

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 4

GINNA STATION  
UNIT #1  
COMPLETED

DATE :-

TIME :-

PROCEDURE NO. PT-16

REV. NO. 23

AUXILIARY FEEDWATER SYSTEM

TECHNICAL REVIEW

PORC 3-24-80

TR Schuler  
QC REVIEW

3-29-80  
DATE

APPROVED FOR USE

J. Moon  
for PLANT SUPERINTENDENT

3-31-80  
DATE

QA  NON-QA \_\_\_\_\_ CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

THIS PROCEDURE CONTAINS 35 PAGES

PT-16AUXILIARY FEEDWATER SYSTEM1.0 PURPOSE:

- 1.1 To describe the steps necessary to enable various surveillance requirements to be accomplished.

2.0 TEST REQUIREMENTS:

- \* 2.1 To verify that each Motor Driven Auxiliary Feedwater Pump is capable of developing the correct discharge pressure when delivering a flow rate of 200 gpm to its respective steam generator in accord with Plant Technical Specifications and the Inservice Pump Test Program.
- \* 2.2 To verify that the Steam Driven Auxiliary Feedwater Pump is capable of developing the correct discharge pressure when delivering a total flow rate of 400 gpm (200 gpm to each steam generator) in accord with Plant Technical Specification and the Inservice Pump Test Program.
- 2.3 To monitor pump bearing vibration and to compare results of measurement with base or reference values within acceptable tolerance.
- 2.4 To exercise normally closed pump suction and discharge check valves to a sufficiently open position to satisfy the flow rates of requirements 2.1 and 2.2.
- 2.5 To verify proper operability of system power operated valves (MOV's and AOV's) in accord with the Inservice Valve Test Program and, where applicable, Inservice Valve Test Sheets.
- 2.6 To verify proper valve realignment following testing of system. To be performed by personnel other than test personnel.

3.0 REFERENCES:

- 3.1 Technical Specifications Section 4.8, page 4.8-1.
- 3.2 Appendix C of Quality Assurance Manual.
- 3.3 Feedwater System Flow Diagram.
- 3.4 IE Bulletin 79-06A.
- \* The correct discharge pressure for each pump is listed with the procedure instruction for the concerned pump.

4.0 INITIAL CONDITIONS:

4.1 The auxiliary feedwater pumps will be aligned to take suction supply from the condensate storage tank and deliver fluid to their respective steam generators through existing piping. \_\_\_\_\_

4.2 This procedure can be performed during any phase of plant operation providing that the steam generators are capable of accomodating the supplied water volume. \_\_\_\_\_

4.3 Sufficient steam header pressure must be available for running the steam driven auxiliary feedwater pump. \_\_\_\_\_

4.4 Inservice valve test sheets for system motor operated valves are attached to this procedure and the steps therein will be performed as indicated below. \_\_\_\_\_

4.4.1 Un-asterisked steps on the attached Inservice valve test sheets will be completed and initialed each time this procedure is performed. \_\_\_\_\_

4.4.2 Single asterisked steps on the attached Inservice valve test sheets will be completed and initialed during months corresponding to a quarterly interval. \_\_\_\_\_

4.4.3 Double asterisked steps on the attached Inservice valve test sheets will be completed and initialed during each refueling interval. \_\_\_\_\_

NOTE: During the refueling interval, if pump performance requirements are not to be verified the attached Inservice valve test sheet steps may be performed independent of the remainder of this procedure.

4.4.4 Test requirements due will be denoted on monthly surveillence schedule, otherwise mark non-applicable step N/A. \_\_\_\_\_

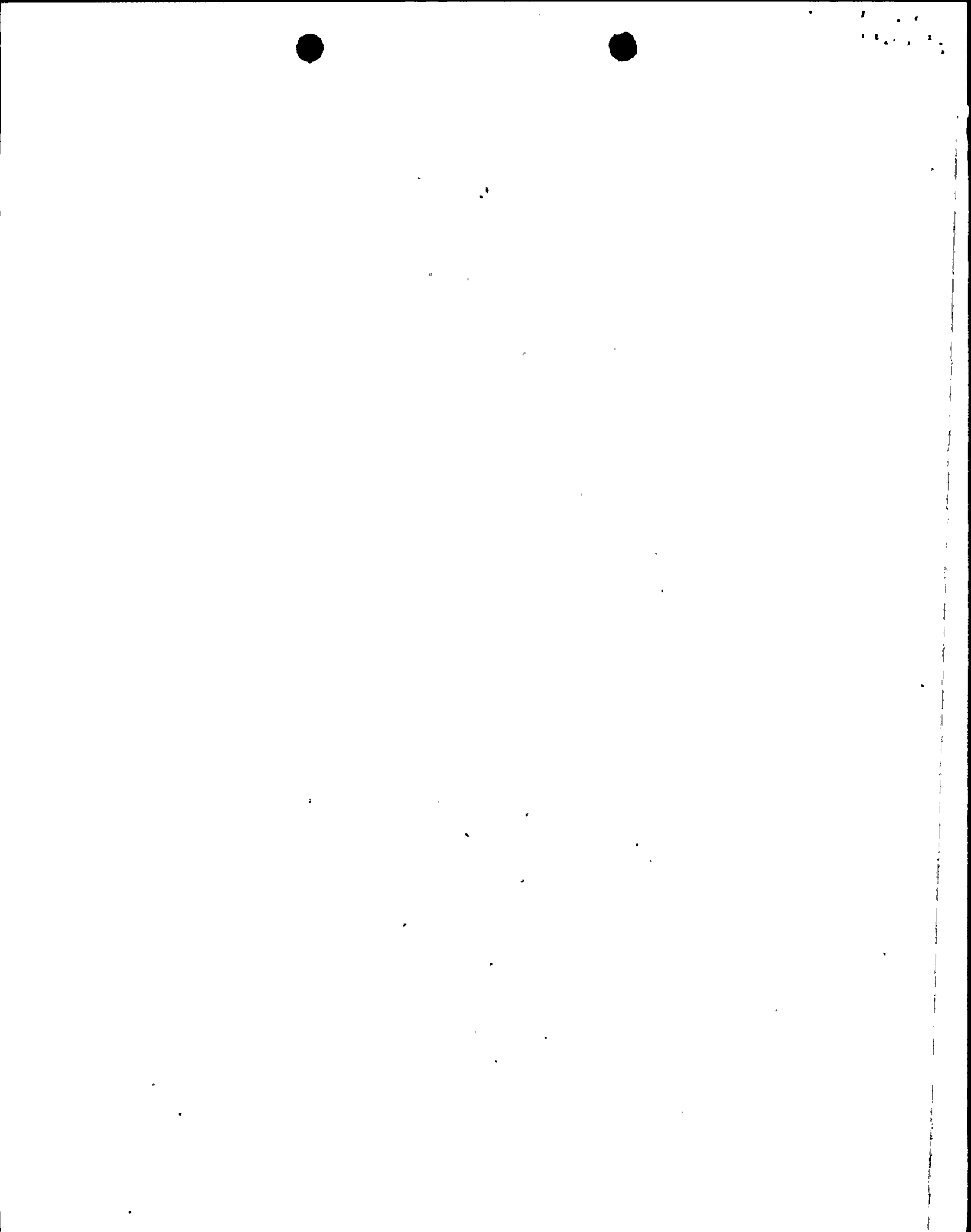
4.5 Test personnel will be qualified in accordance with A-1102. If required, he/they will be instructed in proper test conduct. \_\_\_\_\_

4.6 Test Instrumentation

4.6.1 Pump parameters (flow and pressure) will be verified by existing installed plant instrumentation. Calibration of the necessary devices will be performed by I & C Dept. at intervals not to exceed 18 months. \_\_\_\_\_

4.6.2 Bearing vibration shall be measured with an IRD 306 or equivalent system. Accuracy of the system shall be maintained by recertifying the system with the manufacturer at intervals not to exceed 18 months or by a comparison check against a comparable system which has been certified by the manufacturer within the past 18 month interval. \_\_\_\_\_

- 4.6.3 The pyrometer used for bearing temperature measurement shall be checked for accuracy, over the temperature range of interest, against a test thermometer at intervals not to exceed 18 months. \_\_\_\_\_
- 4.6.4 The Tachometer used for rotative speed measurement shall be checked for accuracy against a known 3600 RPM Turbine at intervals not to exceed 18 months. \_\_\_\_\_
- 4.7 Notify Quality Control Dept. at start of test, so that they may perform Inservice system inspection, when required. \_\_\_\_\_
- 4.8 This procedure is divided into 5 sections. Indicate which sections were used and mark remainder N/A. \_\_\_\_\_
- 4.8.1 A Motor Driven Aux. Feed Pump \_\_\_\_\_
- 4.8.2 B Motor Driven Aux. Feed Pump \_\_\_\_\_
- 4.8.3 Turbine Driven Aux. Feed Pump \_\_\_\_\_
- 4.8.4 T.D.A.F.P. Oil Pump Check \_\_\_\_\_
- 4.8.5 Service Water Suction and Cooling Water Checks \_\_\_\_\_
- 4.9 Shutdown Steam Generator Blowdown Heat Recovery System, if in service, using T-14G. \_\_\_\_\_
- 4.10 Reduce Reactor power as required to 97% when testing steam driven aux. feed pump or to 99% when testing the motor driven aux. feed pump while performing this procedure. The injection of cold water during this test will increase thermal output from the core, and if performed at higher power levels would result in exceeding the plant thermal rating. \_\_\_\_\_
- 4.11 Notify Shift Supervisor at start of test and upon completion. \_\_\_\_\_
- 4.12 Notify Head Control Operator at start of test and upon completion. \_\_\_\_\_
- 5.0 PRECAUTIONS:
- 5.1 Only one auxiliary feedwater pump should be tested at a time with the remaining two pumps on automatic standby.
- 5.2 While any pump is running the operator performing the test should be alert for any signs of improper operation - excessive temperature, vibration or unusual noise. List any noted deficiencies on the attached deficiency sheet and make out trouble card immediately.
- 5.3 Before testing any pump, isolate the service water backup pump suction by closing the manual guard valve.



