Attachment 6
Proc No RO-52
Revision 10
Date 3/19/87

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE
Revision and Approval Summary

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY

TCN-T-88-047
TCN-T-89-102

1. Prepared

Responsible Individual — 2-9-87 Date

2. QA Concurrence

— 2/9/87 Date

3. Recommend Approval/Q-List (Yes) No

Responsible Department Head — 2/12/87 Date

4. PRC Reviewed

87-034 — 3/13/87 Date

5. Approved

Final Approver — 3/16/87 Date

6. ATMS Incorporated

3/18/87 Date

7. Periodic Review

— 2/16/87 Date

— 2/15/89 Date

— Date

— Date

— Date

ts0581-0344h-89

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE
ISSUE AND ROUTING

TITLE: FIRE SUPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPAICTY TEST

ISSUED TO Operations Supervisor FREQ 18 Months COLD SHUTDOWN REQUIRED (Y/N) No

SPEC RQMNT

EQUIPMENT	EQUIPMENT	EQUIPMENT	EQUIPMENT	ASSOCIATED EQUIPMENT
**P-9A				
**P-9B				
**P-41				

SPECIAL INST

( ) Retest because

( ) Temp Increase in Freq to because

ROUTE AFTER COMPLETION (ORDER NO IN BOX)

1	1st LINE SUPV			4	PROG SCHEDULER		
*2	SS/SE			5	ENGR		
	RX ENG SUPT				ISI ENG		
3	OPS SE/SCH SUPV			6	PRO PROT SUPV		
7	SYS ENG SUPT				I&C ENG SUPT		
	HP SUPT				PL PROJ SUPT		
	PL CHEM SUPT				OPS SCHED/SUPT		
	RADWASTE SUPT			8	PROG SCHEDULER		
	RMC ADMIN			9	DOC CONTROL		
	EEQ ENGINEER						

*Required only if inoperable equipment.

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE
ACCEPTANCE CRITERIA AND OPERABILITY

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

1. Data obtained through performance of this procedure meets acceptance criteria.

   _____/_____ a./__/ Yes b./__/ No c./__/Yes, with exceptions listed on Page 2.
   First Line Supervisor Date

2. Limiting safety system settings have been met as required by Tech Spec Section(s) None

   _____/_____ a./__/ Yes b./__/ No c./__/Yes, with exceptions listed on Page 2.
   First Line Supervisor Date

3. Equipment was operable or parameter meets specifications as required by Technical Specifications Section(s) 4.17.2.1e

   _____ a./__/ Yes b./__/ No c./__/Yes, with exceptions listed on Page 2.

   _____/_____/_____
   First Line Supervisor Date Time

4. If 2b, 2c, 3b or 3c were checked, Technical Specifications "Limiting Condition of Operation" Section 3.22.2.1, 3.5.1a, 3.5.2.c, 3.5.2.d, Proposed Standing Order 54, 3.22.2.1 may apply.

5. If 3a is checked along with (1b or 1c) or (2b or 2c), then justify operability.

   _____

   _____ _____/_____
   SS/SE Signature Date

6. If any of 1b, 1c, 2b, 2c, 3b or 3c or 8b were checked, identify corrective action document

   ER Yes /__/ No /__/ No. _____ WR/WO Yes/__/ No/__/ No. _____

   DR Yes /__/ No /__/ No. _____ CL Yes/__/ No/__/ No. _____

7. If 3b or 3c were checked or line 5 filled out, notify SS/SE

   Tags Yes/__/ No /__/ Location _____

   SS/SE review: _____/_____/_____
   Signature Date Time

8. Technical Review Acceptable: a./__/ Yes b./__/ No _____/_____
   Signature Date

   /__/ Retest required /__/ Freq. Changed to _____

9. Superintendent Approval /__/ Yes /__/ No _____/_____
   Signature Date

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

1. Cont

2. Cont

3. Cont

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

Table of Contents

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

Table of Contents

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

1.0 PURPOSE

To determine operability of the Fire Suppression Water System by verifying that each of the Fire Water Pumps (**P-9A, **P-9B and **P-41) delivers 1500 gpm at 125 psig total dynamic head and that the pumps sequentially start on decreasing fire system pressure.

2.0 REFERENCES

2.1 Technical Specifications Chapter 4 - Section 4.17.2.1e

2.2 Technical Specifications Chapter 3 - Sections 3.22.2.1, 3.5.1a, 3.5.2.c, 3.5.2.d, Proposed Standing Order 54, 3.22.2.1 | e

2.3 Technical Specifications Chapter 2 - None

2.4 FSAR - Section 9.6

2.5 PPACS; FPS-005, X-OPS258, MSE-011

2.6 Operating Procedure SOP 21

2.7 Vendor File M-32 and M-317

2.8 P&ID M-216 Sheet 1

3.0 PREREQUISITES

3.1 AUTHORIZATION

Obtain permission from the Shift Supervisor to perform this test. Shift Supervisor shall read Sections 1.0 through 4.0 of this procedure prior to granting permission.

Shift Supervisor: _____ Date: _____ Time: _____

3.2 SPECIAL NOTIFICATIONS

Notify Property Protection Supervisor one week prior to performing test.

3.3 PLANT CONDITIONS

The Plant may be in any mode of operation during the performance of this test, ie, Operational, Hot Shutdown, Cold Shutdown and Refueling.

TAN-T-88-044

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

3.4 SYSTEM CONDITIONS

There should be no other available flow paths than those used in this procedure, except for a small flow possibly out of **PCV-1312.

3.5 MINIMUM PERSONNEL SKILL LEVEL

3.5.1 Performance

Auxiliary Operator

3.5.2 Verification

Auxiliary Operator

3.5.3 Verification is required for all equipment manipulation. Performance and verification signature spaces are provided at the end of procedure.

3.6 SPECIAL TOOLS/EQUIPMENT

NOTE: Except for use of test instruments justified in the appropriate Technical Specification Test Basis Document, only calibrated M&TE and IPI shall be used to measure parameters which are compared to acceptance criteria.

3.6.1 Calibrated sequentially.

NOTE: Serial number and calibration data is not required for pressure gauges **PI-1310, **PI-1311 and **PI-5350. It is required if an equivalent gauge is used.

Calibrated test gauge for pitot tube, 0-100 psig ± 1%

S/N: _____ Cal Date: _____ Cal Due Date: _____

Pump Discharge Pressure Gauges (or equivalent) (0-200 psig ± 1%)

**PI-1311 (or equivalent)

S/N: _____ Cal Date: _____ Cal Due Date: _____

**PI-1310 (or equivalent)

S/N: _____ Cal Date: _____ Cal Due Date: _____

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

**PI-5350 (or equivalent)

S/N: _____ Cal Date: _____ Cal Due Date: _____

Strobe Tachometer (2% of Full Scale)

Identification No: _____ Cal Due Date: _____

3.6.2 Noncalibrated

Pitot tube, knife blade type.

3.7 SPECIAL RADIATION PROTECTION REQUIREMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 PERSONNEL SAFETY

No special requirements.

4.2 EQUIPMENT/PLANT SAFETY OR LIMITS

4.2.1 Valves operated to shut off the water flow should be closed slowly to prevent water hammer.

4.2.2 This procedure is considered safety related.

4.3 LIMITING CONDITIONS OF OPERATION ENTERED DURING PERFORMANCE OF THIS PROCEDURE

4.3.1 Technical Specifications 3.22.2.1, 3.5.1.a., 3.5.2.c, 3.5.2.d, Standing Order 54, 3.22.2.1.

4.3.2 All out of tolerance data shall be circled in red by the person recording that data. Out of tolerance data shall be reported to the supervisor in charge of the test and be evaluated before proceeding to the next step.

4.3.3 Two fire pumps, one of which is the south diesel pump, each with a capicity of at least 1500gpm with their discharge aligned to the fire suppression header shall be operable at all times. With the south diesel pump or with two fire pumps inoperable, restore the inoperable equipment to operable status within 7 days, or in lieu of any other report required by Specification 6.9.2, prepare and submit a special report to the Commission within the next 30 days outlining the plans and procedures to be used to provide for the loss of redundancy in this system.

TCN-T-88-047

TCN-T-88-047

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

5.0 PROCEDURES

5.1 Connect 2-1/2" hoses from 4 of the 6 test header lines to the playpipes mounted at drain. Measure and record outlet diameter of the Playpipes, normally 1-3/4" on Attachment 1.

5.2 Check all four (4) test header valves closed. All references to test header valves are those located outside the Intake Structure (**MV-FP183, **MV-FP184, **MV-FP185, **MV-FP186, **MV-FP187 and **MV-FP188).

5.3 Break seal and open test manifold isolation valve corresponding to the pump being tested; **MV-FP104, (**P-9B), **MV-FP105 (**P-9A) or **MV-FP701 (**P-41). Recommended sequence is **P-9A, **P-9B and **P-41.

5.4 Except for pump being tested, place fire pump selector switches (diesels) and Breaker **52-1305 (electric) in the "OFF" position. This will prevent inadvertant operation of the fire pumps not being tested when the isolation valves are opened.

5.5 Place selector switch in auto (diesel) or close Breaker **52-1305 (electric) of fire pump to be tested.

5.6 Stop Jockey Pump at local motor controllers.

NOTE: Diesel Engines should be run for a minimum of 30 minutes. Record diesel start and stop times on Attachment 1.

5.7 Slowly bleed off fire system pressure with drain valve. Monitor the system pressure gauge (**PI-5350A) for the pressure and starting time reading when the pump starts.

5.8 Use the pumpshaft to check the speed. Break seals and open two test header valves fully. Adjust the speed to as close as possible to 1770 rpm. Set the throttle and do not adjust again.

