LTS-1000-34
Revision 1
February 14, 1984

FOR INFORMATION ONLY

FIRE PUMP FLOW TEST

Attachment 2

A. PURPOSE

The purpose of this procedure is to outline the steps necessary to verify that each pump develops at least 2500 gallons per minute (corrected to 1760 RPM) at a total head (net) discharge pressure of 135 psig (312 feet) (corrected to 1760 RPM) and 3750 gallons per minute (corrected to 1760 RPM) at a total head (net) discharge pressure of 89 psig (205 feet) (corrected to 1760 RPM) and the pumps start sequentially at a fire protection header pressure greater than or equal to 118 psig.

B. REFERENCES

1. P&ID M-71, Fire Protection.
2. LOP-DO-03, Transferring oil to thie Diesel Fire Pump Day Tanks.
3. LOP-FP-01, Fire Protection System Startup.
4. National Fire Code, Volume II, NFPA-20-1983 Chapter 11.3.
5. National Fire Code, Volume II, NFPA-20-1983 Section A-11-2.6.3.
6. Design Specification J-2530, Drawing No. FC-548 Orifice Plate Flow Calculations for Flow Element OFE-FP012.
7. Flowmeter Engineering Handbook by C.F. Cusick.
8. National Fire Code, Volume II, NFPA-20-1983, Paragraph A-4-3.5.3 Airline Method of Water Level Detection.
9. Design Specification J-2570, Dwg. No. C146458 Fire Pump (OFP01PA) characteristic curve.
10. Design Specification J-2570, Dwg. No. C146469 Fire Pump (OFP01PB) characteristic curve.
11. LST-83-259 (OA Diesel Fire Pump Operational Test).
12. LST-83-290 (OB Diesel Fire Pump Flow Test).
13. Fire Protection Handbook, the section on Hydraulics.
14. LTS-1000-12 (Fire Pump Diesel Engine Overspeed Trip Test, Automatic Start Test and Automatic Start Trips Bypass Test).
15. LTP-100-3 (Technical Staff Surveillance Routing).

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16. License NFP 18 License Condition 2.C.(15.)(c).

C. PREREQUISITES

1. The Fire Protection System is operating in accordance with LOP-FP-01, Fire Protection System Startup.

2. Obtain Shift Engineer's permission to conduct this test. After Shift Engineers permission is obtained inform the control room SCRE of the intent to run this procedure.

3. Two operators available to send to Lake Screen House.

4. When performing this procedure the Diesel Fire Pump should be operated in ("Test Only") unless specifically stated otherwise.

5. Install a precision pressure gauge (Heise) or equivalent with a range of 0-300 psig on the discharge of the Diesel Fire Pump being tested.

6. Install a precision pressure gauge (Heise) or equivalent with a range of 0-300 psig adjacent to pressure switch OPS-FP062 (OPS-FP063) that indicates fire protection water system pressures.

7. Obtain Fire Marshal permission before conducting this test.

8. A representative for the engine manufacturer, pump manufacturer, fire protection insurance organization and fire marshal should be in attendance before starting the Diesel Fire Pump. This requirement may be waived at the direction of the Corporate Fire Protection Engineer and the LaSalle Fire Marshal if documented on Attachment J.

9. Three individuals to take data and coordinate the procedure.

10. If the IRD 360 Vibration Analysis machine is to be used a Mechanical Maintenance "A" man should be available.

11. Flow element OFE-FP012 should be inspected within 3 months prior to this procedure for surface discontinuities that may prevent it from developing the correct pressure drop across it for its designed flow. Attach Work Request and inspection report to this procedure.

12. A contact Pyrometer with a temperature range of 0-300°F available to measure the Fire Pump angle drive temperature.

13. Attach a precision differential pressure gauge (Heise) or equivalent with a range of 0-300 inches of water column to indicate the differential pressure across flow element OFE-FP012 (Fire Pump Flow test orifice) if needed.

14. Examine the degraded equipment log to determine if any equipment you will be using or testing is degraded and if this degradation will have a detrimental effect on this procedure.

15. Install a bubbler similar the one described in National Fire Code, Volume II, NFPA-20-1983, Paragraph A-4-3.5.3 so that the level of water in the Diesel Fire Pump casing can be measured when the Fire Pump is operated at various flows. This device will measure draw down.

16. A precision Digistrobe to measure the RPM of the pump available.

17. The Station Fire Marshal and the Test Engineer performing this surveillance will review it entirely in detail prior to this test being performed.

D. PRECAUTIONS

1. Fire Pump Diesel Trips on High Water Temperature (200, +5°F or -10°F) or Low Lube Oil Pressure (13 ± 2 psig) only when in "test". Shut off diesel immediately if trip point is reached while performing this test.

2. Ensure that the Diesel Fire Pump has been shut down for at least 1 hour prior to checking engine coolant level if the engine has overheated.

3. Ensure that the angle drive temperature does not get above 180°F. The right angle drive temperature is controlled by throttling cooling water form the angle drive. Use a contact Pyrometer to measure the temperature.

4. Ensure that the Diesel Fire Pump you are not testing is operable and lined up to supply water to the fire protection water header with the control switch in auto.

5. The fire protection water pressure will be decreased below 118 psig for this procedure. Ensure that this will cause no problems with fire protection water protection water system and also ensure that the Service water to Fire Protection water system cross-connect valves 1FP058 and 2FP058 are open.

6. If the Fire Protection System is needed while this is being performed, stop this procedure and return the Diesel Fire Pump being tested to service supplying water to the Fire Protection water system.

7. Any significant reduction in the operating characteristics of the fire pump assembly shall be reported to the Shift Engineer and the Staion Fire Marshal so that repairs can be made immediately.

E. LIMITATIONS AND ACTIONS

1. If it is necessary to fill the Fire Pump Diesel Day Tank, do so as per LOP-DO-03. Verify HPCS Diesel 1B(2B) Fuel Oil Storage Tank Level is greater than Technical Specifications limit of 29,750 gallons (17.5 feet)(T.S.).

2. Fire Pump Diesel Day Tank Level must be kept greater than or equal to 13" (130 gallons) (T.S.).

3. Fire Pump Diesel Day Tank level must be kept greater than or equal to 24" (275 gallons) (NFPA-20-1983).

4. Diesel Fire Pump Trips automatically on:

   a. Overspeed (all modes).

   b. Low lube Oil Pressure (13 $\pm$ 2 psig) ("Test Only).

   c. High Cooling Water temperature 200°F + 5°F or -10°F ("Test Only").

5. Notify maintenance if any of the following occurs.

   a. Low Lube Oil Pressure.

   b. Low power, excessive use of fuel, oil, or coolant.

   c. Abnormal oil or water temperatures.

   d. Abnormal Right Angle drive temperature.

   e. Unusual engine noise.

   f. Excessive smoke.

   g. Any fuel, water and/or lube oil leaks.

   h. Unusual engine, angle drive, or pump vibration.

6. Maintain the Lube Oil Temperature of the angle drive between 120°F and 180°F by throttling cooling water from the right angle drive. Use a contact pyrometer to measure temperature.

7. The Fire Pump packing gland should not be hot to the touch while the pump is running. If packing becomes excessively hot discontinue this test and notify Mechanical Maintenance.

8. This test is performed at a Technical Specification interval of 18 months in accordance with reference 16 and has been accepted by NRR as meeting NFPA 20 Annual Test.

NOTE

The following procedure is written so as to guide the Test Engineer through this test. If followed correctly the data obtained should give a good indication of the operability of the Diesel Fire Pump. The locations in the procedure where additional pressure gauges, temperature gauges, and flow meters are installed, is for redundancy so that when this test is complete, the data can be double or triple verified. This is not to say that this test should not be run without the additional instruments installed, but that as long as instruments are used that are calibrated, accurate, and are within the range of the measured parameters this test can proceed.

F. PROCEDURE

1. OA Diesel Fire Pump OFP01KA/OFP01PA Flow Test.

   a. Shift Engineer's signature for notification. Signoff on Attachment A.

   b. Station Fire Marshal's signature for notification. Signoff on Attachment A.

   c. Install a precision 0-300" water column differential pressure gauge across flow element OFE-FP012. Record on Attachment A.

   d. Install a precision pressure gauge (Heise) or equivalent with a range of 0-300 psig on the discharge of the OA Diesel Fire Pump. Record on Attachment A.

   e. Install a precision pressure gauge (Heise) or equivalent with a range of 0-300 psig to the fire main header adjacent to pressure switch OPS-FP062 that indicates fire protection water system pressure. Record on Attachment A.

   f. Install six U.L. playpipes on six of the test valves on test flow manifold OFP04M and remove the tips of the playpipes. Record on Attachment A. Also measure the inside diameter of the end of the playpipe and record on Attachment G.

   g. If the IRD 360 vibration analysis machine is used, verify that it is set up adjacent to the Diesel Fire Pump and ready to operate. Record on Attachment A.

NOTE

The IRD 360 vibration analysis machine is not required for the Diesel Fire Pump Annual test unless the cognizant test engineer believes it is needed.

h. Verify 1FP058 and 2FP058 (service water to fire protection water system valves) are open and locked. Record on Attachment A.

i. Verify OFP01KB/OFP01PB (OB Diesel Fire Pump) is operational and lined up to the fire protection water system with the control valves in auto. Record on Attachment A.

j. Verify OFP01KA/OFP01PA (OA Diesel Fire Pump) control switch is off. Record on Attachment A.

k. Attach a device such as shown in NFPA-20-1983 paragraph A-4-3.5.3 to measure draw-down in suction casing of the Diesel Fire Pump. Sign-off on Attachment A.

l. Verify OFP002A (OA Diesel Fire Pump) discharge valve is open. Signoff on Attachment A.

m. Verify OFP068A (OA Diesel Fire Pump discharge to flow test manifold) is closed and unlocked. Signoff on Attachment A.

n. Verify OFP068B (OB Diesel Fire Pump discharge to flow test manifold) is closed and locked. Signoff on Attachment A.

o. Verify OFP052A (OA Diesel Fire Pump discharge to water tunnel) is closed and unlocked. Signoff on Attachment A.

p. Verify all valves from test flow header OFP04M that sprays water into the intake flume for a flow test are closed with caps removed. Signoff on Attachment A.

q. Verify OFP050 drain valve for test manifold OFP04M is closed. Signoff on Attachment A.

r. Open one of the valves on test flow manifold OFP04M that sprays water into the intake flume half open. Signoff on Attachment A.

s. Open valve OFP143 (fire pump discharge to flow test manifold OFP04M). Signoff on Attachment A.

CAUTION

After starting the Diesel Fire Pump verify that the temperatures, pressures, noise, and vibration of the engine, angle drive, and pump stay within their prescribed parameters as mentioned in (Precautions and Limitations) of this procedure.

t. Verify the following before starting the OA Diesel Fire Pump. Record on Attachment A.

1) verify engine oil level is at upper mark on dipstick.

2) Verify water jacket heater is working by placing a hand on the Kim hot start and noting it is warm.

3) Check engine coolant by removing the jacket water fill cap and visually observing water level is between half a tank and two inches below full tank. If low add the appropriate amount of antifreeze and demineralized water mixture.

4) Verify oil level in the right angle drive gear case is within ± 1/2 inch of the "oil level" line.

5) Verify the following for the OA Diesel Fire Pump batteries.

a) Electrolyte level in the batteries is above the plates.

b) Battery charger is operating by verifying the blue pilot lights on the Diesel Control Cabinet are lit.

6) Verify the OA Diesel Fire Pump Day Tank Level is greater than 13" (130 gal) (T.S.).

7) Verify the OA Diesel Fire Pump Day Tank Level is greater than 24" (275 gal) (NFPA-20-1983 Paragraph 8-6.4).

NOTE

After the OA Diesel Fire Pump starts and every 15 minutes thereafter until the test is complete record the lube oil pressure, jacket water temperature, charging amperes, engine RPM, hour meter reading before and after the test.

u. Record hour meter reading on engine before engine is started, and record lube oil pressure, jacket water temperature, charging amperes, engine RPM, and excessive vibration every 15 minutes the OA Diesel Fire Pump is run. Record on Attachment C. Also record bubbler pressure on draw-down device and lake level before start of test on Attachment E.

v. Verify that OFP01KA/OFP01PA (OA Diesel Fire Pump) control switch is in auto. Record on Attachment A.

w. Verify that OFP01KB/OFP01PB (OB Diesel Fire Pump) control switch is off. Record on Attachment A.

x. Slowly open OFP052A (OA Diesel Fire Pump) drain to the water tunnel until the fire protection water pressure starts to drop on the 0-300 psig pressure gauge connected adjacent to pressure switch OPS-FP062 (OA Diesel Fire Pump pressure start switch). When the OA Diesel Fire Pump starts record this pressure on Attachment A.

y. Close and lock OFP052A (OA Diesel Fire Pump drain to the water tunnel). Record on Attachment A.

z. Rotate OFP01KA/OFP01PA (OA Diesel Fire Pump) control switch to test. Record on Attachment A.

aa. Rotate OFP01KB/OFP01PB (OB Diesel Fire Pump) control switch to auto. Record on Attachment A.

ab. Close OFP002A (OA Diesel Fire Pump) discharge valve. Record on Attachment A.

ac. Slowly open OFP068A (OA Diesel Fire Pump discharge to test manifold OFP04M). Record on Attachment A.

NOTE

After the flow of water indicated on OFI-FP012 (Fire Protection test manifold water flow indicator) stabilizes and the diesel engine is operating at its normal temperatures and pressures commence the flow test.

ad. Close all hose cut out valves on OFP04M (flow test manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

ae. Open one hose cut out valve on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differeintal pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

af. Open a total of <u>two</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

ag. Open and/or throttle a total of <u>three</u> hose cut out valves on OFP04M (test flow manifold) to obtain a flow of 2500 GPM and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

ah. Open a total of <u>four</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

ai. Open a total of <u>five</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

aj. Open and/or throttle a total of <u>six</u> hose cut out valves on OFP04M (test flow manifold) to obtain a flow of 3750 GPM and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

ak. Open a total of <u>six</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OA DFP OA DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OA DFP relief valve is open (passing water). Record on Attachment E.

al. Close all hose cut out valves except one which is 1/2 open on OFP04M (test flow manifold) and allow OA DFP to operate for 10 minutes and/or until the jacket water temperature stabilizes. Record on Attachment A.

am. Stop OA Diesel Fire Pump by turning control switch to off. Record on Attachment A.

an. Open OFP052A (OA Diesel Fire Pump drain to water tunnel). Record on Attachment A.

ao. Open OFP050 (test flow manifold drain valve). Record on Attachment A.

NOTE

Do not close OFP050 (test flow manifold drain valve) and OFP052A (OA Diesel Fire Pump drain to water tunnel) until all the water has drained from the Diesel Fire Pump Flow test pipe.

ap. Close and lock OFP052A (OA Diesel Fire Pump drain to water tunnel). Record on Attachment A.

aq. Close and lock OFP068A (OA Diesel Fire Pump discharge to flow test manifold). Record on Attachment A.

ar. Close and lock OFP143 (Diesel Fire Pump discharge valve to flow test header). Record on Attachment A.

as. Close OFP050 (Diesel Fire Pump test manifold drain valve). Record on Attachment A.

at. Close and reinstall the caps on all the hose cut out valves on flow test manifold OFP04M. Record on Attachment A.

CAUTION

Open OFP002A (OA Diesel Fire Pump discharge valve) slowly, because if it is opened quickly the OB Diesel Fire Pump will autostart.

au. Slowly open and lock OFP002A (OA Diesel Fire Pump discharge valve). Record on Attachment A.

av. Remove the following equipment from OA Diesel Fire Pump before returning the OA Diesel Fire Pump to service. Record on Attachment A.

1) Bubbler installed in the OA Diesel Fire Pump suction casing.

2) IRD 360 vibration analysis machine if used.

NOTE

The following equipment should be removed from the Lake Screen House at the earliest convenience, but does not have to be removed to declare the OA Diesel Fire Operable.

1. **0-300 psig precision pressure gauge attached to the discharger of OA Diesel Fire Pump.**

2. **0-300 psig precision pressure gauge that indicated Fire Protection header pressure attached next to pressure switch OPS-FP062.**

3. 0-300" Water Column differential pressure gauge attached across Flow Element OFE-FP012.

4. U.L. listed playpipes installed on test flow manifold OFP04M.

aw. Place control switch for OA Diesel Fire Pump in auto. Record on Attachment A.

ax. Utilizing Attachment I, list all the instruments, pressure gauges, temperature gauges, or any other device used to measure a parameter in this test. Record on Attachment A.

ay. Utilizing Attachment J, list the name, title, and the organization represented of each individual who observed this test. Record on Attachment A.

az. **Utilizing Attachment E, fill in the Attachment G. If help is** needed in determining how to do this utilize reference 5 and 13. Record on Attachment A.

ba. Utilizing a completed Attachment G, (OA Diesel Fire Pump uncorrected pressure versus flow data) correct this data to a pump speed of 1760 RPM and plot the data for the Diesel Fire Pump on its corresponding factory characteristic pump curve reference 9. Also on these same factory characteristic curves plot the corrected pressure versus flow data from reference 11 (OA Diesel Fire Pump previous pump tests) and compare the two sets of data. If any significant differences appear between this procedure's test data and the previous LTS-1000-34 test data or LST-83-259 (OA Diesel Fire Pump Operational Test) test data or this procedure's test results exceed the limits as stated in the Purpose section of this procedure, contact the Technical Staff Supervisor, Station Fire Marshal, Station Superintendent, and/or Station Nuclear Engineering Department for guidance on the operability of the Diesel Fire Pumps. Record on Attachment A.

NOTE

When evaluating this data be aware that the relief valve was installed for this test. The installed relief valve will modify the pump characteristic curve at the low flow end of the curve but will not have a detrimental effect on its operation provided that the pump flow to the test manifold is not adversely affected below a pump discharge pressure of 160 psig. This includes the effects of a flow control valve if installed.

bb. **Verify that LTS-1000-12 has been performed no more than 30 days before this test and include a copy of that data with this procedure. Record on Attachment A.**

bc. Verify that flow element OFE-FP012 has been inspected no more than 60 days prior to this test for surface discontinuities. Record on Attachment A.

bd. Record OA Diesel Fire Pump engine serial number and pump serial number on Attachment C.

be. Route all completed Attachments and supplemental data in accordance with LTP-100-3.

2. OB Diesel Fire Pump OFP01KB/OFP01PB Flow Test.

a. Shift Engineer's signature for notification. Signoff on Attachment B.

b. **Station Fire Marshal's signature for notification. Signoff on** Attachment B.

c. Install a precision 0-300" water column differential pressure gauge across flow element OFE-FP012. Record on Attachment B.

d. **Install a precision pressure gauge (Heise) or equivalent with a range of 0-300 psig on the discharge of the OB Diesel Fire Pump. Record on Attachment B.**

e. **Install a precision pressure gauge (Heise) or equivalent with a range of 0-300 psig to the fire main header adjacent to pressure switch OPS-FP063 that indicates fire protection water system pressure. Record on Attachment B.**

f. **Install six U.L. playpipes on six of the test valves on test flow manifold OFP04M and remove the tips of the playpipes. Record on Attachment B. Also measure the inside diameter of the end of the playpipe and record on Attachment H.**

g. If the IRD 360 vibration analysis machine is used, verify that it is set up adjacent to the Diesel Fire Pump and ready to operate. Record on Attachment B.

