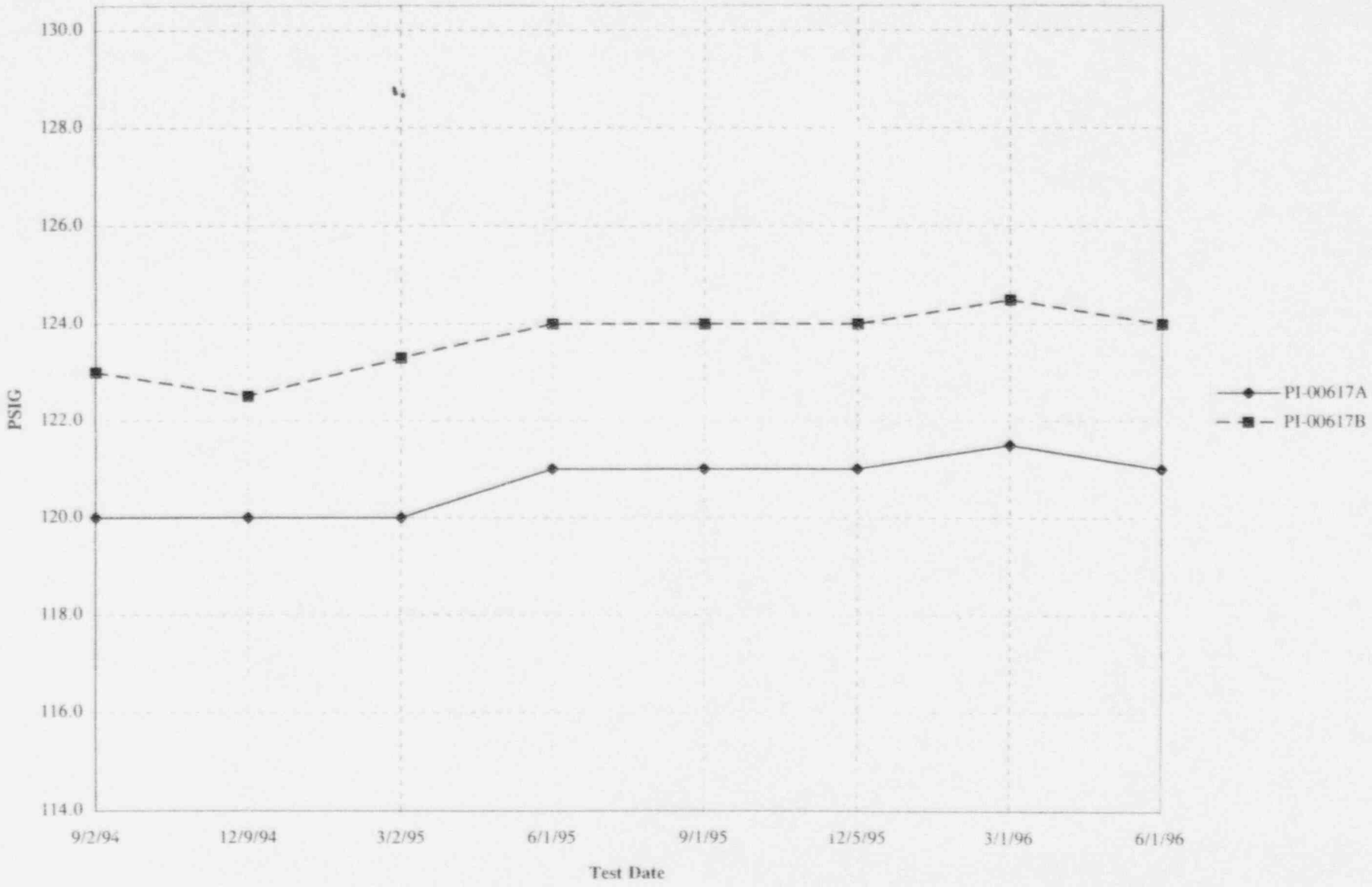
ATT 8 - PB0 PI-04012, 04019



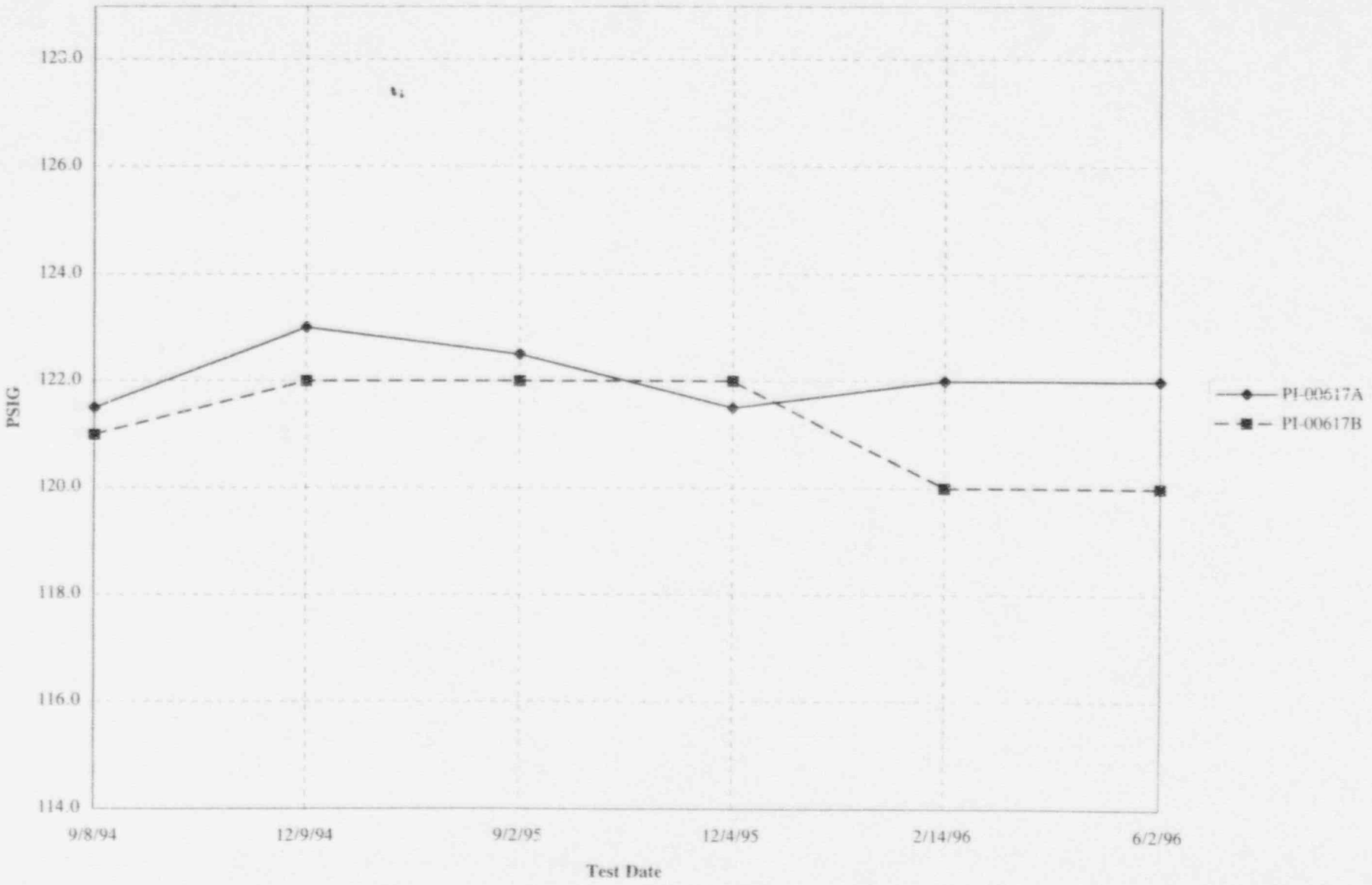
ATTACHMENT 8 - PB0 PI-00631A, B



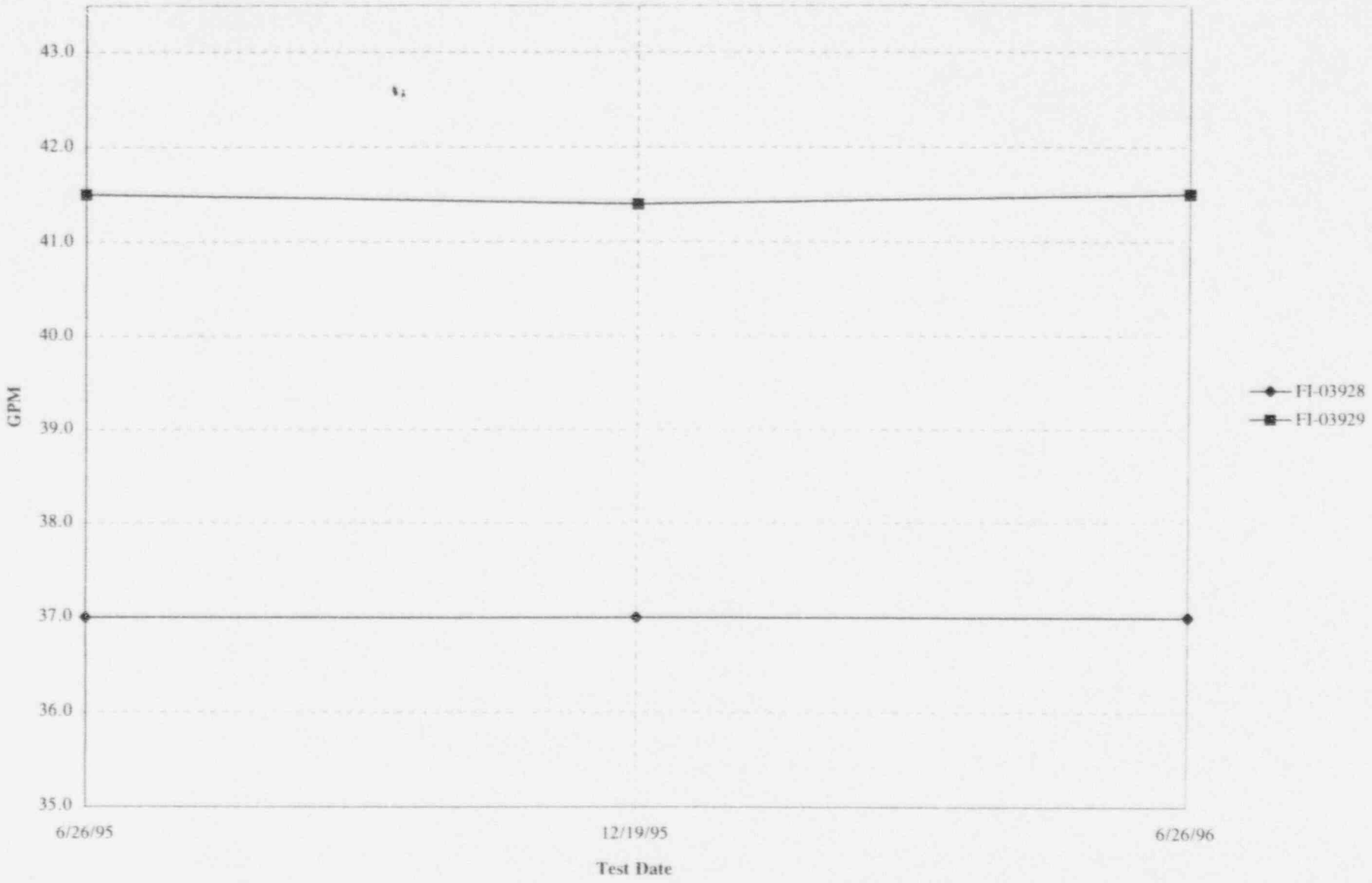
ATTACHMENT 8 - PB1 PI-00617A, B

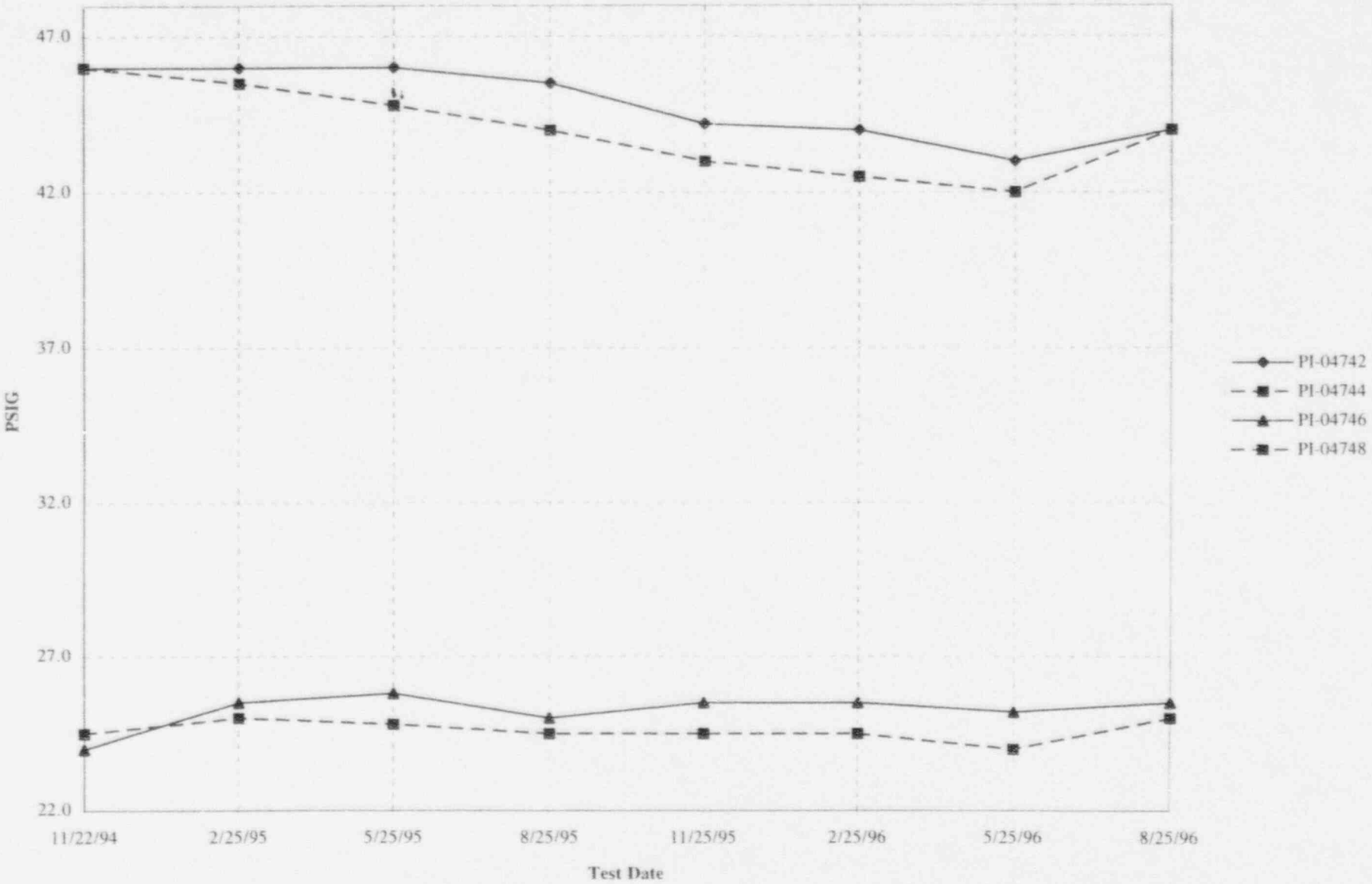


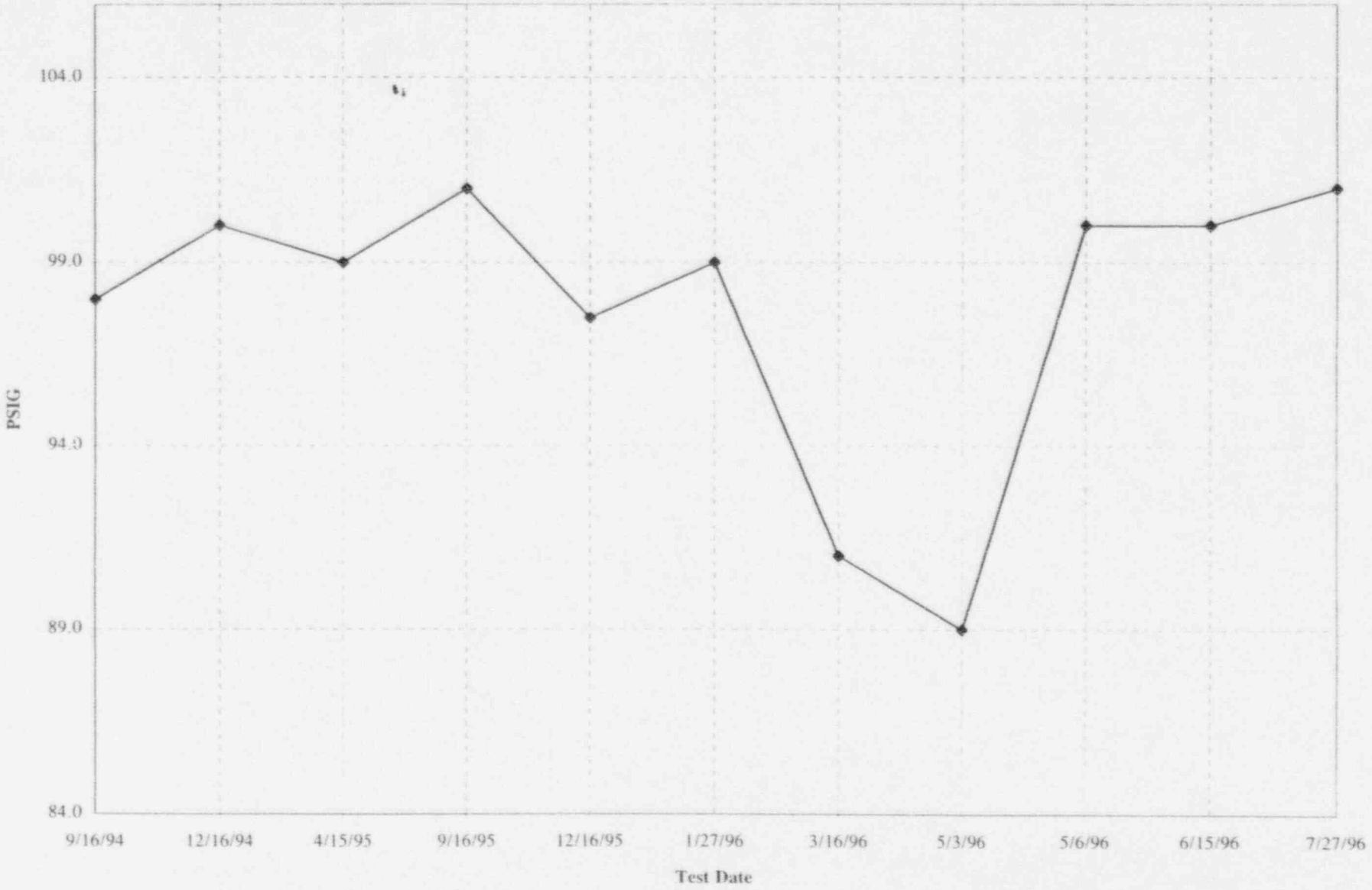
ATTACHMENT 8 - PB2 PI-00617A, B

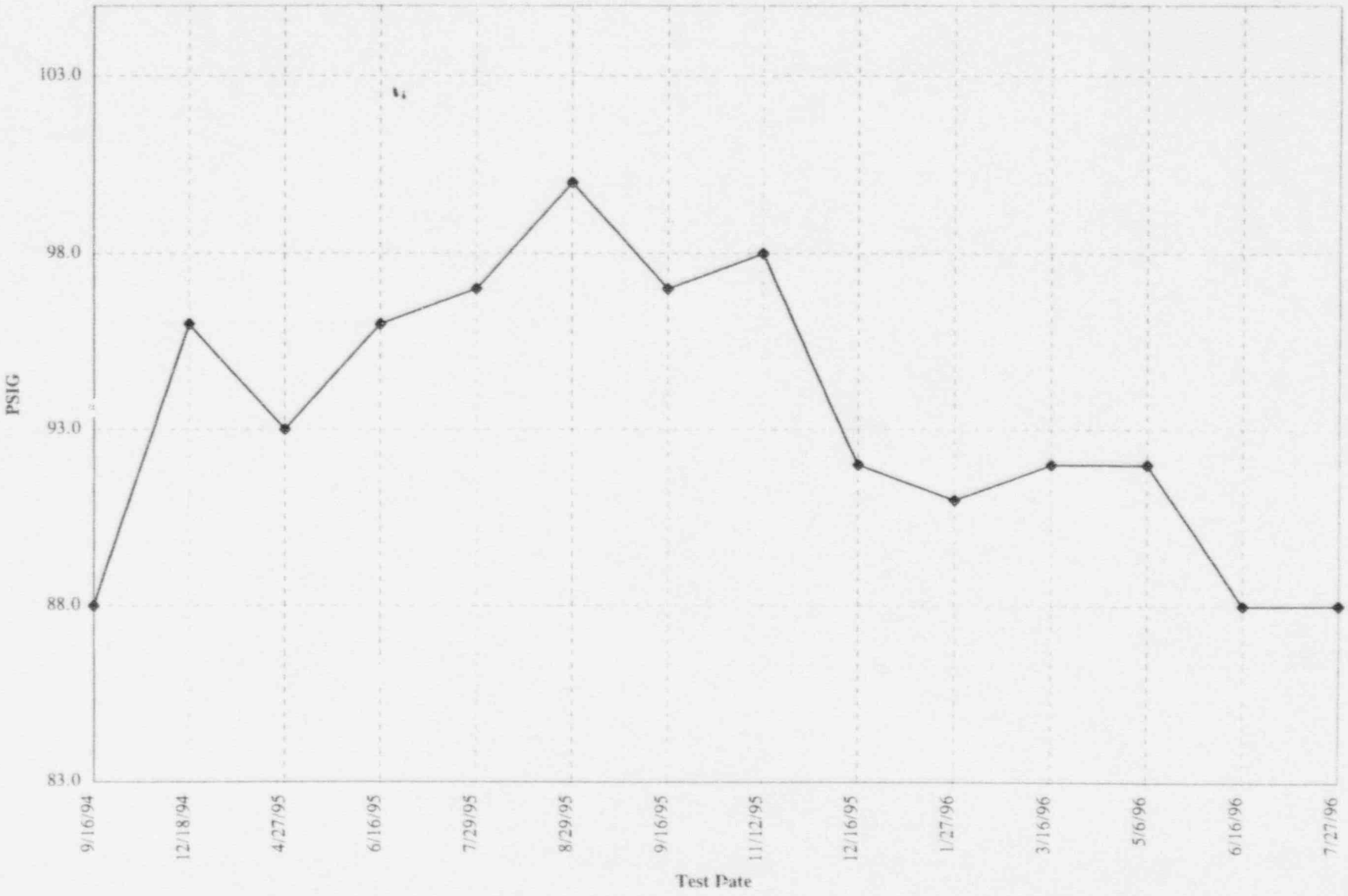


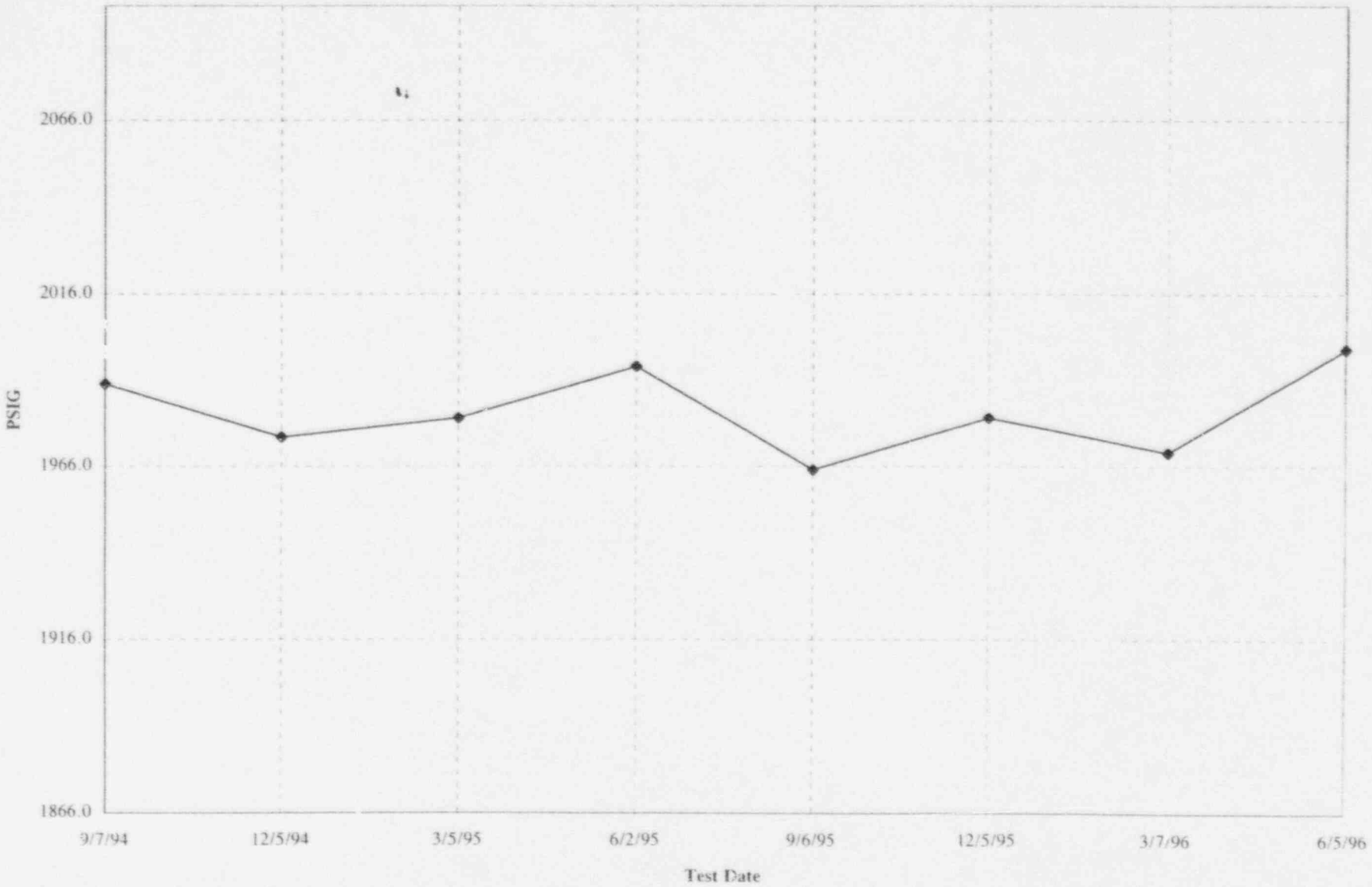
ATT 8 - PB0 FI-03928, 03929

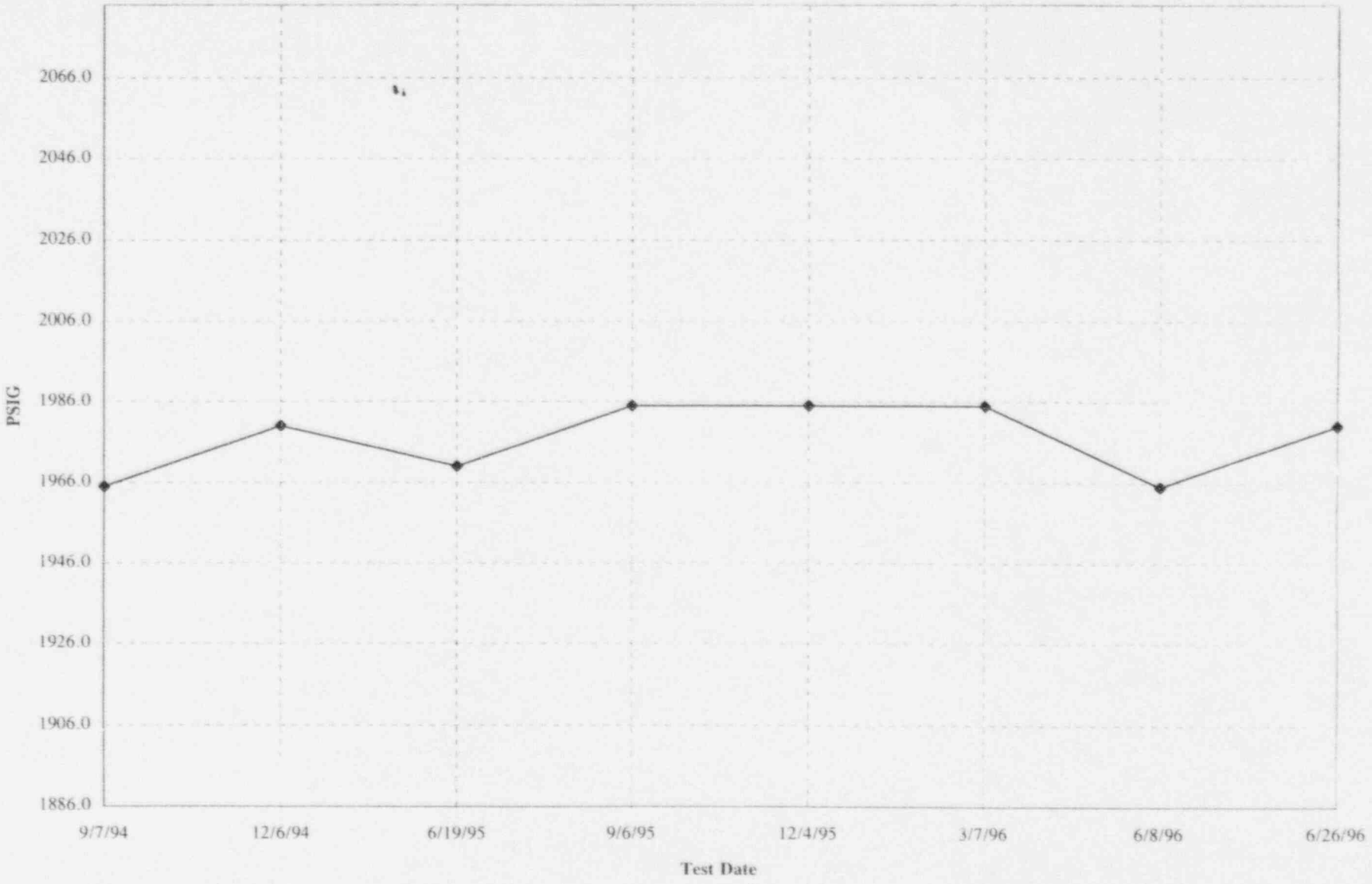



47.0
42.0
37.0
32.0
27.0
22.0
PSIG
11/22/94
2/25/95
5/25/95
8/25/95
11/25/95
2/25/96
5/25/96
8/25/96
Test Date
PI-04742
PI-04744
PI-04746
PI-04748


104.0
99.0
94.0
89.0
84.0
PSIG
9/16/94
12/16/94
4/15/95
9/16/95
12/16/95
1/27/96
3/16/96
5/3/96
5/6/96
6/15/96
7/27/96
Test Date


103.0
98.0
93.0
88.0
83.0
PSIG
9/16/94
12/18/94
4/27/95
6/16/95
7/29/95
8/29/95
9/16/95
11/12/95
12/16/95
1/27/96
3/16/96
5/6/96
6/16/96