Speed: As Found (rpm) _____ As Left (rpm) _____

5.9 Close the two test header valves.

5.10 Record the discharge pressure when there is no flow.

5.11 The sequence of Step 5.12 thru 5.17 can be altered to open valves one at a time or as written below at the discretion of the supervisor.

5.12 Break seals and open fully four test header valves and establish a flow.

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

5.13 With pitot blade inserted to the center of the stream and out a distance approximately 1/2 the nozzle tip diameter (3/4" - 1") from the nozzle end, measure flowing stream pressure and record on Attachment 1. Repeat flow measurement for each stream. Also record pump speed (diesel), pump discharge pressure and Service Water Pit Level (**LI-1307) on Attachment 1.

5.14 Slowly close one of the test header valves and repeat flow and pump measurements. Record on Attachment 1.

5.15 Slowly close a second test header valve and repeat flow and pump measurements. Record on Attachment 1.

5.16 Slowly close a third test header valve and repeat flow and pump measurements. Record on Attachment 1.

5.17 Slowly close the fourth test header valve and record the pump discharge pressure and speed (diesel).

5.18.1 Place Jockey Fire Pump Switch (**P-13) to "AUTO" position.

5.18.2 Place the next pump to be tested to its "AUTO" control position or for the Motor-Driven Pump (**P-9A) assure the breaker is closed.

5.18.3 Stop the pump that was tested by turning the selector switch to off (diesel) or pushing the stop button (electrical). Record stopping time on Attachment 1.

5.19 Close test manifold isolation valve.

5.20 Repeat Steps 5.3 to 5.19 for the remaining fire pumps.

5.21 Return fire system to normal:

5.21.1 Place Jockey Fire Pump Switch (**P-13) to "AUTO" position or designated by Shift Supervisor.

_____ /
Performed By Date

_____ /
Verified By Date

TCN-1-89-102

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

5.21.2 Close Electric Fire Pump Breaker (**P-9A) at local panel.

_____ / _____
Performed By Date

_____ / _____
Verified By Date

5.21.3 Place Diesel Fire Pump Controls (**P-9B) to "AUTO" position.

_____ / _____
Performed By Date

_____ / _____
Verified By Date

5.21.4 Place Diesel Fire Pump Controls (**P-41) to "AUTO" position.

_____ / _____
Performed By Date

_____ / _____
Verified By Date

5.21.5 Replace protective covers on couplings of diesel driven fire pumps.

5.22 Remove and replace valve caps as required.

5.23 Return test equipment as required.

5.24 Seal closed the Test Manifold Isolation Valves (**MV-FP104, **MV-FP105 and **MV-FP701) and the Test Header Valves (**MV-FP183, **MV-FP184, **MV-FP185, **MV-FP186, **MV-FP187 and **MV-FP188).

_____ / _____
Verified By Second Verification

5.25 Inform Shift Supervisor that test has been completed.

Shift Supervisor: _____ Date: _____ Time: _____

5.26 Test Performer and Property Protection Engineer complete Attachment 1.

5.27 Shift Supervisor complete Acceptance Criteria and Operability Sheet.

5.28 Property Protection Engineer complete Attachment 3 - Fire Pump Tests - Total Head vs Flow.

_____ / _____
Property Protection Engineer Date

6.0 ACCEPTANCE CRITERIA

6.1 The test is considered satisfactory if the fire pumps sequentially start at the following auto-start pressures:

Motor-Driven **P-9A $\geq$ 90 psig

Diesel-Driven **P-9B $\geq$ 75 psig

Diesel-Driven **P-41 $\geq$ 60 psig

6.2 The test is considered satisfactory if each pump delivers at least 1500 gpm at a minimum of 125 psig total head. The Property Protection Engineer will sign the Data Sheet indicating his or her acceptance.

6.3 Circle out of tolerance data in red.

7.0 ATTACHMENTS AND RECORDS

7.1 ATTACHMENTS

7.1.1 Attachment 1, "Pump and Water Flow Data Sheet"

7.1.2 Attachment 2, "Theoretical Discharge Through Circular Orifices"

7.1.3 Attachment 3, "Fire Pump Test - Total Head vs Flow"

7.2 RECORDS

The completed procedure and all attachments.

PUMP AND WATER FLOW DATA SHEET

Electric Pump ** P-9A

Pit Level **LI-1307 (inches) = _____

Suction Pressure (psig) = $\left(\frac{\text{**LI-1307 (inches)}}{12 \text{ in/ft}} - 0.42 \text{ ft}\right)\left(0.433 \frac{\text{psig}}{\text{ft}}\right)$ = _____

"As-Found" Auto Start Pressure **PI-5350A (psig) = _____

Playpipe Outlet Diameter (in) = _____

(Record Valve Number) Test Header Valve Open	Pitot Pressure	* Flow From Att. 2	* Total Flow (A+B+C+D) (0.97) gpm	"As-Found" Discharge Pressure **PI-1311 (psig)	* Total Head (psig) Discharge Pressure + 13.6 psig - Suction Pressure	Pump Speed RPM	Recorders Initials	Calculator's Initials
None	0	0	0			N/A		
1 Valve No:	A_____	A_____	A			N/A		
2 Valve No:	A_____ B_____	A_____ B_____	A&B			N/A		
3 Valve No: ____	A_____ B_____ C_____	A_____ B_____ C_____	A&B&C			N/A		
4 Valve No: ____	A_____ B_____ C_____ D_____	A_____ B_____ C_____ D_____	A&B&C&D			N/A		

* To be completed by Engineering or Property Protection

0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection _____ / _____

Signature Date

PUMP AND WATER FLOW DATA SHEET

Diesel Pump **P-9B
Pit Level **LI-1307 (inches) = _____
Suction Pressure (psig) = (**LI-1307 (inches) / 12 in/ft - 0.42 ft)(0.433 psig/ft) = _____
"As-Found" Auto Start Pressure **PI-5350A (psig) = _____
Playpipe Outlet Diameter (in) = _____
Diesel Start Time: _____ Diesel Stop Time: _____

(Record Valve Number) Test Header Valve Open	Pitot Pressure	* Flow From Att. 2	* Total Flow (A+B+C+D) (0.97) gpm	"As-Found" Discharge Pressure **PI-1310 (psig)	* Total Head (psig) Discharge Pressure + 14.6 psig - Suction Pressure	As Found/ As Left Pump Speed RPM	Reader's Initials	Calculator's Initials
None	0	0	0					
1 Valve No:	A_____	A_____	A					
2 Valve No:	A_____ B_____	A_____ B_____	A&B					
3 Valve No: ____	A_____ B_____ C_____	A_____ B_____ C_____	A&B&C					
4 Valve No: ____	A_____ B_____ C_____ D_____	A_____ B_____ C_____ D_____	A&B C&D					

* To be completed by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection _____ / _____
Signature Date

ts0581-0344e-89-154

PUMP AND WATER FLOW DATA SHEET

Diesel Pump **P-41
Pit Level **LI-1307 (inches) = _____
Suction Pressure (psig) = (**LI-1307 (inches) - 0.42 ft)(0.433 psig/ft) = _____
12 in/ft
"As-Found" Auto Start Pressure **PI-5350A (psig) = _____
Playpipe Outlet Diameter (inches) = _____
Diesel Start Time: _____ Diesel Stop Time: _____

(Record Valve Number) Test Header Valve Open	Pitot Pressure	* Flow From Att. 2	* Total Flow (A+B+C+D) (0.97) gpm	"As-Found" Discharge Pressure **PI-5350 (psig)	* Total Head (psig) Discharge Pressure + 13.0 psig - Suction Pressure	As Found/ As Left Pump Speed RPM	Reader's Initials	Calculator's Initials
None	0	0	0					
1 Valve No:	A_____	A_____	A					
2 Valve No:	A_____ B_____	A_____ B_____	A&B					
3 Valve No: ____	A_____ B_____ C_____	A_____ B_____ C_____	A&B&C					
4 Valve No: ____	A_____ B_____ C_____ D_____	A_____ B_____ C_____ D_____	A&B&C&D					