5.3(Con't) NOTE: The present philosophy is to maintain the manual guard valve closed.

5.4 Before testing Turbine driven pump warm up Steam Header and Turbine Shell.

6.0 INSTRUCTIONS:

6.1 "A" Motor Driven Auxiliary Feedwater Pump

6.1.1 Ensure that service water suction supply MOV 4027 is closed (CB switch must be held to fully stroke valve). \_\_\_\_\_

6.1.2 Ensure that service water manual guard valve 4345 is closed. \_\_\_\_\_

6.1.3 Perform valve stroking of MOV 4000A as directed on attached Inservice valve test procedure, Page 23. \_\_\_\_\_

6.1.4 Perform valve stroking of MOV 4007 as directed on attached Inservice valve test procedure, Page 24. \_\_\_\_\_

6.1.5 Close or ensure closed MOV 4007. \_\_\_\_\_

6.1.6 Perform the following:

6.1.6.1 Verify with control that Steam Generator Blowdown Heat Recovery System has been removed from service. \_\_\_\_\_

6.1.6.2 Visually verify that steam generator blowdown valves CV-70 and CV-71 are open and CB status lights are dim (these valves are interlocked to close on start of pump). \_\_\_\_\_

6.1.6.3 Shut off gauge valve to PI 2189A. \_\_\_\_\_

6.1.6.4 Record pump suction pressure (gauge at pump inlet). \_\_\_\_\_ psig

6.1.6.5 Transfer pump suction pressure to the attached Inservice pump test sheet (this is initial suction pressure). \_\_\_\_\_

6.1.6.6 Verify satisfactory oil level in inverted glass for pump bearings. \_\_\_\_\_

6.1.7 Start pump and observe that MOV 4007 goes to its fully open position and that as flow increases, MOV 4007 automatically throttles back to a flow rate of  $\leq 230$  gpm as indicated by locally mounted feedwater flow indicator. Record the following:

6.1.7.1 Scale indication of local flow indicator. \_\_\_\_\_

6.1.7.2 Calculate flow by using the following relationship.

$$\frac{\text{scale indication}}{10} (275) = \frac{\quad}{10} (275) = \quad \text{GPM}$$

6.1.7.3 Slowly throttle open gauge valve to local gauge PI 2189A. Throttle as required to minimize pointer fluctuations. \_\_\_\_\_

6.1.7.4 Pump discharge pressure. \_\_\_\_\_ psig

6.1.8 Manually throttle MOV 4007 until local flow indicator indicates between 7.3 and 7.4 on scale. Permit the pump to operate for 5 minutes at this flow rate to obtain stable flow and pressure conditions; then record the following:

6.1.8.1 Scale indication of local flow indicator. \_\_\_\_\_

6.1.8.2 Calculate flow, using scale indication of step 6.1.8.1 by using the following relationship:

$$\frac{\text{scale indication}}{10} (275) = \frac{\quad}{10} (275) = \quad \text{GPM}$$

6.1.9 Record the following:

6.1.9.1 Pump discharge pressure from local PI 2189A. \_\_\_\_\_ psig

6.1.9.2 Pump suction pressure from local suction gauge. \_\_\_\_\_ psig

6.1.9.3 Transfer suction pressure to attached Inservice Pump test sheet. (this is operational suction pressure). \_\_\_\_\_

6.1.9.4 Net discharge pressure (step 6.1.9.1 - step 6.1.9.2). \_\_\_\_\_ psig

6.1.9.5 Corrected net discharge pressure (add gauge elevation correction of 1.2 psig to step 6.1.9.4). \_\_\_\_\_ psig

NOTE: To conform to Technical Specifications, with a minimum scale indication of 7.3, the pump discharge pressure (step 6.1.9.1) must be  $\geq$  1114 psig. Notify Results and Test Dept. if this relationship cannot be obtained.

6.1.10 Transfer the corrected net discharge pressure (step 6.1.9.5) and calculated flow rate (step 6.1.8.2) to the attached Inservice pump test sheet. \_\_\_\_\_

6.1.11 Perform and/or record the following:

6.1.11.1 Visually verify that Steam Generator blowdown valves CV-70 and CV-71 have closed. \_\_\_\_\_

6.1.11.2 Verify that C.B. status lights for CV-70 and CV-71 are bright. \_\_\_\_\_

6.1.11.3 MOV 4007 position (% opening). \_\_\_\_\_ %

6.1.11.4 Condensate storage tank level (C.B.) \_\_\_\_\_ ft

- 6.1.11.5 "A" Steam Generator Pressure (CB)  
(avg. of PI 468, 469 ad 482) \_\_\_\_\_ psig
- 6.1.11.6 "A" Aux. Feedwater Pump Flow. FI 2021 (CB) \_\_\_\_\_ GPM
- 6.1.11.7 "A" Aux. Feedwater Pump Discharge Pressure. PI 2189 (C.B.) \_\_\_\_\_ psig

NOTE: The C.B. Aux. Feedwater Pump Flow and pressure are for comparison only and are not to be utilized as proof of pump operability.

- 6.1.12 1A pump bearing check.

NOTE: Maintain flow rate of 7.3 on scale

- 6.1.12.1 Select proper range on switch of vibration readout device. \_\_\_\_\_

NOTE: Refer to attached Inservice test sheet for reference level vibration.

- 6.1.12.2 Secure a horizontal and vertical measurement of pump inboard and outboard bearings:

	<u>Inboard</u>	<u>Outboard</u>
6.1.12.2.1 Vertical (Top centerline)	_____ mills	_____ mills
6.1.12.2.2 Horizontal (South side centerline)	_____ mills	_____ mills

NOTE: Hold detector probe firmly in place at specified location. Hold probe perpendicular to shaft.

- 6.1.12.2.3 Transfer readings to attached Inservice pump test sheet. \_\_\_\_\_

- 6.1.13 Verification of check valve opening (position required to fulfill primary function):

- 6.1.13.1 4000C discharge check to "A" Steam Generator

- 6.1.13.2 4009 pump discharge check

- 6.1.13.3 4017 pump suction check

NOTE: The above check valves are included in the Inservice valve test program. The valves shall be considered to have adequately opened as a result of obtaining the required flow rate of step 6.1.8.2.

- 6.1.13.4 Indicate whether proper flow rate was obtained.      yes \_\_\_\_\_  
or      no \_\_\_\_\_



6.1.14 To check the operation of the pump recirculation valve, AOV 4304, perform the following:

6.1.14.1 Manually throttle MOV 4007 slowly until an indication of 2 (equivalent to 50 gpm) is observed on local flow indicator. Verify that pump recirculation valve is fully open.

CAUTION: Do not reduce flow below a scale indication of 1.5 in the event recirc. valve does not open.

6.1.14.2 Slowly open MOV 4007 until an indication of 4.5 (equivalent to 125 gpm) is observed on local flow indicator. Verify that pump recirculation valve is fully closed.

6.1.14.3 Verify recirc. valve failure mode by the following:

6.1.14.3.1 Shut off air supply at air set for valve controller.

6.1.14.3.2 Open drain valve at bottom of air set to bleed air from recirc. valve diaphragm and verify that recirc. valve goes to open position.

6.1.14.3.3 Close drain valve of air set and open supply air valve. As diaphragm pressure builds up, verify that recirc. valve closes.

NOTE 1: If necessary, open MOV 4007 until an indication of 4.5 is observed on flow indicator.

NOTE 2: If recirculation valve operation is not as specified in steps 6.1.14 et al, the I & C Department is to be contacted to make necessary corrections.

NOTE 3: AOV 4304 is included in the Inservice valve testing program. The above checks satisfy the stroking, stem position, verification and failure mode requirements. Valve stroke timing is not applicable.

6.1.15 Shut down 1A MDAFP. Observe locally that MOV 4007 closes.

6.1.16 Wait approximately one minute, then perform and/or verify the following:

6.1.16.1 Verify that Steam Generator Blowdown valves CV-70 and CV-71 are open and CB status lights are dim.

6.1.16.2 Request control to reopen MOV 4007. Verify valve open.

6.1.16.3 If this completes motor driven pump tests, the Steam Generator Blowdown Heat Recovery System may be returned to service if desired by operations.