NOTE

The IRD 360 vibration analysis machine is not required for the Diesel Fire Pump Annual Test unless the cognizant test engineer believes it is needed.

h. Verify 1FP058 and 2FP058 (service water to fire protection water system valves) are open and locked. Record on Attachment B.

i. Verify OFP01KA/OFP01PA (OA Diesel Fire Pump) is operational and lined up to the fire protection water system with the control valves in auto. Record on Attachment B.

j. Verify OFP01KB/OFP01PB (OB Diesel Fire Pump) control switch is off. Record on Attachment B.

k. Attach a device such as shown in NFPA-20-1983 paragraph A-4-3.5.3 to measure draw-down in suction casing of the Diesel Fire Pump. Sign-off on Attachment B.

l. Verify OFP002B (OB Diesel Fire Pump) discharge valve is open. Signoff on Attachment B.

m. Verify OFP068B (OB Diesel Fire Pump discharge to flow test manifold) is closed and unlocked. Signoff on Attachment B.

n. Verify OFP068A (OA Diesel Fire Pump discharge to flow test manifold) is closed and locked. Signoff on Attachment B.

o. Verify OFP052B (OB Diesel Fire Pump discharge to water tunnel) is closed and unlocked. Signoff on Attachment B.

p. Verify all valves from test flow header OFP04M that sprays water into the intake flume for a flow test are closed with caps removed. Signoff on Attachment B.

q. Verify OFP050 drain valve for test manifold OFP04M is closed. Signoff on Attachment B.

r. Open one of the valves on test flow manifold OFP04M that sprays water into the intake flume half open. Signoff on Attachment B.

s. Open valve OFP143 (Fire Pump discharge to flow test manifold OFP09M). Signoff on Attachment B.

CAUTION

After starting the Diesel Fire Pump verify that the temperatures, pressures, noise, and vibration of the engine, angle drive, and pump stay within their prescribed parameters as mentioned in (Precautions and Limitations) of this procedure.

t. Verify the following before starting the OB Diesel Fire Pump. Record on Attachment B.

1) verify engine oil level is at upper mark on dipstick.

2) Verify water jacket heater is working by placing a hand on the Kim hot start and noting it is warm.

3) Check engine coolant by removing the jacket water fill cap and visually observing water level is between half a tank and two inches below full tank. If low add the appropriate amount of antifreeze and demineralized water mixture.

4) Verify oil level in the right angle drive gear case is within ± 1/2 inch of the "oil level" line.

5) Verify the following for the OB Diesel Fire Pump batteries.

a) Electrolyte level in the batteries is above the plates.

b) Battery charger is operating by verifying the blue pilot lights on the Diesel Control Cabinet are lit.

6) Verify the OB Diesel Fire Pump Day Tank Level is greater than 13" (130 gal) (T.S.).

7) Verify the OB Diesel Fire Pump Day Tank Level is greater than 24" (275 gal) NFPA-20-1983 Paragraph 8-6.4.

NOTE

After the OB Diesel Fire Pump starts and every 15 minutes thereafter until the test is complete record the lube oil pressure, jacket water temperature, charging amperes, engine RPM, hour meter reading before and after the test.

u. Record hour meter reading on engine before engine is started, and record lube oil pressure, jacket water temperature, charging amperes, engine RPM, and excessive vibration every 15 minutes the OB Diesel Fire Pump is run. Record on Attachment D. Also record bubbler pressure on draw-down device and lake level before start of test on Attachment F.

v. Verify that OFP01KB/OFP01PB (OB Diesel Fire Pump) control switch is in auto. Record on Attachment B.

w. Verify that OFP01KA/OFP01PA (OA Diesel Fire Pump) control switch is off. Record on Attachment B.

x. Slowly open OFP052B (OB Diesel Fire Pump drain to the water tunnel) until the fire protection water pressure starts to drop on the 0-300 psig pressure gauge connected adjacent to pressure switch OPS-FP063 (OB Diesel Fire Pump pressure start switch). When the OB Diesel Fire Pump starts record this pressure on Attachment B.

y. Close and lock OFP052B (OB Diesel Fire Pump drain to the water tunnel). Record on Attachment B.

z. Rotate OFP01KB/OFP01PB (OB Diesel Fire Pump) control switch to test. Record on Attachment B.

aa. Rotate OFP01KA/OFP01PA (OA Diesel Fire Pump) control switch to auto. Record on Attachment B.

ab. Close OFP002B (OB Diesel Fire Pump) discharge valve. Record on Attachment B.

ac. Slowly open OFP068B (OB Diesel Fire Pump discharge to test manifold OFP04M). Record on Attachment B.

NOTE

After the flow of water indicated on OFI-FP012 (Fire Protection test manifold water flow indicator) stabilizes and the diesel engine is operating at its normal temperatures and pressures commence the flow test.

ad. Close all hose cut out valves on OFP04M (flow test manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F.

ae. Open one nose cut out valve on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differeintal pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F.

af. Open a total of <u>two</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F.

ag. Open and/or throttle a total of <u>three</u> hose cut out valves on OFP04M (test flow manifold) to obtain a flow of 2500 GPM and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F.

ah. Open a total of <u>four</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F.

ai. Open a total of <u>five</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F.

aj. Open and/or throttle a total of <u>six</u> hose cut out valves on OFP04M (test flow manifold) to obtain a flow of 3750 GPM and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F

ak. Open a total of <u>six</u> hose cut out valves on OFP04M (test flow manifold) and record pitot pressures, number of playpipes used, differential pressure across flow element OFE-FP012, indicated flow on flow indicator OFI-FP012, OB DFP discharge pressure, pump RPM, bubbler pressure on draw-down device, OB DFP relief valve is open (passing water). Record on Attachment F.

al. Close all hose cut out valves except one which is 1/2 open on OFP04M (test flow manifold) and allow OB DFP to operate for 10 minutes and/or until the jacket water temperature stabilizes. Record on Attachment B.

am. Stop OB Diesel Fire Pump by turning control switch to off. Record on Attachment B.

an. Open OFP052B (OB Diesel Fire Pump drain to water tunnel). Record on Attachment B.

ao. Open OFP050 (test flow manifold drain valve). Record on Attachment B.

NOTE

Do not close OFP050 (test flow manifold drain valve) and OFP052B (OB Diesel Fire Pump drain to water tunnel) until all the water has drained from the Diesel Fire Pump Flow test pipe.

ap. Close and lock OFP052B (OB Diesel Fire Pump drain to water tunnel). Record on Attachment B.

aq. Close and lock OFP068B (OB Diesel Fire Pump discharge to flow test manifold). Record on Attachment B.

ar. Close and lock OFP143 (Diesel Fire Pump discharge valve to flow test header). Record on Attachment B.

as. Close OFP050 (Diesel Fire Pump test manifold drain valve). Record on Attachment B.

at. Close and reinstall the caps on all the hose cut out valves on flow test manifold OFP04M. Record on Attachment B.

CAUTION

Open OFP002B (Diesel Fire Pump discharge valve) slowly, because if it is opened quickly the OA Diesel Fire Pump will autostart.

au. Slowly open and lock OFP002B (OB Diesel Fire Pump discharge valve). Record on Attachment B.

av. Remove the following equipment from OB Diesel Fire Pump before returning the OB Diesel Fire Pump to service. Record on Attachment B.

1) Bubbler installed in the OB Diesel Fire Pump suction casing.

2) IRD 360 vibration analysis machine if used.

NOTE

The following equipment should be removed from the Lake Screen House at the earliest convenience, but does not have to be removed to declare the OB Diesel Fire Operable.

1. 0-300 psig precision pressure gauge attached to the discharger of OB Diesel Fire Pump.

2. 0-300 psig precision pressure gauge that indicated Fire Protection header pressure attached next to pressure switch OPS-FP063.

3. 0-300" Water Column differential pressure gauge attached across Flow Element OFE-FP012.

4. U.L. listed playpipes installed on test flow manifold OFP04M.

aw. Place control switch for OB Diesel Fire Pump in auto. Record on Attachment B.

ax. Utilizing Attachment I, list all the instruments, pressure gauges, temperature gauges, or any other device used to measure a parmeterr in this test. Record on Attachment B.

ay. Utilizing Attachment J, list the name, title, and the organization represented of each individual who observed this test. Record on Attachment B.

az. Utilizing Attachment F, fill in the Attachment H. If help is needed in determining how to do this utilize reference 5 and 13. Record on Attachment B.

ba. Utilizing a completed Attachment H, (OB Diesel Fire Pump uncorrected pressure versus flow data) correct this data to a pump speed of 1760 RPM and plot the data for each Diesel Fire Pump on its corresponding factory characteristic pump curve reference 10. Also on these same factory characteristic curves plot the corrected pressure versus flow data from reference 12 (OB Diesel Fire Pump previous pump tests) and compare the two sets of data. If any significant differences appear between this procedure's test data and the previous LTS-1000-34 data or LST-83-290 (OA Diesel Fire Pump Operational Test) data or this procedure's test results exceed the limits as stated in the Purpose section of this procedure, contact the Technical Staff Supervisor, Station Fire Marshal, Station Superintendent, and/or Station Nuclear Engineering Department for guidance on the operability of the Diesel Fire Pumps. Record on Attachment B.

NOTE

When evaluating this data be aware that the relief valve was installed for this test. The installed relief valve will modify the pump characteristic curve at the low flow end of the curve but will not have a detrimental effect on its operation provided that the pump flow to the test manifold is not adversely affected below a pump discharge pressure of 160 psig. This includes the affects of a flow control valve if installed.

bb. Verify that LTS-1000-12 has been performed no more than 30 days before this test and include a copy of that data with this procedure. Record on Attachment B.

bc. Verify that flow element OFE-FP012 has been inspected no more than 60 days prior to this test for surface discontinuities and correct installation. Record on Attachment B.

bd. Record OB Diesel Fire Pump engine serial number and pump serial number on Attachment D.

be. Route this procedure through the Technical Staff Supervisor per LTP-100-3.

G. CHECKLISTS

1. None.

H. TECHNICAL SPEFICATION REFERENCES

1. 4.7.5.1.1.

ATTACHMENT A

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.1.a.	Shift Engineer's Signature for Notification	S.E.		
F.1.b.	Station Fire Marshal's Signature for Notification	S.F.M.		
F.1.c.	Install a 0-300" W.C. Diff. Press. Gauge across flow element OFE-FP012	Installed		
F.1.d.	Install a 0-300 psig pressure gauge on the discharge of OA Diesel Fire Pump	Installed		
F.1.e.	Install a 0-300 psig pressure gauge adjacent to pressure switch OPS-FP062 to measure the fire protection water pressure	Installed		
F.1.f.	Install six U.L. play pipes with tips removed on manifold OFP04M	Installed		
F.1.g.	Install IRD 360 vibration analysis machine if used	Installed		
F.1.h.	Open and Lock 1FP058 and 2FP058 (S.W. to F.P. cross-connect valves	Open & Locked		/ /

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.1.i.	Verify OB Diesel Fire pump is operable and lined up to the Fire Protection water system	Operable		
F.1.j.	OA Diesel Fire Pump control switch to off	Off		
F.1.k.	Attach bubbler device to OA Diesel Fire Pump Suction casing	Attached		
F.1.l.	OFP002A (OA Diesel Fire Pump) discharge valve open	Open		/ /
F.1.m.	OFP068A (OA Diesel Fire Pump discharge to test flow manifold) is closed & unlocked	Closed & Unlocked		/ /
F.1.n.	OFP068B (OB Diesel Fire Pump discharge to test flow manifold) is closed & locked	Closed & Locked		/ /
F.1.o.	OFF052A (OA Diesel Fire Pump discharge to water tunnel) is closed & unlocked	Closed & Unlocked		/ /
F.1.p.	All valves (that spray water into the intake flume) from test flow header OFF04M are closed	Closed		
F.1.q.	OFP050 (drain valve for test manifold OFP04M) closed	Closed		

ATTACHMENT A

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.1.r.	Half open one of the valves on test flow manifold OFP04M (that sprays into the intake flume)	Half Open		
F.1.s.	Open OFP143 (Fire pump discharge to test flow manifold OFP04M)	Open		/ /
F.1.t.1)	Engine lube oil level, Diesel Fire Pump OFP01KA	Above midway between L&H		
F.1.t.2)	Engine Water Jacket heater, Diesel Fire Pump OFP01KA	Warm		
F.1.t.3)	Engine Coolant Level, Diesel Fire Pump OFP01KA	Between 1/2 tank and 2" below full tank		
F.1.t.4)	Right Angle Gear Drive Oil Level, Diesel Fire Pump OFP01KA	± 1/2" at "oil level" mark		
F.1.t.5.a	Battery Electrolyte Level, Diesel Fire Pump OFP01KA	Above plates		
F.1.t.5.b	Battery charger operable, Diesel Fire Pump OFP01KA	Blue Pilot Light On		
F.1.t.6)	Diesel Day Tank Level, Diesel Fire Pump OFP01KA	13" (≥ 130 gal.)(T.S.)		

ATTACHMENT A

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PROCEDURE SIGN-OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.1.t.7)	Diesel Day Tank Level, Diesel Fire Pump OFP01KA	≥ 24" (≥ 275 gal.) (NFPA-20-1983, Para 8-64)		
F.1.v.	Control Switch in Auto, Diesel Fire Pump OFP01KA	Auto		
F.1.w.	Control Switch in Off, Diesel Fire Pump OFP01KB	Off		
F.1.x.	Slowly Open OFP052A (OA Diesel Fire Pump drain to water tunnel) until engine auto starts	Slowly Open		
	Fire protection water pressure at which the OA Diesel Fire Pump starts	≥ 118 psig		
F.1.y.	Close and lock OFP052A (OA Diesel Fire Pump drain to water tunnel)	Closed & Locked		/ /
F.1.z.	Control Switch to test, Diesel Fire Pump OFP01KA	Test		
F.1.aa.	Control Switch to Auto, Diesel Fire Pump OFP01KB	Auto		
F.1.ab.	Close OFP002A (OA Diesel Fire Pump Discharge Valve)	Close		

ATTACHMENT A

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.1.ac.	Slowly open OFP068A (OA Diesel Fire Pump Discharge to test (manifold)	Open		
F.1.al.	Close all hose cut out valves except one which is one half open on OFP04M	One Valve 1/2 Open All Other Valves Closed		
	Operate OFP01KA (OA Diesel Fire Pump) for 10 minutes and/or until the jacket water temperature stabilizes	Operate for 10 minutes and/or water temp stabilizes		
F.1.am.	Stop OFP01KA (OA Diesel Fire Pump) by turning control switch to off	Off		
F.1.an.	Open OFP052A (OA Diesel Fire Drain to water tunnel)	Open		/ /
F.1.ao.	Open OFP050 (Test Flow Manifold Drain Valve)	Open		/ /
F.1.ap.	Close and Lock OFP052A (OA Diesel Fire Pump Drain to water tunnel)	Close & Lock		/ /

ATTACHMENT A

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PROCEDURE SIGN-OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.1.aq.	Close and Lock OFP068A (OA Diesel Fire Pump Discharge to flow test manifold)	Close & Lock		/ /
F.1.ar.	Close and Lock OFP143 (Fire Pump Discharge Valve to test manifold)	Close & Lock		/ /
F.1.as.	Close OFP050 (Fire Pump Test Manifold Drain Valve)	Close		/ /
F.1.at.	Close and reinstall the caps on all the hose cutout valves on flow test manifold OFP04M	Close & Cap		/ /
F.1.au.	Slowly open and lock OFP002A (OA Diesel Fire Pump Discharge Valve)	Open & Lock		/ /
F.1.av.	Remove bubbler installed in the OFP01PA (OA Diesel Fire Pump) and IRD 360 Vibration Analysis machine if used	Removed		/ /
F.1.aw.	Control Switch in Auto (OA Diesel Fire Pump)	Auto		
F.1.ax.	Complete Attachment I	Complete		
F.1.ay.	Complete Attachment J	Complete		

ATTACHMENT A

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PROCEDURE SIGN-OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.1.az.	Complete Attachment G	Complete		
F.1.ba.	Compare the pressure verse flow data (corrected to 1760 RPM) of OA Diesel Fire Pump (OFP01PA) to the pressure verse flow data (corrected to 1760 RPM) of LST-83-259 on the original manufacturers' characteristic curves of pump (OFP01PA) to determine if there is significant differences between this test's test data and LST-83-259 test data.	No Significant Difference		
	Compare this test's test data to the limits stated in the purpose at this procedure and determine that these limits are not exceeded.	Limits Not Exceeded		
F.1.bb.	LTS-1000-12 has been performed on OA Diesel Fire Pump (OFP01KA/OFP01PA) no more than 30 days prior to this test and is included with these test results.	Completed & Included		
F.1.bc.	Flow element OFE-FP012 is inspected no more than 60 days prior to this test and results included with these test results.	Completed & Included		

ATTACHMENT B

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.2.a.	Shift Engineer's Signature for Notification	S.E.		
F.2.b.	Station Fire Marshal's Signature for Notification	S.F.M.		
F.2.c.	Install a 0-300" W.C. Diff. Press. Gauge across flow element OFE-FP012	Installed		
F.2.d.	Install a 0-300 psig pressure gauge on the discharge of OB Diesel Fire Pump	Installed		
F.2.e.	Install a 0-300 psig pressure gauge adjacent to pressure switch OPS-FP063 to measure the fire protection water pressure	Installed		
F.2.f.	Install six U.L. play pipes with tips removed on manifold OFP04M	Installed		
F.2.g.	Install IRD 360 vibration analysis machine if used	Installed		
F.2.h.	Open and Lock 1FP058 and 2FP058 (S.W. to F.P. cross-connect valves)	Open & Locked		/ /
F.2.i.	Verify OA Diesel Fire Pump is operable and lined up to the Fire Protection Water System	Operable		

ATTACHMENT B

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.2.j.	OB Diesel Fire Pump control switch to off	Off		
F.2.k.	Attach bubbler device to OB Diesel Fire Pump Suction casing	Attached		
F.2.l.	OFP002B (OB Diesel Fire Pump) discharge valve open	Open		/ /
F.2.m.	OFP068B (OB Diesel Fire Pump discharge to test flow manifold) is closed & unlocked	Closed & Unlocked		/ /
F.2.n.	OFP068A (OB Diesel Fire Pump discharge to test flow manifold) is closed & locked	Closed & Locked		/ /
F.2.o.	OFP052B (OB Diesel Fire Pump discharge to water tunnel) is closed & unlocked	Closed & Unlocked		/ /
F.2.p.	All valves (that spray water into the intake flume) from test flow header OFP04M are closed	Closed		
F.2.q.	OFP050 (drain valve for test manifold OFP04M) closed	Closed		

ATTACHMENT B

DIESEL FIRE PUMP OR
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.2.r.	Half open one of the valves on test flow manifold OFP04M (that sprays into the intake flume)	Half Open		
F.2.s.	Open OFP143 (Fire pump discharge to test flow manifold OFP04M)	Open		/ /
F.2.t.1)	Engine lube oil level, Diesel Fire Pump OFP01KB	Above midway between L&H		
F.2.t.2)	Engine Water Jacket heater, Diesel Fire Pump OFP01KB	Warm		
F.2.t.3)	Engine Coolant Level, Diesel Fire Pump OFP01KB	Between 1/2 tank and 2" below full tank		
F.2.t.4)	Right Angle Gear Drive Oil Level, Diesel Fire Pump OFP01KB	± 1/2" at "oil level" mark		
F.2.t.5.a	Battery Electrolyte Level, Diesel Fire Pump OFP01KB	Above plates		
F.2.t.5.b	Battery charger operable, Diesel Fire Pump OFP01KB	Blue Pilot Light On		
F.2.t.6)	Diesel Day Tank Level, Diesel Fire Pump OFP01KB	13" (≥ 130 gal.)(T.S.)		

