Davis-Besse Nuclear Power Station

Unit No. 1

System Procedure SP 1106.20

MAIN FEED PUMP AND TURBINE

Record of Approval and Changes

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Approved By Jack Evans, Plant Manager — 3/2/76 Date

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1. PURPOSE

To provide a procedure for operation of the Main Feed Pump 1-1, 1-2 (MFP) Booster Feed Pump 1-1, 1-2 (BFP) and Main Feed Pump Turbine 1-1, 1-2 (MFPT).

NOTE: Throughout this procedue, the MFPT, MFP and BFP will be treated as one component and called "MFP".

General Description

The feedwater pumping units consist of two each half-capacity booster feed pumps, main feed pumps and steam turbines. The turbines are double ended, six stage, each driving a full-speed main feed pump and slow-speed booster feed pump through a gear reduction unit. The pumps are provided with seal water systems and minimum flow recirculation systems. The turbine lube oil system maintains the lubrication requirements for the booster and main feed pumps.

1. The booster feed pumps take suction from the deaerators and discharge directly into the main feed pumps. Discharge from these pumps is to the high-pressure feedwater heaters in two parallel trains.

   Booster feed pump NPSH is satisfied by deaerator static head and main feed pump NPSH by booster feed pump discharge pressure. The NPSH required by the booster is 50 feet, available 64 ft at 300°F. The NPSH required for the main feed pump is 200 ft., available 564 ft. at 300°F, 5150 RPM. The bottom of the deaerator storage tank is 72 feet above BFP centerline. The 67,000 gallons contained in the deaerator storage tank at normal level is sufficient for approximately 5 minutes of feed pump operation with the plant at full load. Normal level in the storage tanks is 120 inches from the bottom of the tank. In the event of a deaerator low low level of 48 inches from the storage tank bottom, a signal is sent to the ICS to run the plant back to 55% full power at a rate of 50%/min. Assuming one storage tank reaches this runback level of 48 inches and the deaerator cross connect valve HV 423 is closed, the operator has less than 3 minutes to remove the affected MFP from service or open the cross connect valve HV 423.

2. Seal water for Booster pumps (mechanical seals) is provided from the condensate pumps discharge. Seal water pressure is manually controlled at ~150 psig by throttling valves CD 214, CD 215, CD 217 and CD 218.

3. Seal water for the main feed pumps (throttle bushings) is provided from the condensate pumps discharge. Temperature controllers and regulating valves maintain the seal water temperature low-pressure drain-off at 170°F. See Enclosure 2 and 3 for the control system and throttle bushing cross section.

High pressure drain-off from the seals is returned to the suction of the booster feed pumps. Low-pressure seal drain-off (15 gpm per seal) flows by gravity to the atmospheric seal water drain tanks (T119). Atmospheric pressure forces the water from the drain tanks through tank level control valves to the condenser. (See Enclosure 3)

4. The turbines take steam from the main turbine cross around reheat piping through the low pressure control valves. Discharge from the turbines is into the main condenser. Seal steam is provided from the main turbine steam seal header. Drains from the turbines are pumped into the condenser.

   The turbines are variable-speed units controlled by the intergrated control system which controls feedwater flow to the steam generator.

5. The turbine lube oil system is a self-contained system which also meets the needs of the main feed pumps, booster feed pumps and gear reduction units. One main oil pump for each turbine satisfies all lube oil requirements. The hydraulic control system is also maintained by this system. A second main oil pump and DC motor-driven emergency bearing oil pump are on automatic standby. 7

   Each turbine lube oil system has separate purification and transfer interconnections used for new oil makeup, used oil disposal or operation with the MFPT used lube oil tank. Operation of this system is not required for MFPT operation.

   A lube oil filter pump takes oil from the MFPT lube oil tank and pumps the oil through a single-element cartridge filter back to the tank at a design flow rate of 300 gph. With the pump motor de-energized, a portable lube oil conditioner can be connected in parallel and the oil discharge either through the filter or directly to the tank at a design flow rate of 410 gph.

   A third mode of operation utilizes the MFPT used lube oil tank. Oil can be pumped from the MFPT lube oil tank to the used lube oil tank by the filter pump. The portable lube oil conditioner is connected to the suction of the used lube oil tank and pumps the oil back to the MFPT lube oil tank. Only one turbine purification system may operate in this mode at any one time.

   Normal oepration calls for one MOP to serve pump and turbine requirements. The other MOP serves as a backup and automatically starts at 170 psig decreasing hydraulic oil pressure. During operation, the standby pump can be tested for automatic start by actuating SV 5. A third oil pump, DC, provides oil pressure during emergency conditions and automatically starts at 36 psig decreasing control oil pressure. Lube oil flow is as shown on 7

Controls Diagram, simplified Bearing Oil Supply and Oil XFER valve operation, Enclosure 4, 1 and 5.

6. The main and booster feed pump minimum recirculation control system is required to pass a minimum of 3500 gpm, 1,600,000 lbs/hr at a turbine speed of 5150 rpm.

Turning Gear Operation

Normally when a MFP is placed on gear, the feedwater system from the deaerators to the OTSG's will be filled and vented, the pump seal system will be in service, the main feed pump casing warmup recirculation system, the lube oil system, and the turbine steam drain system will be in service. The pump casings will be filled and vented to ensure the pump throttle seal bushings, wear rings, or mechanical seal faces have sufficient water lubrication. A condensate pump will be required to maintain deaerator level and supply seal water to the MFP, BFP, and MFPT drain pumps. If a condensate pump is not available, the pumps can be placed on gear without seals provided the pump casing are filled and vented with cold condensate (<170°F). Under no circumstances should the pumps be on gear without the booster and main feedpump casing filled and vented.

During a normal plant startup, the main feed pump turbine gland steam system will be brought on line simultaneously with the "Main Turbine" gland steam system. This requires that the MFPT be on gear and the MFPT exhaust valve will be open in preparation for drawing a vacuum in the main condenser. If the MFPT gland steam system is to be shutdown with a vacuum in the main condenser, the MFPT exhaust valve will have to be closed to prevent air from being drawn along the MFPT shafts and hence loosing vacuum.

Station Startup

The main feed pump turbines are placed on turning gear, the steam seal system is placed in operation, and a MFPT drain pump is placed in operation for each turbine. The warmup valves on the discharge of the main feed pumps should be open to allow warmup of the pump casings. At maximum ΔT across the pump casings should be less than 50°F. Seal water injection to the main feed pumps should be on automatic control. The highest pump casing temperature must be within 25°F of the deaerator storage tank temperature before rolling the turbine. Up to approximately 2% power steam supply to the MFPT L.P. control valves will be from the auxiliary boiler, then steam admission is from the main steam line downstream of the MS nonreturn valves to the high pressure control valve. Before a MFP is brought up to full speed, the warmup valve should have been closed by a pressure switch at approximately 150 psig increasing. The minimum flow recirculation valve will be open, allowing flow back to the deaerator (NRV-488 and NRV-491 will be closed due to the discharge pressure of the startup feed pump).

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Before 15% power is reached, the operating MFPT will be put on automatic speed control. Up to about 45% VWO load, steam admission will be through the HP control valve. Above this load, the LP control valve will automatically assume turbine speed control using steam from the crossover reheat lines just before the number 1 and 2 CIV's.

Prior to reaching about 60% load (540 MW), the second MFPT will have been started in the recirculation mode. Above this load, both MFPT's should be on automatic speed control.

ICS Runback and Turbine Trips

1. Loss of a MFPT will cause a station runback to 55% load at 50% per minute.

2. Since the MFPs are variable speed pumps, the discharge pressure could possibly reach as high as 1817 psig (140% of feedwater piping design) during an overspeed condition. To protect the feedwater system against overpressurization, we have the following:

   a. The ICS will runback the plant to 60% load at a rate of 20%/minute when PSH 473A (PSH 484A) reaches 1433 psig.

   b. A high pump discharge pressure will trip a MFPT. Pressure switches PSH 506 and PSH582 set at 1500 psig.

3. Trip of a MFPT causes loss of air to the non-return valve (NRV) on associated pump discharge line (FW 488 or FW 491), thus giving a spring assist to assist valve ΔP in closing the NRV.

4. The MFPT will trip on low exhaust vacuum (12.5 in HgA), low pump or turbine bearing oil pressure (4.0 psig), high MFPT thrust bearing wear, overspeed (5925 rpm) and local and remote (Control Room) manual trips.

5. The main feed pump turbines may be overspeed tested with auxiliary steam when the main turbine is off the line. Steam pressure at PI 262 must be limited to 185 psig by use of the hand-operated globe valve AS 270 or by operating the auxiliary boiler master at 185 psig.

6. Deaerator Low Level Runback is 50% min to 55% load at a setpoint of four (4) feet above storage tank bottom (LSLL 435 and 425).

MFPT Gland Steam System

1. Gland steam supply is taken from the main turbine steam seal header and leakoff is returned to the steam packing exhauster header on low turbine load. The turbine should be on turning gear and a MFPT drain pump in operation for each turbine.

During full load operation, there will be adequate leakoff from the turbine HP packing to supply the turbine LP packing with a small flow to the main turbine steam seal headers.

Vibration Monitoring System

1. The "Indikon" vibration monitoring system consists of a six channel monitoring cabinet located at elev. 585 ft. near the MFPs designed to measure and indicate excessive vibration as sensed by six magnetic pickups mounted on the MFP, BFP, and Reduction Gear shafts. If any alarm setpoint is exceeded, an annunciator will warn the control room operator. In addition to the six alarm channels, there are two additional vibration level switches associated with the MFPT that will also cause the annunciator to alarm at a pre-determined vibration level. The vibration channels have bi-variant computer points (each vibration monitor has two possible computer alarm setpoints). If the annunciator is actuated, non-alarming computer setpoints will alarm at the higher of two vibration levels (see alarm setpoints). If a computer point initially alarmed at the lower value, no alarm will occur at the higher value for that computer point.

   The MFPT has two vibration pickups to measure "turbine" shaft vibration. These are displayed on the Turbine Supervisory Recorder in the control room. All eight vibration pickups, six (6) for the BFP, MFP and Gear, and two (2) for the turbine can have their vibration levels displayed on the computer.

   Alarm Setpoints

   The alarm setpoints for MFP are as follows:

		Bi Variant CMPTR. ALARMS	
Location	Annunc.	Excess	Shutdown
OB Bearing	2.0 MIL	2.0 MIL	3.0 MIL
MFPT End Brg.	2.0 MIL	2.0 MIL	3.0 MIL

   The alarm setpoints for MFPT are as follows:

MFP End Brg.	1.7 MIL	1.7 MIL	2.3 MIL
BFP End Brg.	1.7 MIL	1.7 MIL	2.3 MIL

   The alarm setpoints for gear are as follows:

Pinion Hi Spd.	1.5 MIL	1.5 MIL	2.3 MIL
Gear Rotor Lo Speed	2.0 MIL	2.0 MIL	3.0 MIL

Location	Annunc.	Bi Variant CMPTR. ALARMS Excess	Shutdown
The alarm setpoints for BFP are as follows:			
Gear End Brg.	3.0 MIL	3.0 MIL	5.0 MIL
OB Brg.	3.0 MIL	3.0 MIL	5.0 MIL

Main Feed Pump Turbine (MFPT) Drains

1. The MFPT Drain System is essentially divided into a high pressure drain system and a low pressure drain system with an interconnecting level control valve. See Enclosure 1.

The high pressure drains from the turbine consist of the following:

a. LPSV Below Seat Drain
b. 1st Stage Drain
c. Turbine moisture removal lines
d. Gland Supply and Exhaust Header Drains
e. HPSV Below Seat Drain

The high pressure drains enter the high pressure drain receiver which operates at approximately 15 inches of Hg Vacuum due to a 6 inch equalizing line back to the condenser. It is important to operate this high pressure drain receiver at a high vacuum since the turbine stage moisture removal lines drain into this header. Inadequate drainage at these moisture removal lines could cause erosion of the bucket tenons and subsequent bucket failures. If the level control valve fails to open and maintain a normal level in the receiver, improper drainage will also occur at these moisture removal lines.

As shown on Enclosure 1, the LPSV Below Seat and the 1st stage drain to the High Pressure Drain Receiver. With these MOV's open, the receiver operates at a positive pressure. It is important that these MOV's remain open as long as possible to ensure proper turbine drainage, but during normal operation of the MFPT, these valves should not be left open so that the receiver can operate at a vacuum and provide good drainage at the turbine stage moisture removal lines.

The Low Pressure (L.P.) Drain system consists of a six inch drain header which receives only the MFPT exhaust casing drain except for a short period of time when the high pressure drain receiver dumps into the drain header via the high pressure drain receiver level control valve. It is extremely important that the level control maintain a level in the receiver at all times. If the level control valve fails open, the high pressure drains will blow directly into the 6 inch L.P. drain header causing

this L.P. header to operate at relatively high pressures and prevent the turbine exhaust casing from draining. At 6 inches above the Exhaust Casing bottom the operator will receive a "MFPT EXH HI LVL" annunciator alarm.

The L.P. six inch drain header normally operates at ~27 inches vacuum. Two drain pumps, one operating at all times and one in standby, pump the L.P. drain header to the condenser. This L.P. drain header has a high level alarm "MFPT DRN LVL HI" which should not be confused with the MFPT exhaust casing high level alarm mentioned above. Refer to Enclosure 1 for the alarm arrangement.

If a high casing level alarm and a six inch drain header level alarm stay in the alarm state for over thirty seconds, the MFPT should be tripped.

2. The following is a list of MFPT drains:

   a. Steam seal piping low point piped without valves.

   b. Exhaust casing piped without valves.

   c. Turbine first stage drain piped with a motor operated valve. This valve is closed during normal operation.

   d. HP stop valve below seat drain piped with trap and motor operated valve. The drain valve should be opened when the HP stop valve is fully open.

   e. LP stop valve below seat drain piped with a motor operated valve. Should be closed when the turbine is on low pressure steam.

3. The HP and LP stop valves above seat drains are piped with motor operated valves to the condenser. Once the stop valves are open, the drain valves can be closed.

4. The HP and LP stop valve stem leakoffs are piped without valves to the steam seal piping.

5. A high level switch on the 6 inch drain header is provided to start the standby drain pump. An interlock is provided to prevent automatic shutoff if the switch is actuated.

6. Closure of the steam seal piping isolation valve requires opening of the manual drain valves on the seal steam supply and leakoff piping.

Speed Control

9 Normally MFPT speed will be controlled either manually by the MDT-20 or automatically by the ICS from the control room hand switches. Speed can also be controlled at the MFPT by the MDT-20 hand switches. Turbine speed is determined by a tachometer located locally and in the control room. the MDT-20 can control turbine speed from 0-5959 RPM by the use of pistol grip controls. These controls can either increase or decrease speed depending on what the situation calls for. the ICS can control turbine speed from 3900-5150 RPM by the use of hand switches in the control room.

The turbine control can be transferred from the MDT-20 to ICS when turbine speed is between 3900-5150 RPM. When transferring one to the other, both speed settings must indicate the same speed. This error can be seen on the transfer meter located in the control room. Once the error reads 0 amps, either the ICS or manual button in the control room can be pressed to make the conversion. ICS is normally used to control the turbine for speeds above 3900 RPM.

General Data

Main Feed Pump Turbines 1-1 and 1-2

Type (General Electric)	Double ended, condensing, multi-stage steam turbine
Maximum rating (HP steam), hp	10,395
Design rating (LP steam), hp	10,395
Speed rating rpm	5,150
Steam flow, maximum rating/design rating, pph	97,000/102,200
Rated steam pressures at HP Stop Valve/LP Stop Valve, psia	841/196.7
9 Overspeed trip settings, rpm	5841 - 5959
Exhaust pressure	3.0" HgA
Low Vacuum Trip Setpoint	10.0" HgA

Main Feed Pumps 1-1 and 1-2

Type (Delaval)	Horizontal, single stage, double suction, centrifugal
Capacity, design/operating, gpm	15,000/12,810
Head, design/operating, ft	2,150/2,085
RPM, design rpm	5,150
Temperature, design F	301
Shutoff pressure, maximum at 5,150 rpm, psia	1,365 (sepcific gravity 1.0)
NPSH required ft	200
Minimum recirc Flow for 5150 RPM	3500 GPM

Speed Reduction Units 1-1 and 1-2

Type (Delaval)	Deleval single step, double helical gear
Ratio	2.8837:1
Rating	1960 hp at 5,150/1,786 rpm

Booster Feed Pumps 1-1 and 1-2

Type (Delaval)	Horizontal, single stage, double suction, centrifugal
Capacity, design/operating, gpm	15,000/12,810
Head, design/operating, ft	500/482
RPM, design/operating, rpm	1,786/1,700
Temperature, design, F	301
Shutoff pressure, maximum at 1,780 rpm, psia	364

MFPT Oil Pumping System

MFPT MOPs 1-1-1, 1-1-2, 1-2-1, 1-2-2

Type	Centrifugal
Capacity	190 GPM @ 200 PSIG
Motor	G.E., 480 VAC, 50 HP @ 3600 RPM 60.5 amps full load

MFPT Emergency Oil Pump 1-1, 1-2

Type	Centrifugal
Capacity	95 GPM @ 55 PSIG
Motor	G.E., 240 VDC, 7.5 HP @ 3500 RPM 26.4 amps full load

Dual Oil Coolers

Capacity (ea)	565,000 BTU/HR, 97 GPM

Turning Gear Motor

Type	G.E., 460 VAC, 1.5 HP @ 1160 RPM

2. LIMITATIONS AND PRECAUTIONS

10 2.1 The Main Turbine Lube Oil System and the Main Feed Pump Turbine Lube Oil System has Whitney 3-way Ball Isolation Valves installed on many of the pressure switches in the system.

These valves are "Lock-Wired" in the position to make the associated pressure switches operable.

10 Before any person shall break the lock-wire or change the position of the Three-Way Valve, permission must be obtained from the Shift Supervisor. When maintenance and/or testing is complete, the valves must be returned to the "In Service" position and lock-wired again.

This is absolutely necessary, as inadvertant isolating of these pressure switches could cause considerable damage to the Main Turbine or Main Feed Pump Turbine(s).

2.2 The limitations and precautions associated with this procedure are listed with the section of the procedure they are directly related to.

3. REFERENCES

3.1 Bechtel Drawing (P&ID)

1.	M006B	Feedwater System
2.	M003	Main Steam and Reheat System
3.	M018	Turbine Lube Oil System
4.	M022	Turbine Drains and Seal System
5.	M024	Turbine Inst. Detail
6.	M020	Auxiliary Steam System

3.2 Specifications File

1.	M33	Main Feed Pump
2.	M38	Turbine Drives for Main Feed Pumps

3.3 Technical Manuals

1. EK 83602 GE Manual - Feed Pump Drive
2. 11002 Delaval Main Feed Pump Instructional Manual
3. 11004 Delaval Booster Feed Pump Instructional Manual
4. 2104 Delaval Speed Reducing Gear Instructional Manual

3.4 Periodic Tests

1.	PT 5136.01	Feed Pump Turbine Steam Valves
2.	PT 5136.02	Feed Pump Turbine L.O. System
3.	PT 5136.03	Feed Pump Turbine Overspeed
4.	PT 5136.04	Feed Pump Turning Gear
5.	PT 5136.05	Feed Pump Turbine Vibration
6.	PT 5136.06	Feed Pump Turbine Emergency O/S Gov. Test
7.	PT 5136.07	MFPT Thrust Wear Detector

3.5 System Procedures

1.	SP 1106.03	T-G and MFP Turbine Gland Steam and Turbine Drains

2. SP 1104.39 Turbine Plant Cooling Water System Procedure

3.6 NQAM (Nuclear Quality Assurance Manual)

10| 3.7 Chapter 17.2 DBNPS USAR

3.8 USAR Chapter 10, Section 10.4

4. PREREQUISITES

Specific prerequisites associated with this procedure are listed with the sections of the procedure with which they are associated.