6.2 "B" Motor Driven Auxiliary Feedwater Pump

- 6.2.1 Ensure that service water supply MOV 4028 is closed (C.B. switch must be held to fully stroke valve). \_\_\_\_\_
- 6.2.2 Ensure that service water manual guard valve 4344 is closed. \_\_\_\_\_
- 6.2.3 Perform valve stroking of MOV 4000B as directed on attached Inservice valve test procedure. Page 25. \_\_\_\_\_
- 6.2.4 Perform valve stroking of MOV 4008 as directed on attached Inservice valve test sheet. Page 26. \_\_\_\_\_
- 6.2.5 Close or ensure closed MOV 4008. \_\_\_\_\_
- 6.2.6 Perform the following:
- 6.2.6.1 Verify with control that Steam Generator Blowdown Heat Recovery System has been removed from service. \_\_\_\_\_
- 6.2.6.2 Visually verify that steam generator blowdown valves CV-70 and CV-71 are open and C.B. status lights are dim (these valves are interlocked to close with start of pump). \_\_\_\_\_
- 6.2.6.3 Shut off gauge valve to PI 2190A. \_\_\_\_\_
- 6.2.6.4 Record pump suction pressure (gauge at pump inlet). \_\_\_\_\_psig
- 6.2.6.5 Transfer suction pressure to attached Inservice pump test sheet. (this is initial suction pressure). \_\_\_\_\_
- 6.2.6.6 Verify satisfactory oil level in inverted glass for pump bearings. \_\_\_\_\_
- 6.2.7 Start pump and observe that MOV 4008 goes to its fully open position and that as flow increases MOV 4008 automatically throttles back to a flow rate  $< 230$  gpm as indicated by locally mounted feedwater flow indicator. Record the following:
- 6.2.7.1 Scale indication of local flow indicator. \_\_\_\_\_
- 6.2.7.2 Calculate flow by using the following relationship:
- $$\frac{\text{scale indication}}{10} (275) = \frac{\quad}{10} (275) = \quad \text{GPM}$$
- 6.2.7.3 Slowly throttle open gauge valve to local gauge PI 2190A. Throttle as required to minimize pointer fluctuations. \_\_\_\_\_
- 6.2.7.4 Pump discharge pressure. \_\_\_\_\_psig
- 6.2.8 Manually throttle MOV 4008 until local flow indicator indicates between 7.3 and 7.4 on scale. Then record the following:
- 6.2.8.1 Scale indication of local flow indicator. \_\_\_\_\_

6.2.8.2 Calculate flow using scale indication of step 6.2.8.1.

$$\frac{\text{scale indication}}{10} (275) = \frac{\quad}{10} (275) = \quad \text{GPM}$$

6.2.9 Record the following:

6.2.9.1 Pump discharge pressure from local PI 2190A. \_\_\_\_\_ psig

6.2.9.2 Pump suction pressure from local suction gauge. \_\_\_\_\_ psig

6.2.9.3 Transfer suction pressure to attached Inservice pump test sheet. (this is operational suction pressure). \_\_\_\_\_

6.2.9.4 Net discharge pressure (step 6.2.9.1 - step 6.2.9.2). \_\_\_\_\_ psig

6.2.9.5 Corrected net discharge pressure (add gauge elevation correction of 1.4 psig to step 6.2.9.4). \_\_\_\_\_ psig

NOTE: To conform to Technical Specifications, with a minimum scale indication of 7.3. The pump discharge pressure (step 6.2.9.1) must be  $\geq$  1118 psig. Inability to obtain this relationship signifies that the pump has degraded below its design accident requirements.

6.2.10 Transfer the corrected net discharge pressure (step 6.2.9.5) and calculated flow rate (step 6.2.8.2) to the attached pump Inservice test sheet for comparison to reference data and acceptance tolerance. \_\_\_\_\_

6.2.11 Perform and/or record the following:

6.2.11.1 Visually verify that steam generator blowdown valves CV-70 and CV-71 have closed. \_\_\_\_\_

6.2.11.2 Verify that C.B. status lights for CV-70 and CV-71 are bright. \_\_\_\_\_

6.2.11.3 MOV 4008 position (% opening). \_\_\_\_\_ %

6.2.11.4 Condensate storage tank level (CB). \_\_\_\_\_ ft

6.2.11.5 "B" Steam Generator pressure (CB) average of PI 478, 479 and 483. \_\_\_\_\_ psig

6.2.11.6 "B" Aux. Feedwater pump flow FI 2022 (CB). \_\_\_\_\_ GPM

6.2.11.7 "B" Aux. Feedwater pump discharge pressure PI 2190 (CB) \_\_\_\_\_ psig

NOTE: The C.B. Aux. Feedwater pump flow and pressure are for comparison only and are not to be utilized as proof of pump operability.





6.2.14.3 Verify recirc. valve failure mode by the following:

6.2.14.3.1 Shut off air supply at air set for valve controller. \_\_\_\_\_

6.2.14.3.2 Open drain valve at bottom of air set to bleed air from recirc. valve diaphragm and verify that recirc. valve goes to open position. \_\_\_\_\_

6.2.14.3.3 Close drain valve of air set and open supply air valve. As diaphragm pressure builds up verify that recirc. valve closes. \_\_\_\_\_

NOTE 1: If necessary, open MOV 4008 until an indication of 4.5 is observed on flow indicator.

NOTE 2: If recirculation valve operation is not as specified in steps 6.2.14 et al, the I & C Dept. is to be contacted to make necessary corrections.

NOTE 3: AOV 4304 is included in th Inservice valve testing program. The above checks satisfy stroking, stem position verification and failure mode requirements. Stroking time for this valve is not applicable.

6.2.15 Shut down 1B MDAFP. Observe locally that MOV 4008 closes. \_\_\_\_\_

6.2.16 Wait approximately one minute, then perform and/or verify the following:

6.2.16.1 Verify that Steam Generator Blowdown valves CV-70 and CV-71 are open and C.B. status lights are dim. \_\_\_\_\_

6.2.16.2. Request control to reopen MOV 4008. Verify valve open. \_\_\_\_\_

6.2.16.3 If this completes motor driven pump tests, the Steam Generator Blowdown Heat Recovery System may be returned to service if desired by operations. \_\_\_\_\_

### 6.3 Turbine Driven Auxiliary Feedwater Pump

6.3.1 Ensure adequate oil level in pump reservoir and in inverted glass for pump bearings. \_\_\_\_\_

NOTE: If lube oil is down to the dipstick "add oil mark" submit trouble card and notify shift foreman.

6.3.2 Record lube oil pressure at low oil trip sensor (Gauge 1 located on front of turbine). Should be at least 5 psig. \_\_\_\_\_

psig

6.3.3 Record regulating valve output pressure  
(Gauge 2 located on wall by lube oil reservoir) \_\_\_\_\_psig

6.3.4 Record Oil Pump Discharge Pressure  
(Gauge 3 located on wall by lube oil reservoir).  
Should be 80 psig  $\pm$  5 \_\_\_\_\_psig

6.3.5 Ensure service water suction supply MOV 4013 is closed.  
(C.B. switch must be held in position to fully stroke  
valve). \_\_\_\_\_

6.3.6 Ensure service water manual guard valve 4098 is closed. \_\_\_\_\_

6.3.7 Perform valve stroking of MOV 3996 as directed on attached  
Inservice valve test sheet. Page 27. \_\_\_\_\_

6.3.8 Stroke the TDAFP steam generator feedwater control valves  
through a full cycle, by use of their respective C.B.  
controllers. Test personnel are to visually verify  
proper valve operation. \_\_\_\_\_

6.3.8.1 AOV 4297 stroked full cycle. \_\_\_\_\_

6.3.8.2 AOV 4298 stroked full cycle. \_\_\_\_\_

NOTE: AOV's 4297 & 4298 are included in the Inservice  
valve testing program. The above check satisfies  
the stroking requirement and stem position verifi-  
cation requirement. Valve stroke timing is not  
applicable.

6.3.9 Ensure the following valves open.

6.3.9.1 MOV 3996 (TDAFP discharge) \_\_\_\_\_

6.3.9.2 AOV 4297 ("A" Steam Generator feedwater control) \_\_\_\_\_

6.3.9.3 AOV 4298 ("B" Steam Generator feedwater control) \_\_\_\_\_

6.3.10 Ensure that turbine-governor setting is at 3.6. \_\_\_\_\_

6.3.11 Warm up steam header and turbine shell, if necessary,  
by manually cracking open steam admission valve MOV 3505  
or MOV 3504. \_\_\_\_\_

6.3.12 After adequate warmup (approximately 5 minutes) and in  
preparation for stroking the steam admission valves,  
perform the following:

6.3.12.1 Close the turbine trip and throttle valve 3652 by turning  
handwheel in the full clockwise rotation. \_\_\_\_\_

6.3.12.2 By use of C.B. control switch fully close the steam  
admission valve (MOV 3505 or MOV 3504) if opened in  
step 6.3.11. \_\_\_\_\_

6.3.13 Perform valve stroking of MOV 3504 as directed on attached Inservice valve test sheet. Page 28. \_\_\_\_\_

6.3.14 Perform valve stroking of MOV 3505 as directed on attached Inservice valve test sheet. Page 29. \_\_\_\_\_

NOTE: Turbine Trip and Throttle valve (3652) must be open prior to next step.

