

# INDIANA & MICHIGAN ELECTRIC COMPANY

## DONALD C COOK NUCLEAR PLANT

### PROCEDURE COVER SHEET

Procedure No. \*\*12-OHP 4023.100.001

Revision No. 0

TITLE UNIT 1 EMERGENCY REMOTE SHUTDOWN

SCOPE OF REVISION

 UNCONTROLLED  
DOCUMENT

SIGNATURES	REVISION NUMBER			
*****	Rev. 0			
PREPARED BY	<i>Mark D. O'Leary</i>			
DEPARTMENT HEAD APPROVAL	<i>C E Murphy</i>			
INTERFACING DEPARTMENT HEAD CONCURRENCE	<i>J D O'Leary</i> NA			
QUALITY ASSURANCE SUPERVISOR APPROVAL	<i>M L H</i>			
PLANT NUCLEAR SAFETY COMMITTEE	<i>Met. #1911</i>	8606130102 PDR ADOCK F	860606 05000315 PDR	
PLANT MANAGER APPROVAL	<i>[Signature]</i>			
APPROVAL DATE	5/22/86			
EFFECTIVE DATE	Pending			



LIST OF EFFECTIVE PAGES

PAGE NUMBER

REVISION NUMBER

Page 1 of 6

Revision 0

Page 2 of 6

Revision 0

Page 3 of 6

Revision 0

Page 4 of 6

Revision 0

Page 5 of 6

Revision 0

Page 6 of 6

Revision 0

ATTACHMENT #1

Page 1 of 3

Revision 0

Page 2 of 3

Revision 0

Page 3 of 3

Revision 0

ATTACHMENT #2

Page 1 of 4

Revision 0

Page 2 of 4

Revision 0

Page 3 of 4

Revision 0

Page 4 of 4

Revision 0

ATTACHMENT #3

Page 1 of 2

Revision 0

Page 2 of 2

Revision 0

ATTACHMENT #4

Page 1 of 1

Revision 0



PAGE NUMBER

REVISION NUMBER

ATTACHMENT #5

Page 1 of 4

Revision 0

Page 2 of 4

Revision 0

Page 3 of 4

Revision 0

Page 4 of 4

Revision 0

ATTACHMENT #6

Page 1 of 4

Revision 0

Page 2 of 4

Revision 0

Page 3 of 4

Revision 0

Page 4 of 4

Revision 0

ATTACHMENT #7

Page 1 of 3

Revision 0

Page 2 of 3

Revision 0

Page 3 of 3

Revision 0

ATTACHMENT #8

Page 1 of 3

Revision 0

Page 2 of 3

Revision 0

Page 3 of 3

Revision 0



INDIANA & MICHIGAN ELECTRIC COMPANY  
DONALD C. COOK PLANT

UNIT 1 EMERGENCY REMOTE SHUTDOWN

1.0 OBJECTIVE

- 1.1 To specify an alternate method of controlling the necessary equipment to achieve and maintain Unit 1 in Hot Standby and to bring Unit 1 to Cold Shutdown while maintaining Unit 2 in Safe Configuration, in the event that control of Unit 1 equipment is not available from the Control Room or Hot Shutdown panel and all offsite power is lost. Primary effort is to establish aux feed for heat sink and charging for RCP seal injection and boron injection.

2.0 DISCUSSION

- 2.1 This procedure shall not be construed as limiting the operator's option to use equipment that remains or becomes functional during any specific casualty. Use caution to assure necessary support systems are functional. Monitor for subsequent loss.
- 2.2 The basic assumptions of this procedure are:
- No offsite power to either Unit for up to 72 hours.
  - and
  - No control capability from affected unit's control room or hot shutdown panel..
  - and
  - No emergency diesel generator output available from the affected unit.
- 2.3 Upon leaving the control room all operators shall carry emergency radios for communication if phones and P.A. systems fail. If F-1, becomes unavailable (due to repeater failure or otherwise) all units must use F-2.

- 2.4 Unit 2 will, depending on its status at the start of the casualty, be guided primarily by following procedures as unit conditions dictate:

2-OHP 4021.001.003 "Power Reduction"  
2-OHP 4023.E-0 "Reactor Trip or Safety Injection"  
2-OHP 4023.001.007 "Blackout"  
2-OHP 4021.001.004 "Cooldown"

Coordinate with Unit 1 by operating available Unit 2 equipment as requested to provide cross-tie safe shutdown functions. Pay close attention to cross-tied systems for pump flow, diesel load, Technical Specification limits or action requirements.

- 2.5 Be sure to use proper safety equipment for special jobs, e.g. breaker racking, work in hazardous atmospheres, etc.
- 2.6 It is assumed that the equipment required, by this procedure is available. Additionally, use of equipment required from Unit 2 should not impair safe continued operation or shutdown of that unit.

### 3.0 SYMPTOMS

- 3.1 Control Room and Hot Shutdown panel control capability lost.
- 3.2 Loss of offsite power to both units.
- 3.3 Pyralarm/annunciator(s) for fire in cable vault (Control Room, Aux, Switch Gear Room) or Control Room.
- 3.4 Possible spurious actuations.

### 4.0 IMMEDIATE ACTIONS

#### 4.1 Automatic

- Halon/CO<sub>2</sub> Actuation for affected area.
- Control Room Pressurization fan start for Control Room Cable Vault Alarm.

## 4.2 Manual

### NOTE

Steps 4.2.1 and 4.2.2 can be done simultaneously.

#### 4.2.1 Verify Fire Response

- Actuate Backup Suppression
- Manually initiate any required auto action not received.
- Activate fire brigade (PMP 2080 EPP.009)
- Classify and report emergency status (PMP 2080 EPP.001, PMP 2080 EPP.012, PMI-7030, Attachment #2).

#### 4.2.2 Perform or verify following from control room if possible or locally trip or de-energize. Do not rely on any auto actions.

4.2.2-1 Reactor trip

4.2.2-2 Turbine/Generator trip

4.2.2-3 If diesel starts but will not load to the bus, trip diesel. It will not have jacket water, etc.

#### 4.2.3 Assign personnel to rapidly accomplish the following. Coordinate with Unit 2 as necessary. Priority shall be given to Attachment #1 and #2.

4.2.3-1 Charging header cross-tie Attachment #1.

4.2.3-2 Establish Aux. Feed Attachment #2.

4.2.3-3 Isolate Reactor Coolant System and Steam Generators Attachment #3.

4.2.3-4 Control Steam Generator PORV's Attachment #4.

4.2.3-5 Selectively de-energize equipment to prevent spurious operation Attachment #7.

4.2.3-6 Attempt to re-establish power Attachment #8.



## 5.0 SUBSEQUENT ACTIONS

### 5.1 Establish and maintain stable Hot Standby

- Verify subcriticality on source range monitor at 1-LSI-4.
- Verify natural circulation cooling. (Subcooling  $\geq 50^{\circ}\text{F}$ , S/G Pressure and  $T_h$  steady or decreasing,  $T_c \sim T_{\text{sat}}$  for S/G).
- Verify Aux Feed capability. Monitor CST levels on Panel 1-TFP and 2-TFP. Check cross-tie status in Aux. Feed Pump hallway. If necessary, perform 2-OHP 4022.055.003 "Loss of Condensate to Aux Feed Pumps," if Unit 2 MDAPP is in service, or 1-OHP 4022.055.003 "Loss of Condensate to Aux Feed Pumps," if Unit 1 TDAFP is in service.
- Establish/maintain pressurizer level in 20-50% band via charging crosstie.
- Unit Supervisors copy of this procedure shall be marked to indicate which modifications, steps/ sections are performed, so realignments or Job Orders can be completed for restoration.

#### NOTE

Temporary power may be obtained from supply 4160V of Unit 2 after consulting the IAG and corporate engineering support team.

### 5.2 Evaluate plant status and recovery options with TSC/EOF staff. At Shift Supervisors discretion request Maintenance/Technical to implement appropriate procedures or portions thereof to power Unit 1 equipment from Unit 2 for long term hot standby or cooldown.

- Pressurizer Heaters 1-MHP 2140.082.003.
- Pressurizer PORV's 1-THP 6030 IMP.304.
- RHR pump 1-MHP 2140.082.001.
- Motor operated containment valves 1-MHP 2140.082.005 and 1-THP 6030 IMP.305.
- Control for motor operated containment valves repowered from Unit 2 will be available at the associated breaker cubicle on the Unit 1 switchgear room mezzanine.



5.2.1 When power is available to PZR PORV block valves 1-NMO-151, 1-NMO-152, 1-NMO-153, close each unless its associated PZR PORV is in use. Close when the PZR PORV no longer in use or needs isolation. Reopen and reclose as needed for subsequent use of PZR PORV's.

5.2.2 If accumulator injection not required and power available, close 1-IMO-110, 1-IMO-120, 1-IMO-130 and 1-IMO-140 when RCS pressure decreases to < 1000 psig and > 650 psig. If accumulator injection is needed leave open or reopen isolation and close when RCS pressure decreases to 250 psig.

### 5.3 Cool Down (Optional)

- Max Rate 25°F/hr.
- Maintain pressurizer level 20% - 50% band.
- Maintain RCS pressures and temperature in acceptable range per Tech. Spec. 3.4.9.1 and Tech. Data Book Figure 10.1.
- Maintain  $\geq$  50°F subcooling

5.3.1 Increase S/G PORV's opening to establish cooldown.

5.3.2 When available with Unit 2 Power, use PZR Heaters for RCS pressure control. Control station is in Reactor Cable Tunnel, QUAD. 4 at MCC-1-PHC-4. Once established in service, heaters can be operated from Unit 2 switchgear mezzanine at PHC-4 (Supply breaker).

5.3.3 Align ESW, CCW, and RHR to prepare for RHR cooldown. Perform only Attachment for train being repowered from Unit 2.

5.3.2-1 For 1 'E' RHR use Attachment #5.

or

5.3.2-2 For 1 'W' RHR use Attachment #6.

5.3.4 Start the Unit 1 RHR pump from Unit 2 Control Room. Run on recirc.



NOTE

Pressurizer PORV use is limited by the air bottle backup capacity. Plan it carefully. PRT has no quench or drain capability and has been receiving RCP Seal Leak Off.

- 5.3.5 If necessary for depressurizing RCS, use PZR PORV(s) when powered up from Unit 2.
- 5.3.6 Open 1-IMO-128 and 1-ICM-129 when RCS pressure  $\leq$  363 psi to establish RHR suction from RCS.
- 5.3.7 Open 1-ICM-111 cooldown to Loops 2 and 3. Gradually open the motor operated crosstie valve for the pump in service (East: 1-IMO-314 / West: 1-IMO-324) to establish flow to the loop.
- 5.3.8 Throttle as necessary RHR mini flow valve to limit pump flow. (East: 1-IMO-312 / West: 1-IMO-322).
- 5.3.9 Slowly open RHR Hx outlet to cooldown (East: 1-RH-128E / West: 1-RH-128W) to establish flow through Hx. (limit temperature decrease) Throttle pump crosstie (East: 1-IMO-314 / West: 1-IMO-324) to balance temperature.
- 5.3.10 Coordinate with throttling of CCW from RHR Hx and ESW from CCW Hx to achieve necessary temperature control (East: 1-CMO-419, 1-WMO-733 / West: 1-CMO-429, 1-WMO-737) .
- 5.4 Maintain stable conditions while repairs are being completed. Review Unit Supervisors copy for restorations needed. Consult with Engineering staff and arrange for restoration as appropriate.

# CHARGING HEADER CROSSTIE

This task is to be a coordinated effort of one operator in Unit 2 Control Room and two operators in the charging pump area. Use caution not to exceed pump flow capacity.

## 1.0 OPERATOR AT PUMP ROOM ESTABLISH COMMUNICATIONS WITH UNIT 2 REACTOR OPERATOR THEN

1.1 Check closed 1-CS-536, 1-CS-534

1.2 Slowly Open 2-CS-536

1.3 At local shut down control station in hallway 587 between charging pumps, isolate control air to EPT for 1-QRV-200 Charging Header Pressure Control Valve.

1.4 Throttle open 1-CS-535 to achieve desired seal flow read on 12-QFI-201.

1.5 On 1-LSI-3, select local position on local/remote switches. On 1-LSI-4, select power from Unit 2. Verify with operators at 1-LSI-5 and 6, that power from Unit 2 is selected. If white light for Unit 2 power available is not lit, request Unit 2 to check 2-ELSC Ckt. 20 and 2-ELSC supply breaker on MCC-2-ABD-B are closed (located in 2AB diesel room).

## 2.0 ALIGN BIT INJECTION AS FOLLOWS:

### 2.1 VERIFY DEENERGIZED:

At MCC 1-AZV-A

1-ICM-251  
1-IMO-256  
1-QMO-201

At MCC-1-AM-D

1-ICM-250  
1-IMO-255  
1-QMO-200

2.2 In Boron Injection Tank Room verify 1-IMO-255 and 1-IMO-256 closed. Isolate control air to 1-IRV-251, 1-IRV-252, 1-IRV-255 at 1-XSO-163, 164, and 167 behind batch tank on wall to fail closed.



