

THREE MILE ISLAND NUCLEAR STATION
AUXILIARY SYSTEMS OPERATING PROCEDURES
EMERGENCY FEED

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PORC CHAIRMAN
UNIT 1

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Unit 1 Staff Recommends Approval

Approval NA Date —
Cognizant Dept. Head

Unit 2 Staff Recommends Approval

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Unit 1 PORC Recommends Approval

NA Hartman Date 8/15/79
✓ Chairman of PORC

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Chairman of PORC

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THREE MILE ISLAND NUCLEAR STATION
AUXILIARY SYSTEMS OPERATING PROCEDURES

Emergency Feed

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6.1 REFERENCES

6.1.1 System Descriptions

6.1.1.1 Emergency Feed Pumps & Drives Volume I, Section C, Chapter 8

6.1.1.2 Feedwater System Volume I, Section C, Chapter 6

6.1.2 Drawings

6.1.2.1 Main Steam GAI-302-011

6.1.2.2 Feedwater GAI-302-081

6.1.2.3 Nuclear Service Closed Cycle Cooling Water GAI-302-610

6.1.3 Manufacturers Instruction Manual

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6.1.3.2 Worthington Manual on Pumps and Steam Turbine

6.1.3.3 Westinghouse Motors

6.1.4 Applicable Operating Procedures

6.1.4.1 O.P. 1202-26 Loss of Steam Generator Feed

6.1.4.2 O.P. 1203-5 Feed System Abnormal Operation

6.2 LIMITATIONS AND PRECAUTIONS

6.2.1 Equipment

6.2.1.1 To prevent damage to pumps, insure that each pump recirculation path is lined up when system is in emergency standby.

6.2.1.2 EF-V4 and EF-V5 (River Water to EFP Suction isolation valve) will be opened only when all other sources of water have been exhausted.

NOTE: Prior to opening EF-V4 and EF-V5 (from CC), one (1) of the R.B. Emergency Cooling Pumps must be running to satisfy interlock in valve opening CKT. Also EF-V4 and 5 are locked closed at valve, and breakers are locked open at 480 V. Control Center ICESV.

- 6.2.1.3 When returning system to standby after maintenance or extended shutdown, thoroughly vent each pump.
- 6.2.1.4 Oil should always be visible in the glass bottle on the constant level oilers on the pumps.
- 6.2.2 Administrative
 - 6.2.2.1 The emergency feed pumps will not be used to replace a main feed pump for normal operation.
 - 6.2.2.2 During plant start-up, place the emergency feed pump turbine auto-start switch in NORMAL per OP 1102-2, Plant Heatup with the RCS at hot shutdown conditions.
 - 6.2.2.3 During plant shutdown, place the emergency feed pump turbine auto-start switch in DEFEAT prior to removing the second main feed pump from service per OP 1102-10, Plant Shutdown.
 - 6.2.2.4 Insure emergency trip for EF-U-1 is reset for standby operation.
 - 6.2.2.5 During startup, before the primary coolant temperature exceeds 250 F as indicated on RC5A/B-TI-1, the turbine driven emergency feedwater pump (EF-P1) and both motor driven emergency feedwater pumps (EF-P2A & 2B) shall be operable per Tech. Specs.
 - 6.2.2.6 Any component in 6.2.2.5 above may be removed from service for a period not to exceed 48 hours. If this period exceeded, the unit will be placed in the cold shutdown condition, per OP 1102-10, Plant Shutdown, and OP 1102-11, Plant Cooldown, within 12 hours per Tech. Specs.
- 6.3 OPERATING PROCEDURE
 - 6.3.1 Emergency Standby

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The following procedure outlines the steps necessary for placing the emergency feed system in an emergency standby condition.

6.3.1.1 Prerequisites (Indicate satisfactory completion of steps below by initialing at each step and sign name at end of procedure section).