6.3.15 Record pump suction pressure (local gauge). \_\_\_\_\_psig

6.3.16 Transfer pump suction pressure to attached Inservice pump test sheet. (this is initial suction pressure). \_\_\_\_\_

6.3.17 Place Hotwell level controller in "Manual" and start pump by opening in rapid succession both MOV steam admission valves. \_\_\_\_\_

NOTE: C.B. switch must be held in open position to fully open valve.

6.3.17.1 MOV 3505 ("A" S/G) open \_\_\_\_\_

6.3.17.2 MOV 3504 ("B" S/G) open \_\_\_\_\_

6.3.18 Request the control room operator to adjust each steam generator AOV feedwater control valve until 200 to 204 GPM (4 to 4.08 scale indication on local flow rators) is being delivered to each steam generator. \_\_\_\_\_

6.3.19 Permit the pump to operate for 5 minutes to ensure stable flow and pressure conditions. Maintain required flow rate of step 6.3.18, then perform the following:

6.3.19.1 Note the scale indication of the 1A Steam Generator local flow indicator and calculate flow by the following relationship:

$$\frac{\text{Scale indication}}{10} (500) = \frac{\quad}{10} (500) = \quad \text{GPM}$$

6.3.19.2 Note the scale indication of the 1B Steam Generator local flow indicator and calculate the flow by the following relationship:

$$\frac{\text{Scale indication}}{10} (500) = \frac{\quad}{10} (500) = \quad \text{GPM}$$

6.3.19.3 Record pump discharge pressure (local gauge PI 2156) \_\_\_\_\_psig

6.3.19.4 Record pump suction pressure (local gauge) \_\_\_\_\_psig

6.3.19.5 Transfer pump suction pressure to attached Inservice pump test sheet. (this is operational suction pressure). \_\_\_\_\_



6.3.19.6 Calculate net pump discharge pressure  
(step 6.3.19.3 - 6.3.19.4) \_\_\_\_\_psig

NOTE: At the time of delivery of 200 to 204 GPM (4 to 4.08 scale indication) to each steam generator the pump discharge pressure (step 6.3.19.3) must be  $\geq$  1131 psig to satisfy Technical Specification requirements. Failure to obtain the desired flow and pressure balance indicates unacceptable system performance.

6.3.19.7 Transfer the net discharge pressure step (6.3.19.6) and total calculated flow rate of steps 6.3.19.1 (1A S/G flow) and 6.3.19.2 (1B S/G flow) to the attached pump Inservice test sheet for comparison to reference data and acceptance tolerance. \_\_\_\_\_

6.3.20 Record the turbine lube oil pressure indicated by gauge #1 located at front end of turbine. \_\_\_\_\_psig

6.3.21 Record the following data from control board indicators:

6.3.21.1 1A S/G flow (FI 2023) \_\_\_\_\_GPM

6.3.21.2 1B S/G flow (FI 2024) \_\_\_\_\_GPM

6.3.21.3 Pump discharge pressure (PI 2048) \_\_\_\_\_psig

6.3.21.4 1A S/G pressure (average) \_\_\_\_\_psig

6.3.21.5 1B S/G pressure (average) \_\_\_\_\_psig

6.3.21.6 Condensate storage tank level \_\_\_\_\_ft.

6.3.21.7 1A S/G flow controller output (AOV 4297) \_\_\_\_\_%

6.3.21.8 1B S/G flow controller output (AOV 4298) \_\_\_\_\_%

NOTE: The Control Board pump flow and pump pressure indications are for comparison only and are not to be utilized as proof of pump operability.

6.3.22 Turbine driven pump bearing check.

NOTE: Maintain S/G flow rates of steps 6.3.21.1 and 6.3.21.2.

6.3.22.1 Select proper range on switch of readout device. \_\_\_\_\_

NOTE: Refer to attached Inservice pump test sheet for reference level vibration.

6.3.22.2 Secure a horizontal and vertical measurement of the pump inboard and outboard bearings:

NOTE: Hold detector probe firmly in place at specified locations on bearing housing. Ensure that probe is perpendicular to shaft.

	<u>Inboard</u>	<u>Outboard</u>
6.3.22.2.1 Vertical (top centerline)	_____ mills	_____ mills
6.3.22.2.2 Horizontal (north side centerline)	_____ mills	_____ mills
6.3.22.2.3 Transfer reading to attached Inservice pump test sheet.		_____
6.3.23 Continue to maintain the required flow rates to S/G's; then secure pump shaft rotative speed by use of reed tachometer.		_____ RPM
6.3.23.1 Transfer shaft speed to attached Inservice Pump Test Sheet.		_____
6.3.24 Verification of check valve opening (position required to fulfill primary function).		
6.3.24.1 3998 pump discharge check to A & B S/G		
6.3.23.2 4003 discharge check to "A" S/G		
6.3.23.3 4004 discharge check to "B" S/G		
6.3.24.4 4014 pump suction check		

NOTE: The above check valves are included in the Inservice valve test program. The valves shall be considered to have adequately opened as a result of obtaining the required flow rates of step 6.3.21.1 and step 6.3.21.2.

6.3.24.5 Indicate whether proper flow rates were obtained.      yes \_\_\_\_\_  
or      no \_\_\_\_\_

6.3.25 To check operation of pump recirculation valve AOV-4291, perform the following:

6.3.25.1 Throttle AOV feedwater control valves to both steam generators. Maintain balanced flow until total flow of 100 gpm is obtained. Verify that recirculation valve has opened. \_\_\_\_\_

NOTE: There is a total flow meter, located in pump area, which reads directly in gpm.

CAUTION: Do not decrease total flow below 80 gpm in the event that recirculation valve does not open.

6.3.25.2 Readjust AOV feedwater control valves until a total flow of 150 gm is obtained and verify that recirculation valve is closed. \_\_\_\_\_

6.3.25.3 Verify recirc. valve failure mode by the following: \_\_\_\_\_

6.3.25.3.1 Shut off air supply at air set for valve controller. \_\_\_\_\_

6.3.25.3.2 Open drain valve at bottom of air set to bleed air from recirc. valve diaphragm and verify that recirc. valve goes to open position. \_\_\_\_\_

6.3.25.3.3 Close drain valve of air set and open supply air valve. As diaphragm pressure builds up verify that recirc. valve closes. \_\_\_\_\_

NOTE 1: If necessary adjust AOV feedwater control valves to increase total flow to 150 gpm.

NOTE 2: If recirculation valve operation is not as specified in steps 6.3.25 et al, the I & C Dept. is to be contacted to make necessary corrections.

NOTE 3: AOV 4291 is included in the Inservice valve testing program. The above check satisfies the stroking, stem position verification and failure mode requirements. Stroking time for this valve is not applicable. Recirculation check valve 4023 is also included in the program and its requirements shall be deemed to be satisfied as a result of obtaining the recirculation line flow rates.

6.3.26 Shut down pump by closing both MOV steam admission valves. \_\_\_\_\_

6.3.27 Verification of failure mode of Feedwater control valves AOV 4297 and AOV 4298. \_\_\_\_\_

6.3.27.1 From C.B. controller close fully AOV 4297. \_\_\_\_\_

6.3.27.2 Shut off air supply at air set for valve positioner. \_\_\_\_\_

6.3.27.3 Open drain valve at bottom of air set to bleed air from valve diaphragm and verify that valve goes to open position. \_\_\_\_\_

6.3.27.4 Close drain valve of air set and open supply air valve. As diaphragm pressure builds up, verify that valve closes. \_\_\_\_\_

6.3.27.5 From Control Board close fully AOV 4298. \_\_\_\_\_

6.3.27.6 Shut off air supply at air set for valve positioner. \_\_\_\_\_

- 6.3.27.7 Open drain valve at bottom of air set to bleed air from valve diaphragm and verify that valve goes to open position. \_\_\_\_\_
- 6.3.27.8 Close drain valve of air set and open supply air valve. As diaphragm pressure builds up verify that valve closes. \_\_\_\_\_
- 6.3.28 From Control Board controller fully open feedwater control valves. \_\_\_\_\_
- 6.3.28.1 AOV 4297 open \_\_\_\_\_
- 6.3.28.2 AOV 4298 open \_\_\_\_\_
- 6.3.29 Place Hotwell level controller back to "Auto". \_\_\_\_\_
- 6.4 Operation of D.C. Oil Pump and Low Oil Trip:
- 6.4.1 Stop A.C. oil pump and verify D.C. oil pump starts. \_\_\_\_\_
- 6.4.2 Verify Main Control Board (MCB) alarm "Turbine Driven Feedpump D.C. oil pump auto start" has annunciated. \_\_\_\_\_
- 6.4.3 Record D.C. oil pump discharge (Gauge 3) pressure. Should be 80 psig  $\pm$  5. \_\_\_\_\_psig
- 6.4.4 Record lube oil pressure (Gauge 1). Should be at least 5 psig. \_\_\_\_\_psig
- NOTE: Before performing step 6.4.5, assure the turbine/pump unit has stopped rolling. If necessary, close steam supply manual block valve.
- 6.4.5 Pull stop D.C. oil pump. \_\_\_\_\_
- 6.4.6 As system oil pressure decreases, closely observe pressure Gauge #1 and record pressure at which turbine low oil pressure trip tripped (should be 3 psig  $\pm$ .5 psig). \_\_\_\_\_psig
- 6.4.7 Verify MCB alarm "turbine driven feedpump low oil pressure" annunciates. \_\_\_\_\_
- 6.4.8 Verify turbine throttle valve trips closed. \_\_\_\_\_
- 6.4.9 Verify turbine driven feed pump governor valve indicating light green (located at MCB). \_\_\_\_\_
- 6.4.10 Start A.C. oil pump and permit oil pressure to build up. \_\_\_\_\_
- 6.4.11 Return D.C. oil pump to auto and verify the following:
- 6.4.11.1 Pump switch indicating light is green. \_\_\_\_\_
- 6.4.11.2 "Turbine driven feedpump, lo oil pressure" alarm has cleared. \_\_\_\_\_