- 2.3 In BIT Outlet Valve Room manually open 1-ICM-.50 or 1-ICM-251. Notify pump operator that BIT lineup is ready and go to seal injection flow meters to verify seal injection flow maintained during next step.
- 2.4 Pump operator notify Unit 2 Reactor Operator and throttle open 1-CS-534 to achieve desired flow. Also throttle open 1-CS-535 as required to maintain seal injection.
- 2.5 Pump operator verify in Recip. charging pump room 1-QMO-200 or 1-QMO-201 closed.
- 3.0 Unit 2 reactor operator maintain charging pump suction supply and Unit 2 seal injection and charging flows as needed.
  - 3.1 If Unit 2 is in Mode 1 and supplying auxiliary transformers:
    - 3.1.1 Use blender makeup at Unit 2's concentration.
    - 3.1.2 Maintain Unit 2 programmed PZR level.
    - 3.1.3 Maintain Unit 2 seal injection flow normal.
    - 3.1.4 Minimize Unit 2 charging and letdown if makeup cannot keep up with Unit 1 charging needs.
  - 3.2 If Unit 2 is not supplying its own auxiliary transformers or if required to maintain Unit 1 or Unit 2 shutdown:
    - 3.2.1 Open 2-IMO-910 or 2-IMO-911 suction from RWST.
    - 3.2.2 Close 2-QMO-451 or 2-QMO-452 suction from VCT.
    - 3.2.3 Maintain Unit 2 programmed PZR level and seal injection normal unless in a condition where not needed.
    - 3.2.4 If Unit 2 letdown is continued, insure that divert to CVCS holdup tanks limits VCT level and pressure.

4.0 IF DIRECTED BY SHIFT SUPERVISOR CROSSTIE RWST'S

4.1 Verify refueling water purification pump breaker  
open on MCC-1-AB-D1.

4.2 Close or verify closed

WD-216 from Unit 1 Refuel Cavity Drain  
SF-184 from Unit 2 Refuel Cavity Drain  
SF-136 return from SFP Demin  
SF-148 supply to SFP Demin  
SF-146 pump vent  
SF-161 return to Unit 2 Refuel Cavity  
SF-163 return to Unit 1 Refuel Cavity  
SF-145 pump drain

4.3 Open or verify open

SF-167 from Unit 1 RWST  
SI-183 from Unit 1 RWST  
SI-184 from Unit 2 RWST

### AUX FEED

This task requires at least one operator in the plant and a minimal amount of time from Unit 2 Reactor Operator. Plant Operator(s) be sure to wear hearing protection. Adequate cooling should result if either step 2 or 3 or 4 is satisfactorily completed.

### CAUTION

Since core cooling mode is natural circulation, do not over-feed or oversteam.

- 1.0 Plant operator attempt to relatch and manually operate turbine drive aux feed pump trip/throttle valve to provide aux feed. If successful proceed to Step #4 (this attachment).
- 2.0 Establish Aux Feed control to 12 and 13 Steam Generators. NOTE: An A-3 key is required for the following step.
  - 2.1 Unlock and open 1-FW-129 MDAFP Discharge Cross-Tie in Unit 1-EAST MDAFP Room.
  - 2.2 De-Energize at MCC-1-EZC-D: 1-FMO-222 MDAFP to 12 S/G. 1-FMO-232 MDAFP to 13 S/G.
  - 2.3 On 1-LSI-2, select local position on local/remote switches. On 1-LSI-6, select power from Unit 2. Verify with operator at 1-LSI-4 that power from Unit 2 is selected. If white light for Unit 2 power available is not lit, request Unit 2 to check 2-ELSC Ckt. 20 and 2-ELSC supply breaker on MCC-2-ABD-B are closed. Prepare to manually operate 1-FMO-222 and 1-FMO-232.
  - 2.4 Unit 2 R.O. close 2-FMO-212 MDAFP to 21 S/G. 2-FMO-242 MDAFP to 24 S/G.
  - 2.5 Unit 2 R.O. start 2 West MDAFP be alert for possible leakby into 21 & 24 S/G.
  - 2.6 Plant operator manually operate 1-FMO-222 and 1-FMO-232, handwheels to establish and maintain level in S/G's 12 & 13.
  - 2.7 If not already in service establish local control of steam generator PORV's per Attachment #4.

NOTE

An A-2 key required for following step.

- 2.8 If directed by Unit/Shift Supervisor, isolate control air at 1-XSO-52, (located in hallway on wall between doors to Unit 1 TDAFP and "E" MDAFP), unlock clutch, and manually open 12-CRV-51 CST Cross-Tie, if not already done.
- 2.9 If Step results in adequate control, steps 3 and 4 should be optional.
- 3.0 Establish Aux Feed Control to 11 and 14 Steam Generators. NOTE: An A-4 key is required for the following step.
  - 3.1 Unlock and open 2-FW-129 MDAFP Discharge Cross-Tie in Unit 2-East MDAFP Room.
  - 3.2 De-Energize at MCC 1-AZV-A: 1-FMO-212 MDAFP to 11 S/G. 1-FMO-242 MDAFP to 14 S/G.
  - 3.3 On 1-LSI-1, select local position on local/remote switches. On 1-LSI-5, select power from Unit 2. Verify with operator at 1-LSI-4 that power from Unit 2 is selected. If white light for Unit 2 power available is not lit request Unit 2 to check 2-ELSC Ckt. 20 and 2-ELSC supply breaker on MCC-2-ABD-B are closed. Prepare to manually operate 1-FMO-212 and 1-FMO-242.
  - 3.4 Unit 2 R.O. close 2-FMO-222 MDAFP to 22 S/G. 2-FMO-232 MDAFP to 23 S/G.
  - 3.5 Unit 2 R.O. start 2-EAST MDAFP. Be alert for possible leakby into 22 and 23 S/G.
  - 3.6 Plant operator manually operate 1-FMO-212 and 1-FMO-242 handwheels to establish and maintain level in S/G's 11 and 14.
  - 3.7 If not already in service, establish local control of steam generator PORV's per Attachment #4.

NOTE

An A-2 key required for following step.

- 3.8 If directed by Unit/Shift Supervisor, isolate control air at 1-XSO-52, (located in hallway on wall between doors to Unit 1 TDAFP and "E" MDAFP), unlock clutch, and manually open 12-CRV-51 CST Cross-Tie, if not already done.

- 3.9 If step results in adequate control, steps 2 and 4 should be optional.

NOTE

If during the process of Step 4, the TDAFP trips, immediately perform Step 2 or 3.

- 4.0 Establish Aux Feed control to S/G's from TDAFP, be alert for potential subsequent loss of TDAFP due to spurious trip. If necessary modify TDAFP trip solenoid and overspeed circuits as directed in 1-OHP 4023.001.001, Attachment #5, Pages 13 and 14.
- 4.1 Isolate control air to 1-FRV-258 (at 1-XSO-258 in Panel 1-TFP) to fail it open and prevent unwanted closure. Standby to operate Trip/Throttle Valve Handwheel as needed when operator(s) at FMO's are ready.
- 4.2 Plant operator Deenergize:
- |        |                           |                  |
|--------|---------------------------|------------------|
| 1-AB-N | 1-FMO-211                 | TDAFP to 11 S/G  |
|        | 1-FMO-221                 | TDAFP to 12 S/G  |
|        | 1-FMO-231                 | TDAFP to 13 S/G  |
|        | 1-FMO-241                 | TDAFP to 14 S/G  |
|        | Trip/Throttle Valve Motor |                  |
| 1-AM-A | 1-MCM-221                 | 12 S/G to TDAFP  |
| 1-AM-D | 1-MCM-231                 | 13 S/G to TDAFP. |
- 4.3 On 1-LSI-1 and 2, select local on local/remote switches. On 1-LSI-5 and 6, select power from Unit 2. Verify with operator at 1-LSI-4 that power from Unit 2 is selected. If white light for Unit 2 is not lit, verify CKT 20 on 2-ELSC panel and its supply breaker on 2-ABD-B are closed. Prepare to manually operate 1-FMO-211, 1-FMO-221, 1-FMO-231, and 1-FMO-241.
- 4.4 Manually open TDAFP Trip/Throttle Valve and adjust governor as needed.
- 4.5 Manually operate handwheels of 1-FMO-211, 1-FMO-221, 1-FMO-231, and 1-FMO-241 to establish and maintain steam generator levels. If minimum personnel are available close 1-FMO-211 and 1-FMO-241 and control 12 and 13 S/G levels with 1-FMO-221 and 1-FMO-241 by manual operation of handwheels. Operator at 1-LSI-4 will need to monitor levels of S/G's 11 and 14.



- 4.6 If not already done establish local control of S/G PORV's per Attachment #4.

NOTE

An A-2 Key required for the followir. step.

- 4.7 If directed by Unit/Shift Supervisor, isolate control air at 1-XSO-52 (located in hallway on wall between doors to Unit 1 TDAFP and "E" MDAFP), unlock clutch, and manually open 12-CRV-51 CST crosstie, if needed.

ISOLATE RCS AND STEAM GENERATORS

1.0 Verify closed the following reactor coolant system isolations from the Control Room if safe and possible. Otherwise de-energize to fail the valves closed and coordinate with Attachment #7.

		<u>BREAKER</u>	<u>BUS SUPPLY</u>
1-NRV-151	PZR PORV	1-CCV-AB CKT 79	1-MCAB CKT 16
1-NRV-152	PZR PORV	1-CCV-AB CKT 80	1-MCAB CKT 16
1-NRV-153	PZR PORV	1-CCV-CD CKT 79	1-MCCD CKT 16
1-QRV-111	Letdown Isol.	1-CCV-CD CKT 74	1-MCCD CKT 16
1-QRV-112	Letdown Isol.	1-CCV-AB CKT 75	1-MCAB CKT 16
1-QRV-113	Excess Letdown Isol.	1-VDAB-2 CKT 16	1-CRAB CKT 4 1-MDAB-1
1-QRV-114	Excess Letdown Isol.	1-VDCD-2 CKT 18	1-CRCD CKT 4 1-MDCD-1
1-NSO-21	Reactor Vent	1-SSV-A1 CKT 16 Nuclear Sample Room	1-CCV-CD CKT 47 1-MCCD-16
1-NSO-22	Reactor Vent	1-SSV-A1 CKT 16 Nuclear Sample Room	1-CCV-CD CKT 47 1-MCCD-16
1-NSO-23	Reactor Vent	1-CCV-AB CKT 73	1-MCAB CKT 16
1-NSO-24	Reactor Vent	1-CCV-AB CKT 73	1-MCAB CKT 16
1-NSO-61	Pressurizer Vent	1-SSV-A1 CKT 17 Nuclear Sample Room	1-CCV-CD CKT 41 1-MCCD-16
1-NSO-62	Pressurizer Vent	1-SSV-A1 CKT 17 Nuclear Sample Room	1-CCV-CD CKT 41 1-MCCD-16
1-NSO-63	Pressurizer Vent	1-CCV-AB CKT 74	1-MCAB CKT 16
1-NSO-64	Pressurizer Vent	1-CCV-AB CKT 74	1-MCAB CKT 16



2.0 S/G valves.

2.1 Verify 1-MRV-210, 1-MRV-220, 1-MRV-230, 1-MRV-240 S/G stop valves closed. If not closed, fail open the dump valves 1-MRV-211, 1-MRV-212, 1-MRV-221, 1-MRV-222, 1-MRV-231, 1-MRV-232, 1-MRV-241, and 1-MRV-242 by isolating control air.

2.2 Deenergize steam generator stop valves:

1-MRV-210	1-EZC-CN
1-MRV-220	1-AM-B
1-MRV-230	1-EZC-CS
1-MRV-240	1-EZC-BN

2.3 Deenergize TDAFP steam supply valves:

1-MCM-221	1-AM-A
1-MCM-231	1-AM-D

2.4 If TDAFP is not in service, close manually:

1-MCM-221	1-MCM-231
-----------	-----------

3.0 Seal return.

3.1 At 1-ABV-A de-energize 1-QCM-350 seal return containment isolation.

3.2 Manually close 1-QCM-350. The seal return will now be relieved to the PRT when line pressure  $\geq$  150 psi.



S/G PORV'S

This task may be done by the operator(s) controlling aux feed valves, once a somewhat stable condition is achieved, as long as Step 6 is not required.

1. Verify high pressure nitrogen bottle(s) valved in at the nitrogen bank.
2. Open the following valves:  

1-N-304	N <sub>2</sub>	to S/G PORV	Control Air Backup
1-N-305	N <sub>2</sub>	to 1-MRV-223	Control Air Backup
1-N-306	N <sub>2</sub>	to 1-MRV-233	Control Air Backup
1-N-307	N <sub>2</sub>	to 1-MRV-243	Control Air Backup
1-N-308	N <sub>2</sub>	to 1-MRV-213	Control Air Backup
3. Verify pressure regulator 1-GRV-354 (lockwired) is controlling downstream pressure at ~ 75 psig. Adjust if necessary.
4. At local control stations next to 1-LSI-1 and 1-LSI-2 select local control.
5. Operate 1-MRV-213, 1-MRV-223, 1-MRV-233, 1-MRV-243, as directed to maintain temperature or cooldown as required. Be careful not to cooldown too rapidly.
6. If local control stations(s) don't work or nitrogen supply is depleted, control the valves(s) by handwheel. Be sure to wear hearing protection.

1-EAST-RHR

This task requires coordination of Unit 2 reactor operator and one or more operators in the plant to align systems to provide RHR cooling using 2-W ESW Pump, 2-W CCW Pump, and 1-E RHR Pump powered from Unit 2 Emergency power supply.

