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CENTRAL

APR 23 1979

THREE MILE ISLCLEAR STATION
UNIT #2 OPERACEDURE 2104-6.3
EMERGDWATER

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Unit 1 Staff Recommends Approval

Approval NA Date —
Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval NA Date —
Cognizant Dept. Head

Unit 1 PORC Recommends Approval

NA Date —
Chairman of PORC

Unit 2 PORC Recommends Approval

J. F. Hilbish Date 6/5/78
Chairman of PORC

Unit 1 Superintendent Approval

NA Date —

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J. R. Hoelinger Date 6/8/78

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THREE MILE ISLAND NUCLEAR STATION

UNIT #2 OPERATING PROCEDURE 104-6.3

EMERGENCY FEEDWATER

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THREE MILE ISLAND NUCLEAR STATION

UNIT #2 OPERATING PROCEDURE 2104-6.3

EMERGENCY FEEDWATER

1.0 REFERENCES

1.1 Drawings Applicable for Operation.

1.1.1 Burns and Roe Flow Diagrams.

1.1.1.1 Main and Reheat Steam, B&R Drawing No. 2002.

1.1.1.2 Auxiliary Steam, B&R Drawing No. 2004.

1.1.1.3 Feedwater and Condensate, B&R Drawing No. 2005.

1.2 Operating Procedures Applicable for Operation.

1.2.1 2102-1.1, Unit Heatup.

1.2.2 2102-3.1, Unit Shutdown.

1.2.3 2106-1.1, Main and Reheat Steam.

1.2.4 2106-1.3, Auxiliary Steam.

1.2.5 2202-2.2, Loss of S. G. Feed.

1.2.6 2106-2.4, Feedwater.

1.2.7 2106-2.1, Condensate.

1.3 Manufacturers' Instruction Manuals.

1.3.1 Ingersoll-Rand Pump Manual (B&R File No. 42).

1.4 System Descriptions.

1.4.1 Main and Reheat Steam, Index No. 1.

1.4.2 Auxiliary Steam, Index No. 3.

1.4.3 Feedwater and Condensate, Index No. 4A.

1.5 Curves, Tables, etc.

None.

2.0 LIMITS AND PRECAUTIONS

2.1 Equipment.

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UNIT #2 OPERATING PROCEDURE 2104-6.3

EMERGENCY FEEDWATER

1.0 REFERENCES

1.1 Drawings Applicable for Operation.

1.1.1 Burns and Roe Flow Diagrams.

1.1.1.1 Main and Reheat Steam, B&R Drawing No. 2002.

1.1.1.2 Auxiliary Steam, B&R Drawing No. 2004.

1.1.1.3 Feedwater and Condensate, B&R Drawing No. 2005.

1.2 Operating Procedures Applicable for Operation.

1.2.1 2102-1.1, Unit Heatup.

1.2.2 2102-3.1, Unit Shutdown.

1.2.3 2106-1.1, Main and Reheat Steam.

1.2.4 2106-1.3, Auxiliary Steam.

1.2.5 2202-2.2, Loss of S. G. Feed.

1.2.6 2106-2.4, Feedwater.

1.2.7 2106-2.1, Condensate.

1.3 Manufacturers' Instruction Manuals.

1.3.1 Ingersoll-Rand Pump Manual (B&R File No. 42).

1.4 System Descriptions.

1.4.1 Main and Reheat Steam, Index No. 1.

1.4.2 Auxiliary Steam, Index No. 3.

1.4.3 Feedwater and Condensate, Index No. 4A.

1.5 Curves, Tables, etc.

None.

2.0 LIMITS AND PRECAUTIONS

2.1 Equipment.

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2.1.1 To prevent damage to pumps, insure that each pump recirculation path to the condenser or condensate storage tank is lined up when system is in standby.

2.1.2 NR-V-27A and B (Nuclear Services River Water to EFP Suction Header are normally locked closed with breakers open, and will be opened only when all other sources of water have been exhausted.

2.1.3 When returning system to standby after maintenance or extended shutdown, thoroughly vent each pump.

2.1.4 Oil should always be visible in the glass bottle on the constant level oilers on the pumps.

2.2 Administrative.

2.2.1 The emergency feed pumps will not be used to replace a main feed pump for normal operation.

2.2.2 The Emergency Feedwater Pumps will be put into standby, during a unit heatup, after the first main feedwater pump has been placed in service, and EF-V11A and B placed in AUTO per 2102-1.1.

