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DAVIS-BESSE NUCLEAR POWER STATION - UNIT 1
TEMPORARY MODIFICATION REQUEST

ED 8926

SECTION 1

PROCEDURE TITLE AND NUMBER

AUXILIARY FEEDWATER SYSTEM

SP 1106.06.22

REASON FOR CHANGE

A commitment was made to the NRC that engineering would walkdown the AFPT steam piping after any operation of the AFPT's.

CHANGE

ADD STEP 4.1.4:

4.1.4 Engineering has walked down and approved the steam piping for Nuclear Facility AFPT 1-1 and 1-2. Engineer _____ Time _____ Date _____
NOTE: N/A if AFPT's have not been operated.

ADD STEP 5.1.2:

5.1.2 Engineering has been notified to walkdown the AFPT 1-1 and 1-2 steam piping after any operation of the AFPT's. } DEM 5-1-85

ADD STEP 7.1.4: Nuclear Facility

7.1.4 Notify Engineering to walk down the AFPT 1-1 and 1-2 steam piping after any operation of the AFPT's.

8507300362 850508
PDR ADDCK 05000346
P PDR

IS PROCEDURE REVISION REQUIRED

Yes

☐

No

☒

If no, this modification is valid until

NRC Commitment
is 1.5.1.85

PREPARED BY

Donald King

DATE

5-1-85

APPROVED BY

[Signature]

DATE

5-1-85

APPROVED BY

John Johnson

DATE

5/1/85

SUBMITTED BY (Section Head)

W.D.

DATE

5/6/85

RECOMMENDED BY (SRB Chairman)

D.W. Buden

DATE

MAY 8 1985

QA APPROVED BY (Manager of Quality Assurance)

[Signature]

DATE

MAY 8 1985

APPROVED BY (Station Superintendent)

[Signature]

DATE

MAY 8 1985

Aux. Feedwater Pump Room Ventilation Systems

The Auxiliary Feedwater Pump Room Ventilation Systems are shown on P&ID M-026A and HVAC plan drawing M-413. The systems consist of one (1) 100% capacity, Q exhaust fan per pump room, fans C73-1 and 2, temperature switches TS-5135 and TS-5136, and motor-operated exhaust air dampers HV-4835 and HV-4836. Missile protection supply air transfer grills are located in the elevation 585' Turbine Building floor slab, and exhaust air is discharged from each room through similar openings located so as to preclude short-circuiting of supply and exhaust air. Each exhaust fan is started automatically by its pump room temperature switch at a predetermined temperature setpoint and is sized to maintain its pump room between 60°F and 120°F during all modes of operation including post-accident, utilizing supply air from the Turbine Building at <110°F. Loss of an Auxiliary Feedwater Pump Room Ventilation System will make the train inoperable. Due to the small size of the Auxiliary Feedwater Pump Rooms and the magnitude of the room heat loads, these rooms cannot be maintained indefinitely at or below 120°F following a failure of their respective ventilation systems, regardless of the ambient outside air temperature, nor can operability of the affected Auxiliary Feedwater train be ensured once the room temperature goes above 120°F. In order to comply with the single failure criterion, redundancy is provided by the availability of the alternate train Auxiliary Feedwater System and its associated ventilation system.

2. The 1-2 AFPT has a PGG type governor. Manual or Auto Essential speed change signals drive an internal speed changer motor. This change determines a new speed setpoint and the governor moves the steam governor valve to drive the turbine to the new speed. The internal speed changer motor also drives an external manual speed setting control knob and speed setting revolution counter. These can be used to locally determine if the governor is at HSS or LSS. Limit switches in the governor stop speed changer motor rotation when the motor reaches HSS and LSS. ~~This allows AF 3072 to be left normally open. Since AF 3072 is open, the Auto Essential level control circuit will continuously send a signal to the governor. This means that if OTSG 2 level is less than 43 inches the governor will be at HSS. However, if level is greater than 43 inches the governor will be at LSS.~~ The governor also has a speed droop control knob to aid in the governors stability. A load limit control knob provides the ability to limit the turbine power. This must be set at 10. An overspeed trip test device is installed on top of the governor to aid in the yearly overspeed test. Operation of both turbines from the control room is the same.

2. PRECAUTIONS AND LIMITATIONS

2.1 Minimum allowable feedwater temperature to the SG auxiliary feed nozzles is 40°F.

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SECTION 1

PROCEDURE TITLE AND NUMBER

Auxiliary Feedwater System Procedure SP1106.06

REASON FOR CHANGE

The Terry Turbine representative has set the APT-1-2 drop knob setting to 0. The setting was not known until he had set it and the procedure contained a "later." This mod removes the later

CHANGE

In Step 4.2.9.1 Change: "later" to 0

IS PROCEDURE REVISION REQUIRED	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If no, this modification is valid until _____
PREPARED BY	<i>[Signature]</i>	DATE 1/9/85
APPROVED BY	<i>[Signature]</i>	DATE 1/9/85
APPROVED BY	<i>[Signature]</i>	DATE 1-9-85
SUBMITTED BY (Section Head)	<i>[Signature]</i>	DATE 1-15-85
RECOMMENDED BY (SRB Chairman)	<i>[Signature]</i>	DATE JAN 16 1985
QA APPROVED BY (Manager of Quality Assurance)	<i>[Signature]</i>	DATE
APPROVED BY (Station Superintendent)	<i>[Signature]</i>	DATE JAN 16 1985

[Handwritten initials]

1. PURPOSE

The purpose of this procedure is to provide a procedure for operating the Auxiliary Feedwater System (AFWS). The following modes of operation are covered.

MODESSECTION

Placing the AFWS in service for plant startup	4.0
Removing the AFWS from service for plant shutdown	5.0
Manual and Abnormal Operations of the AFWS	6.0
AFWS Shutdown from Manual Operation <u>or</u> from SFRCS Initiation	7.0

DISCUSSION

The purpose of the Auxiliary Feedwater System is to provide feedwater to the SG's for the removal of decay heat in the absence of main feedwater and to promote natural circulation in the reactor coolant system on a loss of all four reactor coolant pumps.

During normal plant operation, the Auxiliary Feedwater System performs no function. It is a standby system to be used should there be a loss of the Main Feedwater System or it is desired to promote natural circulation. The Auxiliary Feed Nozzles must be used to fill a dry SG if the RCS is above 200°F.

The Auxiliary Feedwater System consists of the following components: two steam turbine-driven feedwater pumps (AFP), two condensate storage tanks (CST), suction and discharge water piping, steam piping, valves and associated instrumentation and controls.

Turbine Driven Feedwater Pumps:

The auxiliary feedwater pumps are horizontal, seven stage, double volute, centrifugal pumps having a capacity of 1050 gpm at 1050 psig. The capacity of the AFP was determined by the decay heat removal requirements 40 seconds after a reactor trip from full power - one AFP meets this capacity requirements.

The turbines can take steam from either the main or auxiliary steam system. Valves in the main steam system permit operating the auxiliary feed pump turbines from either their respective SG's or the opposite SG. The auxiliary feed pumps can take a suction from either the Condensate Storage Tanks, Service Water System, or the Fire Protection System. The pumps are capable of discharging the auxiliary feedwater either to its respective SG or the opposite SG through a set of isolation and cross-over valves discharging into the SG's through the auxiliary feedwater nozzles located at 596'-3 3/8" in reference to the SG Startup Range Indication.

22| The amount of feedwater entering the SG is controlled by varying the AFPT speed using the AFPT speed changer. The AFP head curve (Enclosure #1) and FI 4521, 4522, 4630 or 4631 must be used to prevent pump runout when operating at various speeds and discharge/SG pressures. When using AFW with low steam pressures, the AFP discharge pressure at LSS may be too great to properly control OTSG levels. At that time AF 360 and AF 388 will be closed and feedwater enters the SG through a 0.46" restricting orifice (RO-416 and RO-498) which bypass the AFP discharge valve(s) AF-360 and/or AF-388.

The auxiliary feed pump turbines are rated at 800 hp at 3600 rpm for a steam pressure of 885 psig and steam temperature of 590°F. The turbines are of the horizontal type having a split casing, solid (helical) wheel rotor and two stages.

Overspeed protection for the auxiliary feedwater pump turbine is provided by a turbine trip throttle valve actuated by the mechanical overspeed tripping device on the turbine. Should the trip throttle valve trip on overspeed, an operator must be dispatched to the auxiliary feed pump to manually reset the valve since the valve is locally operated and no remote reset is provided. Overspeed trip occurs at approximately 4500 rpm.

22| The turbine governor has a low speed stop set at 1100 RPM.

The auxiliary feed pump turbine governor valve is operated hydraulically by an oil pump attached to the turbine shaft. Hydraulic oil pressure is not developed until the turbine is turning. Therefore, on a loss of oil pressure or until the oil pressure is developed, the governor valve position remains as is.

During operation, a minimum speed of 600 RPM is required to circulate lube oil. Circulation of the AFP lubricating oil is accomplished by means of a "circulator" within the Kingsbury thrust bearing. The pumping force is the adhesion of the oil to the thrust collar rim. Oil is drawn from the oil reservoir and enters the oil circulator. The oil is carried around by a collar until it encounters the closely fitting parts of the ring where it is scraped off into the oil passages, flowing along the shaft and then outward between the thrust shoes. The oil then travels through the oil cooler where it returns to the reservoir. Oil from the circulator also goes to the journal bearing at the other end of the pump shaft via supply and return piping. Both the built in journal bearing of the Kingsbury thrust unit and the separate journal bearing of the AFP's have an oil ring at one end of the bearing shell for lubrication. The pump bearing lubricating oil system is cooled by an oil reservoir oil cooler housed within the thrust bearing lower casing. Cooling water is normally supplied by the first stage discharge of the AFP.

Cooling water for the AFPT bearing oil is provided by the first stage discharge of the AFP (normally) or from the service water system (alternate).

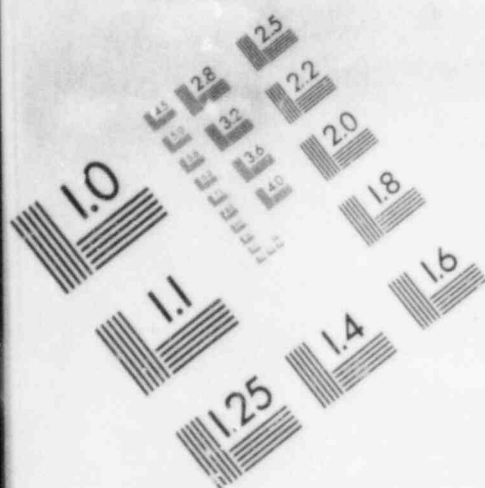
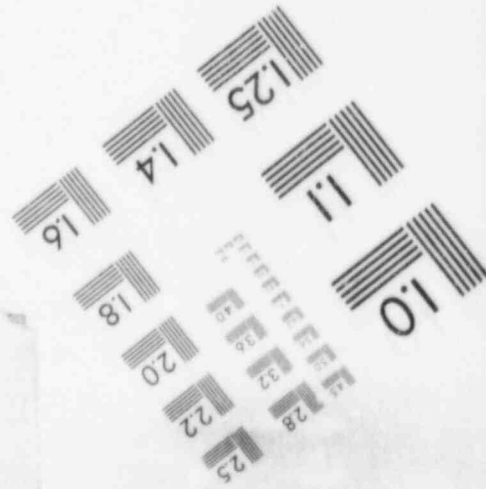
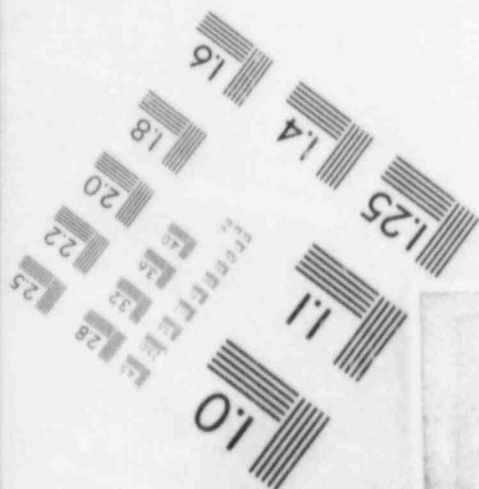
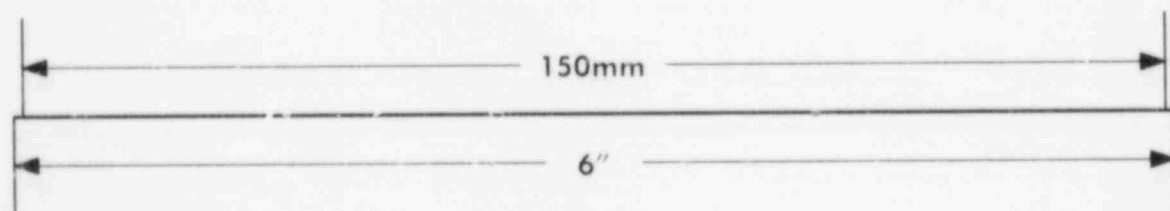
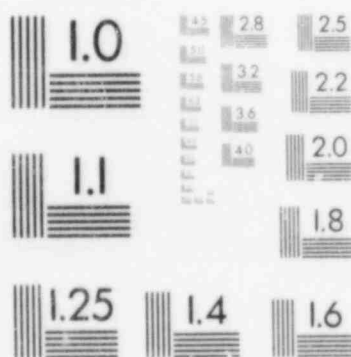
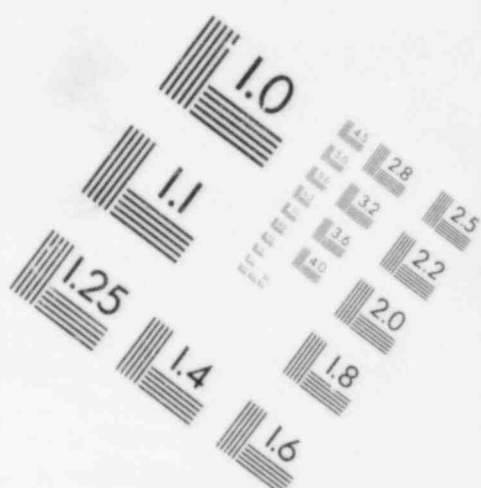


IMAGE EVALUATION TEST TARGET (MT-3)



The AFPT's have two operational modes: Auto Essential and Manual. The mode selector switch still has an ICS position which is not to be used.