5. PROCEDURE

Section 5 of this procedure will cover operations of the MFP in the following modes:

Mode	Section
Placing a MFPT on Turning Gear	5.1
Placing a MFPT in Standby	5.2
Startup of an MFP	5.3
Shutdown to turning gear operation of an MFP	5.4
Shutdown of an MFP for maintenance	5.5
Controlling MFP speed locally	5.6
Transferring Steam Supply From the Aux Boiler to Main Steam	5.7
Transferring Steam Supply From the Main Steam Header to the Auxiliary Steam Header	5.8
Transferring Main Feed Pumps Turbine Oil Coolers	5.9
Changing MFPT LO Filters	5.10
Transferring MDT20 to ICS (ICS to MDT20)	5.11

5.1 Placing a MFPT on Turning Gear

5.1.1 Limitations and Precautions

1. Pressure switches on the oil supplies to pump and turbine bearings prevent starting of turning gear when oil pressure to bearings is less than 7 PSIG.

2. The MFP shall be on gear whenever there is gland seal steam on the MFPT shaft.

5.1.2 Prerequisites

_____1. At least one condensate pump is running.

_____2. Both Deaerator storage tank levels are greater than 5 feet.

_____3. The MFPT Eccentricity instruments should be in service (Pts 15 and 16 on Turbine TSI Vibration Recorder ZJR2538).

_____4. The red MFPT trip light is on.

_____5. The MFPT lube oil tank is filled to the normal level on LI 2214 (LI 2218).

_____6. Valve verification list A (B) is complete.

5.1.3 Procedure

1. From the Control Room, place the following switches in lockout.

_____HIS 1234A (HIS 1221A) MFPT Turning Gear Motor
_____HIS 1195 (HIS 1236) MFPT Main Oil Pump 1
_____HIS 1198 (HIS 1247) MFPT Main Oil Pump 2
_____HIS 1209 (HIS 1188) MFPT EBOP
_____HIS 1973 (HIS 1961) MFPT Drain Pump 1
_____HIS 1969 (HIS 1965) MFPT Drain Pump 2

2. Verify closed or close the following breakers.

_____D115 (D215) MFPT EBOP on DCMCC 1 (2)
_____BF 3265 (BF 3272) MFPT Main Oil Pump 2 on F32B
_____BF 3276 (BF 3277) MFPT Drain Pump 2 on F32B
_____BE 3264 (BF 3264) MFPT Vapor Extractor on E32B (F32B)
_____BE 3265 (BF 3265) MFPT Lo Filter Pump on E32B (F32B)
_____BE 3270 (BF 3270) MFPT Turning Gear Motor on E32B (F32B)
_____BE 3273 (BF 3137) MFPT Lo Filter Header on E32B (F32B)
_____BE 3276 (BE 3277) MFPT Drain Pump 1 on E32B
_____BE 3266 (BE 3272) MFPT Main Oil Pump 1 on E32B

_____3. Start the MFPT L.O. Filter Pump using local switch NPO 311 (NPO 312).

_____4. Start the MFPT L.O. Filter Heaters using local switch NF 0371 (NF 0372).

_____5. Verify the MFPT L.O. Filter inlet pressure is between 40 to 48 PSIG on PI 1223 (PI 1227).

_____6. Verify flow through the MFPT L.O. filter using FG 1208 (FG 1218).

_____7. Verify the L.O. Cooler Temperature Control Valve controller TIC 1204 (TIC 1254) is set at 115°F.

_____8. Start the MFPT L.O. Vapor Extractor using NC 0281 (NC 0282).

_____9. Verify Tank Pressure is approximately .5 inches of water vacuum using PDI 1155 (PDI 1219).

_____10. Place the MFPT EBOP in Auto using HIS 1209 (HIS 1188).

_____11. Verify the EBOP starts and maintains at least 10 PSIG on both the Turbine and Pump bearing headers.

12. Place the MFPT Main Oil Pumps in Auto.

_____HIS 1195 (HIS 1236) MFPT Main Oil Pump 1
_____HIS 1198 (HIS 1247) MFPT Main Oil Pump 2

13. Have the Control Room verify the following to ensure the MFPT Stop Valves are closed.

_____The Green LP SV closed light is on.
_____The Green HP SV closed light is on.

_____14. Stop and leave in auto the MFPT EBOP.

_____15. Ensure only one MFPT Main Oil pump is running.

16. Verify the main oil pump is maintaining the following pressures.

_____Hydraulic Oil Pressure greater than 200 PSIG on PI 1194 (PI 1246).
_____Turbine Bearing Oil Pressure between 11.0 to 13.0 PSIG on PI 1216 (PI 1269)
_____Pump Bearing Oil Pressure between 11.0 to 13.0 PSIG on PI 1207 (PI 1257)
_____Control Oil Pressure between 55 to 65 PSIG on PI 2650 (PI 2630)

_____17. Perform PT 5136.02 and verify the other Main Oil Pump maintains the above pressures.

_____18. Verify Oil flow to the Booster and Main Feed Pump bearings using the four sight flow indicators.

_____19. Open CD 46 (CD 47) MFP Seal Water Inlet Isolation.

20. Perform the following to adjust MFP and BFP seals.

_____Verify greater than 240 PSIG seal water supply pressure on PI 942 (PI 960)

_____Verify the MFP seal water controllers TIC 593 and TIC 940 (TIC 961 and TIC 963) are set at 170°F.

_____Momentarily open the seal water control valve bypass valves CD 52 and CD 58 (CD 53 and CD 59) to flush the seals.

_____Throttle the BFP seal water inlet valves CD 217 and CD 218 (CD 214 and CD 215) to maintain 100 to 150 PSIG on seal water pressure indicators PI 758 and PI 752 (PI 764 and PI 772) respectively.

_____At the top of the stairs on the 585' level, ensure the MFP casing warmup temperature controller TIC 472 (TIC 479) is set to maintain 5°F MFP upper/lower casing temperature difference.

_____21. Verify open or slowly open the Deaerator Storage Tank to BFP Suction Valve FW 1 (FW 2).

_____22. Slowly open the Deaerator Storage Tank to BFP Suction Valve FW 3 (FW 4) to Fill the Main and Booster Feed Pumps.

_____23. Vent the BFP casing using Vent Valve FW 38 (FW 39).

_____24. Vent the MFP casing using Vent Valve FW 40 (FW 41).

_____25. Vent the feedwater line between the BFP and MFP using vent valve FW 10 (FW 21).

_____26. Open the MFP casing warmup valve isolation valves FW 22 and FW 24 (FW 23 and FW 25) to establish warmup flow to the condenser.

_____27. On the turbine front console, verify the lube oil from cooler temperature on TIS 1202 (TIS 1252) is at least 70°. If the lube oil temperature is less than 70°, continue to run the lube oil filter pump and main oil pump until lube oil temperature is 70°F before placing the turbine on gear.

_____28. Press the local "Turning Gear Engage Failure - Reset Button".

_____29. Have the Control Room place the MFPT turbine gear switch HIS 1234A (HIS 1221A) in Auto.

_____30. Verify the turbine goes on turning gear.

_____31. Listen for rubs and report any to the Shift Supervisor.

_____32. Fail open the DMFPT Drn Receiver Level Control Valve

TD 4981 (TD 4982) by isolating the instrument air and opening the air filter regulator flowdown pet cock.

_____33. Open the MFPT Drn Pump Seal Water Isolation Valves CD 220 (CD 222) and CD 221 (CD 223).

_____34. Verify a flow of seal water by verifying approximately 30 psig is indicated on both PI 1401 (PI 1444) and PI 1440 (PI 1449).

_____35. Open the MFPT drain pump discharge valves TD 44 and TD 45 (TD 46 and TD 47) and have the control room start either MFPT drain pumps and place the other MFPT drain pump in Auto.

_____36. Notify the pipe shop to unpin the MFP 1 (2) hangers.

Section 5.1 completed by_____Date_____

5.2 Placing a MFPT to standby.

5.2.1 Prerequisites

_____1. The MFPT steam seals have been placed in service per SP 1106.03 Turbine Generator and Main Feedwater Pump Turbine Gland Steam and Turbine Drains.

_____2. Vacuum has been established in the condenser.

5.2.2 Procedures

_____1. Verify the MFPT is tripped.

_____2. Determine the position of the MFPT Exhaust Valve MS 136 (MS 137). If it is open, then go to Step 5.2.2.5.

_____3. Open the MFPT exhaust drain valve MS 723 (MS 722).

_____4. After MS 723 (MS 722) has been open for at least 5 minutes, then open the MFPT exhaust valve MS 136 (MS 137).

_____5. Verify the MFPT exhaust casing level is less than 4 inches in the gage glass.

_____6. Verify the MFP seal wtr drain tank is being maintained at approximately the tank centerline on LG 778 (LG 597).

_____7. Verify approximately 20 inches of vacuum discharge pressure on the running MFPT drain pump(s) using PI 1970 and PI 1966 (PI 1958 and PI 1962).

____8. Place the MFPT Drain Receiver Level Control Valve TD 4981 (TD 4982) in service by closing the filter regulator blowdown petcock AND opening the instrument air supply. The valve should go fully closed.

____9. Lineup steam to the MFPT by performing one of the two lineups below as determined by the Shift Supervisor. Steam traps should be placed in startup mode first then after the steam line is warmed placed in service.

FROM THE AUXILIARY STEAM SYSTEM

____Close RH 22 (RH 23) RHT Stm to MFPT
____Throttle AS 270 (AS 270) Aux Stm to MFPTs to maintain 185 psig
____Open AS 271 (AS 272) Aux Stm Supply to MFPT
____Place in service ST 41 (ST 43) L.P. Stm Supply Stm trap
____Place in service ST 42 (ST 42) L.P. Stm Supply Hdr Stm trap

NOTE: Perform either the above lineup or the following lineup but not both.

FROM THE MAIN AND REHEAT STEAM SYSTEM

____1. Place ST 66 (ST 67) Mn Stm line Stm trap in service
____2. Open MS 2565 (MS 2568) Mn Stm to MFPT Bypass
____3. Open MS 2564 (MS 2567) Mn Stm to MFPT Bypass
____4. When pressure around MS 706 (MS 707) Mn Stm to MSPT has equalized, open MS 706 (MS 707)
____5. Close MS 2565 (MS 2568) Mn Stm to MFPT Bypass
____6. Close MS 2564 (MS 2567) Mn Stm to MFPT Bypass
____7. Close AS 270 (AS 270) Aux Stm to MFPT
____8. Place ST 44 (ST 45) Mn Stm Supply Stm trap from MFPT in service
____9. Open RH 24 (RH 25) MFPT Stm Trap Iso.
____10. Place ST 41 (ST 43) LP Stm Supply Stm trap in service
____11. Place ST 42 (ST 42) LP Stm Supply Hdr Stm trap in service
____12. Open RH 22 (RH 23) MFPT Reheat Stm Source

10. Open or Verify open the following MFPT Recirc Valves

____FW 28 (FW 29) MFP min Recirc inlet iso
____FW 428 (FW 438) MFP min Recirc Cntrl Vlv
____FW 34 (FW 35) MFP min Recirc Out Isc

____11. Ensure the MFP casing temperature differential (T634 or T649) is less than 50°F and EITHER MFP upper casing vs. FW Temperature (T636 or T643) OR MFP lower casing vs. FW Temperature (T635 or T642) is within 25°F. Local temperature and contact pyrometer reading may be used instead of computer points.

		Computer Point
a.	MFP 1 CASING TEMP DIFF	T634
	MFP 1 LWR CASING VS FW TEMP	T635
	MFP 1 UPR CASING VS FW TEMP	T636
b.	MFP 2 CASING TEMP DIFF	T649
	MFP 2 LWR CASING VS FW TEMP	T642
	MFP 2 UPR CASING VS FW TEMP	T643

NOTE: If the MFP casing is greater than these temperature limits, the MFP casing should be vented using FW 40 for MFP 1-1 and FW 41 for MFP 1-2. Seal flows may be decreased to establish these limits. However, the MFP may be run only after 30 min. has elapsed since the last seal flow change.

Section 5.2 completed by_____Date_____

5.3 Startup of an MFP

5.3.1 Limitations and Precautions

1. When using auxiliary steam to the MFPs, LPCV casing maximum allowable inlet steam conditions are 185 psig.

2. The pumps have been warmed at least 30 minutes after any change in flow of the seal injection water.

3. The maximum oil temperature rise through any MFPT bearing should be less than 50°F.

4. The maximum oil temperature leaving any turbine or pump bearing should be less than 180°F.

5. Acceptable and shutdown vibration levels are as follows:

	Acceptable (Mils)	Shutdown (Mils)
MFPT	1.7 (alarm pt.)	2.3
MFP	2.0 @ 5150 RPM	3.0 @ 5150 RPM
BFP	3.0 @ 1786 RPM	5.0 @ 1786 RPM
Gear Reducer		
Hi Spd Shaft	1.5 @ 5150 RPM	2.3 @ 5150 RPM
Lo Spd Shaft	2.0 @ 1786 RPM	3.0 @ 1786 RPM

6. If a MFPT high casing level alarm and a high 6" drain header alarm are received simultaneously and remain in the alarm state for 30 seconds, TRIP the MFP. A high vibration alarm coming in simultaneously or shortly thereafter the other alarms is a further warning to trip the MFP.

5.3.2 Prerequisites

_____1. The MFPT is on turning gear and warmed up as per Section 5.1 and 5.2.

_____2. The MFP casing temperature differential is less than 50°F and either MFP upper casing or MFP lower casing vs. FW temperature is less than 25°F.

_____3. The TSI vibration recorder ZJR 2538 is in service.

_____4. Eccentricity has been less than 2 mils as shown on ZJR 2538 for at least one hour.

_____5. The MFPT has been on gear for at least four hours.

_____6. The Feedwater System is filled and vented as per Main Feedwater System Procedure SP 1106.07.

_____7. The local MFP, BFP and gear reducer vibration monitoring panel is in service.

_____8. Minimum recirc valve FW 428 (FW 438) is open.

_____9. Lube oil temperature is greater than 80°F.

5.3.3 Procedure

9 _____1. Verify that the manual pushbutton light, HIS 805C2 (806C2) is illuminated. If it is not illuminated, push it until the light illuminates.

_____2. Verify that the green "LSS" light 805A (806A) is illuminated. If it is not, turn the manual pistol grip HS 805D (806D) in the decrease direction until the green "LSS" light illuminates.

_____3. Check annunciator panel 10 to verify the alarms associated with the MFPT, MFP and BFP are normal.

4. Verify the following valves are open (located on the MSR and Heater Drain Panel).

_____TD 1955 (TD 1948) MFPT LPSV above seat drain
_____TD 1954 (TD 1956) MFPT LPSV below seat drain

_____TD 1951 (TD 1947) MFPT HPSV above seat drain
_____TD 1952 (TD 1945) MFPT HPSV below seat drain
_____TD 1950 (TD 1944) MFPT 1st stage drain

5. Reset the MFPT and verify the following lights illuminate.

_____(1) Green reset light.
_____(2) LPSV open light.
_____(3) HPSV open light.

NOTE: Stop the standby oil pump if it started.

_____6. Verify cmptr pt Z610 (Z611) MFP discharge NRV reads "not closed".

9 _____7. Intermittently jog the manual pistol grip HS 805D (806D) in the increase direction until the turning gear disengages.

NOTE: At startup, care should be taken that the electronics and hydraulics are given time to overcome built-in overtravels so that when control valves open, turbine speed will remain below 200 RPM.

_____8. Locally reset the Turning Gear.

9. Trip the MFPT and verify the following lights illuminate.

_____(1) Tripped light.
_____(2) LPSV closed light.
_____(3) HPSV closed light.

_____10. Verify the turbine goes back on gear.

9 _____11. Verify that the green "LSS" light 805A (806A) illuminated. If it is not, turn the manual pistol grip in the decrease direction until the light illuminates.

_____12. Reset the MFPT.

NOTE: Stop the standby oil pump if it started.

9 _____13. Increase turbine speed to 1000 to 1500 RPM using the manual pistol grip HS 805D (806D) and turning it to the increase direction.

_____14. Verify the MFP minimum recirc valve FW 428 (FW 438) is open.

_____15. Reset the MFPT turning gear logic locally.

_____16. Hold MFPT speed at 1000 to 1500 RPM until lube oil temperature is at least 110°F.

NOTE: Steps 17 through 20 can be performed while waiting for oil temperature.

17. Locally verify the following:

_____Hydraulic Oil Pressure is greater than 200 PSIG on PI 1194 (PI 1246)
_____Turbine bearing oil pressure is between 11.0 and 13.0 PSIG on PI 1216 (PI 1269)
_____Pump bearing oil pressure is between 11.0 and 13.0 PSIG on PI 1216 (PI 1269)
_____Control oil pressure is between 55 and 65 PSIG on PI 2650 (PI 2630)
_____Oil flow from both BFP oil flow sight glasses
_____Oil flow from both MFP oil flow sight glasses

18. Verify the following steam traps are in service.

_____ST 24 (ST 25) MFPT HPSV below seat drain
_____ST 44 (ST 45) HP Stm inlet
_____ST 41 (ST 43) LP Stm supply
_____ST 42 (ST 42) Aux Stm Supply

19. Close the following drains.

_____TD 1951 (TD 1947) MFPT HPSV above seat drain
_____TD 1950 (TD 1944) MFPT 1st stage drain

20. If the MFPT is running on LP Steam (this can be verified by the HPSV test permit light being on), then close then following drains.

_____TD 1955 (TD 1948) MFPT LPSV above seat drain
_____TD 1954 (TD 1956) MFPT LPSV below seat drain

11 _____21. Set the Bailey H/A station ICS 36B (ICS 36A) to its lowest speed setting or verify it is already there.

_____22. Increase turbine speed using the manual pistol grip HS 805D (806D) until a zero difference is indicated on the transfer meter amps Y1-805 (Y1-806).

NOTE: Perform Steps 23 and 24 while the turbine is accelerating.