1. Verify instrument air system lined up for normal operation per OP 1104-25 and air available to system valves and controls.
2. The Normal and Emergency Electrical Systems lined up for normal operation per OP 1107-1 and 1107-2 respectively.
3. On console 'CL' and 'CC' in the control room, place the C/S for EF-P2 A & B in PULL-TO-LOCK.

NOTE: Each pump has two (2) control switches.

4. Control power (125VDC) is available at the switch gear for breaker control. PNL 1E SW #9 and PNL 1F SW #9 for 4160V Buses 1D and 1E respectively.
5. On the 4160 volt engineered safeguard bus 1D, place the breakers for EF-P2A and B in the racked-in position.
6. On the 4160 volt engineered safeguard bus 1E, place the breaker for EF-P2A and B in the racked-in position.
7. On the following 480 V control centers, insure that the designated equipment manual breakers are closed.
 - a. 1A E.S.; EF-V1A at Bkr. 2B
EF-V2A at Bkr. 2D
 - b. 1B E.S.; EF-V1B at Bkr. 15D
EF-V2B at Bkr. 15E

c. 1C E.S.V.;MS-V2A at Bkr. 8D

MS-V2B at Bkr. 10C

8. On the 250/125VDC distribution system, close the following switches.

Dist.	pn1.	SW#	Equip.
250VDC	1C	1	MS-V10A
250VDC	1D	1	MS-V10B
125VDC	1E	3 (to XCC cab.)	MS-V13A (fuse)
125VDC	1F	3 (to XCL cab)	MS-V13B (fuse)

9. At 480 V control center 1C-ESV, place the CKT breakers for EF-V4 and 5 in the "locked open" position.
10. Align system valves per 6.4, Enclosure I.
11. Verify that the condensate system is lined up, per OP 1106-2, to provide water to emergency feed pump suction header.
12. Steam Driven Emergency Feed Pump (EF U 1) Trip Reset.

6.3.1.2 Procedure (Indicate satisfactory completion of steps below by initialing at each step and sign name at end of procedure section).

1. During Plant Startup per OP 1102-2 with the RCS at hot shutdown place the emergency feed pump turbine AUTO-START DEFEAT switch on console 'CC' to the NORMAL position and accomplish steps 2 and 3 below.
2. On console CL, place C/S for EF-P2A-D in the Normal - After Stop and EF-P2B-D in Pull-to-lock.
3. On console 'CC' place C/S for EF-P2A-E in Pull-to-Lock and EF-P2B-E in Normal - After - Stop.

The system is now lined up for Emergency Standby.

1123 091

6.4 Fill 1A OTSG with Emergency Feed Pumps

NOTE: Only for use when normal feedwater supply is not available during Cold Shutdown Conditions.

6.4.1 Prerequisites:

1. Nitrogen truck lined up to secondary plant.
2. 1A or 1B OTSG's are not on sample recirc.

6.4.2 Procedure for A OTSG

1. Complete valve line up per Enclosure II.
2. Open EF-V-2A and EF-V-2B.
3. Start EF-P-2A or EF-P-2B open MS-V-71A and 71B.
4. Control fill rate with EF-V-30A.

NOTE: See Section 6.6.4.

5. Secure EF-P-2A or EF-P-2B when 1A OTSG level is 416" (or lower level if required) and close EF-V-30A. To fill above 416" refer to OP 1106-16.
6. Close MS-V-71A and 71B and open MS-V-75A and 75B.
7. Establish nitrogen pressure on 1A OTSG by 1106-16.
8. Place 1A OTSG on sample recirc per OP 1106-16.
9. Close EF-V-2A and EF-V-2B.

6.5 Fill 1B OTSG's with Emergency Feed Pumps.

NOTE: Only for use when normal feedwater supply is not available during Cold Shutdown Conditions.

6.5.1 Prerequisites:

1. Nitrogen truck lined up to sec. plant.
2. 1A or 1B OTSG's are not on sample recirc.

6.5.2 Procedure for B OTSG

1. Complete valve line up as per Enclosure III.

2. Open EF-V-2B and EF-V-2A.
3. Start EF-P-2B or EF-P-2A. Open MS-V-71C and 71D.
4. Control fill rate with EF-V-30B.

NOTE: See Section 6.6.4.