- 1.0 Verify Maintenance/Technical have been requested to repower
  - 1.1 1-E RHR Pump from Unit 2 per procedure 1-MHP 2140.082.001.
  - 1.2 1-ICM-111, 1-ICM-129, 1-IMO-128 RHR cooldown suction and discharge valves per procedures 1-MHP 2140.082.005 and 1-THP 6030 IMP.305.
- 2.0 Unit 2 R.O.
  - 2.1 Verify both Unit 2 ESW Pumps running.
  - 2.2 Verify both Unit 2 CCW Pumps running or available.
  - 2.3 Throttle 2-WMO-738 ESW from 2-W CCW Hx as needed to maintain 2-W ESW Pump flow.
  - 2.4 Reduce cooling load on 2-W CCW Hx.
  - 2.5 Open 2-WMO-706, if not already open.
- 3.0 Plant Operator.
  - 3.1 In 1-CD Diesel room at MCC-1-ABD-D, De-energize 1-WMO-707 ESW Crosstie.
  - 3.2 In ESW Pipe tunnel manually open 1-WMO-707, if not already open.
  - 3.3 On 633' Unit 1 Aux at MCC-1-AM-D, De-energize:
    - 1-WMO-731 ESW to 1-E CCW Hx
    - 1-WMO-733 ESW from 1-E CCW Hx
    - 1-CMO-411 1-E CCW Suction Cross-tie
    - 1-CMO-412 1-E CCW Discharge Cross-tie
    - 1-CMO-415 1-E CCW to Misc. Header
    - 1-CMO-410 1-E CCW Hx Outlet
    - 1-CMO-419 CCW from 1-E RHR Hx
    - 1-IMO-312 1-E RHR Mini Flow
    - 1-IMO-330 1-E RHR Containment Spray
    - 1-IMO-340 1-E RHR Hx to Charging Suction
  - 3.4 Manually open 1-WMO-731 ESW to 1-E CCW Hx, if not already open.



3.5 Manually throttle 1-WMO-733 ESW from 1-E CCW Hx as necessary to maintain CCW Cooling during subsequent steps.

4.0 Unit 2 R.O. complete following valve alignment.

4.1 Open 2-CMO-411 2-E CCW Suction Cross-tie.

4.2 Open 2-CMO-415 2-E CCW to Misc. Header.

4.3 Closed 2-CMO-413 2-W CCW Suction Cross-tie.

4.4 Closed 2-CMO-414 2-W Discharge Cross-tie.

4.5 Closed 2-CMO-416 2-W to Misc. Header.

5.0 Plant operator complete following valve alignment (manually).

5.1 Closed 1-CCW-214 1-E CCW Surge Tank Isolation.

5.2 Closed 1-CCW-220 1-W CCW Surge Tank Isolation

5.3 Closed 1-CMO-410 1-E CCW Hx Outlet.

5.4 Closed 1-CMO-415 1-E CCW To Misc. Header.

5.5 Closed 1-CMO-411 1-E CCW Suction Cross-tie.

5.6 Closed 1-CMO-412 1-E CCW Discharge Cross-tie.

5.7 Closed 1-CCW-173 1-W CCW Discharge Unit Cross-tie.

5.8 Closed 1-CCW-256 1-W CCW Suction Unit Cross-tie.

5.9 Closed 12-CCW-168 Spare CCW Pump Suction.

5.10 Closed 12-CCW-171 Spare CCW Pump discharge.

5.11 Closed 2-CCW-167 2-E CCW Suction Unit Cross-tie.

5.12 Closed 2-CCW-172 2-E CCW Discharge Unit Cross-tie.

5.13 Open 2-CCW-173 2-W CCW Discharge Unit Cross-tie.

5.14 Open 2-CCW-256 2-W CCW Suction Unit Cross-tie.

5.15 Open 1-CCW-167 1-E CCW Suction Unit Cross-tie.

5.16 Open 1-CCW-172 1-E CCW Discharge Unit Cross-tie.

CAUTION

Step 6 eliminates cooling to Unit 2 W Train ECCS. Do not proceed unless 2'W' RHR, 2'W' CTS, 2'W' Cent. Charging and 2'S' S.I. pumps are locked out.

NOTE

Steps 6 and 7.1 should be done in rapid succession or simultaneously to limit time with no flow-path.

- 6.0 Unit 2 R.O. close 2-CMO-420; 2-W CCW Hx Outlet.
- 7.0 Plant operator.
  - 7.1 Manually open 1-CMO-410 1-E CCW Hx Outlet.
  - 7.2 Manually throttle 1-CMO-419 CCW from 1-E RHR Hx to control RHR Hx cooling.
  - 7.3 On 609' Unit 1 Aux at MCC-1AZV-A De-Energize 1-IMO-324 1-W RHR Cross-tie.
  - 7.4 On 587' Unit 1 Aux at MCC-1-ABV-D, De-Energize:
    - 1-IMO-310 1-E RHR Suction
    - 1-IMO-314 1-E RHR Cross-tie
    - 1-IMO-390 RWST to RHR
    - 1-ICM-311 RHR to Loops 1 and 4
  - 7.5 Complete following valve alignment (manually)
    - 7.5.1 Open 1-IMO-390 RWST to RHR.
    - 7.5.2 Open 1-IMO-310 1-E RHR Suction.
    - 7.5.3 Closed 1-IMO-324 1-W RHR Cross-tie.
    - 7.5.4 Closed 1-RH-128W 1-W RHR Hx to Cooldown.
    - 7.5.5 Closed 1-ICM-311 1-E RHR to Loops 1 and 4.
    - 7.5.6 Closed 1-IMO-330 1-E RHR to Containment Spray.
    - 7.5.7 Closed 1-IMO-340 1-E RHR to Charging Suction.
    - 7.5.8 Open 1-IMO-312 1-E RHR Mini Flow.
    - 7.5.9 Closed 1-IMO-314 1-E RHR Cross-tie.
    - 7.5.10 Closed 1-RH-130 RHR to RWST.

- 7.5.11 Open 1-RH-117 RHR Hx Bypass Isolation.
- 7.5.12 Closed 1-RH-128E 1-E RHR Hx to Cooldown.
- 7.5.13 Closed 1-RH-121E 1-E RHR to Letdown.
- 7.6 At local shutdown control station just east of RHR Hx room door isolate control air to EPT's for:
  - 1-IRV-310 1-E RHR Hx Outlet
  - 1-IRV-311 RHR Hx Bypass
- 8.0 Power from Unit 2 available to the following equipment
  - 8.1 1-E RHR Pump
  - 8.2 1-ICM-111 Cooldown to Loops 2 and 3.
  - 8.3 1-ICM-129 Cooldown from containment.
  - 8.4 1-IMO-128 Cooldown from Loop 2.
- 9.0 Manual local flow control will be accomplished by adjusting throttle position of:
  - 1-IMO-314 to Control Hx Bypass
  - 1-RH-128E to Control Hx Outlet
  - 1-IMO-312 to Control Recirculation

1-WEST-RHR

This task requires coordination of Unit 2 reactor operator and one or more operators in the plant to align systems to provide RHR cooling using 2-E ESW Pump, 2-E CCW Pump, and 1-W RHR Pump powered from Unit 2 Emergency power supply.

- 1.0 Verify Maintenance/Technical have been requested to repower
  - 1.1 1-W RHR Pump from Unit 2 per procedure 1-MHP 2140.082.001.
  - 1.2 1-ICM-111, 1-ICM-129, 1-IMO-128 RHR cooldown suction and discharge valves per procedures 1-MHP 2140.082.005 and 1-THP 6030 IMP.305.
- 2.0 Unit 2 R.O.
  - 2.1 Verify both Unit 2 ESW Pumps running.
  - 2.2 Verify both Unit 2 CCW Pumps running or available.
  - 2.3 Throttle 2-WMO-734 ESW Pump from 2-E CCW Hx as necessary to maintain 2-E ESW pump flow.
  - 2.4 Reduce cooling load on 2-E CCW Hx.
  - 2.5 Open 2-WMO-708, if not already open.
- 3.0 Plant Operator.
  - 3.1 In 1-AB Diesel room at MCC-1-ABD-A, De-energize 1-WMO-705 ESW Crosstie.
  - 3.2 In ESW Pipe tunnel manually open 1-WMO-705, if not already open.
  - 3.3 On 609' Unit 1 Aux at MCC-1-AZV-A, De-energize:  
1-WMO-735 ESW to 1-W CCW Hx  
1-WMO-737 ESW from 1-W CCW Hx  
1-IMO-324 1-W RHR Cross-tie
  - 3.4 Manually open 1-WMO-735 ESW to 1-W CCW Hx, if not already open.
  - 3.5 Manually throttle 1-WMO-737 ESW from 1-W CCW Hx as necessary to maintain CCW Cooling during subsequent steps.
- 4.0 Unit 2 R.O. complete following valve alignment.
  - 4.1 Open 2-CMO-413 2-W CCW Suction Cross-tie.

- 4.2 Open 2-CMO-416 2-W CCW to Misc. Header.
- 4.3 Closed 2-CMO-411 2-E CCW Suction Cross-tie.
- 4.4 Closed 2-CMO-412 2-E Discharge Cross-tie.
- 4.5 Closed 2-CMO-415 2-E to Misc. Header.

5.0 Plant operator

5.1 On 633' Unit 1 Aux at MCC-1-AM-A De-Energize

- 1-CMO-413 1-W CCW Suction Cross-tie
- 1-CMO-414 1-W CCW Discharge Cross-tie
- 1-CMO-416 1-W CCW to Misc. Header
- 1-CMO-420 1-W CCW Hx Outlet
- 1-CMO-429 CCW from 1-W RHR Hx
- 1-IMO-322 1-W RHR Mini Flow
- 1-IMO-331 1-W RHR Containment Spray
- 1-IMO-350 1-W RHR to S.I. Pump Suction

5.2 Complete following valve alignment (manually).

- 5.2.1 Closed 1-CCW-214 1-E CCW Surge Tank Isolation.
- 5.2.2 Closed 1-CCW-220 1-W CCW Surge Tank Isolation.
- 5.2.3 Closed 1-CMO-420 1-W CCW Hx Outlet.
- 5.2.4 Closed 1-CMO-416 1-W CCW To Misc. Header.
- 5.3.5 Closed 1-CMO-413 1-W CCW Suction Cross-tie.
- 5.2.6 Closed 1-CMO-414 1-W CCW Discharge Cross-tie.
- 5.2.7 Closed 1-CCW-167 1-E CCW Suction Unit Cross-tie.
- 5.2.8 Closed 1-CCW-172 1-E CCW Discharge Unit Cross-tie.
- 5.2.9 Closed 12-CCW-168 Spare CCW Pump Suction.
- 5.2.10 Closed 12-CCW-171 Spare CCW Pump discharge.

- 5.2.11 Closed 2-CCW-173 2-W CCW Discharge Unit Cross-tie.
- 5.2.12 Closed 2-CCW-256 2-W CCW Suction Unit Cross-tie.
- 5.2.13 Open 2-CCW-167 2-E CCW Suction Unit Cross-tie.
- 5.2.14 Open 2-CCW-172 2-E CCW Discharge Unit Cross-tie.
- 5.2.16 Open 1-CCW-173 1-W CCW Discharge Unit Cross-tie.
- 5.2.15 Open 1-CCW-256 1-W CCW Suction Unit Cross-tie.

CAUTION

Step 6 eliminates cooling to 2 E Train ECCS. Do not proceed unless 2'E' RHR, 2'E' CTS, 2'E' Cent. Charging, and 2'N' S.I. pumps are locked out.

NOTE

Steps 6 and 7.1 should be done in rapid succession if not simultaneously to limit time with no flow path.

6.0 Unit 2 R.O. close 2-CMO-410, 2-E CCW Hx Outlet.

7.0 Plant operator.

7.1 Manually open 1-CMO-420 1-W CCW Hx Outlet.

7.2 Manually throttle 1-CMO-429 CCW from 1-W RHR Hx to control RHR Hx cooling.

7.3 On 587' Unit 1 Aux at MCC-1-ABV-D, De-Energize:

- 1-IMO-314 1-E RHR Cross-tie
- 1-IMO-390 RWST to RHR

7.4 On 587' Unit 1 Aux at MCC-1-ABV-A De-Energize

- 1-ICM-321 RHR to Loops 2 and 3
- 1-IMO-320 1-W RHR Suction

7.5 Complete following valve alignment (manually)

- 7.5.1 Open 1-IMO-390 RWST to RHR.



- 7.5.2 Open 1-IMO-320 1-W RHR Suction.
- 7.5.3 Closed 1-IMO-324 1-W RHR Cross-tie.
- 7.5.4 Closed 1-RH-128W 1-W RHR Hx to Cooldown.
- 7.5.5 Closed 1-ICM-321 1-W RHR to Loops 2 and 3.
- 7.5.6 Closed 1-IMO-331 1-W RHR to Containment Spray.
- 7.5.7 Closed 1-IMO-350 1-W RHR to Charging Suction.
- 7.5.8 Open 1-IMO-322 1-W RHR Mini Flow.
- 7.5.9 Closed 1-RH-121W 1-W RHR to Letdown.
- 7.5.10 Closed 1-IMO-314 1-E RHR Cross-tie.
- 7.5.11 Closed 1-RH-130 RHR to RWST.
- 7.5.12 Open 1-RH-117 RHR Hx Bypass Isolation.
- 7.5.13 Closed 1-RH-128E 1-E RHR Hx to Cooldown.
- 7.6 At local shutdown control station just east of RHR Hx room door isolate control air to EPT's for:
  - 1-IRV-320 1-W RHR Hx Outlet
  - 1-IRV-311 RHR Hx Bypass
- 8.0 Power from Unit 2 available to the following equipment
  - 8.1 1-W RHR Pump
  - 8.2 1-ICM-111 Cooldown to Loops 2 and 3.
  - 8.3 1-ICM-129 Cooldown from containment.
  - 8.4 1-IMO-128 Cooldown from Loop 2.
- 9.0 Manual local flow control will be accomplished by adjusting throttle position of:
  - 1-IMO-324 to Control Hx Bypass
  - 1-RH-128W to Control Hx Outlet
  - 1-IMO-322 to Control Recirculation



DE-ENERGIZE

De-energize the following equipment to prevent spurious actuations of components which could have significant effect on shutdown control.