7/27/96
Test Date


2066.0
2016.0
1966.0
1916.0
1866.0
PSIG
9/7/94
12/5/94
3/5/95
6/2/95
9/6/95
12/5/95
3/7/96
6/5/96
Test Date


2066.0
2046.0
2026.0
2006.0
1986.0
1966.0
1946.0
1926.0
1906.0
1886.0
PSIG
9/7/94
12/6/94
6/19/95
9/6/95
12/4/95
3/7/96
6/8/96
6/26/96
Test Date

ACTION ITEM STATUS REPORT RESTART ITEM #15 PAGE 12/26/96

****
* Trkid: NRC 96EC *
* Action Number: 20 *
****

Responsible Person:
Urgency: NOT DUE / IN CLOSEOUT
Work Priority: 99

Activity Pending is: ACTION VERIFICATION ASSOCIATED WITH A COMMITMENT

----------TITLE AND TASK DESCRIPTION----------

NRC 09/12/96 Enforcement Conference

Operations Conduct: Revise the initial and requalification training plans to include a review of the administrative procedures identified as significant to daily operation of the plant during each 2-year Operations training plan.

----------DATES----------

Source Record: 11/13/96	******* Evaluation *********	****** Correction ******
Commitment: 12/27/96	Eval Due:	Corr Act Due: 12/27/96
Action Create: 11/14/96	Orig Eval Due:	Orig CA Due: 12/27/96
Action Closed:	Eval Done:	Corr Act Done: 12/26/96

----------PEOPLE----------

Responsible for Overall Action: TROPS
Responsible for Current Pending Activity: PEI
Issue Manager:
Initiator:
Punchlist Administrator:

----------UPDATE----------

(11/22/96 PJS1) Ability to complete this item is dependent upon Operations identifying the "administrative procedures significant to daily plant operations." Initial discussions with T. Sheley indicate that 12/6 is the target date to have the procedures identified. TRPR 33.0 will need revision to reflect the commitment to review these on a two year basis. LRTP for 1997 will need to be updated to reflect which procedures will be covered in the various cycles. This NUTRK also refers to an initial training plan which