5. Secure EF-P-2B or EF-P-2A when 1B OTSG level is 416" (or lower level if required) and close EF-V-30B. To fill above 416" refer to OP 1106-16.
6. Close MS-V-71C and 71D and open MS-V75C and 75D.
7. Establish nitrogen pressure on 1B OTSG by OP 1106-16.
8. Place 1B OTSG on sample recirc per OP 1106-16.
9. Close EF-V-2A and EF-V-2B.

ENCLOSURE I

6.6.1 Startup Valve Checklist

A - Control Room

Valve No.	Description	Position	Initial
MS-V-2A	Steam dump Hdr. A Isolation	Open	_____
MS-V-2B	Steam dump Hdr. B Isolation	Open	_____
MS-V-6	EFPI Steam Regulator	Locked Open	_____
MS-V-10A	Steam supply to EF-U1	Closed	_____
MS-V-13A	MS-V-10A Startup Bypass	Closed	_____
MS-V-10B	Steam supply to EF-U1	Closed	_____
MS-V-6	EF-P-1 Steam Regulator	Handwheel Locked Open	_____
MS-V-13B	MS-V-10B Startup bypass	Closed	_____
EF-V-1A	Suction Hdr. Sectional Isolation	Open	_____
EF-V-1B	Suction Hdr. Sectional Isolation	Open	_____
EF-V-2A	Discharge Hdr. Sectional Isolation	Open	_____
EF-V-2B	Discharge Hdr. Sectional Isolation	Open	_____
EF-V-4	Emergency River Water Supply to Suction	Locked Closed	_____
EF-V-5	Emergency River Water Supply to Suction	Locked Closed	_____
EF-V-30A	Emergency feed C.V. to S.G.A. Verify Emergency feed pumps are off and have CRO stroke valve from the Control Room to assure it properly and smoothly strokes.	Auto	_____
EF-V-30B	Emergency feed C.V. to S.G.B. Verify Emergency feed pumps are off and have CRO stroke valve from the Control Room to assure it properly and smoothly strokes.	Auto	_____
CO-V-10A	Condensate Tk. A Isolation	Open	_____
CO-V-10B	Condensate Tk. B Isolation	Open	_____
EF-V-45A	Sensing Line Root for EF-V-15A	Open	_____
EF-V-45B	Sensing Line Root for EF-V-15B	Open	_____

3 - Intermediate Bldg

Valve No.	Description	Position	Initial
EF-V8B	EF-P-1 Min. Flow Recirc.	Auto	_____
V28A	Vent on Suction of EF-P-1	Closed	_____
V28B	Vent on Discharge of EF-P-1	Closed	_____
V22	EF-P-1 Recirc. Isolation	Locked Open	_____
V-31	EF-P-1 Brg. Cooling Water Outlet	Open	_____
V15A	EF-P-1 Brg. Cooling Supply Reg.	Auto	_____
V15B	EF-P-1 Brg. Cooling Supply Reg.	Auto	_____
V1015	PT 65 Root	Open	_____
V1016	PT 65 Isolation	Open	_____
V1017	PT 65 Drain	Closed	_____
V6	E.F.-P1 Suction Isolation	Locked Open	_____
V1005	F.E. 78 High side root	Open	_____
V1006	F.E. 78 Low side root	Open	_____
V1007	F ~ 78 Valve Manifold H.P. Isolation	Open	_____
	L.P. Isolation	Open	_____
	Equalizer	Closed	_____
	Drain	Closed	_____
V1008	FS-78 High side drain	Closed	_____
V1009	FS-78 Low side drain	Closed	_____
V1020	P1 69 Root	Open	_____
V23	EF-P-2A Suction Hdr. drain	Closed	_____
V24	EF-P-1 Suction Hdr. Drain	Closed	_____
EF-V-14	Emergency River line Flushing	Closed	_____
V1000	FE-77 High side root	Open	_____
V-1001	FE-77 Low side root	Open	_____

B - Intermediate Bldg. (Cont.)