_____23. Monitor BFP DISCH FLOW FI 428 (FI 438) to verify minimum pump flow per Enclosure 8, Page 11 of 11.

24. When MFP discharge pressure is greater than 150 PSIG, perform the following

____(1) Verify the MFP casing warmup valve FW 472 (FW 479) is closed
____(2) Close the MFP casing warmup valve isolation FW 24 (FW 25)
____(3) Close the MFP casing warmup valve isolation FW 22 (FW 23)

25. Perform the following tests.

____MFPT stop valve test PT 5136.01
____MFPT Emergency (overspeed) Governor PT 5136.06

NOTE: If this is the second MFPT being brought on line, the running MFPT HPSV would not have been tested. Perform PT 5136.01 for the running pump by allowing the second MFP to take the load and backing off the first MFPT.

9| ____26. Transfer control from MDT20 to ICS auto per Section 5.11 of this procedure.

9| ____27. Using the Bailey H/A station ICS 36B (ICS 36A), increase turbine speed to Control Main Feedwater Pump as needed.

NOTE: At 1.6 x 10^6 lbs/hr flow the minimum recirc valve should close automatically.

28. When the MFPT(s) are being driven by low pressure steam (the HPSV test permissive light will be on), verify the following drains are closed for all MFPT's running on LP steam.

____TD 1954 MFPT 1 LSPV below seat drain
____TD 1955 MFPT 1 LPSV above seat drain
____TD 1948 MFPT 2 LPSV above seat drain
____TD 1956 MFPT 2 LPSV below seat drain

Section 5.3 completed by_____Date_____

5.4 Shutdown to Turning Gear Operation

5.4.1 Limitations and Precautions

1. If one MFPT is to be shutdown during parallel operation, then it will be necessary to crossconnect the deaerator outlets.

5.4.2 Procedure

9 ____1. Reduce the Bailey H/A station ICS 36B (ICS 36A), to its lowest speed setting to reduce MFPT speed.

NOTE: The minimum recirc valve should open below 1.6×10^6 lbs/hr BFP flow.

____2. Monitor BFP discharge flow FI 428 (FI 438) to verify minimum pump flow per Enclosure 8, Page 11 of 11.

9 ____3. Transfer control from ICS auto to MDT20 per Section 5.11 of this procedure.

____4. Gradually decrease turbine speed by turning manual pistol grip HS 805D (806D) to decrease.

5. When MFP discharge pressure is less than 150 PSIG, perform the following.

____(1) Open the MFP casing warmup valve throttle FW 24 (FW 25)
____(2) Open the MFP casing warmup valve isolation FW 22 (FW 23)
____(3) Verify the MFP casing warmup valve is operating properly

6. At a MFPT speed less than 1000 RPM, open or verify open the following drains.

____(1) TD 1955 (TD 1948) MFPT LPSV above seat drain
____(2) TD 1954 (TD 1956) MFPT LPSV below seat drain
____(3) TD 1951 (TD 1947) MFPT HPSV above seat drain
____(4) TD 1950 (TD 1944) MFPT 1st stage drain

9 ____7. Reduce MFPT speed to zero RPM by turning manual pistol grip HS 805D (806D) until green "LSS" light 805A (806A) illuminates.

____8. Locally verify the MFPT is on gear.

____9. The MFPT can now be returned to operation by using Steps 13 through 28 of Section 5.3 of this procedure. If it is desired to trip the MFPT proceed with Step 10.

____10. Trip the MFPT.

11. Verify the following lights illuminate.

____(1) Red tripped light
____(2) LPSV closed light
____(3) HPSV closed light

_____12. The MFPT is in standby.

Section 5.4 completed by_____Date_____

5.5 Shutting MFPT Down

5.5.1 Prerequisites

_____1. MFPT is on gear

_____2. MFPT is tripped

5.5.2 Procedure

1. Close the following valves

_____MS 706 (MS 707) Main Stm Supply to MFPT
_____RH 22 (RH 23) Reheat Stm Supply to MFPT
_____AS 271 (AS 272) Aux Stm to MFPT
_____MS 723 (MS 722) MSPT exhaust one inch drain

2. Close the MFPT Exhaust Valve by performing the following.

_____(1) Close BE 3268 on E32B (BF 3268 on F32B) MFPT Exhaust Valve.
_____(2) Have the Control Room close MS 136 (MS 137) MFPT Exhaust Valve.
_____(3) Open BE 3268 (BF 3268).
_____(4) Tag the Control Room MFPT reset button to indicate the exhaust valve is closed.

_____3. From the Control Room Lockout both MFPT drain pumps using HIS 1973 and HIS 1968 (HIS 1961 and HIS 1965).

4. Close the following valves

_____(1) CD 220 (CD 222) MFPT Drn pmp 1 Seal wtr Supply Iso
_____(2) CD 221 (CD 223) MFPT Drn Pmp 2 Seal wtr Supply Iso
_____(3) TD 44 (TD 46) MFPT Drn pmp 1 Disch iso
_____(4) TD 45 (TD 47) MFPT Drn pmp 2 Disch iso

_____5. Break vacuum in the MFPT by opening MS 139 (MS 110) 2 inch drain valve.

_____6. When air is no longer being drawn into the MFPT, close MS 139 (MS 110).

7. Close the following steam seal valves:

____GS 21 (GS 22) MFPT Gland Steam Supply
____GS 23 (GS 24) MFPT Gland leakoff iso

____8. From the Control Room lockout the turning gear motor using HIS 1234A (HIS 1221A). It is preferable to leave the turbine on gear for 4 hours, however, it may be taken off gear immediately after taking steam seals off. 10

9. At least 4 hours after Step 7, lockout the following oil pumps from the control room.

____(1) HIS 1209 (HIS 1188) MFPT EBOP
____(2) HIS 1195 (HIS 1236) MFPT Main Oil Pump 1
____(3) HIS 1198 (HIS 1247) MFPT Main Oil Pump 2

____10. Notify the Pipe Shop to pin the MFP 1 (2) hangers.

11. Close the following valves to isolate the MFP and BFP.

____FW 3 (FW 4) BFP Suction Valve
____FW 45 (FW 46) MFP Discharge Valve
____FW 24 (FW 25) MFP Warmup throttle
____FW 22 (FW 23) MFP Warmup iso
____FW 28 (FW 29) MFP minimum recirc iso
____FW 36 (FW 37) MFP minimum recirc bypass

____12. When MFP casing temperature is less than 170°F, close CD 46 (CD 47) MFP and BFP Seal Supply isolation.

NOTE: Computer points T641 and T637 (T648 and T644) may be used for MFP casing temperature.

13. If the MFP and BFP is to be drained, open the following valves to drain the MFP and BFP casings.

____(1) FW 10 (FW 21) MFP vent
____(2) FW 5 (FW 7) BFP drain
____(3) FW 6 (FW 8) BFP drain
____(4) FW 111 (FW 113) BFP drain
____(5) FW 11 (FW 13) MFP drain
____(6) FW 12 (FW 14) MFP drain

Section 5.5 completed by_____Date_____

5.6 Controlling MFPT Speed Locally (see description of "Speed Control", Page 8)

5.6.1 Limitations and Precautions

1. Communication established between operator

9 controlling the manual pistol grip and person monitoring turbine speed and pump flow and the control room operator.

9 2. MFPT trips at 5841 to 5959 RPM.

5.6.2 Prerequisites

_____1. The control room operator is informed that speed is being controlled locally.

5.6.3 Procedure

9 _____1. If MFPT is controlled by ICS auto, transfer control to MDT-20 manual using Section 5.11.

_____2. Increase and decrease MFPT speed as needed by using the manual pistol grip located on the MFPT.

Section 5.6 completed by_____Date_____

5.7 Transferring Steam Supply from the Auxiliary Boiler to the Main Steam Header

The high pressure control valve opens after the last low pressure control valve has fully opened. If the turbine is running on auxiliary steam, the H.P. control valve will be fully closed and held closed by its actuator bias spring. If the turbine is at speed, on L.P. steam, it is extremely important when transferring over to H.P. steam supply line.

5.7.1 Limitations and Precautions

1. Communications established between local operator and control room operator.

2. Transfer is to be made slowly to allow the governor system to respond without significant speed variations.

5.7.2 Prerequisites

1. Station an operator at the auxiliary boiler.

5.7.3 Procedure

1. Isolate the following steam traps and valves if the main steam supply isolation valve MS 705 (707) are closed. If MS 706 (707) is open, skip to Step 3.

MFP 1-1		MFP 1-2
___ ST44	M.S. Supply Steam Traps	____ST45
___ TD10	HPSV Above Seat Drain	____TD11
___ TD 1951	HPSV Above Seat Drain	____TD1947
___ TD1952	HPCV Above Seat Drain	____TD1945
____ST24	HPCV Above Seat Drain	____ST25

2. Slowly open main steam supply isolation valves, if not already open.

____MS706 open ____MS707 open

3. Place H.P. steam supply line steam traps inservice by opening steam trap bypasses approximately one turn and warming the steam supply line thoroughly. Throttle bypass as necessary to prevent excessive steam flow to the condenser.

____ST44 ____ST45

4. Open the Above Seat Drain for the HP stop valve and ensure its isolation valve is open.

____TD10 open ____TD11 open
____TD1951 open ____TD1947 open

5. Place the H.P. Control valve above seat drain inservice by opening the trap outlet motor operated isolation and opening the steam trap bypass approximately one turn. Throttle the trap bypass as necessary to prevent excessive steam flow to the drain header.

____TD1952 open ____TD1945 open
____ST24 ____ST25

6. Slowly throttle closed Auxiliary Steam Supply Globe Valve AS270 while monitoring turbine speed. Maintain a constant turbine speed while the transfer is made.

7. Close the bypasses on the following steam traps:

MFP 1-1	MFP 1-2
____ST44	____ST45
____ST24	____ST25

8. Close the HP Stop Valve Above Seat Drains.

_____TD1951 closed _____TD1947 closed

Section 5.7 completed by_____Date_____

8 5.8 Transferring Steam Supply From the Main Steam Header to the Aux Steam Hdr (Aux Boiler)

CAUTION: The high pressure control valve opens after the last low pressure control valve has fully opened. If the turbine is running on Main Steam, the low pressure control valve will be fully open. It is extremely important when transferring to Aux Steam header that the transfer be made slowly to allow the governor system to respond without significant speed variations.

5.8.1 Limits and Precautions

1. Communications Established betweed Local Operator and Control Room Operator.

2 All water must be removed from Aux Steam Line and the line warmed up prior to opening Aux Steam Isol to MFP Turbine AS271 (AS272).

3. Reheat Stm Stop Valves RH22A, (RH23A) and RH22 (RH23) should be closed to prevent Aux Steam from going backwards thru RH24 (RH25) and into the MSR Shells.

4. Transfer is to be made slowly to allow the governor system time to respond without significant speed variations.

5.8.2 Prerequisites

_____1. The Aux Steam header is pressurized to at least 180 psig from either the Mn Stm to Aux Stm reducer or the Aux Boiler.

_____2. If transfer is to be made to the Aux Boiler, the Aux Boiler should be operating in the Power Mode. An operator should be stationed at the Aux Boiler during the transfer.

_____3. Establish communications between the Control Room and the MFP Turbine.

5.8.3 Procedure

1. Warm up the Aux Stm Header to the Aux Boiler by:

_____Verify AS177 Open
_____Close RH Stop Valve RH22 (RH23)
_____Close RH Stop Valve RH22A (RH23A)
_____Place ST42 in start-up mode
_____Crack open AS270 Aux Stm Supply to MFPT Throttle Valve
_____Crack open MS42 Aux Stm to MFP Turbine Stub header drain to ensure all water is removed from Aux Stm header
_____Close MS42
_____Place ST41 (ST43) in start up mode
_____Open TD 1955 (TD 1948) MFPT LPSV above seat drain
_____Open TD 1954 (TD 1956) MFPT LPSV below seat drain

2. When the Aux. Steam header is warmed up, establish Aux Steam flow to MFP Turbine by:

_____Open AS270 1 turn
_____Open AS271 (AS272)
_____While in communications with the Control Room, slowly throttle open AS270 until the HP control valves indicate fully shut by verifying HP Stop Valve Test Permit Light is ON [Blue light above HIS 793 (HIS 794) on MFP Control Console]
_____Control Aux. Steam Header Turbine Throttle Pressure 180 psig as indicated by PT 262 local gauge

NOTE: As MFPT demand changes, AS270 will need to be adjusted to maintain MFPT Throttle pressure at 180 psig.

_____Monitor FW valve ΔP and MFPT speed during the transfer
_____Return ST41 (ST43) to normal
_____Return ST42 to normal
_____Close TD 1955 (TD 1948) MFPT LPSV above seat drain
_____Close TD 1954 (TD 1956) MFPT LPSV below seat drain
_____Open TD 1951 (TD 1947) MFPT HPSV above seat drain
_____Open TD 1952 (TD 1945) MFPT HPSV below seat drain

Section 5.8 completed by_____Date_____

5.9 Transferring Main Feed Pump Turbine Oil Coolers

5.9.1 Limits and Precautions

1. Keep MFPT Lube Oil contamination to a minimum. Before opening a MFPT oil tank manway cover, be sure that the top of the tank is free of dirt and debris. The operator will take all loose articles out of his pockets and ensure that his hands, arms, and other parts of his body or clothing which will be in the tank are clean before actuating any valves within the tank.

2. Ensure all air is eliminated from cooler spaces by maintaining a circulating oil flow through the standby oil cooler at all times.

3. Ensure that the cooling water inlet pressure is always less than the MFPT L.O. Filter inlet pressure. This will prevent water from entering the MFPT lubrication oil system in the event of a cooler leak.

5.9.2 Prerequisites

1. Main Feed Pump Turbine 1-1 (1-2) is either on turning gear or running per this procedure.

5.9.3 Procedure

9 Section 5.9.3.1 will pertain to the MFPT 1-1 oil coolers and Section 5.9.3.2 will pertain to the MFPT 1-2 oil coolers. Numbers outside of parenthesis will be used when the #1 cooler is the "standby" cooler and numbers inside the parenthesis will be used when the #2 cooler is the "standby" cooler.

1. Transferring oil coolers on MFPT 1-1.

____Perform Valve Verification List C, Sh. 1 (2).

____Open MFPT Lube Oil Cooler 1-1-1 (1-1-2) Cooling Water Vent Valve CW 129 (CW 128) to vent cooler.

____When cooler is vented, close CW 129 (CW 128).

____Transfer oil flow from MFPT Oil Cooler 1-1-2 (1-1-1) to MFPT Oil Cooler 1-1-1 (1-1-2) by switching MFPT 1-1 L.O. Discharge Header to oil coolers two-way valve L.O. 121. See Enclosure 2 for instructions on operating this valve.

NOTE: If the main feed pump turbine is on turning gear, CW 1204A (1204B) may not open. If it does not open, manually open CW 1204A (1204B) until the cooler is vented. Close SW 129 (128).

_____Monitor MFPT 1-1 Lube Oil Cooler Oil Outlet Temperature on TIC 1204 until it conforms to the following condition:

MFPT on turning gear - >70°F
MFPT running - >110°F

_____If lube oil cooler outlet oil temperature is outside these limits, adjust the hand actuator on CW 1204A (1204B) until it is within these limits.

NOTE: When adjusting these valves, make sure that the cooling water pressure as read on PI 658 (662) is less than the MFPT L.O. Filter inlet pressure as read on PI 1201.

2. Transferring oil coolers on MFPT 1-2.

_____Perform Valve Verification List C, Sh. 3 (4).

_____Open MFPT Lube Oil Cooler 1-2-1 (1-2-2) cooling water vent valve CW 117 (116) to vent cooler.

NOTE: If cooling water flows from this vent before Step 4 of this section is completed, close CW 117 (116).

_____When cooler is vented, close CW 129 (CW 128).

_____Transfer oil flow from MFPT Oil Cooler 1-2-2 (1-2-1) to MFPT Oil Cooler 1-2-1 (1-2-2) by switching MFPT 1-1 L.O. Discharge Header to oil coolers two-way valve LO 121. See Enclosure 2 for instructions on operating this valve.

NOTE: If the main feed pump turbine is on turning gear, CW 1254A (1254B) may not open. If it does not open, manually open CW 1254A (1254B) until the cooler is vented. Close CW 117 (116).

_____Monitor MFPT 1-2 Lube Oil Cooler Oil Outlet temperature on TIC 1254 until it conforms to the following conditions:

MFPT on turning gear - >70°F
MFPT running - >110°F

_____If lube oil cooler outlet oil temperature is outside these limits, adjust the hand actuator on CW 1254A (1254B) until it is within these limits.

NOTE: When adjusting these valves, make sure that the cooling water pressure as read on PI 666 (670) is less than the MFPT L.O. Filter 1-2 inlet pressure as read on PI 1251.