22| The Auto Essential mode automatically controls Steam Generator level
22| by controlling the AFPT speed. If an SFRCS trip occurs the Steam
22| Generator level will be controlled at 46 inches on the Startup Range.
22| If an SFRCS and an SFAS level 2 trip is present, the Steam Generator
22| level will be controlled at 124 inches on the startup range. HIS SP9B
22| (HIS SP9A) is a high-low select switch which allows the operator to
22| select either the 124 inch (green) or 46 inch (red) setpoint. An SFAS
22| level 2 trip will override the HIS and automatically select the 124
22| inch level setpoint. This SFAS signal can be blocked using HIS SP9B1
22| (HIS SP9A1) and the 46 inch setpoint can be reselected using HIS SP9B
22| (HIS SP9A). If a less than 612 PSI SFRCS occurs, the opposite trains
22| AFP will feed the good OTSG to 50" or 128" if a level 2 SFAS occurs.
22| The other AFP is in standby at low speed stop. In the manual mode,
22| the operator through the use of the AFPT speed changer switch can
either raise or lower AFPT speed to adjust SG level. When operating
in this mode, use of the pump head curve (Enclosure 1) is mandatory
mandatory to prevent pump runoff.

The AFP TRBL annunciator will alarm due to the following four conditions. If the Mode Selector switch is in any position other than auto-essential. If the AFPT trip throttle valve is fully closed. If steam pressure at the inlet of AFPT is less than 10 psig. If AFP suction pressure is less than 1 psig. The last two conditions should close the AFPT main steam valve.

The AFPT's exhaust through silencers to the atmosphere.

A sentinel valve on each AFPT casing is set at 28 psig to provide audible and visual warnings to the operator of excessive exhaust pressure. Local pressure gauges provide a means of measuring exhaust pressure.

Condensate Storage Tanks

The condensate storage capacity is sized so that a total condensate inventory of 250,000 gallons may be available to the AFP's to remove decay heat for approximately 13 hours plus a subsequent cooldown of the plant to 280°F.

Instrumentation and Control

There are 4 low pressure switches (2 for each AFP) located on the suction line from the CST which automatically switches the AFP suction to service water on the event suction pressure from CST falls below 2 psig. If suction pressure from CST increases to above 2 psig this will enable the Operator to manually switch AFP suction from service water back to CST. There are 4 additional low pressure switches (2 for each AFP) on pump suction which automatically closes

or blocks the opening of AFPT steam valves if suction pressure drops below 1 psig for more than 2.5 seconds.

FI 4521 and FI 4630 indicates the amount of Auxiliary Feedwater flow to Steam Generator 1 from either Auxiliary Feed Pump. FI 4522 and 4631 indicates the amount of Auxiliary Feedwater Flow to Steam Generator 2 from either Auxiliary Feed Pump. FI 4521 and FI 4522 are Ultrasonic Flow instruments. FI 4630 and FI 4631 are Safety grade orifice Type Flow instruments on the Post Accident Instrument Panel.

The remote control switches HIS-360 and HIS-388 (Figure 1) on control room console C-5709 for the AFP discharge valves AF 360 and AF 388 have a mechanical latching device built into the switch which engages and holds the "Open" pushbutton in the open position whenever it is pressed. Adjacent to the "Open" pushbutton is a smaller release pushbutton labeled "Off". Depressing this pushbutton releases the mechanical latch function and permits closing of the valve.

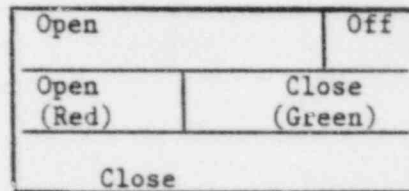


Figure 1

Located between the AFPT trip throttle valve and the AFPT steam isolation valve on each main steam line are four pressure switches. The purpose of these pressure switches is to close the AFPT main steam isolation valves should a main steam line break occur between the AFP room and the isolation valves in the auxiliary building. The pressure switches are set to close the AFPT main steam isolation valves should steam pressure decrease to less than 10 psig. Once these pressure switches have tripped, their relay must be reset. To reset, an operator must be dispatched to press their reset pushbuttons which are located at Auxiliary Building Elevation 585 by MCC E11C (for MS 106 and MS 106A) and #2 Electrical Penetration Room by MCC F11A (for MS 107 and MS 107A). A time delay with a variable setpoint is part of the valve closure circuit. Once the main steam isolation valve has begun to open, 10 psig must be developed at these pressure switches within the allotted time span of the time delay, otherwise, the AFPT main steam isolation valves will close.

21 |

Any condition which causes the AFWS to depart from its normal operational status, whether it be due to an abnormal valve lineup, component failure, repair work or routine maintenance, requires the operator to turn on the "Manual System Bypass" indicating light (AFW 4800) using HS-4800 on the SFAS panel. The illumination of this blue light serves as a reminder and indication to the operator that the system is in an inoperable status.

21 |

Aux. Feedwater Pump Room Ventilation Systems

The Auxiliary Feedwater Pump Room Ventilation Systems are shown on P&ID M-026A and HVAC plan drawing M-413. The systems consist of one (1) 100% capacity, Q exhaust fan per pump room, fans C73-1 and 2, temperature switches TS-5135 and TS-5136, and motor-operated exhaust air dampers HV-4835 and HV-4836. Missile protection supply air transfer grills are located in the elevation 585' Turbine Building floor slab, and exhaust air is discharged from each room through similar openings located so as to preclude short-circuiting of supply and exhaust air. Each exhaust fan is started automatically by its pump room temperature switch at a predetermined temperature setpoint and is sized to maintain its pump room between 60°F and 120°F during all modes of operation including post-accident, utilizing supply air from the Turbine Building at <110°F. Loss of an Auxiliary Feedwater Pump Room Ventilation System will make the train inoperable. Due to the small size of the Auxiliary Feedwater Pump Rooms and the magnitude of the room heat loads, these rooms cannot be maintained indefinitely at or below 120°F following a failure of their respective ventilation systems, regardless of the ambient outside air temperature, nor can operability of the affected Auxiliary Feedwater train be ensured once the room temperature goes above 120°F. In order to comply with the single failure criterion, redundancy is provided by the availability of the alternate train Auxiliary Feedwater System and its associated ventilation system.

22 | The 1-2 AFPT has a PGG type governor. Manual or Auto Essential speed change signals drive an internal speed changer motor. This change determines a new speed setpoint and the governor moves the steam governor valve to drive the turbine to the new speed. The internal speed changer motor also drives an external manual speed setting control knob and speed setting revolution counter. These can be used to locally determine if the governor is at HSS or LSS. Limit switches in the governor stop speed changer motor rotation when the motor reaches HSS and LSS. This allows AF 3872 to be left normally open. Since AF 3872 is open, the Auto Essential level control circuit will continuously send a signal to the governor. This means that if OTSG 2 level is less than 43 inches the governor will be at HSS. However, if level is greater than 49 inches the governor will be at LSS. The governor also has a speed droop control knob to aid in the governors stability. A load limit control knob provides the ability to limit the turbine power. This must be set at 10. An overspeed trip test device is installed on top of the governor to aid in the yearly overspeed test. Operation of both turbines from the control room is the same.

2. PRECAUTIONS AND LIMITATIONS

- 2.1 Minimum allowable feedwater temperature to the SG auxiliary feed nozzles is 40°F.

2.2 Above an RC temperature of 200°F, the auxiliary feed nozzles must be used for filling a dry SG.

2.3 Maximum operating SG level is 82.5% of operating range when above 10% power.

(TS 2.4 Two independent steam generator auxiliary feedwater pumps and
3.7.1.2) associated flow paths shall be OPERABLE.

2.4.1 Applicability: Modes 1, 2, and 3.

2.5 When at least one 100% capacity flowpath is NOT available, the reactor shall be made subcritical (Mode 3) within one hour and the facility placed in a shutdown cooling mode (Mode 4) which does NOT rely on steam generators for cooling within 12 hours or at the maximum safe shutdown rate.

2.6 Whenever the Auxiliary Feedwater System is inoperable because of a failure, repair work in progress, or routine maintenance on the system, the operator is to turn IL-4800 "AUX FW SYS" on using HS-4800 on SFAS Panel C-5717. This light is to remain on as long as the system is inoperable.

2.7 Steam traps are placed in operation as per Enclosure 2 and Valve Verification List "A".

2.8 If a SFAS actuation occurs, the following requirements apply:

2.8.1 DO NOT OVERRIDE ANY SAFETY EQUIPMENT EXCEPT AS LISTED BELOW:

1. IF PLANT CONDITIONS ARE STABLE AT NORMAL OPERATING OR HOT STANDBY CONDITIONS AFTER A TRANSIENT WITH NO EVIDENCE OF AN RCS LEAK, SYSTEMS MAY BE BYPASSED WITH THE SHIFT SUPERVISOR'S PERMISSION.
2. IF THERE ARE ANY QUESTIONABLE CONDITIONS OR ANY SIGN OF AN RCS LEAK, NO SAFETY SYSTEM SHOULD BE BYPASSED WITHOUT APPROVAL OF STATION MANAGEMENT (PLANT MANAGER OR HIS DESIGNEE).

2.8.2 If an SFAS signal to some ESF equipment is "Blocked" (i.e. overridden), that equipment is incapable of responding to either any subsequent automatic actuation signal or the SFAS system-level manual, actuate ("Trip") pushbuttons on Panel C5717. Before an operator "Blocks" any SFAS signal, he must assure that the safety function of the equipment is no longer needed. Afterward the operator is totally responsible for the proper operation of that equipment, including reactivation if required, until the "Block" is removed.

22 | Reactuation, subsequent to a "Block", can be accomplished two ways. First, at the equipment level, "Blocked" equipment will respond to the individual control switches for that piece of equipment. Second at the SFAS system level, operation of the system-level "Reset" pushbutton on Panel C5717 will clear any output logic blocks in the system (output logic "Blocks" are the block switches next to the SAM lights and on the output modules). The equipment will then respond to the system-level manual, actuate ("Trip") pushbutton and to automatic actuation signals. For guidance on resetting the SFAS after a real or erroneous trip see EP 1202.01, RPS, SFAS, SFRCS Trip, or SG Tube Rupture.

- 2.9 Maximum bearing metal temperature for the AFP is 210° and maximum bearing metal temperature for the AFPT is 220°.
- 2.10 Maximum seal water temperature is 160°F and maximum seal temperature is 300°F.
- 2.11 Four pressure switches (2 for each AFP) automatically shift AFP suction to Service Water on low AFP suction pressure of 2 psig. If cooldown using AFP's is required for an extensive period such that CST water is exhausted, the automatic shift to Service Water should be verified or manually initiated if CST level falls below 3 feet. Manual initiation is achieved by opening SW 1382 (SW to AFP 1-1 suction) and SW 1383 (SW to AFP 1-2 suction) and then closing FW 786 (AFP 1-1 suction valve) and FW 790 (AFP 1-2 suction valve). This can be done from the Control Room using the Control Room switches.