ATTACHMENT B

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PROCEDURE SIGN-OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.2.t.7)	Diesel Day Tank Level, Diesel Fire Pump OFP01KB	≥ 24" (≥ 275 gal.) (NFPA-20-1983, Para 8-64)		
F.2.v.	Control Switch in Auto, Diesel Fire Pump OFP01KB	Auto		
F.2.w.	Control Switch in Off, Diesel Fire Pump OFP01KA	Off		
F.2.x.	Slowly Open OFP052B (OB Diesel Fire Pump drain to water tunnel) until engine auto starts	Slowly Open		
	Fire protection water pressure at which the OB Diesel Fire Pump starts	≥ 118 psig		
F.2.y.	Close and lock OFP052B (OB Diesel Fire Pump drain to water tunnel)	Closed & Locked		/ /
F.2.z.	Control Switch to test, Diesel Fire Pump OFP01KB	Test		
F.2.aa.	Control Switch to Auto, Diesel Fire Pump OFP01KA	Auto		
F.2.ab.	Close OFP002B (OB Diesel Fire Pump Discharge Valve)	Close		

ATTACHMENT B

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PROCEDURE SIGN-OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.2.ac.	Slowly open OFP068B (OB Diesel Fire Pump Discharge to test (manifold)	Open		
F.2.al.	Close all hose cut out valves except one which is one-half open on OFP04M	One Valve 1/2 Open All Other Valves Closed		
	Operate OFP01KB (OB Diesel Fire Pump) for 10 minutes and/or until the jacket water temperature stabilizes	Operate for 10 minutes and/or water temp stabilizes		
F.2.am.	Stop OFP01KB (OB Diesel Fire Pump) by turning control switch to off	Off		
F.2.an.	Open OFP052B (OB Diesel Fire Drain to water tunnel)	Open		/ /
F.2.ao.	Open OFP050 (Test Flow Manifold Drain Valve)	Open		/ /
F.2.ap.	Close and Lock OFP052B (OB Diesel Fire Pump Drain to water tunnel)	Close & Lock		/ /

ATTACHMENT B

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PROCEDURE SIGN-OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.2.aq.	Close and Lock OFP068B (OB Diesel Fire Pump Discharge to flow test manifold)	Close & Lock		/ /
F.2.ar.	Close and Lock OFP143 (Fire Pump Discharge Valve to test manifold)	Close & Lock		/ /
F.2.as.	Close OFP050 (Fire Pump Test Manifold Drain Valve)	Close		/ /
F.2.at.	Close and reinstall the caps on all the hose cutout valves on flow test manifold OFP04M	Close & Cap		/ /
F.2.au.	Slowly open and lock OFP002B (OB Diesel Fire Pump Discharge Valve)	Open & Lock		/ /
F.2.av.	Remove bubbler installed in the OFP01PB (OB Diesel Fire Pump) and IRD 360 Vibration Analysis machine if used	Removed		/ /
F.2.aw.	Control Switch in Auto (OB Diesel Fire Pump)	Auto		
F.2.ax.	Complete Attachment I	Complete		
F.2.ay.	Complete Attachment J	Complete		

ATTACHMENT H

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PROCEDURE SIGN OFF

PARAGRAPH NUMBER	DESCRIPTIONS AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIALS & DATE
F.2.az.	Complete Attachment G	Complete		
F.2.ba.	Compare the pressure verse flow data (corrected to 1760 RPM) of OB Diesel Fire Pump (OFP01PB) to the pressure verse flow data (corrected to 1760 RPM) of LST-83-290 on the original manufacturers' characteristic curves of pump (OFP01PB) to determine if there is significant differences between this test's test data and LST-83-290 test data.	No Significant Difference		
	Compare this test's test data to the limits stated in the purpose at this procedure and determine that these limits are not exceeded.	Limits Not Exceeded		
F.2.bb.	LTS-1000-12 has been performed on OB Diesel Fire Pump (OFP01KB/OFP01PB) no more than 30 days prior to this test and is included with these test results.	Completed & Included		
F.2.bc.	Flow element OFE-FP012 is inspected no more than 60 days prior to this test and the results are included with these test results.	Completed & Included		

ATTACHMENT C

LTS-1002-34
Revision 1
February 14, 1984
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DIESEL FIRE PUMP OA
FIRE PROTECTION FLOW TEST
ENGINE LOG

Data Record By _____/_____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITS	REQUIRED VALUE	OBSERVED VALUE	INITIAL
F.1.u.	Hour meter at start	N/A		
F.1.u	Reading to be taken at 15 minute Intervals when engine is running	N/A	15 30 45 1 hr 15 30 45 2 hr 15 30 45 3 hr	
	Lube oil pressure	38-85 psig		
	Jacket water temperature	165 - 195°F		
	Charging Amp	1+ to 15+		
	Engine RPM	≥ 2000		
	Diesel or pump vibration	None excessive		
	Angle drive Temperature	≤ 180°F		
	Hour meter at end of test	N/A		

Engine Serial No. _____ Pump Serial No. _____

DIESEL FIRE PUMP OB
FIRE PROTECTION FLOW TEST
ENGINE LOG

Data Record By _____/

PARAGRAPH NUMBER	DESCRIPTION AND LIMITS	REQUIRED VALUE	OBSERVED VALUE												INITIAL
F.2.u.	Hour meter at start	N/A													
F.2.u	Reading to be taken at 15 minute Intervals when engine is running	N/A	15	30	45	1 hr	15	30	45	2 hr	15	30	45	3 hr	
	Lube oil pressure	38-85 psig													
	Jacket water temperature	165 - 195°F													
	Charging Amp	1+ to 15+													
	Engine RPM	≥ 2000													
	Diesel or pump vibration	None excessive													
	Angle drive Temperature	≤ 180°F													
	Hour meter at end of test	N/A													

Engine Serial No. _____ Pump Serial No. _____

ATTACHMENT E

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
PRESSURE & SPEED DATA

Data Recorded by _____/_____

PARA NUMBER

F.1.u Bubbler pressure before start of OA Diesel Fire Pump Engine _____

F.1.u. Lake Level at time of test _____

PARAGRAPH NUMBER	PUMP RPM	(PSIG) DISCH PRESS	See Attach. K (feet) DRAW DOWN	BUBBLER PRESSURE	RELIEF VALVE PASSING WATER YES OR NO
F.1.ad					
F.1.ae					
F.1.af					
F.1.ag					
F.1.ah					
F.1.ai					
F.1.aj					
F.1.ak					

ATTACHMENT E

DIESEL FIRE PUMP OA
FIRE PUMP FLOW TEST
FLOW METER DATA

Data Recorded by _____/_____

PARAGRAPH NUMBER	(inch w.c.) FLOW METER Δ P OFE-FP012	See Attach. K (GPM) CALCULATED FLOW	(GPM) FLOW METER OFI-FP012
F.1.ad			
F.1.ae			
F.1.af			
F.1.ag			
F.1.ah			
F.1.ai			
F.1.aj			
F.1.ak			

ATTACHMENT F

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PLAY PIPE DATA

Data Recorded by _____/_____

PARAGRAPH NUMBER	DIA. OF PLAY PIPES	# OF PLAY PIPES	PITOT PRESSURE	See Attachment K PITOT PRESS FLOW (GPM)
F.2.ad				
F.2.ae				
F.2.af				
F.2.ag				
F.2.ah				
F.2.ai				
F.2.aj				
F.2.ak				

ATTACHMENT F

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
PRESSURE & SPEED DATA

Data Recorded by _____/_____

PARA NUMBE

F.2.u Bubbler pressure before start of OB Diesel Fire Pump Engine _____

F.2.u. Lake Level at time of test _____

PARAGRAPH NUMBER	PUMP RPM	(PSIG) DISCH PRESS	See Attach. K (feet) DRAW DOWN	BUBBLER PRESSURE	RELIEF VALVE PASSING WATER YES OR NO
F.2.ad					
F.2.ae					
F.2.af					
F.2.ag					
F.2.ah					
F.2.ai					
F.2.aj					
F.2.ak					

ATTACHMENT F

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
FLOW METER DATA

Data Recorded by _____/_____

PARAGRAPH NUMBER	(inch w.c.) FLOW METER Δ P OFE-FP012	See Attach. K (GPM) CALCULATED FLOW	(GPM) FLOW METER OFI-FP012
F.2.ad			
F.2.ae			
F.2.af			
F.2.ag			
F.2.ah			
F.2.ai			
F.2.aj			
F.2.ak			

ATTACHMENT G

DIESEL FIRE PUMP 3A
FIRE PUMP FLOW TEST
UNCORRECTED DATA

See Attachment K

Data Recorded by _____/_____

PUMP SPEED	DISCH. PRESS. (feet)	SUC. PRESS. (feet)	NET HEAD (feet)	STREAMS NO.	STREAMS SIZE	STREAMS PITOT PRESSURE	GPM PITOT	Δ PRESS OFE-FP-12 AND GPM	GPM FLOW METER	VIBRATION

ATTACHMENT H

DIESEL FIRE PUMP OB
FIRE PUMP FLOW TEST
UNCORRECTED DATA

Data Recorded by _____/_____

PUMP SPEED	DISCH. PRESS. (feet)	SUC. PRESS. (feet)	NET HEAD (feet)	STREAMS NO.	STREAMS SIZE	STREAMS PITOT PRESSURE	GPM PITOT	Δ PRESS OFE-FP-12 AND GPM	GPM FLOW METER	VIBRATION

ATTACHMENT I

DIESEL FIRE PUMP ____
FIRE PUMP FLOW TEST
CALIBRATION DATA

Data Recorded by _____/_____

DESC. OF INSTRUMENT	TYPE	S/N	CALIBRATION LAST	CALIBRATION DUE
Device to measure RPM of pump				
OPI-FP007				
OPI-FP003				
Precision Pressure Gauge OA DFP Discharge				
Precision Pressure Gauge OB DFP Discharge				
Precision Pressure Gauge Fire Main Pressure by OPS-FP063				
Precision Pressure Gauge Fire Main Pressure by OPS-FP062				
OFI-FP012				
OFE-FP012				
Pitot Tube Gauge				
Bubbler used to measure draw down				
IRD 360 Vibration analysis machine if used				
Thermometer to measure temperature of right angle drive				

ATTACHMENT J

DIESEL FIRE PUMP _____
FIRE PUMP FLOW TEST
PERSONNEL IN ATTENDANCE
AT TIME OF TEST

NAME	TITLE	ORGANIZATION REPRESENTED

ATTACHMENT K

FORMULAS

ATTACHMENT E AND F FORMULAS

Pitot Pressure Flow (GPM) = $29.83\ cd^2\ \sqrt{DP}$

Formula obtained from (Fire Protection Handbook) fifteenth edition, Section 16, Chapter 2, page 16-18.

c	= Coefficient of discharge, for underwriter playpipes this is 0.97
d	= Diameter of outlet, inches
Δ P	= Pitot pressure, psig

Drawn Down = BPBS - BP

Drawn Down	= Number of feet the level of water in the pump suction drops from lake level at each pump flow, inches of water column
BPBS	= Bubbler pressure before start of OA(OB) Diesel Fire Pump Engine, feet of water column
BP	= Bubbler pressure, feet of water column at each pump flow

CALCULATED FLOW = $\sqrt{\Delta P}$ X 247.99

Calculated Flow	= Flow of water through flow orifice OFE-FP012, gallons per minute. Formula obtained from "Flowmeter Engineering Handbook by C.F. Cusick and multiplier 247.49 obtained from Design Specification J-2530, Dwg. No. FC-548.
Δ P	= Differential Pressure across flow element OFE-FP012, inches of water column
247.49	= Multiplier obtained from Design Specification J-2530, Dwg. No. FC-548 @ SP. GR. of .9940

ATTACHMENT K (Continued)

ATTACHMENT G AND H FORMULAS

Discharge Pressure (feet) = Discharge Pressure (PSIG) X 2.307 feet/psig

Disch Press (feet) = Discharge Pressure of the Diesel Fire Pump in feet of water column

Disch Press (psig) = Discharge Pressure of the Diesel Fire Pump in pounds per square inch from Attachment E(F)

2307 feet/psig = Conversion factor between pressure in pounds per square inch to feet of water column

Suction Pressure (feet) = EL gauge - [LL_{ATOT} - Draw Down]

Suc Press (feet) = Distance in feet (of water column) from the surface of water in the Fire Pump Suction casing (at each pump flow) to the center line of the discharge gauge

EL gauge = Elevation of Fire Pump Discharge Gauge Center Line

LL_{ATOT} = Lake level at time of test, feet. See Attachment E(F).

Draw Down = Number of feet the level of water in the Fire Pump Suction Casing drops from lake level at a certain pump flow, feet. See Attachment E(F).

NET HEAD (feet) = Discharge Pressure (feet) + Suction Pressure (feet)

Net Head (feet) = Discharge Pressure converted to feet of water column plus the distance in feet from the center line of the discharge gauge to the level of water in the Fire Pump Suction Casing.

Disch Press (feet) = Discharge Pressure of the Fire Pump converted to feet of water column

Suc Press (feet) = Distance in feet from the center line of the discharge gauge to the water level in the Fire Pump Suction Casing

GPM PITOT = Pitot Pressure Flow GPM

GPM Pitot = Gallons per minute going through play pipes. See Attachment E(F).

Pitot Pressure Flow GPM = Gallons per minute going through play pipes. See Attachment E(F).

FOR INFORMATION ONLY

LTS-1000-12
Revision 1
February 15, 1984
1

Attachment 2

FIRE PUMP DIESEL ENGINE OVERSPEED TRIP TEST, AUTOMATIC START TEST AND AUTOMATIC START TRIPS BYPASS TEST

A. PURPOSE

The purpose of this test is to verify:

1. That the diesel fire pumps start from ambient conditions on an automatic start signal, and

2. That all diesel engine trips, except the overspeed trip are bypassed on an automatic start signal, and

3. That the diesel overspeed trips function per design.

B. REFERENCES

1. F.M.C. Corporation, Operation and Maintenance Manual Cummins Diesel Engines.

2. King-Knight Company, Installation, Operation and Maintenance of the Automatic Control for Engine Drive Fire Pumps.

3. National Fire Protection Association Codes and Standards Chapter 20-Centrifugal Fire Pumps.

C. PREREQUISITES

1. The Shift Engineer will obtain permission from the Fire Marshall prior to conducting these tests.

D. PRECAUTIONS

1. During this test diesel fire pump OFP01PA/OFP01KA (OFP01PB/OFP01KB) will be inoperative.

E. LIMITATIONS AND ACTIONS

1. In the event of a fire, the diesel fire pump under test shall be stopped, all jumpers removed and the diesel fire pump returned to service expeditiously.

2. To prevent damage to the fire pump the overspeed test shall be conducted using an approved vendor adapter.

F. PROCEDURE

1. VERIFY Diesel Fire Pump OFP01PB/OFP01KB (OFP01PA/OFP01KA) is available for operation.

2. Check diesel trips as follows:

   a. Place the selector switch in the Test position and the engine will start. (Record on Attachment A).

   b. With the engine running, simulate the closure of the high water temperature switch by jumpering terminals #5 and #11 on TB-3. (Record on Attachment A).

   c. Verify Alarm sounds, red lamp lights, and engine stops (Record on Attachment A).

   d. Remove the jumper from across terminals #5 and #11 on TB-3 and reset alarms. (Record on Attachment A).

   e. Rotate Fire Pump control switch to off, reset the alarms, and then turn Fire Pump control switch to Test.

   f. With the engine running, simulate the closure of the low oil pressure switch by jumpering terminals #4 and #11 on TB-3. (Record on Attachment A).

   g. Verify alarm sounds, red lamp lights, and engine stops (Record on Attachment A.)

   h. Remove the jumper from across terminals #4 and #11 on TB-3 and reset alarms. (Record on Attachment A).

   i. Rotate Fire Pump control switch to off, reset the alarms, and then turn Fire Pump control switch to Auto.

3. Verify diesel auto start trip bypasses as follows:

   a. Unlock and close valve OFP131 (OFP130) Fire Protection Header Low Pressure Switch Stop. (Record on Attachment A).

b. Slowly vent DPSL-FP005 (DPSL-FP006), Fire Protection Header Low Pressure Switch until Diesel Fire Pump DFP01PA/DFP01KA (DFP01PB/DFP01KB) starts and verify engine starts at greater than or equal to 118 psig. (Record on Attachment A).

c. Close vent valve for DPSL-FP005 (DPSC-FP006) (Fire Protection header Low Presser Switch).

d. Open and Lock DFP131 (DF130) Fire Protection header Low Pressure Switch Stop.

e. After the diesel fire pump has stabilized perform the following at the diesel control panel:

1) Simulate a closure of the high water temperature switch by jumpering terminals #5 and #11 on TB3. (Record on Attachment A).

2) Verify alarm sounds, red lamp lights, and engine does not stop. (Record on Attachment A).

3) Remove the jumper from terminals #5 and #11 on TB3 and reset the alarms. (Record on Attachment A).

4) Simulate a closure of the low oil pressure switch by jumpering terminals #4 and #11 on TB-3. Record on Attachment A.

5) Verify alarm sounds, red lamp lights, and engine does not stop. (Record on Attachment A).

6) Remove the jumper from terminals #4 and #11 on TB-3 and reset the alarms. (Record on Attachment A).

7) Simulate a closure of the overspeed switch by jumpering between terminals #3 and #7 or TB3. (Record on Attachment A).

8) Verify alarm sounds, red lamp lights, and engine stops. (Record on Attachment A).

9) Remove the jumper from terminals #3 and #7 on TB3 and reset the alarms. (Record on Attachment A).

10) Fire Pump Control Switch to off and reset the alarms. (Record on Attachment A).

4. Conduct an overspeed test of diesel fire pump 0FP01PA/0FP01KA (0FP01PB/0FP01KB) as follows:

a. Remove the installed tachometer drive adapter.

b. Install service tool ST-1224 between the tachometer and the overspeed stop switch. (Record on Attachment A).

c. Remove the bimba valve. (Record on Attachment A).

d. At the diesel control cabinet, place selector switch in TEST position and the diesel starts.

e. With the throttle slowly increase the idle speed until the engine trips.

f. Record the speed at which the engine tripped and then turn Fire Pump Control Switch to off. (Record on Attachment A).

g. Install the bimba valve.

h. Remove service tool ST-1224, and reconnect the Tachometer to the speed drive adapter.

i. Reset the overspeed switch by depressing the button on the top of the overspeed switch.

j. Place selector switch in AUTO position.

k. Reset and verify alarms clear on diesel control panel and 1PM10J.