* To be calculated by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection

_____ / _____
Signature Date

ts0581-0344e-89-154

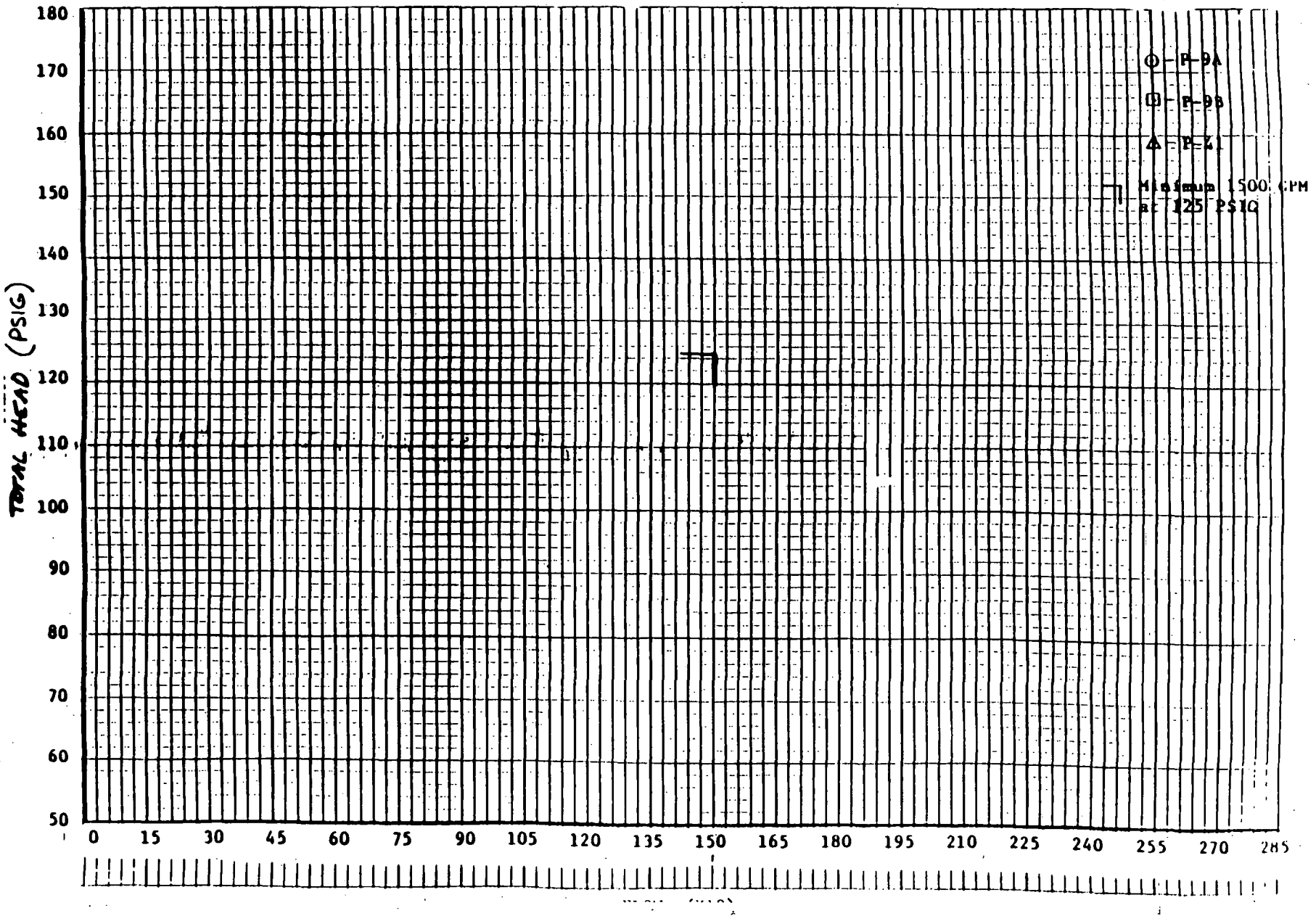
Theoretical Discharge Through Circular Orifices[1]
C = 1.00
(United States Gallons of Water per Minute)

Velocity Head Psi	Flow for Orifices Size of 1-3/4"	Velocity Head Psi	Flow for Orifices Size of 1-3/4"	Velocity Head Psi	Flow for Orifices Size of 1-3/4"
20	409	52	659	84	837
22	428	54	671	86	847
24	448	56	684	88	857
26	466	58	696	90	867
28	483	60	708	92	876
30	500	62	719	94	886
32	517	64	731	96	895
34	533	66	742	98	904
36	548	68	753	100	914
38	563	70	764		
40	578	72	775		
42	592	74	786		
44	606	76	796		
46	620	78	807		
48	633	80	817		
50	646	82	827		

[1] Table extracted from 14th Edition of Fire Protection Handbook (NFPA), Table 11-6B, Section 11, Chapter 6, Pages 11-68 and 11-69.

ts0581-0344f-89-154

"As-Found"
Fire Pump Tests - Total Head vs Flow



ATTACHMENT 7

Consumers Power Company
Palisades Plant
Docket 50-255

SUMMARY OF

FIRE PUMP DISCHARGE PRESSURES

TAKEN FROM TECHNICAL SPECIFICATION

SURVEILLANCE MO-7B

January 30, 1990

2 Pages

Summary of Historical Discharge
Pressure form Fire Pumps
P9A & B, P-41

Date	P9A	P9B	P-41
7/1/83	153	160	150
10/3/83	160	155	144
4/3/83	160	162	150
12/2/83	159	160	150
1/2/84	155	160	150
2/1/84	155	160	---
3/1/84	157	142	152
4/2/84	157	160	---
4/28/84	---	---	142
5/2/84	160	160	150
6/9/84	---	160	---
7/2/84	160	160	150
8/1/84	160	149	150
9/1/84	160	155	152
10/5/84	---	155	---
10/1/84	---	154	---
1/3/85	160	160	150
2/2/85	160	156	152
3/1/85	160	160	151
4/3/85	158	158	151
5/3/85	160	160	152
6/2/85	160	162	153
7/5/85	158	162	148
8/31/85	160	160	152
10/5/85	160	155	154
11/6/85	158	160	150
12/5/85	162	162	153
1/2/86	158	---	150
2/3/86	158	160	152
3/4/86	155	160	152
4/4/86	160	160	150
5/3/86	160	160	150
6/4/86	160	155	150
6/30/86	160	156	150
8/1/86	156	154	150
9/3/86	161	157	150
10/11/86	160	158	150
12/2/86	160	158	154
11/2/86	160	155	154
11/17/86	---	---	134
1/2/87	160	160	153
2/5/87	160	167	152
2/10/87	---	---	152
3/5/87	159	156	150
3/30/87	158	155	150

5/1/87	157	155	150
6/4/87	158	155	152
6/30/87	158	155	150
8/1/87	155	157	150

MO-7B rev 8/12/87

Pressure obtained
from Surveillance MO-7B
Full & Partial Tests

LTP 12/1/89

ATTACHMENT 8

Consumers Power Company
Palisades Plant
Docket 50-255

HISTORICAL RO-52

RESULTS - FLOW CAPACITIES

Date Completed:

09-09-83
08-23-84
05-29-86
04-12-88

January 30, 1990

30 Pages

Attachment 8

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE
ACCEPTANCE CRITERIA AND OPERABILITY

Proc RO-52
Rev 7
Form 18.1.6

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

---

1. Data obtained through performance of this procedure meets acceptance criteria.

   Bruce M Dusterhoft / 10-19-83 a./✓/ Yes (BMD 10-19-83) b./_/ No c./X/Yes, with exceptions listed on back.
   First Line Supervisor — Date

2. Limiting safety system settings have not been violated per Tech Spec Section(s) None

   ________ / ____ a./_/ Yes b./_/ No c./_/Yes, with exceptions listed on back.
   First Line Supervisor — Date

3. Equipment was operable or parameter meets specifications as required by Technical Specifications Section(s) 4.17.2.1e

   a./✓/ Yes b./_/ No c./_/Yes, with exceptions listed on back.

   Bruce M Dusterhoft — 9-26-83 / 1944
   First Line Supervisor — Date — Time

4. If 2b, 2c, 3b or 3c were checked, Technical Specifications "Limiting Condition of Operation" Section(s) 3.22.2.1, 3.5.1b

   ________ may apply.

5. If 1b or 1c or 2b or 2c and 3a were checked, then justify operability

   See back

   ~~NA~~ BMD 10-19-83 — Bruce M Dusterhoft (~~NA~~ BMD 10-19-83) / 10-19-83 (~~NA~~ BMD 10-19-83)
   Signature — Date

6. If any of 1b, 1c, 2b, 2c, 3b or 3c or 8b were checked, identify corrective action document

   ER Yes /_/ No /X/ No. ________ CL Yes /_/ No /X/ No. ________

   DR Yes /_/ No /X/ No. ________

   MO Yes /_/ No /X/ No. ________

7. If 3b or 3c were checked or Line 5 filled out, notify SS/STA

   Tags Yes /_/ No /X/ Location ________

   SS/STA review: NA / NA / NA
   Signature — Date — Time

8. Engineering Evaluation Acceptable: a./_/ Yes b./_/ No ________ / ____
   Signature — Date

   /_/ Retest Required /_/ Freq Changed to ________

9. Tech Supt Approval /X/ Yes /_/ No RPMargol / 12/8/83
   Signature — Date

pa0581-0344d-89-93 See attached also engr evaluation

ATTACHMENT 1
Pump and Water Flow Data Sheet

Electric **P-9A Pump

PUMP DATA

Auto Start Pressure	Pit Level (In)	Discharge Pressure (psig)	Total Head (Discharge Press) + (13.6 psig) - [(LI-1307 (In) - 0.42 Ft) (.433 psig/Ft)] / 12 In/Ft	Pump Speed
**PI-1311	**LI-1307	**PI-1311		RPM
98	238"	153*	~~166.9~~ 165.9	1805

WATER FLOW DATA

Test Header Valves Open	Pitot Pressure	Flow*	Total** Flow*	Recorder's Initials	Calculator's Initials
		From Att 2	A+B+C+D		
None	0	0	0		
1 143	A 94	A 886	A ~~886~~ 859 calc'd	TNS	
2 128	A 80 B 74	A 817 B 786	A&B 1555 calc'd ~~1603~~	TNS	TW
3 106	A 65 B 34 C 60	A 736 B 533 C 708	A&B&C 1918 calc'd ~~1977~~	TNS	TW
4 93	A 60 B 30 C 14 D 50	A 708 B 500 C 332 D 646	A&B C&D 2120 calc'd ~~2186~~	TNS	TW

Nozzle Outlet Diameter: 1 3/4"

PT-1311 equ. gauge used

* To be completed by Engineering
** Flow x 0.97 (Coefficient for Playpipes)

ATTACHMENT 1
Pump and Water Flow Data Sheet

Diesel Pump **P-9B

PUMP DATA

Auto Start Pressure	Pit Level (In)	Discharge Pressure (psig)	Total Head (Discharge Press) + (14.6 psig) - [(LI-1307 (In) - 0.42 Ft) (.433 psig/Ft)] / 12 In/Ft	Pump Speed
**PI-1310	**LI-1307	**PI-1310		RPM
82	≥39	143	156.9	1720