3. REFERENCES

- (TS) 3.1 D-B Technical Specifications, 3.7.1.2 and 4.7.1.2
- 3.2 Plant Limits and Precautions, PP 1101.01, Section 1.3
- 3.3 S/G Secondary Fill, Drain and Wet Layup Procedure, SP 1106.08
- 3.4 Bechtel P&ID M-003C, Main Steam and Reheat System
- 3.5 Bechtel P&ID M-006B Feedwater System
- 3.6 Bechtel P&ID M-007, Steam Generator Secondary System
- 3.7 Bechtel Drawing M-050, Main Steam Line and Main Feed Water Line Rupture Control System Logic
- 3.8 USAR Questions and Answers, 7.5.2

3.9 Bechtel Drawing M-051, Auxiliary Feed Water Pump Turbine Start Control System Logic

3.10 USAR, Section 7.4.1.3 and 9.2.7

3.11 Terry Steam Turbine Company Instruction Manual for the Auxiliary Feed Pump Turbines

3.12 Byron-Jackson Pumps Specification

4. PLACING THE AFWs IN SERVICE FOR PLANT STARTUP

4.1 Prerequisites

(TS 3.7.1.3) 4.1.1 A total combined Condensate and Feedwater availability of 250,000 gallons of water.

4.1.2 The Steam and Feedwater Rupture Control System is energized and in service as per SP 1105.16, SFRCS Operating Procedure.

4.1.3 Valve Verification List "A" has been performed.

NOTE: Use Enclosure 4 to assist in locating valves.

22 | Section 4.1 completed by _____ Date _____

4.2 Procedure

4.2.1 Verify the "MN STM CH 1 LO PRESS TRIP BLKD" and "MN STM CH 2 LO PRESS TRIF BLKD" alarms are lit on annunciator panel #12.

NOTE: Verification of both alarm windows being lit signifies the SFRCS low steam pressure trip is "blocked".

1. On C5717, ensure HIS SP9B (HIS SP9A) has a low (red) indication.

4.2.2 Ensure the following switches or lights on the main console are in the designated positions.

1. Auxiliary Feed System Mode selector switches HIS-520B and HIS-521B in "Manual".

2. IL ICS-38A and IL ICS-38B shutdown panel remote control lights are out.

4.2.3 At the following MCC's, close the designated breakers and ensure the associated disconnect switches are in the "Normal" position.

NOTE: Step 4.2.3 and 4.2.4 may be performed simultaneously.

<u>INITIAL</u>	<u>MCC</u>	<u>BREAKER</u>	<u>NAME</u>	<u>VLV NO.</u>	<u>DISCONNECT SWITCH CAB.</u>
<u>In the #2 Electrical Penetration Room:</u>					
19	F-11-A	BF-1124	AFPT 1-2 Mn Stm In Iso Vlv	MS-107	CDF-11-A-2
NOTE: Step 4.2.4.1 may be done at this time. The Reset Pushbutton for MS107 and MS107A low pressure trip should be pressed at this time. There is one pushbutton and two lights next to F-11-A. Ensure both lights are out after resetting.					
<u>In the Fuel Handling Storage Room 405, East of the Equipment Hatch:</u>					
	F-11-B	BF-1188	SG 1-1 to AFPT 1-2 In Stm Vlv	MS-107A	CDF-11-B
<u>In the #1 Electrical Penetration Room:</u>					
	E-11-E	BE-1146	AFP 1-1 Disch to SG 1-2 Vlv	AF-3869	CDE-11-E
NOTE: Step 4.2.4.2 may be done at this time. The disconnect switch for AF 360 is on CDE-11-E and should be checked at this time.					
<u>Between the #3 and #4 Mechanical Penetration Rooms:</u>					
The Reset pushbutton for MS106 and MS106A low pressure trip should be pressed at this time. There is one pushbutton and two lights east of MCC E-11-C. Ensure both lights are out after resetting. The Disconnect switch for AF 608 (CDYE 2) and MS106 (CDE-11-C) should be checked at this time.					
<u>In the South End of the Corridor from the MU Pump Room by the Hatch:</u>					
Step 4.2.4.3 may be done at this time. The disconnect switch for AF 3870 should be checked at this time.					
<u>To the Right of the Door Inside the #2 Mechanical Penetration Room:</u>					
	F-11-C	BF-1177	SW 1383 to AFP 1-2	SW-1383	CDF-11-C
<u>In the low Voltage Switchgear Room #1:</u>					
	D1PA	D107	AFP 1-1 Disch to SG 1-1 Vlv	AF-3870	CDE-11-D
	D1NA	D135	AFP 1-1 Mn Stm Inlet Iso Vlv	MS-106	CDE-11-C
NOTE: Step 4.2.4.4 may be done at this time.					
	E-12-A	BE-1218	SW 1382 to AFP 1-1	SW-1382	CDE-12A-1
<u>In the low voltage Switchgear Room #2:</u>					
19	F-12-A	BF-1201	AFP 1-2 Disch to SG 1-1	AF-3871	CDF-12-A-2
NOTE: Step 4.2.4.5 and Step 4.2.4.6 may be done at this time.					

<u>INITIAL</u>	<u>MCC</u>	<u>BREAKER</u>	<u>NAME</u>	<u>VLV NO.</u>	<u>DISCONNECT SWITCH CAB.</u>
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In the Diesel Generator Room #1:

E-12-B	BE-1271	SG 1-2 to AFPT 1-1 in Stm Vlv	MS-106A	CDE-12-B
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In Diesel Generator Room #2:

F-12-B	BF-1262	AFP 1-2 Disch to SG 1-2	AF-3872	CDF-12-B
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4.2.4 Ensure the following breakers are closed and the associated disconnect switches are in the NORMAL position:

NOTE: AF 599 and AF 608 have two disconnect switches that must be in the NORMAL position.

1. F-11-A	BF-1118	AFP to SG 1-2 Motor Iso Vlv	AF-599	CDF-11-A-2 CDYF2
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2. E-11-E	BE-1160	AFP to SG 1-1 Motor Iso Vlv	AF-608	CDE-11-E CDYE2
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NOTE: Disconnect switch CDYE2 is in the corridor between the #3 and #4 Mechanical Penetration Rooms. It is noted in Step 4.2.3 when it may be checked.

3. E-11-D	BE-1194	AFP 1-1 Suct Valve	FW-786	CDE-11-D
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4. D1PA	D-108	AFP 1-1 Disch Iso Vlv	AF-360	CDE-11-E
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5. F-12-A	BF-1208	AFP 1-2 Suct Vlv	FW-790	CDF-12-A-2
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6. F-12-A	BF-1207	AFP 1-2 Disch Iso Vlv	AF-388	CDF-12-A-1
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4.2.5 The following Local-Remote select hand switches at the Shutdown Panel are in the "Remote" position.

1. AFPT 1-1 Governor Control Valve HS-ICS-38B.
2. Service Water Inlet Isolation Valve HIS-1382B.
3. AFPT 1-2 Governor Control Valve HS-ICS-38A.
4. Service Water Inlet Isolation Valve HIS-1383B.

4.2.6 Verify the proper oil levels.

NOTE: While the AFPT is idle, the oil level may be above the normal level. However, while the AFPT is running the oil level must be in the normal area.

- _____ 1. Governor oil level is above the level mark.
- _____ 2. Governor gear box oil level is in the bulls eye.
- _____ 3. The turbine end turbine bearing oil level is in or above the black area of the sight glass.
- _____ 4. The pump end turbine bearing oil level is in or above the black area of the sight glass.
- _____ 5. The turbine end pump bearing oil level is in or above the black area of the sight glass.
- _____ 6. The pump end pump bearing oil level is in or above the black area of the sight glass.

4.2.7 Perform the following to drain the AFPT.

- 1. Check open the following AFPT casing drains
 - _____ MS 745 (MS 744)
 - _____ MS 746 (MS 747)
- 2. Open the following AFPT drain valves.
 - _____ MS 745A (MS 744A)
 - _____ MS 746A (MS 747A)
 - _____ MS 748 (MS 749)
 - _____ MS 750 (MS 751)
- 3. After the valves stop draining liquid, close the following valves:
 - _____ MS 745A (MS 744A)
 - _____ MS 746A (MS 747A)
 - _____ MS 748 (MS 749)
 - _____ MS 750 (MS 751)

4.2.8 Perform the following to reset and exercise the overspeed trip mechanism:

- _____ 1. Using the manual trip lever, manually trip the trip throttle valve.

- 22 | _____ 2. Turn the trip throttle valve handwheel clockwise until the sliding nut rises and engages the latch up lever to the trip hook.
- NOTE: It may be necessary to pull on the trip throttle valve linkage to fully engage the latch up lever to the trip hook.
- _____ 3. Verify the latch up lever and the trip hook are fully engaged.
- _____ 4. Turn the trip throttle valve handwheel counterclockwise until the trip throttle valve is fully open.
- _____ 5. Turn the trip throttle valve handwheel 1/4 turn clockwise.
- _____ 6. Seal the trip throttle valve handwheel.

Independently Verified _____

- _____ 7. Verify computer point Z001 (Z002) AFPT 1 (2) Stop Valve reads "OPEN".
- _____ 8. Verify the red IL ICS 38E (38J) AFPT 1 (2) Governor Valve fully open light is on.

4.2.9 For AFPT 1-2 only, perform the following:

- _____ 1. Verify the speed droop control knob is set at later.
- _____ 2. Verify the load limit control knob is set at 10.

_____ 4.2.10 Place the AFPT speed changers HIS 520A and HIS 521A in the raise position. Hold in this position for 25 seconds.

_____ 4.2.11 Place the AFP mode selector switches HIS-520B and HIS-521B in the "Auto-Essen" mode.

4.2.12 In the Control Room, ensure that the following valves have a closed indication.

NOTE: If the closed light is not present, verify by other means power to the valve and closed valve position.

_____ AF 3869	_____ MS 106
_____ AF 3870	_____ MS 106A
_____ AF 3871	_____ MS 107
_____ SW 1382	_____ MS 107A
_____ SW 1383	

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____ 4.2.13 Open AF 3872.

Section 4.2 completed by _____ Date _____

5. REMOVING THE AFWS FROM SERVICE FOR PLANT SHUTDOWN

5.1 Prerequisites

____ 5.1.1 Plant is in Operational Modes 4, 5, or 6.

5.2 Procedure

____ 5.2.1 Place both AFWS mode selector switches HIS-520B and HIS-521B in the "MANUAL" mode.

____ 5.2.2 Close both AFPT trip throttle valves.

____ 5.2.3 Ensure AFPT turbine drains are cracked open.

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____ 5.2.4 Close AF 3872.

____ 5.2.5 At the following MCC's, open the below listed breakers:

INITIAL	MCC	BREAKER NO.	NAME	VLV NO.
<u>In Diesel Generator Room #1:</u>				
_____	E-12-B	BE-1271	SG 1-2 to AFPT 1-1 In Stm Vlv	MS-106A
<u>In Diesel Generator Room #2:</u>				
_____	F-12-B	BF-1262	AFP 1-2 Disch to SG 1-2	AF-3872
<u>In the Low Voltage Switchgear Room #1:</u>				
_____	D1PA	D-107	AFP 1-1 Disch to SG 1-1	AF-3870
_____	D1NA	D-135	AFPT 1-1 Mn Stm In Iso Vlv	MS-106
_____	E-12-A	BE-1218	SW 1382 SW to AFP 1-1	SW-1382
<u>In the Low Voltage Switchgear Room #2:</u>				
_____	F-12-A	BF-1201	AFP 1-2 Disch to SG 1-1	AF-3871
<u>In the #2 Electrical Penetration Room:</u>				
_____	F-11-A	BF-1124	AFP 1-2 Mn Stm In Iso Vlv	MS-107
<u>In the Fuel Handling Storage Room 405, East of the Equipment Hatch:</u>				
_____	F-11-E	BF-1188	SG 1-1 to AFPT 1-2 In Stm Vlv	MS-107A
<u>In the #1 Electrical Penetration Room:</u>				
_____	E-11-E	BE-1146	AFP 1-1 Disch to SG 1-2 Vlv	AF-3869
<u>To the Right of the Door Inside the #2 Mechanical Penetration Room:</u>				
_____	F-11-C	BF-1177	SW 1383 SW to AFP 1-2	SW-1383

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Section 5 completed by _____ Date _____

6. MANUAL AND ABNORMAL OPERATIONS OF THE AFWS

6.1 Prerequisites

- ____ 6.1.1 The AFWS is in service as per Section 4.0 of this procedure.
- ____ 6.1.2 Energize and record AFPT and AFP data on speed and vibration monitors during startup.

6.2 Procedure

- ____ 6.2.1 Determine the AFP(s) that will be used and from which source it will take a suction. Normal AFP suction is from the Condensate Storage Tanks (CST). If suction is desired from one of the other water systems, the valve for the desired source must be opened: for Service Water, SW-1382 and/or SW-1383; for Fire Protection Water FP-28 (these sources of water are not preferred due to water chemistry problems).

NOTE: On low AFP suction from CST (2 psig pressure, 3 feet of water in CST's), suction will automatically shift to Service Water. If AFP suction pressure remains low the AFPT steam valves are blocked from opening.