does not exist. Initial materials can be revised prior to next implementation but will not be able to be revised by commitment date. I will check with J. Palmer to ensure this is acceptable.

(12/26/96 PJS1) Operations has undertaken an initiative to upgrade and revise the operations manual and associated administrative procedures. The process is expected to be completed by 4/1/97. As such, Operations has defined the following significant administrative "areas," vice "procedures," which affect daily operation of the plant; OM expectations, Control Room conduct, watchstanding, logkeeping, and work control/configuration management.

(12/26/96 PJS1) CONTINUING TRAINING: TRPR 33.0 (Licensed Operator Requalification Training Program) has had a revision submitted to add "Review administrative areas significant to daily operation of the plant during each 2-year operations training plan" to the appendix associated with commitments. In addition, the long range training plan has been revised to include blocks of time devoted to covering significant administrative areas and current issues in cycles 97-1, 97-2, 97-4, 97-5, and 97-6.

(12/26/96 PJS1) INITIAL TRAINING: To encompass initial training, a NUTRK item has been generated (TWR 96-074) directing operations training to ensure that the significant administrative procedures affecting daily plant operations are incorporated into the initial programs administrative training courses (TRCR 61.0, TRCR 68.0, and TRCR 86.0) prior to 5/1/97. The due date allows for a one month window to make the necessary revisions to the courses and associated lesson plans upon completion of the operations administrative procedure upgrade initiative. Operations management has committed to define the significant administrative procedures upon completion of the upgrade (4/1/97).