9| Section 5.9 completed by_____Date_____

5.10 Changing MFPT L.O. Filters

5.10.1 Procedure for draining

_____1. Lockout filter pump using HIS NPO 311 (HIS NPO 312).

_____2. Lockout filter heating using HS NPO 371 (HIS NPO 372).

_____3. Close LO 94 (LO 95) Filter Pump Suction Iso.

_____4. Close LO 112 (LO 113) Filter discharge iso.

_____5. Verify closed LO 53 (LO 52) L.O. Transfer iso.

_____6. Verify closed LO 98 (LO 99) L.O. iso to MFPT used lo tk.

_____7. Verify closed LO 104 (LO 105) L.O. filter bypass.

_____8. Open LO 143 (LO 142) L.O. filter vent.

_____9. Open LO 115 (LO 116) L.O. filter drain and drain oil into suitable container.

_____10. Open LO 117 (LO 118) L.O. filter drain and drain oil into suitable container.

Section 5.10.1 completed by_____Date_____

5.10.2 Procedure for restoration

_____1. Close LO 117 (LO 118) L.O. filter drain.

_____2. Close LO 115 (LO 116) LO filter drain.

_____3. Close LO 143 (LO 142) LO filter vent.

_____4. Open LO 94 (LO 95) L.O. filter Pump Suct. iso.

_____5. Open LO 112 (LO 113) L.O. filter disch. iso.

_____6. Start filter pump.

_____7. Vent L.O. filter.

_____8. Start L.O. filter heater.

Section 5.10.2 completed by_____ _____Date_____

9 5.11 Transferring MDT20 (ICS) to ICS (MDT-20)

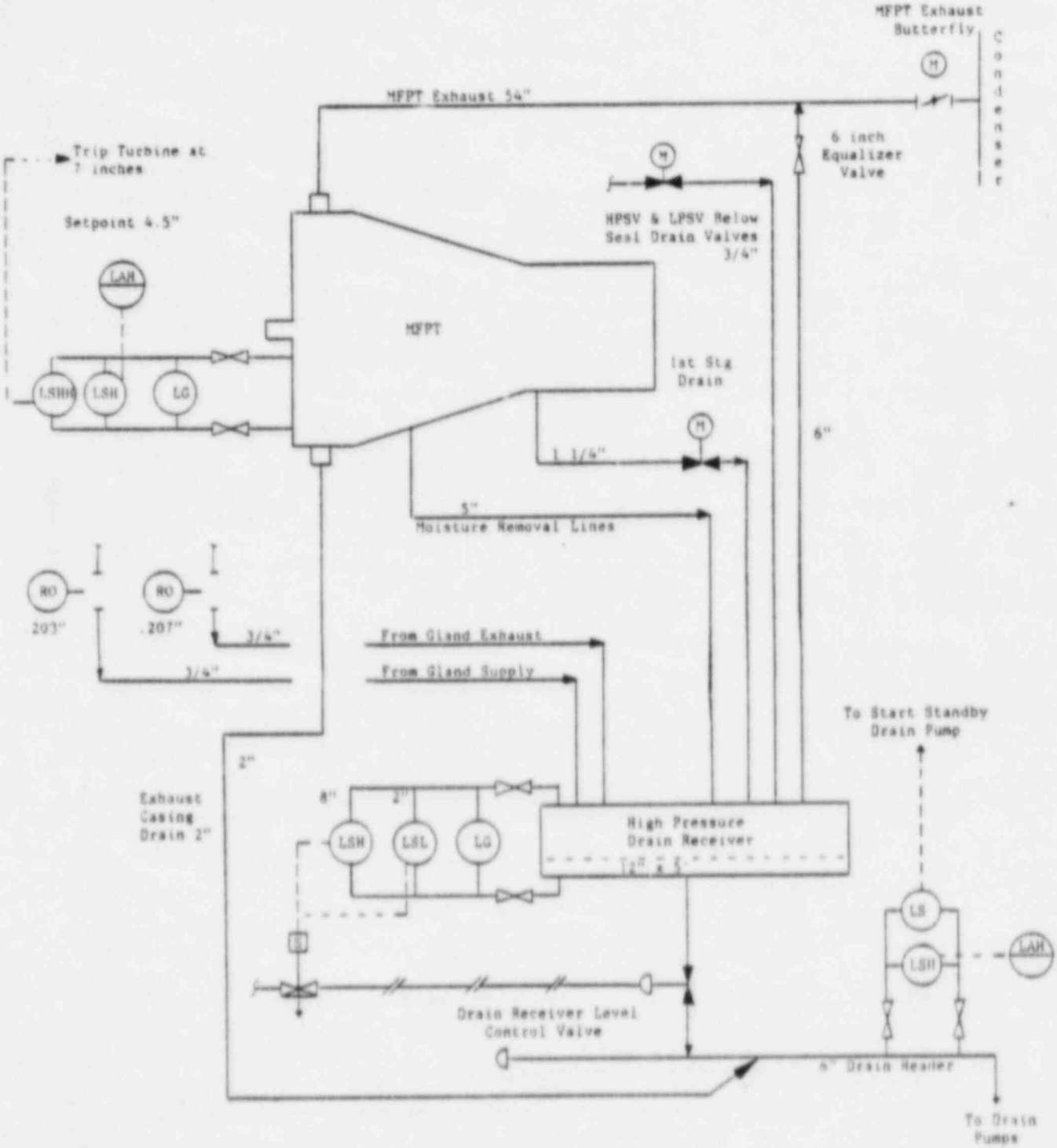
NOTE: This section does not require signoffs.

5.11.1 Verify MFPT speed is between 3900 RPM and 5150 RPM.

5.11.2 For the speed controller not in use (ICS or manual) adjust its output to indicate a zero amp reading on the transfer meter amp Y1-805 (Y1-806).

5.11.3 Press the desired button (ICS HIS 805C1 (806C1) or HIS 806C1 (806C2)) so that it illuminates and takes over control of MFPT speed.

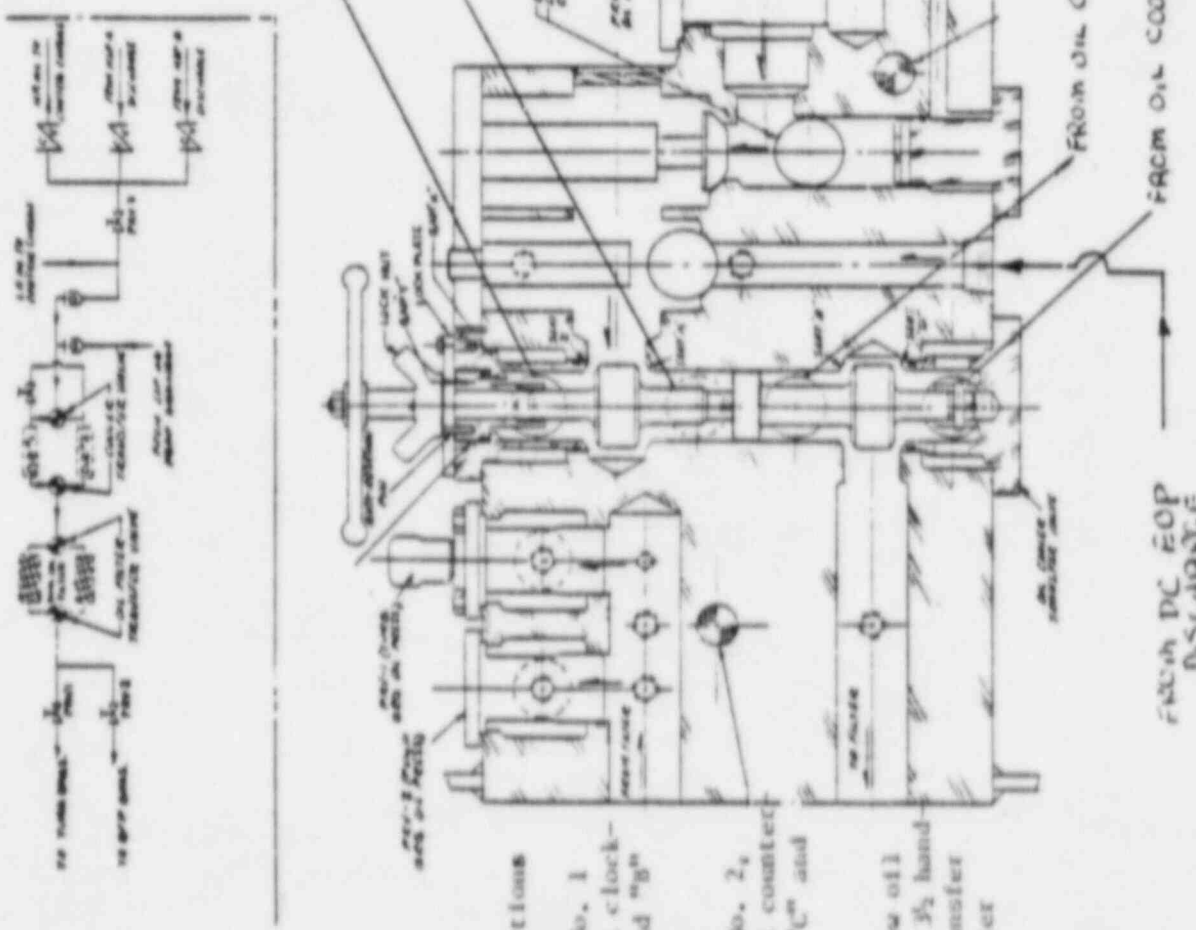
5.11.4 After the ICS has control of MFPT speed and is steady state, adjust the MDT-20 output so zero amp is indicated on the transfer meter amp Y1-805 (Y1-806).



Enclosure 1
Page 1 of 1

OIL TRANSFER VALVE INSTRUCTIONS

NOTE: This manifold is located inside the MFPT oil base.



Transfer Valve Instructions

To pass oil thru Clr No. 1 only, rotate handwheel clockwise until seat "A" and "B" have seated.

To pass oil thru Clr No. 2, only, rotate handwheel counterclockwise until seat "C" and "D" have seated.

Mid position will allow oil flow thru both Clrs. ½ handwheel turns of the transfer valve from single cooler operation will be the midposition.

Enclosure (1)
Page 1 of 1

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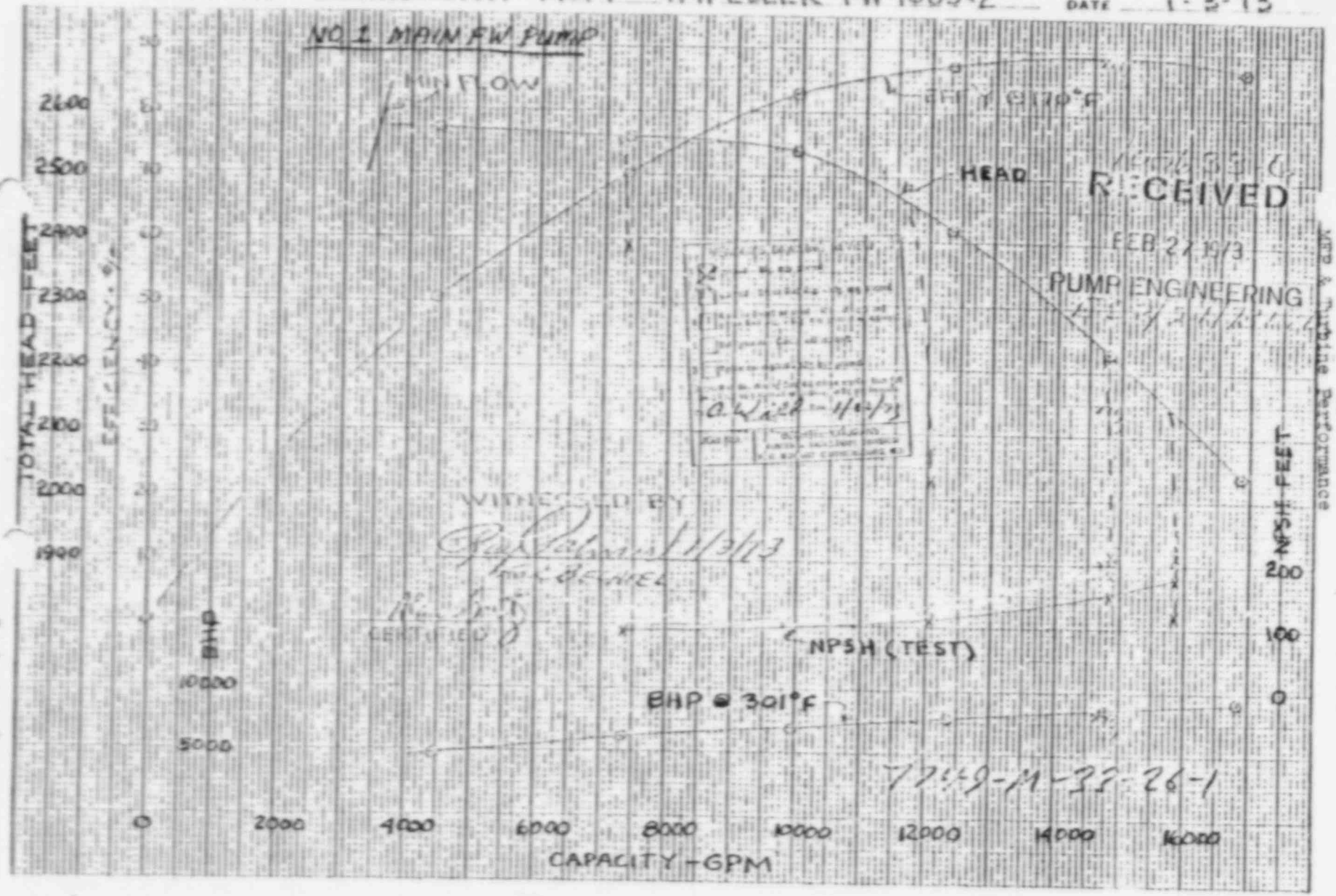
DE LAVAL TURBINE INC. TRENTON 2, NEW JERSEY

CC - 7172
ALT. NO. [illegible]

TEST RESULTS OF SINGLE STAGE CENTRIFUGAL PUMP PERFORMANCE
FOR
TOLEDO EDISON COMPANY
BECHTEL P.O. # 7749-M-33 UNIT FIZ-1
DAVIS-BESSE UNIT NO. 1 IMPELLER PW-1685-2

ORDER NO. 705633
TYPE 18SXI516
SPEED 5150
SUCTION FIELD 301°F
DATE 1-3-73

NO 1 MAIN FW PUMP



RECEIVED
FEB 21 1973
PUMP ENGINEERING

WITNESSED BY
[signature] 1/3/73

7749-M-33-26-1

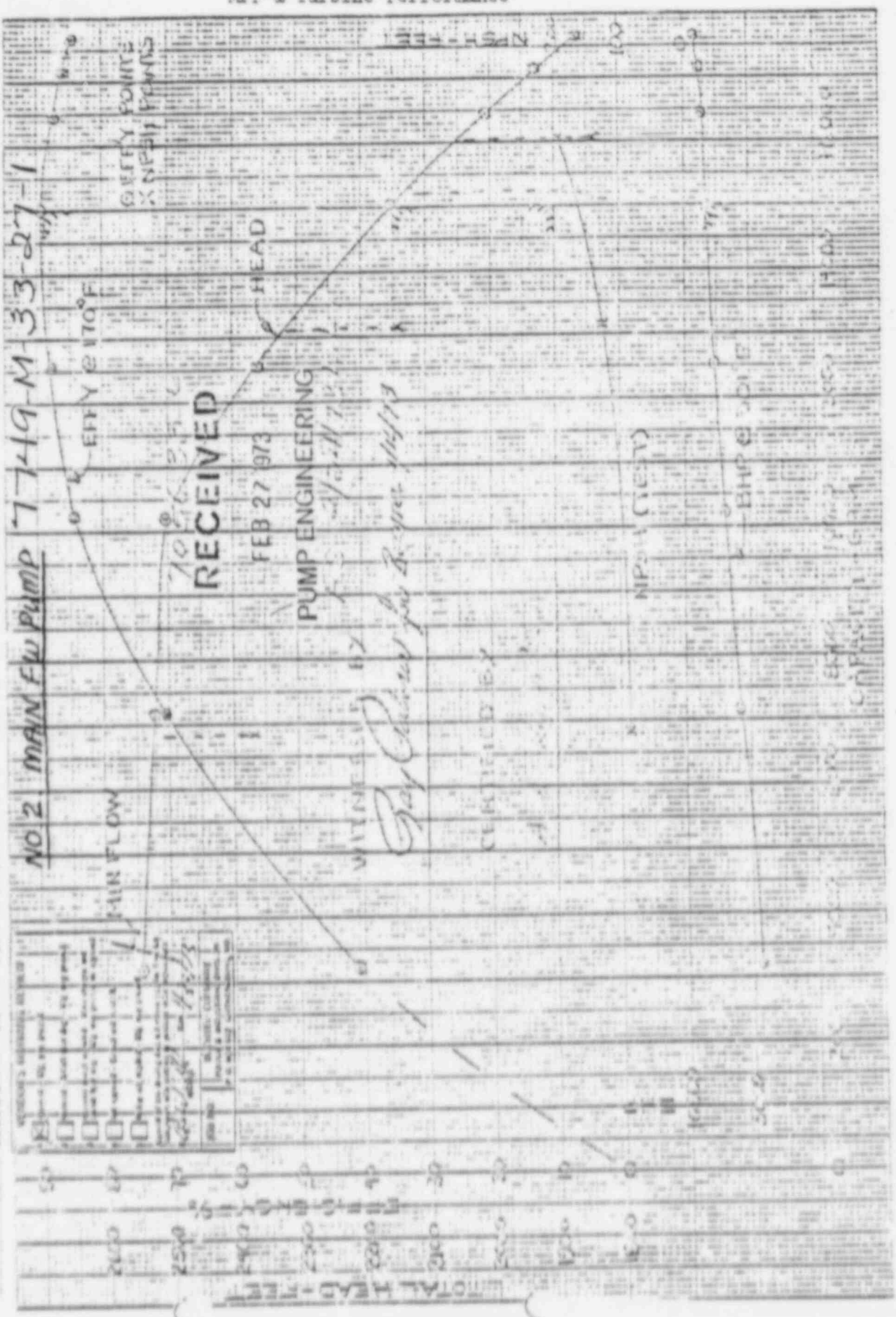
35

MFP & Turbine Performance

SP 1106.20.7

Enclosure 3
Page 1 of 11

MFP & Turbine Performance



DE LAVAL TURBINE INC. TRENTON 2, NEW JERSEY

CC-8535

TEST RESULTS OF FACTORY TEST OF CENTRIFUGAL FEED BOOSTER PUMP FOR THE TOLEDO EDISON Co & CLEVELAND ELECTRIC ILLUMINATING CO. DAVIS-BESSE UNIT NO 1, ORDER 1091 (UNIT P-13-1)

ORDER NO. 705638
TYPE P18/16D
SPEED 1786
SUCTION NPSHA 64 F
DATE FEB 14, 1972

PW 1687

NO. 1 BOOSTER FW PUMP

EFF'Y

HEAD - FT.