- 6.4.11.3 "Turbine driven feedpump D.C. oil pump auto start" alarm has cleared. \_\_\_\_\_
- 6.4.12 To reset the low oil pressure trip, perform the following:
- 6.4.12.1 Pull out on the plunger rod handle (yellow) until the bellows stem engages the plunger rod. \_\_\_\_\_
- 6.4.12.2 Turn the trip and throttle valve hand wheel in the clockwise direction until the latching lever reaches the end of its travel. \_\_\_\_\_
- 6.4.12.3 Depress the main trip valve (orange) and hold down until the trip hook engages the latching lever. \_\_\_\_\_
- 6.4.12.4 Reset the trip and throttle valve by turning the handwheel in the CCW direction until the valve is fully open. \_\_\_\_\_
- 6.4.13 Verify and/or perform the following:
- 6.4.13.1 Verify turbine driven feedpump governor valve indicating light is red (located at MCB). \_\_\_\_\_
- 6.4.13.2 Assure steam supply manual block valve is chain locked in open position. \_\_\_\_\_
- 6.5 Service Water Suction and Cooling Water Checks:
- "A" Aux. Feed Pump
- 6.5.1 Check MOV 4027 (Service water suction supply valve) by performing the following:
- 6.5.1.1 Perform valve stroking of MOV 4027 as directed on attached Inservice valve test sheet. Page 30. \_\_\_\_\_
- NOTE: C.B. Switch must be held in desired position to fully stroke valve.
- 6.5.1.2 Ensure MOV 4027 to open position. \_\_\_\_\_
- 6.5.1.3 Open drain valve and observe flow. \_\_\_\_\_
- 6.5.1.4 Actuate CB switch to close position and observe that MOV 4027 closes completely. \_\_\_\_\_
- 6.5.1.5 Open manual isolation valve 4345 and back flush with condensate storage tank water. \_\_\_\_\_
- 6.5.1.6 Close drain valve. \_\_\_\_\_
- 6.5.1.7 Close manual S.W. isolation valve 4345. \_\_\_\_\_

6.5.2 Check operation of cooling water strainer delta P switch by performing the following:

NOTE: Clean strainer prior to performing these steps.

6.5.2.1 Ensure that C.B. common annunciator "Aux. F.W. Pump Cooling Water Filter Hi Diff. Pressure" is cleared. \_\_\_\_\_

6.5.2.2 Shut off sensing line valve 4355 to low pressure side of delta P switch. \_\_\_\_\_

6.5.2.3 Loosen tubing cap on low pressure side of delta P switch and slowly relieve trapped pressure. \_\_\_\_\_

6.5.2.4 Note that Solenoid coil de-energizes (plunger will drop down permitting latch lever to disengage-opening bypass valve). \_\_\_\_\_

6.5.2.5 Verify that C.B. common, "Hi Diff. Pressure" alarm has annunciated. \_\_\_\_\_

6.5.2.6 Retighten tubing cap and turn sensing line valve 4355 on. \_\_\_\_\_

6.5.2.7 When solenoid re-energizes (plunger up) re-latch mechanism to close byass valve. \_\_\_\_\_

6.5.2.8 Verify that C.B. Annunciator has cleared. \_\_\_\_\_

"B" Aux. Feed Pump

6.5.3 Check MOV 4028 (Service Water Suction Supply Valve) by performing the following:

6.5.3.1 Perform valve stroking of MOV 4028 as directed on attached Inservice valve test sheet. Page 31. \_\_\_\_\_

NOTE: C.B. switch must be held in desired position to fully stroke valve.

6.5.3.2 Ensure MOV 4028 to open position. \_\_\_\_\_

6.5.3.3 Open drain valve and observe flow. \_\_\_\_\_

6.5.3.4 Actuate C.B. switch to close position and observe that MOV 4028 closes completely. \_\_\_\_\_

6.5.3.5 Open manual isolation valve 4344 and back flush with condensate storage tank water. \_\_\_\_\_

6.5.3.6 Close drain valve. \_\_\_\_\_

6.5.3.7 Close manual S.W. isolation valve 4344. \_\_\_\_\_

6.5.4 Check operation of cooling water strainer delta P switch by performing the following:

NOTE: Clean strainer prior to performing these steps.

- 6.5.4.1 Ensure that C.B. common annunciator "Aux. F.W. Pump Cooling Water Filter Hi Diff. Pressure" is cleared. \_\_\_\_\_
- 6.5.4.2 Shut off sensing line valve 4354 to low pressure side of delta P switch. \_\_\_\_\_
- 6.5.4.3 Loosen tubing cap on low pressure side of delta P switch and slowly relieve trapped pressure. \_\_\_\_\_
- 6.5.4.4 Note that Solenoid coil de-energizes (plunger will drop down permitting latch lever to disengage-opening bypass valve). \_\_\_\_\_
- 6.5.4.5 Verify that C.B. common, "Hi Diff. Pressure" alarm has annunciated. \_\_\_\_\_
- 6.5.4.6 Retighten tubing cap and turn sensing line valve 4354 on. \_\_\_\_\_
- 6.5.4.7 When solenoid re-energizes (plunger up) re-latch mechanism to close bypass valve. \_\_\_\_\_
- 6.5.4.8 Verify that C.B. annunciator has cleared. \_\_\_\_\_

Turbine Driven Aux. Feed Pump

6.5.5 Check service water suction supply MOV 4013 by performing the following:

6.5.5.1 Perform valve stroking of MOV 4013 as directed on attached Inservice valve test sheet. Page 32. \_\_\_\_\_

NOTE: C.B. switch must be held in desired position to fully stroke valve.

- 6.5.5.2 Ensure MOV 4013 to open position. \_\_\_\_\_
- 6.5.5.3 Open drain valve 4358 and observe flow. \_\_\_\_\_
- 6.5.5.4 Actuate MOV 4013 C.B. switch to close position and observe that valve closes completely. \_\_\_\_\_
- 6.5.5.5 Open manual isolation valve 4098 and backflush with condensate storage tank water. \_\_\_\_\_
- 6.5.5.6 Close drain valve. \_\_\_\_\_
- 6.5.5.7 Close manual S.W. isolation valve 4098. \_\_\_\_\_

6.5.6 Check operation of cooling water strainer delta P switch by performing the following:

NOTE: Clean strainer prior to performing these steps.

6.5.6.1 Ensure that C.B. common annunciator "Auxiliary Feedwater Pump Cooling Water Filter High Diff. Pressure" is cleared. \_\_\_\_\_

6.5.6.2 Shut off sensing line valve 4078A to low-pressure side of delta P switch. \_\_\_\_\_

6.5.6.3 Loosen tubing cap on low pressure side of delta P switch and slowly relieve trapped pressure. \_\_\_\_\_

6.5.6.4 Note that solenoid coil de-energizes (plunger will drop down permitting latch lever to disengage-opening bypass valve). \_\_\_\_\_

6.5.6.5 Verify that C.B. common, "High Diff. Pressure" alarm has annunciated. \_\_\_\_\_

6.5.6.6 Retighten tubing cap and turn sensing line valve 4088A on. \_\_\_\_\_

6.5.6.7 When solenoid re-energizes (plunger up) relatch mechanism to close bypass valve. \_\_\_\_\_

6.5.6.8 Verify that C.B. annunciator has cleared. \_\_\_\_\_

DEFICIENCIES NOTED:

CORRECTIVE ACTION:

COMPLETED BY: \_\_\_\_\_

DATE COMPLETED: \_\_\_\_\_



1111



6.6	To verify proper valve realignment, ensure the following:		
6.6.1	V 3528 -TDAFP	Locked Open	_____
6.6.2	V 4345 -"A"MDAFP	Locked Closed	_____
6.6.3	V 4344 -"B"MDAFP	Locked Closed	_____
6.6.4	V 4098 -TDAFP	Locked Closed	_____
6.6.5	MOV 4000A -"A"-MDAFP	Closed	_____
6.6.6	MOV 4007 -"A"-MDAFP	Open	_____
6.6.7	MOV 4000B -"B"-MDAFP	Closed	_____
6.6.8	MOV 4008 -"B"-MDAFP	Open	_____
6.6.9	MOV 3996 -TDAFP	Open	_____
6.6.10	MOV 3504 -MAIN STEAM TO TDAFP FROM 1-B S/G	Closed	_____
6.6.11	MOV 3505 -MAIN STEAM TO TDAFP FROM 1-A S/G	Closed	_____
6.6.12	MOV 4027 -"A"-MDAFP	Closed	_____
6.6.13	MOV 4028 -"B"-MDAFP	Closed	_____
6.6.14	MOV 4013 -TDAFP	Closed	_____

NOTE: MOV's may be verified by Control Board light indication.