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- 6.2.2 Perform the following to drain the AFPT.

1. Check open the following casing drains.

____ MS 745 (MS 744)

____ MS 746 (MS 747)

2. Open the following AFPT drain valves.

____ MS 745A (MS 744A)

____ MS 746A (MS 747A)

____ MS 748 (MS 749)

____ MS 750 (MS 751)

3. After the valves stop draining liquid, close the following valves:

____ MS 745A (MS 744A)

____ MS 746A (MS 747A)

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____ MS 748 (MS 749)

____ MS 750 (MS 751)

____ 6.2.3 Place the AFWS mode selector HIS-520B (HIS-521R) in the "Manual" position.

____ 6.2.4 Using the AFPT speed changer switch HIS-520A (HIS-521A) position the governor to the low speed limit by holding the switch in the lower position for a minimum of 60 seconds.

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NOTE: The governor valve for the AFPT is operated hydraulically by an oil pump attached to the governor. Oil pressure is not developed until the AFPT begins turning. Therefore, until oil pressure is developed or upon a loss of governor oil pressure the governor valve fails as is.

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____ 6.2.5 Determine which AFP is to be used and what SG is to be fed, then open/verify the desired AFP to SG stop valve as listed below.

AFP 1-1 to SG 1-1 Stop Valve AF-3870 using HIS-3870
AFP 1-1 to SG 1-2 Stop Valve AF-3869 using HIS-3869
AFP 1-2 to SG 1-2 Stop Valve AF-3872 using HIS-3872
AFP 1-2 to SG 1-1 Stop Valve AF-3871 using HIS-3871

NOTE: It is not possible to crossconnect an AFP to a Steam Generator when SFRCS is tripped.

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____ 6.2.6 If not feeding OTSG 1-2 with AFP 1-2, close AF 3872.

____ 6.2.7 Ensure the desired SG AFW line stop valve is open as listed below:

For SG 1-1 AF-608
For SG 1-2 AF-599

____ 6.2.8 Determine which steam source is to be used for the AFPT(s) and open the appropriate valve(s).

1. For AFPT 1-1 to receive steam from:

- (1) SG 1-1 Open - "Mn Stm Line 1-1 to AFPT 1-1 Inlet Iso Vlv" MS106 using HIS 106-A.
- (2) SG 1-2 Open - "Mn Stm Line 1-2 to AFPT 1-1 Inlet Iso Vlv MS-106A using HIS-106E.

- (3) Auxiliary Steam System: (Manually operated valves) Open AS-273 "Secondary Isolation Valve from 235# Auxiliary Steam Header to AFPT's".

2. For AFPT 1-2 to receive steam from:

- (1) SG 1-2 Open "Mn Stm Line 1-2 to AFPT 1-2 Inlet Iso Vlv" MS-107 using HIS-107A.
- (2) SG 1-1 Open "Mn Stm Line 1-1 to AFPT 1-2 Inlet Iso Vlv" MS-107A using HIS-107E.
- (3) Auxiliary Steam System: (Manually operated valves).

NOTE: To cut in auxiliary steam to AFP 1-2 without also starting AFP 1-1, close MS730 prior to opening AS273.

Open AS-273 "Secondary Isolation Valve from 235# Auxiliary Steam Header to AFPT's and MS733 and open MS-728 "AFPT 1-2 Stm Inlet Hdr "X" - Connect Iso Vlv".

NOTE: As AFPT speed increases hydraulic oil pressure is developed causing the governor valve to close to the low speed limit. The green light above the appropriate speed charger switch will be lit (Panel C-5709).

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6.2.9

The amount of feedwater entering the SG is controlled by varying the AFPT speed using the AFPT speed changer (HIS-520A and/or HIS-521A) comparing AFP discharge pressure to SG pressure, checking the SG level, and by FI 4521, 4522, 4630 or 4631.

6.2.10

If the auxiliary feedwater system was automatically initiated by SFRCS, the Auto Essential mode will automatically control steam generator level at 46 inches on the startup range or at 124 inches if an SFAS level 2 condition is present.

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Section 6 completed by _____ Date _____

7. AFWS SHUTDOWN FROM MANUAL OR ABNORMAL OPERATION OR FROM SFRCS INITIATION

7.1 Prerequisites

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- ____ 7.1.1 The AFWS has been placed in operation as per Section 6, Manual Mode of Operation, or the Steam and Feedwater Rupture Control System (SFRCS) has automatically initiated Auxiliary Feedwater operation.
- ____ 7.1.2 The AFWS is in either the "Manual" or "Auto Essen" mode of operation.
- ____ 7.1.3 The immediate and supplementary actions of the applicable Emergency Procedure have been followed.

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Section 7.1 completed by _____ Date _____

7.2 Procedure

NOTE: A normal shutdown of the AFWS after a SFRCS automatic initiation would require the parameter which caused the trip as well as any subsequent trips to be cleared before a normal AFWS shutdown can begin. Determination that all SFRCS trips have cleared can be done at the SFRCS cabinets by observing that red test lights L1-L12 and L14 are lit. Should an abnormal situation exist where the SFRCS cannot be cleared and it is desired to shutdown the AFWS first follow the appropriate Emergency Procedure for the incident and (in most cases) cooldown until the AFWS is no longer required and decay heat is being removed by the Decay Heat System; then perform AFWS shutdown per this section.

- ____ 7.2.1 Place the AFWS mode selector switch(s) (HIS-520B and/or HIS-521B) in the "Manual" position.
- ____ 7.2.2 Decrease AFPT (1-1 and/or 1-2) speed to approximately 1500 RPM using the appropriate AFPT Speed Changer (HIS-520A and/or HIS-521A).
- 7.2.3 Determine which steam source is being used for the AFPT's and close the appropriate valve(s).

For AFPT 1-1 receiving steam from:

- ____ SG 1-1 - Close "Mn Stm Line 1-1 to AFPT 1-1 Inlet Isolation Valve" MS-106 using HIS-106A.
- ____ SG 1-2 - Close "Mn Stm Line 1-2 to AFPT 1-1 Inlet Isolation Valve" MS-106A using HIS-106E
- ____ Aux Steam System - Close "AFPT 1-1 Stm Inlet Isolation Valve" MS-730 (manually operated valve).

For AFPT 1-2 receiving steam from:

- _____ SG 1-2 - Close "Mn Stm Line 1-2 to AFPT 1-2 Inlet Isolation Valve" MS-107 using HIS-107A.
- _____ SG 1-1 - Close "Mn Stm Line 1-1 to AFPT 1-2 Inlet Isolation Valve" MS-107A using HIS-107E
- _____ Aux Steam System - Close "AFPT 1-1 Stm Inlet Hdr "X" Connect Isolation Valve" MS-728 (manually operated valve).

NOTE: If the auxiliary steam system is no longer needed for steam to either AFPT(s), close AS-273, "Secondary Isolation Valve from 235# Aux Steam Header to AFPT's and MS 733 Xconnect isolation.

As steam pressure decreases, the governor control valve opens to maintain AFPT speed. When the control valve is fully open, the red governor control valve fully open light above the speed changer switch(s) (HIS-520A and/or HIS-521A) will light. AFPT speed will then decrease. Due to the loss of hydraulic control oil pressure to the governor control valve as the AFPT speed decreases, the governor control valve will remain open.

- _____ 7.2.4 Determine which AFP was supplying feedwater and to which SG; then close the desired AFP to SG stop valve as listed below:

AFP 1-1 to SG 1-1 Stop Valve AF-3870 using HIS-3870
 AFP 1-1 to SG 1-2 Stop Valve AF-3869 using HIS-3869
 AFP 1-2 to SG 1-1 Stop Valve AF-3871 using HIS-3871

- _____ 7.2.5 Using the AFPT speed changer (HIS-520A and/or HIS-521A), exercise speed changer to the low speed stop using the "lower" position, then position the AFPT governor to the high speed limit by holding in the "Raise" position for 25 seconds.

- _____ 7.2.6 Crack open MS 748 (MS 749) and MS 750 (MS 751), MS 745A (MS 744A) and MS 746A (MS 747A). Allow condensate to drain off, then close each valve.

7.2.7 Drain AFPT 1-1 (1-2) Exhaust Lines and the Missile Shield by performing the following.

- ____ 1. In CWRT 1-2 Room (Rm 123), open MS54 and MS52 (AFPT 1-1 & 1-2 Exhaust Line Drain Valves). After condensate has drained, close MS54 and MS52.
- ____ 2. In the BAAT Rm open MS53 & MS51 (AFPT 1-1 & 1-2 Exhaust Line Drain Valves). After the condensate has drained, close MS53 & MS51.
- ____ 3. In Waste Gas Compressor Rm 1-1 open MS108 (Missile Shield Drain Line Iso Valve) and drain the missile shield through a temporary hose to a floor drain, then close MS108.

____ 7.2.8 If the RCS is in Modes 4, 5, or 6, and the AFWS is to be removed from service, close the AFPT Trip Throttle Valves and perform Step 5.2.4 of Section 5 of this procedure.

____ 7.2.9 If the AFWS is to be Placed in the SFRCS automatic actuation Mode, perform Section 4 of this procedure.

Section 7.2 completed by _____ Date _____

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8. AFPT 1-2 MANUAL SPEED CONTROL AT THE AFPT 1-2 GOVERNOR

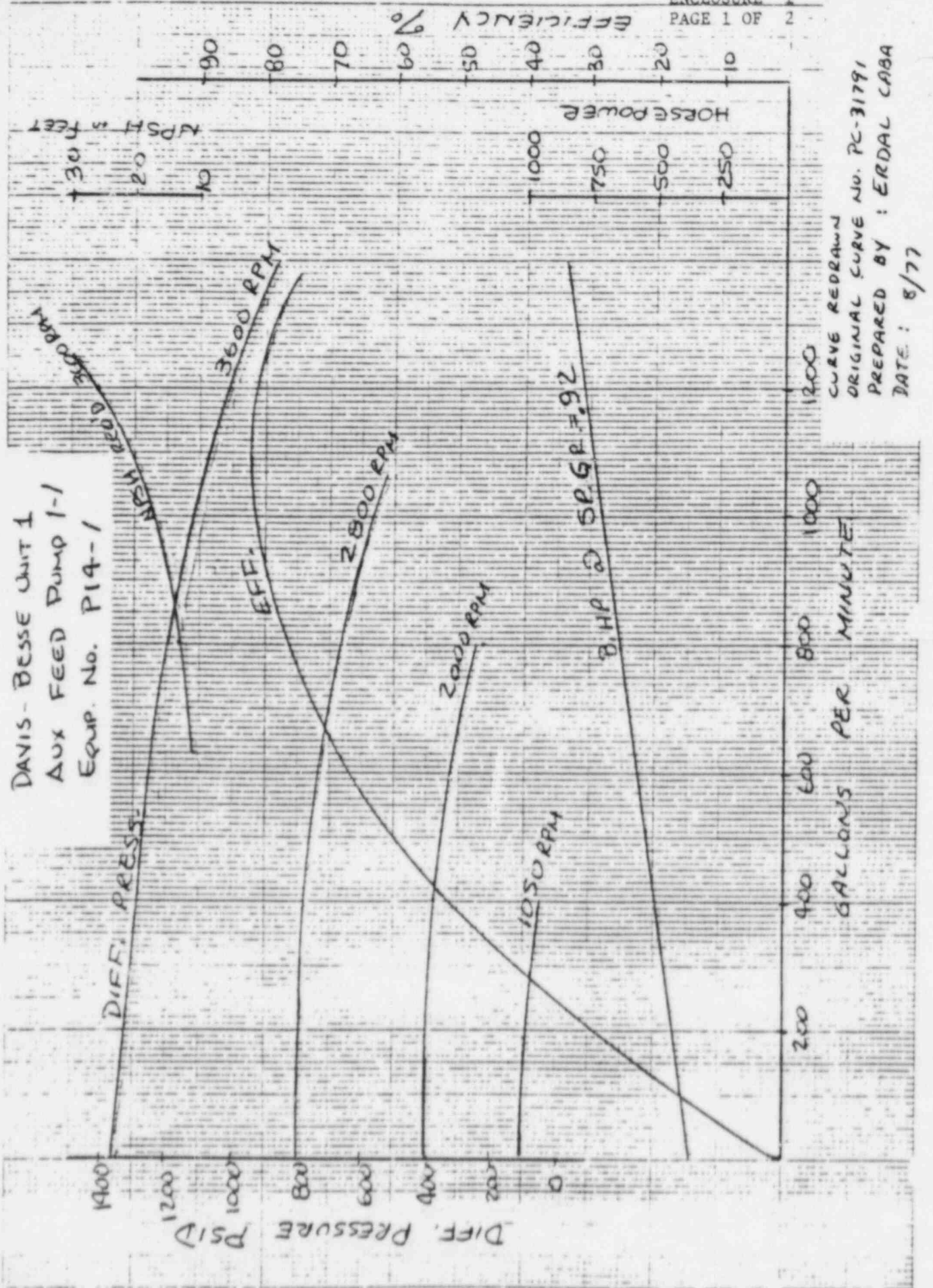
8.1 Prerequisites

- ____ 8.1.1 AFPT 1-2 speed can NOT be properly controlled automatically or in manual from the control room OR auxiliary shutdown panel AND it is desired to manually control AFPT 1-2 speed at the governor.