BHP

NPSHA

NPSHR

CAPACITY - GPM

Witnessed By - [illegible]
Certified By - [illegible]

NPSH & Turbine Performance

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SP 1106.20.7

Enclosure 1
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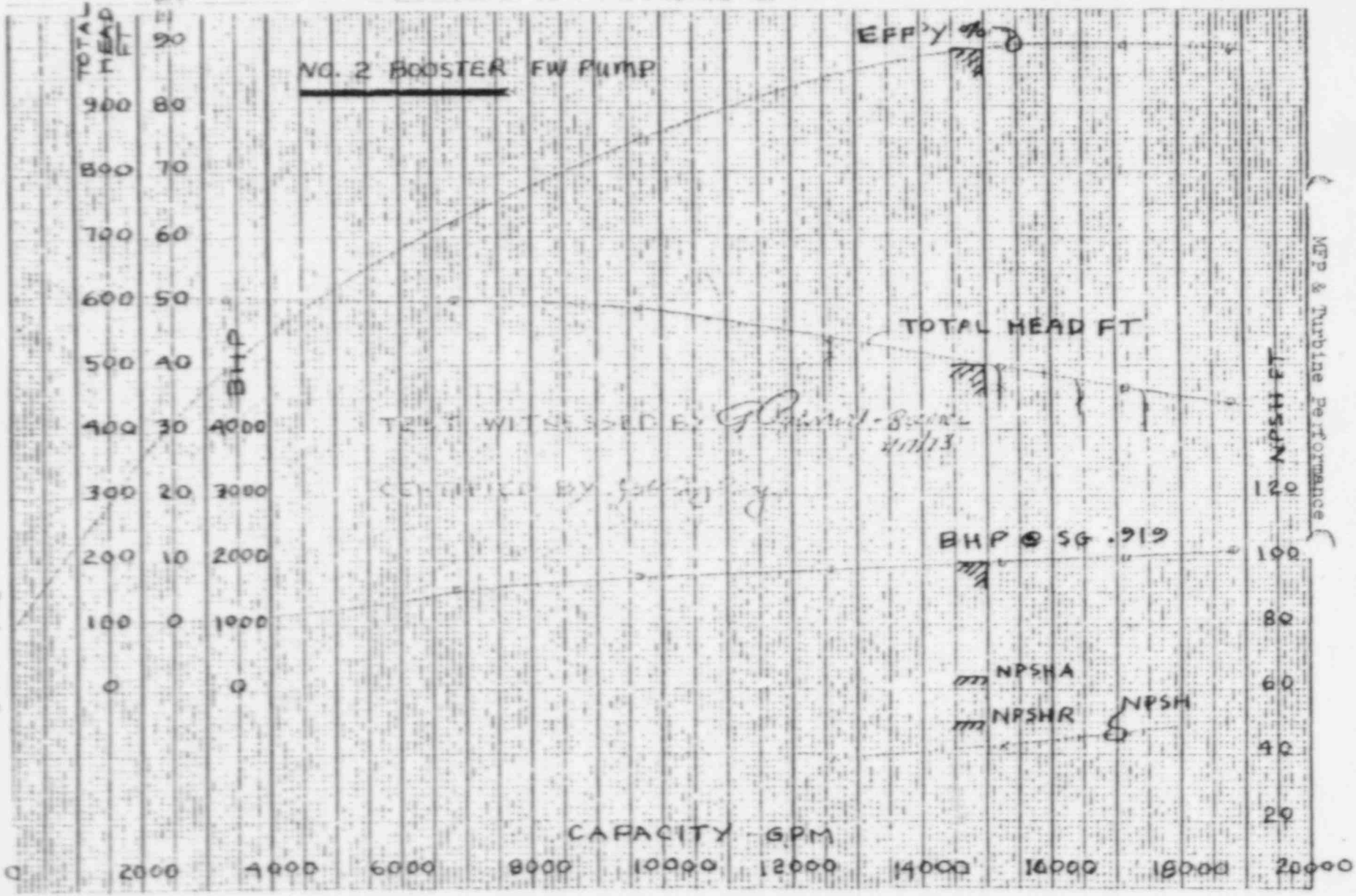
DE LAVAL TURBINE INC. TRENTON 2, NEW JERSEY

CC85356

TEST RESULTS OF FACTORY TEST OF CENTRIFUGAL FEED BOOSTER PUMP
FOR TOLEDO EDISON CO & CLEVELAND ELECTRIC
ILLUMINATING CO. DAVIS-BESSE UNIT NO 1, PO 1091
UNIT P-13-2 RJB 3/2/76

ORDER NO 705636
TYPE P18/16P
SPEED 1786
SUCTION NPSHA
DATE FEB 17, 1973



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SP 1106.20.7

Enclosure 1
Page 1 of 1

TURBINE DESIGN SPECIFICATION SHEET

OPERATING CONDITIONS		COLUMN 1 MAIN TURBINE V.W.O. @ NORMAL PRES.	COLUMN 2 F.P.TURBINE L.P.RATING DESIGN 2 PUMPS	COLUMN 3 F.P.TURBINE MAX.RATING 1 PUMP	COLUMN 4 MIN.MAIN TURBINE FLOW START-UP 2 PUMPS	COLUMN 5 AUX. STEAM SOURCE FOR INITIAL OR SUBSEQUENT (2) TESTS OF FEED PUMPS AND TURBINES		
STEAM SOURCE FOR FEED PUMP TURBINE		LP CROSSOVER	LP CROSSOVER	H.P.STEAM	L.P.STEAM	AUX. STEAM		
*MAIN TURBINE HEAT INPUT (BTU/HR)								
MAIN TURBINE THROTTLE INLET STEAM		870	870	870	870	-		
MAIN TURBINE EXHAUST FLOW, #/HR		11,376,487	11,376,487	7,060,000	4,550,000**	-		
FEED PUMP TURBINE INLET STEAM	PRESSURE PSIA	196.7	196.7	(2) 841 ±	(2) 88	200		
	TEMP. °F							
	ENTHALPY BTU/#	1270.1	1270.1	(2) 1257.±	1281.8	1200		
FEED PUMP TURBINE EXHAUST	STEAM TEMP.	3.0	3.0	3.0	3.0	3.0		
	EXHAUST PRESSURE "Hg	-	-	-	-	-		
FEED PUMP DATA	HEAD RISE	4910	5150	5100	4470	5150/4300	3660	
	CAPACITY	8667	10395	10395	4800	4510/3740	2340	
FEED PUMP TURBINE INLET STEAM FLOW	L.P. INLET #/HR	(2) 85205	(2) 102200		(2) 54000 (3)	6800/46900	(3) 32400	
	H.P. INLET #/HR			(2) 97100				
FEED PUMP TURBINE EXHAUST ENTHALPY BTU/#		(2) 1007.1	(3) 1007.1	(2) 980.4	(3) 1049.8	(2) 979/991	(3) 1010	

CE to fill in below heavy line.

*Feed pump turbine not required to carry rated load at higher than rated exhaust pressure.

**40% of V.W.O. Flow (45% Max)

±1170 PSIA Max (Relief Valve Full Open)

GENERAL ELECTRIC
NUCLEAR ENERGY SYSTEMS OPERATION FITCHBURG

CUSTOMER TOLEDO EDISON

STATION DAVIS BESSE #1

REQ. NO. 390-31480

TURBINE NO. 122848-49

DWG. NO.

1	2	3	4	5
2/1/72	5-10-72	11-15-72		
JL	JL	JL		

Revised data will be indicated by a circled revision number in the appropriate box. For previous data, see previous revision.

FINAL ISSUE JL

DATE 2/1/72

DISTR 12A5 122

SP 1106.20.7

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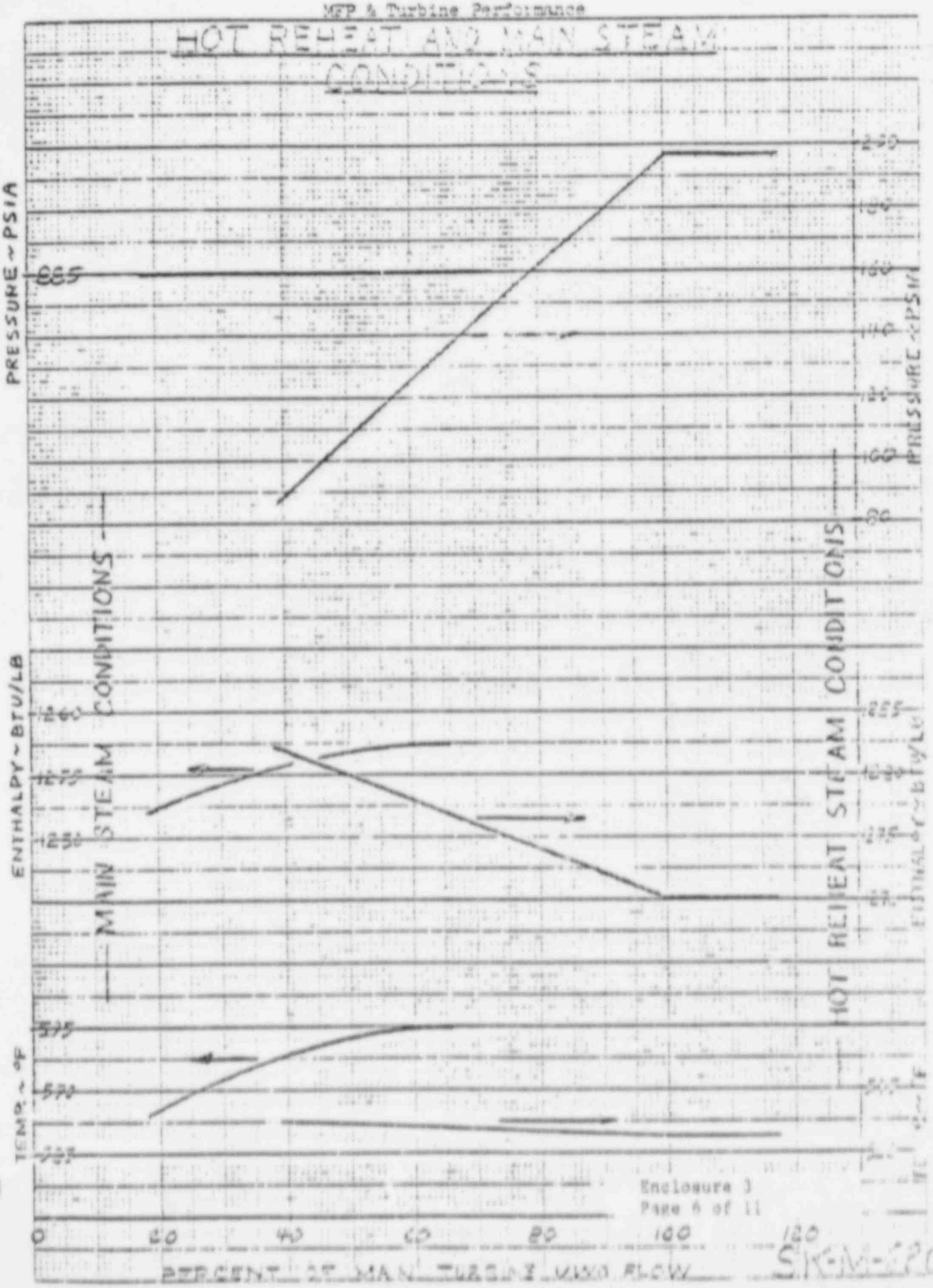
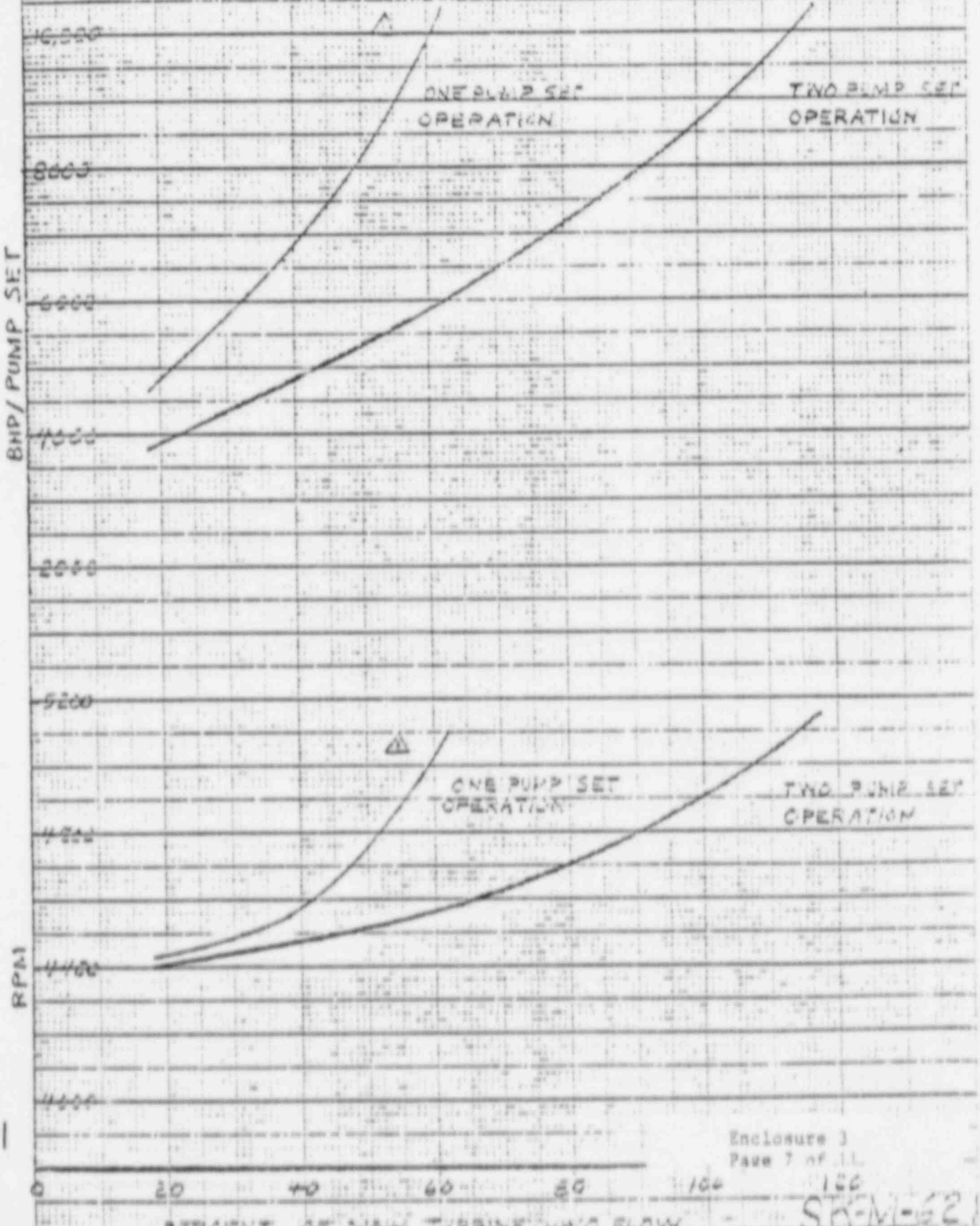
MFP & Turbine Performance



SK-M-20

MAIN/BOOSTER FEED PUMP SET OPERATING CHARACTERISTICS



SR-M-82.1

REV. 0 10-31-78

TOLEDO EDISON CO. TS No. 122-4-3-4-7-2
DAVIS BESSE # 1 REQ No. 390-31420

REACTOR FEED PUMP TURBINE EFFICIENCY
Vs
% MAIN TURBINE STEAM FLOW
EXHAUST PRESSURE = 3.0 "Hg ABS.
100% MAIN TURBINE STEAM FLOW = 11,376,487 LB/HR
PREDICTED DATA

REACTOR FEED PUMP TURBINE EFFICIENCY

770
780
770
760
750

TWO PUMP SET OPERATION
LOW PRESSURE STEAM

REACTOR FEED PUMP TURBINE EFFICIENCY

640
630
620
610
600
590
580
570
560

ONE PUMP SET OPERATION
HIGH PRESSURE STEAM

0 20 40 60 80 100

% MAIN TURBINE STEAM FLOW

Enclosure 3
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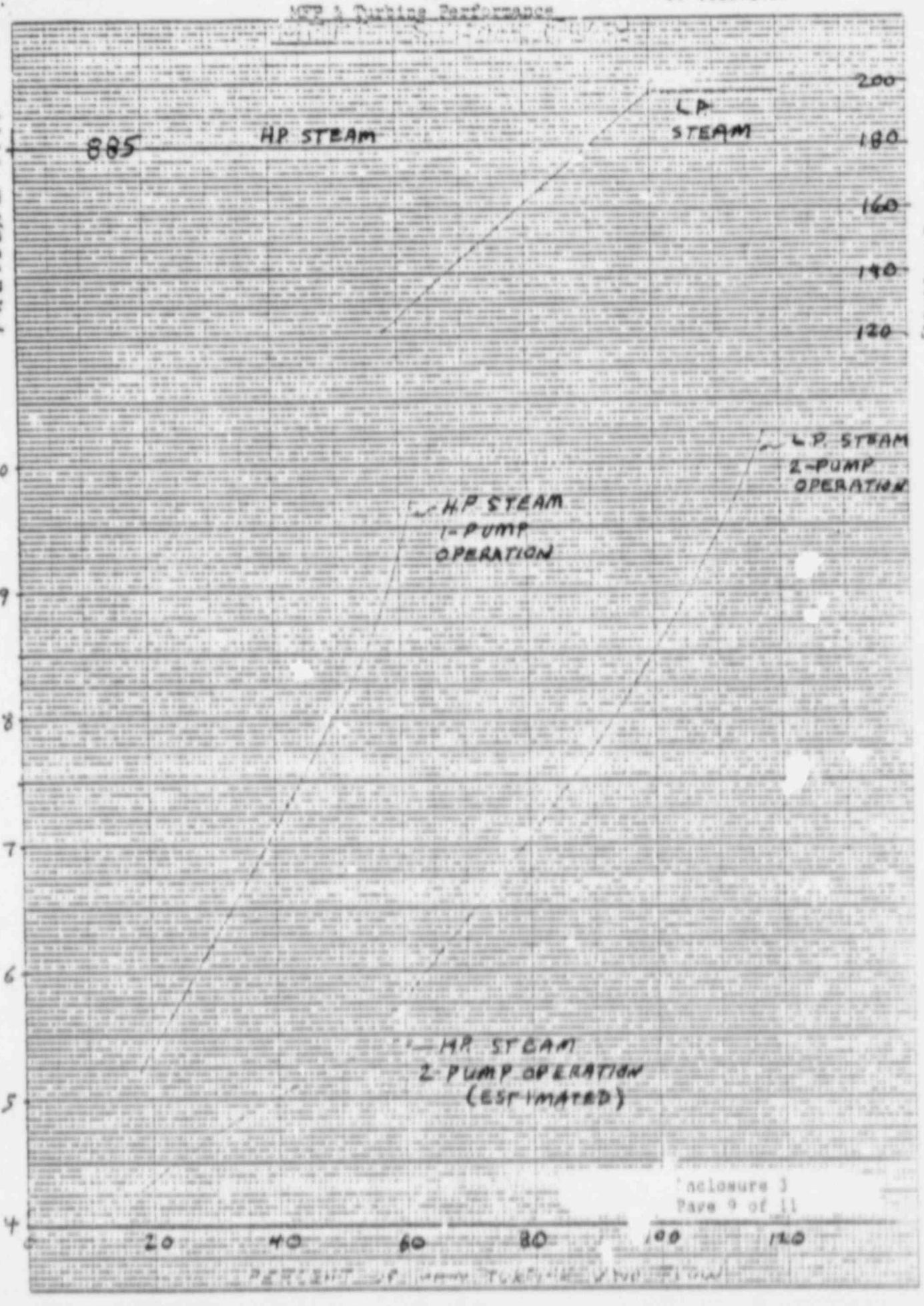
INLET PRESSURES TEMP. ENTHALPY LOADS AND SPEEDS PERTAINING TO THESE CURVES TAKEN FROM BECTEL CURVES
SK-M-620 REV #0 8/21/71
SK-M-621 REV #1 8/5/71