5. Forward the completed Attachment A to your Supervisor per LTP-100-3.

G. CHECKLISTS

1. None.

H. TECHNICAL SPECIFICATION REFERENCES

1. 4.7.5.1.2.D.2.

2. 4.7.5.1.2.D.3.

TO: C. W. Schroeder

SUBJECT: LaSalle Unit 2 License Condition NPF-18 License Conditions 2.C.15(b),(c), & (d): Fire Protection Program

The LaSalle Unit 2 Facility Operating License NPF-18 contains three Fire Protection Program License Conditions 2c(15)(b), 2c(15)(c) and 2c(15)(d) that are required to be completed prior to Unit 2 initial criticality. Attachments 1,2 and 3 are provided and indicate that the required actions have been addressed. It is requested that these License Conditions be closed based on the information provided.

Procedures provided in the Attachments are for information only and future changes to the procedures will be controlled in accordance with LaSalle Unit 2 Technical Specification Administrative Section.

R. D. Bishop
for G. J. Diederich

GJD/ch

cc: H. Massin
T. Haushoer

DOCUMENT 0050r

ATTACHMENT 1

NPF-18 License Condition 2.c.(15)(b) States:

> "(b) Prior to initial criticality, the Licensee shall replace the B diesel fire pump engine and perform a test in accordance with Sections 11-2.3, 11-2.4 and 11-2.5 of NFPA 20/1983"

NFPA 20/1983 Sections 11-2.3, 11-2.4 and 11-2.5 States:

> 11-2.3 A copy of the manufacturer's certified pump test characteristic curve shall be available for comparison of results of field acceptance test. The fire pump as installed shall equal the performance as indicated on the manufacturer's certified shop test characteristic curve within the accuracy limits of the test equipment.
>
> 11-2.4 The fire pump shall perform at minimum, rated and peak loads without objectionable overheating of any component.
>
> 11-2.5 Vibrations of the fire pump assembly shall not be of a magnitude to warrant potential damage to any fire pump component.

C. W. Schroeder letter to H. R. Denton dated 23 November 1983, in Issue 1 Stated:

> '1. The A diesel fire pump has been replaced with a rebuilt Engine and an overhauled fire pump.'
>
> '2. On November 5, 1983, a test of the A pump was performed. The results of that test have been provided to Region III.'

On December 29, 1983 a test similiar to the test performed on the A pump was conducted satisfactorily. The test on the B pump provided results similiar to those on the A pump and meet the requirements of sections 11-2-3, 11-2.4 and 11-2.5. A Fire Protection Engineer was present during the conduct of the test and confirmed that the pump performed satisfactorily and meet the requirements of sections 11-2-3, 11-2.4 and 11-2.5. It should be noted that the as tested pump curve at high flows when corrected to 1760 rpm did not equal the manufacturer pump test characteristic curve. The pump was accepted based on the following:

1. The pump capacity does meet its design points

2. The pump curves developed in June 1981 and in December 1983 are almost identical at flows above the relief valve setpoint and thus no abnormal degradation has been detected.

3. Error analysis on test data indicates the pump is performing satisfactory in the field when compared to the manufacturers pump test curve assuming NO instrument error at the factory.

C. W. Schroeders letter referenced above further stated

'3. Commonwealth Edison fire protection engineer and M&M Protection Consultants are reviewing the results of the A fire pump test against the applicable section of NFPA20'

This action has been completed.

ATTACHMENT 2

NPF-18 License Condition 2.c.(15)(c) States:

"Prior to initial criticality, the License shall revise the periodic fire pump tests to be in accordance with Section 11.3 of NFPA 20/1983 and be conducted on 18 month intervals."

NFPA-20/1983 Sections 11-3 States:

11-3 Annual Fire Pump Tests.

11-3.1 An annual test of the fire pump assembly (pump, driver and controller) shall be performed to determine its ability to continue to attain satisfactory performance at peak loads. All alarms shall operate satisfactorily. All valves in suction line shall be checked to assure that they are fully open.

11-3.2 This annual test shall be performed by personnel trained in the operation of the fire pump.

11-3.3 Any significant reduction in the operating characteristics of the fire pump assembly shall be reported to the owner and repairs made immediately.

C. W. Schroeder to H. R. Denton dated 23 November 1983 in Issue 1 Stated:

'12a) The periodic fire pumps surveillance will be revised (or prepared) in accordance with NFPA 20. It is understood that NFPA 20 "annual test" will be performed at 18 month intervals. Commonwealth Edison Company will have these procedures and the fire pump maintenance program reviewed by a fire protection engineer for technical adequacy. The revised surveillances will be performed at the next regularly scheduled test interval.

This action has been completed. It should be noted that the Fire Protection Consultant found that the maintenance program met the requirements of NFPA 20 but the station upgraded certain aspects based on additional comments and concerns. It also should be noted that the Fire Protection consultant reviewed almost all surveillance procedures concerning the Diesel Fire Pumps and procedures other than the annual test have been revised.

In specific reference to NFPA 20/1983 section 11.3 the point of 'shut off head' was determined, by the Fire Protection Consultant, to be satisfied by doing an all valves closed test point with the relief valve inservice.

Also in specific reference to NFPA 20/1983 a new procedure was prepared to address the controller specifically.

Although the Fire Protection Consultants reviewed the Weekly Fire Pumps Test to NFPA 20 Commonwealth Edison has not made a commitment by this letter to a weekly Fire Pump Test. The LaSalle Technical Specification and the BWR Standardized Technical Specification require a monthly fire pump test for 30 minutes with a fuel requirement of 130 gallons.

Attached for information are the following procedures:

LTS-1000-34 'Fire Pump Flow Test'

LTS-1000-12 'Fire Pump Diesel Engine Overspeed Test, Automatic Start Test and Automatic Start Trips Bypass Test'

LOS-FP-W2 'Diesel Fire Pump Weekly Operational Check'

The procedures are controlled but future changes will not be forwarded to NRR.

ATTACHMENT 3

NPF-18 License Condition 2.c.(15)(d) States:

"(d) Prior to initial criticality the licensee shall revise the fire protection loop flow test in accordance with Chapter 5, Section 11 of the Fire Protection Handbook, 14th Edition published by the National Fire Protection Association.

C. W. Schroeder letter to H. R. Denton dated 23 November 1983 in Issue 1 States:

"12b) The loop flow surveillance test procedure will be revised in accordance with Technical Specification 4.7.5.1.1.d. per Chapter 5, Section 11 of the Fire Protection Handbook, 14 Edition, published by the National Fire Protection Association, Commonwealth Edison Company will have this procedure reviewed by a fire protection engineer for Technical adequacy. The revised surveillance will be performed at the next regularly scheduled test interval."

The loop flow test procedure has been reviewed and revised in accordance with LaSalle County Station Operating License (NFP-18) condition 2.c.(15)(d) and Technical Specification 4.7.5.1.1.d to more definitively assess the state of the water distribution system. Paragraph B of the referenced Handbook states the following in part " the usual procedure for conducting a flow test on a water system is to take pitot readings on a sufficient number of hydrants to determine the capacity of the system " M&MPC, the fire protection consultant, determined contrary to paragraph B that for the LaSalle underground yard loop it is appropriate and acceptable to flow through the installed test header to develop friction loss curves.

Acceptance criteria have been embodied in the yard loop test to assure that the design requirements will be satisfied in the event of a design basis fire. The acceptance criteria takes the form of friction loss curves for selected points (hydrants) around the yard loop.

Additional flow paths have been identified and analyzed for acceptance criteria that could be used <u>if necessary</u> to determine the adequacy of the yard loop and interior plant supply loops, if the resuslts of any scheduled test fall above the provide curves. The acceptance criteria were generated by computer analyses and reviewed by M&MPC.

Attached for information is LTS-1000-30 'Technical Specification Yard Loop Flow Test.' This procedure is controlled but future changes will not be forwarded to NRR. The subject test will be conducted at the next regularly scheduled test interval.

ATTACHMENT A

FIRE PUMP DIESEL ENGINE
OVERSPEED TRIP TEST, AUTOMATIC
START TEST AND AUTOMATIC START TRIPS BYPASS TEST

DIESEL FIRE PUMP _____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITATIONS	REQUIRED VALUE	OBSERVED VALUE	INITIAL & DATE
F.2.a.	Fire Pump Selector Switch in Test and verify engine starts	Test & Starts		
F.2.b.	In Fire Pump Control Cabinet install jumper between Terminals #5 and #11 on TB-3 (Diesel Engine High Water Temperature Trip)	Jumper Installed		/ /
F.2.c.	Verify local alarms sound, red lamp lights, and engine stops	Alarm Sounds, Red Lamp Lights, and Engine Stops		
	Verify remote alarm actuated (Control Room)	Actuated		
F.2.d.	In Fire Protection Control Cabinet, remove jumper between Terminals #5 and #11 on TB-3	Jumper Removed		/ /

ATTACHMENT A

FIRE PUMP DIESEL ENGINE
OVERSPEED TRIP TEST, AUTOMATIC
START TEST AND AUTOMATIC START TRIPS BYPASS TEST

DIESEL FIRE PUMP _____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITATIONS	REQUIRED VALUE	OBSERVED VALUE	INITIAL & DATE
F.2.e.	Fire Pump Control Switch to off, reset alarms, and turn Fire Pump Control Switch to Test	Control Switch to Off		
		Reset Alarms		
		Control Switch to Test		
F.2.f.	In Fire Pump Control Cabinet install jumper between Terminals #9 and #11 on TB 3 (Diesel Fire Pump Low Oil Pressure Trip)	Jumper Installed		/ /
F.2.g.	Verify local alarms sound, red lamp lights, and engine stops	Alarm Sounds, Red Lamp Lights, and Engine Stops		
	Verify remote alarm actuated (Control Room)	Actuated		
F.2.h.	In Fire Pump Control Cabinet, remove jumper between Terminals #4 and #11 on TB 3	Jumper Removed		/ /

ATTACHMENT A

FIRE PUMP DIESEL ENGINE
OVERSPEED TRIP TEST, AUTOMATIC
START TEST AND AUTOMATIC START TRIPS BYPASS TEST

DIESEL FIRE PUMP _____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITATIONS	REQUIRED VALUE	OBSERVED VALUE	INITIAL & DATE
F.2.i.	Fire Pump Control Switch to off, reset alarms, and then turn Fire Pump Control switch to auto	Control Switch to Off		
		Reset Alarms		
		Control Switch to Auto		
F.3.a.	Close OFP131(OFP130) (Fire Protection Header Low Pressure Switch Stop)	Closed		/ /
F.3.b.	Slowly vent OPSL-FP005(OPSL-FP006) (Fire Protection Header Low Pressure Switch) until the Fire Pump starts at ≥ 118 psig	Vented		
		Starts at ≥ 118 psig		
F.3.c.	Close vent valve for OPSL-FP005(OPSL-FP006) (Fire Protection Header Low Pressure Switch)	Closed		
F.3.d.	Open and Lock OFP131(OFP130) (Fire Protection Header Low Pressure Switch Stop)	Open		/ /

ATTACHMENT A

FIRE PUMP DIESEL ENGINE
OVERSPEED TRIP TEST, AUTOMATIC
START TEST AND AUTOMATIC START TRIPS BYPASS TEST

DIESEL FIRE PUMP _____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITATIONS	REQUIRED VALUE	OBSERVED VALUE	INITIAL & DATE
F.3.e.1.	In Fire Pump Control Cabinet install jumper between Terminals #5 and #11 on TB-3 (Diesel Engine High Water Temperature Trip)	Jumper Installed		/ /
F.3.e.2.	Verify local alarm sounds, red lamp lights, and engine does not stop	Alarm Sounds, Red Lamp Lights, and Engine Does Not Stop		
	Verify remote alarm actuated (Control Room)	Actuated		
F.3.e.3.	In Fire Pump Control Cabinet remove jumper between Terminals #5 and #11 on TB-3	Jumper Removed		/ /
	Reset alarms	Reset		
F.3.e.4.	In Fire Protection Cabinet install jumper between Terminal #9 and #11 on TB-3 (Diesel Fire Pump Low Oil Pressure Trip)	Jumper Installed		/ /

ATTACHMENT A

FIRE PUMP DIESEL ENGINE
OVERSPEED TRIP TEST, AUTOMATIC
START TEST AND AUTOMATIC START TRIPS BYPASS TEST

DIESEL FIRE PUMP _____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITATIONS	REQUIRED VALUE	OBSERVED VALUE	INITIAL & DATE
F.3.e.5.	Verify local alarm sounds, red lamp lights, and engine does not stop	Alarm Sounds, Red Lamp Lights and Engine Does Not Stop		
	Verify remote alarm actuated (Control Room)	Actuated		
F.3.e.6.	In Fire Pump Control Cabinet remove jumper between Terminal #4 and #11 on TB 3	Jumper Removed		/ /
	Reset alarms	Reset		
F.3.e.7.	In Fire Pump Control Cabinet install jumper between Terminal #3 and #7 on TB 3 (Diesel Fire Pump Overspeed Trip)	Jumper Installed		/ /
F.3.e.8.	Verify local alarm sounds, red lamp lights, and engine stops	Alarm Sounds, Red Lamp Lights, and Engine Stops		
	Verify remote alarm actuated (Control Room)	Actuated		

ATTACHMENT A

FIRE PUMP DIESEL ENGINE
OVERSPEED TRIP TEST, AUTOMATIC
START TEST AND AUTOMATIC START TRIPS BYPASS TEST

DIESEL FIRE PUMP _____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITATIONS	REQUIRED VALUE	OBSERVED VALUE	INITIAL & DATE
F.3.e.9.	In Fire Pump Control Cabinet remove jumper between Terminal #3 and #7 on TB-3	Jumper Removed		/ /
F.3.e.10.	Fire Pump Control Switch to off and reset alarms	Off		
		Reset		
F.4.b.	Install service tool ST-1224 between the tachometer and the overspeed stop switch	Installed		
F.4.c.	Remove the Bimba Valve	Removed		
F.4.f.	Record the speed at which the engine tripped and then turn Fire Pump Control Switch to Off	1200 + 0, -50 RPM X 2 - 2400 ±0, -100 RPM	____ RPM X 2 = ____ RPM	
		Off		
F.4.g.	Install the Bimba Valve	Installed		

ATTACHMENT A

FIRE PUMP DIESEL ENGINE
OVERSPEED TRIP TEST, AUTOMATIC
START TEST AND AUTOMATIC START TRIPS BYPASS TEST

DIESEL FIRE PUMP _____

PARAGRAPH NUMBER	DESCRIPTION AND LIMITATIONS	REQUIRED VALUE	OBSERVED VALUE	INITIAL & DATE
F.4.h.	Remove service tool ST-1224 and reconnect the tachometer to the speed drive adapter	ST 1224 Removed Tachometer Connected to Speed Drive Adapter		
F.4.i.	Reset overspeed switch	Reset		
F.4.j.	Diesel Fire Pump Control Switch in auto	Auto		
F.4.k.	Reset and verify alarms clear on Diesel Control Panel and 1PM10J (Control Room Indicating Panel)	Reset and Clear		

FOR INFORMATION ONLY

LOP-W2
Revision 9
February 7, 1984
1
Attachment 2

DIESEL FIRE PUMP WEEKLY OPERATIONAL CHECK

A. PURPOSE

The purpose of this procedure is to outline the steps necessary to perform the Diesel Fire Pump Weekly Operational Checks.

B. REFERENCES

1. LOP-DO-03, Transferring Oil to the Diesel Fire Pump Day Tanks.
2. P&ID M-71, Fire Protection.
3. LOP-FP-02, Fire Pump Diesel Startup and Shutdown.
4. National Fire Code, Vol. II, NFPA 20, Ch. 9, Sec. 8-6.1, P. 20-61.
5. LOS-DC-Q5
6. LOS-DC-W1

C. PREREQUISITES

1. The Fire Protection System is operating in accordance with LOP-FP-01, Fire Protection System Startup.
2. Obtain Shift Supervisor's permission to conduct this test.
3. This test should be conducted on Monday through Friday during the hours of 7:30 A.M. to 4:00 P.M.
4. The following personnel are available to go to the Lake Screen House to perform and observe this test:
   a. Mechanical Maintenance management person
   b. Designated Technical Staff person
   c. Operator
5. Operator should have in his possession:
   a. One Glass Bottle greater than or equal to 1 pint.

b. One 12" Crescent wrench.

D. PRECAUTIONS

1. Ensure that the Diesel Fire Pump has been shutdown for at least 1 hour prior to checking Engine Coolant level.

2. Fire Pump Diesels do not trip on High Water Temperature or Low Lube Oil Pressure when started manually. These trips are operable with the Selector Switch at the local panel in TEST. Therefore, the diesel must not be run with the selector switch in MANUAL unless Shift Supervisor consent is obtained and an operator is on hand to monitor engine operation.

E. LIMITATIONS AND ACTIONS

1. The Maintenance person in attendance should initiate the appropriate corrective action if any of the following occurs:

   a. Low lube oil pressure.

   b. Abnormal oil or water temperatures.

   c. Unusual engine noise.

   d. Low power, excessive use of coolant, fuel, or lube oil.

   e. Excessive smoke.

   f. Any fuel, lube oil, or water leaks.

2. Diesel Fire Pump Trips automatically on:

   a. Overspeed (At all times).

   b. Low lube oil pressure 10 psig $\pm$3 psig (In Test).

   c. High cooling water temperature 205^{o}F $\pm$ 5^{o}F (In Test).

3. If it is necessary to fill the Fire Pump Diesel Day Tank, VERIFY the fuel oil available for the HPCS Diesel 1B(2B) (Storage Tank plus Day Tank) is greater than Technical Specification Limit of 29,750 gallons

17.5 ft. (T.S.) after filling and record on Attachment A(8).

4. Fire Pump Diesel Day Tank Level should be greater than or equal to 24 inches (275 gallons). This requirement is per NFPA 20 "Centrifugal Fire Pumps" paragraph 8.6.4 and should be corrected as soon as possible, but it is not a Technical Specification requirement. The requirement to maintain the Diesel Fuel Oil Level in the Diesel Fire Pump Day Tank to a level greater than or equal to 13 inches (130 gallons) is a Technical Specification (4.7.5.1.2) requirement and shall be maintained.

5. Normal operation of the Diesel follows the sequence below:

   a. Engine starts in the idle position (approximately 900 RPM).

   b. The engine then steps up to rated speed (approximately 2000 RPM) after sufficient oil pressure is produced.

6. Make up of coolant can be either clean demineralized water or a 50% solution of demineralizec water and anti-freeze. If greater than 2 quarts of water is added, a coolant sample must be drawn and delivered to Rad/Chem to ensure freeze protection is acceptable ($-30^{\circ}F$).

7. The Diesel engine crankcase and engine oil bath air cleaner contains Mobil (Delvac 1). The pump right angle-drive oil reservoir contains Mobile (SHC626).

8. The Diesel Fire Pump must be considered inoperable if it is not capable of starting and maintaining fire header pressure on an auto start signal, or if it has a deficiency which would not prevent start but would damage the diesel.

   a. The AUTO start sequence consists of 3 - 30 second cranking intervals followed by a lockout and alarm if no start occurs.

   b. Limits on pump discharge pressure are valid only when the pump is not moving water into the FP header.

c. Diesel trips from low lube oil pressure and high cooling water temperature are bypassed in the AUTO start sequence (and MANUAL starts).