Valve No.	Description	Position	Initial
V1002	FS-77 Valve Manifold High side Isolation	Open	_____
	Low side Isolation	Open	_____
	Equalizer	Closed	_____
	Drain	Closed	_____
V1003	FS-77 High side drain	Closed	_____
V1004	FS-77 Low side drain	Closed	_____
V40	EF-P1 Bearing cooling vent	Closed	_____
V41	EF-P2A/2B Bearing cooling Vent	Closed	_____
V42A	EF-P2A Suction Vent	Closed	_____
V16A	EF-P2A Suction	Locked Open	_____
V1021	P1 70 Root valve	Open	_____
V1022	PT 71 Root	Open	_____
V1023	PT 71 Isolation	Open	_____
V1024	PT 71 Drain	Closed	_____
V36A	EF-P-2A Brg. Cool Isol.	Open	_____
V38A	Bearing cooler inlet	Open	_____
V8A	Min. flow recirc.	Auto	_____
V10A	EF-P-2A disch. valve	Locked Open	_____
V26A	EF-P-2A vent	Closed	_____
V20A	EF-P-2A Recirc. Isol.	Locked Open	_____
EF-V25	EF-P-2B Suction Hdr. drain	Closed	_____
V27A	Drain disch. Hdr.	Closed	_____
V44	OTSG "B" Feed line vent	Closed	_____
V1028	P1 476 root	Open	_____

B-Intermediate Bldg. (Cont.)

Valve No.	Description	Position	Initial
V1029	P1 477 Root	Open	_____
V29	Drain Disch. Hdr.	Closed	_____
V27B	Drain Disch. Hdr.	Closed	_____
V1018	Px 67 test valve	Closed	_____
V26B	EF-P-2B Disch. Hdr. Vent	Closed	_____
V10B	EF-P-2B Disch. Isolation	Locked Open	_____
V38B	EF-P-2B bearing cooling water inlet	Open	_____
V36B	EF-P-2B bearing cooling water outlet	Open	_____
V-8C	EF-P-2B Minimum flow recirc.	Auto	_____
V1025	PT 72 root valve	Open	_____
V1026	PT 72 Isolation	Open	_____
V1027	PT 72 drain	Closed	_____
V20B	EF-P-2B recirc. line isolation	Lock Open	_____
V16B	EF-P-2B Suction isolation	Locked Open	_____
V42B	EF-P-2B Suction Hdr. Vent	Closed	_____
V17	E.F.P.'s Recirc. line drain	Closed	_____
V18	E.F.P.'s Recirc. line vent	Closed	_____
V43A	A feed Hdr. to S.G.A. vent (In Reactor Bldg.)	Closed	_____
V43B	A feed Hdr. to S.G.B. vent (In Reactor Bldg.)	Closed	_____
CO-V176	Feed pumps recirc. to CO-T-1B Isol.	Locked Open	_____
EF-V47	Supply to EF-P1 seal cool. wtr. vv. EF-V46A/B	Open	_____
V46A	EF-P1 inboard seal cooling water	Open	_____
V46B	EF-P1 outboard " " "	Open	_____
V49	Supply to EF-P2A seal cool. wtr. vv. EF-V48A/B	Open	_____
V48A	EF-P2A inboard seal cooling water	Open	_____
V48B	EF-P2A outboard " " "	Open	_____

B-Intermediate Bldg. (Cont.)