8/22/72
RFB

MFP 1 Turbine Performance



Enclosure 3
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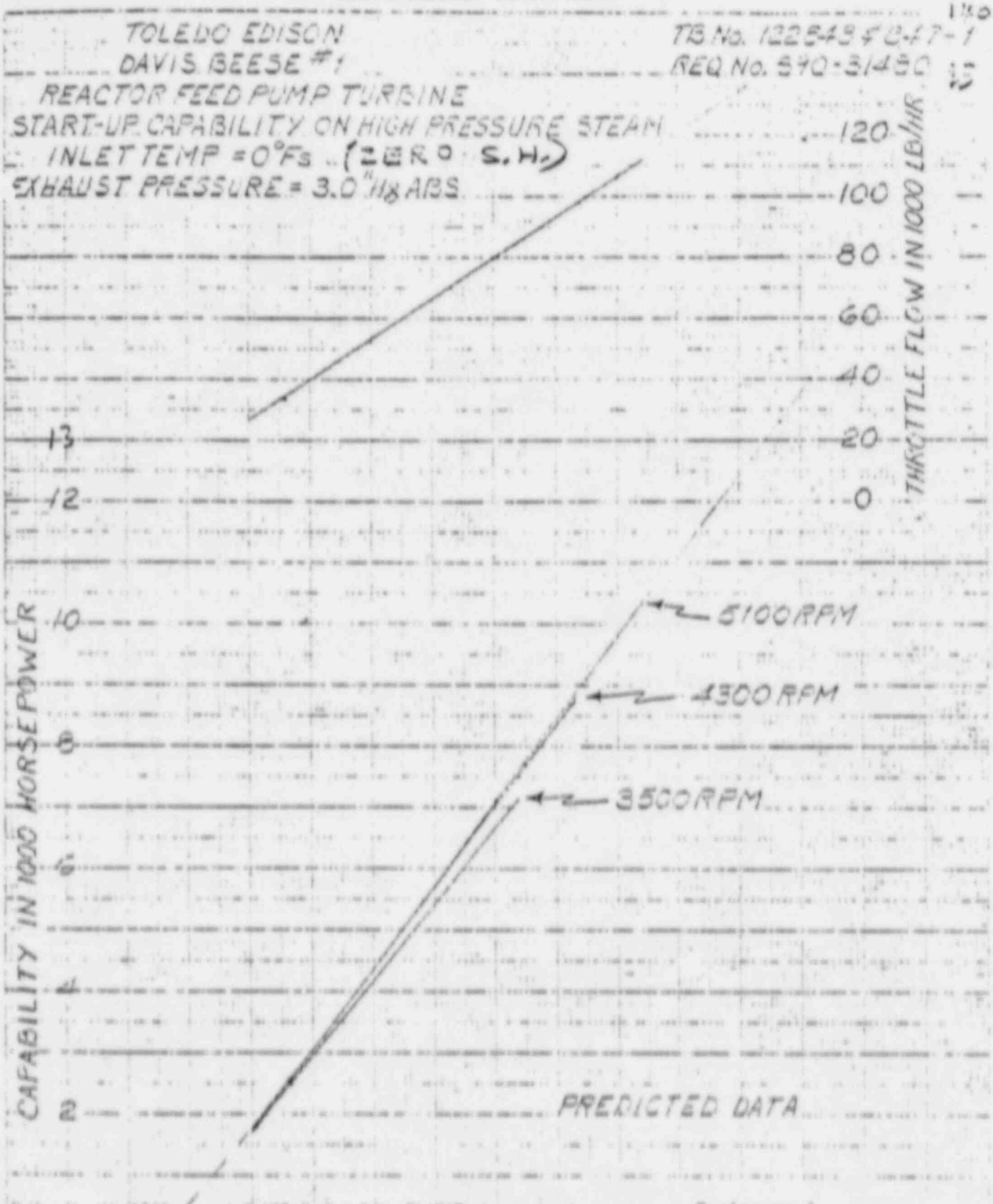
TOLEDO EDISON
DAVIS BEESE #1
REACTOR FEED PUMP TURBINE
START-UP CAPABILITY ON HIGH PRESSURE STEAM
INLET TEMP = 0°Fs (ZERO S.H.)
EXHAUST PRESSURE = 3.0" HgA BS

TB No. 122549 & 047-1
REQ No. 540-31450



Enclosure 3
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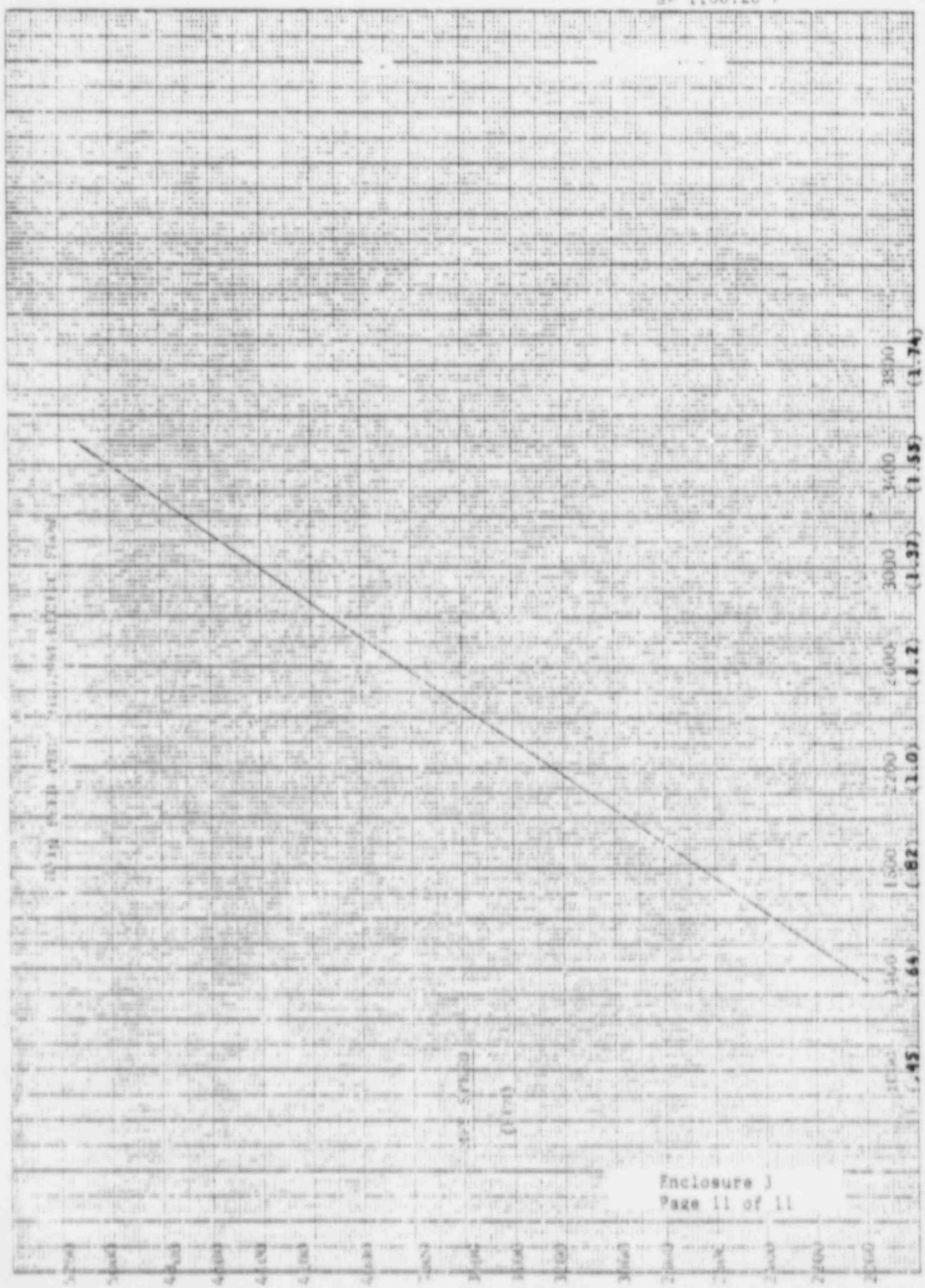
12/14/71
R.S.B.

SP 1106.20 7



Enclosure 1
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Sheet No. 1
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing
MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
BFP 1-1 Suction	M-006B D-2	FW 3	Closed	
TPCW Return	M-009 E-10	CW 194	Open	
MFP 1-1 Suction Line Vent Valve	M-006B G-3	FW 10	Closed	
ON THE 565' ELEVATION BY THE BFP				
BFP 1-1 Seal Wtr Press Ind Source	F-1	CD 758	Open	
BFP 1-1 Seal Wtr Inlet Iso	H-6	CD 216	Open	
BFP 1-1 Vent	E-2	FW 38	Closed	
BFP 1-1 Seal Wtr Press Ind	F-1	PI 752	In Service	
BFP 1-1 Seal Wtr Press Ind	F-1	PI 758	In Service	
BFP 1-1 Drain	F-2	FW 6	Closed	
BFP 1-1 Drain	G-2	FW 111	Closed	
BFP 1-1 Cyclone Sep Drain	G-2	FW 110	Open	
BFP 1-1 Drain	F-2	FW 5	Open	
MFPT 1-1 LO Temp Controller	M-18 J-2	TIC 2014	In Service	
MFPT 1-1 LO Vap Extractor Iso	G-5	LO 80	Open	
MFPT 1-1 LO TK Level Ind	H-6	LI 2214	In Service	
MFPT 1-1 LO TK Diff Press Source	G-5	LO 1155	Open	
MFPT 1-1 LO Filter Pmp Suct	J-6	LO 90	Open	
MFPT 1-1 LO TK Diff Press Ind	G-5	PDI 1155	In Service	
MFPT 1-1 LO Clr 1 Press Ind	M-009 K-5	PI 658	In Service	
MFPT 1-1 LO Clr 2 Press Ind	K-6	PI 662	In Service	

Sheet No. 2
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing
MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFPT 1-1 LO Clr 2 Drn	M-018 G-2	LO 129	Capped Closed	
MFPT 1-1 LO Clr 2 Shell Drn	M-009 K-7	CW 130	Closed	
MFPT 1-1 LO Tk Sample	M-018 J-2	SS 172	Closed	
MFPT 1-1 LO Tk Drn	K-2	LO 136	Closed	
MFPT 1-1 LO Clr Drn	G-1	LO 128	Capped Closed	
MFPT 1-1 LO Clr 1 Shell Drn	M-009 K-6	CW 131	Closed	
MFPT 1-1 LO Clr 2 Inlet Iso	J-6	CW 124	Open	
MFPT 1-1 LO Clr 2 Outlet Iso	K-7	CW 126	Open	
MFPT 1-1 LO Clr 2 Press Source	K-6	CW 659	Open	
MFPT 1-1 LO Clr 2 Vent	J-6	CW 128	Closed	
MFPT 1-1 LO Clr 2 Inlet Press Source	K-7	CW 662	Open	
MFPT 1-1 LO Clr 2 Temp Contrl Vlv	J-6	CW 1204B	In Service	
MFPT 1-1 LO Clr Outlet Hdr Vent	K-6	CW 136	Closed	
MFPT 1-1 LO Clr 1 Outlet Iso	K-6	CW 127	Open	
MFPT 1-1 LO Clr 1 Press Source	K-7	CW 663	Open	
MFPT 1-1 LO Clr 1 Vent	J-6	CW 129	Closed	
MFPT 1-1 LO Clr 2 Inlet Press Source	K-5	CW 658	Open	
MFPT 1-1 LO Clr 1 Temp Control Vlv	J-5	CW 1204A	In Service	
MFPT 1-1 LO Clr Inlet Iso	J-5	CW 125	Open	
BFP 1-1 Suct Press Ind Source	M-006B F-1	FW 466	Open	
MFPT 1-1 LO Filter to Used LO Tk	M-18 G-6	LO 85	Closed	

Sheet No. 3
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing
MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFPT 1-1 LO Filter Disch	H-6	LO 112	Open	
MFPT 1-1 LO Filter Suct Hdr to Hose Conn	J-6	LO 92	Closed	
MFPT 1-1 LO Filter Pmp Suct	J-6	LO 94	Open	
MFPT 1-1 LO Filter Suct Line Drn	J-6	LO 88	Closed	
MFPT 1-1 LO Filter Vent	G-5	LO 143	Closed	
MFPT 1-1 LO Filter Sample	G-5	SS 197	Closed	
MFPT 1-1 LO Filter Disch Press Source	H-6	LO 1223	Open	
MFPT 1-1 LO Filter Disch Press	M-018 H-6	PI 1223	In Service	
MPFT 1-1 LO Filter Drn	H-7	LO 117	Closed	
MFPT 1-1 LO Filter Drn	H-7	LO 115	Closed	
MFPT 1-1 LO Filter Disch Bypass	H-6	LO 104	Closed	
MFPT 1-1 LO Filter Disch Bypass	H-6	LO 108	Closed	
MFPT 1-1 LO Filter Tk Fill	E-8	LO 53	Closed	
MFPT 1-1 LO Filter Inlet	J-7	LO 102	Open	
MFPT 1-1 LO Filter to Used LO Tk	J-7	LO 98	Closed	
MFPT 1-1 LO Filter Pmp Disch PSL	K-6	PSL 1167	In Service	
MFPT 1-1 LO Filter Pmp Disch Press Ind	K-6	PI 1167	In Service	
MFPT 1-1 LO Filter Pmp Disch PSH	K-6	PSH 1167	In Service	
MFPT 1-1 LO filter Pmp Disch Source	K-6	LO 1167	Open	
MFPT Drn Pmp 1 Seal Wtr Press Ind	M-022 J-9	PI 1401	In Service	
MFPT Drain Pump 1-1-1 Seal Water Press Gage Source Valve	M-022 J-9	CD 1401	Open	

Sheet No. 4
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing
MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFPT Drain Pump 1-1-1 Seal Water Reg Valve	M-022 H-9	TD 24	Open	
MFPT Drain Pmp 1-1-1 Seal Wtr Regulator Vlv	M-022 K-9	CD 1408	In Service	
MFPT Drain Pump 1-1-1 Seal Water Inlet Valve	M-022 K-9	CD 220	Closed	
MFPT Drain Pump 1-1-1 Suction Valve	M-022 H-9	TD 20	Open	
MFP Seal Wtr Temp Cntrlr	M-006B G-6	TIC 940	In Service	
MFPT Drn Tk Lvl SW Source	M-022 G-9	TD 1949B	Open	
MFPT Drn TIC Lvl SW Source	G-9	TD 1949A	Open	
MFPT Drn TIC Lvl SW	G-9	LS 1949	In Service	
MFPT Drn Tk Lvl SW High	G-9	LSH 1949	In Service	
MFPT Drn Pmp 1 Reservoir Out	M-022 H-11	TD 44	Closed	
MFPT Drn Pmp 2 Seat Wtr Press Ind	J-10	PI 1440	In Service	
MFPT Drn Pmp 2 Reservoir Out	H-12	TD 45	Closed	
MFPT Drn Pup 2 Seat Wtr Press Ind Scr	M-022 J-10	CD 1440	Open	
MFPT Drn Pmp 2 Seal Wtr Reg	J-10	CD 1442	In Service	
MFPT Drn Pmp 2 Suct	H-9	TD 25	Open	
MFPT Drn Pmp 2 Seal Wtr In	K-10	CD 221	Closed	
MFPT Drn Pmp 2 Suct	J-9	TD 21	Open	
MFPT 1-1 LO Clr Main Isolation	M-009 H-1	CW 107	Open	
MFPT 1-1 Seal Wtr Drn Tk to Cond Vent	M-006A F-2	FW 42	Closed	
MFPT 1-1 Seal Wtr Drn Tk Lvl Contrlr	M-006B H-2	FW 485	In Service	
MFPT 1-1 Drn to Seal Wtr Drn Tk	H-3	FW 19	Open	

Sheet No. 5
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing
MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
BFP 1-1 Seal Wtr Diff Press Source	G-5	FW 15	Open	
MFP 1-1 Seal Wtr Out Hdr to FW Iso	D-1	FW 90	Open	
MFP 1-1 Vent	G-5	FW 40	Closed	
BFP 1-1 Seal Wtr Diff Press Source	G-5	FW 17	Open	
MFP Seal Wtr Inlet Iso	G-6	CD 56	Open*	
MFP Seal Wtr Cntrl	G-6	CD 593	In Service	
MFP Seal Wtr Inlet Iso	G-6	CD 54	Open*	
MFP Seal Wtr Inlet Bypass	M-006B G-6	CD 58	Closed	
MFP Seal Wtr Temp Ind Contrlr	G-5	TIC 593	In Service	
MFP Drn Vlv	H-5	FW 12	Closed	
MFP Seal Wtr Press Ind	G-6	PI 942	In Service	
MFP Seal Wtr Supply Iso	H-6	CD 46	Closed*	
MFP Seal Wtr Press Ind Source	G-6	CD 942	Open	
MFPT #1 Drain Receiver Inst Manifold Source	M-022 G-8	TD 4981A	Open	
MFPT #1 Drain Receiver Inst Manifold Source	G-8	TD 4981B	Open	
MFP Seal Wtr Inlet Iso	H-6	CD 48	Open*	
MFP Seal Wtr Control	G-6	CD 940	In Service	
MFP Seal Wtr Inlet Iso	G-6	CD 50	Open*	
MFP Seal Wtr Cntrlr Bypass	G-6	CD 52	Closed	
MFPT #1 Drain Receiver Equalizer Valve	M-003A J-4	MS 140	Open	

*Before opening this valve, verify FW 19 is open. This is to prevent flooding to bearings.

Sheet No. 6
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFP Drain	M-006B H-5	FW 11	Closed	
MFP Seal Wtr Drn Tk to Cond Drn	M 006A F-3	CD 345	Closed	
MFP Seal Wtr Drn Tk to Cond	F-3	FW 43	Open	
MFP Seal Wtr Iso	J-9	CD 24	Open*	
MFPT Drain Receiver Lvl SW Low	M-022 G-8	LSL 4981	In Service	
MFPT Drain Receiver Lvl SW High	G-8	LSH 4981	In Service	
MFPT Drain Receiver Lvl Gage	G-8	LG 4981	In Service	
MFPT Drain Receiver Drn Vlv	G-8	TD 4981	In Service	
MFPT to ARTS Press SW	M-024B C-9	PSL 4533D	In Service	
MFPT to ARTS Press SW	C-9	PSL 4533C	In Service	
BFP Disch Press Ind	M-006B F-3	PI 478A	In Service	
BFP Suct Press Ind	E-1	PI 466A	In Service	
BFP Suct Press Transmitter	E-1	PT 466	In Service	
BFP Disch Press Transmitter	F-3	PT 478	In Service	
The following instruments and valves are located in the MFPT LO instrument cabinet on the east side of the turbine. The black 3-way valves are open when their handle is rotated to the west. These valves should also be sealed open per Standing Order 13.				
Main feed pump turbine oil filter 1-1 differential press source	M-018 J2	LO 1205A	Open	
Main feed pump turbine oil filter 1-1 differential press source	J2	LO 1205B	Open	
Main feed pump turbine lube oil disch header 1-1 press indication source	J2	LO 1171	Open	
Main feed pump turbine lube oil to hydraulic control system press indiction source	J4	LO 1194	Open	

*Before opening this valve, verify FW 19 is open. This is to prevent flooding to bearings.