Be sure to use safety equipment: SCBA, Gloves, Face Shield, etc. as appropriate.

1.0 In the Switch Gear Rooms.

- 1.1 This step deenergizes PZR PORV's, Rx and PZR Vents, Letdown and Excess Letdown and many other valves and equipment. Coordinate with Attachment #3, Step 1.0.

Open DC Switches: 1-MCAB CKT 16  
1-MDAB CKT 1  
1-MCCD CKT 16  
1-MCCD CKT 1

- 1.2 4kv Buses: Remove Control Power Fuse Block and manually trip the breaker.

1.2.1 T11D BUS Breaker:

T11D12 Bus Tie to 1D  
T11D1 E.P.  
T11D8 CD Diesel Output  
T11D3 #1E CCW Pump  
T11D4 #1E CTS Pump  
T11D5 #1N S.I. Pump  
T11D6 #1E RHR Pump  
T11D7 #1E CHG Pump  
T11D9 TR 11 PHC  
T11D10 #1E ESW Pump  
T11D11 #1E MDAF Pump

1.2.2 T11C BUS Breaker:

T11C1 Bus Tie to 1C  
T11C2 E.P.  
T11C3 CD Diesel Output

1.2.3 T11A BUS Breaker:

T11A9 Bus Tie to 1A  
T11A12 E.P.  
T11A11 AB Diesel Output  
T11A1 #1S S.I. Pump  
T11A2 #1W MDAFP  
T11A3 #1W CTS Pump  
T11A4 #1W RHR Pump  
T11A5 #1W ESW Pump  
T11A6 TR 11PHA  
T11A7 #1W CCW Pump  
T11A8 #1W CHG Pump



1.2.4 T11B BUS Breaker:

T11B1 Bus Tie to 1B  
T11B2 E.P.  
T11B4 AB Diesel Output

1.2.5 1A BUS Breaker:

1A7 Normal Supply  
1A5 Reserve Supply  
1A4 #14 RCP  
1A6 #12 Circ. Pump  
1A8 #1M Hotwell Pump  
1A10 #1M Cond. Booster PP

1.2.6 1B BUS Breaker:

1B7 Normal Supply  
1B5 Reserve Supply  
1B2 #1M Heater Drn. Pump  
1B3 #13 Circ. Pump  
1B6 TR. 11BMC  
1B9 #11 RCP

1.2.7 1C BUS Breaker:

1C6 Normal Supply  
1C4 Reserve Supply  
1C2 #12 RCP  
1C5 TR 11 CMC  
1C8 #1S Hotwell Pump  
1C9 #1S Cond. Booster PP  
1C10 #1S Heater Drn. PP

1.2.8 1D BUS Breaker:

1D5 Normal Supply  
1D3 Reserve Supply  
1D2 #1N Heater Drn. Pump  
1D4 #11 Circ. Pump  
1D6 #1N Hotwell Pump  
1D7 #1N Cond. Booster Pump  
1D9 #13 RCP

1.3 Deenergize non essential 600V Loads from the "11"  
Buses. Pull fuses and trip or verify tripped or racked  
out.

1.3.1 11A BUS Breaker:

11A1 #1S Rod Drive M/G Set  
11A4 #1S Plant Light  
11A7 Office Lighting  
11A10 #1W TACW Pump  
11A13 MCC-1-AM-A1  
11AC Bus Tie 11A/11C



1.3.2 11B BUS Breaker:

11B3 Aux Bldg Crane  
11B5 MCC-1-TB6-BE & 1-TBP-BW  
11B6 #1E TACW Pump  
11B7 Heating Boiler F.D. Fan  
11B8 2nd Stage Degass. Vac. Pump  
11B10 Plant Air Comp.  
11B12 #1S NESW Pump  
11B13 Turbine Rm Bolt Heaters  
11BD Bus Tie 11B/11D

1.3.3 11C Bus Breaker:

11C2 Polar Crane  
11C3 MCC-1-AM-C1  
11C4 N Screen Wash Pump  
11C5 STD By Degas Vac Pump  
11C8 SVC Bldg & STD By Light  
11C9 Main & Spare Transformer Aux Normal  
11C12 N Spent Fuel Pit Pump  
11C13 Recip Chrg. Pump  
11C14 Hi Demand Fire Pump  
11C16 MCC-TBV-CS & 1-TGB-CW  
11C17 #1N NESW Pump  
11C18 Turbine Bldg Crane

1.3.4 11D BUS Breaker:

11D3 Containment Lighting  
11D9 Main & Spare Transformer Aux Emergency  
11D10 1N Plant Lighting  
11D13 1N Control Rod M/G Set



RESTORE AC TO EMERGENCY BUS(ES)

- 1.0 Verify equipment de-energized, Attachment #7 completed.

NOTE

Attempt to restore power to at least one emergency bus.  
Either Step 2 or 3 may be used first.

- 2.0 Restore AC to Train B Emergency Bus. Modify breakers as necessary using the appropriate attachment of 1-OHP 4023.001.001.
- 2.1 Verify racked in and locally close E.P. breakers T11A12 and T11B2 (1-OHP 4023.001.001, Attachment #2)
- 2.2 If power to bus is restored, go to Step 6.3.
- 2.3 If bus still has no power, pull fuses and locally trip E.P. breakers T11A12 and T11B2. Start AB Diesel using the local control procedure 1-OHP 4023.032.002.
- 2.4 If power to bus is restored, go to Step 6.3.
- 2.5 If bus still has no power and Steps 3.1 through 3.3 have been unsuccessful, go to Step 4.0, otherwise go to Step 3.0.
- 3.0 Restore AC to Train A, Emergency Bus. Modify breakers as necessary using the appropriate attachment of 1-OHP 4023.001.001.
- 3.1 Verify racked in and locally close E.P. breakers T11D1 and T11C2 (1-OHP 4023.001.001, Attachment #2).
- 3.2 If power to bus is restored, go to Step 7.3.
- 3.3 If bus still has no power, pull fuses and locally trip E.P. breakers T11D1 and T11C2. Start CD Diesel using the local control procedure 1-OHP 4023.032.003.
- 3.4 If power to bus is restored, go to Step 7.3.
- 3.5 If bus still has no power and Steps 2.1 through 2.3 have been unsuccessful, go to Step 4.0, otherwise go to 2.0.
- 4.0 In E.P. switch yard check breaker 1-E.P. closed.
- 4.1 If found closed, proceed to Step 5.0.
- 4.2 If found open, manually close 1-EP using 1-OHP 4023.001.001, Attachment #1, Pages 7 and 8.



- 4.3 Re-attempt Step 2.1 or 3.1. If power is restored, go to Step 6.3 or 7.3 respectively.
- 4.4 Re-attempt Step 2.1 or 3.1 whichever was not tried in Step 4.3. If power is restored, go to Step 6.3 or 7.3 respectively.
- 4.5 If still no power, go to Step 5.0.
- 5.0 Investigate status of transformers 101-AB, 101-CD, 4 and 5, as well as Switch Yard Bus Status.
  - 5.1 If 12AB breaker is open, use 1-OHP 4023.001.001, Attachment #1, Page 3 and 4, to locally close it.
  - 5.2 Verify in Unit 2 C.R. light is lit for 12AB bus energized. If lit, go to Step 6.0.
  - 5.3 If not lit and if 12CD breaker is open, use 1-OHP 4023.001.001, Attachment #1, Page 5 and 6, to locally close it.
  - 5.4 Verify in Unit 2 C.R. light is lit for 12CD bus energized. If lit, go to Step 7.0.
  - 5.5 If not, re-evaluate entire electrical status with Michiana Dispatch and TSC/EOF.
- 6.0 If power was restored to 12AB Bus.
  - 6.1 Locally close 4 kv. breaker 1A5 Reserve Supply (1-OHP 4023.001.001, Attachment #2).
  - 6.2 Locally close 4 kv. breaker T11A9 Bus Tie (1-OHP 4023.001.001, Attachment #2).
  - 6.3 Locally close 4 kv. breaker T11A10, TR11A High Side (1-OHP 4023.001.001, Attachment #2).
  - 6.4 Locally close 600 v. breaker 11A11 TR11A Low Side (1-OHP 4023.001.001, Attachment #3, Page 3 and Attachment #4).
  - 6.5 Energize additional equipment as needed, available, controllable to enhance control of safe shutdown equipment.
- 7.0 If power was restored to 12CD Bus.
  - 7.1 Locally close 4 kv. breaker 1D3 Reserve Supply (1-OHP 4023.001.001, Attachment #2).
  - 7.2 Locally close 4 kv. breaker T11D12 Bus Tie (1-OHP 4023.001.001, Attachment #2).

- 7.3 Locally close 4 kv. breaker T11D2 TR11D High Side  
(1-OHP 4023.001.001, Attachment #2).
- 7.4 Locally close 600 v. breaker 11D1 TR11D Low Side (1-OHP  
4023.001.001, Attachment #3, Page 6, and Attachment  
#4).
- 7.5 Energize additional equipment as needed, available,  
controllable to enhance safe shutdown efforts.
- 8.0 Establish and maintain stable control, while repairs and  
replacement of damaged cables etc., are in progress.



# INDIANA & MICHIGAN ELECTRIC COMPANY

## DONALD C COOK NUCLEAR PLANT

### PROCEDURE COVER SHEET

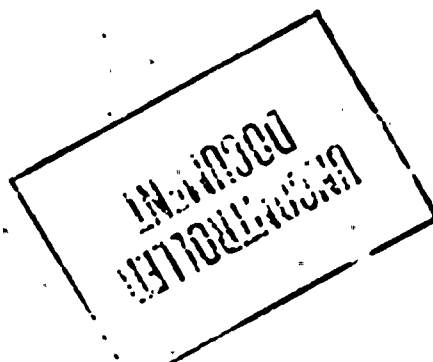
MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

Procedure No. \*\*IMHP2140.082.001

Revision No. 0

**TITLE** MAINTENANCE PROCEDURE FOR REPOWERING AN RHR PUMP

**SCOPE OF REVISION**



SIGNATURES	REVISION NUMBER			
*****	ORIGINAL			
PREPARED BY	<i>[Signature]</i>			
DEPARTMENT HEAD APPROVAL	<i>[Signature]</i>			
INTERFACING DEPARTMENT HEAD CONCURRENCE	N/A			
QUALITY ASSURANCE SUPERVISOR APPROVAL	<i>[Signature]</i>			
PLANT NUCLEAR SAFETY COMMITTEE	<i>[Signature]</i> #1911			
PLANT MANAGER APPROVAL	<i>[Signature]</i>			
APPROVAL DATE	5/22/86			
EFFECTIVE DATE	5/29/86			

8606130107 860606  
PDR ADOCK 05000315  
F PDR

LIST OF EFFECTIVE PAGES

PAGE NUMBERS

REVISION NUMBER/EFFECTIVE CHANGES

1 of 10  
2 of 10  
3 of 10  
4 of 10  
5 of 10  
6 of 10  
7 of 10  
8 of 10  
9 of 10  
10 of 10

Revision 0  
Revision 0  
Revision 0  
Revision 0  
Revision 0  
Revision 0  
Revision 0  
Revision 0  
Revision 0  
Revision 0

Attachment No. 1  
Page 1 of 1

Revision 0

Attachment No. 2  
Page 1 of 1

Revision 0

Attachment No. 3  
Page 1 of 1

Revision 0



INDIANA & MICHIGAN ELECTRIC COMPANY  
DONALD C. COOK NUCLEAR PLANT

1.0 TITLE: Maintenance Procedure for Repowering an RHR Pump

2.0 OBJECTIVE

2.1 This procedure provides instructions for the installation of a temporary power feed to either a disabled Unit 1 East or West RHR pump from a power source in Unit 2. It is intended for use when the power and/or control cables for both RHR pumps have been fire damaged resulting in a loss of operability of the RHR system.

3.0 REFERENCES

- 3.1 Equipment Control - Clearance Permit System - PMI-2110.
- 3.2 Radiation Protection Manual, Section 5.F and Procedure No. THP.6010.RAD.406 Radiation Work Permit.
- 3.3 Plant Safety Manual, General Safety G.9.
- 3.4 Maintenance Procedure 12MHP5021.082.006.
- 3.5 Temporary Modifications, PMI-2140.
- 3.6 A.E.P. High Voltage Cable Splicing & Terminating Procedures and Training Manual.
- 3.7 I&M Electric Company Guide to High Voltage DC Testing of Cables.
- 3.8 10CFR50, Appendix R, Section III, L.5.
- 3.9 Control of Special Tools and Measuring and Test Equipment, MHI-5060.