(12/26/96 PJS1) The intent of this commitment is to ensure that administrative procedures that significantly effect daily plant operations are incorporated into initial training, continuing training, as well as ensuring they are periodically reviewed in subsequent 2-year plans. The actions contained in the previous updates describe the actions taken to ensure this takes place.

(12/26/96 PJS1) Passed to for Verification.
This item is complete. Close.

POINT BEACH NUCLEAR PLANT

TRAINING PROGRAM COVER SHEET

TITLE TRPR 33.0 LICENSED OPERATOR REQUALIFICATION TRAINING PROGRAM

REVISION 4 DATE _____

DESCRIBE CHANGES (STEP/CHANGE/REASON):
(FOR REVISION 0, DESCRIBE PURPOSE: PROVIDE SUMMARY REVIEW)

ADDED "REVIEW ADMINISTRATIVE AREAS SIGNIFICANT TO DAILY OPERATION OF THE PLANT" TO APPENDIX C PER NUTRK: NRC 96 EC #20.

Prepared By [signature] 12/26/96 Date

☐ ACCR Review OPTIONAL: Check if desired — N/A — N/A Date

Reviewed By [signature] Training Coordinator 12/26/96 Date

Approved By _____ Group Head _____ Date

Approved By _____ Training Manager _____ Date

LOR LONG RANGE TRAINING PLAN

CYCLE	PRA BASED THEME				PROCEDURES	PROGRAM COMMITMENTS	ASSESSMENT BASED CONTENT		
	EVENTS	TRANSIENTS	TASKS	SYSTEMS			SYSTEMS	MANIP	OPERATOR SURVEYS / EVOLUTIONS
97-1 Adverse Primary Conditions	Large Break LOCA	Primary System Leakage	Align ECCS for Containment Sump Recirculation Establish RCS Feed & Bleed	RHR **Reactor Protection (deferred R1)**	EOP-0 EOP-1.0 EOP-1.3 ECA-1.1 Tech Specs	Conservative Decision Making Philosophy ***Ops. Mgt. - Current Issues** **(added R1)**	N+2 **(deferred R1)**	LOCA (saturated RC response) **Loss of protection system channel** **NI failure (deferred R1)**	Tech Specs Overview
97-2 Adverse Secondary Conditions	Random Secondary Rupture	MSIV Full or Partial Closure Secondary System Leakage Condenser Leakage Steam Reliefs Fail Open	Isolating SW Header Rupture in PAB	Main Steam Extraction Steam Gland Seal Steam Reheat Steam FSEAS (secondary)	AOP-2A AOP-5A AOP-9A EOP-0 EOP-3 EOP-1.3 EOP-2	Written Exam ***Ops. Mgt. - Current Issues** **(added R1)**	Radwaste Steam	Main steam line break (outside containment) Outage Overview RCS temperature control after faulted S/G is blown dry	
97-3 Adverse Electrical Conditions	Loss of Offsite Power	Main Generator Trip or Fault	Start and Align GDS	345kv Electrical 13.8kv Electrical Gas Turbine	OP-16A EOP-0 ECA-0.0	E Plan Accident Assessment (4 hrs.) ***Ops. Mgt. - Significant Administrative Procedures** **(added R1)**	120-AC Instrument Buses	Loss of electrical power or degraded power source Loss of core cooling flow, natural circulation Turbine/Gene rator trip	Restoration of electrical power
97-4 Adverse Primary Conditions	Small Break LOCA SGTR	Pressurizer Leakage Low Pressurizer Pressure	CFT and Depressurize RCS during SGTR/SBLOCA Alignment of ECCS for Containment Sump Recirculation	SI FSEAS (primary)	AOP-1A AOP-1C EOP-0 EOP-3 ECA-3.1 ECA-3.2	Update training on NP 3.2.2 and NP 3.2.3 (if applicable) E Plan Reentry (2 hrs.) ***Ops. Mgt. - Significant Administrative Procedures** **(added R1)**	Primary Sampling Waste Liquid/Gas	LOCA (significant CO tube leaks) LOCA (outside containment) LOCA (small break with leak rate determination)	Tours
97-6 Adverse Support System Conditions	Interfacing System LOCA Loss of CCW	Pressurizer Spray Failure CVCS Malfunction (boron dilution)	None	CCW CVCS Fuel Oil	AOP-7A AOP-9B EOP-0 EOP-1.1	Operational Exam Ensure SCBA Quals complete ***Ops. Mgt. - Significant Administrative Procedures** **(added R1)**	Radiation Monitoring SFP Cooling	Loss of CCW or cooling to a component Malfunctions of RCS pressure-volume control system Boration or Dilution during power operation	Outage Overview
97-8 Adverse Electrical Conditions	Loss of Safeguards Power	Loss of Power to Necessary Plant Systems	None	EDGs 4160v Electrical 480v Electrical	AOP-10 series EOP-0 ECA-0.0	None	None	Loss of electrical power or degraded power sources	Restoration of electrical power Control Room Evacuation

* **Cycle time devoted to reviewing significant administrative procedures which effect daily plant operations. Specifics determined on basis of planned procedure upgrade and assessment based needs (Ops. Mgt.)**

APPENDIX C
LONG RANGE TRAINING PLAN
REQUIRED OR COMMITMENT RELATED TOPICS

Commitment	References	Frequency
Complete task P7311AOT, Wear SCBA	NUREG 0041 10 CFR 20.103	Annual
Review and update training, as appropriate, on NP 3.2.2, Primary Chemistry Monitoring Program and NP 3.2.3, Secondary Chemistry Monitoring Program	AM 3-1, Corporate Water Chemistry Policy	Annual
Review Conservative Decision Making Operating Philosophy	SOER 94-01 (Salem) NUTRK: SOER 94-01-04A/1	Annual
Conduct Operational Examination (Dynamics/JPMs)	10 CFR 55.59	Annual
Conduct Written Examination (Static/Limits & Controls)	10 CFR 55.59	Biennial
Conduct evaluation of shift management turnover. DSS, DOS, or Third RO outside of the simulator control room at commencement of the dynamic evaluation	NUTRK: TAC-OPS-94-06, SOER 94-01-04A/1	Biennial
REVIEW ADMINISTRATIVE AREAS SIGNIFICANT TO DAILY OPERATION OF THE PLANT DURING EACH 2-YEAR OPERATIONS TRAINING PLAN	NUTRK: NRC 96EC #20	Biennial

****
* Trkid: TWR 96-074 *
* Action Number: 1 *
****

Responsible Person:
Urgency: DUE IN 121-180 DAYS
Work Priority: -100

Activity Pending is: ACTION NEEDED

----------TITLE AND TASK DESCRIPTION----------

Incorporation of Admin Procedures into Training Documents.

Ensure that the significant administrative procedures affecting daily plant operations are incorporated into the initial programs administrative training courses (TRCR 61.0, TRCR 68.0, + TRCR 86.0). Significant administrative procedure list to be determined by Operations Mgt. by 4/1/97.