Sheet No. 7
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing
MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
Main feed pump turbine lube oil discharge header 1-1 press indication source	H2	LO 1201	Open	
Main feed pump turbine lube oil to control oil system pressure indication source	H4	LO 2650	Open	
Main feed pump lube oil bearing header 1-1 press indication source	K2	LO 1207	Open	
Main feed pump turbine lube oil bearing header 1-1 pressure indication source	K2	LO 1216	Open	
Main feed pump turbine lube oil bearing header 1-1 press transmitter source	K3	LO 1206	Open	
MFPT LO Tk Level Switch High	H-5	LSH 1170	In Service	
MFPT LO Tk Level Switch Low	J-5	LSL 1170	In Service	
Main feed pump turbine lube oil bearing header 1-1 pres switch source 3-way vlv	K3	LO 1228	Sealed Open	
Main feed pump turbine lube oil bearing header 1-1 pres switch source 3-way valve	K4	LO 1161	Sealed Open	
Main feed pump turbine lube oil bearing header 1-1 pres switch source 3-way valve	K3	LO 1217	Sealed Open	
MFPT HP SV Reset Press SW Source	M-24 C-6	LO 2729	Sealed Open	
MFPT #1 PSL 2731 Source 3-way valve	D-7	LO 2731	Sealed Open	
Main feed pump lube oil bearing header 1-1 pressure switch source 3-way valve	M-018 K-2	LO 1200	Sealed Open	
Main feed pump lube oil bearing header 1-1 pressure switch source 3-way valve	K2	LO 2552	Sealed Open	
Main feed pump turbine lube oil bearing header 1-1 pres switch source 3-way valve	K2	LO 1192	Sealed Open	
MFPT EBOP Test Solenoid Valve	M-18 H-4	LO 1210	Sealed Open	
MFPT Main Oil Pump Test Solenoid Valve	G-4	LO 1199	Sealed Open	
Main oil pump 1-1-1 discharge pressure switch source 3-way valve	J3	LO 2719	Sealed Open	
Emergency oil pump 1-1 discharge pressure switch source 3-way valve	J4	LO 1212	Sealed Open	
Main oil pump 1-1-1 discharge pressure switch source 3-way valve	G3	LO 1215	Sealed Open	
MFPT lube oil to hydraulic control system pressure transmitter source	J3	LO 1193	Open	

Sheet No. 8
of 8

VALVE VERIFICATION LIST A

Valve Lineup Prior to Placing
MFPT 1-1 and MFP 1-1 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
Main feed pmp turb lube oil to hydraulic control sys pres switch source 3-way vlv	J3	LO 1191	Sealed Open	
Emergency oil pump 1-1 discharge pressure switch source 3-way valve	J5	LO 2723	Sealed Open	
Main oil pump 1-1-2 discharge pressure switch source 3-way valve	J4	LO 2721	Sealed Open	
BY THE BFP				
MFPT to ARTS Press SW	M-24B C-9	PSL 4533A	In Service	
BFP Seal Press Ind Source	M-006B F-1	CD 752	Open	
BFP Disch Press Ind Source	F-2	FW 478	Open	
MFPT to ARTS Press SW	M-24B C-9	PSL 4533B	In Service	

Sheet No. 1
of 8

VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing
MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
ON THE 585' ELEVATION				
Dear to BFP Suct	M-006B F-11	FW 4	Closed	
CW Return to Lo Lvl Tk	M-009 E-10	CW 194	Open	
MFP Suct Vent	M-006B G-9	FW 21	Closed	
ON THE 565' ELEVATION BY THE 1-2 MFP				
BFP Dish Press Ind	H-10	PI 486A	In Service	
BFP Suct Press Ind	G-11	PI 494A	In Service	
BFP Suct Press Trans	G-11	PT 494	In Service	
BFP Disch Press Trans	H-9	PT 486	In Service	
MFPT LO Filter Pump Press Ind	M-018 K-7	PI 1172	In Service	
MFPT LO Filter Pump Press SW	K-7	PSL 1172	In Service	
MFPT LO Filter Pump Press SW	K-7	PSL 1172	In Service	
MFP Drn to Seal Wtr Drn Tk	M-006B H-11	FW 120	Open	
MFP Vent	G-8	FW 41	Closed	
Seal Wtr to BFP Diff Press Ind Scr	H-8	FW 16	Open	
MFP Seal Wtr Out Hdr to FW Iso	F-11	FW 89	Open	
Seal Wtr to BFP Diff Press Ind Scr	G-8	FW 18	Open	
MFP Drn	H-8	FW 14	Closed	
MFP Seal Wtr Temp Cntrlr	G-8	TIC 961	In Service	
MFP Seal Wtr in Bypass	G-8	CD 59	Closed	
MFP Seal Wtr in Iso	G-7	CD 55	Open*	

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of 8

VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing
MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFP Seal Wtr in	G-8	CD 961	In Service	
MFP Seal Wtr in Iso	M-006B G-8	CD 57	Open*	
MFPT Drain Receiver Instr Source	M-022 K-7	TD 4282A	Open	
MFPT Drain Receiver Instr Source	K-7	TD 4982B	Open	
MFP Seal Wtr in Iso	M-006B G-7	CD 49	Open*	
MFP Seal Wtr in	G-8	CD 963	In Service	
MFP Seal Wtr in Iso	H-8	CD 51	Open*	
MFP Seal Wtr in Bypass	H-8	CD 53	Closed	
MFPT Drain Receiver Equalizer	M-003A H-9	MS 112	Open	
MFP Drn	H-8	FW 13	Closed	
MFP Seal Wtr Supply Iso	H-7	CD 47	Closed*	
Cnds to MFP 1-1 and 1-2 Seals	M-006A J-9	CD 24	Open*	
MFP Seal Wtr in Press Ind Src	M-006B G-7	CD 960	Open	
MFP Seal Wtr in Press Ind	G-7	PI 960	In Service	
MFP Seal Wtr Drn Tk to Cond	H-12	FW 395	In Service	
MFPT Seal Wtr Drn Tk to Cond Iso	M-006A F-7	FW 76	Open	
MFPT Drn Receiver Lvl SW Low	M-022 K-7	LSL 4982	In Service	
MFPT Drn Receiver Lvl SW High	K-7	LSH 4982	In Service	
MFPT Drn Receiver Lvl Gage	K-7	LG 4982	In Service	
MFPT Drn Receiver Drn	K-9	TD 4982	In Service	

*Before opening this valve, verify FW 120 is open. This is to prevent flooding the bearings.

Sheet No. 3
of 8

VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing
MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFPT to ARTS Press SW	M-024B C-9	PSL 5434D	In Service	
MFPT to ARTS Press SW	C-9	PSL 5434C	In Service	
The following instruments and valves are located in the MFPT LO instrument cabinet on the east side of the turbine. The black 3-way valves are open when their handle is rotated to the west. These valves should also be sealed open per Standing Order 13.				
MFPT L.O. Bearing Hdr Press Trans Src	M-018 K-10	LO 1256	Open	
MFPT EBOP Disch Press Src	H-9	LO 1233	Sealed Open	
MFPT Main Oil Pump 1 Disch Press Src	J-9	LO 2611	Sealed Open	
MFPT Main Oil Pmp 1 Disch Press Src	G-10	LO 1238	Sealed Open	
MFPT LO disch & Hdr Press Trans Src	M-018 J-10	LO 1245	Open	
MFPT LO Hyd Press Src	J-10	LO 1244	Sealed Open	
MFPT DBOP Disch Press Src	J-9	LO 2607	Sealed Open	
MFPT Main Oil Pump 2 Disch Press Src	J-10	LO 2617	Sealed Open	
MFP LO Bearing Hdr Press Src	K-10	LO 1240	Sealed Open	
MFP LO Bearing Hdr Press Src	K-12	LO 2553	Sealed Open	
MFP LO Bearing Hdr Press Src	K-12	LO 1242	Sealed Open	
MFPT Main Oil Pump Test Solenoid	G-10	LO 1237	In Service	
MFPT EBOP Test Solenoid	H-9	LO 1231	In Service	
MFPT LO Control Oil Press Src	H-10	LO 2630	Open	
MFP LO Bearing Hdr Press Ind Src	K-12	LO 1257	Open	
MFP LO Bearing Hdr Press Ind Src	K-11	LO 1259	Open	
MFPT LO Disch Hdr Press Ind Src	J-11	LO 1184	Open	

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of 8

VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing
MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFPT LO Hyd Press Ind Src	J-10	LO 1246	Open	
MFPT LO Disch Hdr Press Ind Src	H-11	LO 1251	Open	
MFPT LO Filter Diff Press Ind Src	J-11	LO 1255A	Open	
MFPT LO Filter Diff Press Ind Src	J-11	LO 1255B	Open	
MFPT LO Tk Lvl SW	H-8	LSH 1194	In Service	
MFPT LO Tk Lvl SW	H-8	LSL 1194	In Service	
MFP LO Bearing Hdr Press Src	K-10	LO 1261	Sealed Open	
MFP LO Bearing Hdr Press Src	K-9	LO 1262	Sealed Open	
MFP LO Bearing Hdr Press Src	M-018 K-11	LO 1260	Sealed Open	
MFPT LO Press Src	M-024B Table	LO 2730	Sealed Open	
MFPT LO Press Src	Table	LO 2732	Sealed Open	
MFPT to ARTS Press SW	C-9	PSL 5434B	In Service	
MFPT to ARTS Press SW	C-9	PSL 5434A	In Service	
BFP Seal in Iso	M-006B H-7	CD 213	Open	
BFP Seal Wtr Press Ind Src	H-9	CD 772	Open	
BFP Disch Press Ind Src	H-10	FW 486	Open	
BFP Seal Wtr in Press Ind Src	G-9	CD 7	Open	
BFP Drn	H-10	FW 8	Closed	
BFP Seal Wtr Press Ind	G-9	PI 764	In Service	
BFP Seal Wtr Press Ind	H-9	PI 772	In Service	
BFP Vent	G-10	FW 39	Closed	

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of 8

VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing
MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
BFP Drn	H-10	FW 113	Closed	
BFP Seal Wtr Cyclone Sep Drn	H-10	FW 112	Open	
BFP Drn	H-10	FW 7	Open	
MFPT Vapor Ext Iso	M-018 G-8	LO 81	Open	
MFPT LO Tk Level Ind	H-8	LI 2218	In Service	
MFPT LO Cooler Controler	J-12	TIC 1254	In Service	
MFPT LO Clrs Iso	M-009 G-1	CW 106	Open	
Main feed pump turbine lube oil filter pump 1-2 suction valve	M-018 H-8	LO 91	Open	
MFPT LO Tk Press Ind Src	G-9	LO 1219	Open	
MFPT LO Tk Press Ind	M-018 G-9	PDI 1219	In Service	
MFPT LO Clr 1 TPCW in Press	M-009 H-7	PI 666	In Service	
MFPT LO Clr 2 TPCW in Press	H-5	PI 670	In Service	
MFPT LO Clr 2 Drn	H-6	CW 118	Closed	
MFPT LO Clr 2 Drn	M-018 G-12	LO 131	Closed	
Main feed pump turbine lube oil tank 1-2 sample valve	J11	SS 173	Closed	
Main feed pump lube oil tank 1-2 drain	K11	LO 137	Closed	
MFPT LO Clr 2 in Press Src	M-009 H-5	CW 670	Open	
MFPT LO Clr 2 Temp Cntrl	J-5	CW 1254B	In Service	
MFPT LO Clr 2 Out Press Tap	H-6	CW 671	Closed	
MFPT LO Clr 2 Vent	H-6	SW 116	Closed	
MFPT LO Clr 2 Out Iso	H-6	CW 114	Open	

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VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing
MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFPT LO Clrs Out Vent	H-6	CW 231	Closed	
MFPT LO Clr 2 in Iso	J-5	CW 112	Open	
MFPT LO Clr 1 Vent	H-7	CW 117	Closed	
MFPT LO Clr 1 Out Iso	H-7	CW 115	Open	
MFPT LO Clr 1 Out Press Tap	H-7	CW 667	Closed	
MFPT LO Clr 1 Temp Cntrl	H-6	CW 1254A	In Service	
MFPT LO Clr 1 in Press Src	H-7	CW 666	Open	
MFPT LO Clr 1 in Iso	H-6	CW 113	Open	
MFPT LO Clr 1 Drn	H-7	CW 119	Closed	
MFPT LO Clr 1 Drn	M-018 G-12	LO 130	Closed	
MFPT LO Tk Filter Sud Line Drn	M-018 J-8	LO 89	Closed	
Main feed pump turbine lube oil filter pmp 1-2 suction header to hose connection	J8	LO 93	Closed & Capped	
Main feed pump turbine lube oil filter pump 1-2 suction valve	J8	LO 95	Open	
Main feed pump turbine lube oil filter 1-2 crossover	G7	LO 86	Closed	
Main feed pump turbine lube oil filter 1-2 discharge valve	H7	LO 113	Open	
MFPT LO Filter 1-2 Vent	G7	LO 142	Closed	
MFPT LO Filter 1-2 Sample	G7	SS 198	Closed	
Main feed pump turbine lube oil filter 1-2 pressure indication source	H7	LO 1227	Open	
MFPT LO Filter Drn	H7	LO 118	Closed	
Main feed pump turbine lube oil filter 1-2 drain	H7	LO 116	Closed & Capped	
Main feed pump turbine lube oil filter 1-2 discharge valve bypass	H7	LO 109	Closed	

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of 8

VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
Main feed pump turbine lube oil filter 1-2 discharge valve bypass	H7	LO 105	Closed	
Makeup and fill the main feed pump turbine lube oil tank 1-2	F8	LO 52	Closed	
Main feed pmp turbine lube oil filter pump 1-2 discharge to MFPT used lube oil tank	J7	LO 99	Closed	
Main feed pump turbine lube oil filter 1-2 inlet valve	J7	LO 103	Open	
Main feed pump turbine lube oil filter pump 1-2 discharge pres indication source	K7	IO 1172	Open	
MFPT Drn Pmp 1 Seal Wtr Dress Ind Src	M-022 F-13	CD 1444	Open	
MFPT Drn Pmp 1 Seal Wtr Reg Vlv	F-14	CD 1445	In Service	
MFPT Drn Pmp 1 Suct	M-022 D-14	TD 26	Open	
MFPT Drn Pmp 1 Seal Wtr in	F-14	CD 222	Closed	
MFPT Drn Pmp 1 Suct	D-14	TD 22	Open	
MFP Seal Wtr Temp Cntrlr	M-006B H-8	TIC 963	In Service	
MFPT Drn Tk Lvl SW Source	M-022 K-9	TD 1957B	Open	
MFPT Drn Tk Lvl SW Source	K-9	TD 1957A	Open	
MFPT Drn Tk Lvl SW	K-10	LS 1957	In Service	
MFPT Drn Tk Lvl SW High	K-10	LSH 1957	In Service	
MFPT Drn Pmp 1 Res Out	M-022 D-12	TD 46	Closed	
MFPT Drn Pmp 2 Res Out	E-12	TD 47	Closed	
MFPT Drn Pmp 2 Seal Wtr Press Ind Src	F-13	CD 1449	Open	
MFPT Drn Pmp 2 Seal Wtr Reg	E-14	CD 1448	In Service	
MFPT Drn Pmp 2 Suct	E-14	TD 27	Open	
MFPT Drn Pmp 2 Seal Wtr in	E-14	CD 223	Closed	

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of 8

VALVE VERIFICATION LIST B

Valve Lineup Prior to Placing MFPT 1-2 and MFP 1-2 on Gear

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
MFPT Drn Pmp 2 Suct	D-14	TD 23	Open	
MFP Seal Wtr Drn Tk Vent	M-006A E-7	FW 75	Closed	

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of 4

VALVE VERIFICATION LIST C

Transferring Lube Oil Coolers on Main Feed Pump Turbines 1-1 and 1-2

5 Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
The following valves should be verified if MFPT 1-1 L.O. Cooler 1-1-1 is the "standby" cooler.				
MFPT L.O. Cooler 1-1-1 Inlet Iso Vlv	M-009 J-5	CW 125	Open	
Inlet to MFPT L.O. Cooler 1-1-1 Temperature Control Valve	J-5	CW 1204A	In Service	
MFPT L.O. Cooler 1-1-1 Outlet Iso Vlv	K-6	CW 127	Open	
MFPT L.O. Cooler 1-1-1 Inlet Press Src Vlv	J-5	CW 658	Open	
MPFT L.O. Cooler 1-1-1 Inlet Press Gage	J-5	PI 658	In Service	
MFPT L.O. Cooler 1-1-1 Vent Valve	J-6	CW 129	Pipe Cap Removed	
MFPT L.O. Cooler 1-1-1 Shell Drn Vlv	K-6	CW 131	Closed	
Press Test Tap Source Vlv	K-6	CW 659	Closed	
MFPT 1-1 Standby L.O. Clr Circ Vlv	M-018 H-2	LO 126	Open	
MFPT L.O. Cooler 1-1-1 Drain Vlv	G-1	LO 128	Closed	

Sheet No. 2
of 4

VALVE VERIFICATION LIST C

Transferring Lube Oil Coolers on Main Feed Pump Turbines 1-1 and 1-2

5 Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
The following valves should be verified if MFPT L.O. Cooler 1-1-1 is the "standby" cooler.				
MFPT L.O. Cooler 1-1-2 Inlet Iso Vlv	M-009 J-6	CW 124	Open	
Inlet to MFPT L.O. Cooler 1-1-2 Temperature Control Valve	J-7	CW 1204B	In Service	
MFPT L.O. Cooler 1-1-2 Inlet Press Src Vlv	J-6	CW 662	Open	
MPFT L.O. Cooler 1-1-2 Inlet Press Gage	K-6	PI 662	In Service	
MFPT L.O. Cooler 1-1-2 Vent Valve	J-7	CW 128	Pipe Cap Removed	
MFPT L.O. Cooler 1-1-2 Shell Drn Vlv	K-7	CW 130	Closed	
MFPT L.O. Cooler 1-1-2 Press Test Tap Source Valve	K-7	CW 663	Closed	
MFPT L.O. Cooler 1-1-2 Outlet Iso Vlv	J-7	CW 126	Open	
MFPT 1-2 Standby L.O. Clr Circ Vlv	M-018 H-2	LO 126	Open	
MFPT L.O. Cooler 1-1-2 Drn Vlv	G-2	LO 129	Closed	

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of 4

VALVE VERIFICATION LIST C

Transferring Lube Oil Coolers
on Main Feed Pump Turbines 1-1 and 1-2

5 Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
The following valves should be verified if MFPT 1-2 L.O. Cooler 1-2-1 is the "standby" cooler.				
MFPT L.O. Cooler 1-2-1 Inlet Iso Vlv	M-009 H-6	CW 113	Open	
Inlet to MFPT L.O. Cooler 1-2-1 Temperature Control Valve	H-6	CW 1254A	In Service	
MPFT L.O. Clr 1-2-1 Inlet Press Src Vlv	H-6	CW 666	Open	
MPFT L.O. Clr 1-2-1 Inlet Press Gage	H-7	PI 666	In Service	
MFPT L.O. Clr 1-2-1 Vent Vlv	H-7	CW 117	Pipe Cap Removed	
MFPT L.O. Clr 1-2-1 Shell Drn Vlv	H-7	CW 119	Closed	
Press Test Tap Source	H-7	CW 667	Closed	
MFPT L.O. Clr 1-2-1 Outlet Iso Vlv	H-7	CW 115	Open	
MFPT 1-2 Standby L.O. Clr Circ Vlv	M-018 H-11	LO 132	Open	
MFPT 1-2 L.O. Clr 1-2-1 Drn Vlv	G-12	LO 130	Closed	