F. PROCEDURE

1. Turn Diesel Fire Pump control switch to off. (Check off on Attachment A/B).

NOTE

The operator doing this surveillance will stay in attendance at the Lake Screen House all the time that the Diesel Fire Pump control switch is in "off" so that the Diesel Fire Pump can be started if Fire Protection water pressure drops below 118 psig.

2. Pre-start checks (check off on Attachment A/B):

a. CHECK engine coolant by removing the heat exchanger cap and visually observing level. Level should be between 1/2 tank full and 2 inches from full. If necessary, replenish coolant with clean demineralized water. If greater than 2 quarts of water were added, take a sample of coolant to Rad/Chem to ENSURE antifreeze protection greater than -30°F.

b. INSPECT Radiator Neck and Cap Seating Area. CLEAN with a soft cloth if necessary.

c. CHECK that cap "ears" are not bent and that cap seats securely. Replace cap with a new one (Stores Item #254847) if needed.

d. VERIFY oil level in the right angle gear drive case is at $\pm\frac{1}{2}$ inch of the "Oil Level" line.

CAUTION:

Do Not Stand on Process Piping.

e. Remove the air cleaner oil pan and VERIFY the oil level is at the "Oil Level" mark on outside of pan. If necessary, add oil to the pan.

f. At the fuel oil day tank, DRAIN approximately 1 pint of fuel to check for possible sludge or

water and dispose of it properly. REINSTALL cap on fuel drain line.

g. VERIFY the following for the Fire Pump Diesel batteries:

1) Electrolyte level is above the plates.

2) Battery charger is operating by observing the Blue pilot lights on the diesel control cabinet are lit.

3) No oil/dirt on covers, clean as necessary.

h. Verify Kim Hot Start is operable by noting it is warm to the touch.

i. Inspect belts for defects and check that belt tension allows a maximum of 1" deflection. Also inspect belt guards for cracks.

IMPORTANT

j. Bump the Diesel over 3 times by quickly taking the selector switch from the AUTO position to the TEST position and back again. This will prime the fuel and lube oil systems. CHECK the diesel lube oil level using the dipstick. FILL to the full mark before starting the diesel.

3. Test to verify that the Diesel Fire Pump OFP01KA (OFP01KB) auto starts when Fire Protection header pressure is decreased (check off on Attachment A/B).

a. Turn control switch of Diesel Fire Pump OFP01KA (OFP01KB) to auto.

b. Close valve OFP131 (OFP130) Fire Protection Header Low Pressure stop.

c. Slowly vent OPSL-FP005 (OPSL-FP006) Fire Protection Header Low Pressure Switch until Diesel Fire Pump OFP01PA/OFP01KA (OFP01PB/OFP01KB) starts in less than or equal to 30 seconds.

d. Turn control switch of Diesel Fire Pump OFP01KA/OFP01KB to test.

e. Close vent valve of OPSL-FP005 (OPSL-FP006), Fire Protection Header Low Pressure Switch.

f. Open and Lock valve OFP131 (OFP130) Fire Protection Header Low Pressure Stop.

NOTE

If diesel is started in MANUAL A/B position, operator must stay in Diesel Room while engine is running to VERIFY Diesel operability.

If the Fire Pump Diesel does not Start in less than or equal to 30 seconds, place the control switch back to AUTO and NOTIFY the Shift Supervisor.

4. When the Diesel Fire Pump OFP01KA (OFP01KB) starts, PERFORM the following and RECORD on Attachment A(B):

a. CHECK the diesel for abnormal noise or vibration.

b. CHECK the Fire Pump Right Angle Drive for excessive vibration.

c. CHECK for fuel, lube oil, or water leaks.

d. CHECK the diesel charging current meter on diesel (+ 1 to + 15 amps).

e. CHECK the Control Panel float charge ammeters at diesel control panel (both at zero amps).

5. After the diesel has been running for approximately 15 minutes, RECORD the following on Attachment A(B).

a. Diesel charging current meter on diesel (+ 1 to + 15 amps).

b. Oil Pressure (Normal 35-85 psig).

c. Cooling water Temperature (Normal 165-195^{o}F).

d. CHECK for flow indication in Relief Valve discharge line and CHECK discharge pressure at OP1-FP007 (145-165 psig).

6. Blow down the Fire Pump Diesel Cooling water "Y" Strainer by opening the "Y" strainer drain valve.

When sediment is removed, CLOSE the "Y" strainer drain valve.

7. CHECK temperature of Right Angle Drive by placing a hand on it and noting that it is not excessively hot. If hot, VERIFY cooling water outlet valve open.

CAUTION

The Right Angle Drive Cooling H_2O Outlet Valve has been throttled to maintain acceptable temperatures at the diesel and the right angle drive. Any change in the valves position will affect the temperature of the diesel. If it is necessary to acjust the valves position, monitor diesel cooling water temperature to ensure it remains within acceptable limits. If any changes are made, note them in the comment section of the surveillance.

8. SHUT DOWN the Fire Pump Diesel after 30 minutes in accordance with LOP-FP-02, Fire Pump Diesel Startup and Shutdown.

9. CHECK Fire Pump Diesel Day Tank Level is greater than or equal to 24 inches (275 gallons). This requirement is per NFPA 20 "Centrifugal Fire Pumps" paragraph 8.6.4 and should be corrected as soon as possible, but it is not a Technical Specification requirement.

CHECK Fire Pump Diesel Day Tank Level is greater than or equal to 13 inches (130 gallons). This requirement is per Technical Specification (4.7.5.1.2) and shall be maintained. If not, replenish in accordance with LOS-FP-M1, Fire Protection Fuel Oil Transfer Pump Test and Day Tank Level Verification. RECORD on Attachment A(B).

CAUTION

If fuel oil is transferred to Diesel Fire Pump Day Tank, RECORD HPCS Diesel Fuel Oil Storage Tank level on Attachment A(B) and VERIFY level is greater than Technical Specification limit (T.S.).

10. CHECK the Cooling System for Leakage approximately 15 minutes after engine is shutdown. Lifting of coolant reservoir relief is acceptable, however any

leakage out of the radiator cap is not. Replace the radiator cap if necessary (Stores item #254847).

11. Check FP header pressure recorder OPR-FP906A(B) inside diesel control cabinet for proper inking. REPLACE chart or add ink when encessary. RETURN used charts to Shift Supervisor.

12. VERIFY Diesel Fire Pump Room A/B is clean (no oil dry on floor) and that engine is completely wiped down.

13. RECORD the "Run Time" on Attachment A and B from the hour meter located on the Diesel Fire Pump Instrument Rack.

14. The Operator and the Mechanical Maintenance management person should sign the "performed by" block of Attachment A(B). The Technical Staff person should review the data sheet and sign the "reviewed by Tech Staff" block of Attachment A(B).

15. VERIFY Diesel Fire Pump OA/OB control switch is in Auto.

G. CHECKLISTS

1. None.

H. TECHNICAL SPECIFICATION REFERENCES

1. 4.7.5.1.2.a.1.

2. 4.7.5.1.2.a.2.

3. 4.7.5.1.2.a.4.

4. 3.8.1.1.b.2.

ATTACHMENT A

DIESEL FIRE PUMP OA (OFPO1KA)
WEEKLY OPERATIONAL CHECK

PRE-START CHECKLIST

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.1	Turn "A" Diesel Fire Pump (OFPO1KA) Control Switch to off	Off		
F.2.a.	Engine OFPO1KA Coolant Level	Between 1/2 full and 2 inches from full		
	If greater than 2 quarts of coolant was added to heat exchanger, Rad/Chem must be given a sample to ENSURE antifreeze protection greater than -30°F	Coolant sample delivered or N/A		
F.2.b/c	Inspect radiator neck and cap seating area. Check that cap "ears" are not bent - cap seats securely. Replace cap if needed	Radiator cap inspected		
F.2.d.	Right angle drive oil level	±1/2" of the "Oil Level" line		
F.2.e.	Engine OFPO1KA air cleaner pan oil level	Oil Level Mark		
F.2.f.	Engine OFPO1KA - 1 pint fuel oil drained	No water or sludge and cap reinstalled		
F.2.g.1.	Battery Electrolyte Level	Above the plates		

ATTACHMENT A

DIESEL FIRE PUMP OA (OFP01KA)
WEEKLY OPERATIONAL CHECK

PRE-START CHECKLIST

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.2.g.2.	Battery charger pilot lights	On		
F.2.g.3.	Batteries NOTE: Clean when needed	Clean		
F.2.h.	Kim Hot Start	Warm to touch		
F.2.i.	Belt Tension	≤ 1" deflection		
	Belt Guard	No Cracks		
F.2.j.	Bump diesel over 3 times, Engine Oil level (add if necessary)	Diesel bumped/oil level on full mark		

ATTACHMENT A

DIESEL FIRE PUMP OA (OFP01KA)
WEEKLY OPERATIONAL CHECK

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.3.a.	Turn control switch of Diesel Fire Pump OFP01KA to Auto	Auto		
F.3.b.	Close valve OFP131 (Fire Protection Header Low Pressure Stop)	Closed		/ /
F.3.c.	Slowly vent OPSL-FP005 Fire Protection Header Low Pressure Switch until Diesel Fire Pump OFP01PA/OFP01KA starts	Engine starts ≤ 30 sec. (NFPA20)		
F.3.d.	Turn control switch of Diesel Fire Pump OFP01KA to Test	Control Switch to test		
F.3.e.	Close vent valve of OPSL-FP005 Fire Protection Header Low Pressure Switch	Vent Closed		/ /
F.3.f.	Open and Lock valve OFP131 Fire Protection Header Low Pressure Stop	Open		/ /
F.4.a.	Diesel OFP01KA No Abnormal noise or vibration	Normal		
F.4.b.	Fire pump right angle drive excessive vibration	Normal		
F.4.c.	Diesel fuel, lube oil, or water leaks	No leaks		

ATTACHMENT A

DIESEL FIRE PUMP OA (OFP01KA)
WEEKLY OPERATIONAL CHECK

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.4.d.	Diesel charging ammeter (on Diesel)	Between +1 and +15 amps		
F.4.e.	Control panel float charge ammeters	Zero + 1 Amps		
F.5.a.	Diesel charging current (on Diesel)	Between +1 and +15 amps		
F.5.b.	Lube Oil Pressure	35 - 85 psig		
F.5.c.	Cooling Water temperature	165°F - 195°F		
F.5.d.	Discharge pressure	145 - 165 psig		
F.9.	Diesel fire pump OFP01KA day tank level OFP01TA	≥ 13 " (130 gal) (T.S.)		
F.9.	Diesel Fire Pump OFP01KA day tank level OFP01TA	≥ 24 " (275 gal) (NFPA 20)		
F.9.	HPCS Diesel 1B fuel oil storage tank level 1D002T (required only if fire pump day tank was filled)	≥ 29,750 gals. (T.S.)		

ATTACHMENT A

DIESEL FIRE PUMP OA (OFPO1KA)
WEEKLY OPERATIONAL CHECK

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.10.	Check cooling system for leakage approximately 15 minutes after engine is shut down	No Leakage		
F.12.	Diesel fire pump room/diesel fire pump inspection. (Clean floor or wipe down diesel as needed)	Floor and diesel are clean		
F.13.	Run Time / None	≥ 30 Min.		
F.14.	Hour meter reading after surveillance completed	N/A		
F.15.	Diesel Fire Pump A Control Switch in Auto	Auto		

ATTACHMENT A
DIESEL FIRE PUMP OA (OFP01KA)
WEEKLY OPERATIONAL CHECK

COMMENTS:

_____

_____

_____

_____

_____

_____

_____

1. Surveillance performed by: _____ NAME/TIME/DATE

2. Unit Operator Review. _____ NSO SIGNATURE/TIME/DATE

3. Shift Supervisor review _____ SS SIGNATURE/DATE

4. Recorded on Operating Surveillance Schedule. _____ E.A. INITIALS

5. Data reviewed by Technical Staff. _____ TECH STAFF SIGNATURE/DATE

6. Data Sheet filed.

ATTACHMENT B

DIESEL FIRE PUMP OB (OFPO1KB)
WEEKLY OPERATIONAL CHECK

PRE-START CHECKLIST

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.1	Turn "B" Diesel Fire Pump (OFPO1KB) Control Switch to off	Off		
F.2.a.	Engine OFPO1KB Coolant Level	Between 1/2 full and 2 inches from full		
	If greater than 2 quarts of coolant was added to heat exchanger, Rad/Chem must be given a sample to ENSURE antifreeze protection greater than -30°F	Coolant sample delivered or N/A		
F.2.b/c	Inspect radiator neck and cap seating area. Check that cap "ears" are not bent - cap seats securely. Replace cap if needed	Radiator cap inspected		
F.2.d.	Right angle drive oil level	±1/2" of the "Oil Level" line		
F.2.e.	Engine OFPO1KB air cleaner pan oil level	Oil Level Mark		
F.2.f.	Engine OFPO1KB - 1 pint fuel oil drained	No water or sludge and cap reinstalled		
F.2.g.1.	Battery Electrolyte Level	Above the plates		

ATTACHMENT B

DIESEL FIRE PUMP OB (OFP01KB)
WEEKLY OPERATIONAL CHECK

PRE-START CHECKLIST

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.2.g.2.	Battery charger pilot light	On		
F.2.g.3.	Batteries NOTE: Clean when needed	Clean		
F.2.h.	Kim Hot Start	Warm to touch		
F.2.i.	Belt Tension	≤ 1" deflection		
	Belt Guard	No Cracks		
F.2.j.	Bump diesel over 3 times, Engine Oil level (add if necessary)	Diesel bumped/oil level on full mark		

ATTACHMENT B

DIESEL FIRE PUMP OB (OFP01KB)
WEEKLY OPERATIONAL CHECK

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.3.a.	Turn control switch of Diesel Fire Pump OFP01KB to Auto	Auto		
F.3.b.	Close valve OFP130 (Fire Protection Header Low Pressure Stop)	Closed		/ /
F.3.c.	Slowly vent OPSL-FP006 Fire Protection Header Low Pressure Switch until Diesel Fire Pump OFP01PB/OFP01KB starts	Engine starts ≤ 30 sec. (NFPA 20)		
F.3.d.	Turn control switch of Diesel Fire Pump OFP01KB to Test	Control Switch to test		
F.3.e.	Close vent valve of OPSL-FP006 Fire Protection Header Low Pressure Switch	Vent Closed		/ /
F.3.f.	Open and Lock valve OFP130 Fire Protection Header Low Pressure Stop	Open		/ /
F.4.a.	Diesel OFP01KB No Abnormal noise or vibration	Normal		
F.4.b.	Fire pump right angle drive excessive vibration	Normal		
F.4.c.	Diesel fuel, lube oil, or water leaks	No leaks		

ATTACHMENT B

DIESEL FIRE PUMP OJ (OFP01KB)
WEEKLY OPERATIONAL CHECK

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.4.d.	Diesel charging ammeter (on Diesel)	Between +1 and +15 amps		
F.4.e.	Control panel float charge ammeters	Zero ± 1 Amps		
F.5.a.	Diesel charging current (on Diesel)	Between +1 and +15 amps		
F.5.b.	Lube Oil Pressure	35 - 85 psig		
F.5.c.	Cooling Water temperature	165°F - 195°F		
F.5.d.	Discharge pressure	145 - 165 psig		
F.9.	Diesel fire pump OFP01KB day tank level OFP01TB	≥ 13 " (130 gal) (T.S.)		
F.9.	Diesel Fire Pump OFP01KB day tank level OFP01TB	≥ 24 " (275 gal) (NFPA 20)		
F.9.	HPCS Diesel 1B fuel oil storage tank level 1D002T (required only if fire pump day tank was filled)	≥ 29,750 gals. (T.S.)		

ATTACHMENT B

DIESEL FIRE PUMP OB (OFP01KB)
WEEKLY OPERATIONAL CHECK

PARAGRAPH NUMBER	DESCRIPTIONS AND ACTIONS	REQUIRED VALUE	OBSERVED WITHIN LIMITS	OPERATOR INITIALS
F.10.	Check cooling system for leakage approximately 15 minutes after engine is shut down	No Leakage		
F.12.	Diesel fire pump room/diesel fire pump inspection. (Clean floor or wipe down diesel as needed)	Floor and diesel are clean		
F.13.	Run Time / None	≥ 30 Min.		
F.14.	Hour meter reading after surveillance completed	N/A		
F.15.	Diesel Fire Pump B Control Switch in Auto	Auto		

ATTACHMENT B
DIESEL FIRE PUMP OB (OFP01KB)
WEEKLY OPERATIONAL CHECK

COMMENTS:

_____

_____

_____

_____

_____

_____

_____

1. Surveillance performed by: _____
NAME/TIME/DATE

2. Unit Operator Review. _____
NSO SIGNATURE/TIME/DATE

3. Shift Supervisor review _____
SS SIGNATURE/DATE

4. Recorded on Operating Surveillance Schedule. _____
E.A. INITIALS

5. Data reviewed by Technical Staff. _____
TECH STAFF SIGNATURE/DATE

6. Data Sheet filed.

FOR INFORMATION ONLY

Attachment (3)

TECHNICAL SPECIFICATION YARD LOOP FLOW TEST

A. PURPOSE

The purpose of this procedure is to outline the method used to conduct and perform a "Flow Test" in accordance with NFPA Chapter 5 Section 11 handbook and to meet the intent of Technical Specification 4.7.5.1.1.d. This is accomplished by forcing water around the loop (ring) header surrounding the plant and discharging it to the lake. There are ten (10) "feeders" to the plant of which only two (2) of these "feeders" are being used to allow water into the plant. (A Unit 1 feed and a Unit 2 feed.) See Diagram #1 of this procedure for pictorial flow of water around loop.

B. REFERENCES

1. S&L P&ID M-71, Sh. 1, 2.
2. S&L P&ID M-72, Sh. 1, 2.
3. S&L P&ID M-126, Sh. 1, 2, 3.
4. Fire Protection Handbook, 14th Edition, National Fire Protection Association - Chapter 5 Section 11.
5. LOP-FP-01, 02, 03, 05.
6. LOS-FP-W2.
7. CECo Vendor Manual No. 297 (CVI 1- Alison Controls Manual).
8. LST-82-177 and LST-82-178.
9. LTS-1000-15, Fire Suppression Water Systems Flow Tests.
10. LTS-1000-34, Fire Pump Annual Test.
11. NRC Inspection Report 50-374/83-48-23.
12. LaSalle County Station Unit 2 Facility Operating License NPF-18 Condition 2.C.15.d.
13. M&M Protection Consultants letter dated February 2, 1984. Letter describes flow test analysis. (See Attachment H.) This document can be found in Central File filed under Fire Protection.

C. PREREQUISITES

1. VERIFY Fire Protection Valves are lined up in accordance with Attachment A.

2. Perform Attachment A of LOP-FP-02, (Diesel Fire Pump Startup and Shutdown).

3. VERIFY Diesel Fire Pump OFP01KA and OFP01KB Day tanks are filled to capacity. RECORD on Attachment B.

4. Permission must be obtained from the Fire Marshal through the Shift Engineer prior to conducting this test. RECORD on Attachment B.