2.2.3 The maximum allowable number of cycles of the auxiliary feedwater nozzles in the OTSG is 80 for 80°F feedwater and 40 cycles for 40°F feedwater.

2.2.4 During unit shutdown, prior to tripping the second main feedwater, the Emergency Feedwater Pumps control switches must be placed in PULL-TO-LOCK to prevent inadverent actuation.

2.2.5 Insure the emergency trip for EF-U-1 is reset for emergency standby operation.

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2.2.6 During startup, prior to entering Mode 3 per Tech. Spec. 3.7.1.2 all three Emergency feedwater pumps and their associated flow paths must be OPERABLE. If one of the emergency feedwater pump systems are declared INOPERABLE, comply with action statement 3.7.1.2.a of the Tech. Specs.

2.2.7 With flow through the emergency feed nozzles, there is a possibility of Water accumulation in the OTSG steam annulus space and the steam lines. After flow through the E F header has stopped, insure the steam annulus space, and the MS lines are drained prior to startup.

3.0 PREREQUISITES

Initial Each Step upon satisfactory completion.

_____3.1 VERIFY Instrument Air system is lined up for normal operation per 2104-2.3 and air is available to system valves.

_____3.2 PLACE the following control switches on Panel 4 in PULL-TO-LOCK, 2A Emergency Feed Pump, 2B Emergency Feed Pump, Steam Driven Emergency Feed Pump (MS-V207), Steam from 2A Generator to Emergency Feed Pump Turbine (MS-V11A), and Steam from 2B Generator to Emergency Feed Pump Turbine (MS-V11B).

_____3.3 On the 4160V ESF BUS 2-1E, PLACE the breaker for EF-P-2A in the RACKED-IN position.

_____3.4 On the 4160V ESF BUS 2-2E, PLACE the breaker for EF-P-2B in the RACKED-IN position.

_____3.5 On the following 480V control centers, INSURE that the designated equipment manual brekaers are CLOSED.

	VALVE	MCC	UNIT
_____	EF-V4A	2-11A	98R
_____	EF-V4B	2-21EA	13CF

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____	EF-12A	2-11EA	13CF
____	EF-V12B	2-21EA	14DR
____	EF-V32A	2-11EA	11BR
____	EF-V32B	2-21EA	11CR
____	EF-V33A	2-21EA	12CR
____	EF-V33B	2-11EA	12BR
____	AS-V10	2-32B	5AF
____	CO-V87	2-11EB	1CR

3.6 INSURE that NR-V27A and B are CLOSED then OPEN and lock the respective circuit breakers.

	VALVE	VALVE POSITION	MCC	UNIT	BREAKER POSITION
____	NR-V27A	CLOSED	2-32A	9BR	OPEN
____	NR-V27B	CLOSED	2-42A	6AF	OPEN

3.7 On the 250/125 VDC distribution system CLOSE the following switches:

	VALVE/EQUIPMENT	DC PANEL	SWITCH
____	EF-V5A	DCA-1A	No. 24
____	EF-V5B	DCA-2A	No. 24
____	MS-V11A	DCC-1A	No. 14
____	MS-V11B	DCC-1A	No. 11
____	MS-V207	DCC-1A	No. 9
____	Cabinet 163	DCC-1B	No. 2
____	Cabinet 164	DCC-2B	No. 2
____	Cabinet 163	DCT-1A	No. 6

3.8 At Cabinet 163 Distribution Panels, CLOSE the following circuit breakers:

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	EQUIPMENT	PANEL	VOLTAGE	CKT NO.
_____	RCP/TG & RCP/T	#1	125 VDC	#1
_____	R6	#4	120 VAC	#2
_____	RCPTX/T	#2	125 VDC	#2
_____	EF-V26	#4	120 VAC	#3
_____	EF-V27A	#4	120 VAC	#5

3.9 At Cabinet 164 Distribution Panels, CLOSE the following circuit breakers:

	EQUIPMENT	PANEL	VOLTAGE	CKT NO.
_____	RCPTX/TG	#3	125 VDC	#4
_____	EF-V27B	#2	120 VAC	#5

_____3.10 COMPLETE valve line-up per APPENDIX A and sign-off valve line-up complete in APPENDIX B.

_____3.11 Insure that the system is filled and vented.

4.0 PROCEDURE

Initial Each Step Upon Satisfactory Completion.