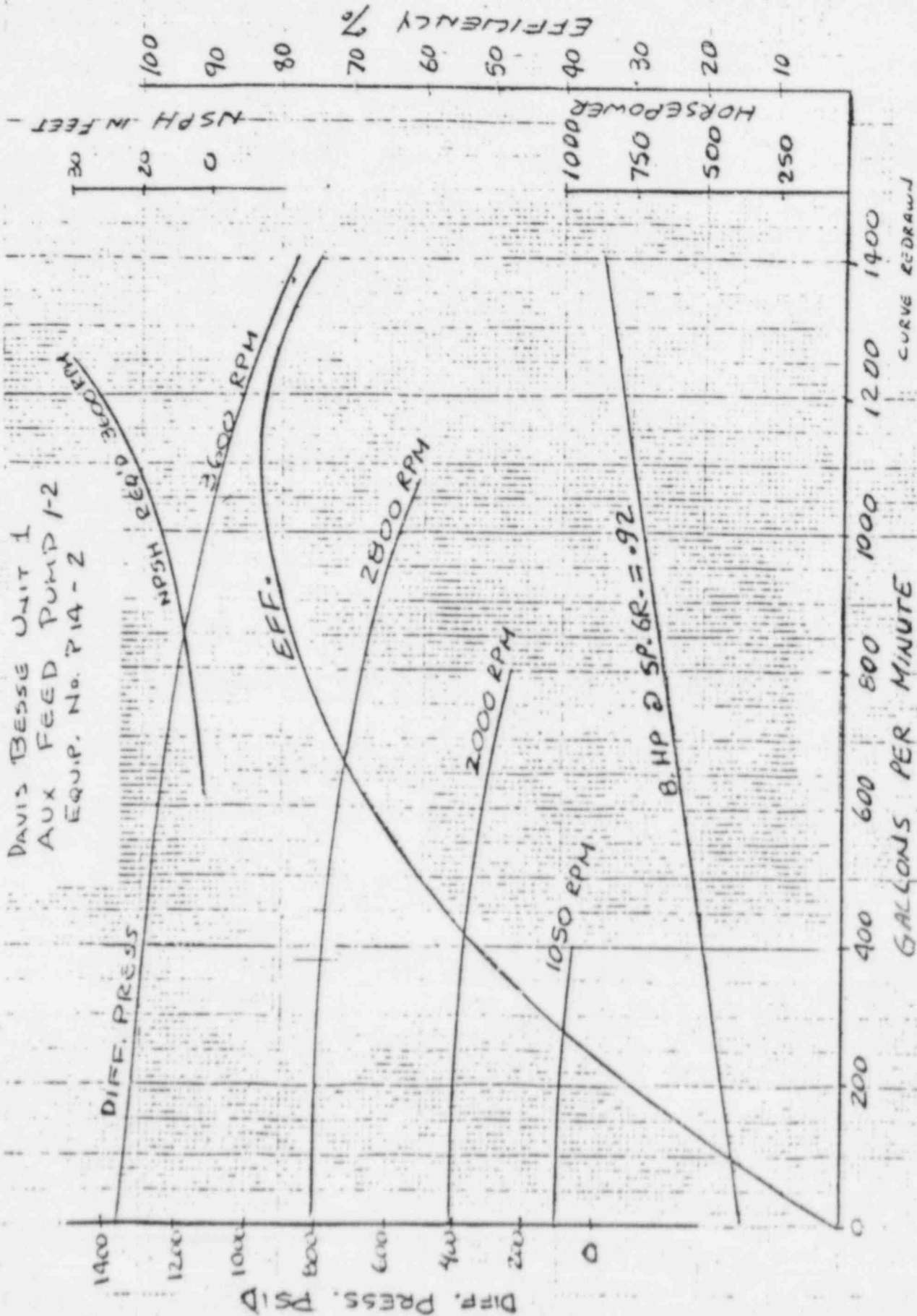
8.2 Procedure

- ____ 8.2.1 Unscrew and remove the electrical connector from the governor.
- ____ 8.2.2 Turn the manual speed setting control knob as appropriate to control turbine speed.

Section 8 completed by _____ Date _____



CURVE REDRAWN
ORIGINAL CURVE NO. PC-31791
PREPARED BY: ERDAL CABA
DATE: 8/77



CURVE REDRAWN
ORIGINAL CURVE NO. PC-31791
PREPARED BY: EEDAL:ASG
DATE: 8/77

STEAM TRAP OPERATION

NOTE: This is a generic steam trap procedure to be attached to all procedures involving steam trap operation.

1. Place steam trap in startup mode.
 - 1.1 Open steam trap bypass, inlet, and outlet valves, close the strainer blow down valve.
2. Place steam traps "In Service".
 - 2.1 Shut the steam trap bypass valve.
3. Place steam trap in "Shutdown" mode.
 - 3.1 Open the steam trap bypass valve.
4. Take steam trap "Out of Service".
 - 4.1 Crack open steam trap bypass valve.
 - 4.2 Close steam trap inlet and outlet valves.
 - 4.3 The steam trap can be repaired or replaced in this mode.

NOTE: Do not close the bypass on any trap in pressure-vacuum service until the trap has several pounds pressure on inlet.

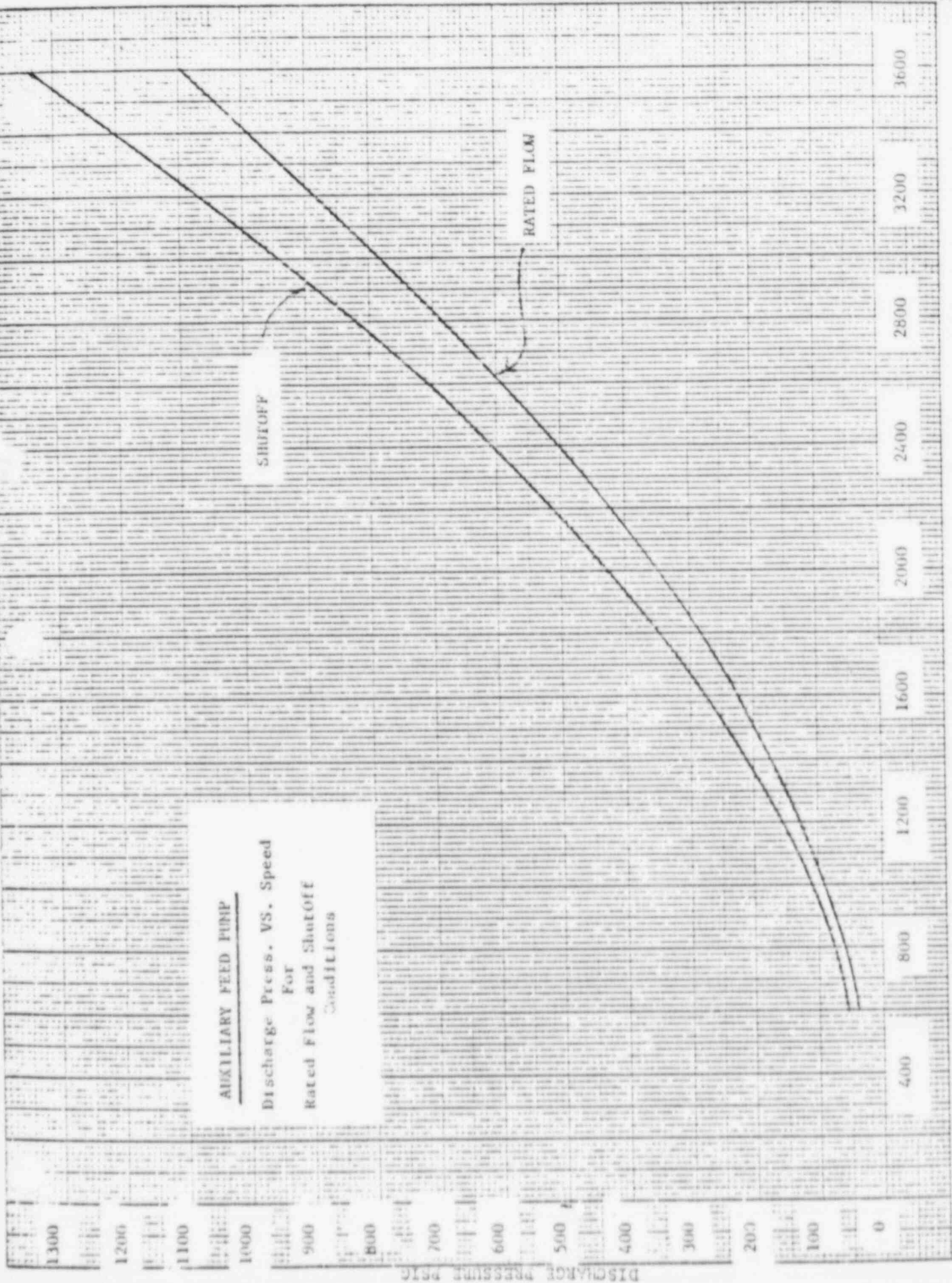
AUXILIARY FEED PUMP

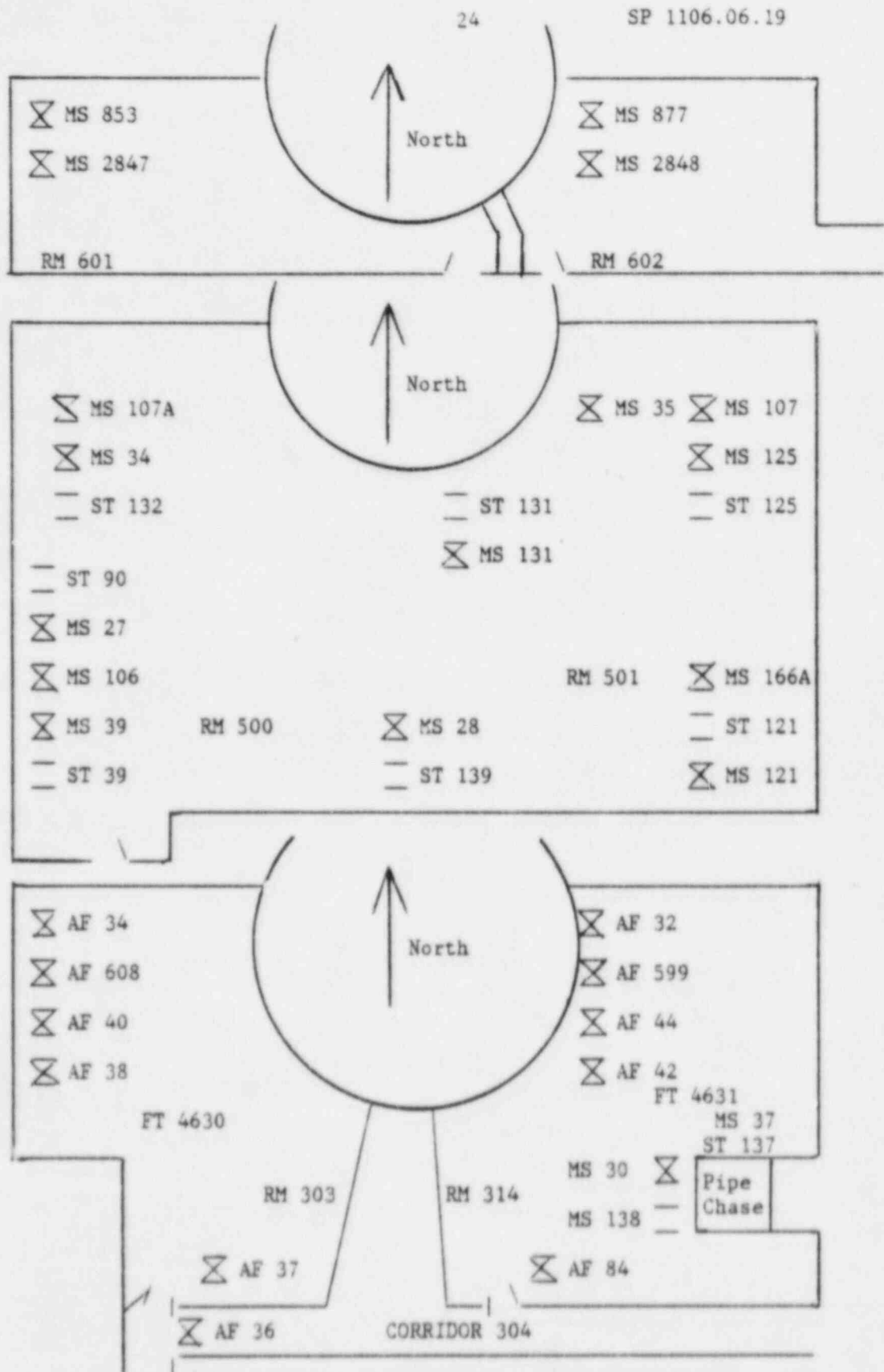
Discharge Press. VS. Speed
For
Rated Flow and ShutOff
Conditions