4.0 PRECAUTIONS

- 4.1 Calibrated tools or measuring and test equipment shall not be used in a manner that would invalidate its calibration.
- 4.2 If temporary cable routes break a fire barrier's integrity (i.e., prevents a fire door's full closure) a fire watch shall be posted until the fire barrier is returned to normal.



## 5.0 LIMITATIONS

- 5.1 Subsections and steps within Section 7.0 should be accomplished in the sequence shown, unless specified otherwise in the body of the procedure. Steps which are performed out of sequence shall be indicated by a short explanation of why it was performed out of sequence and initialed by the Maintenance Supervisor assigned the work.
- 5.2 The Maintenance Supervisor assigned the work is responsible for ensuring that the controlled copy of this procedure is the latest revision and includes all applicable approved change sheets.
- 5.3 The Maintenance Supervisor assigned the work is responsible for ensuring that the controlled copy of this procedure is maintained at the work site, if not in a radiological controlled area, and that required data is entered in the controlled copy. If the work to be performed is in a radiological controlled area, the controlled copy shall be maintained in the Supervisor's office and a controlled working copy shall be available at the job site.

NOTE: When a controlled working copy is being used at the work site, data should be entered as best as practical.

- 5.4 The Maintenance Supervisor assigned the work is responsible for initialing all steps which are performed out of sequence. All steps which will not be performed based on the scope of work, will be indicated by "N/A" in the appropriate sign off blank, and initialed by the Supervisor with a brief explanation of why the step was not performed.
- 5.5 Attachments No. 2 or 3 must be completed for Lifted Leads or Electrical Jumpers, per PMI-2140. Multiple copies of these attachments may be used.
- 5.6 Steps in the procedure which require a verification by the Maint. Supv. may be performed by a qualified individual designated by the Supervisor, provided that individual is independent of the work being performed.
- 5.7 It is assumed that the equipment required by this procedure is available. Additionally, use of equipment required from the opposite (unaffected) unit should not impair safe continued operation or shutdown of that unit.



## 6.0 INITIAL CONDITIONS

NOTE: Temporary power may be obtained from one of the U2 RHR or CTS pumps, or from a U2 4KV breaker, as applicable, after consulting the IAG and corporate engineering support teams. If used, the pump must be returned to operable status (for U-2) within 72 hours (Modes 1, 2, & 3 for RHR; Modes 1, 2, 3, & 4 for CTS) per Tech. Spec. Section 3.5.2 and 3.6.2.1, respectively.

- 6.1      Maint. Mech.      Indicate which Unit 1 pump is to be repowered, and which Unit 2 pump-breaker or supply 4KV breaker, as applicable, will be used for the power supply.
- Unit 1 pump \_\_\_\_\_
- Unit 2 pump-breaker \_\_\_\_\_
- Unit 2 Supply 4KV breaker \_\_\_\_\_
- Performed By \_\_\_\_\_ Date \_\_\_\_\_
- 6.2      Maint. Mech./      Enter Job Order Number.
- J.O. # \_\_\_\_\_
- 6.3      Maint. Mech.      Obtain the necessary Clearance Permit(s) and record the Clearance Permit number(s).
- Clearance Permit # \_\_\_\_\_
- 6.4      Maint. Mech.      Notify the Unit Supervisor that work is to be started.
- Unit 1 Supervisor \_\_\_\_\_ Date \_\_\_\_\_
- Unit 2 Supervisor \_\_\_\_\_ Date \_\_\_\_\_
- 6.5      Maint. Mech.      Verify that all materials which are known to be required are available prior to starting the work. See Attachment No. 1 for a list of required materials.
- Verified By \_\_\_\_\_ Date \_\_\_\_\_



## 7.0 DETAILS

### 7.1 DISCONNECTING POWER - UNIT 1 MOTOR

- 7.1.1 Maint. Mech. Verify the breaker for the Unit 1 pump has been racked out and tagged and the motor is de-energized. See Step 6.1.  
 1 E RHR Pump (1-PP-35E) = Breaker T11D6  
 1 W RHR Pump (1-PP-35W) = Breaker T11A4
- 7.1.2 Maint. Mech. Verify grounds are installed on the existing power feed. Disconnect the power cable from the U-1 RHR pump motor and breaker. Apply Temporary Modification I.D. Tags. Enter data and sign-off Attachment No. 2.
- 7.1.3 Maint. Mech. Disconnect the flex conduit and remove it from the terminal box.

### 7.2 TEMPORARY POWER SUPPLY - UNIT 2

NOTE: Subsection 7.2.1 should be used if temporary power is to be obtained from a Unit 2 RHR or CTS pump. Subsection 7.2.2 should be used if temporary power is to be obtained from a Unit 2 4KV breaker.

#### 7.2.1 RHR OR CTS PUMP MOTOR - UNIT 2

- 7.2.1.1 Maint. Mech. Verify the breaker for the unaffected Unit 2 pump has been racked out and tagged, and the motor is de-energized. See Step 6.1.  
 2 E RHR Pump (2-PP-35E) = Breaker T21D6  
 2 W RHR Pump (2-PP-35W) = Breaker T21A4  
 2 E CTS Pump (2-PP-9E) = Breaker T21D4  
 2 W CTS Pump (2-PP-9W) = Breaker T21A3
- 7.2.1.2 Maint. Mech. Verify grounds have been installed on the breaker/cable. Disconnect the power cable at the U-2 breaker.
- 7.2.1.3 NOTE: Mark the cables to ensure proper phasing when the cables are re-terminated.
- Maint. Mech. Disconnect the existing power cable from the selected U-2 RHR or CTS pump motor, as applicable. Apply Temporary Modification I.D. Tags. Enter data and sign-off on Attachment No. 2.
- 7.2.1.4 Maint. Supv. Verify the power feeds for the U-1 and U-2 pump motors have been lifted correctly and temporary I.D. tags have been applied. Sign-off on Attachment No. 2.



## 7.2.2 4KV BREAKER - UNIT 2

- 7.2.2.1 Maint. Mech. Verify the appropriate Unit 2 4KV breaker has been racked out and tagged. See Step 6.1.
- 7.2.2.2 Maint. Mech. Verify grounds have been installed on the breaker/cable, as applicable.
- 7.2.2.3 NOTE: Mark cables to ensure proper phasing when the cables are re-terminated.
- Maint. Mech. Disconnect the existing power cable from the breaker, if applicable. Apply Temporary Modification I.D. Tags. Enter data and signoff on Attachment No. 2, if applicable.
- 7.2.2.4 Maint. Supv. Verify the power feed for the U-1 RHR motor and the U-2 4KV breaker (if applicable) have been properly lifted and Temporary I.D. Tags have been applied. Sign-off on Attachment No. 2, as applicable.

## 7.3 CONNECTING POWER

- 7.3.1 Maint. Mech. Route the jumper cable assembly between the U-2 motor or the selected supply 4KV breaker, as applicable, and the U-1 motor.
- 7.3.2 Maint. Mech. NOTE: Preferred routing is overhead in the hallway as opposed to laying the cable on the floor.
- Connect the temporary power cable to the motor end of the Unit 2 pump power cable or to the selected supply 4KV breaker, as applicable, using the appropriate section(s) of Maint. Procedure 12MHP5021.082.006. Route the cable thru the hole where the flex conduit was removed. Use the mica board and cable ties to support the cable inside the box.
- 7.3.3 Maint. Mech. Protect the pump end of the temporary power cable and perform a hi-pot test of the new power cable assembly. Record test instrument data below.

Test Instrument I.D. #	Calib. Date/Due Date

7.3.4 Maint. Mech.

Connect the temporary power cable to the U-1 pump using appropriate sections of Maintenance Procedure 12MHP5021.082.006.

7.3.5 Maint. Mech.

NOTE: Existing clearances may have to be released and appropriate clearances hung to perform the rotational check.

Connect the temporary power cable to the U-2 breaker, using appropriate section of Maintenance Procedure 12MHP5021.082.006, and bump for rotation. Apply Temporary Modification I.D. Tags. Swap leads at the breaker, if required, to achieve proper rotation. Mark the cables to ensure proper phasing when the breaker is returned to normal service. Enter data and sign-off on Attachment No. 3.

7.3.6 Maint. Supv.

Verify the temporary power cable is properly installed and temporary I.D. tags are attached. Sign-off on Attachment No. 3.

7.3.7 Maint. Mech.

Notify the Control Room/Shift Supervisor that the new RHR pump power cable has been installed and tested and that the pump is functional.

Performed By \_\_\_\_\_

Date \_\_\_\_\_

S.S. \_\_\_\_\_

Date \_\_\_\_\_

## 8.0 RESTORATION

### 8.1 UNIT 1 PUMP

8.1.1 Maint. Mech.

Perform a visual inspection of the power feed(s) to the motor(s). If any damage is noted, proceed directly to step 8.1.3.

Observations \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



8.1.2 Maint. Mech.

Perform a hi-pot on the power cable(s).  
Record the current measured and instrument data.

1-E RHR \_\_\_\_\_

1-W RHR \_\_\_\_\_

Test Instrument I.D. # \_\_\_\_\_ Calib. Date/Due Date \_\_\_\_\_

An acceptable value is two (2) microamps or less. If the current is greater than two microamps, contact Maint. Supv. for resolution. If the hi-pot is acceptable, proceed directly to Step 8.1.6.

8.1.3 Maint. Mech.

Remove the damaged cable and pull new cable per Maintenance Procedure  
\*\*12MHP5021.082.004.

8.1.4 Maint. Mech.

Install lugs on the new cable per Maintenance Procedure 12MHP5021.082.006.

8.1.5 Maint. Mech.

Perform a hi-pot on the new power cable.

Test Instrument I.D. # \_\_\_\_\_ Calib. Date/Due Date \_\_\_\_\_

8.1.6 Maint. Mech.

Verify the appropriate U-2 breaker has been racked out and tagged, and the U-1 pump motor is de-energized.

8.1.7 Maint. Mech.

Verify grounds have been installed on the breaker/temporary power cable. Determine the temporary power cable from the motor. Enter data and sign-off on Attachment No. 3.

8.1.8 Maint. Mech.

Terminate the permanent power cable at the U-1 motor and its associated breaker per Maintenance Procedure 12MHP5021.082.006.

8.1.9 Maint. Mech.

NOTE: Existing clearances may have to be released and appropriate clearances hung to perform this step.

Bump the motor for rotation. Swap leads as required for proper operation. Sign-off on Attachment No. 2.

8.1.10 Maint. Supv.

Verify power feed has been properly restored to the U-1 motor and temporary I.D. tags have been removed. Sign-off on Attachment No. 2.



8.1.11 Maint. Mech. Notify the Shift Supervisor and Unit Supervisor that the Unit 1 RHR Pump has been tested and is functional.

Performed By \_\_\_\_\_ Date \_\_\_\_\_  
S.S. \_\_\_\_\_ Date \_\_\_\_\_

8.2 UNIT 2 PUMP (AS APPLICABLE)

8.2.1 Maint. Mech. Verify the appropriate U-2 breaker has been racked out and tagged and that the power cable is de-energized.

8.2.2 Maint. Mech. Verify grounds have been installed on the breaker/power cable. Disconnect the jumper cable from the motor end of the power cable and remove temporary I.D. tags. Complete Attachment No. 3 and sign-off.

8.2.3 Maint. Supv. Verify the jumper has been properly removed. Sign-off on Attachment No. 3.

8.2.4 Maint. Mech. Terminate the power cable at the motor (if applicable) per Maintenance Procedure 12MHP5021.082.006. If leads were swapped at the breaker, return them to their normal position. (See Step 7.3.5).

8.2.5 Maint. Mech. NOTE: Existing clearances may have to be released and appropriate clearances hung to perform this step.

Bump the motor for rotation. Swap leads as required for proper operation. Sign-off Attachment No. 2.

8.2.6 Maint. Supv. Verify the temporary power cable has been removed and the permanent cable is re-terminated at the motor, and all temporary I.D. tags have been removed. Sign-off on Attachments No. 2 and No. 3.



8.2.7 Maint. Mech. Notify the Shift Supervisor and Unit Supervisor that the U-2 RHR Pump has been tested and is functional.

Performed By \_\_\_\_\_

Date \_\_\_\_\_

S.S. \_\_\_\_\_

Date \_\_\_\_\_

8.3 U-2 4KV BREAKER (AS APPLICABLE)

8.3.1 Maint. Mech. Verify the appropriate U-2 breaker has been racked out and tagged and that the power cable is de-energized.

8.3.2 Maint. Mech. Verify grounds have been installed on the breaker/power cable. Disconnect the jumper cable from the breaker end of the power cable and remove temporary I.D. tags. Complete Attachment No. 3 and sign-off.

8.3.3 Maint. Supv. Verify the jumper has been properly removed. Sign-off on Attachment No. 3.

8.3.4 Maint. Mech. Terminate the power cable at the breaker per Maintenance Procedure 12MHP5021.082.006. If leads were swapped at the breaker, return them to their normal position. (See Step 7.2.2.3).

8.3.5 Maint. Supv. Verify the temporary power cable has been removed and the permanent cable is re-terminated at the breaker, and all temporary I.D. tags have been removed. Sign-off on Attachments No. 2 and No. 3.

8.3.6 Maint. Mech. Notify the Shift Supervisor and Unit Supervisor that the U-2 4KV breaker's power feed has been restored and may be released for clearance.