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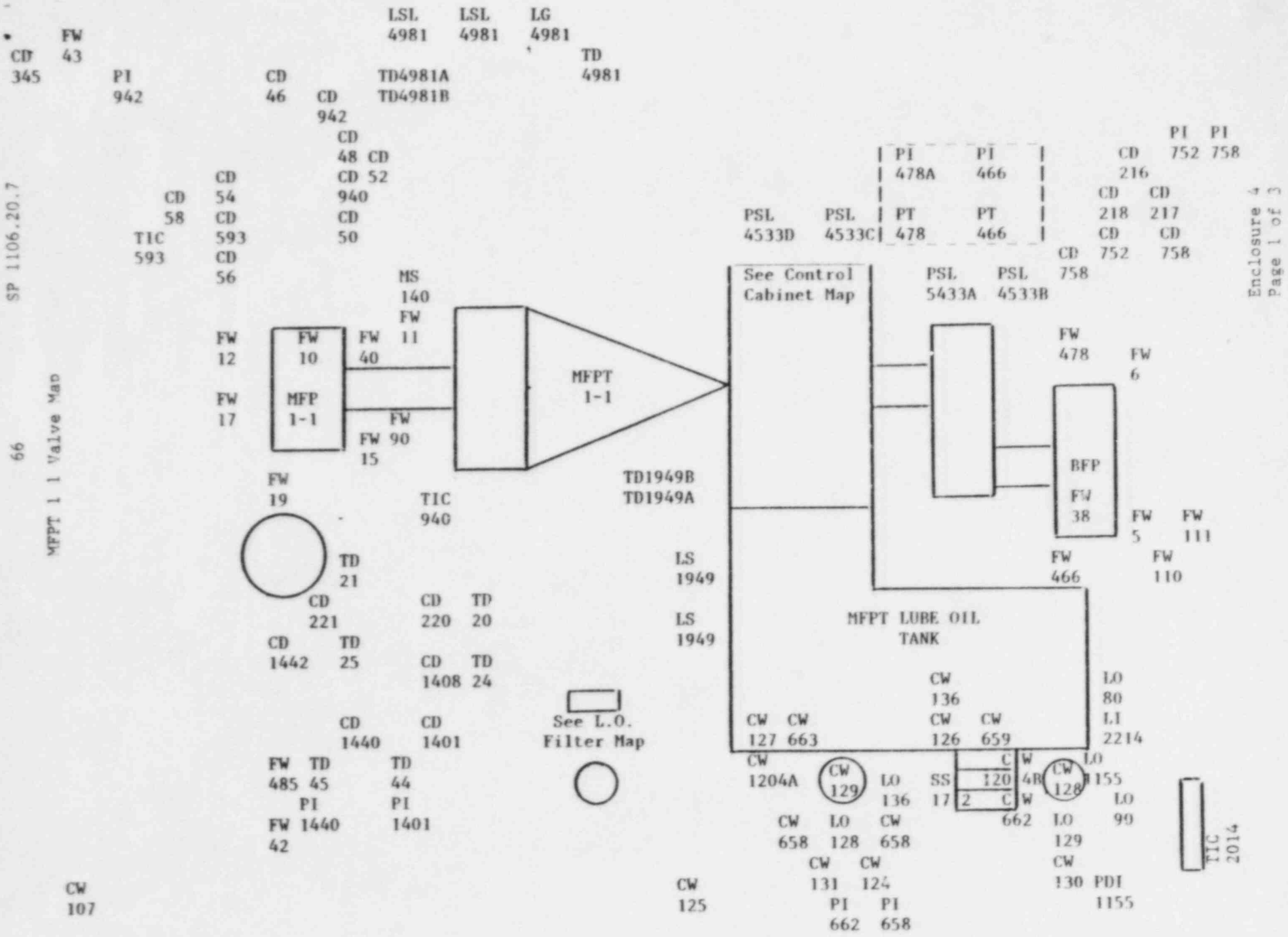
of 4

VALVE VERIFICATION LIST C

Transferring Lube Oil Coolers on Main Feed Pump Turbines 1-1 and 1-2

5 Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID No. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
The following valves should be verified if MFPT 1-2 L.O. Cooler 1-2-2 is the "standby" cooler.				
MFPT L.O. Cooler 1-2-2 Inlet Iso Vlv	M-009 J-5	CW 112	Open	
Inlet to MFPT L.O. Cooler 1-2-2 Temperature Control Valve	H-5	CW 1254B	In Service	
MFPT L.O. Clr 1-2-2 In Press Source Vlv	H-5	CW 670	Open	
MPFT L.O. Clr 1-2-2 In Press Gage	H-5	PI 670	In Service	
MFPT L.O. Cooler 1-2-2 Vent Vlv	H-6	CW 116	Pipe Cap Removed	
MFPT L.O. Cooler 1-2-2 Shell Drn Vlv	J-6	CW 118	Closed	
Press Test Tap Source Vlv	H-6	CW 671	Closed	
MFPT L.O. Clr 1-2-2 Outlet Iso Vlv	H-6	CW 114	Open	
MFPT 1-2 Standby L.O. Clr Circ Vlv	M-018 H-11	LO 132	Open	
MFPT L.O. Clr 1-2-2 Drain Vlv	G-12	LO 131	Closed	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66
MFPT 1 1 Valve Map
Enclosure 4
Page 1 of 3
LSL 4981
LSL 4981
LG 4981
TD 4981
TD4981A
TD4981B
FW
CD 43
345
PI 942
CD 46
CD 942
CD 48
CD 52
CD 940
CD 50
CD 54
CD 58
TIC 593
CD 593
CD 56
PI 478A
PI 466
PT 478
PT 466
PSL 4533D
PSL 4533C
CD 216
CD 218
CD 217
CD 752
CD 758
PI 752
PI 758
See Control Cabinet Map
PSL 5433A
PSL 4533B
MS 140
FW 11
FW 12
FW 10
FW 40
MFP 1-1
FW 17
FW 90
15
MFPT 1-1
FW 478
FW 6
BFP
FW 38
FW 5
FW 111
FW 466
FW 110
FW 19
TIC 940
TD1949B
TD1949A
TD 21
LS 1949
LS 1949
CD 221
CD 220
TD 20
CD 1442
TD 25
CD 1408
TD 24
MFPT LUBE OIL TANK
CW 136
CW 127
CW 663
CW 126
CW 659
LO 80
LI 2214
See L.O. Filter Map
CD 1440
CD 1401
FW 485
TD 45
TD 44
PI FW 1440 42
PI 1401
CW 1204A
CW 129
LO 136
SS 17
120
2
C
W 662
4B
CW 128
LO 1155
LO 99
CW 658
LO 128
CW 658
CW 131
CW 124
PI 662
PI 658
LO 129
CW 130
PDI 1155
TIC 2014
CW 107
CW 125

MFPT 1-1 INSTRUMENT CABINET

LEFT (SOUTH) WALL

PDSH1205
LO1205A
LO1205B

PI 1171	PI 1194	PI 1201
LO 1171	LO 1194	LO 1201
PI 2650	PI 1207	PI 1216
LO 2650	LO 1207	LO 1216
	PT 1206	
	LO 1206	
LO 2719	LO 1212	LO 1215
	PT 1193	
	LO 1193	
LO 1191	LO 2723	LO 2721

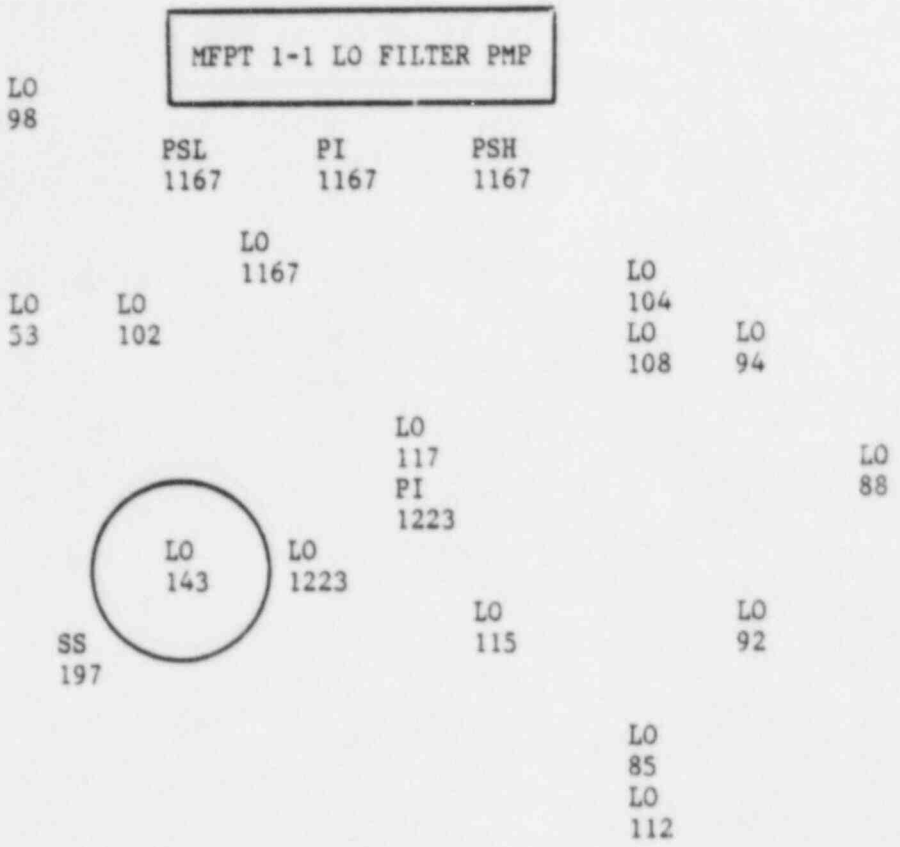
WEST WALL

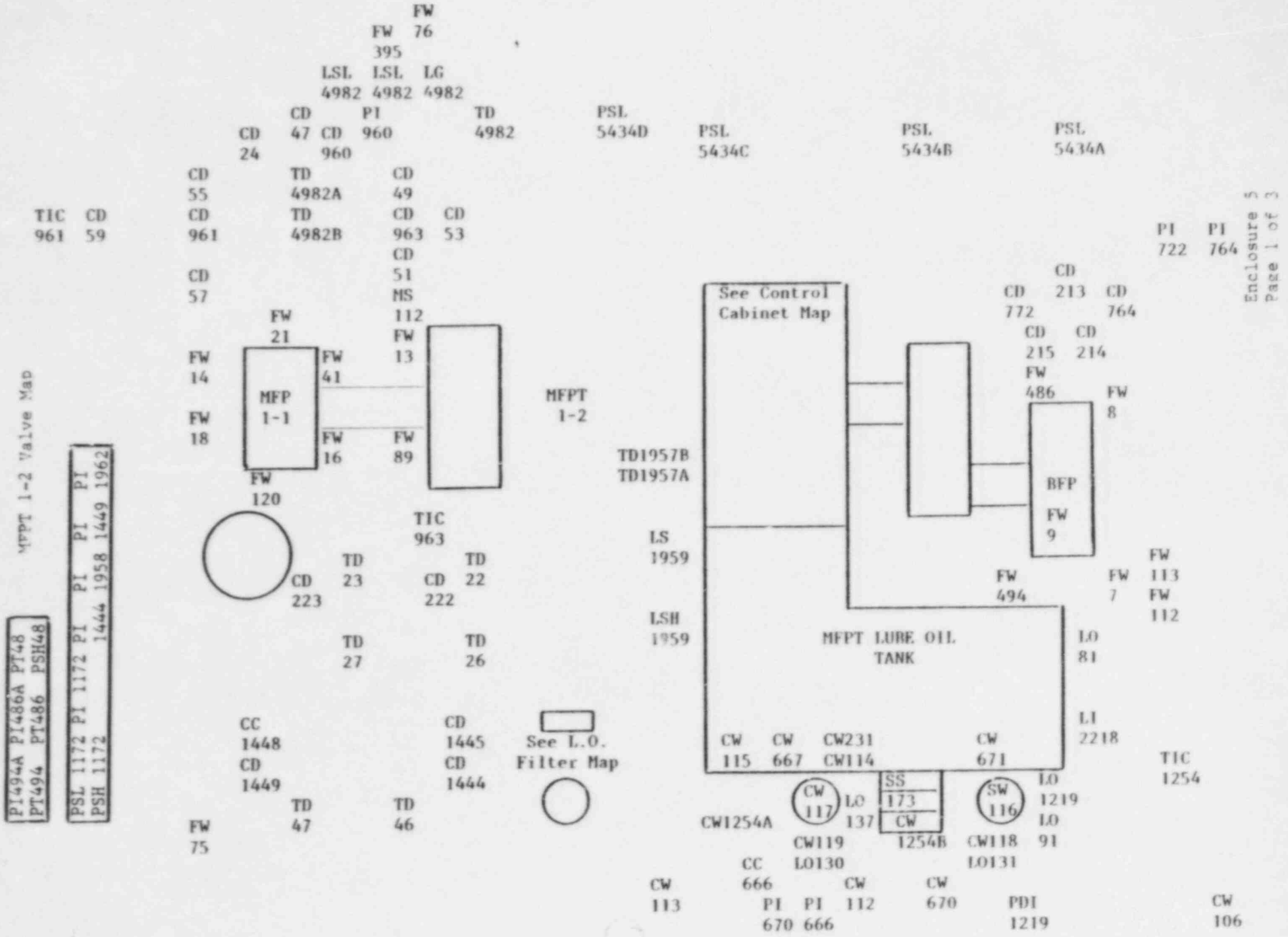
PSL 1228	PSL 1161	PSL 1217
	PSL 2729	PSL 27431
LSH 1170		
PSL 1200	PSL 2552	PSL 1192
LSL 1170		
PSL 1215		
PSH 2719	PSL 1212	
PSH 2721	PSH 2723	PSL 1191

RIGHT (NORTH) WALL

LO 1217	LO 1161	LO 1228
LO 2731	LO 2729	
LO 1192	LO 2552	LO 1200
	LO 1199	SV 2769
	LO 1210	SV 2767

MFPT 1-1 Lube Oil Filter Valve Map




69
MFPT 1-2 Valve Map
PI494A PI486A PT48
PT494 PT486 PSH48
PSL 1172 PI 1172 PI PI PI
PSH 1172 1444 1958 1449 1962
TIC CD
961 59
FW
FW 76
395
LSL LSL LG
4982 4982 4982
CD PI TD
CD 47 CD 960 4982
24 960
CD TD CD
55 4982A 49
CD TD CD CD
961 4982B 963 53
CD
51
CD MS
57 112
FW FW
21 13
FW FW
14 41
MFP
1-1
FW FW
18 16
FW FW
89
FW
120
TIC
963
TD TD
CD 23 CD 22
223 222
TD TD
27 26
CC CD
1448 1445
CD CD
1449 1444
TD TD
FW 47 46
75
MFPT
1-2
See L.O.
Filter Map
PSL
5434D
PSL
5434C
PSL
5434B
PSL
5434A
PI PI
722 764
See Control
Cabinet Map
CD
CD 213 CD
772 764
CD CD
215 214
FW
486 FW
8
BFP
FW
9
TD1957B
TD1957A
LS
1959
LSH
1959
FW
FW 113
494 7 FW
112
MFPT LUBE OIL
TANK
LO
81
LI
2218
CW CW CW231 CW
115 667 CW114 671
TIC
1254
SS
173
CW
1254B
CW
117
LO
137
CW1254A
SW
116
LO
1219
LO
91
CW119 CW118
LO130 LO131
CC
666
CW
113
CW
112
CW
670
PI PI
670 666
PDI
1219
CW
106

MFPT 1-2 INSTRUMENT CABINET

LEFT (SOUTH) WALL

PSH 1255
LO 1255A
LO 1255B

PI 1184
LO 1184

PI 1246
LO 1246

PI 1251
LO 1251

PI 2630
LO 2630

PI 1257
LO 1257

PI 1259
LO 1259

PT 1256
LO 1256

LO 1233

LO 2611

LO 1238

PT 1245
LO 1245

LO 1244

LO 2607

LO 2617

WEST WALL

PSL 1261

PSL 1262

PSL 1260

PSL 2730

PSL 2732

LSH1194
PSL 1240

PSL 2553

PSL 1242

LSL1194

PSL 1238

PSH 2611

PSL 1233

PSH 2617

PSH 2607

PSL 1244

RIGHT (NORTH) WALL

LO 1260

LO 1262

LO 1261

LO 2732

LO 2730

LO 1242

LO 2553

LO 1240

LO 1237

SV 2770

LO 1231

SV 2768

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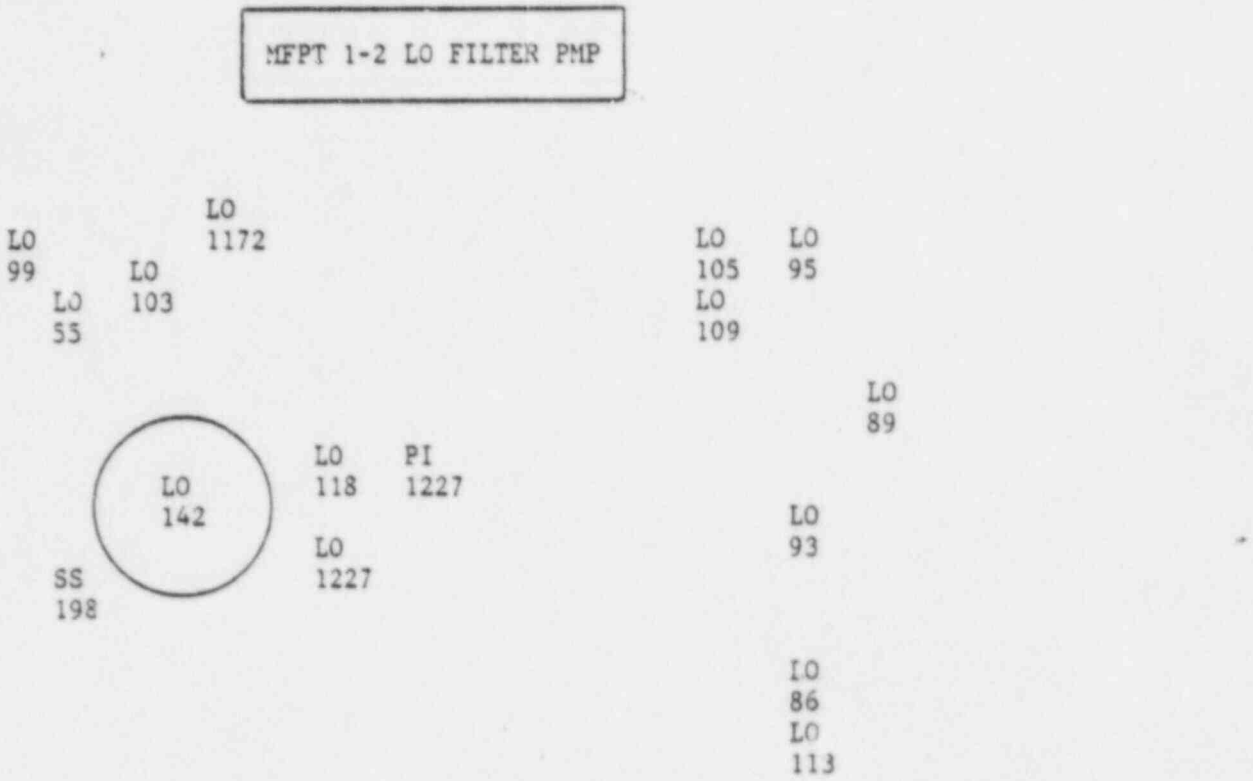
MFPT 1-2 Lube Oil Filter Valve Map



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