5. Notify the Shift Engineer upon completion of test activities. RECORD on Attachment B.

6. Equipment required:

   a. UL listed playpipes.

   b. Valve persuaders.

   c. CECo approved radios for all personnel participating in test.

   d. Calibrated Water Pressure Test Gauges.

   e. Drawings, Vendor Manuals as required.

   f. Operators must have keys to open locked valves.

7. VERIFY Diesel Fire Pumps OFP01KA and OFP01KB are in the AUTO Position. RECORD on Attachment B.

8. VERIFY calibration for the instruments listed on Attachment C. RECORD on Attachment C.

9. Flush water strainers on the piping entering the plant before and after Flow Test. RECORD on Attachment B.

10. VERIFY 1FP009 (for this test, closed end supply for U-1 - see Diagram #1) is OPEN. RECORD on Attachment B.

11. VERIFY 2FP006 (for this test, closed end supply for U-2 - see Diagram #1) is OPEN. RECORD on Attachment B.

12. To ensure surveillance can be adequately performed, REVIEW Fire Protection Out of Service Log and Degraded Equipment Log for any Fire Protection abnormalities for both Unit 1 and Unit 2. VERIFY this on Attachment B.

13. Inform Shift Engineer that no Fire Protection isolation valves shall be taken out of service during the performance of this surveillance. Have the Shift Engineer sign Attachment B.

14. It is requested that the CECo Corporate Fire Protection Engineer be present during the performance of this surveillance. The Station Fire Marshal is the only one who can waiver this prerequisite. Have the Fire Marshall sign Attachment B if this waiver is implemented.

15. VERIFY no other fire protection surveillances are being conducted simultaneous with this surveillance. Notify Shift Engineer of this prerequisite. This can also be waivered by the Fire Marshal. Document on Attachment B. (See E.3 for only exemption.)

16. The Station Fire Marshal and the Test Engineer performing this surveillance will review its entirety in detail prior to the test being performed. Document this on Attachment B.

D. PRECAUTIONS

1. During the performance of this test, the Diesel Fire pump n t under test will be returned to service immediately if the Diesel Fire pump under test should encounter problems or if there is a fire on site.

2. This test shall only be performed when two Diesel Fire Pumps are operable. VERIFY prior to starting test and RECORD on Attachment B.

3. If pressure is lost through out the plant (or just portions of plant), while performing flow test (IE: Blockage in flow path). Do Not change valve line-up. Proceed to close test manifold valves (obtaining a closed system) and shut down the running diesel. Notify the Shift Engineer and station Fire Marshal that a problem exists in the fire water system. With the Shift Engineer's guidance, isolate all the automatic deluge system valves in order to prevent spurious deluging. (IE: deluging a transformer). REFER to the following operating procedures to assure the correct valves are isolated.

   a. LOP-FP-05 - Charcoal Filter Beds Manual Deluge Valve Reset Operation and Initiation.

   b. LOP-FP-03 - Viking Automatic Deluge Valve Reset Operation and Manual Operation.

Proceed to find out where the problem exists (IE: Blockage). Once problem is found return system to normal via operating procedure (LOP-FP-01). Continue with the test when all systems are ready for operation.

4. In the event, the flow meter or Diesel Fire Pump discharge gauge should become non-usable during this surveillance, portable test equipment will be available and equipment to be used will be documented on Attachment I.

NOTE

To measure flow an alternate way, measure the differential pressure across the installed flow element OFE-FP012 with a differential pressure gauge with range of 0-300 inches of water column. (See Ref. LTS-1000-34.) Also pitot tube readings can be used.

If the Diesel Fire Pump pressure gauge fails, install precision pressure gauge at discharge of fire pump.

E. LIMITATIONS AND ACTIONS

1. This surveillance will be conducted at least once every (3) years.

2. The results of this test must meet the requirements of Technical Specification 4.7.5.1.1.d.

3. Perform LOS-FP-W2 (Weekly Test Run) in conjunction with this surveillance.

F. PROCEDURE

1. Install U.L. listed playpipes on the Flow Test Manifold valves. RECORD on Attachment D.

2. VERIFY valve OFP068A, OFP068B, and OFP143 are closed. RECORD on Attachment D.

3. Place the control switch for Diesel Fire Pump OFP01KB/OFP01PB in the OFF position. RECORD on Attachment D.

NOTE

This does not render the OB Diesel inoperable since an operator will be in attendance the entire duration of the flow test. If need be, the OB Diesel can be started at any point during the test.

4. Place the control switch for Diesel Fire Pump OFP01KA/OFP01PA in the TEST position (Diesel will start). RECORD on Attachment D.

5. OPEN valve OFP068B (FP Diesel capacity Test Header Stop) "SLOWLY" to prevent water hammer. RECORD on Attachment D.

6. Once valve OFP068B is open, "SLOWLY" open valve OFP143 (FP Diesel capacity test header stop). RECORD on Attachment D.

7. At the test flow manifold OPEN three valves. RECORD on Attachment D.

NOTE

Watch the flow from the test manifolds to insure nice steady stream. Monitor pressure gauges at sprinkler systems in Lake Screen House. If pressure begins to drop, close test manifold valves so that a closed system is obtained. Proceed to find out why a pressure drop was occurring.

8. Line-up valves in accordance with Attachment E. RECORD on Attachment D.

9. Close service water tie valves 1FP058 and 2FP058. RECORD on Attachment D.

NOTE

Watch the flow from the test manifolds to insure nice steady stream. Monitor pressure gauges at sprinkler systems in Lake Screen House. If pressure begins to drop, close teste manifold valves so that a closed system is obtained. Proceed to find out why a pressure drop was occurring.

10. CLOSE the three flow test manifold valves that were previously open in Step 7. RECORD on Attachment D.

11. If any of the Fire System Jockey Pumps are running - turn off. RECORD on Attachment D.

12. For each of the hose reels/fire hydrants listed in step 13, do the following:

    a. Open the subject valve/port for the hose reel/fire hydrant.

NOTE

If needed, put a hose on the connection so the water will flow where no damage will occur.

b. Flush the hose reel/fire hydrant to VERIFY a clear path from the loop header up through the hose reel/fire hydrant.

c. Place calibrated gauge on the hose reel/fire hydrant.

d. VERIFY gauge reads "some" pressure. (IE: is the needle deflecting).

RECORD the above steps on Attachment D.

13. Place pressure gauges at the following locations as specified by step 12. RECORD in conjunction with Step 12.

a. Fire hydrant FC 507

b. Fire hydrant FC 516

c. Fire hydrant FC 501.

d. Fire hydrant FC 515

e. Fire hydrant FC 519

f. Fire hydrant FC 517

g. Fire Hydrant FC 512

h. Fire hydrant FC 510

i. Fire hydrant FC 509

j. Hose reel FB 233 (inside Lake Screen)

14. OPEN valves on the test flow manifold until at least six (6) valves are open. Allow conditions to stabilize and then RECORD data as specified by Attachment F. RECORD on Attachment D.

15. PROCEED to CLOSE flow test manifold valves and RECORD data as specified by Attachment F. Continue until all valves on the test manifold are closed. RECORD on Attachment D.

NOTE

With three (3) valves open, the Fire Pump Discharge Relief Valve should be closed. When only two (2) or one (1) valve(s) remain open, the Relief Valve will probably be open, dumping water to the water tunnel. This should be observed and taken into account when determining friction loss for these flows.

This will be noted in Surveillance Evaluation. (See Attachment K.)

16. RETURN Fire Protection System valves to Normal position as specified by Attachment E. Leave valves OFP143 and OFP068B open. These valves will be closed in Step F.22.

17. Line-up valves in accordance with Attachment J. RECORD on Attachment D.

NOTE

This valve Line-up ensures flow through valve OFP081.

18. Open three (3) valves on the Test Manifold. RECORD on Attachment D.

19. VERIFY nice flow of water through the discharge manifold valves. RECORD on Attachment D.

20. Close three (3) manifold valves previously opened in Step F.18. RECORD on Attachment D.

21. CLOSE valves OFP143, FP Diesel Capacity test header stop and OFP068B, FP Diesel capacity test header stop. RECORD on Attachment D.

22. RETURN valves to Normal position as specified by Attachment J and Attachment E.

23. OPEN service water tie valves 1FP058 and 2FP058. RECORD on Attachment D.

24. TURN Jockey Pumps ON. RECORD on Attachment D.

25. Shutdown Fire Pump Diesel OFP01KA, OFP01PA by placing control switch in the OFF position. As soon as "Diesel Shutdown", place control switch in the AUTO position. RECORD on Attachment D.

26. Place the control switch for Diesel Fire Pump OFP01KB/OFP01PB in the AUTO position. RECORD on Attachment D.

27. At hose reels/fire hydrants in step F.13, remove the previously placed pressure gauges. RECORD on Attachment D.

28. DRAIN Test Header. RECORD on Attachment D.

29. Determine the pressure drop (ΔP) between the installed pressure gauges as specified by Attachment G.

NOTE

Large pressure drop between any two gauges denotes some type of blockage.

30. Using the data from Attachment G, determine the differential pressure from the pump discharge gauge to the individual pressure gauges for all five (5) flows. Plot differential pressure versus the corresponding flow for the number of valves open. For example: with six (6) valves open, the first graph would be (PD-FC 307) ΔP versus measured flow. Plot curves on Attachment H.

31. Compare the above graph(s) to the acceptance criteria of Attachment H.

NOTE

Acceptance criteria has been provided by M&M Protection Consultants. See Reference B.13.

32. If the "actual" pressure versus flow graph (curve) falls above the given acceptance criteria of Attachment H, NOTIFY Corporate Engineering so that a prompt evaluation can be made.

33. The test evaluation will be included as Attachment K. This will be reviewed by the Station Fire Marshal and Technical Staff Supervisor.

34. Route completed Attachments in accordance with LTP-100-3.

G. CHECKLISTS

1. None.

H. TECHNICAL SPECIFICATION REFERENCES

1. 3.7.5.1.

2. e.7.5.1.1.d.

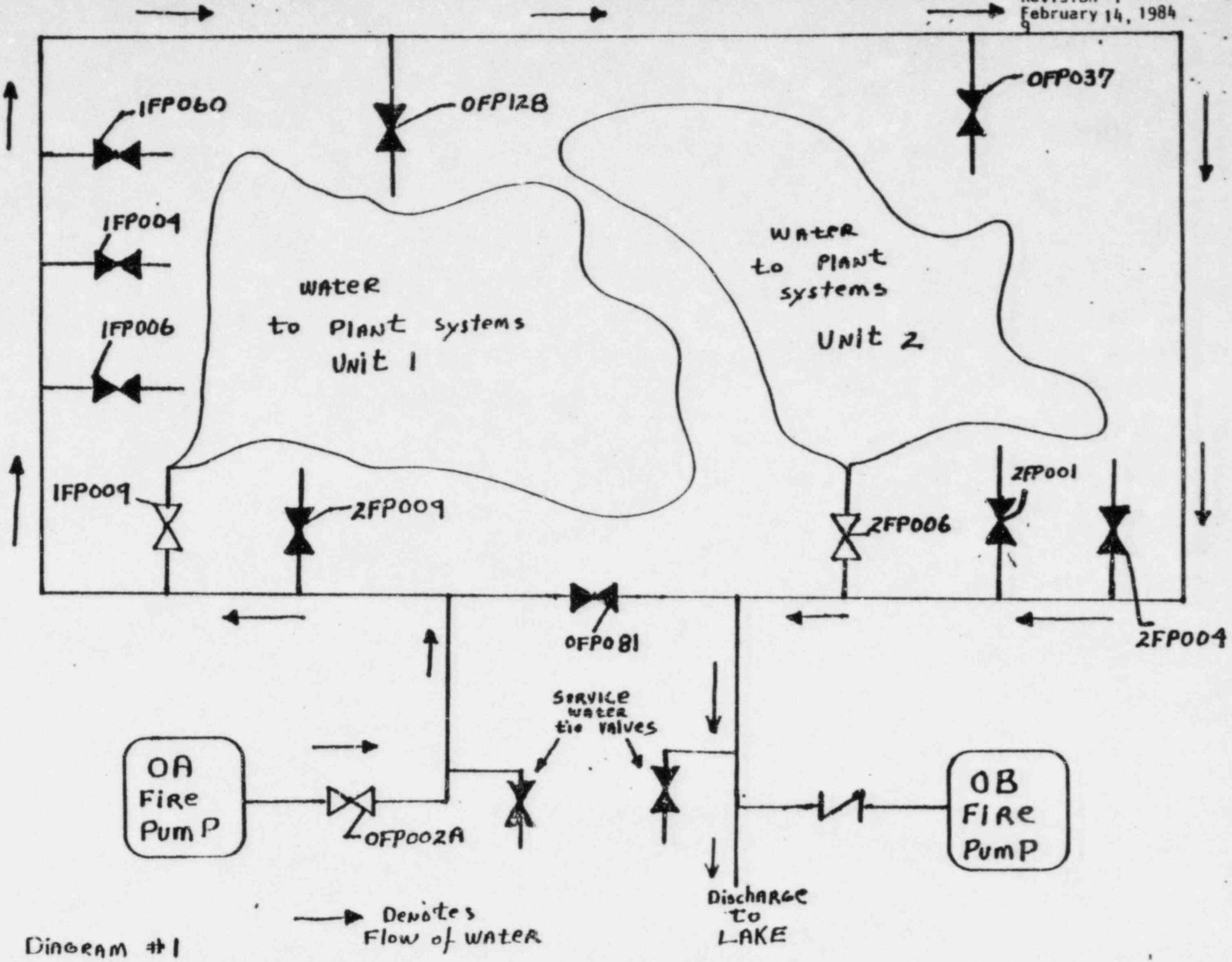
1FP060
0FP128
0FP037
1FP004
1FP006
WATER
to PLANT systems
UNIT 1
WATER
to PLANT
systems
UNIT 2
1FP009
2FP009
2FP006
2FP001
2FP004
0FP081
SERVICE
WATER
tie VALVES
0A
Fire
PumP
0FP002A
0B
Fire
PumP
Discharge
to
LAKE
Denotes
Flow of WATER

DIAGRAM #1

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
0FP037	FP System Stop to Service Bldg.	80' W. of Service Bldg. Main Entrance	Locked Open	_____	_____
0FP016	FP Main Ring Header Stop	80' W. of Service Bldg. Main Entrance	Locked Open	_____	_____
0FP096	FP Main Ring Header Stop	80' W. of Service Bldg. Main Entrance	Locked Open	_____	_____
0FP017	FP Main Ring Header Stop	10' N. of Unit #2 Turbine Bldg. N.E. Corner	Locked Open	_____	_____
0FP018	FP Main Ring Header Stop	10' N. of Unit #2 Turbine Bldg. N.E. Corner	Locked Open	_____	_____
0FP019	FP Main Ring Header Stop	10' N. of Unit #2 T.B. N.E. Corner	Locked Open	_____	_____
0FP014	FP Main Ring Header Stop	10' N. of Unit #2 T.B. N.E. Corner	Locked Open	_____	_____
2FP001	Main Ring Header to Unit 2 Ring Header Cross-tie Stop	10' N. of Unit 2 T.B. N.E. Corner	Locked Open	_____	_____
2FP004	Main Ring Header to Unit 2 Ring Header Cross-tie Stop	10' N. of Unit 2 T.B. N.E. Corner	Locked Open	_____	_____
2FP006	Unit 2 FP Transformer Deluge System Header Stop	10' N. of Unit 2 T.B. N.E. Corner	Locked Open	_____	_____
0FP104	FP Main Ring Header Stop	300' E. of Unit 2 T.B. Trackway Door	Locked Open	_____	_____

* NO FURTHER ENTRIES *

Oper__________________/Date__________ UNIT - __________________ Mechanical Check LTS 30-__________

(System)

Oper__________________/Date__________

Oper__________________/Date__________ ATTACHMENT A - Initial Valve Line-Up

(Description)

Oper__________________/Date__________

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
OFP003	FP Main Ring Header Stop	300' E. of Unit 2 TB Trackway Door	Locked Open	______	__________
OFP004	FP A Supply Stop to Main Ring Header	200' E. of Unit 2 System Aux. Transformer	Locked Open	______	__________
OFP113	FP Main Ring Header Stop	200' E. of Unit 2 System Aux. Transformer	Locked Open	______	__________
OFP020	FP B Supply Stop to Main Ring Header	200' E. of Unit 2 System Aux. Transformer	Locked Open	______	__________
OFP106	FP Main Ring Header Stop	200' E. of Unit 2 System Aux. Transformer	Locked Open	______	__________
OFP081	FP Main Ring Header Stop	200' East of Unit 2 SAT	Locked Open	______	__________
OFP080	FP Unit B Supply to Main Ring Header	150' W. of LSH N.W. Corner	Locked Open	______	__________
OFP050	FP Diesel Pumps Capacity Test Line Drain	LSH Outside 6' E. of N.E. Corner	Sealed Closed	______	__________
No EPN	DFP Test Manifold Test Valve	Outside LSH 6' East of N.E. Corner	Closed	______	__________
No EPN	DFP Test Manifold Test Valve	Outside LSH 6' East of N.E. Corner	Closed	______	__________
No EPN	DFP Test Manifold Test Valve	Outside of LSH 6' East of N.E. Corner	Closed	______	__________
No EPN	DFP Test Manifold Test Valve	Outside LSH 6' East of N.E. Corner	Closed	______	__________

* NO FURTHER ENTRIES *

Oper _____ /Date _____ Unit - _____ Mechanical Checklist

Oper _____ /Date _____ (System)

Oper _____ /Date _____ ATTACHMENT A - Initial Valve Line-Up

Oper _____ /Date _____ (Description)

LTS 00-_____

Revision 1

Date February 1984

Valve Number	Valve Description	Location	Position	Ck Init	Remarks/Deficiencies
No EPN	DFP Test Manifold Test Valve	Outside LSH 6' East of N.E. Corner	Closed	_____	_____
No EPN	DFP Test Manifold Test Valve	Outside LSH 6' East of N.E. Corner	Closed	_____	_____
No EPN	DFP Test Manifold Test Valve	Outside LSH 6' East of N.E. Corner	Closed	_____	_____
No EPN	DFP Test Manifold Test Valve	Outside LSH 6' East of N.E. Corner	Closed	_____	_____
OFP143	FP Diesel Capacity Test Headed Stop	LSH 714' North of Traveling Screen 2F	Locked Closed	_____	_____
OFP150A	FP Diesel Pumps Flow Instrument OFI-FP012 Root	LSH 714' Above Traveling Screen 2F	Sealed Open	_____	_____
OFP150B	FP Diesel Pumps Flow Instrument OFI-FP012 Root	LSH 714' Above Traveling Screen 2F	Sealed Open	_____	_____
OFP002B	B Diesel Fire Pump Discharge Stop	LSH 714' in "B" Diesel Fire Pump Room	Locked Open	_____	_____
OFP053B	B FP Diesel Coolant Stop	LSH 714' in "B" Diesel Fire Pump Room	Sealed Open	_____	_____
OFP052B	B FP Diesel Fire Pump Discharge Header Drain Stop	LSH 714' in "B" Diesel Fire Pump Room	Locked Closed	_____	_____
OFP068B	B FP Diesel Capacity Test Header Stop	LSH 714' in "B" Diesel Fire Pump Room	Locked Closed	_____	_____