8.4 RETURN TEMPORARY POWER SUPPLY MATERIALS TO STORAGE CABINET

8.4.1 Maint. Mech. Return all temporary power supply cable and tools to the storage cabinet.

8.4.2 Maint. Supv. NOTE: Attachment No. 1 is a listing of the required materials.

Verify all required materials are in the storage cabinet.



9.0 ACCEPTANCE CRITERIA

- 9.1 Interim acceptance will be achieved upon installation of the temporary power supply to the U-1 RHR Pump, provided work is completed per this procedure and the affected U-1 pump is functional with a U-2 power supply.
- 9.2 Final acceptance will be achieved upon restoration of normal power supply to both Unit RHR pumps per this procedure, and both pumps are functional, or restoration of normal power supply to the U-1 RHR pump per this procedure with satisfactory operational check if a supply 4KV breaker was used for temporary power.
- 9.3 In the event that jumpers are not removed and/or lifted leads are not restored, a PNSRC evaluation shall be performed and the signoff completed on the appropriate attachment(s).

10.0 DATA COLLECTION

- 10.1 Maint. Supv. Review entire procedure for completeness.

\_\_\_\_\_  
Maint. Supv.

\_\_\_\_\_  
Date

- 10.2 Maint. Supt. Review of entire procedure.

\_\_\_\_\_  
Maint. Supt.

\_\_\_\_\_  
Date

TOOLS AND HARDWARE

Fine Tip Screwdriver  
Heavy Tip Screwdriver  
3/8" Drive Socket Set  
12" Extension  
Straight Wrenches (1/8" - 3/4")  
6" Cresoent Wrench  
10" Crescent Wrench  
Medium Channel-lock  
Large Channel-lock  
Knife  
Hammer  
Punch  
Chisel  
Splicing Tape  
Mica Board and Cable Ties

LIFTED WIRE FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT \_\_\_\_\_  
LOCATION \_\_\_\_\_  
EQUIPMENT AFFECTED \_\_\_\_\_  
7.1.2 7.2.2.3  
8.1.9 7.2.1.3  
8.2.5

ITEM #	TERM. BLOCK #	CABLE #/COMPONENT DESCRIPTION	LIFTED		LANDED	
	TERMINAL #		BY	DATE	BY	DATE

7.2.1.4 THE ABOVE WIRES HAVE BEEN CORRECTLY LIFTED.  
(7.2.2.4) ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.1.10 PARTIAL RESTORATION: THE FOLLOWING WIRES HAVE BEEN RESTORED TO  
DESIGN CONFIGURATION.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.2.6 FINAL RESTORATION: ALL WIRES WHICH WERE LIFTED HAVE BEEN  
(8.3.5) RESTORED TO DESIGN CONFIGURATION AND ALL TAGS  
HAVE BEEN REMOVED.  
VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE LIFTED WIRES HAVE BEEN RESTORED AND A 10  
CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND  
APPROVED BY THE PNSRC PER PMI-1040.  
PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.



# ELECTRICAL JUMPER FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT \_\_\_\_\_  
LOCATION \_\_\_\_\_  
EQUIPMENT AFFECTED \_\_\_\_\_  
7.3.5 \_\_\_\_\_  
8.1.7 \_\_\_\_\_

[illegible]

7.3.6 THE ABOVE JUMPERS HAVE BEEN CORRECTLY INSTALLED.  
ITEM # VERIFIED BY DATE

8.2.3 PARTIAL RESTORATION: THE FOLLOWING JUMPERS HAVE BEEN REMOVED.  
(6.3.3)

ITEM #.	VERIFIED BY	DATE
---------	-------------	------

8.2.6 FINAL RESTORATION: ALL JUMPERS WHICH WERE INSTALLED AND ALL TAGS  
(8.3.6) HAVE BEEN REMOVED AND THE CIRCUIT RESTORED TO  
DESIGN CONFIGURATION.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3           PNSRC REVIEW: NOT ALL THE JUMPERS HAVE BEEN REMOVED AND A 10 CFR  
50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED  
BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY	PNSRC MTG	DATE

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.



# INDIANA & MICHIGAN ELECTRIC COMPANY

## DONALD C COOK NUCLEAR PLANT

### PROCEDURE COVER SHEET

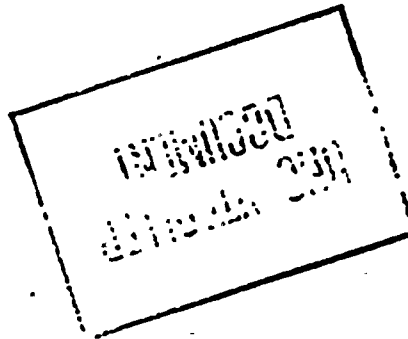
MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

Procedure No. \*\*1MHP2140.082.003

Revision No. 0

**TITLE** MAINTENANCE PROCEDURE FOR REPOWERING PRESSURIZER BACKUP HEATERS

**SCOPE OF REVISION**



SIGNATURES	REVISION NUMBER			
*****	ORIGINAL			
PREPARED BY	<i>[Signature]</i>			
DEPARTMENT HEAD APPROVAL	<i>[Signature]</i>			
INTERFACING DEPARTMENT HEAD CONCURRENCE	<i>[Signature]</i> N/A			
QUALITY ASSURANCE SUPERVISOR APPROVAL	<i>[Signature]</i>			
PLANT NUCLEAR SAFETY COMMITTEE	<i>[Signature]</i>	8606130109 PDR	860606 ADOCK 05000315 PDR	
PLANT MANAGER APPROVAL	<i>[Signature]</i>			
APPROVAL DATE	5/22/86			
EFFECTIVE DATE	5/29/86			



LIST OF EFFECTIVE PAGES

<u>PAGE NUMBER</u>	<u>REVISION NUMBER/EFFECTIVE CHANGES</u>
1 of 7	Revision 0
2 of 7	Revision 0
3 of 7	Revision 0
4 of 7	Revision 0
5 of 7	Revision 0
6 of 7	Revision 0
7 of 7	Revision 0
<u>Attachment No. 1</u>	
Page 1 of 1	Revision 0
<u>Attachment No. 2</u>	
Page 1 of 1	Revision 0
<u>Attachment No. 3</u>	
Page 1 of 1	Revision 0
<u>Attachment No. 4</u>	
Page 1 of 1	Revision 0

DONALD C. COOK NUCLEAR PLANT  
INDIANA & MICHIGAN ELECTRIC COMPANY

1.0 TITLE: Maintenance Procedure for Repowering Pressurizer Backup Heaters

2.0 OBJECTIVE:

2.1 This procedure provides instructions for the installation of a temporary power feed to an inoperative Unit 1 pressurizer heater backup group from a Unit 2 power source. It is intended for use when the power and/or control cables for the backup heater groups have been fire damaged resulting in a loss of operability of the pressurizer backup heater groups.

3.0 REFERENCES:

- 3.1 Equipment Control-Clearance Permit System, PMI-2110.
- 3.2 Plant Safety Manual, General Safety G.9.
- 3.3 Maintenance Procedure 12MP5021.082.006.
- 3.4 Maintenance Procedure \*\*MP5022.082.002.
- 3.5 10CFR50, Appendix R, Section III, L.5.
- 3.6 Control of Special Tools and Measuring and Test Equipment, MHI-5060.
- 3.7 Donald C. Cook Technical Specification 3.4.4.

4.0 PRECAUTIONS

4.1 Calibrated tools or measuring and test equipment shall not be used in a manner that would invalidate its calibration.

5.0 LIMITATIONS

- 5.1 Subsections and steps within Section 7.0 shall be accomplished in the sequence shown, unless specified otherwise in the body of the procedure.
- 5.2 The Maintenance Supervisor assigned the work is responsible for ensuring that the controlled copy of this procedure is the latest revision and includes all applicable approved change sheets.

- 5.3 The Maintenance Supervisor assigned the work is responsible for ensuring that the controlled copy of this procedure is maintained at the work site, if not in a radiological controlled area, and that required data is entered in the controlled copy. If the work to be performed is in a radiological controlled area, the controlled copy shall be maintained in the Supervisor's office and a controlled working copy shall be available at the job site.

NOTE: When a controlled working copy is being used at the work site, data should be entered as best as practical.

- 5.4 The Maintenance Supervisor assigned the work is responsible for initialing all steps which are performed out of sequence. All steps which will not be performed based on the scope of work, will be indicated by "N/A" in the appropriate sign off blank, and initialed by the Supervisor with a brief explanation of why the step was not performed.
- 5.5 Attachments No. 3 or 4 must be completed for Lifted Leads or Electrical Jumpers, per PMI-2140. Multiple copies of these attachments may be used.
- 5.6 Steps in the procedure which require a verification by the Maint. Supv. may be performed by a qualified individual designated by the Supervisor; Provided that individual is independent of the work being performed.
- 5.7 It is assumed that the equipment required by this procedure is available. Additionally, use of equipment required from the opposite (unaffected) unit should not impair safe continued operation or shutdown of that unit.

#### 6.0 INITIAL CONDITIONS

- |     |                                     |   |
|-----|-------------------------------------|---|
| 6.1 | Maint. Mech.                        | Enter backup heater bundle(s) to be repowered.<br><br>_____   |
| 6.2 | Maint. Supv./<br>Production Control | Enter Job Order Number.<br><br>_____<br>J.O. #  |
| 6.3 | Maint. Mech.                        | Necessary tools and equipment which require periodic calibration must be checked to ensure that they have been calibrated within the specified time interval. |

- 6.4 Maint. Supv. Verify that all parts which are known to be required are available prior to starting the work. Refer to Attachment No. 1 for listing of required material.
- 6.5 Maint. Mech. Obtain Shift Supervisor approval to start the work.

\_\_\_\_\_  
S.S. Date

\_\_\_\_\_  
Verified By Date

## 7.0 DETAILS

### 7.1 DETERMINATING EACH AFFECTED POWER CABLE

- 7.1.1 Maint. Mech. Verify the breaker for the Unit 1 heater group has been racked out, tagged, and the heaters are de-energized. See Attachment No. 2 for appropriate MCC's and breakers.
- 7.1.2 Maint. Mech. Verify grounds are installed on the power cable. Disconnect the cable at the containment penetration. (See Attachment No. 2 for penetration and cable numbers.) Apply Temporary Modification I.D. Tags. Enter data and sign-off on Attachment No. 3.
- 7.1.3 Maint. Supv. Verify the cable has been properly disconnected at the containment penetration. Sign-off on Attachment No. 3.
- 7.1.4 Maint. Mech. Megger the heater bundles per applicable sections of \*\*MHP5022.082.002. If a heater bundle fails the megger, contact the S.S. and determine which heater bundle will be used.

\_\_\_\_\_  
Megger Serial No. Calib. Date/Due Date



## 7.2 TERMINATING TEMPORARY POWER CABLE

NOTE: Temporary power for the backup heaters is obtained from MOC 1-PHC-4, which is located in the U-1 reactor cable tunnel. Power is fed to the MOC from breaker 21-PHC-4. Three (3) three (3)-conductor cables are terminated at MOC 1-PHC-4, and are to be used for the temporary power supply.

- |       |              |   |
|-------|--------------|---|
| 7.2.1 | Maint. Mech. | Verify the breaker (21PHC4) for the temporary power supply has been racked out, tagged, and the MOC is de-energized.  |
| 7.2.2 | Maint. Mech. | Verify grounds are installed on the emergency power feed from the breaker.<br><br>Route the temporary power cable(s) from MOC 1-PHC-4 to the appropriate containment penetration.                                     |
| 7.2.3 | Maint. Mech. | Terminate the temporary power cable(s) at the penetration using appropriate sections of Maintenance Procedure 12MHP5021.082.006. Apply Temporary Modification I.D. Tags. Enter data and sign-off on Attachment No. 4. |
| 7.2.4 | Maint. Supv. | Verify the temporary power cables are properly terminated and grounds have been removed. Sign-off on Attachment No. 4.  |
| 7.2.5 | Maint. Mech. | Notify the Control Room/Shift Supervisor that the temporary power supply to the backup heaters is installed.  |

\_\_\_\_\_  
Performed By

\_\_\_\_\_  
Date

\_\_\_\_\_  
S.S.

\_\_\_\_\_  
Date

## 8.0 RESTORATION

### 8.1 TEMPORARY POWER SUPPLY

- |       |              |  |
|-------|--------------|--|
| 8.1.1 | Maint. Mech. | Verify breaker 21-PHC-4 has been racked out and tagged, and the backup heaters are de-energized. |
|-------|--------------|--|



8.1.2 Maint. Mech. Verify grounds are installed on the temporary breaker. Determine the cable at the containment penetration and return the cable to its storage location near MCC 1-PHC-4. Remove Temporary Modification I.D. Tags. Sign-off Attachment No. 4.

8.1.3 Maint. Supv. Verify temporary cables have been de-terminated and returned to the storage rack and I.D. tags are removed. Sign-off on Attachment No. 4.

## 8.2 PERMANENT POWER SUPPLY

8.2.1 Maint. Mech. Verify the appropriate breaker(s) is/are racked out and tagged and the heaters are de-energized.

8.2.2 Maint. Mech. Verify grounds have been installed on the breaker(s).

8.2.3 Maint. Mech. Perform a visual inspection of the power feeds to the heaters. If any damage is noted, proceed directly to Step 8.2.5

Observations \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

8.2.4 Maint. Mech. Perform a megger on the power cables using applicable sections of \*\*MHP5022.082.002.  
 If the megger is unacceptable, contact Maint. Supv. for resolution.  
 If the megger is acceptable, proceed directly to Step 8.2.8.