COMPLETED BY: \_\_\_\_\_

DATE COMPLETED: \_\_\_\_\_

HEAD CONTROL OPERATOR: \_\_\_\_\_

SHIFT SUPERVISOR: \_\_\_\_\_

RESULTS AND TEST REVIEW: \_\_\_\_\_ DATE \_\_\_\_\_

INSERVICE VALVE TEST SHEETMOV-4000A (ISI) CROSSOVER VLV. FOR MAFP's

- 6.7 INSTRUCTIONS: (Initial applicable steps)
- 6.7.1 Prior to stroking valve from "As Found" Position verify the following:
- 6.7.1.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.7.2 "STROKE" MOV-4000A to opposite position and verify the following:
- \*6.7.2.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 34 SEC.
- OPEN 36 SEC.
- 6.7.2.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\* 6.7.2.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.7.3 "STROKE" MOV-4000A to "As Found" Position and verify the following:
- \*6.7.3.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.7.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\* 6.7.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

INSERVICE VALVE TEST SHEETMOV-4007 1A AUX. FEED PUMP DISCHARGE VALVE:

- 6.8 INSTRUCTIONS: (Initial applicable steps)
- 6.8.1 Prior to stroking valve from "As Found" Position verify the following:
- 6.8.1.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.8.2 "STROKE" MOV-4007 to opposite position and verify the following:
- \*6.8.2.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 24 SEC.
- OPEN 23 SEC.
- 6.8.2.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\* 6.8.2.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.8.3 "STROKE" MOV-4007 to "As Found" Position and verify the following:
- \*6.8.3.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.8.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\* 6.8.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

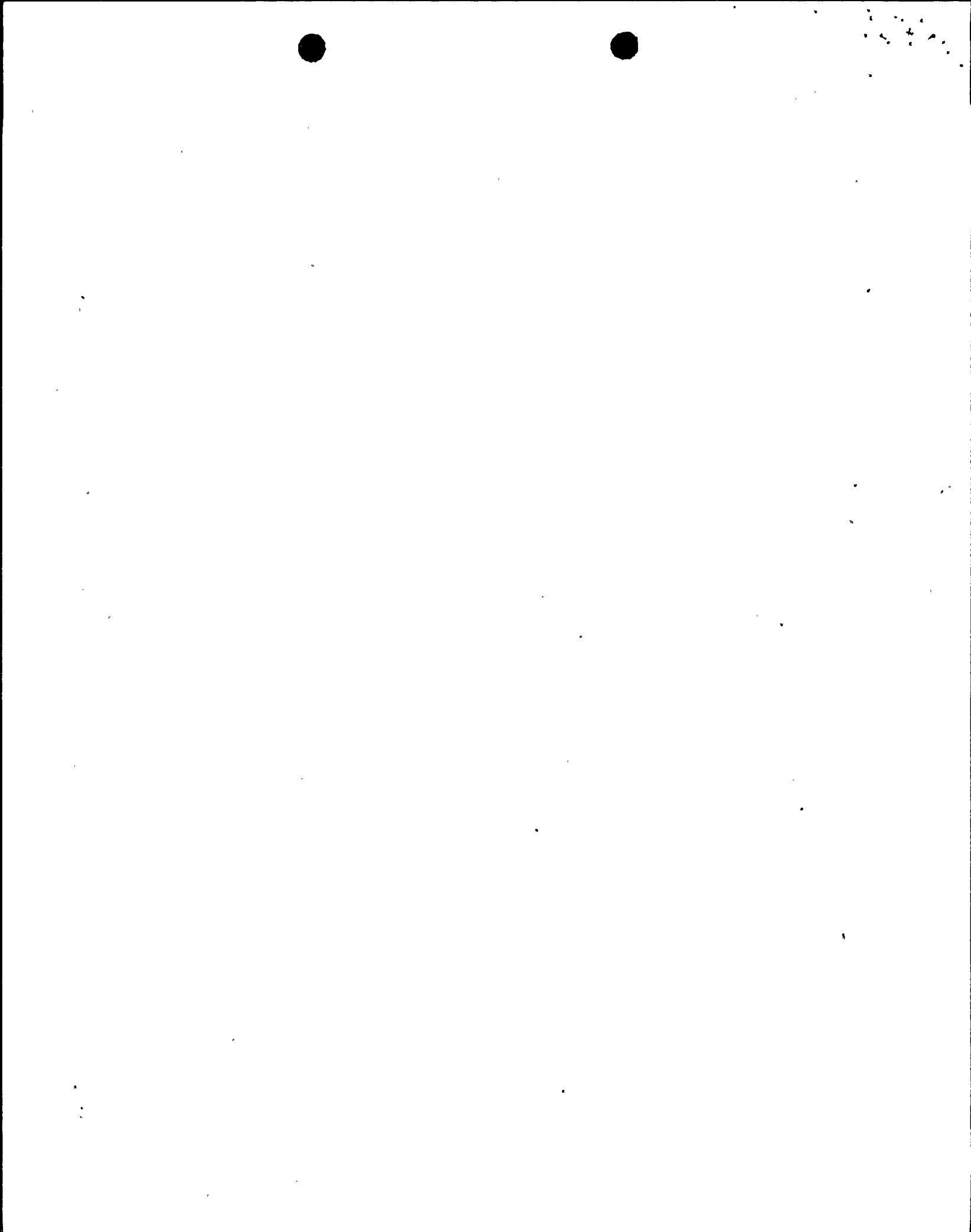
REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

INSERVICE VALVE TEST SHEETMOV-4000B (ISI) CROSSOVER VLV. FOR MAFP's

- 6.9 INSTRUCTIONS: (Initial applicable steps)
- 6.9.1 Prior to stroking valve from "As Found" Position verify the following:
- 6.9.1.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.9.2 "STROKE" MOV-4000B to opposite position and verify the following:
- \*6.9.2.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 33 SEC.
- OPEN 34 SEC.
- 6.9.2.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.9.2.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.9.3 "STROKE" MOV-4000B to "As Found" Position and verify the following:
- \*6.9.3.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.9.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.9.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_



INSERVICE VALVE TEST SHEETMOV-4008 1B AUX. FEED PUMP DISCHARGE VALVE:

- 6.10 INSTRUCTIONS: (Initial applicable steps)
- 6.10.1 Prior to stroking valve from "As Found" Position verify the following:
- 6.10.1.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.10.2 "STROKE" MOV-4008 to opposite position and verify the following:
- \* 6.10.2.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 22 SEC.
- . OPEN 22 SEC.
- 6.10.2.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\* 6.10.2.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.10.3 "STROKE" MOV-4008 to "As Found" Position and verify the following:
- \*6.10.3.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.10.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\* 6.10.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

INSERVICE VALVE TEST SHEETMOV-3996 TURBINE AUX. FEED PUMP DISCHARGE VALVE:

- 6.11 INSTRUCTIONS: (Initial applicable steps)
- 6.11.1 Prior to stroking valve from "As Found" Position verify the following:
- 6.11.1.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.11.2 , "STROKE" MOV-3996 to opposite position and verify the following:
- \*6.11.2.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 14 SEC.
- OPEN 15 SEC.
- 6.11.2.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.11.3 "STROKE" MOV-3996 to "As Found" Position and verify the following:
- \*6.11.3.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.11.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