Valve No.	Description	Position	Initial
V51	Supply to EF-P2B seal cool. wtr. vv. EF-V50A/B	Open	_____
V50A	EF-P2B inboard seal cooling water	Open	_____
V50B	EF-P2B Outboard " " "	Open	_____
EF-V1010	FE-79 High Side Root Valve	Open	_____
EF-V1011	FE-79 Lo Side Root Valve	Open	_____
EF-V1012	FS-79 Manifold - Drain	Closed	_____
	H.P. Isolation	Open	_____
	L.P. Isolation	Open	_____
	Equalizer	Close	_____
EF-V1013	FS-79 Hi Side Drain	Close	_____
EF-V1014	FS-79 Lo Side Drain	Close	_____
EF-V1019	PX-68 Test Valve	Close	_____

VALVE CHECKLIST COMPLETE

Performed By _____
Signature Date

Reviewed By SRO or
RO License _____
Signature Date

ENCLOSURE II

6.6.2 1A OTSG Fill with CFP's Valve Checklist

Valve No.	Description	Position	Initial
SD-V-14A		Close	_____
SD-V-87A		Close	_____
FW-V-78A		Close	_____
FW-V-79A		Close	_____
FW-V-80A		Close	_____
FW-V-81A		Close	_____
FW-V-82A		Close	_____
FW-V-83A		Close	_____
EF-V-16A	Locked	Open	_____
EF-V-16B	Locked	Open	_____
EF-V-10A	Locked	Open	_____
EF-V-10B	Locked	Open	_____
EF-V-20A		Open	_____
EF-V-20B		Open	_____
CO-V-176		Open	_____
CO-V-10A		Open	_____
CO-V-10B		Open	_____
MS-V-25A		Close	_____
MS-V-25B		Close	_____
MS-V-70A		Open	_____
MS-V-70B		Open	_____
MS-V-75A		Close	_____
MS-V-75B		Close	_____

ENCLOSURE II (con't)

6.6.2 1A OTSG Fill with EFP's Valve Checklist

Valve No.	Description	Position	Initial
MS-V-71A		Close	_____
MS-V-71B		Close	_____

Valve Checklist Complete

Performed By _____ Date _____
Signature

Reviewed By SRO
or RO License _____ Date _____
Signature

ENCLOSURE III

6.6.3 1B OTSG Fill with EFP's Valve Checklist

Valve No.	Description	Position	Initial
SD-V-14B		Close	_____
SD-V-87B		Close	_____
FW-V-78B		Close	_____
FW-V-79B		Close	_____
FW-V-80B		Close	_____
FW-V-81B		Close	_____
FW-V-82B		Close	_____
FW-V-83B		Close	_____
EF-V-16A	Locked	Open	_____
EF-V-16B	Locked	Open	_____
EF-V-10A	Locked	Open	_____
EF-V-10B	Locked	Open	_____
EF-V-20A		Open	_____
EF-V-20B		Open	_____
CO-V-176		Open	_____
CO-V-10A		Open	_____
CO-V-10B		Open	_____
MS-V-25A		Close	_____
MS-V-25B		Close	_____
MS-V-70C		Open	_____
MS-V-70D		Open	_____
MS-V-75C		Close	_____
MS-V-75D		Close	_____

ENCLOSURE III (cont't)

G.6.3 1B OTSG Fill with EFP's Valve Checklist

<u>Valve No.</u>	<u>Description</u>	<u>Position</u>	<u>Initial</u>
MS-V-71C		Close	_____
MS-V-71D		Close	_____

Valve Checklist Complete

Performed By _____
Signature

Date _____

Reviewed By SRO
or RO License _____
Signature

Date _____

6.6.4 Placing EF-V-30A/B from Auto to Manual and Manual to Auto.

Auto To Manual

1. Turn handwheel to align holes.
2. Insert pin.
3. Position Auto-Manual switch to manual located on controller box.
4. Open equalizing valve located on outside of diaphragm.
5. Position valve as needed with handwheel.

Manual To Auto

1. Shut ~~equalizing valve.~~
2. Position Auto-Manual Switch to Auto.
3. Remove Pin from hole.
4. Position pointer on valve stem to align with neutral position marked on valve body by use of handwheel.