4.1 Aligning Emergency Feedwater during Unit Heatup.

_____4.1.1 After the first main feedwater pump has been put into service per 2102-1.1, Unit Heatup, PLACE the following control switches in NORMAL AFTER STOP:

2A Emergency Feed Pump (EF-P-2A), 2B Emergency Feed Pump (EF-P-2B), Steam Driven Emergency Feed Pump (MS-V207), Steam from 2A Generator to Emergency Feed Pump Turbine (MS-V11A), and Steam from 2B Generator to Emergency Feed Pump Turbine (MS-V11B). The system is now aligned for standby operation.

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NOTE: Valve line-up has a recirc path to the Condensate Storage Tank, CO-T-1A. If a recirc path to the Condenser is desired complete step 4.1.2 and 4.1.3 per Shift Supervisor/Shift Foreman instructions.

_____4.1.2 CLOSE EF-V8A, B and C using the control switches on Panel 4.

_____4.1.3 OPEN EF-V7A, B and C using the control switches on Panel 4.

4.2 Disabling Emergency Feedwater during Unit Shutdown.

_____4.2.1 Prior to taking the second main feedwater pump out of service per 2103-3.1, Unit Shutdown, PLACE the following control switches on Panel 4 in PULL-TO-LOCK:
2A Emergency Feed Pump (EF-P-2A), 2B Emergency Feed Pump (EF-P-2B), Steam Driven Emergency Feed Pump (MS-V207), Steam from 2A Generator to Emergency Feed Pump Turbine (MS-V11A), and Steam from 2B Generator to Emergency Feed Pump Turbine (MS-V11B), and proceed with Unit Cooldown.

4.3 Special and Infrequent Operations.

4.3.1 Using Auxiliary Steam for the Turbine Driven Emergency Feedwater Pump.

NOTE: If it becomes necessary to run the Turbine Driven Emergency Feedwater Pump on Aux. Steam perform the following steps:

_____4.3.1.1 INSURE that Auxiliary Steam is available per 2106-1.3, and steam is available at AS-V10.

NOTE: If the Aux Steam line is already warmed by Main Steam then go to step 4.3.1.5.

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_____4.3.1.2 OPEN MS-V65, and dripleg valves MS-V309 and MS-V314.

_____4.3.1.3 SLOWLY OPEN AS-V218 (AS-V10 Bypass valve) and BLOWDOWN the Aux steam inlet to EF-P-1 for 5 minutes.

_____4.3.1.4 CLOSE MS-V314 and MS-V309.

_____4.3.1.5 OPEN AS-V10 using the control switch on Panel 17 to provide Aux Steam to EF-P-1.

_____4.3.1.6 CLOSE AS-V218 (AS-V10 Bypass Valve).

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APPENDIX A

Valve Line-Up

Valve No.	Description	Position	Initials
EF-V3A	EF-P-2A Discharge Pressure Inst.	OP	_____
EF-V3B	EF-P-2B Discharge Pressure Inst.	OP	_____
EF-V3C	EF-P-1 Discharge Pressure Inst.	OP	_____
EF-V4A	EF-P-2A Discharge Isolation Valve	OP	_____
EF-V4B	EF-P-2B Discharge Isolation Valve	OP	_____
EF-V5A	EF-P-1 Discharge to RC-H-1A	OP	_____
EF-V5B	EF-P-1 Discharge to RC-H-1B	OP	_____
EF-V7A	EF-P-2A Recirc to Condenser	CL	_____
EF-V7B	EF-P-2B Recirc to Condenser	CL	_____
EF-V7C	EF-P-1 Recirc to Condenser	CL	_____
EF-V8A	EF-P-2A Recirc to CO-T-1A	OP	_____
EF-V8B	EF-P-2B Recirc to CO-T-1A	OP	_____
EF-V8C	EF-P-1 Recirc to CO-T-1A	OP	_____
EF-V9	EF-P-1, 2A and B Inlet to CO-T-1A	OP	_____
EF-V10	EF-P-1 Discharge Isolation Valve	LO	_____
EF-V12A	Em. Feedwater to RC-H-1A	OP	_____
EF-V12B	Em. Feedwater to RC-H-1B	OP	_____
EF-V14A	"A" Em. Feedwater to RC-H-1A Drain	Wired & Sealed CL	_____
EF-V14B	"B" Em. Feedwater to RC-H-1B Drain	Wired & Sealed CL	_____
EF-V15A	"A" Em. Feedwater to RC-H-1A Drain	CL	_____
EF-V15B	"B" Em. Feedwater to RC-H-1B Drain	CL	_____
EF-V16	Em. Feedwater Pump Disc. Head. Dr.	CL	_____
EF-V17	Em. Feedwater Pump Disc. Head. Dr.	CL	_____