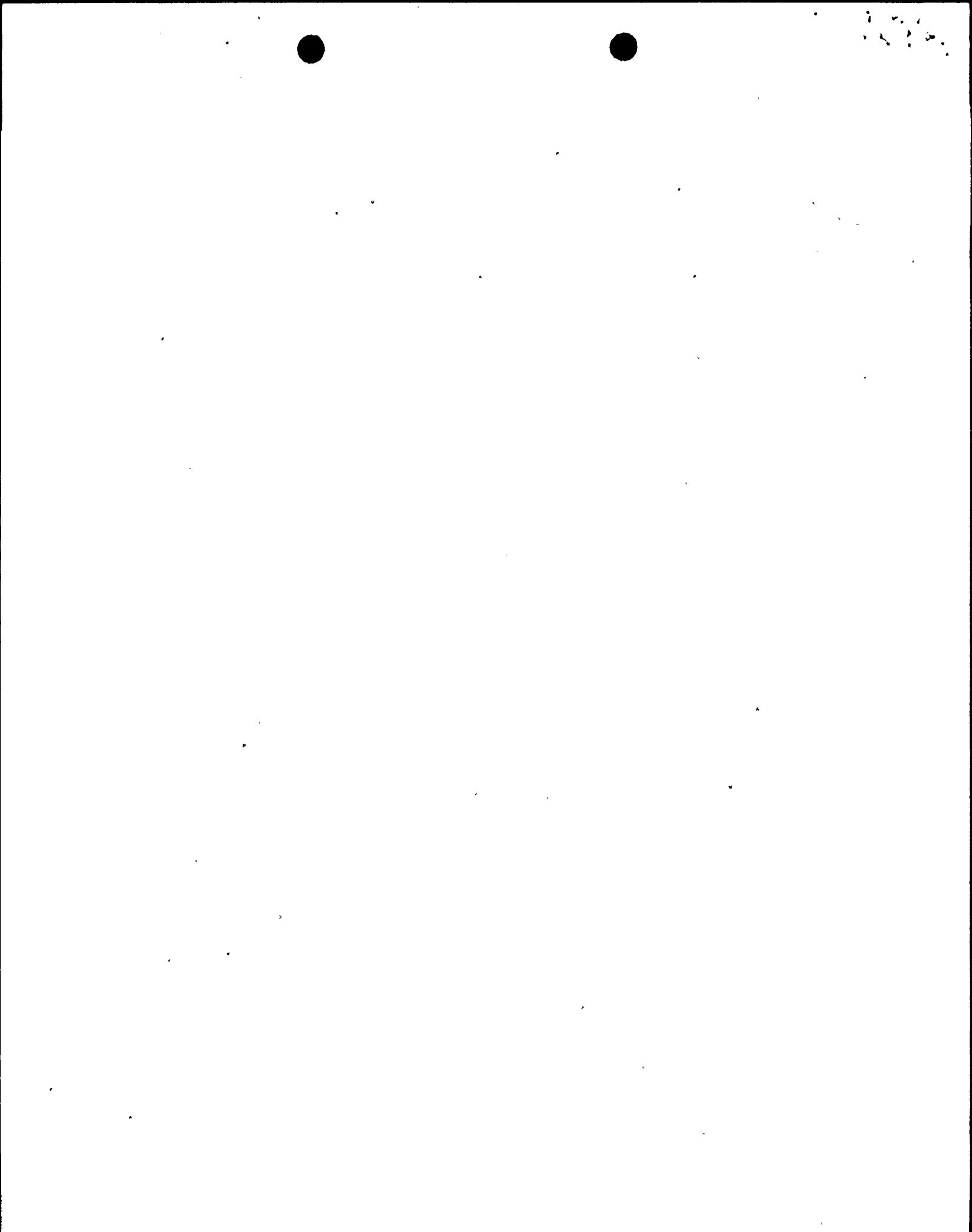


INSERVICE VALVE TEST SHEETMOV-3504, MAIN STEAM TO AFP FROM 1-B S/G

- 6.12 INSTRUCTIONS: (Initial applicable steps)
- 6.12.1 If Valve requirements are done separately and steam header pressure exists, perform steps 6.12.1.1 thru 6.12.1.3 and 6.12.6 (If being done in conjunction with PT-16, these steps may be marked N/A).
- 6.12.1.1 Close turbine trip and throttle Valve 3652. \_\_\_\_\_
- 6.12.1.2 Warm up steam header by cracking open MOV 3505. \_\_\_\_\_
- 6.12.1.3 After warm-up period, of 2 minutes, close MOV 3505. \_\_\_\_\_
- 6.12.2 Prior to stroking valve from "As Found" Position verify the following:
- 6.12.2.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.12.3 "STROKE" MOV-3504 to opposite position and verify the following:
- \*6.12.3.1 "TRAVEL TIME": (Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 14 SEC.
- OPEN 14 SEC.
- 6.12.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.12.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.12.4 "STROKE" MOV-3504 to "As Found" Position and verify the following:
- \*6.12.4.1 "TRAVEL TIME": (Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.12.4.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.12.4.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.12.5 Ensure closed MOV-3504 and MOV-3505. \_\_\_\_\_
- 6.12.6 Open slowly Turbine Trip & Throttle Valve 3652. \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_



INSERVICE VALVE TEST SHEET

MOV-3505, MAIN STEAM TO AFP FROM 1-A S/G

6.13 INSTRUCTIONS: (Initial applicable steps)

6.13.1 If Valve requirements are done separately and steam header pressure exists, perform steps 6.13.1.1 thru 6.13.1.3 and 6.13.6 (If being done in conjunction with PT-16, these steps may be marked N/A).

6.13.1.1 Close turbine trip and throttle Valve 3652. \_\_\_\_\_

6.13.1.2 Warm up steam header by cracking open MOV 3504. \_\_\_\_\_

6.13.1.3 After warm-up period, 2 minutes, close MOV 3504. \_\_\_\_\_

6.13.2 Prior to stroking valve from "As Found" Position verify the following:

6.13.2.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_

6.13.3 "STROKE" MOV-3505 to opposite position and verify the following:

\*6.13.3.1 "TRAVEL TIME": (Switch actuation to indicating light) SECONDS \_\_\_\_\_

Acceptable times:

CLOSE 11 SEC.

OPEN 10 SEC.

6.13.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_

\*\*6.13.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

6.13.4 "STROKE" MOV-3505 to "As Found" Position and verify the following:

\*6.13.4.1 "TRAVEL TIME": (Switch actuation to indicating light) SECONDS \_\_\_\_\_

6.13.4.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_

\*\*6.13.4.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

6.13.5 Ensure closed MOV-3504 and MOV-3505. \_\_\_\_\_

6.13.6 Open slowly Turbine Trip & Throttle Valve 3652. \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

MOV-4027 (ISI) 1-A MDAFP SERVICE WATER ISOLATION VALVE:

- 6.14 INSTRUCTIONS: (Initial applicable steps)
- 6.14.1 Close or ensure closed manual S.W. isolation valve 4345. \_\_\_\_\_
- 6.14.2 Prior to stroking valve from "As Found" Position verify the following:
- 6.14.2.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.14.3 "STROKE" MOV-4027 to opposite position and verify the following:
- \*6.14.3.1 "TRAVEL TIME": \_\_\_\_\_  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 31 SEC.
- OPEN 33 SEC.
- 6.14.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.14.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.14.4 "STROKE" MOV-4027 to "As Found" Position and verify the following:
- \*6.14.4.1 "TRAVEL TIME": \_\_\_\_\_  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.14.4.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.14.4.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

MOV-4028 (ISI) 1-B MDAFP SERVICE WATER ISOLATION VALVE:

- 6.15 INSTRUCTIONS: (Initial applicable steps)
- 6.15.1 Close or ensure closed manual S.W. isolation valve 4344. \_\_\_\_\_
- 6.15.2 Prior to stroking valve from "As Found" Position verify the following:
- 6.15.2.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.15.3 "STROKE" MOV-4028 to opposite position and verify the following:
- \*6.15.3.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 29 SEC.
- OPEN 30 SEC.
- 6.15.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.15.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.15.4 "STROKE" MOV-4028 to "As Found" Position and verify the following:
- \*6.15.4.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.15.4.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.15.4.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

MOV-4013 (ISI) TDAFP SERVICE WATER SUPPLY ISOLATION VALVE:

- 6.16 INSTRUCTIONS: (Initial applicable steps)
- 6.16.1 Close or ensure closed manual S.W. isolation valve 4098. \_\_\_\_\_
- 6.16.2 Prior to stroking valve from "As Found" Position verify the following:
- 6.16.2.1 Valve indicating light. RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- 6.16.3 "STROKE" MOV-4013 to opposite position and verify the following:
- \*6.16.3.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- Acceptable times:
- CLOSE 31 SEC.
- OPEN 31 SEC.
- 6.16.3.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.16.3.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_
- 6.16.4 "STROKE" MOV-4013 to "As Found" Position and verify the following:
- \*6.16.4.1 "TRAVEL TIME":  
(Switch actuation to indicating light) SECONDS \_\_\_\_\_
- 6.16.4.2 Valve indicating light: RED \_\_\_\_\_ or GREEN \_\_\_\_\_
- \*\*6.16.4.3 Valve stem position: OPEN \_\_\_\_\_ or CLOSED \_\_\_\_\_

COMPLETED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

PUMP INSERVICE TEST SHEET

PUMP IDENTIFICATION	1A MOTOR DRIVEN AUXILIARY FEEDWATER PUMP		
MANUFACTURER:	WORTHINGTON CORP.	SERIAL NO.	1614812
		MODEL:	2-WtF087

TEST PARAMETER	REFERENCE VALUES	MEASURED VALUES	ACCEPTABLE RANGE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW VALUES	HIGH VALUES	LOW VALUES	HIGH VALUES
* P1: PUMP INLET PRESSURE :	INITIAL	CST	CST	NA	NA	NA	NA
	OPERATIONAL	CST	CST	NA	NA	NA	NA
* ΔP: PUMP DIFFERENTIAL PRESSURE:	1205.2 psid		1120.8-1229.3	1114-1120.8	1229.3-1241.4	< 1114	> 1241.4
* Q: PUMP FLOW:	200.75 gpm		200.0-204.8	< 200.0	204.8-206.8	< 200.0	> 206.8
* Vb: PUMP BEARING VIBRATION:	INBOARD VERTICAL	.065 mills	0 - 1	NA	1 - 1.5	NA	> 1.5
	INBOARD HORIZONTAL	.07 mills	0 - 1	NA	1 - 1.5	NA	> 1.5
	OUTBOARD VERTICAL	.09 mills	0 - 1	NA	1 - 1.5	NA	> 1.5
	OUTBOARD HORIZONTAL	.095 mills	0 - 1	NA	1 - 1.5	NA	> 1.5
**tb: PUMP BEARING TEMPERATURE:	INBOARD						
	OUTBOARD						

	MODEL	SERIAL NO.	VIBRATION SYSTEM IDENTIFICATION:	MODEL NO.	SERIAL NO.
TACHOMETER IND.	N/A	N/A	READOUT DEVICE	306	
PYROMETER IND.			PICKUP DEVICE	544	

- NOTES:**
- IF MEASURED VALUES FALL WITHIN ALERT RANGE, THE FREQUENCY OF TESTING SHALL BE DOUBLED UNTIL CAUSE OF DEVIATION IS DETERMINED AND CORRECTED AND EITHER EXISTING VALUES OF REFERENCE REVERIFIED OR A NEW SET ESTABLISHED.
  - WHEN SUBSEQUENT TESTS SHOW DEVIATION GREATER THAN ALLOWED, THE INSTRUMENTATION INVOLVED MAY BE RECALIBRATED AND THE TEST RERUN.
  - IF THE DEVIATIONS FALL WITHIN THE REQUIRED ACTION RANGE, THE PUMP SHALL BE DECLARED INOPERABLE AND NOT RETURNED TO SERVICE UNTIL THE CONDITION HAS BEEN CORRECTED.
  - WHEN A REFERENCE VALUE MAY HAVE BEEN AFFECTED BY PUMP REPAIRS OR SERVICING, NEW REFERENCE VALUES SHALL BE OBTAINED WITHIN 96 HOURS OF PUMP RETURNING TO SERVICE.
  - TEST SHALL BE ANALYZED BY A QUALIFIED REVIEWER WITHIN 96 HOURS OF COMPLETION.