Megger Serial No. _____	Calib. Date/Due Date _____
-------------------------	----------------------------

8.2.5 Maint. Mech. Remove the damaged cable and pull new cable per Maintenance Procedure \*\*12MHP5021.082.004.

8.2.6 Maint. Mech. Install lugs on the new cable per Maintenance Procedure 12MHP5021.082.006.



- 8.2.7 Maint. Mech. Perform a megger on the new cable using the applicable sections of \*\*MHP5022.082.002.
- 8.2.8 Maint. Mech. Terminate the cable at the containment penetration, the MCC, and the breaker as required, per Maintenance Procedure 12MHP5021.082.006. Remove Temporary Modification I.D. Tags. Complete and sign-off Attachment No. 3.
- 8.2.9 Maint. Supv. Verify the power feeds are restored and temporary I.D. tags have been removed if the existing cable was re-used. Sign-off on Attachments No. 3.
- 8.2.10 Maint. Supv. Verify all electrical jumpers have been removed, all lifted leads have been re-terminated, and all Temporary Modification I.D. tags have been removed. Signoff on Attachments No. 3 and No. 4.
- 8.2.11 Maint. Mech. Notify the Shift Supervisor and Unit Supervisor the backup heaters are functional.

_____ Performed By	_____ Date
_____ S.S.	_____ Date

### 8.3 RETURN TEMPORARY POWER SUPPLY MATERIALS TO STORAGE

- 8.3.1 Maint. Mech. Return all tools and materials used for the temporary power supply to their storage location.
- 8.3.2 Maint. Supv. Verify all tools and materials are in the proper storage location.

### 9.0 ACCEPTANCE CRITERIA

- 9.1 Installation of the temporary power supply to the U-1 pressurizer backup heaters shall be considered acceptable provided work is completed per this procedure and the pressurizer backup heaters are functional.



- 9.2 Final acceptance shall be achieved upon restoration of a normal power supply to the U-1 pressurizer backup heaters.
- 9.3 In the event that jumpers are not removed and/or lifted leads are not restored, a PNSRC evaluation shall be performed and the signoff completed on the appropriate attachment(s).

10.0 DATA COLLECTION

- 10.1 Maint. Supv. Review entire procedure for completeness.

\_\_\_\_\_  
Maint. Supv. Date

- 10.2 Maint. Supt. Review of entire procedure.

\_\_\_\_\_  
Maint. Supt. Date

TOOLS AND HARDWARE

Knife

Dykes

Emery Paper

Butt Sleeve

Crimper

Heat Shrink

Heat Gun

Extension Cord

Lights

BACKUP HEATER GROUP	BREAKER	MCC	PENETRATION	HEATER BUNDLE	CABLE
1-A1	11-PHA-2	1-PHA-1	1-1P1	13, 14, 37 (A1A) 17, 18, 42 (A1B)	1403 PR-1 1404 PR-1
			1-4P2	33, 61, 62 (A1C) 38, 67, 68 (A1D) 43, 73, 74 (A1E)	1414 PR-1 1415 PR-1 1416 PR-1
1-A2	11-PHA-3	1-PHA-2	1-1P1	1, 2, 22 (A2A) 5, 6, 27 (A2B) 9, 10, 32 (A2C)	1400 PR-1 1401 PR-1 1402 PR-1
1-A3	11-PHA-4	1-PHA-3	1-4P2	23, 49, 50 (A3A) 28, 55, 56 (A3B)	1412 PR-1 1413 PR-1
1-C1	11-PHC-2	1-PHC-1	1-2P2	3, 4, 25 (C1A) 7, 8, 30 (C1B) 11, 12, 35 (C1C) 15, 16, 40 (C1D) 19, 20, 45 (C1E)	1435 PG-1 1436 PG-1 1437 PG-1 1438 PG-1 1439 PG-1
1-C2	11-PHC-3	1-PHC-2	1-3P1	24, 51, 52 (C2A) 29, 57, 58 (C2B) 34, 63, 64 (C2C)	1456 PG-1 1457 PG-1 1458 PG-1
1-C3	11-PHC-5	1-PHC-3	1-3P1	39, 69, 70 (C3A) 44, 75, 76 (C3B)	1459 PG-1 1460 PG-1



## LIFTED WIRE FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

# UNIT 1

**LOCATION** Reactor Cable Tunnel

**EQUIPMENT AFFECTED** Pressurizer Backup Heaters

### 7.1.2

### 8.2.8

[illegible]

7.1.3 THE ABOVE WIRES HAVE BEEN CORRECTLY LIFTED.

ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.2.9 PARTIAL RESTORATION: THE FOLLOWING WIRES HAVE BEEN RESTORED TO DESIGN CONFIGURATION.

ITEM #	VERIFIED BY	DATE
--------	-------------	------

8.2.10 FINAL RESTORATION: ALL WIRES WHICH WERE LIFTED HAVE BEEN RESTORED TO DESIGN CONFIGURATION AND ALL TAGS HAVE BEEN REMOVED.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

PNSRC REVIEW: NOT ALL THE LIFTED WIRES HAVE BEEN RESTORED AND A 10 CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER. IF NOT,  
PLACE THIS FORM IN CONTROL ROOM BOOK.

# ELECTRICAL JUMPER FORM

MAINTENANCE CONTROLLED: STATEMENT  
COPY NO. \_\_\_\_\_

UNIT 1  
LOCATION Reactor Cable Tunnel  
EQUIPMENT AFFECTED Pressurizer Backup Heaters  
7.2.3  
8.1.2

[illegible]

7.2.4 THE ABOVE JUMPERS HAVE BEEN CORRECTLY INSTALLED.

ITEM #	VERIFIED BY	DATE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
91		
92		
93		
94		
95		
96		
97		
98		
99		
100		

8.1.3 PARTIAL RESTORATION: THE FOLLOWING JUMPERS HAVE BEEN REMOVED AND THE CIRCUIT RESTORED TO DESIGN CONFIGURATION.

ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.2.10 FINAL RESTORATION: ALL JUMPERS WHICH WERE INSTALLED AND ALL TAGS HAVE BEEN REMOVED AND THE CIRCUIT RESTORED TO DESIGN CONFIGURATION.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

**PNSRC REVIEW:** NOT ALL THE JUMPERS HAVE BEEN REMOVED AND A 10 CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY	PNSRC MTG	DATE

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER. IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.



# INDIANA & MICHIGAN ELECTRIC COMPANY

## DONALD C COOK NUCLEAR PLANT

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

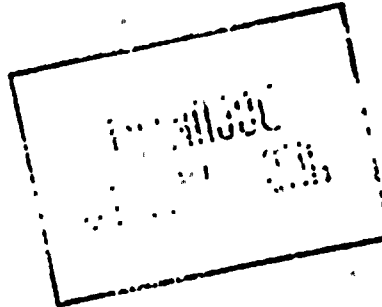
### PROCEDURE COVER SHEET

Procedure No. \*\*1MHP2140.082.005

Revision No. 0

TITLE MAINTENANCE PROCEDURE FOR REPOWERING CONTAINMENT VALVES

SCOPE OF REVISION



SIGNATURES	REVISION NUMBER			
*****	ORIGINAL			
PREPARED BY	<i>pmccart</i>			
DEPARTMENT HEAD APPROVAL	<i>P.H. Taylor</i>			
INTERFACING DEPARTMENT HEAD CONCURRENCE	<i>[Signature]</i> N/A			
QUALITY ASSURANCE SUPERVISOR APPROVAL	<i>mlk</i>			
PLANT NUCLEAR SAFETY COMMITTEE	<i>mt #1911</i>			
PLANT MANAGER APPROVAL	<i>[Signature]</i>	8606130113 PDR	860606 ADOCK 05000315 PDR	
APPROVAL DATE	5/22/86			
EFFECTIVE DATE	5/29/86			

LIST OF EFFECTIVE PAGES

<u>PAGE NUMBER</u>	<u>REVISION NUMBER/EFFECTIVE CHANGES</u>
1 of 16	Revision 0
2 of 16	Revision 0
3 of 16	Revision 0
4 of 16	Revision 0
5 of 16	Revision 0
6 of 16	Revision 0
7 of 16	Revision 0
8 of 16	Revision 0
9 of 16	Revision 0
10 of 16	Revision 0
11 of 16	Revision 0
12 of 16	Revision 0
13 of 16	Revision 0
14 of 16	Revision 0
15 of 16	Revision 0
16 of 16	Revision 0
<u>Attachment No. 1</u>	
1 of 1	Revision 0
<u>Attachment No. 2</u>	
1 of 1	Revision 0
<u>Attachment No. 3</u>	
1 of 1	Revision 0
<u>Attachment No. 4</u>	
1 of 1	Revision 0
<u>Attachment No. 5</u>	
1 of 1	Revision 0
<u>Attachment No. 6</u>	
1 of 1	Revision 0
<u>Attachment No. 7</u>	
1 of 1	Revision 0
<u>Attachment No. 8</u>	
1 of 1	Revision 0
<u>Attachment No. 9</u>	
1 of 1	Revision 0

INDIANA & MICHIGAN ELECTRIC COMPANY  
DONALD C. COOK NUCLEAR PLANT

1.0 TITLE Maintenance Procedure for Repowering Containment Valves

2.0 OBJECTIVE

- 2.1 This procedure provides instructions for the installation of temporary power feeds to the following in-containment motor operated valves:

IMO-110	ICM-129
IMO-120	ICM-111
IMO-130	NMO-151
IMO-140	NMO-152
IMO-128	NMO-153

It is intended for use when the power cables for these valves have been fire damaged, resulting in a loss of operability of these valves.

3.0 REFERENCES

- 3.1 Equipment Control-Clearance Permit System - PMI-2110.
- 3.2 Plant Safety Manual, General Safety G.9:
- 3.3 Maintenance Procedure 12MHP5021.082.006.
- 3.4 10CFR50, Appendix R, Section III, L.5.
- 3.5 Control of Special Tools and Measuring and Test Equipment, MHI-5060.

4.0 PRECAUTIONS

- 4.1 Calibrated tools or measuring and test equipment shall not be used in a manner that would invalidate its calibration.
- 4.2 Fire doors and security doors will be required to remain open during implementation of this procedure. Appropriate fire watches and security guards must be posted while these doors remain open.

## 5.0 LIMITATIONS

- 5.1 The Maintenance Supervisor assigned the work is responsible for ensuring that the controlled copy of this procedure is the latest revision and includes all applicable approved change sheets.
- 5.2 The Maintenance Supervisor assigned the work is responsible for ensuring that the controlled copy of this procedure is maintained at the work site, if not in a radiological controlled area, and that required data is entered in the controlled copy. If the work to be performed is in a radiological controlled area, the controlled copy shall be maintained in the Supervisor's office and a controlled working copy shall be available at the job site.

NOTE: When a controlled working copy is being used at the work site, data should be entered as best as practical.

- 5.3 All steps which will not be performed, based on the scope of the work, shall be indicated by "N/A" in the appropriate signoff blank and initialed by the Maintenance Supervisor assigned the work, along with an explanation of why the step was not performed.
- 5.4 Section 7.0 of this procedure need not be performed in sequence. Steps within each Subsection shall be performed in sequence.
- 5.5 Attachments No. 1 thru 9 must be completed for Lifted Wires and Electrical Jumpers. Multiple copies of these Attachments may be used.
- 5.6 It is assumed that the equipment required by this procedure is available. Additionally, use of equipment required from the opposite (unaffected) unit should not impair the safe continued operation or shutdown of that unit.

## 6.0 INITIAL CONDITIONS

- 6.1      Maint. Supv.      Identify, with assistance from Operations, the breaker to be used for a temporary power feed. Enter the breaker I.D.

Breaker I.D. \_\_\_\_\_

Performed By \_\_\_\_\_

Date \_\_\_\_\_

NOTE: Minimum breaker size 50A. Should be fed from either bus 21A, B, C or D.



- 6.2 Maint. Supv. Obtain Clearance Permits, as time allows, and record the Clearance Permit Nos. (See reference step nos.)

<u>Equipment</u>	<u>Clearance Permit No.</u>
Temp. Feed Breaker (7.1.1)	_____
Breaker 11A3 (7.2.1)	_____
Breaker 11B2 (7.3.1)	_____
Breaker 11C6 (7.4.1)	_____
Breaker 11D6 (7.5.1)	_____

- 6.3 Maint. Mech. Necessary tools and equipment which require periodic calibration must be checked to ensure that they have been calibrated within the specified time interval.

- 6.4 Maint. Supv. Verify that all materials which are known to be required are available prior to starting the work.

<u>Verified By</u>	<u>Date</u>
--------------------	-------------

- 6.5 Maint. Mech. Obtain Shift Supervisor approval to start the work via Shift Supervisor signature on applicable job order or a Clearance Permit, as applicable.

- 6.6 Maint. Mech. Notify the Unit Supervisors that work is to be started.