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
OFP108B	B Fire Pump Instrument Root Valve (OPI-FP007)	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
OFP130	B Fire Pump Main Header Instrument Root Valve	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
No EPN	DFP B Cooling Water Reg. Inlet	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
No EPN	DFP B Cooling Water Reg. Outlet	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
No EPN	DFP B Cooling Water Reg. Bypass	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
No EPN	DFP B Internal Cooling Water Inlet	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
No EPN	DFP B Internal Cooling Water Outlet	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
No EPN	DFP B Right Angle Drive Cooling Water Outlet	LSH 714' in "B" Diesel Fire Pump Room	Locked Open		
200026	B Diesel Fire Pump Fuel Suction	LSH 714' in "B" Diesel Fire Pump Room	Sealed Open		
OFP070	FP Unit A Supply to Main Ring Header Stop	LSH 683' Above and N. of 1B SW Pump	Locked Open		
OFP068A	"A" FP Diesel Capacity Test Header Stop	LSH 714' in "A" Diesel Fire Pump Room	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
OFP053A	"A" FP Diesel Coolant Stop	LSH 714' in "A" Diesel Fire Pump Room	Sealed Open		
OFP002A	"A" FP Diesel Capacity Test Header Stop	LSH 714' in "A" Diesel Fire Pump Room	Locked Open		
OFP052A	"A" FP Diesel Fire Pump Discharge Header Drain Stop	LSH 714' in "A" Diesel Fire Pump Room	Sealed Closed		
OFP108A	"A" Fire Pump Discharge Test Connection Stop	LSH 714' in "A" Diesel Fire Pump Room	Sealed Open		
No EPN	Inlet Root OPI-FP003	LSH 714' in DFP A Room	Locked Open		
No EPN	Diesel Fire Pump "A" Cooling Water Reg. Inlet	LSH 714' in DFP "A" Room	Sealed Open		
No EPN	Diesel Fire Pump "A" Cooling Water Reg. Outlet	LSH 714' in DFP "A" Room	Sealed Open		
No EPN	"A" Diesel Fire Pump Cooling Water Regulator Bypass Stop	LSH 714' in DFP "A" Room	Sealed Closed		
No EPN	"A" Diesel Fire Pump Cooling Water Wye Strainer Drain Stop	LSH 714' in DFP "A" Room	Sealed Closed		
No EPN	"A" Diesel Fire Pump Internal Cooling Water Filter Inlet Stop	LSH 714' in DFP "A" Room	Sealed Open		
No EPN	"A" Diesel Fire Pump Internal Cooling Water Filter Outlet Stop	LSH 714' in DFP "A" Room	Sealed Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
No EPN	"A" Diesel Fire Pump Right Angle Gear Drive Cooling Water Discharge Stop	LSH 714' in DFP "A" Room	Sealed Throttled Turns Open From Closed		
0FP131	Fire Protection Header Pressure Switch and Transmitter Root Stop	LSH 714' in "A" Diesel Fire Pump Room	Locked Open		
1DO026	"A" FP Diesel Fire Pump Fuel Suction	LSH 714' in "A" Diesel Fire Pump Room	Sealed Open		
0FP012	FP Main Ring Header Stop	60' N.E. of Equipment Access Bldg.	Locked Open		
0FP013	FP Main Ring Header Stop	60' N.E. of Equipment Access Bldg.	Locked Open		
2FP009	Main Ring Header to Unit 2 Ring Header Cross-tie Stop	60' N.E. of Equipment Access Bldg.	Locked Open		
1FP009	Unit 1 FP Header Stop	150 E. of Unit RB S.E. Corner	Locked Open		
0FP010	FP Main Ring Header Stop	150' E. of Unit 1 RB S.E. Corner	Locked Open		
0FP011	FP Main Ring Header Stop	150' E. of Unit 1 RB S.E. Corner	Locked Open		
1FF006	FP Main Ring Header Stop	20' S. of Well Water Stop	Locked Open		
0FP008	FP Main Ring Header Stop	200' S. of Unit 1 TB Trackwa Door	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
0FP009	FP Main Ring Header Stop	200' S. of Unit 1 TB Trackway Door	Locked Open		
1FP001	Unit 1 FP Turbine Building Fire Main Stop	20' S. of Well Water Bldg.	Locked Open		
1FP004	Unit 1 FP Feedpump and Turbine Building System Header Stop	20' S. of Well Water Bldg.	Locked Open		
0FP005	FP Main Ring Header Stop	20' S. of Well Water Bldg.	Locked Open		
0FP006	FP Main Ring Header Stop	20' S. of Well Water Bldg.	Locked Open		
0FP007	FP Main Ring Header Stop	20' S. of Well Water Bldg.	Locked Open		
0FP128	FP Radwaste Building Stop	105' W. of Radwaste Bldg. S.W. Corner	Locked Open		
0FP075	FP Main Ring Header Stop	105' W. of Radwaste Bldg. S.W. Corner	Locked Open		
0FP076	FP Main Ring Header Stop	105' W. of Radwaste Bldg. S.W. Corner	Locked Open		
0FP164	SB Header Stop	SB 710' in Storeroom Near Lobby Access Door	Locked Open		
0FP060	FP System Stop to Service Building	SB 710' Storeroom S.W. Corner	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
OFP150	FP Service Building Header Strainer Drain Stop	SB 710' Storeroom S.W. Cornerr	Sealed Closed	_____	_____
OFP163	SB Header Stop	SB 710' Machine Shop by Tool Crib	Locked Open	_____	_____
OFP087	FP Service Building Header Stop	SB 710' Machine Stop Near Planners and EA's Office	Locked Open	_____	_____
OFP120	FP Unit 2 and Main Ring Header Cross-tie Stop	TB 710' Col. V-28 N. of Bus 234B	Locked Open	_____	_____
1FP114	Unit 1 FP Ring Header Stop	TB 710' LP Heater Bay Overhead Near Cond. Hood "B"	Locked Open	_____	_____
1FP112	FP Construction Office Stop	8' E. of Construction Office	Locked Open	_____	_____
1FP208	RW Building Fire Protection Header Stop	RW 734' 15' N. of Stairway	Locked Open	_____	_____
1FP149	FP Unit 1 to Main Ring Header Cross-tie Drain (Strainer Drain)	RW 734' Col. Ya-12 at Top of Stairway	Sealed Closed	_____	_____
1FP173	FP Diesel Gen. Header Stop	710' 1A DG Room Overhead E. of DG Control Room	Locked Open	_____	_____
OFP127	FP Fire Hose Reel Header Stop and Cross-tie	TB 710' W. of EHC Unit	Locked Open	_____	_____
1FP104	Unit 1 FP Ring Header Stop	TB 710' 10' N.W. of Bus 131A	Locked Open	_____	_____

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
1FP105	Unit 1 FP Ring Header Stop	TB 710' 10' N.W. of Bus 131A	Locked Open	_____	_____
1FP166	Unit 1 FP Ring Header Stop	TB 710' Col. V-15 30' N.E. of Bus 131A	Locked Open	_____	_____
1FP167	Unit 1 FP Ring Header Stop	TB 710' Col. V-15 30' N.E. of Bus 131A	Locked Open	_____	_____
OFP119	FP Unit 1 and 2 Auxiliary Building Cross-tie Stop	TB 710'Col. R-15 20' W. of AB Elev.	Locked Open	_____	_____
1FP003	Unit 1 FP Cross-tie to Reactor Bldg. and Auxiliary Bldg. Stop	AB 710' N.W. Corner of Cardox Unit	Locked Open	_____	_____
OFP054	Unit 2 FP Turbine Building Cross-tie Stop	AB 710' by N.W. Corner of Cardox Unit	Locked Open	_____	_____
1FP076	Unit 1 FP Main Ring Header Stop	AB 710' Col. R-14 on Grating 25' W. of Cardox Unit	Locked Open	_____	_____
1FP100	Unit 1 FP Main Ring Header Stop	AB 710' Col. R-14 on Grating 25' W. of Cardox Unit	Locked Open	_____	_____
1FP005	Unit 1 FP Turbine Building to Diesel Gen. Room Cross-tie Stop	TB 710' Col. R-8 30' W. of 1B DG Room	Locked Open	_____	_____
1FP205	TB Fire Protection Header Stop	TB 710' Col. R-8 30' W. of 1B DG Room	Locked Open	_____	_____
1FP106	Unit 1 FP Ring Header Stop	TB 710' Col. R-8 30' W. of 1B DG Room	Locked Open	_____	_____

* NO FURTHER ENTRIES *

Oper______/Date______
Oper______/Date______
Oper______/Date______

ATTACHMENT A - Initial Valve Line-Up
(Description)

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
1FP206	TB Fire Protection Header Stop	TB 710' Col. R-8 30' W. of 1B DG Room	Locked Open	______	______
1FP110	Unit 1 FP Ring Header Stop	TB 710' Col. R-8 25' W. of 1B DG Room	Locked Open	______	______
1FP056	Unit 1 Ring Header Stop	TB 710' in Trackway S. of MCC 132Y-3	Locked Open	______	______
1FP088	FP Unit 1 Ring Header Stop	TB 710' E. Side of Trackway S. of MCC 132Y-3	Locked Open	______	______
1FP008	Unit 1 FP Transformer Deluge Header Stop	TB 710' N. of Col. R-3 E. Side of Trackway	Locked Open	______	______
1FP143	FP Unt 1 Transformer Deluge Header Strainer Drain	TB 710' Col. R-3 E. Side of Trackway	Sealed Closed	______	______
1FP010	Unit 1 FP Transformer Deluge Header Stop	TB 710' Col. R-3 E. Side of Trackway	Sealed Open	______	______
1FP204	TB Fire Protection Header	TB 710' E. Side of Trackway by Rolling Door	Locked Open	______	______
1FP002	Unit 1 FP Fire Hose Reel and Sprinkler System Header Stop	TB 710' E. of Demin. Regen Waste Trans. Pumps	Locked Open	______	______
1FP049	FP Main Ring Header Cross-tie Stop	TB 710' E. of Demin. Regen Waste Trans. Pumps	Locked Open	______	______
1FP060	FP Main Ring Header Cross-tie Stop	TB 710' E. of Demin. Regen Waste Trans. Pumps	Locked Open	______	______

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
1FP212	TB Fire Protection Header Stop	TB 710' E. of Demin. Regen Waste Trans. Pumps	Locked Open		
1FP061	FP Main Ring Header Cross-tie	TB 710' E. of Demin. Regen Waste Trans. Pumps	Locked Open		
1FP080	Unit 1 FP Main Ring Header Stop	TB 710' E. of Demin. Regen Waste Trans. Pumps	Locked Open		
1FP081	FP Unit 1 Ring Cross-tie Strainer Drain	TB 710' E. of Demin. Regen Waste Trans. Pumps	Sealed Closed		
1FP082	FP Unit 1 Ring Cross-tie Strainer Drain	TB 710' E. of Demin. Regen Waste Trans. Pumps	Sealed Closed		
1FP207	TB Fire Protection Header Stop	TB 710' E. of CY/HC Level Standpipes	Locked Open		
1FP144	FP Auxiliary Bldg. to Reactor Bldg. Cross-tie Stop	AB 692' Col. L-14 S. of Turbine Oil Sotrage Room	Locked Open		
0FP055	FP Cross-tie Stop Units 1 and 2	AB 692' Col. J-16 E. of Clean and Dirty Oil Tank Room	Locked Open		
1FP141	FP Fire Hose Reel Header Stop	AB 786' Col. J-14 Overhead East of VR Fans	Locked Open		
1FP210	AB Fire Header Stop	AB 786' Above RB Vent Exh. CAM	Locked Open		
1FP211	AB Fire Header Stop	AB 786' Above RB Vent Isol. Damper Cont. Panel	Locked Open		

* NO FURTHER ENTRIES *

ATTACHMENT A - Initial Valve Line-Up
(Description)

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
1FP140	FP Fire Hose Reel Header Stop	AB 786' Col. J-10 Near S. Stairway	Locked Open		
1FP173	FP Diesel Gen. Header Stop	710' 1A DG Room Overhead E. of DG Control Panel	Locked Open		
1FP171	FP Diesel Gen. Header Stop	710' 1A DG Room Above DG Control Panel	Locked Open		
1FP153	FP Diesel Gen. Header Stop	674' on Grating Above "0" DG Cooling Water Pump	Locked Open		
1FP154	FP Diesel Gen. Header Stop	674' on Grating Above "0" DG Cooling Water Pump	Locked Open		
1FP054	FP Rx Bldg. to Diesel Rooms Cross-tie Stop	674' on Grating Above "0" DG Cooling Water Pump	Locked Open		
1FP170	FP Diesel Gen. Header Stop	674' on Grating Above "0" DG Cooling Water Pump	Locked Open		
1FP168	FP Diesel Gen. Header Stop	674' on Grating Above "0" DG Cooling Water Pump	Locked Open		
1FP209	FP Diesel Gen. Header Stop	674' on Grating Above "0" DG Cooling Water Pump	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
1FP169	FP Diesel Gen. Header Stop	674' on Grating Above 1A DG Cooling Water Pump	Locked Open		
1FP172	FP Diesel Gen. Header Stop	674' Overhead in 1B DG Cooling Water Pump Room	Locked Open		
1FP047	FP Fire Hose Reel Header and Unit 1 Rx/Aux. Cross-tie Stop	RB 740' N. of RB Elevator	Locked Open		
1FP055	FP Fire Hose Reel Header and Unit 1 Rx/Aux. Cross-tie Stop	RB 740' by CRD Repair Room	Locked Open		
1FP050	FP Cross-tie Line to Reactor Building Strainer Drain	RB 710' Col. A-10 N. of "B" RHR Hx	Sealed Closed		
1FP124	FP Reactor Bldg. Header Stop	RB 710' S.E. Corner N. of "B" RHR Hx	Locked Open		
1FP125	FP Reactor Bldg. Header Stop	RB 710' S.E. Corner N. of "B" RHR Hx	Locked Open		
1FP063	FP Main Ring Header to Rx Bldg. Stop	RB 710' Col. A-11 N. of "B" RHR Hx	Locked Open		
1FP134	FP Reactor Bldg. to Filter Bldg. Cross-tie	OG B 710' W. of HVAC Exhaust Filter Unit "A"	Locked Open		
0FP073	FP Fire Hose Reel Header to Filter Building Stop	OG B 710' W. of "A" HVAC Air Handling Unit	Locked Open		
0FP074	FP Fire Hose Reel Header to Filter Building Stop	OG B 674' W. Side N. of Stairs	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
1FP131	FP Reactor Bldg. Unit 1 Hose Reel Header Stop	RB 740' by CRD Repair Room	Locked Open		
1FP132	FP Unit 1 and Unit 2 Cross-tie Stop	RB 740' by CRD Repair Room	Locked Open		
1FP133	Unit 1 FP Reactor Bldg. Hose Reel Header Stop	RB 740' by RD Repair Room	Locked Open		
1FP126	FP Reactor Bldg. Header Stop	RB 710' N. of Elevator and W. of DW Equip. Drain Pumps	Locked Open		
1FP128	FP Reactor Bldg. Header Stop	RB 710' N. of Elevator and W. of DW Equip. Drain Pumps	Locked Open		
1FP127	FP Reactor Bldg. to Auxiliary Bldg. Cross-tie Stop	RB 710' N. of Elevator and W. of DW Equip. Drain Pumps	Locked Open		
2FP112	FP Unit 2 Ring Header Stop	TB 710' Col. V-20 Overhead Rear Grating on 728'	Locked Open		
2FP155	FP Unit 2 Ring Header Stop	TB 710' Col. V-18 15' N. of Cond. Ext. Tank 2AS01T	Locked Open		
2FP156	FP Unit 2 Ring Header Stop	TB 710' Col. V-19 25' S. of "A" Cond. Hood	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
2FP073	FP Unit 2 Ring Header Stop	TB 710' Col. V-28 15' E. of Service Bldg. Elevator	Locked Open		
2FP114	FP Unit 2 Ring Header Stop	TB 710' Col. V-28 15' E. of Service Bldg. Elevator	Locked Open		
2FP049	FP Main Ring Header to Unit 2 Ring Header Stop	TB 710' Col. R-27 S. of RLC 214	Locked Open		
2FP060	FP Main Ring Header to Unit 2 Ring Header Stop	TB 710' Col. R-27 S. of RLC 214	Locked Open		
2FP081	FP Unit 2 Ring Cross-tie Strainer Drain	TB 710' Col. R-27 S. of RLC 214	Sealed Closed		
2FP082	FP Unit 2 Ring Cross-tie Strainer Drain	TB 710' Col. R-27 S. of RLC 214	Sealed Closed		
2FP002	Unit 2 Ring Header Stop	TB 710' Col. R-27 Overhead S. of RLC 214	Locked Open		
2FP143	FP Unit 2 Transformer Deluge Header Strainer Drain	TB 710' Between Col. R-25 and R-26	Sealed Closed		
2FP010	Unit 2 FP Transformer Deluge System Header Stop	TB 710' Cols. R-25 and R-26 Along E. Wall	Locked Open		
2FP008	Unit 2 FP Transformer Deluge System Header Stop	TB 710' Cols. R-25 and R-26 Along E. Wall	Locked Open		
2FP056	FP Unit 2 Ring Header Stop	TB 710' Overhead at Col. R-25	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
2FP088	FP Unit 2 Ring Header Stop	TB 710' Overhead at Col. R-25	Locked Open	_____	_____
2FP005	Unit 2 Turbine Bldg. to Diesel Generator Room Cross-tie Stop	TB 710' Col. R-22 N. of "B" HP Htr. Room	Locked Open	_____	_____
2FP202	TB Fire Protection Header Stop	TB 710' W. of "2B" DG Room	Locked Open	_____	_____
2FP203	TB Fire Protection Header Stop	TB 710' W. of "2B" DG Room	Locked Open	_____	_____
2FP106	FP Unit 2 Ring Header Stop	TB 710' Col. R-22 N. of "B" HP Htr. Room	Locked Open	_____	_____
2FP110	FP Unit 2 Ring Header Stop	TB 710' Col. R-22 N. of "B" HP Htr. Room	Locked Open	_____	_____
2FP171	Unit 2 Diesel Oil Tanks FP Header Stop	710' Col. J-22 Overhead 10' S. of 2A DG Air Compt. Unit	Locked Open	_____	_____
2FP154	Unit 2 Diesel Oil Tank FP Header Stop	710' 10' S. of 2A DG Control Panel	Locked Open	_____	_____
2FP176	Aux. Bldg. Header Drain	AB 786' E. of the Stairs to the U-2 Pri. Cont. Purge Filter	Sealed Closed	_____	_____
2FP100	FP Unit 2 Ring Header Stop	TB 710' Col. R-15 20' W. of Aux. Bldg. Elevator	Locked Open	_____	_____
2FP140	FP Aux. Bldg. Header Stop	AB 786' Col. L-21 Overhead 10' N. of SWGR 232X	Locked Open	_____	_____