MEASURED VALUES COMPARED WITH REFERENCE AND TOLERANCE VALUES:

( CHECK APPROPRIATE STATEMENT BELOW )

- MEASURED VALUES WITHIN ACCEPTABLE RANGE? \_\_\_\_\_ :
- MEASURED VALUES WITHIN ALERT RANGE? \_\_\_\_\_ :
- MEASURED VALUES WITHIN REQUIRED ACTION RANGE? \_\_\_\_\_ :

DATE PERFORMED: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

TEST ANALYZED BY: \_\_\_\_\_

DATE ANALYZED: \_\_\_\_\_

PT-16:33





PUMP INSERVICE TEST SHEET

PUMP IDENTIFICATION 1B MOTOR DRIVEN AUXILIARY FEEDWATER PUMP								
MANUFACTURER: WORTHINGTON CORPORATION			SERIAL NO. 1614811	MODEL: 2-WtF-87				
TEST PARAMETER		REFERENCE VALUES	MEASURED VALUES	ACCEPTABLE RANGE	ALERT RANGE		REQUIRED ACTION RANGE	
					LOW VALUES	HIGH VALUES	LOW VALUES	HIGH VALUES
* PI: PUMP INLET PRESSURE :	INITIAL	CST		CST	N/A	N/A	N/A	N/A
	OPERATIONAL	CST		CST	N/A	N/A	N/A	N/A
* ΔP: PUMP DIFFERENTIAL PRESSURE:		1169.4 psid		1118-1192.8	< 1118	1192.8-1204.5	< 1118	> 1204.5
* Q: PUMP FLOW:		200.75 gpm		200.0-204.8	< 200.0	204.8-206.8	< 200.0	> 206.8
* Vb: PUMP BEARING VIBRATION:	INBOARD VERTICAL	.06 mills		0 - 1	N/A	1 - 1.5	N/A	> 1.5
	INBOARD HORIZONTAL	.065 mills		0 - 1	N/A	1 - 1.5	N/A	> 1.5
	OUTBOARD VERTICAL	.075 mills		0 - 1	N/A	1 - 1.5	N/A	> 1.5
	OUTBOARD HORIZONTAL	.065 mills		0 - 1	N/A	1 - 1.5	N/A	> 1.5
**1b: PUMP BEARING TEMPERATURE:	INBOARD							
	OUTBOARD							

	MODEL	SERIAL NO.	VIBRATION SYSTEM IDENTIFICATION:	MODEL NO.	SERIAL NO.
TACHOMETER IND.	N/A	N/A	READOUT DEVICE	306	
PYROMETER IND.			PICKUP DEVICE	544	

- NOTES:**
- IF MEASURED VALUES FALL WITHIN ALERT RANGE, THE FREQUENCY OF TESTING SHALL BE DOUBLED UNTIL CAUSE OF DEVIATION IS DETERMINED AND CORRECTED AND EITHER EXISTING VALUES OF REFERENCE REVERIFIED OR A NEW SET ESTABLISHED.
  - WHEN SUBSEQUENT TESTS SHOW DEVIATION GREATER THAN ALLOWED, THE INSTRUMENTATION INVOLVED MAY BE RECALIBRATED AND THE TEST RERUN.
  - IF THE DEVIATIONS FALL WITHIN THE REQUIRED ACTION RANGE, THE PUMP SHALL BE DECLARED INOPERABLE AND NOT RETURNED TO SERVICE UNTIL THE CONDITION HAS BEEN CORRECTED.
  - WHEN A REFERENCE VALUE MAY HAVE BEEN AFFECTED BY PUMP REPAIRS OR SERVICING, NEW REFERENCE VALUES SHALL BE OBTAINED WITHIN 96 HOURS OF PUMP RETURNING TO SERVICE.
  - TEST SHALL BE ANALYZED BY A QUALIFIED REVIEWER WITHIN 96 HOURS OF COMPLETION.

MEASURED VALUES COMPARED WITH REFERENCE AND TOLERANCE VALUES:

( CHECK APPROPRIATE STATEMENT BELOW )

- MEASURED VALUES WITHIN ACCEPTABLE RANGE? \_\_\_\_\_:
- MEASURED VALUES WITHIN ALERT RANGE? \_\_\_\_\_:
- MEASURED VALUES WITHIN REQUIRED ACTION RANGE? \_\_\_\_\_:

DATE PERFORMED: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

TEST ANALYZED BY: \_\_\_\_\_

DATE ANALYZED: \_\_\_\_\_

PUMP INSERVICE TEST SHEET

PUMP IDENTIFICATION **TURBINE DRIVEN AUXILIARY FEEDWATER PUMP**

MANUFACTURER: **Worthington Corporation** SERIAL NO. **1614756** MODEL: **3-WtL-87**

TEST PARAMETER	REFERENCE VALUES	MEASURED VALUES	ACCEPTABLE RANGE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW VALUES	HIGH VALUES	LOW VALUES	HIGH VALUES
* PI: PUMP INLET PRESSURE :	INITIAL	CST .	CST	N/A	N/A	N/A	N/A
	OPERATIONAL	CST	CST	N/A	N/A	N/A	N/A
* ΔP: PUMP DIFFERENTIAL PRESSURE:	1155 psid		1131-1178.1	< 1131	1178.1-1189.7	< 1131	> 1189.7
* Q: PUMP FLOW:	400 gpm		400-408	< 400	408 - 412	< 400	> 412
* Vb: PUMP BEARING VIBRATION:	INBOARD VERTICAL	.075 mills	0 to 1	N/A	1 - 1.5	N/A	> 1.5
	INBOARD HORIZONTAL	.085 mills	0 to 1	N/A	1 - 1.5	N/A	> 1.5
	OUTBOARD VERTICAL	.07 mills	0 to 1	N/A	1 - 1.5	N/A	> 1.5
	OUTBOARD HORIZONTAL	.16 mills		0 to 1	N/A	1 - 1.5	N/A
**tb: PUMP BEARING TEMPERATURE:	INBOARD						
	OUTBOARD						

\*N: Rotative Speed **4410 RPM**

	MODEL	SERIAL NO.	VIBRATION SYSTEM IDENTIFICATION:	MODEL NO.	SERIAL NO.
TACHOMETER IND.	N/A		READOUT DEVICE	306	
PYROMETER IND.			PICKUP DEVICE	544	

- NOTES:**
- IF MEASURED VALUES FALL WITHIN ALERT RANGE, THE FREQUENCY OF TESTING SHALL BE DOUBLED UNTIL CAUSE OF DEVIATION IS DETERMINED AND CORRECTED AND EITHER EXISTING VALUES OF REFERENCE REVERIFIED OR A NEW SET ESTABLISHED.
  - WHEN SUBSEQUENT TESTS SHOW DEVIATION GREATER THAN ALLOWED, THE INSTRUMENTATION INVOLVED MAY BE RECALIBRATED AND THE TEST RERUN:
  - IF THE DEVIATIONS FALL WITHIN THE REQUIRED ACTION RANGE, THE PUMP SHALL BE DECLARED INOPERABLE AND NOT RETURNED TO SERVICE UNTIL THE CONDITION HAS BEEN CORRECTED:
  - WHEN A REFERENCE VALUE MAY HAVE BEEN AFFECTED BY PUMP REPAIRS OR SERVICING, NEW REFERENCE VALVES SHALL BE OBTAINED WITHIN 96 HOURS OF PUMP RETURNING TO SERVICE.
  - TEST SHALL BE ANALYZED BY A QUALIFIED REVIEWER WITHIN 96 HOURS OF COMPLETION.

**MEASURED VALUES COMPARED WITH REFERENCE AND TOLERANCE VALUES:**

( CHECK APPROPRIATE STATEMENT BELOW )

1. MEASURED VALUES WITHIN ACCEPTABLE RANGE?	_____:	DATE PERFORMED:	_____
2. MEASURED VALUES WITHIN ALERT RANGE?	_____:	PERFORMED BY:	_____
3. MEASURED VALUES WITHIN REQUIRED ACTION RANGE?	_____:	TEST ANALYZED BY:	_____
		DATE ANALYZED:	_____

PT-16:35