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APPENDIX A

Valve Line-Up

Valve No.	Description	Position	Initials
EF-V18	EF-P-1 Discharge Vent	CL	_____
EF-V19	EF-P-2 Discharge Vent	CL	_____
EF-V20	EF-U-1 Bearing Inlet Test Conn.	CL	_____
EF-V21	EF-U-1 Bearing Outlet Test Conn.	CL	_____
EF-V22	EF-P-1 Bearing Outlet Test Conn.	CL	_____
EF-V23A	EF-P-2A Bearing Inlet Test Conn.	CL	_____
EF-V23B	EF-P-2B Bearing Inlet Test Conn.	CL	_____
EF-V24A	EF-P-2A Bearing Outlet Test Conn.	CL	_____
EF-V24B	EF-P-2B Bearing Outlet Test Conn.	CL	_____
EF-V25	EF-U-1 Bearing Drain	OP	_____
EF-V28	EF-U-1 Bearing Inlet Isolation	OP	_____
EF-V29A	EF-P-2A Bearing Inlet Isolation	OP	_____
EF-V29B	EF-P-2B Bearing Inlet Isolation	OP	_____
EF-V30	EF-P-1 Bearing Outlet Drain	OP	_____
EF-V31A	EF-P-2A Bearing Outlet Drain	OP	_____
EF-V31B	EF-P-2B Bearing Outlet Drain	OP	_____
EF-V32A	EF-V12A Bypass	CL	_____
EF-V32B	EF-V12B Bypass	CL	_____
EF-V33A	EF-V11A Bypass	CL	_____
EF-V33B	EF-V11B Bypass	CL	_____
CO-V125	Suction to EF-P-1	LO	_____
CO-V82A	CO Storage Tanks to EF	LO	_____
CO-V82B	CO Storage Tanks to EF	LO	_____

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APPENDIX A

Valve Line-Up

Valve No.	Description	Position	Initials
CO-V85	Condensate to EF	LO	_____
CO-V87	EF Pump Suction Header Isolate	OP	_____
CO-V83A	EF-P-2A Suction	LO	_____
CO-V83B	EF-P-2B Suction	LO	_____
CO-V98A	CO-T-1A Isolation	LO	_____
CO-V98B	CO-T-1B Isolation	LO	_____
EF-V38	EF-P-1 Recirc. Line Min. Flow Orifice Bypass	LC	_____
EF-V39	EF-P-2A Recirc. Line Min. Flow Orifice Bypass	LC	_____
EF-V40	EF-P-2B Recirc. Line Min. Flow Orifice Bypass	LC	_____
EF-V-36	FW to SG B DRN.	CL	_____
EF-V-37	FW to SG B DRN	CL	_____
EF-V-501	EF-PI 2001 Isol	OP	_____
EF-V-502	EF-PT 1150 Isol	OP	_____
EF-V-503	Inst DRN	CL	_____
EF-IV-504	EF-PI 2002 Isol	OP	_____
EF-IV-505	EF-PT 1147 Isol	OP	_____
EF-IV-506	Inst DRN	CL	_____
EF-IV-507	EF-PI 2003 Isol	OP	_____
EF-IV-508	EF-PT 826	OP	_____
EF-IV-509	Inst DRN	CL	_____

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APPENDIX B

Signatures of those performing/supervising valve line-up

Valve Line-up Signature Sheet

Operator Initials	Operator Signature	Shift	Date	Shift Foreman or Supervisor Sig.	Remarks

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TMI DOCUMENTS

DOCUMENT NO: TM-020

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