WATER FLOW DATA

Test Header Valves Open	Pitot Pressure	Flow*	Total** Flow*	Recorder's Initials	Calculator's Initials
		From Att 2	A+B+C+D		
None	0	0	0 ~~850 GPD~~		
1 139	A 92	A 876	A ~~876~~	TNS	
2 120	A 78 B 73	A 807 B 781	A&B 1540 GPD ~~1588~~	TNS	TW
3 90	A 60 B 56 C 53	A 708 B 684 C 665	A&B&C 1995 GPD ~~2057~~	TNS	TW
4 71	A 44 B 33 C 39 D 39	A 606 B 525 C 570 D 570	A&B C&D 2203 GPD ~~2274~~	TNS	TW

Diesel Start Time: 1104

Diesel Stop Time: 1130

Nozzle Outlet Diameter: 1 3/4"

* To be completed by Engineering
** Flow x 0.97 (Coefficient for Playpipes)

pa0581-0344e-89-93

ATTACHMENT 1
Pump and Water Flow Data Sheet

Diesel Pump **P-41

PUMP DATA

Auto Start Pressure	Pit Level (In)	Discharge Pressure (psig)	Total Head (Discharge Press) + (13.0 psig) - [(LI-1307 (In) - 0.42 Ft) (.433 psig/Ft)] 12 In/Ft	Pump Speed
**PI-5350	**LI-1307	**PI-5350		RPM
60	238	145	157.3	1720

Used test gauge

[redacted]

[redacted]

ATTACHMENT 1
Pump and Water Flow Data Sheet

Diesel Pump **P-41

WATER FLOW DATA

Test Header Valves Open	Pitot Pressure	Flow*	Total** Flow*	Recorder's Initials	Calculator's Initials
		From Att 2	A+B+C+D		
None	0	0	0 ~~792 gpm~~		
1 135	A 80	A 817	A ~~817~~	TNS	
2 119	A 72 B 71	A 775 B 770	A&B 1499 gpm ~~1545~~	TNS	TW
3 95	A 54 B 55 C 60	A 671 B 677 C 708	A&B&C 1994 gpm ~~2056~~	TNS	TW
4 72	A 38 B 39 C 40 D 44	A 563 B 570 C 578 D 606	A&B C&D 2274 gpm ~~2317~~	TNS	TW

Diesel Start Time: 1142 Diesel Stop Time: 1210

Nozzle Outlet Diameter: 1 3/4"

Return to Normal (Initials): TWatson TN Stevenson (op)

Test Performed by/Date: TWatson 9-9-83 TN Stevenson

Engineering Evaluation:

Completed by/Date: Eric A. Dorbek 9-9-83 (Engr)

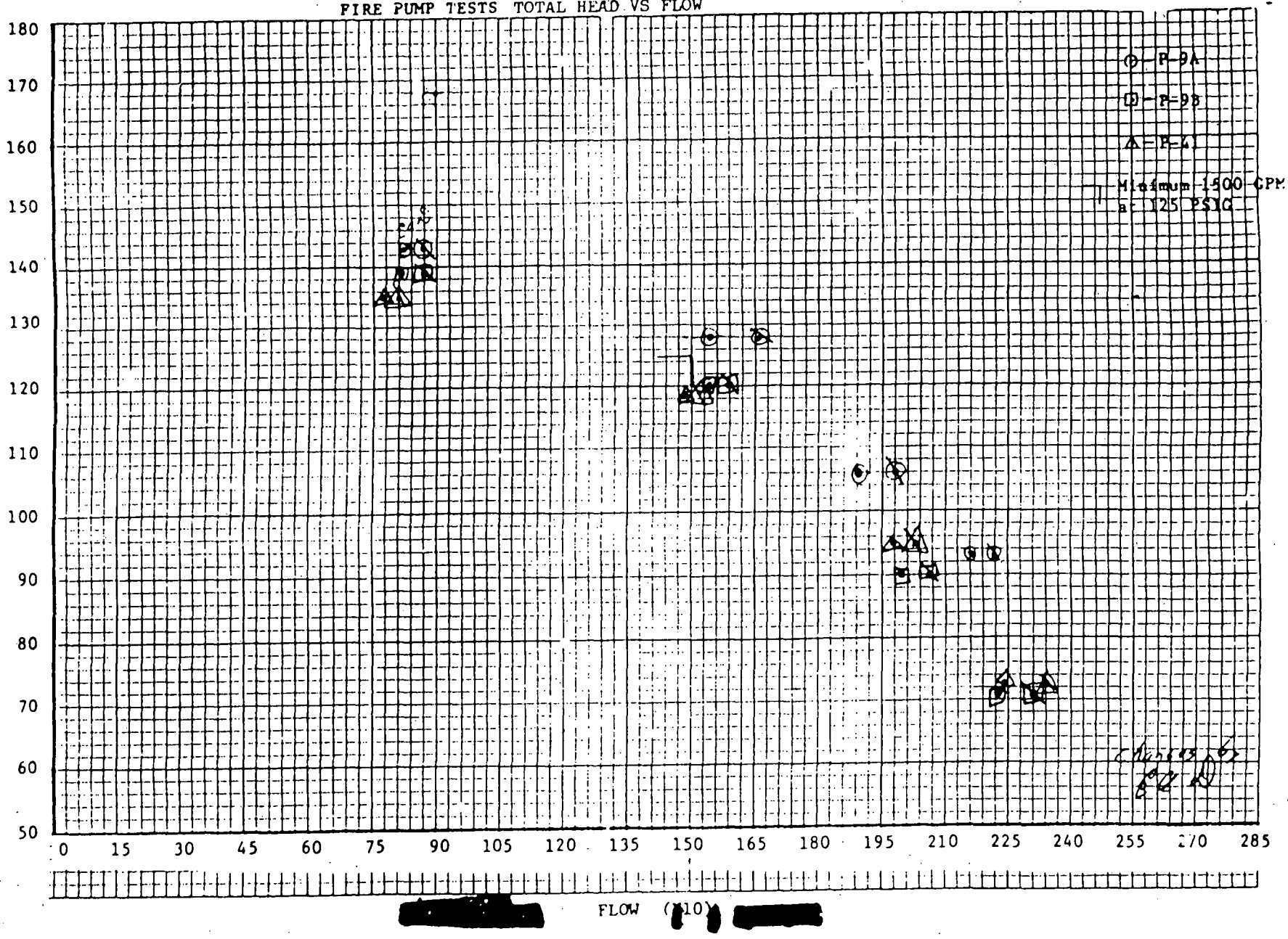
* To be completed by Engineering
** Flow x 0.97 (Coefficient for Playpipes)

pa0581-0344e-89-93

ATTACHMENT 3

RO-52

FIRE PUMP TESTS TOTAL HEAD VS FLOW



R Mayol 12/8/05

P-9A

Assumptions

1) pump speed remain constant @ 1805 RPM
2) pit level was constant @ 238"
3) pressures recorded for flow test are from PI-1311

TEST HEADER OPEN	PI-1311	PITOT PRESS	FLOW	TOTAL FLOW (FLOW x 0.97)	TOTAL HD *
1	143	44	886	859.4	148.2 psig
2	128	80 74	817 786	1554.9	133.2 psig
3	106	65 54 60	736 593 708	1917.7	111.2
4	93	60 30 14 50	708 500 332 646	2120.4	98.2

* TOTAL HD = (PI-1311 DISCHARGE PRESS.) + [13.6 psig − ((LI-1307 / 12 in/ft) − 0.42 ft)(.433 psig/ft)]

TOTAL HD = (PI-1311) + (5.2 psig)

KPM sept 12/8/87

P-9B

Assumptions

1) pump speed remain constant @ 1770 RPM
2) Pit level was constant @ 239"
3) pressures recorded for flow test are from PI-1311

TEST HEADER VALVE OPEN	PI-1311	PITOT PRESS	FLOW	TOTAL FLOW (FLOW x 0.97)	TOTAL HD *
1	139	92	876	849.7	144.2
2	120	78 75	807 781	1540.4	125.2
3	90	60 56 53	708 684 665	1995	95.2
4	71	44 35 39 39	606 525 570 570	2202.9	76.2

* TOTAL HD = (PI-1311) + [13.6 - ($\frac{LI-1307}{12\ in/ft}$ - 0.42 ft)(.433 psig/ft)]

- PI-1311 + 5.2

P-41.

PRMaryol 12/8/03

Assumptions

1) Pump speed remains constant @ 1770 RPM
2) Pit level was constant @ 238"
3) pressures recorded for flow test are from PI-1311

TEST HEADER VALVE OPEN	PI-1311	PITOT PRESS	FLOW	TOTAL FLOW (FLOW x .97)	TOTAL HD *
1	135	80	817	792.5	140.2
2	119	72 71	775 770	1498.6	124.2
3	95	54 55 60	671 677 708	1994.3	100.2
4	72	38 39 40 44	563 570 578 606	~~231~~ 2247.5	77.2

* TOTAL HD = $(PI\text{-}1311) + \left[13.6\,psig - \left(\frac{LI\text{-}1307}{12\,^{IN}/_{ft}} - 0.42\,ft\right)(.433\,psi/ft)\right]$

$= (PI\text{-}1311) + 5.2\ psig$

NOTE: Acceptance criteria requires pump to deliver 1500 gpm @ 125 psig. P-41 falls minutely under this criteria (ie 1498.6 @ 124.2) but this could be contributed to instrument error. As well ASME section XI ~~~~ pump & valve testing allows a deviation from the established reference value. P41 fell well within the tolerance band. It is concluded the pump and its systems has not degraded and will perform it function.