----------DATES----------

Source Record: 12/26/96	******* Evaluation *********	****** Correction ******
Commitment:	Eval Due:	Corr Act Due: 05/01/97
Action Create: 12/26/96	Orig Eval Due:	Orig CA Due: 05/01/97
Action Closed:	Eval Done:	Corr Act Done:

----------PEOPLE----------

Responsible for Overall Action: TROPS
Responsible for Current Pending Activity: TROPS
Issue Manager:
Initiator:
Punchlist Administrator:

----------UPDATE----------

----------REFERENCES----------

NRC 96EC

----------MISCELLANEOUS----------

Originating Agency:
NRC Open Item Number:
Related Outages:
Engineering Work Type: Information
Person Hours: Original Estimate =
Current Estimate =
Actual Hours =

System: XX
NRC Status:

RESTART ITEM # 13

SUMMARY
OF
OPERATIONS PROCEDURES REVIEW
FOR
MAINTENANCE ACTIVITIES

January 21, 1997

The Operations Group procedures were reviewed for maintenance activities using the attached document (page 2). This document was developed for this review to aid in flagging maintenance activities. The list of flags developed on this document was only to be a guide and not set the limit to what was finally identified as a maintenance activity.

The following Operations Group series procedures were reviewed:

ORT.....with exception to 3, 3a, 3b, 3c, 9,10, and 17 see attached exception table.
OI
OP
TS
IT
PC
RP.....with exception to 7 and 8 see attached exception table.
RF

Total number of procedures reviewed for maintenance activities	781
Total number of procedures requiring a revision for PMT or QC (see attached list of procedures requiring revision)	70
Total number of procedures requiring a revision for PMT	67
Total number of procedures requiring a revision for QC	15

Summary prepared by Bill Heinsohn

OPERATIONS PROCEDURES
MAINTENANCE ACTIVITY REVIEWS

The following is a list of flags that can be used to help find Maintenance activities during initial reviews of Operations procedures.

NOTE: If any of the following words or descriptions under IS A FLAG appear in the procedure you are reviewing, then the step is flagged by making a rev-bar using a blue highlighter. This will identify possible procedures needing PMT or QC revisions. If you are not sure FLAG IT in pink.

IS A FLAG	IS NOT A FLAG
Flange or test cap removal (test cap only if there is NO isolation valve. In most cases there will be an isolation valve)	Flange or test cap removal if isolation valve is used
Perform packing adjustment or tighten packing on AOV or MOV	Packing adjustment on a manual valve
Lubricate, fill with oil, or grease	If grease type is specified in procedure
Filter removal or replacement	
Resin replacement (eg , boron control)	Resin is not used for Safety related system
Setpoint adjustment	If controlled in procedure
Installing/removing jumpers, grounds, or lifting/landing leads	It restoration is described in procedure
	Breaker racking-in or out
	Valve manipulations
	Changing bulbs
	Hose connections
Repair (anytime the word repair is used flag it)	
Any other possible maintenance activities you think are appropriate	

EXAMPLES OF MAINTENANCE ACTIVITIES FOUND DURING REVIEW

1. PMT steps were added following installation of equipment requiring a leak check.

   EXAMPLE;

   7.3.6 Install following steam traps:

   a. (list of steam traps)

   PMT

   7.3.7 Check components listed in step 7.3.6 for leakage when system is at normal operating pressure.

2. Removal and installation of filter housing covers.

   EXAMPLE; Added PMT identification to existing step.

   PMT

   4.6 Inspect filter housings listed in step 1.1 for leakage while system is in operation.

3. Preventative maintenance performed on pumps.

   EXAMPLE; Added PMT identification to existing step.

   PMT

   4.7 Cycle pump No. 3 from minimum to maximum (greater than 56 gpm), noting any abnormal noises or conditions.

4. QC witness points were added following cover installation.

   EXAMPLE; Added QC inspector note and step. Added M&TE identification.

   NOTE: ***QC Inspector must witness performance of Step 5.2.12.***

   5.2.12 Ensure access cover properly installed and torqued to 60 ft-lbs. _____

   Torque Wrench No._____ Cal Date: _____

   5.2.13 Access cover bolts properly torqued. _____
   QC

EXCEPTION TABLE

The procedures listed below will recieve an extensive revision prior to use.

ORT 3 series has many issues not related to maintenance steps that require resolution before the procedures will be revised and used. ORT 3 Unit 2 is being reviewed for this outages performance.

ORT 9, 10, and 17 (Unit 2) series are in the process of revision for this outage. The current schedule for approval of this procedure series is after Jan 31, 1997. Guidance on including PMT/QC for maintenance activities has been provided to the responsible engineer. A review for QC will be required by a QC inspector qualified individual prior to procedure approval.

ORT 9, 10, and 17 (Unit 1) series will be based on the Unit 2 procedures when that series is complete. The Unit 1 ILRT is currently scheduled for the spring outage. This series will be required for that performance.

RP-7 and RP-8 are for ISFSI. The review of this series of procedures was previously completed by a maintenance QC inspector. The procedure series is currently in draft form. It is not expected that this series will be approved by Jan 31, 1997. The revisions to this series will be required for loading the next cask.

Procedure ID		Unit 1	Unit 2
ORT	3 3A 3B 3C	Revisions will be done prior to next use (ORT 3, 3A, 3B, 3C)	ORT 3 will be done Jan 29 ORT 3A and 3B revisions will be done prior to next use
ORT	9 10 17	Prior to next use (Unit 1 Outage)	Prior to completion of Unit 2 Outage
RP	7 8	ISFSI Prior to Cask Load	

PROCEDURES REQUIRING REVISION

ORT UNIT 1			ORT UNIT 2		
PROCEDURE NUMBER	TITLE	REV	PROCEDURE NUMBER	TITLE	REV
ORT 4	Main Turbine Mechanical Overspeed Trip Device	8	ORT 4	Main Turbine Mechanical Overspeed Trip Device	8
ORT 31	Nitrogen Supply to the Pressurizer Relief Tank (P14A)	10			
ORT 50	PRT to Gas Analyzer Sample Line (P34A)	8	ORT 50	PRT to Gas Analyzer, Sample Line(P34A)	6
ORT 59	Train A Spray System CIV Leakage Test	16	ORT 59	Train A Spray System CIV Leakage Test(P54)	17
ORT 60	Train B Spray System CIV Leakage Test	18	ORT 60	Train B Spray System CIV Leakage Test(P55)	17
ORT 67	Component Cooling Water to and from the Excess Letdown Heat Exchanger - Refueling Shutdown (P19, 20)	14	ORT 67	Component Cooling Water to and from the Excess Letdown Heat Exchanger, Unit 2 - Refueling Shutdown(P19, 20)	12
ORT 71	Electrical Penetration Leak Test (P58)	6	ORT 71	Electrical Penetration Leak Test(PE58)	6
ORT 72	Electrical Penetration Leak Test (P21, 22)	7	ORT 72	Electrical Penetration Leak Test(PE20, E22)	8
ORT 73	Electrical Penetration Leak Test (P28)	7	ORT 73	Electrical Penetration Leak Test(PE1)	6