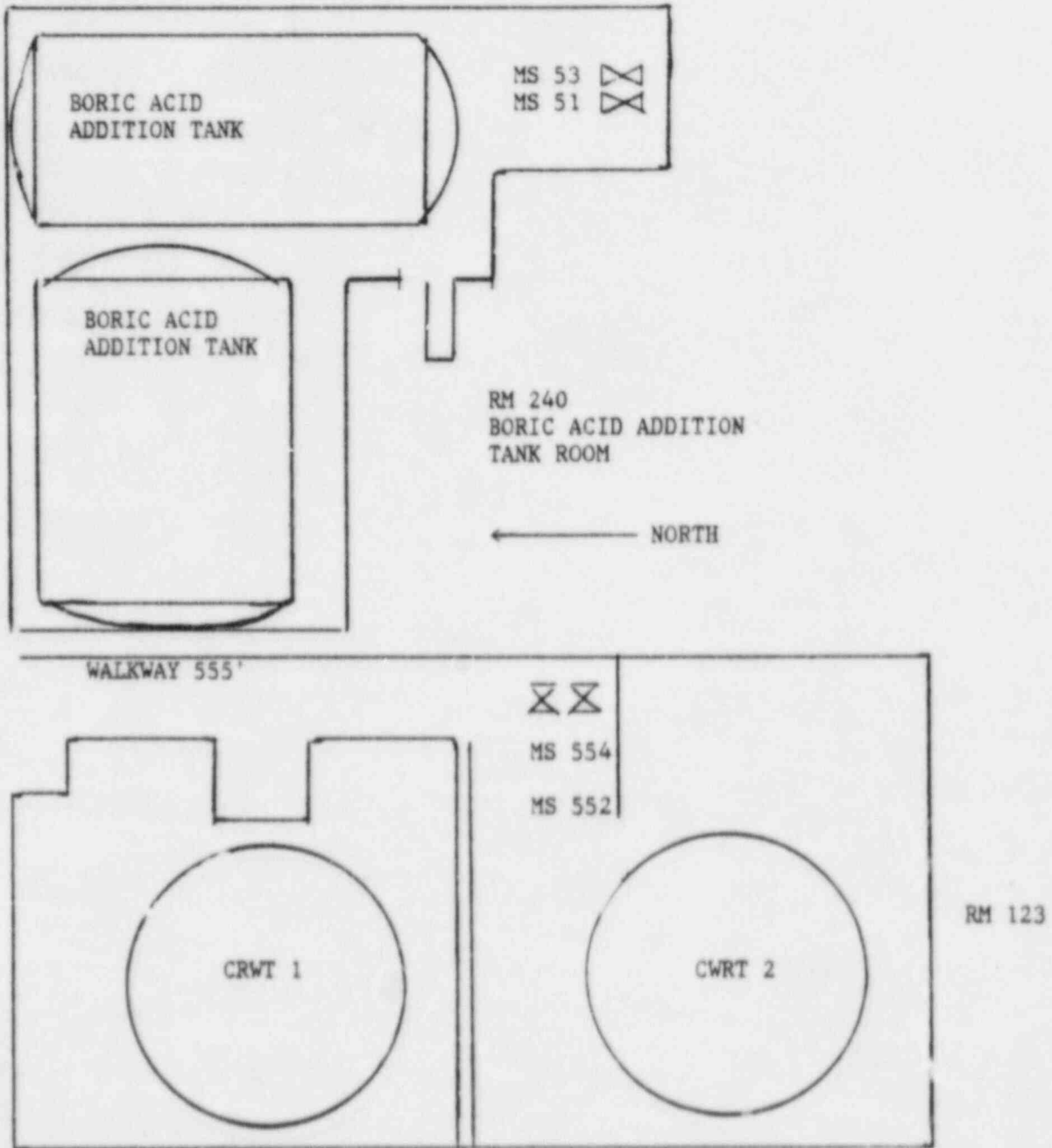
SHUTOFF

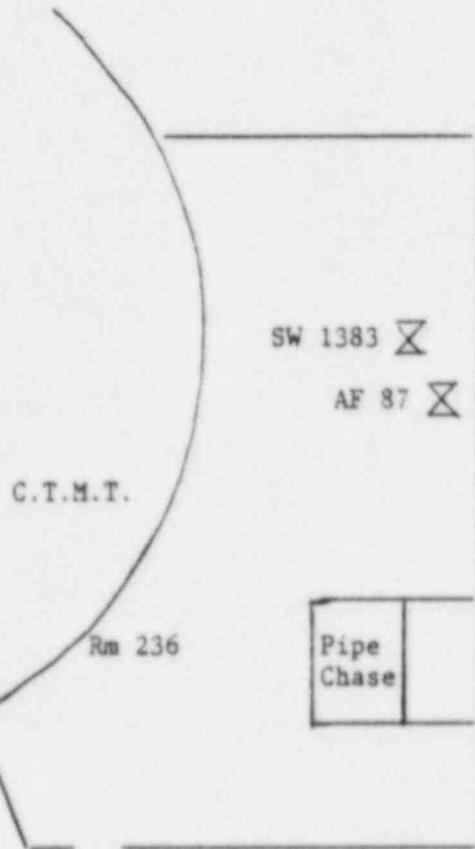
RATED FLOW

PUMP SPEED RPM









RACA

AFP PIT

FW HEATER 1-1-5

FW HEATER 1-1-6

FW 105

FP 28

FP 169

FW 85

HEATER BAY AREA
585'AF 69
AF 59

CD 163

CD 167

AF 50

AF 51

CD 168

CD 164

CST Room 585'

AFPT Rooms
Turbine Room

AF 35

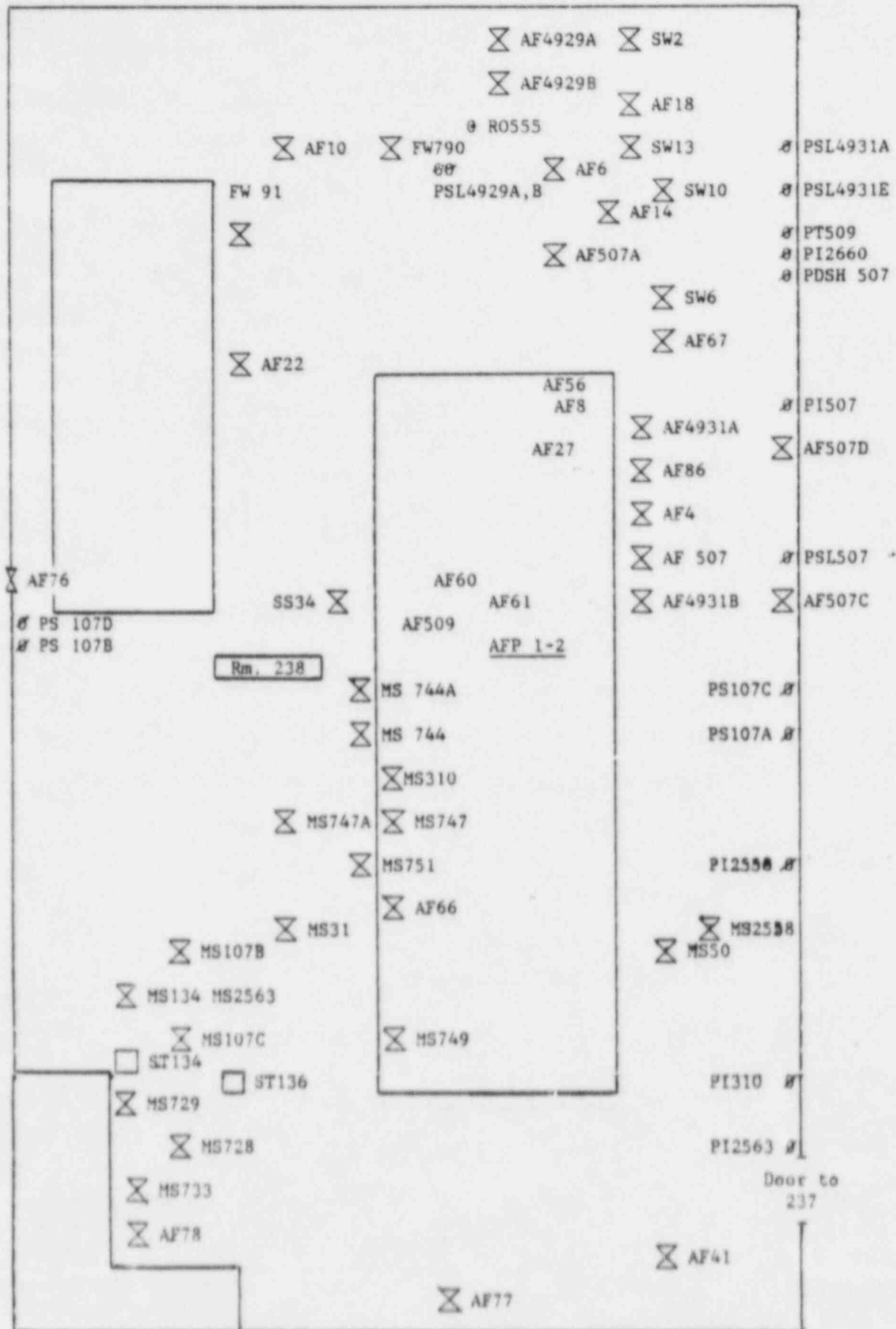
CD 170

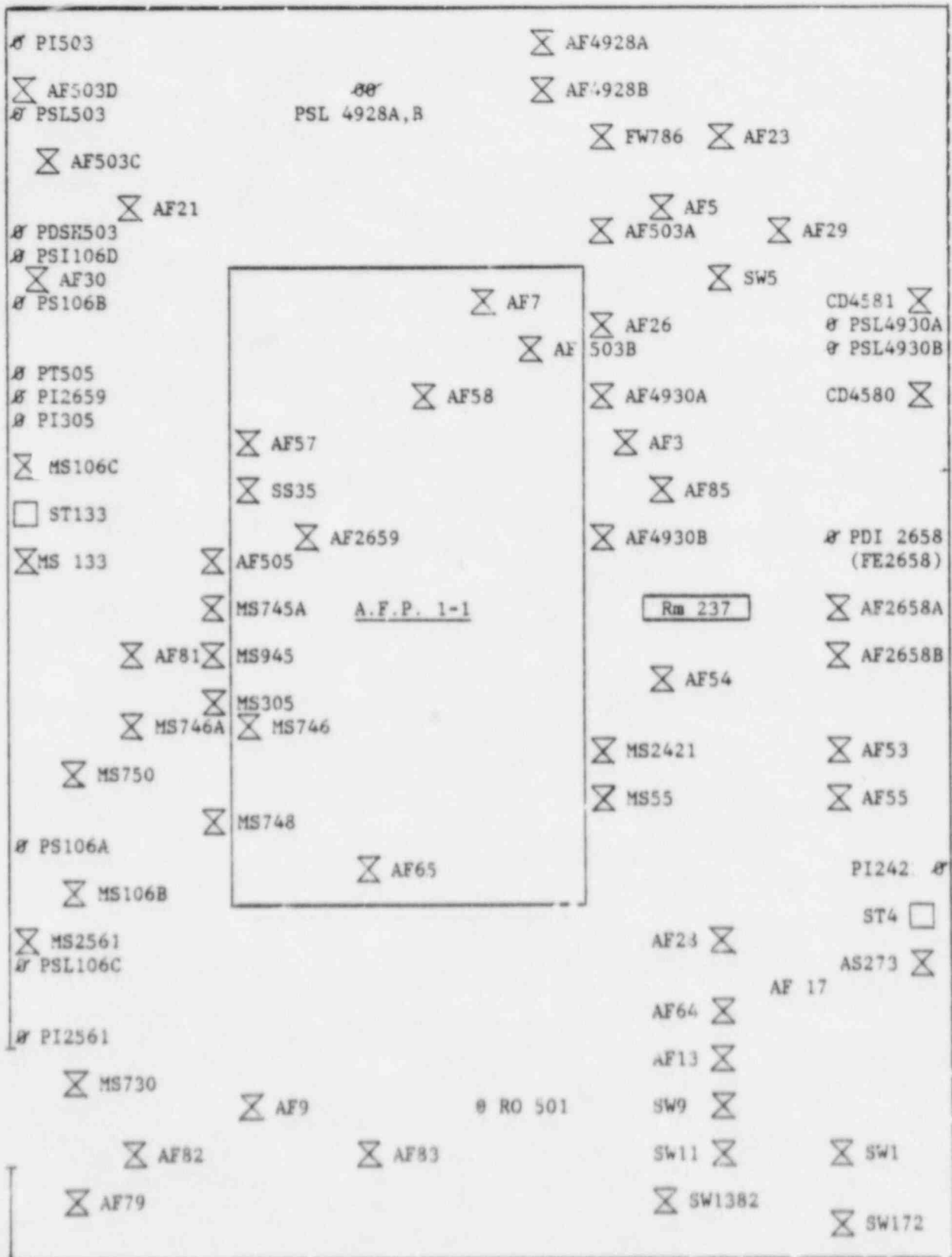
CD 197

Level 565'