P-1A

P-41

K•E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

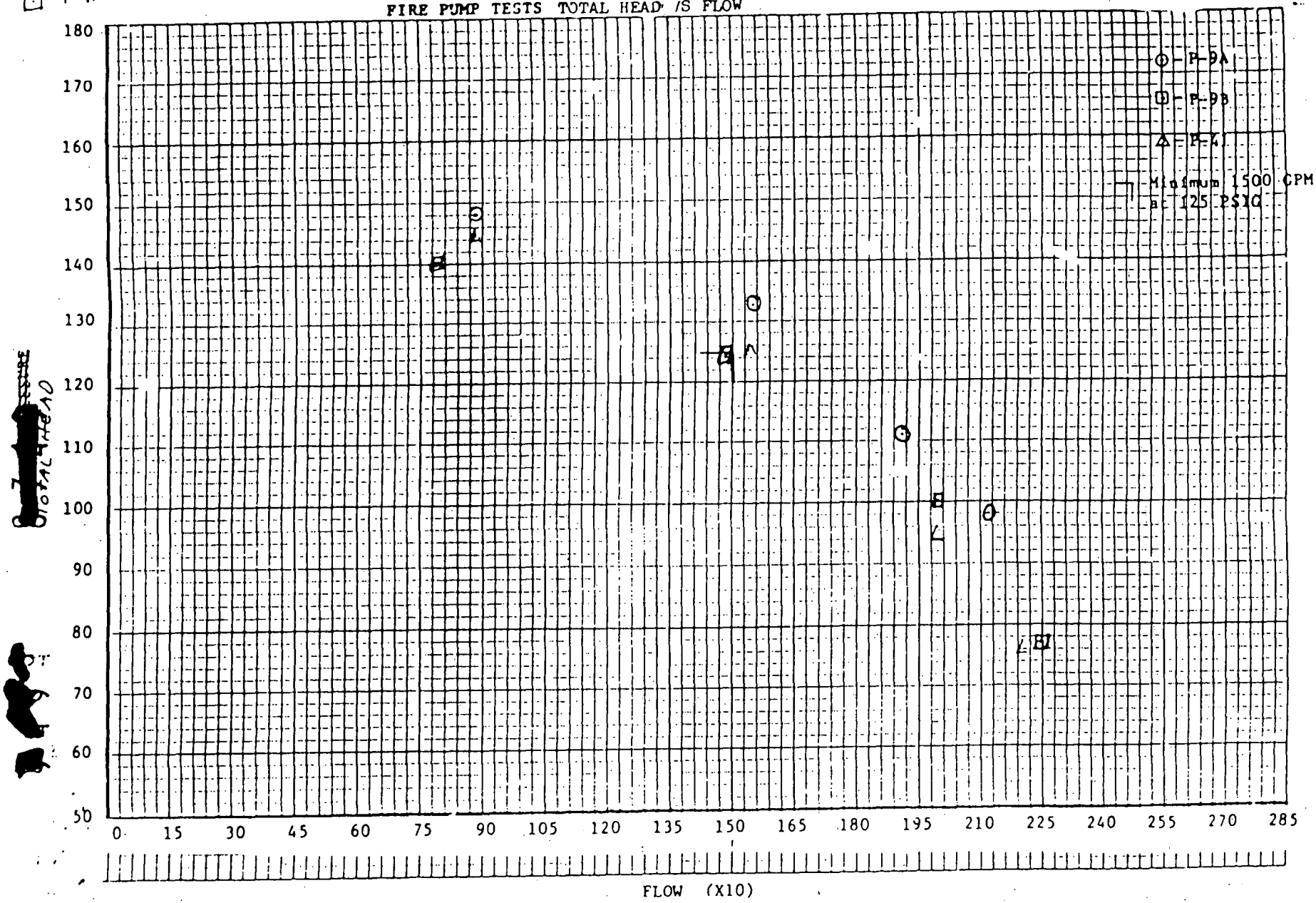
46 0782

RPM mgd 12/8/83

ATTACHMENT 3

RO-52.

FIRE PUMP TESTS TOTAL HEAD /S FLOW



PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE
ACCEPTANCE CRITERIA AND OPERABILITY
TITLE: FIRE SUPPRESSION WATER SYSTEM
FUNCTIONAL TEST AND PUMP CAPACITY TEST

Proc RO-52
Revision 8

1. Data obtained through performance of this procedure meets acceptance criteria.

[signature] / ____ a./X/ Yes b./_/ No c./X/Yes, with exceptions listed on back.
First Line Supervisor Date

2. Limiting safety system settings have not been violated per Tech Spec Section(s) None

N/A / ____ a./_/ Yes b./_/ No c./_/Yes, with exceptions listed on back.
First Line Supervisor Date

3. Equipment was operable or parameter meets specifications as required by Technical Specifications Section(s) 4.17.2.1e

____ a./X/ Yes b./_/ No c./_/Yes, with exceptions listed on back.
[signature] / 12-29-89 / ~~AM~~ 1640
First Line Supervisor Date Time

4. If 2b, 2c, 3b or 3c were checked, Technical Specifications "Limiting Condition of Operation" Section(s) 3.22.2.1, 3.5.1b

____ may apply.

5. If 1b or 1c or 2b or 2c and 3a were checked, then justify operability

[illegible]

____ [signature] / 12-1-89
Signature Date

6. If any of 1b, 1c, 2b, 2c, 3b or 3c or 8b were checked, identify corrective action document

ER Yes /_/ No /X/ No. ____ CL Yes /_/ No /X/ No. ____

DR Yes /X/ No /_/ No. [illegible]

MO Yes /_/ No /X/ No. ____

7. If 3b or 3c were checked or Line 5 filled out, notify SS/STA

Tags Yes /_/ No /X/ Location ____

SS/STA review: [signature] / ____ / ____
Signature Date Time

8. Engineering Evaluation Acceptable: a./X/ Yes b./_/ No [signature] [illegible]
Signature Date

/_/ Retest Required /_/ Freq Changed to ____

9. Tech Supt Approval /X/ Yes /_/ No [signature] / 12/5/89
Signature Date

ts0581-0344d-89-154

There are two test headers with different valve numbers. The valves that were on the test header not listed. The use of these valves doesn't affect the test results. Recommend that all valves off of both test headers be listed in procedure.

[illegible] 1-29-64

Pump and Water Flow Data Sheet

Electric **P-9A Pump

PUMP DATA

Auto Start Pressure	Pit Level (In)	Discharge Pressure (psig)	Total Head (Discharge Press) + (13.6 psig) - [(LI-1307 (In) - 0.42 Ft) (.433 psig/Ft)] / 12 In/Ft	Pump Speed
**PI-5350A	**LI-1307	**PI-1311		RPM *
~~58~~ 98	247	156	161 psig	~~N/A~~ 1760

WATER FLOW DATA

Test Header Valves Open	Pitot Pressure	Flow*	Total** Flow*	Recorder's Initials	Calculator's Initials	PI 1311
	0	From Att 2	A+B+C+D	FH		
None	0	0	0	FH		0. 156
1	A 68	A 657	A 831	FH		1. 142
2	A 77 B 75	A 801 B 791	A&B	FH		2. 126
3	A 54 B 55 C 57	A 671 B 678 C 686	A&B&C	FH		3. 98
4	A 42 B 41 C 41 D 48	A 592 B 583 C 598 D 633	A&B C&D	FH		4. 75

Nozzle Outlet Diameter: 1 3/4"

* To be completed by Engineering
** Flow x 0.97 (Coefficient for Playpipes)

* ELECTRIC PUMP MAINTAINED 1760 RPM THRU-OUT TEST

Pump and Water Flow Data Sheet

Diesel Pump **P-9B

PUMP DATA

Auto Start Pressure	Pit Level (In)	Discharge Pressure (psig)	Total Head (Discharge Press) + (14.6 psig) - [(LI-1307 (In) - 0.42 Ft) (.433 psig/Ft)] / 12 In/Ft	Pump Speed
**PI-5350A	**LI-1307	**PI-1310	1880	RPM 0. VALVE
76	247	*144	1880	~~1825~~ FIR 1.
			1825	~~1800~~ FIR 2.
				1800 3.
				1800 4.

WATER FLOW DATA

Test Header Valves Open	Pitot Pressure	Flow** From Att 2	Total** Flow* A+B+C+D	Recorder's Initials	Calculator's Initials	PI 1310
				FIR		
None	0	0	0	FIR	174	0. ~~*144~~
1	A 100+	A	A	FIR	125	1. 160
2	A 82 B 78	A B	A&B	FIR	157	2. 132
3	A 61 B 55 C 57	A B C	A&B&C	FIR	144	3. 99
4	A 44 B 43 C 35 D 48	A B C D	A&B C&D	FIR	21	4. 76

Diesel Start Time: 1130

Diesel Stop Time: 1200

Nozzle Outlet Diameter: 1 3/4"

* To be completed by Engineering
** Flow x 0.97 (Coefficient for Playpipes)

* 144 PSI W/RU LIFTING

Pump and Water Flow Data Sheet

Diesel Pump **P-41

PUMP DATA

Auto Start Pressure	Pit Level (In)	Discharge Pressure (psig)	Total Head (Discharge Press) + (13.0 psig) - [(LI-1307 (in) - 0.42 Ft) (.433 psig/Ft)] / 12 In/Ft	Pump Speed	F.J.R. ~~[illegible]~~ ~~[illegible]~~ F.J.R.
**PI-5350A	**LI-1307	**PI-5350	1740	RPM	0. James
58	247	148	153	1740	1. "
				1710	2. "
				1700	3. "
				1700	4.

1. [illegible] pump speed low should be 1760 [illegible] over for results calculated to 76[illegible] rpm [illegible]

$$\frac{Q_1}{Q_2} = \frac{N_1}{N_2} \qquad \frac{H_1}{H_2} = \frac{N_1^2}{N_2^2}$$

Q = flow in gpm

N = speed in r.p.m.