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
2FP141	FP Hose Reel Header Stop	AB 786' in VR Fan Room 3' E. of Fan 2VR02C	Locked Open		
2FP205	Aux. Bldg. Header Stop	AB 786' Above U-2 Rx Bldg. Vent. Exh. Isol. Dampers	Locked Open		
2FP204	Aux. Bldg. Header Stop	AB 786' E. of the Stairs to the U-2 Pri. Cont. Purge Filter	Locked Open		
2FP169	Unit 2 Diesel Oil Tanks FP Header Stop	687' 30' N.W. of Dis 243 through Water Tight Doors	Locked Open		
2FP054	FP Rx Bldg. to Diesel Rooms Cross-tie Stop	674' on Grating Above "B" RHR S.W. Strainer	Locked Open		
2FP153	Unit 2 Diesel Oil Tanks FP Header Stop	674' on Grating Above "B" RHR S.W. Strainer	Locked Open		
2FP168	Unit 2 Diesel Oil Tanks FP Header Stop	674' on Grating Above "B" RHR S.W. Strainer	Locked Open		
2FP170	Unit 2 Diesel Oil Tanks FP Header Stop	674' on Grating Above "B" RHR S.W. Strainer	Locked Open		
2FP055	FP Hose Reel Header and U-2 Rx/Aux. Cross-tie	RB 740' Col. E-20 8' S.W. of HCC 232-2	Locked Open		
2FP047	FP Hose Reel Header and U-2 Rx/Aux. Cross-tie Stop	RB 740' Col. J-16 Next to RB Elevator	Locked Open		

* NO FURTHER ENTRIES *

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
2FP132	FP Cross-tie Stop Unit 1 and Unit 2	RB 710' Col. A-16 N. of "B" RHR Hx.	Locked Open		
2FP124	FP Unit 2 Reactor Building Header Stop	RB 710' Col. A-16 N. of "B" RHR Hx.	Locked Open		
2FP125	FP Unit 2 Reactor Building Header Stop	RB 710' Col. A-16 N. of "B" RHR Hx.	Locked Open		
2FP050	FP Main Ring Header	RB 710' Col. A-19 and A-20 30' S. of Stairway	Locked Open		
2FP133	FP Unit 2 Reactor Bldg. Header Stop	RB 710' Col. A-19 and A-20 30' S. of Stairway	Locked Open		
2FP063	FP Main Ring Header to Unit 2 Fire Hose Reel Header	RB 710' Col. A-19 and A-20 30' S. of Stairway	Locked Open		
2FP131	FP Unit 2 Reactor Building Header Stop	RB 710' Col. A-19 and A-20 30' S. of Stairway	Locked Open		
2FP126	FP Unit 2 Reactor Bldg. Header Stop	RB 710' Col. J-17 25' N. of RB Elevator	Locked Open		
2FP127	FP Cross-tie Stop Unit 1 and Unit 2	RB 710' Col. J-17 25' N. of RB Elevator	Locked Open		
2FP128	FP Unit 2 Reactor Bldg. Header Stop	RB 710' Col. J-17 25' N. of RB Elevator	Locked Open		
0FP170	FP Main Ring Header Stop	120' N. of Service Bldg. N.W. Corner	Locked Open		

* NO FURTHER ENTRIES *

ATTACHMENT A - Initial Valve Line-Up
(Description)

Valve Number	Valve Description	Location	Position	Ck Int	Remarks/Deficiencies
OFP171	FP Main Ring Header Stop	120' N. of Service Bldg. S.W. Corner	Locked Open		
OFP172	FP Main Ring Header Stop	15' N. of N.E. Corner of Security/TSC DG Bldg.	Locked Open		
OFP173	FP Main Ring Header Stop	15' N. of N.E. Corner of Security/TSC DG Bldg.	Locked Open		

* NO FURTHER ENTRIES *

ATTACHMENT B

PREREQUISITES AND PRECAUTIONS FOR
TECHNICAL SPECIFICATIOAN YARD LOOP FLOW TEST

Step	Condition Required	Checked	Init/Date
C.3	Diesels OFP01KA and OFP01KB Day Tanks are filled to capacity.		
C.4	Permission obtained from Fire Marshal via Shift Engineer		
C.5	Shift Engineer notified of completion of Test		
C.7	Diesels OFP01KA and OFP01KB are in AUTO		
C.9	Strainers Flushed before test.		
C.9	Strainers flush after test.		
C.10	VERIFY 1FP009 is OPEN (Normal position)		
C.11	VERIFY 2FP006 is OPEN (Normal position)		

ATTACHMENT B

PREREQUISITES AND PRECAUTIONS FOR
TECHNICAL SPECIFICATIOAN YARD LOOP FLOW TEST

Step	Condition Required	Checked	Init/Date
C.12	Fire Protection Out of Service Log and Degraded Equipment Log Reviewed		
C.13	Shift Engineer notified that no F.P. isolation valves shall be taken Out of Service Shift Engineer _____/_____		
C.14	CECo F.P. Engineer requested to be present during surveillance. Fire Marshal can waiver this prerequisite Fire Marshal _____/_____		
C.15	VERIFY no other F.P. surveillances are being conducted simultaneous with this surveillance. Shift Engineer shall be aware of this. This prerequisite can be waivered by Fire Marshall Shift Engineer _____/_____ Fire Marshal _____/_____		
C.16	Station Fire Marshal and Cognizant Engineer have reviewed surveillance in detail		
D.2	Diesels OFP01KA and OFP01KB are operable		

DOCUMENT ID 0025T/

ATTACHMENT C

LIST OF CALIBRATED INSTRUMENTATION TO BE USED ON THE
TECHNICAL SPECIFICATION YARD LOOP FLOW TEST

EPN #	LAST CALIBRATED DATE	NEXT CALIBRATION DUE DATE	INT/DATE

Flow meter (indicator and element)
OFI-FP012 and OFE-FP012

DFP OA Discharge pressure
gauge OPI-FP003

Water Pressure Test Gauge #1
EPN #_____
To be used at FC 507

Water Pressure Test Gauge #2
EPN #_____
To be used at FC 516

Water Pressure Test Gauge #3
EPN #_____
To be used at FC 501

Water Pressure Test Gauge #4
EPN #_____
To be used at FC 515

DOCUMENT ID 0025T/

ATTACHMENT C

LIST OF CALIBRATED INSTRUMENTATION TO BE USED ON THE
TECHNICAL SPECIFICATION YARD LOOP FLOW TEST

EPN #	LAST CALIBRATED DATE	NEXT CALIBRATION DUE DATE	INT/DATE

Water Pressure Test Gauge #5
EPN #_____
To be used at FC 519

Water Pressure Test Gauge #6
EPN #_____
To be used at FC 517

Water Pressure Test Gauge #7
EPN #_____
To be used at FC 512

Water Pressure Test Gauge #8
EPN #_____
To be used at FC 510

Water Pressure Test Gauge #9
EPN #_____
To be used at FC 509

Water Pressure Test Gauge #10
EPN #_____
To be used at FB 233

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ATTACHMENT D

TECHNICAL SPECIFICATIOAN YARD LOOP FLOW TEST

Step	Condition Required	Checked	Init/Date
F.1	UL Listed Playpipes are installed		
F.2	Valves OFP068A, OFP068B and OFP143 are closed		
F.3	Control Switch for Diesel OFP01KB is in the OFF position		
F.4	Control Switch for Diesel OFP01KA is in Test		
F.5	Valve OFP068B is open		
F.6	Valve OFP143 is open		
F.7	Three valves open at the Test Manifold		
F.8	Valves lined-up in accordance with Attachment E		
F.9	Service Water tie valves 1FP058 and 2FP058		

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ATTACHMENT D

TECHNICAL SPECIFICATIOAN YARD LOOP FLOW TEST

Step	Condition Required	Checked	Init/Date
F.10	Close the three valves on the test manifold which were opened in Step F.7.		
F.11	Verify Jockey Pumps NOT RUNNING		
F.12	Hose reels/fire hydrants flushed - pressure gauges placed - verified working		
F.14	Open valves (at least 6) as specified by Attachment F		
F.15	All test manifold valves closed - Data taken as specified by Attachment F		
F.16	Valve positions in normal position		
F.17	Valves lined-up as specified by Attachment J. Valves OFP143 and OFP068B remain open.		
F.18	Three (3) valves open on test manifold		

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ATTACHMENT D

TECHNICAL SPECIFICATIOAN YARD LOOP FLOW TEST

Step	Condition Required	Checked	Init/Date
F.19	Flow verified		
F.20	Three (3) valves on manifold closed		
F.21	Close valves OFP143 and OFP068B		
F.22	Valves returned to normal as specified by Attachment J and Attachment E		
F.23	LOCK OPEN service water tie valves 1FP058 and 2FP058		/ /
F.24	TURN Jockey Pumps ON		
F.25	Diesel OFP01KA control switch in AUTO. Diesel shutdown		
F.26	Diesel OFP01KB control switch in AUTO		
F.27	Remove pressure guages previously placed		
F.28	Drain Test Header		

ATTACHMENT E

VALVE LINE-UP FOR TECHNICAL SPECIFICATION
YARD LOOP FLOW TEST

VALVE EPN	LOCATION	TEST POSITION	TEST POSITION VERIFIED	NORMAL POSITION	NORMAL POSITION VERIFIED
OFP081	200' East of U#2 SAT (System Aux Transformer)	Closed	/ /	Locked Open	/ /
2FP009	60' NE of U#1 RB Trackway	Closed	/ /	Locked Open	/ /
1FP006	200' South of U#1 TB Trackway Door	Closed	/ /	Locked Open	/ /
1FP004	20' South of Well Water Bldg	Closed	/ /	Locked Open	/ /
1FP060	TB 710' SW Corner of Demin. Regen. Trans. Pump	Closed	/ /	Locked Open	/ /
OFP128	105' West of Rad. Waste Bldg SW Corner	Closed	/ /	Locked Open	/ /
OFP037	80' West of Service Bldg. Main Entrance	Closed	/ /	Locked Open	/ /

ATTACHMENT E

VALVE LINE-UP FOR TECHNICAL SPECIFICATION
YARD LOOP FLOW TEST

VALVE EPN	LOCATION	TEST POSITION	TEST POSITION VERIFIED	NORMAL POSITION	NORMAL POSITION VERIFIED
OFP119	TB 710' NW of Cardox Unit	Closed	/ /	Locked Open	/ /
2FP128	RB 710' 25' N of RB Elevator	Closed	/ /	Locked Open	/ /
2FP124	RB 710' 10' N of "B" RHR Hx on east wall	Closed	/ /	Locked Open	/ /
2FP004	Outside NE Corner of U#2 Turbine Bldg.	Closed	/ /	Locked Open	/ /
2FP001	Outside NE Corner of U#2 Turbine Bldg.	Closed	/ /	Locked Open	/ /
OFP068B	LSH 714' in DFP OB Room	Open	/ /	Locked Closed	/ /
OFP143	LSH 714' North of Traveling Screens	Open	/ /	Locked Closed	/ /

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ATTACHMENT F

PRESSURES AND GPM TAKEN FOR THE INDICATED
NUMBER OF TEST MANIFOLD VALVES OPEN

INSTRUMENT EPN # OR PRESSURE GAUGE #	6 VALVES OPEN	5 VALVES OPEN	4 VALVES OPEN	3 VALVES OPEN	2 VALVES OPEN*	1 VALVE OPEN*	0 VALVES OPEN
Flow (Inst. # OFI-FP012)	gpm	gpm	gpm	gpm	gpm	gpm	gpm
PD (Pump discharge pressure Inst. # OPI-FP003)	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 507	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 516	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 501	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 515	psi	psi	psi	psi	psi	psi	psi

*NOTE: When two (2) or one (1) valve(s) are open, water might be discharging through the Fire Pump Relief Valve.

DOCUMENT ID 0025T/

ATTACHMENT F

PRESSURES AND GPM TAKEN FOR THE INDICATED
NUMBER OF TEST MANIFOLD VALVES OPEN

INSTRUMENT EPN # OR PRESSURE GAUGE #	6 VALVES OPEN	5 VALVES OPEN	4 VALVES OPEN	3 VALVES OPEN	2 VALVES OPEN*	1 VALVE OPEN*	0 VALVES OPEN
Pressure Gauge at Fire Hydrant FC 519	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 517	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 512	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 510	psi	psi	psi	psi	psi	psi	psi
Pressure Gauge at Fire Hydrant FC 509	psi	psi	psi	psi	psi	psi	psi
Pressure gauge at hose reel FB 233 (LSH)	psi	psi	psi	psi	psi	psi	psi

*NOTE: When two (2) or one (1) valve(s) are open, water might be discharging through the Fire Pump Relief Valve.

DOCUMENT ID 0025T/

ATTACHMENT G

DATA SUMMARY - HEAD LOSS FOR THE INDICATED FLOW AND NUMBER OF TEST MANIFOLD VALVES OPEN FOR THE TECHNICAL SPECIFICATION YARD LOOP FLOW TEST

INSTRUMENT EPN # OR PRESSURE GAUGE #	6 VALVES OPEN	5 VALVES OPEN	4 VALVES OPEN	3 VALVES OPEN	2 VALVES OPEN*	1 VALVE OPEN*	0 VALVES OPEN
From PD to FC 507	psi	psi	psi	psi	psi	psi	psi
From FC 507 to FC 516	psi	psi	psi	psi	psi	psi	psi
From FC 516 to FC 501	psi	psi	psi	psi	psi	psi	psi
From FC 501 to FC 515	psi	psi	psi	psi	psi	psi	psi
From FC 515 to FC 519	psi	psi	psi	psi	psi	psi	psi
From FC 519 to FC 517	psi	psi	psi	psi	psi	psi	psi
From FC 517 to FC 512	psi	psi	psi	psi	psi	psi	psi
From FC 512 to FC 510	psi	psi	psi	psi	psi	psi	psi

*NOTE: When two (2) or one (1) valve(s) are open, water might be discharging through the Fire Pump Relief Valve.

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ATTACHMENT G

DATA SUMMARY - HEAD LOSS FOR THE INDICATED FLOW AND NUMBER OF TEST MANIFOLD VALVES OPEN FOR THE TECHNICAL SPECIFICATION YARD LOOP FLOW TEST

INSTRUMENT EPN # OR PRESSURE GAUGE #	6 VALVES OPEN	5 VALVES OPEN	4 VALVES OPEN	3 VALVES OPEN	2 VALVES OPEN*	1 VALVE OPEN*	0 VALVES OPEN
From FC 510 to FC 509	psi	psi	psi	psi	psi	psi	psi
From FC 509 to FB 233	psi	psi	psi	psi	psi	psi	psi

*NOTE: Wh. two (2) or one (1) valve(s) are open, water might be discharging through the Fire Pump Relief Valve.

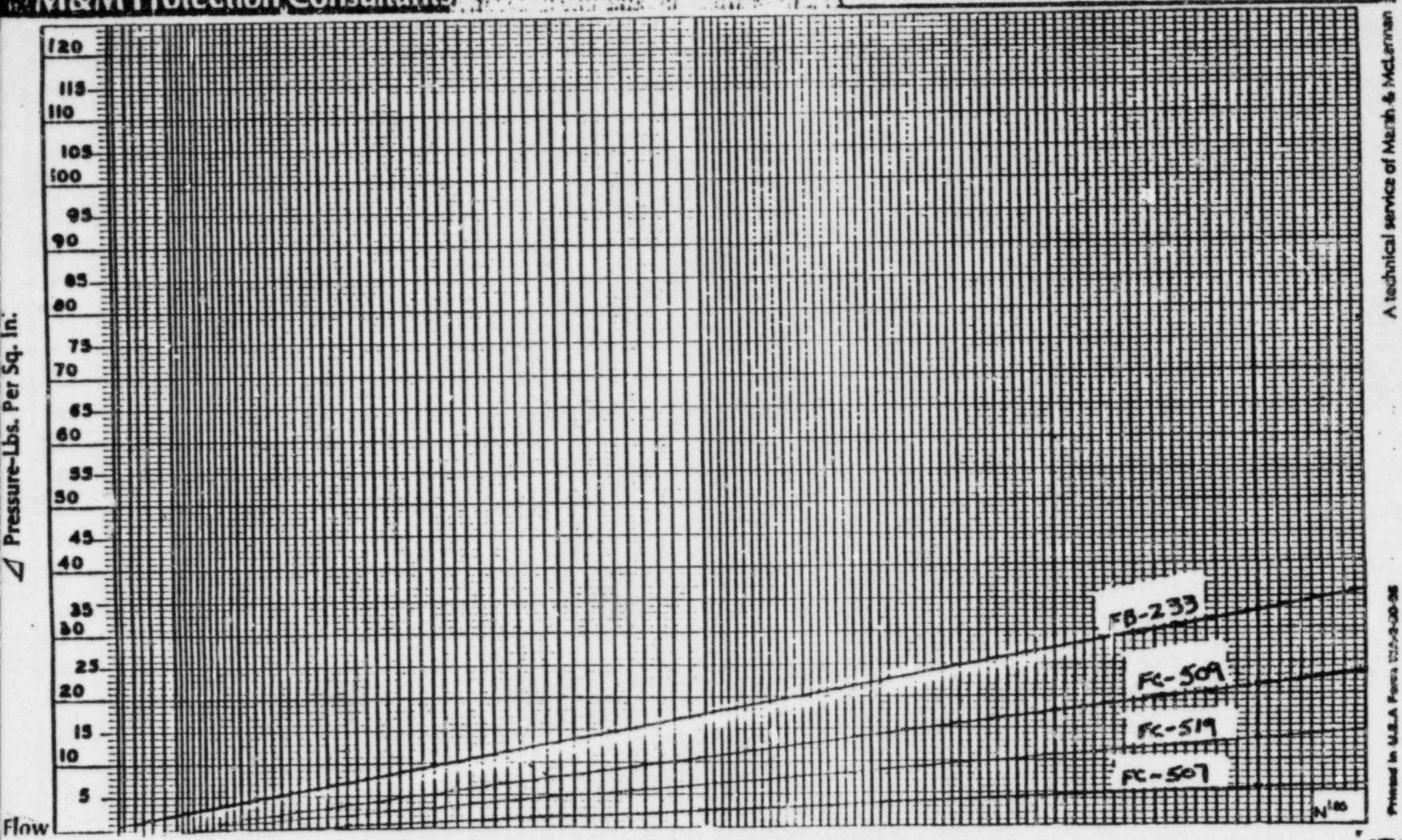
ATTACHMENT H

Friction Loss Acceptance Criteria as Provided by
M&M Protection Consultants Hydraulic Analysis

Remarks

Pressure Change Curve
(C=100)
Flow Path
For Technical Specification Yard Loop

M&M Protection Consultants



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ATTACHMENT I

PORTABLE TEST EQUIPMENT (IF NEEDED, TO BE USED ON TECHNICAL SPECIFICATION YARD LOOP TEST)

EPN #	LAST CALIBRATED	NEXT CALIBRATION DUE DATE	INT/DATE

Pitot Tube
Serial #_____

Differential Pressure Gauge

Precision Pressure Gauge

ATTACHMENT J

VALVE LINE-UP TO VERIFY FLOW THROUGH VALVE OFP081

VALVE EPN	LOCATION	TEST POSITION	TEST POSITION VERIFIED	NORMAL POSITION	NORMAL POSITION VERIFIED
OFP113	200' E. of U#2 System Auxiliary Transformer	Closed	/ /	Open	/ /

ATTACHMENT K

TEST EVALUATION

Prepared By:

_____ /

Reviewed By:
Station Fire Marshal

_____ /

Technical Staff Supervisor:

_____ /

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