OI					
PROCEDURE NUMBER	TITLE	REV	PROCEDURE NUMBER	TITLE	REV
OI-17	Letdown Gas Stripper Operation	9	OI-22G	Changing Boric Acid Evaporator Feed Filters (F8)	4
OI-17A	Letdown Gas Stripper Preparation for Maintenance and Recovery, Unit 1	1	OI-22H	Changing Boric Acid Concentrates Filters (F-5A&B)	4
OI-17B	Letdown Gas Stripper Preparation for Maintenance and Recovery, Unit 2	1	OI-32	Hydrogen System Operation	16
OI-22A	Changing Reactor Coolant Micron Filter (F1)	9	OI-48B	Lube Oil Filter Changeouts	3
OI-22B	Changing Seal Water Return Filter (F2)	6	OI-48E	EH Fluid System	14
OI-22C	Changing Spent Fuel Pit Filter (F6)	5	OI-64A	Installation and Removal of Purge Valve Component Bypass Lines	5
OI-22D	Changing Seal Water Injection Filters (F39A&B)	8	OI-86	Instrument Air K2A/K2B and Service Air K3A/K3B Compressor Run-in Operating Instructions	5
OI-22E	Changing Letdown Gas Stripper Filters (F60A&B)	6	OI-86A	Instrument Air Dryer Z-31 Operating Instructions	1
OI-22F	Changing Boric Acid Filters (F3)	2	OI-115	SFP Service Water Cooling Isolation for Maintenance	1
OI-73J	Water Treatment Resin Sampling	1			

OP		
PROCEDURE NUMBER	TITLE	REV
OP-4D Part 1	Draining the Reactor Coolant System to a CVCS HUT Without Entering Reduced Inventory	45
OP-4D Part 5	Draining the Reactor Coolant System to a CVCS Hut Without Entering Reduced Inventory and Without Draining Steam Generator Tube	0
OP-9C	Containment Venting and Purging	37

TS		
PROCEDURE NUMBER	TITLE	REV
TS-37 U1	Containment Spray Nozzles Check (Frequency of Less Than or Equal to Five Years)	5
TS-38 U2	Containment Spray Nozzles Check (Frequency of Less Than or Equal to Five Years)	5
TS-80	Sampling of Emergency Fuel Oil Tank (T-72), Fuel Oil Storage Tanks (T-175A,B) and EDG Day Tanks (T-31A,B & T-176A,B) (Quarterly)	8

IT		
PROCEDURE NUMBER	TITLE	REV
IT-200 U1	Pressurizer Power-Operated Relief Valves and Block Valves (Cold Shutdown)	12
IT-205 U2	Pressurizer Power-Operated Relief Valves and Block Valves (Cold Shutdown)	14
IT-380 U1	Purge Valve Air System Check Valve (Quarterly)	5
IT-385 U2	Purge Valve Air System Check Valve (Quarterly)	6
IT-530 U1	Leakage Reduction and Preventive Maintenance Program Test of the Residual Heat Removal System (Refueling)	11
IT-530A U1	Leakage Reduction and Preventive Maintenance Program Test of the Train A HHSI and RHR Systems (Refueling)	1
IT-530B U1	Leakage Reduction and Preventive Maintenance Program Test of the Train B HHSI and RHR Systems (Refueling)	1
IT-535 U2	Leakage Reduction and Preventive Maintenance Program Test of the Residual Heat Removal System (Refueling)	11
IT-535A U2	Leakage Reduction and Preventive Maintenance Program Test of the Train A HHSI and RHR Systems (Refueling)	1
IT-535B U2	Leakage Reduction and Preventive Maintenance Program Test of the Train B HHSI and RHR Systems (Refueling)	2

PC		
PROCEDURE NUMBER	TITLE	REV
PC-1 Part 3	Monthly Heating and Ventilation System Checks, Unit 2 Turbine Hall	20
Part 2	Monthly Heating and Ventilation System Checks, Unit 1 Turbine Hall	27
PC-9 Part 1	Monthly Shifting of Instrument Air Compressors and Air Dryer Checks	20
PC 23 Part 5	Charging Pump Preventative Maintenance	1
PC 24	Containment Inspection Checklist (Monthly), Unit 1	42
PC-24	Containment Inspection Checklist (Monthly), Unit 2	42
PC-43 Part 3	Service Water Strainers	12
PC-77 Part 1	Refueling Interval Automatic Fire Protection System Valve Trip-Test and Alarm Verification Test, Unit 1	8
Part 2	Refueling Interval Automatic Fire Protection System Valve Trip-Test and Alarm Verification Test Unit 2	10
Part 4	Annual Automatic Dry-Pipe Fire Protection System Valve Trip-Test and Alarm Verification Test	4
Part 6	Annual Gas Turbine and Auxiliary Transformer Fire Protection System Valve Trip-Test and Alarm Verification Test	5

RP		
PROCEDURE NUMBER	TITLE	REV
RP-1A	Preparation for Refueling	42
RP-1B	Recovery from Refueling	32
RP-6A	Steam Generator Crevice Flush (Vacuum Mode)	8

RF		
PROCEDURE NUMBER	TITLE	REV
RF-190	Condenser Hotwell Inspection, Unit 1	3
RF-195	Condenser Hotwell Inspection, Unit 2	2
RF-230.1	EH Filter Changeout and Magnetic Plug Inspection, U1	4
RF-235.1	EH Filter Changeout and Magnetic Plug Inspection, U2	3

--
* Printed For: BRAD.FROMM   *
--

Date: Sunday, 19 January 1997 22:46 CT
To:

Cc:
From:
Subject: WO/PMT: Project Plan
Topic: rev. 0

QA PROJECT PLAN

PBNP Unit 2 Restart Commitment # 15

"Work Order / Post-Maintenance Testing Surveillance"

Restart Issue # 15 reads as follows:

"Review 20% of the work orders performed since January 1, 1995 on Unit 2 or common PSA safety significant systems (AFW, SW, EDG, IA, 4.16 kv, gas turbine, and CCW) to verify adequate PMT was performed to ensure system/component safety function."

Clarification of this commitment is as follows:

** it applies to ALL work orders, not just Maintenance work orders (e.g., not just work performed by the Maintenance group, but all work orders in total).

** should generic or significant issues be identified, the scope of the review will be expanded beyond the 20% sample.

** the 20% will be selected in a truly random manner, using a random number generation.

** documentation will be made and maintained for the selection/sample process, as well as documented evidence of each work order review.

** systems will be ordered and reviewed in the expected order of "return to service" for U2R22.

Approach:

A QA Surveillance (# S-P-97-01) will be conducted i.a.w. NP 11.2.1 as follows:

SCOPE: As per this project plan. Also, a full "surveillance checklist" will also be prepared and approved.

Selection Based on A Random Number Generator Process is Described in the QAS Surveillance Plan. You'll See A Copy Soon.

	TOTAL	SELECTED
AF	194	40
CC	168	37
DG	487	109
GT	219	42
IA	228	42
SW	487	96
4.16KV	161	31
	1944	397 - Review

$\frac{397}{1944} \times 100\% = 20.4\%$

- This is the sheet we will Document the Reviews on

PBNP UNIT 2 Restart Issue # 15
Work Order / Post-Maintenance Testing
QA Surveillance # S-P-97-01

System: _____ Work Order #: _____

NATURE OF WORK PERFORMED: _____

PMT PERFORMED / REFERENCES: _____

DISCREPANCIES / DEFICIENCIES NOTED: _____

CONCLUSION:

☐ Adequate ☐ Deficiencies Noted, QCR # _____

Comments: _____

Reviewed by: _____ Date: _____