H = head pressure in psig

from NFPA Handbook 15th edition

Min flow

$\frac{153}{H_2} = \frac{1740^2}{1760^2}$, $H_2 = 153\left(\frac{1760}{1740}\right)^2$ $H_2 = 157$

Valve open

$\frac{807}{Q_2} = \frac{1740}{1760}$ $Q_2 = 807\frac{1760}{1740}$ $Q_2 = 816$

$\frac{150}{H_2} = \left(\frac{1740}{1760}\right)^2$ $H_2 = 150\left(\frac{1760}{1740}\right)^2$ $H_2 = 153$

Peak HP open

$\frac{1435}{Q_2} = \frac{1710}{1760}$ $Q_2 = \frac{1760}{1710}1435$ $Q_2 = 1477$

$\frac{117}{H_2} = \frac{1710^2}{1760^2}$ $H_2 = \frac{1760^2}{1710^2}117$ $H_2 = 124$

3 valves open

$\frac{1909}{Q_2} = \frac{1700}{1760}$ $Q_2 = \frac{1760}{1700}1909$ $Q_2 = 1976$

$\frac{91}{H_2} = \frac{1700^2}{1760^2}$ $H_2 = \frac{1760^2}{1700^2}91$ $H_2 = 98$

4 valves open

$\frac{2213}{Q_2} = \frac{1700}{1760}$ $Q_2 = \frac{1760}{1700}2213$ $Q_2 = 2291$

$\frac{72}{H_2} = \frac{1700^2}{1760^2}$ $H_2 = \frac{1760^2}{1700^2}72$ $H_2 = 77$

Pump and Water Flow Data Sheet

Diesel Pump **P-41

WATER FLOW DATA

Test Header Valves Open	Pitot Pressure	Flow From Att 2	Total** Flow* A+B+C+D	Recorder's Initials	Calculator's Initials	PI 5350B
					Total Head	
None	0	0	0			0.148
1	A 83	A 832	A 807		150	1.145
2	A 69 B 66	A 756 B 702	A&B 1455		117	2.112
3	A 53 B 49 C 51	A 677 B 634 C 652	A&B&C		91	3.86
4	A 38 B 38 C 38 D 42	A 563 B 563 C 563 D 622	A&B C&D		72	4.67

Diesel Start Time: 1210 Diesel Stop Time: 1240

Nozzle Outlet Diameter: 1 3/4

Return to Normal (Initials): T. Kuno F. Lund (op)

Test Performed by/Date: F. Lund / T. Kuno 8/25/84

Engineering Evaluation:

Completed by/Date: (Engr)

* To be completed by Engineering
** Flow x 0.97 (Coefficient for Playpipes)

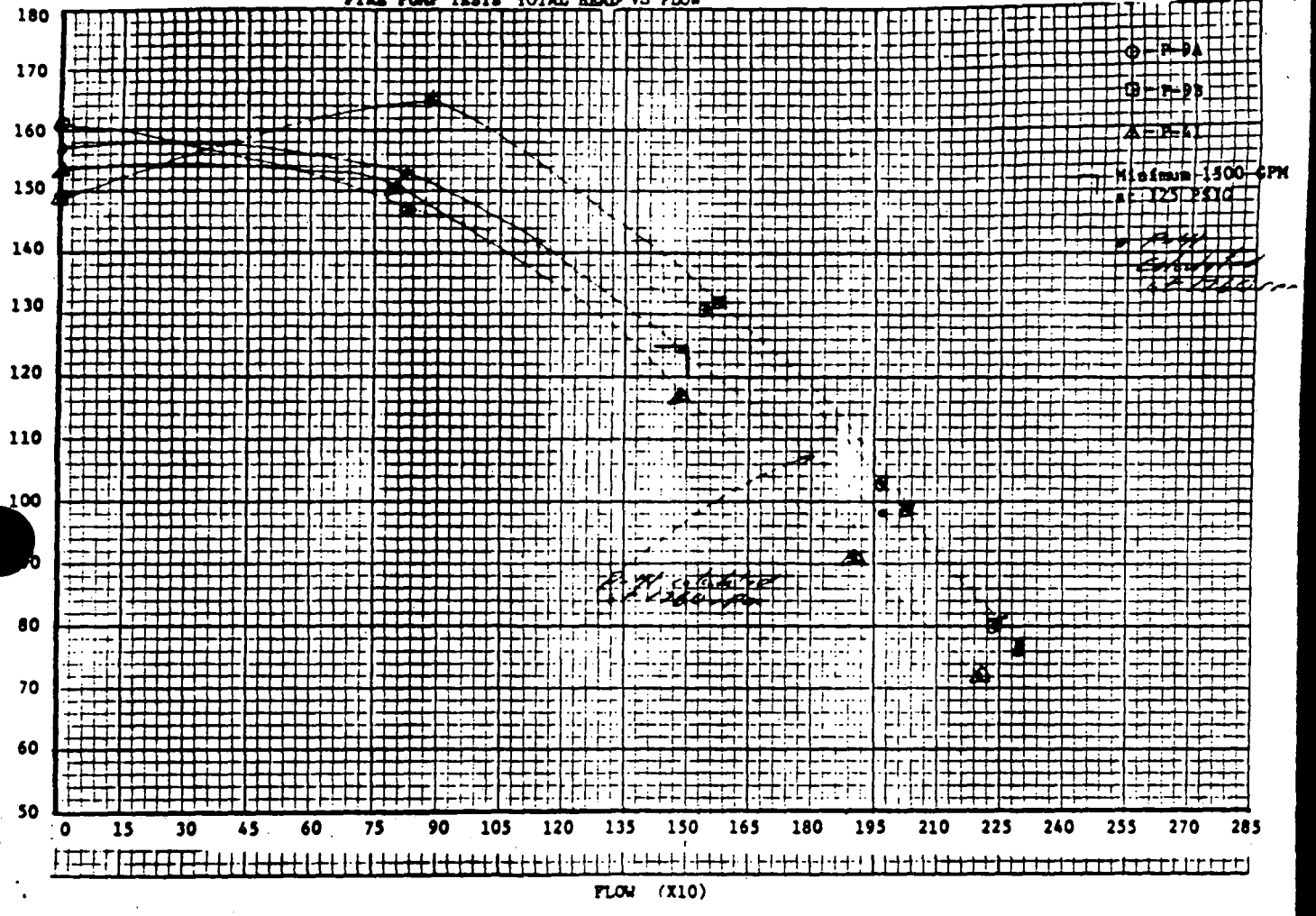
ts0581-0344e-89-93

[redacted] 46 0782

ATTACHMENT 3

RO-52

FIRE PUMP TESTS TOTAL HEAD VS FLOW



PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE
ACCEPTANCE CRITERIA AND OPERABILITY

Proc No RO-52
Revision 9

TITLE: FIRE SUPPRESSION WATER SYSTEM
FUNCTIONAL TEST AND PUMP CAPACITY TE

1. Data obtained through performance of this procedure meets acceptance criteria.

   _____ / 30 May 86 a./X/ Yes b./__/ No c./__/Yes, with exceptions
   First Line Supervisor Date listed on back.

2. Limiting safety system settings have not been violated per Tech Spec Section(s) None

   NA / _____ a./__/ Yes b./__/ No c./__/Yes, with exceptions
   First Line Supervisor Date listed on back.

3. Equipment was operable or parameter meets specifications as required by Technical Specifications Section(s) 4.17.2.1e

   _____ a./X/ Yes b./__/ No c./__/Yes, with exceptions
   listed on back.

   _____ / 30 May 86 / 0120
   First Line Supervisor Date Time

4. If 2b, 2c, 3b or 3c were checked, Technical Specifications "Limiting Condition of Operation" Section(s) 3.22.2.1, 3.5.1b

   _____ may apply.

5. If 1b or 1c or 2b or 2c and 3a were checked, then justify operability

   _____

   _____ _____ / _____
   Signature Date

6. If any of 1b, 1c, 2b, 2c, 3b or 3c or 8b were checked, identify corrective action document

   ER Yes /__/ No /__/ No. _____ MO Yes /__/ No /__/ No. _____

   DR Yes /__/ No /__/ No. _____ CL Yes /__/ No /__/ No. _____

7. If 3b or 3c were checked or Line 5 filled out, notify SS/STA

   Tags Yes /__/ No /__/ Location _____

   SS/STA review: _____ / _____ / _____
   Signature Date Time

8. Engineering Evaluation Acceptable: a./__/ Yes b./__/ No N/A / _____
   Signature Date

   /__/ Retest Required /__/ Freq Changed to _____

9. Section Head Approval /X/ Yes /__/ No _____ / 6/4/86
   Signature Date

ts0581-0344d-89

0460

N/A 7
N/A
30 May 86

PUMP AND WATER FLOW DATA SHEET

Electric Pump ** P-9A
Pit Level **LI-1307 (inches) = 250
Suction Pressure (psig) = $\left(\frac{\text{**LI-1307 (inches)}}{12 \text{ in/ft}} - 0.42 \text{ ft}\right)\left(0.433 \frac{\text{psig}}{\text{ft}}\right)$ = 8.84 psig
Auto Start Pressure **PI-5350A (psig) = 100
Playpipe Outlet Diameter (in) = 1 3/4

Test Header Valve Open	Pitot Pressure	□ Flow From Att. 2	□ Total Flow (A+B+C+D) (0.97) gpm	Discharge **PI-1311	Pressure (psig)	□ Total Head (psig) Discharge Pressure + 13.6 psig - Suction Pressure	Pump Speed RPM	Recorders Initials	Calculator's Initials
None	0	0	0	160		164.8	N/A	RAR	EAD
1	A 90	A 867	A 841	147		151.8	N/A	RAR	EAD
2	A 76 B 75	A 796 B 791	A&B 1539	128		132.8	N/A	RAR	EAD
3	A 58 B 58 *C 40	A 696 B 696 C 578	A&B&C 1911 ~~2478~~ ~~2653~~ EAD	102		106.8	N/A	RAR	EAD
4	A ~~48~~ 41 B ~~41~~ 41 *C ~~45~~ 30 D ~~76~~ 50	A 585 B 585 C 500 D 646	A&B&C&D 2247	79		83.8	N/A	RAR	EAD