MFP 1-1

Enclosure 4
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VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
<u>CONTROL ROOM</u>				
Steam Generator 1-1 Aux Feedwater Flow Ind		FI 4521	In Service	
AFP 1-1 Disch Press	M-006B J-8	PI 505	In Service	
AFP 1-1 Disch Iso Valve	M-006B J-11	AF 360	**Locked Open	
Steam Generator 1-2 Aux Feedwater Flow Ind		FI 4522	In Service	
AFP 1-2 Disch Press	M-006B J-10	PI 509	In Service	
AFP 1-2 Disch Iso Valve	M-006B K-11	AF 388	**Locked Open	
<u>ROOM 602</u>				
Main Steam Line 2 Press Point	M-007 B-3	MS 2848	* Closed	
Main Steam Line 2 Vent Valve	M-007 B-4	MS 877	* Closed	
<u>ROOM 601</u>				
Main Steam Line 1 Vent Valve	M-007 B-10	MS 853	* Closed	
Main Steam Line 1 Press Point	M-007 B-10	MS 2847	* Closed	
<u>ROOM 500 AND ROOM 501</u>				
Mn Stm Line to Aux Fd Pmp Turb 1-1 Stm Trap	M-003C E-5	ST 39	In Service	
Steam Trap 39 Stub Header Drain Valve	M-003C E-5	MS 39	Closed	
Steam Trap 90 Stub Header Drain Valve	M-003C F-5	MS 27	Closed	
Steam Line 2 to AFPT 1-1 Steam Trap	M-003C F-5	ST 90	In Service	
Steam Trap 139 Stub Header Drain Valve	M-003C F-5	MS 28	Closed	
Main Steam Line 2 to AFPT 1-1 Steam Trap	M-003C F-6	ST 139	In Service	

*Valves need not be verified in Modes 1 & 2.

**Locked open, controlled per AD 1839.02.

Sheet No. 2
of 12

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SP 1106.06.19

VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
Main Steam Line 2 to AFPT 1-1 Steam Trap	M-003C F-6	ST 121	In Service	
Steam Trap 121 Stub Header Drain Valve	M-003C F-6	MS 121	Closed	
Mn Stm Line to Aux Feed Pmp Turb 1-2 Stm Trap	M-003C E-9	ST 125	In Service	
MS Line 2 to AFPT 1-2 Inlet Hdr Drain Valve	M-003C E-8	MS 125	Closed	
Steam Trap 131 Stub Header Drain Valve	M-003C F-8	MS 35	Closed	
Steam Trap 131 Stub Header Drain Valve	M-003C F-8	MS 131	Closed	
Main Steam Line 1 to AFPT 1-2 Steam Trap	M-003C F-8	ST 131	In Service	
Steam Trap 132 Stub Header Drain Valve	M-003C F-7	MS 34	Closed	
Main Steam Line 1 to AFPT 1-2 Iso Valve	M-003C F-7	ST 132	In Service	
<u>ROOM 303 MECHANICAL PENETRATION #3</u>				
S/G 1-1 Aux F.W. Line Vent Valve #2	M-007 F-10	AF 37	Closed & Capped	
AFW 1 Flow Transmitter	M-007 F-10	FT 4630	In Service	
S/G 1-1 Aux F.W. Line Vent Valve #1	M-007 F-10	AF 38	Closed & Capped	
S/G 1-1 Aux F.W. Line Drain Valve #1	M-007 F-11	AF 40	Closed	
S/G 1-1 Aux Feedwater Line Stop Valve	M-007 F-11	AF 608	Locked Open*	
S/G 1-1 Wet Layup Recirc Line Iso Valve	M-007 F-11	AF 34	Closed	
<u>CORRIDOR 304 (BETWEEN 314 AND 303)</u>				
S/G 1-1 Aux F.W. Line Drain #2	M-007 F-10	AF 36	Closed & Capped	
<u>ROOM 314 MECHANICAL PENETRATION #4</u>				
SG 1-1 Aux F.W. Line Vent Valve	M-007 F-10	AF 84	Closed & Capped	

*Controlled as per AD 1839.02.

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VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

	VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
	Mn Stm Inlet Hdr to AFPT 1-1 Stm Trap	M-003C F-4	ST 138	In Service	
	Steam Trap 138 Stub Header Drain Valve	M-003C F-4	MS 30	Closed	
19	Main Steam Inlet Hdr to AFPT 1-2 Steam Trap	M-003C F-9	ST 137	In Service	
	Steam Trap 137 Stub Header Drain Valve	M-003C F-9	MS 37	Closed	
	AFW 2 Flow Transmitter	M-007 F-3	FT 4631	In Service	
	S/G 1-2 Aux F.W. Line Vent Valve #1	M-007 F-3	AF 42	Closed & Capped	
	Aux F.W. Line to S/G 1-2 Drain Valve	M-007 F-3	AF 44	Closed	
	S/G 1-2 Aux Feedwater Line Stop Valve	M-007 F-2	AF 599	Locked Open*	
	S/G 1-2 Wet Layup Recirc Line Iso Valve ROOM 240 BAAT ROOM	M-007 F-3	AF 32	Closed	
19	AFPT 1-1 Exhaust Drain Valve	M-003C K-5	MS 53	Closed	
	AFPT 1-2 Exhaust Drain Valve ROOM 236 MECHANICAL PENETRATION #2	M-003C K-9	MS 51	Closed	
	S.W. System to Aux Feed Pump 1-2 Iso Valve	M-041 F-3	SW 1383	Locked Closed*	
	AFP 1-2 Discharge Line Drain ROOM 123 WALKWAY 555'	M-007 F-4	AF 87	Closed & Capped	
19	AFPT 1-1 Exhaust Drain Valve	M-003C K-5	MS 54	Closed	
	AFPT 1-2 Exhaust Drain Valve CST ROOM 585'	M-003C K-9	MS 52	Closed	
	Outlet from CST 1-2	M-006A E-12	CD 164	Locked Open* ¹	

*Controlled as per AD 1839.02.

¹Only one of these valves is required to be locked open at any one time.

VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
Cond Strg Tk #2 to Aux Feed Pump Iso Valve	M-006A E-14	CD 168	Locked Open* ²	
AFP Recirc to Condensate Storage Tank 1-2	M-006A E-13	AF 51	Closed	
AFP Recirc to Condensate Storage Tank 1-1	M-006A E-12	AF 50	Closed	
Cond Strg Tk #1 to Aux Feed Pump Iso Valve	M-006A E-11	CD 167	Locked Open* ²	
Outlet from CST 1-1	M-006A E-12	CD 163	Locked Open* ¹	
AFP Recirc to the Cond Strg Tk Over Flow	M-006A E-12	AF 59	Locked Open*	
AFP Recirc Drain	M-006A E-12	AF 69	Closed	
<u>ROOM 252 MFPT 1-1 AREA</u>				
Aux Feed Pump Recirc Line Flush Connection	M-006B H-11	AF 35	Closed	
Cnds Stg Tks to FW Iso Valve	M-006B H-7	CD 170	Locked Open*	
Cnds Stg Tks to FW Hdr Flushing Valve	M-006B H-6	CD 197	Closed	
<u>ROOM 326 HEATER BAY AREA</u>				
SUFP 1-1 to Condensate Storage Tank	M-006B F-8	FW 105	Closed	
Fire Protection Sys to Aux Feed Pmp Iso Vlv	M-006B J-6	FP 28	Closed	
Fire Protection System Flush Conn	M-006B J-6	FP 169	Closed	
Deaer Strg Tks to Aux & SU Feed Pump Suction	M-006B H-7	FW 85	Locked Closed	
<u>ROOM 238 AFPT 1-2</u>				
AFPT 1-1 Stm Inlet Hdr Cross Connect Iso Vlv	M-003C G-5	MS 733	Locked Closed*	
Aux Feed Pump 1-2 Disch Header Vent Valve	M-007 E-4	AF 78	Closed	

*Controlled as per AD 1839.02.

¹Only one of these valves is required to be locked open at any one time.

²Only one of these valves is required to be locked open at any one time.

VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

	VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
19	AFPT 1-2 Stm Inlet Press Switch B	M-003 E-13	PSL 107B	In Service	
	AFPT 1-2 Stm Inlet Press Switch D	M-003 E-13	PSL 107D	In Service	
19	Aux Feed Pump 1-2 Disch Header Vent Valve	M-007 F-4	AF 76	Closed & Capped	
	Aux Feed Pump 1-2 Recirc Stop Valve	M-006B J-11	AF 22	Locked Closed*	
	SU Feed Pump 1-1 Suction Valve	M-006B J-5	FW 91	Closed	
	Aux Feed Pump 1-2 Min Flow RO Inlet Iso	M-006B J-11	AF 10	Locked Open*	
	Aux FW Pump 1-2 Suction Valve	M-006B K-7	FW 790	Locked Open*	
	Aux Feed Pump 1-2 SW Line Vent	M-006B K-6	SW 2	Closed	
	Aux Feed Pump 1-2 Suction Line Flush Conn.	M-006B K-6	AF 6	Closed	
	AFP 1-2 Suction from CST PSL	M-006B K-5	PSL 4929A	In Service	
	AFP 1-2 Suction from CST PSL	M-006B K-5	PSL 4929B	In Service	
	AFP 1-2 Suction from CST PSL Source Valve	M-006B K-5	AF4929A	Open	
	AFP 1-2 Suction from CST PSL Source Valve	M-006B K-6	AF4929B	Open	
	Aux Feed Pump 1-2 Min Flow RO Outlet Iso	M-006B J-11	AF 18	Locked Open*	
19	AFP 1-2 Suction PSL	M-006B F-11	PSL 4931A	In Service	
	AFP 1-2 Suction PSL	M-006B F-11	PSL 4931B	In Service	
	AFP 1-2 Disch Press Transmitter	M-006B J-10	PT 509	In Service	
	AFP 1-2 Disch Press Indicator	M-006B J-10	PT 2660	In Service	
19	Aux Feed Pump 1-2 SW Supply Line Strnr Drn	M-006B K-7	SW 13	Closed	
	Aux Feed Pump 1-2 SW Brg CW Iso	M-006B K-11	SW 10	Closed	

*Controlled as per AD 1839.02.

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VALVE VERIFICATION LIST A

Auxiliary Feedwater Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
Aux Feed Pump 1-2 Norm Brg CW Iso	M-006B K-11	AF 14	Locked Open*	
Aux Feed Pump 1-2 Suction Line PDSH	M-006B J-9	PDSH507	In Service	
AFP 1-2 Clngr Water Supply Valve	M-006B K-10	AF 67	Locked Open*	
Aux Feed Pump 1-2 SW Supply Line Iso	M-006B K-7	SW 6	Locked Open*	
Aux Feed Pump 1-2 Suction Line PI	M-006B J-9	PI 507	In Service	
Aux Feed Pump 1-2 Suction Line PSL Iso	M-006B J-9	AF 507D	Open	
Aux Feed Pump 1-2 Suction Line PSL	M-006B J-9	PSL 507	In Service	
Aux Feed Pump 1-2 Suction Line PI Iso	M-006B J-9	AF 507C	Open	
AFPT 1-2 Steam Inlet Press Switch C	M-003 E-13	PS 107C	In Service	
AFPT 1-2 Steam Inlet Press Switch A	M-003 E-13	PS 107A	In Service	
AFPT 1-2 Exhaust Press Gage	M-003C J-9	PI 2558	In Service	
AFPT 1-2 Exhaust Press Source Valve	M-003C J-9	MS 2558	Open	
AFPT 1-2 Exhaust Drain Valve	M-003C J-10	MS 50	Closed	
AFPT 1-2 Suction PSL Source Valve	M-006B K-9	AF4931B	Open	
Aux Feed Pump 1-2 Suction Line PDSH Iso	M-006B J-9	AF 507B	Open	
Aux Feed Pump 1-2 Clngr Wtr Return Line Valve	M-006B K-9	AF 4	Locked Open*	
AFP 1-2 Clngr Water Return Line Drn	M-006B K-9	AF 86	Closed	
AFP 1-2 Suction PSL Source Valve	M-006B K-9	AF4931A	Open	
Aux Feed Pump 1-2 Casing Vent Valve	M-006B E-13	AF 61	Closed	
Aux Feed Pump Suction Line Strnr Drain #2	M-006B K-9	AF 27	Closed	

*Controlled as per AD 1839.02.