□ To be completed by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection
Signature Date

*Item C — Nozzle was crimped causing the pressure drop

ts0581-0344e-89

7477 0468

PUMP AND WATER FLOW DATA SHEET

Diesel Pump **P-9B
Pit Level **LI-1307 (inches) = 259
Suction Pressure (psig) = $\left(\frac{\text{**LI-1307 (inches)}}{12 \text{ in/ft}} - 0.42 \text{ ft}\right)\left(0.433 \frac{\text{psig}}{\text{ft}}\right)$ = 8.95 psig
Auto Start Pressure **PI-5350A (psig) = 83
PlaypipeOutlet Diameter (in) = 1¾
Diesel Start Time: 2200 Diesel Stop Time: 2250

Test Header Valve Open	Pitot Pressure	□ Flow From Att. 2	□ Total Flow (A+B+C+D) (0.97) gpm	Discharge Pressure **PI-1310 (psig)	□ Total Head (psig) Discharge Pressure + 14.6 psig - Suction Pressure	As Found/ As Left Pump Speed RPM	Reader's Initials	Calculator's Initials
None	0	0	0	160	165.6	1770/1770	RAL	EAD
1	A 92	A 876	A 850	147	152.6		RAL	EAD
2	A 55 B 74	A 678 B 286	A&B 1420	123	128.6		RAL	EAD
3	A 58 B 57 C 40	A 686 B 690 C 578	A&B&C 1405	97	102.6		RAL	EAD
4	A 42 B 42 C 30 D 42	A 592 B 592 C 500 D 592	A&B C&D 2208	74	79.6	1770	RAL	EAD

□ To be completed by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection — Signature — Date 16-3-86

ts0581-0344e-89

7477 0469

PUMP AND WATER FLOW DATA SHEET

Diesel Pump **P-41
Pit Level **LI-1307 (inches) = 253

Suction Pressure (psig) = $\left(\frac{\text{**LI-1307 (inches)}}{12 \text{ in/ft}} - 0.42 \text{ ft}\right)\left(0.433 \frac{\text{psig}}{\text{ft}}\right)$ = 8.95

Auto Start Pressure **PI-5350A (psig) = 164
Playpipe Outlet Diameter (Inches) = 13/4
Diesel Start Time: 2300 Diesel Stop Time: 2337

Test Header Valve Open	Pitot Pressure	□ Flow From Att. 2	□ Total Flow (A+B+C+D) (0.97) gpm	Discharge Pressure **PI-5350 (psig)	□ Total Head (psig) Discharge Pressure + 13.0 psig - Suction Pressure	As Found/ As Left Pump Speed RPM	Reader's Initials	Calculator's Initials
None	0	0	0	148	152.0	1700/1770		EGD
1	A 94	A 886	A 859	~~128~~ 150	154.0			EGD
2	A 76 B 74	A 796 B 786	A&B 1535	127	131.0			EGD
3	A 59 B 57 C 41	A 702 B 680 C 525	A&B&C 1918	102	106.0			EGD
4	A 45 B 44 C 32 D 41	A 613 B 606 C 517 D 585	A&B&C&D 2251	79	83.0	1770		EGD

□ To be calculated by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection

Eric A. Dahl 16-3-88
Signature Date

ts0581-0344e-89

Return to Normal: R. Clark (Ops)

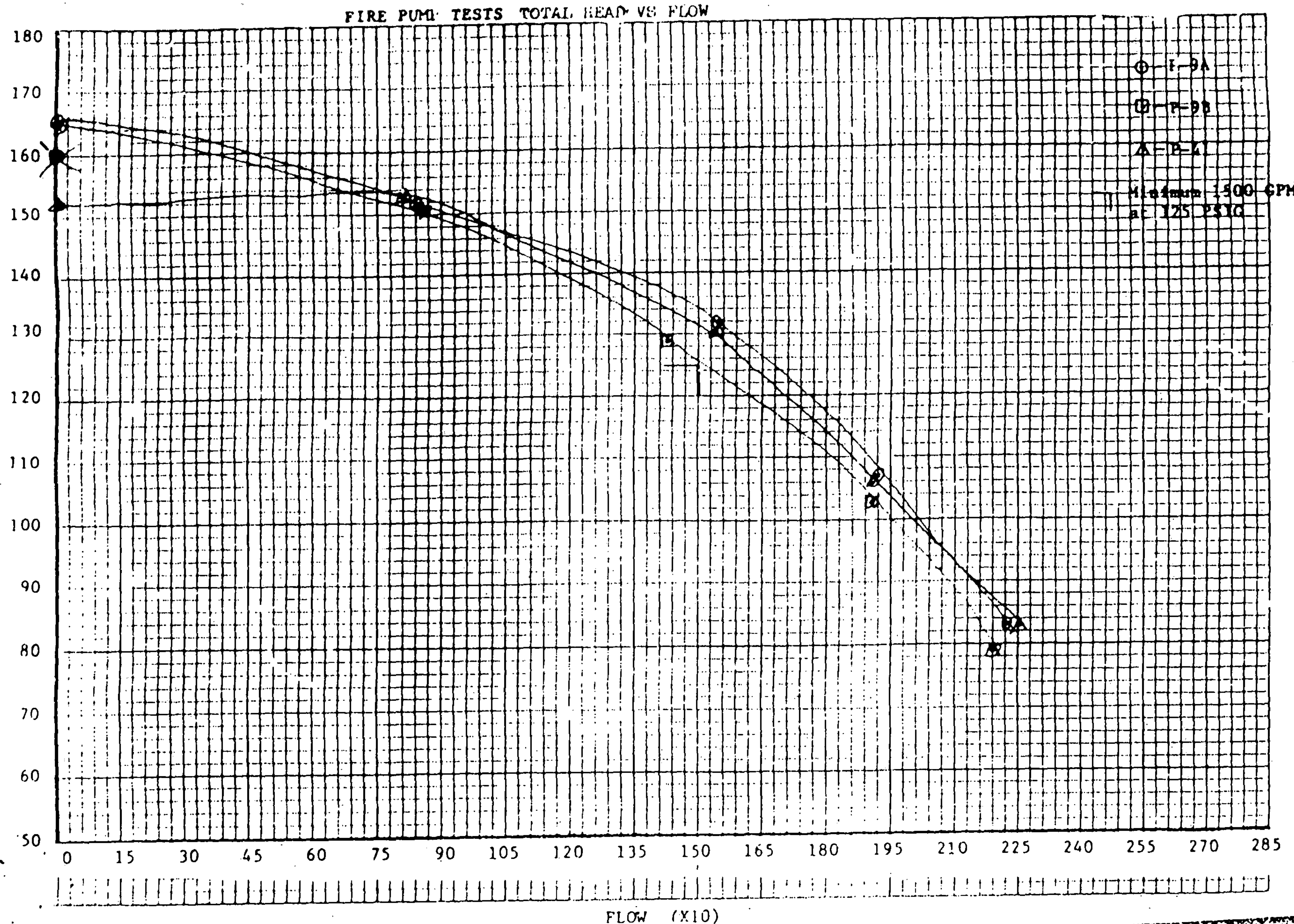
Test performed by/Date: R Clark / 5-29-86

Engineering Evaluation: Eric P. Dorbel 6-3-86

Completed by/Date: Eric P. Dorbel 6-3-86 (Engineer)

46 0782

FIRE PUMP TESTS TOTAL HEAD VS FLOW



7 4 7 7 0 4 7 5

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATIONS SURVEILLANCE PROCEDURE
ACCEPTANCE CRITERIA AND OPERABILITY

Proc No RO-52
Revision 10
Page 1 of 2

TITLE: FIRE SUPPRESSION WATER SYSTEM FUNCTIONAL TEST AND PUMP CAPACITY TEST

1. Data obtained through performance of this procedure meets acceptance criteria.

Gary Allen / 4-12-88 a./✓/ Yes b./ / No c./ / Yes, with exceptions listed on Page 2.
First Line Supervisor / Date

2. Limiting safety system settings have been met as required by Tech Spec Section(s) None

Gary Allen / ____ a./✓/ Yes b./ / No c./ / Yes, with exceptions listed on Page 2.
First Line Supervisor / Date

3. Equipment was operable or parameter meets specifications as required by Technical Specifications Section(s) 4.17.2.1e

____ a./✓/ Yes b./ / No c./ / Yes, with exceptions listed on Page 2.

Gary Allen / 4-12-88 / 1745
First Line Supervisor / Date / Time

4. If 2b, 2c, 3b or 3c were checked, Technical Specifications "Limiting Condition of Operation" Section 3.22.2.1, 3.5.1.a, 3.5.2.c, 3.5.2.d

N/A may apply.

5. If 1b or 1c or 2b or 2c and 3a were checked, then justify operability

N/A / ____
SS/SE Signature / Date

6. If any of 1b, 1c, 2b, 2c, 3b or 3c or 8b were checked, identify corrective action document

ER Yes / / No / / No. ____ WR/WO Yes/ / No/ / No. N/A

DR Yes / / No / / No. N/A CL Yes/ / No/ / No. ____

7. If 3b or 3c were checked or line 5 filled out, notify SS/SE

Tags Yes/ / No / / Location ____

SS/SE review: ____ / ____ / ____
Signature / Date / Time

8. Technical Review Acceptable: a./X/ Yes b./ / No L D Phillips 4-13-88
Signature / Date

/ / Retest required / / Freq. Changed to ____

9. Superintendent Approval /✓/ Yes / / No ____ / 4-15-88
Signature / Date

ts0581-0344d-89 154

7845 0107

PUMP AND WATER FLOW DATA SHEET

Electric Pump ** P-9A
Pit Level **LI-1307 (inches) = 237

Suction Pressure (psig) = (**LI-1307 (inches) / 12 in/ft - 0.42 ft)(0.433 psig/ft) = 8.4

Auto Start Pressure **PI-5350A (psig) = 77
Playpipe Outlet Diameter (in) = 1 3/4"

(Record Valve Number) Test Header Valve Open	Pitot Pressure	* Flow From Att. 2	* Total Flow (A+B+C+D) (0.97) gpm	Discharge Pressure **PI-1311 (psig)	* Total Head (psig) Discharge Pressure + 13.6 psig - Suction Pressure	Pump Speed RPM	Recorders Initials	Calculator's Initials
None	0	0	0	163	168.2 ~~154.6~~ [illegible]	N/A	[illegible]	[illegible]
1 Valve No: 183	A 67	A 747.5	A 725.1	152	157.2 ~~143.6~~ [illegible]	N/A	[illegible]	[illegible]
2 Valve No: 184 183	A 61 B 56.5 * *	A 713.5 B 687	A&B 1358.4	141	146.2 ~~132.6~~ [illegible]	N/A	[illegible]	[illegible]
3 Valve No: 183 184 185	A 50 B 52 C 47.5	A 646 B 659 C 629.7	A&B&C 1876.7	119	124.2 ~~110.6~~ [illegible]	N/A	[illegible]	[illegible]
4 Valve No: 183 184 185 186	A 37 B 38 C 35 D 39	A 555.5 B 563 C 540.5 D 570.5	A&B&C&D 2162.6	96	101.2 ~~87.6~~ [illegible]	N/A	[illegible]	[illegible]

* To be completed by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection [signature] 14/3/78
Signature Date

ts0581-0344e-89-154

7345 0117

PUMP AND WATER FLOW DATA SHEET

Diesel Pump **P-9B
Pit Level **LI-1307 (inches) = 23
Suction Pressure (psig) = (**LI-1307 (inches) / 12 in/ft - 0.42 ft)(0.433 psig/ft) = 8.4
Auto Start Pressure **PI-5350A (psig) = 80
PlaypipeOutlet Diameter (in) = 1 3/4
Diesel Start Time: 1305 Diesel Stop Time: 1556

(Record Valve Number) Test Header Valve Open	Pitot Pressure	* Flow From Att. 2	* Total Flow (A+B+C+D) (0.97) gpm	Discharge Pressure **PI-1310 (psig)	* Total Head (psig) Discharge Pressure + 14.6 psig - Suction Pressure	As Found/ As Left Pump Speed RPM	Reader's Initials	Calculator's Initials
None	0	0	0	160	166.2	1815	MM	mbb
1 183 Valve No:	A 77	A 780.5	A 757.1	154	160.2	1810	MM	mbb
2 183 Valve 184 No:	A 61 B 61	A 713.5 B 713.5	A&B 1384.2	135	141.2	1780	MM	mbb
3 183 Valve 184 No: ___ 185	A 50 B 50 C 46	A 646 B 646 C 620	A&B&C 1854.6	110	116.2	1765	MM	mbb
4 183 Valve 184 No: ___ 185 186	A 38.5 B 36.5 C 35 D 36	A 566.8 B 551.9 C 540.5 D 548	A&B C&D 2140.9	85	91.2	1760	MM	mbb

* To be completed by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection — Signature — Date

ts0581-0344e-89-154

7345 0118

STA 240

PUMP AND WATER FLOW DATA SHEET

Diesel Pump **P-41
Pit Level **LI-1307 (inches) = 237

Suction Pressure (psig) = (**LI-1307 (inches) / 12 in/ft − 0.42 ft)(0.433 psig/ft) = 8.4

Auto Start Pressure **PI-5350A (psig) = 66
Playpipe Outlet Diameter (Inches) = 1 3/4
Diesel Start Time: 1435 Diesel Stop Time: 1515

(Record Valve Number) Test Header Valve Open	Pitot Pressure	* Flow From Att. 2	* Total Flow (A+B+C+D) (0.97) gpm	Discharge Pressure **PI-5350 (psig)	* Total Head (psig) Discharge Pressure + 13.0 psig − Suction Pressure	As Found/ As Left Pump Speed RPM	Reader's Initials	Calculator's Initials
None	0	0	0	152	156.6	1800	MM	mGG
1 Valve No:	A 730	A 780.5	A 757.1	147	151.6	1790	MPM	mGG
2 Valve No:	A 135 B 63.0	A 728 B 725	A&B 1409.4	134	138.6	1770	MPM	mGG
3 Valve No: ___	A 515 B 51.0 C 42.5	A 655.6 B 652.5 C 629.7	A&B&C 1879.9	110	114.6	1755	MPM	mGG
4 Valve No: ___	A 40 B 40 C 36.5 D 37	A 578 B 578 C 551.8 D 555.5	A&B&C&D 2195.4	88	92.6	1750	MPM	mGG

* To be calculated by Engineering or Property Protection
0.97 = Coefficient for Playpipes

Acceptance Evaluation-Property Protection [signature] 14/10/88
Signature Date

ts0581-0344e-89-154

7345 0119

Return to Normal (Reference Paragraph 5.21): m Mokan (Ops)

Test performed by/Date: m Mokan / 4/12/88

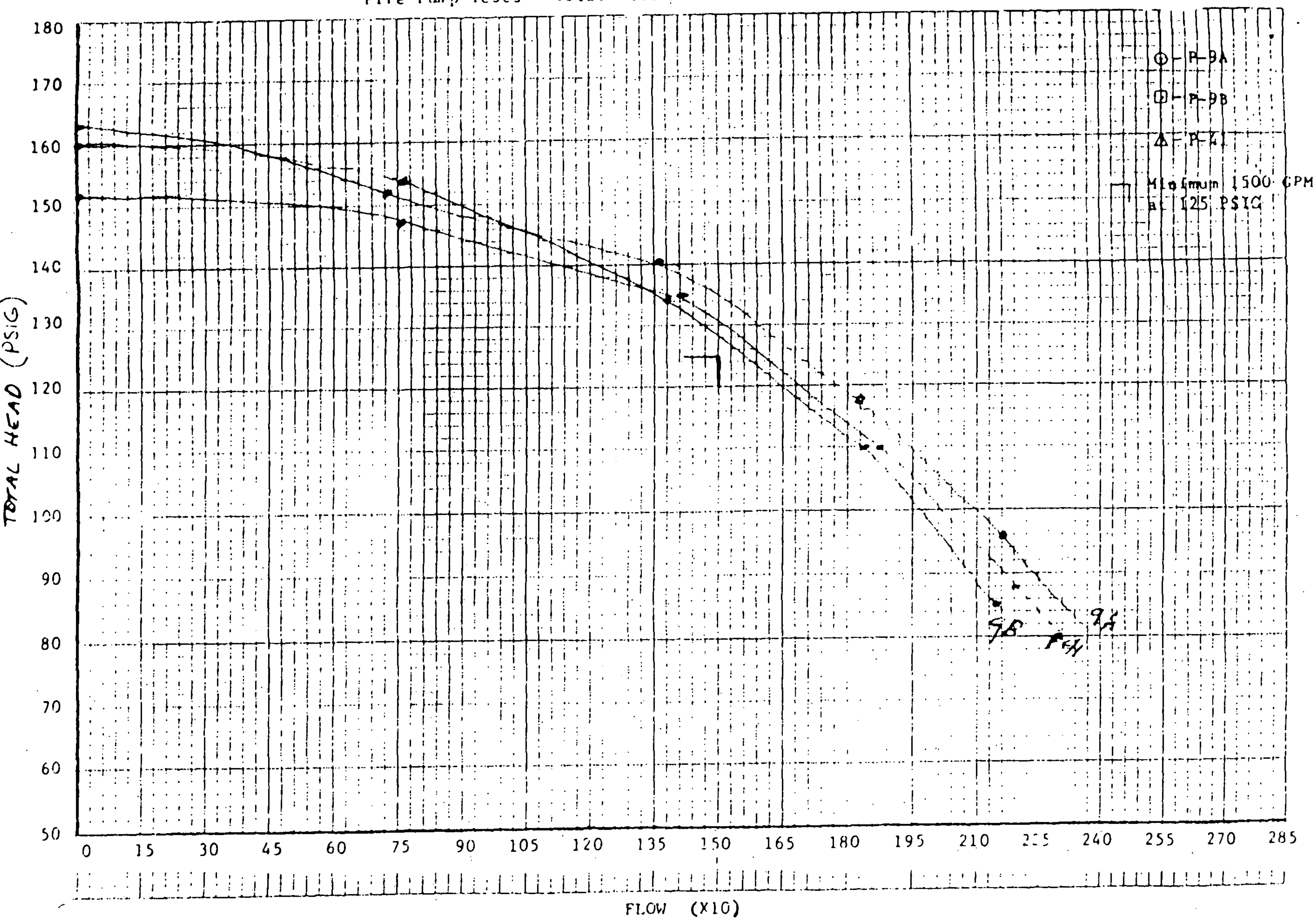
Engineering Evaluation: Pumps performed acceptably.

Completed by/Date: Eric Dorlak 4/24/88 (Property Protection Engineer)

K·E 10 X 10 TO THE INCH 7 X 10 INCHES KEUFFEL & ESSER CO.

46 0782

Fire Pump Tests - Total Head vs Flow



7 3 4 5