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VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

	VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
	Aux Feed Pump 1-2 Brg CW Line Strnr Drain	M-006B K-10	AF 56	Closed	
	Aux Feed Pump 1-2 Cooling Water Valve	M-006B K-9	AF 8	Locked One Turn Open*	
	Aux Feed Pump 1-2 Suction Line PDSH Iso	M-006B J-9	AF 507A	Open	
	Aux Feed Pump 1-2 Casing Drain Valve	M-006B E-13	AF 60	Closed	
	Aux Feed Pump 1-2 Disc Sample Iso	M-006B J-10	SS 34	Closed	
	Aux Feed Pump 1-2 Disc Line PT Iso	M-006B J-10	AF 509	Open	
21	AFPT 1-2 Casing Drain Throttle Valve	M-003C F-12	MS 744A	Closed	
	AFPT 1-2 Casing Drain	M-003C F-12	MS 744	Open	
	AFPT 1-2 Inlet to Nozzle Blk Press Src Vlv	M-003C H-9	MS 310	Open	
	AFPT 1-2 Casing Drain	M-003C F-13	MS 747	Open	
21	AFPT 1-2 Casing Drain Throttle Vlv	M-003C F-13	MS 747A	Closed	
	AFPT 1-2 Gov. Valve Above Seat Drain	M-003C E-13	MS 751	Closed	
	AFPT 1-2 Gov. Valve Cng Water Supply Vlv	M-006B K-10	AF 66	Locked Open*	
	AFPT 1-2 Stm Inlet Press Swch B&D Src Vlv	M-003C G-10	MS 107C	Open	
	AFPT 1-2 Stm Inlet Press Source Vlv	M-003C G-10	MS 2563	Open	
	Steam Trap 136 Stub Heater Drain Vlv	M-003C H-9	MS 31	Closed	
	AFPT 1-2 Stm Inlet Press Swch A&C Src Vlv	M-003C H-10	MS 107B	Open	
	Stm Inlet Iso Valve to AFPT 1-2	M-003C G-9	MS 729	Locked Open*	
	AFPT 1-2 Stm Inlet Hdr Cross Connect Iso Vlv	M-003C G-8	MS 728	Locked Closed*	

*Controlled as per AD 1839.02.

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VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

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VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
AFPT's Stm Inlet Hdr Cross Connect Stm Trap	M-003C G-8	ST 134	In Service	
Steam Trap 134 Stub Heater Drain Valve	M-003C G-9	MS 134	Closed	
Stm Inlet Hdr to AFPT 1-2 Steam Trap	M-003C G-9	ST 136	In Service	
AFPT 1-2 Gov Vlv Below Seat Drain	M-003C E-13	MS 749	Closed	
AFPT 1-2 Inlet to Nozzle Blk Press Gage	M-003C H-9	PI 310	In Service	
AFPT 1-2 Steam Inlet Press Gage	M-003C G-10	PI 2563	In Service	
S/G 1-2 Aux F.W. Line Drain #2	M-007 F-3	AF 41	Closed & Capped	
Aux Feed Pump 1-2 Disch Hdr Drain Valve ROOM 237 AFPT 1-1	M-007 E-3	AF 77	Closed	
Aux Feed Pump 1-2 Cross Tie to 1-1 Vent Vlv	M-007 E-5	AF 79	Closed & Capped	
AFP 1-1 Discharge Line Drain Valve	M-007 E-9	AF 82	Closed	
Aux Feed Pump 1-1 Min Flow RO Inlet Iso	M-006B J-8	AF 9	Locked Open*	
SG 1-1 Aux F.W. Line Drain Valve	M-007 F-10	AF 83	Closed & Capped	
S.W. System to Aux Feed Pump 1-1 Iso Vlv	M-041 F-3	SW 1382	Locked Closed*	
Aux Feed Pump 1-1 SW Supply Line Drain Valve	M-041 F-2	SW 172	Closed	
Aux Feed Pump 1-1 SW Supply Line Vent	M-006B K-6	SW 1	Closed	
Aux Feed Pump 1-1 SW Supply Line Drain	M-006 K-8	SW 11	Closed	
Aux Feed Pump 1-1 SW Brg SW Iso	M-006B J-8	SW 9	Sealed Closed	
Aux Feed Pump 1-1 Normal Brg CW Iso	M-006B J-8	AF 13	Locked Open*	

*Controlled as per AD 1839.02.

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VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

	VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
	AFP 1-1 Clngr Water Supply Valve	M-006B J-8	AF 64	Locked Open*	
	Aux Feed Pump 1-1 Min Flow RO Outlet Iso	M-006B J-9	AF 17	Locked Open*	
19	2nd Iso Vlv from 235# Aux Stm Hdr to AFPT's	M-003C G-4	AS 273	Closed	
	Aux Feed Pump 1-1 Brg CW Line Strnr Drain	M-006B J-8	AF 28	Closed	
19	235# Aux Stm Hdr to AFPT's Stm Trap	M-003C G-3	ST 4	In Service	
	AFP 1-2 Min Recirc Line Vent	M-006B J-11	AF 53	Closed	
	AFP 1-1 Min Recirc Line Vent	M-006B J-10	AF 55	Closed	
19	AFPT 1-1 Exhaust Press Gage	M-003C J-4	PI 2421	In Service	
	Aux Feed Pump Recirc Line PDI Iso	M-006B J-10	AF2658A	Open	
	Aux Feed Pump Recirc Line PDI Iso	M-006B J-10	AF2658B	Open	
	Aux Feed Pump Recirc Line FE	M-006B J-10	FE 2658	In Service	
	Aux Feed Pump Recirc Line PDI	M-006B J-10	PDI2658	In Service	
	AFW Pressure Test Connection	M-006B J-6	CD 4580	Closed	
	AFW Pressure Test Connection	M-006B J-6	CD 4581	Closed	
	AFP 1-1 Suction PSL	M-006B E-11	PSL 4930B	In Service	
19	AFP 1-1 Suction PSL	M-006B E-11	PSL 4930A	In Service	
	Aux Feed Pump 1-1 SW Supply Line Iso	M-006B J-7	SW 5	Locked Open*	
	Aux Feed Pump Recirc Line Drain #1	M-006B J-10	AF 29	Closed	
19	Aux Feed Pump Recirc Line Iso	M-006B J-10	AF 23	Locked Closed*	
	AFP 1-1 Suction Line Flush Conn.	M-006B J-6	AF 5	Closed	

*Controlled as per AD 1839.02.

VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
AFP 1-1 Suction from CST PSL	M-006B H-5	PSL 4928A	In Service	
AFP 1-1 Suction from CST PSL	M-006B H-5	PSL 4928B	In Service	
Aux Feed Pump 1-1 Suction Valve	M-006B J-6	FW 786	Locked Open*	
AFP 1-1 Suction from CST PSL Source Valve	M-006B H-5	AF4928B	Open	
AFP 1-1 Suction from CST PSL Source Valve	M-006B H-5	AF4928A	Open	
19 Aux Feed Pump 1-1 Suction Line PI	M-006B H-8	PI 503	In Service	
Aux Feed Pump 1-1 Suction Line PSL Iso	M-006B J-7	AF 503D	Open	
Aux Feed Pump 1-1 Suction Line PSL	M-006B J-7	PSL 503	In Service	
Aux Feed Pump 1-1 Suction Line PI Iso	M-006B J-7	AF 503C	Open	
Aux Feed Pump 1-1 Recirc Stop Valve	M-006B J-11	AF 21	Locked Closed*	
Aux Feed Pump 1-1 Suction Line PDSH	M-006B J-7	PDSH503	In Service	
AFPT 1-1 Stm Inlet Pressure Switch D	M-003 H-2	PS 106D	In Service	
AFPT 1-1 Stm Inlet Pressure Switch B	M-003 H-2	PS 106B	In Service	
Aux F.W. Pump 1-1 Recirc Line Vent Valve	M-006B J-11	AF 30	Closed	
AFP 1 Disch Press Transmitter	M-006B J-8	PT 505	In Service	
AFP 1-1 Disch Press Indic	M-006B J-8	PI 2659	In Service	
AFPT 1-1 Inlet to Nozzle Blk Press Gage	M-003 J-2	PI 305	In Service	
AFPT 1-1 Stm Inlet Press Swch B&D Src Vlv	M-003C G-4	MS 106C	Open	
19 Steam Inlet Hdr to AFPT 1-1 Steam Trap	M-003 G-5	ST 133	In Service	
Steam Trap 133 Stub Hdr Drn Vlv	M-003 G-4	MS 133	Closed	

*Controlled as per AD 1839.02.

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VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

	VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
21	AFPT 1-1 Turbine Casing Drain Throttle Vlv	M-003C F-14	MS 746A	Closed	
	AFPT 1-1 Gov. Vlv Above Seat Drain	M-003C E-13	MS 750	Closed	
	AFPT 1-1 Turbine Casing Drain	M-003C F-13	MS 746	Open	
	AFPT 1-1 Inlet to Nozzle Blk Press Src Vlv	M-003C H-4	MS 305	Open	
	AFPT 1-1 Turbine Casing Drain	M-003C F-12	MS 745	Open	
21	AFPT 1-1 Turbine Casing Drain Throttle Vlv	M-003C F-12	MS 745A	Closed	
	Aux Feed Pump 1-1 Disc Line PT Iso	M-006B J-8	AF 505	Open	
	Aux Feed Pump 1-1 Disc Sample Iso	M-006B J-8	SS 35	Closed	
	AFP 1-1 Disc Line PI Iso Valve	M-006B J-8	AF 2659	Closed	
	Aux Feed Pump 1-1 Casing Drain Vlv	M-006B E-13	AF 57	Closed	
	Aux Feed Pump 1-1 Casing Vent Vlv	M-006B E-13	AF 58	Closed	
	Aux Feed Pump 1-1 Cng Wtr Supply Vlv	M-006B J-7	AF 7	Locked One Turn Open*	
	Aux Feed Pump 1-1 Suction Line Strnr PDSH Iso	M-006B J-7	AF 503A	Open	
	Aux Feed Pump 1-1 Suction Line Strnr Drn #2	M-006B J-7	AF 26	Closed	
	AFP 1-1 Suction PSL Source Vlv	M-006B J-7	AF 4930A	Open	
	Aux Feed Pump 1-1 Suction Line Strnr PDSH Iso	M-006B J-7	AF 503B	Open	
	Aux Feed Pump 1-1 Cng Water Return Line Vlv	M-006B J-7	AF 3	Locked Open*	
	AFP 1-1 Cooling Water Return to Suct Hdr Drn	M-006B J-7	AF 85	Closed	
	AFP 1-1 Suction PSL Source Valve	M-006B J-7	AF 4930B	Open	

*Controlled as per AD 1839.02.

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VALVE VERIFICATION LIST A

Auxiliary Feedwater
Normal Lineup

Verification List Only - Consult Shift Supervisor Prior to Repositioning Valve

VALVE DESCRIPTION	P&ID NO. Coord.	VALVE NUMBER	VALVE POSITION	VERIFY BY
AFP 1-2 Min Recirc Line Drain	M-006B J-11	AF 54	Closed	
AFPT 1-1 Exhaust Press Source Valve	M-003C J-4	MS 2421	Open	
AFPT 1-1 Exhaust Drain Valve	M-003C J-4	MS 55	Closed	
AFPT 1-1 Gov Vlv Clnng Water Supply Valve	M-006B J-8	AF 65	Locked Open*	
AFPT 1-1 Gov Vlv Below Seat Drain	M-003C E-13	MS 748	Closed	
AFPT 1-1 Stm Inlet Press Swch A&C Source Vlv	M-003C H-4	MS 106B	Open	
Aux Feed Pump 1-1 Cross Tie to 1-2 Vent Valve	M-007 E-9	AF 81	Closed	
AFPT 1-1 Stm Inlet Press Switch A	M-003C G-4	PSL 106A	In Service	
AFPT 1-1 Steam Inlet Press Switch C	M-003C G-3	PSL 106C	In Service	
AFPT 1-1 Steam Inlet Press Source Valve	M-003C G-4	MS 2561	Open	
AFPT 1-1 Steam Inlet Press Ind	M-003C G-4	PI 2561	In Service	
Stm Inlet Iso Vlv to Aux Feed Pmp Turbine 1-1	M-003C G-4	MS 730	Locked Open*	

Verified _____ Date _____
(Shift Supervisor or Assistant Shift Supervisor)

*Controlled as per AD 1839.02.

END