<u>Unit 1 Supervisor</u>	<u>Date</u>
--------------------------	-------------

<u>Unit 2 Supervisor</u>	<u>Date</u>
--------------------------	-------------

## 7.0 DETAILS

- INDEX:
- 7.1 Temporary Power Feed
  - 7.2 MCC EZC-A (IMO-140 & NMO-151)
  - 7.3 MCC EZC-B (IMO-120, IMO-128 & NMO-152)
  - 7.4 MCC EZC-C (IMO-110, ICM-129 & ICM-111)
  - 7.5 MCC EZC-D (IMO-130 & NMO-153)

NOTE: C & I Procedure \*\*1THP6030.IMP.305 has been prepared to provide temporary control for these valves. Implementation of this section shall be co-ordinated with the implementation of the C & I procedure.



## 7.1 Temporary Power Feed

This section may be performed in parallel with the section for the first MCC to be powered.

Steps in this section need not be performed sequentially, provided safety measures are observed.

- |       |              |  |
|-------|--------------|--|
| 7.1.1 | Maint. Mech. | Request Operations to open and tag the temporary feed breaker identified in Step 6.1 with a Striped Tag clearance.   |
| 7.1.2 | Maint. Mech. | Verify the temporary feed breaker has been opened and tagged, and the output side of the breaker is de-energized.  |
| 7.1.3 | Maint. Mech. | Disconnect the power cables from the output side of the temporary feed breaker. Signoff on Attachment No. 9. Attach Temporary Modification I.D. Tags.  |
| 7.1.4 | Maint. Supv. | Verify the power cables have been properly lifted from the temporary feed breaker. Signoff on Attachment No. 9.  |
| 7.1.5 | Maint. Mech. | <p>NOTE: This may require running the cable thru fire doors, security doors, and/or penetrations. Firewatches and guards shall be posted as needed. Penetrations shall be repaired per applicable sections of **12MHP5021.001.031.</p> <p>Route a 3 phase power cable from the temporary feed breaker to the E.S.S. MCC area in the Unit 1 4-KV switchgear room. The cable must be able to reach each of the 4 MCC's listed under 7.0.</p> |
| 7.1.6 | Maint. Mech. | Make-up lugs on the cable ends per applicable sections of 12MHP5021.082.006.   |
| 7.1.7 | Maint. Mech. | Make the connection at the temporary feed breaker and attach a phase rotation meter to the MCC end of the cable.   |
| 7.1.8 | Maint. Mech. | Request Operations to close the temporary feed breaker to power up the meter and determine the phasing of the cable. A 1-2-3 phase connection should produce a clockwise rotation on the meter. Mark the cable for future reference.   |

7.1.9 Maint. Mech. Request Operations to open the temporary feed breaker. Remove the phase rotation meter.

7.2 MCC EZC-A (IMO-140 & NMO-151)

7.2.1 Maint. Mech. Verify breaker 11A3 has been racked out and tagged, and MCC EZC-A is de-energized.

7.2.2 Maint. Mech. Remove cover(s) from the incoming feeder compartment(s).

7.2.3 Maint. Mech. NOTE: MCC EZC-A has two incoming feeders, both supplied from breaker 11A3.

Disconnect the feeder cables from the buses in the MCC. Enter data and sign-off on Attachment No. 1. Attach Temporary Modification I.D. Tags.

7.2.4 Maint. Supv. Verify the feeders have been properly lifted. Sign-off on Attachment No. 1.

7.2.5 Maint. Mech. Connect the temporary power cable to the buses using applicable sections of 12MHP5021.082.006. Take care to achieve proper phasing.

Attach Temporary Modification I.D. Tags. Enter data and sign-off on Attachment No. 2.

7.2.6 Maint. Supv. Verify the temporary power feed is properly installed. Sign-off on Attachment No. 2.

7.2.7 Maint. Mech. Transfer control of the striped tag clearance on the temporary feed breaker to C&I via a Striped Tag permission slip.

The following step is to be implemented when C & I has completed control wiring modifications for the first valve to be operated:

7.2.8 Maint. Supv. Jointly notify the S.S. that modifications to MCC EZC-A are complete.

\_\_\_\_\_  
Maint. Supv. Date

\_\_\_\_\_  
C & I Supv. Date

\_\_\_\_\_  
S.S. Date

The following steps are to be implemented after all valves controlled from this MCC are closed or opened.

- 7.2.9     Maint. Mech.     Regain control of the striped tag clearance on the temporary feed breaker and request Operations to open the breaker.
- 7.2.10    Maint. Mech.     Verify the temporary feed breaker has been opened and tagged, and MCC EZC-A is de-energized.
- 7.2.11    Maint. Mech.     Disconnect the temporary feeder from the buses in the MCC. Remove temporary I.D. tags. Sign-off on Attachment No. 2.
- 7.2.12    Maint. Supv.     Verify the temporary feeder has been properly removed from MCC EZC-A. Sign-off on Attachment No. 2.

7.3    MCC EZC-B (IMO-120, IMO-128, & NMO-152)

- 7.3.1     Maint. Mech.     Verify breaker 11B2 has been racked out and tagged, and MCC EZC-B is de-energized.
- 7.3.2     Maint. Mech.     Remove cover(s) from the incoming feeder compartments.
- 7.3.3     Maint. Mech.     Disconnect the feeder cables from the buses in the MCC. Enter data and sign-off on Attachment No. 3. Attach Temporary Modification I.D. Tags.
- 7.3.4     Maint. Supv.     Verify the feeders have been properly lifted. Sign-off on Attachment No. 3.
- 7.3.5     Maint Mech.     Connect the temporary power cable to the buses using applicable sections of 12MHP5021.082.006. Take care to achieve proper phasing.  
  
Attach Temporary Modification I.D. Tags. Enter data and sign-off on Attachment No. 4.
- 7.3.6     Maint. Supv.     Verify the temporary power feed is properly installed. Sign-off on Attachment No. 4.
- 7.3.7     Maint. Mech.     Transfer control of the Striped Tag Clearance on the temporary feed breaker to C&I via a Striped Tag Permission Slip.

The following step is to be implemented when C & I has completed control wiring modifications for the first valve to be operated:

- 7.3.8 Maint. Supv. Jointly notify the S.S. that modifications to MCC EZC-B are complete.

\_\_\_\_\_  
Maint. Supv. Date

\_\_\_\_\_  
C & I Supv. Date

\_\_\_\_\_  
S.S. Date

The following steps are to be implemented after all valves controlled from this MCC are closed or opened.

- 7.3.9 Maint. Mech. Regain control of the Striped Tag Clearance on the temporary feed breaker and request Operations to open the breaker.
- 7.3.10 Maint. Mech. Verify the temporary feed breaker has been opened and tagged, and MCC EZC-B is de-energized.
- 7.3.11 Maint. Mech. Disconnect the temporary feeder from the buses in the MCC. Remove temporary I.D. tags. Sign-off on Attachment No. 4.
- 7.3.12 Maint. Supv. Verify the temporary feeder has been properly removed from MCC EZC-B. Sign-off on Attachment No. 4.

7.4 MCC EZC-C (IMO-110, ICM-129, & ICM-111)

- 7.4.1 Maint. Mech. Verify breaker 11C6 has been racked out and tagged, and MCC EZC-C is de-energized.
- 7.4.2 Maint. Mech. Remove cover(s) from the incoming feeder compartment(s).
- 7.4.3 Maint. Mech. Disconnect the feeder cables from the buses in the MCC. Enter data and sign-off on Attachment No. 5. Attach Temporary Modification I.D. Tags.
- 7.4.4 Maint. Supv. Verify the feeders have been properly lifted. Sign-off on Attachment No. 5.

- 7.4.5 Maint. Mech. Connect the temporary power cable to the buses using applicable sections of 12MHP5021.082.006. Take care to achieve proper phasing.
- Attach Temporary Modification I.D. Tags. Enter data and sign-off on Attachment No. 6.
- 7.4.6 Maint. Supv. Verify the temporary power feed is properly installed. Sign-off on Attachment No. 6.
- 7.4.7 Maint. Mech. Transfer control of the Striped Tag Clearance on the temporary feed breaker to C&I via a Striped Tag Permission Slip.

The following step is to be implemented when C & I has completed control wiring modifications for the first valve to be operated:

- 7.4.8 Maint. Supv. Jointly notify the S.S. that modifications to MCC EZC-C are complete.

_____	_____
Maint. Supv.	Date
_____	_____
C & I Supv.	Date
_____	_____
S.S.	Date

The following steps are to be implemented after all valves controlled from this MCC are closed or opened.

- 7.4.9 Maint. Mech. Regain control of the Striped Tag Clearance on the temporary feed breaker and request Operations to open the breaker.
- 7.4.10 Maint. Mech. Verify the temporary feed breaker has been opened and tagged, and MCC EZC-C is de-energized.
- 7.4.11 Maint. Mech. Disconnect the temporary feeder from the buses in the MCC. Remove temporary I.D. tags. Sign-off on Attachment No. 6.
- 7.4.12 Maint. Supv. Verify the temporary feeder has been properly removed from the MCC EZC-C. Sign-off on Attachment No. 6.



7.5 MCC EZC-D (IMO-130 & NMO-153)

Step No.	To Be Performed By	Action
7.5.1	Maint. Mech.	Verify breaker 11D6 has been racked out and tagged, and MCC EZC-D is de-energized.
7.5.2	Maint. Mech.	Remove cover(s) from the incoming feeder compartment(s).
7.5.3	Maint. Mech.	Disconnect the feeder cables from the buses in the MCC. Enter data and sign-off on Attachment No. 7. Attach Temporary Modification I.D. Tags.
7.5.4	Maint. Supv.	Verify the feeders have been properly lifted. Sign-off on Attachment No. 7.
7.5.5	Maint. Mech.	Connect the temporary power cable to the buses using applicable sections of 12MHP5021.082.006. Take care to achieve proper phasing.  Attach Temporary Modification I.D. Tags. Enter data and sign-off on Attachment No. 8.
7.5.6	Maint. Supv.	Verify the temporary power feed is properly installed. Sign-off on Attachment No. 8.
7.5.7	Maint. Mech.	Transfer control of the Striped Tag Clearance on the temporary feed breakers to C&I via a Striped Tag Permission Slip.
The following step is to be implemented when C & I has completed control wiring modifications for the first valve to be operated:		
7.5.8	Maint. Supv.	Jointly notify the S.S. that modifications to MCC EZC-D are complete.

_____	_____
Maint. Supv.	Date
_____	_____
C & I Supv.	Date
_____	_____
S.S.	Date

The following steps are to be implemented after all valves controlled from this MCC are closed or opened.

- 7.5.9     Maint. Mech.     Regain control of the Striped Tag Clearance on the temporary feed breaker and request Operations to open the breaker.
- 7.5.10    Maint. Mech.     Verify the temporary feed breaker has been opened and tagged, and MCC EZC-D is de-energized.
- 7.5.11    Maint. Mech.     Disconnect the temporary feeder from the buses in the MCC. Remove temporary I.D. tags. Sign-off on Attachment No. 8.
- 7.5.12    Maint. Supv.     Verify the temporary feeder has been properly removed from MCC EZC-D. Sign-off on Attachment No. 8.

## 8.0 RESTORATION

### 8.1 MCC EZC-A

- 8.1.1     Maint. Mech.     Visually inspect the power feed to MCC EZC-A. If any damage is found, proceed directly to Step 8.1.3. Note any observations.

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- 8.1.2     Maint. Mech.     Perform a megger on the power cable per MHP5022.082.002.  
  
 If the megger is unacceptable, contact Maint. Supv. for resolution.  
  
 If the megger is acceptable, proceed directly to Step 8.1.6.

Megger Serial No.	Calib. Date/Due Date
-------------------	----------------------

- 8.1.3     Maint. Mech.     Remove the damaged cable and pull new cable per 12MHP5021.082.004.
- 8.1.4     Maint. Mech.     Install lugs on the new cable per 12MHP5021.082.006.



8.1.5 Maint. Mech.

Perform a megger on the new cable per  
12MHP5022.082.002.

\_\_\_\_\_  
Megger Serial No.      Calib. Date/Due Date

8.1.6 Maint. Mech.

Verify breaker 11A3 is racked out and tagged,  
and MCC EZC-A is de-energized.

8.1.7 Maint. Mech.

Terminate power feeds at breaker 11A3 per  
12MHP 5-21.082.006, if new cable was pulled.

8.1.8 Maint. Mech.

Terminate power feeds at the MCC, ensuring  
proper phasing is maintained, per  
12MHP5021.082.006.. Remove temporary I.D.  
Tags. Sign-off on Attachment No. 1.

8.1.9 Maint. Supv.

Verify power feed is properly terminated at  
the MCC. Sign-off on Attachment No. 1.

8.1.10 Maint. Supv.

Verify all lifted leads have been properly  
re-terminated and all electrical jumpers have  
been removed, and all Temporary Modification  
I.D. Tags have been removed. Sign-off on  
Attachments No. 1 and No. 2.

8.1.11 Maint. Supv.

Notify the Shift Supervisor that normal power  
feeds to MCC EZC-A are restored.

\_\_\_\_\_  
Performed By      Date

\_\_\_\_\_  
S.S.      Date

## 8.2 MCC EZC-B

8.2.1 Maint. Mech.

Visually inspect the power feed to MCC EZC-B.  
If any damage is found, proceed directly to  
Step 8.2.3. Note any observations.

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



8.2.2 Maint. Mech.

Perform a megger on the power cable per MHP5022.082.002.

If the megger is unacceptable, contact Maint. Supv. for resolution.

If the megger is acceptable, proceed directly to Step 8.2.6.

\_\_\_\_\_  
Megger Serial No.

\_\_\_\_\_  
Calib. Date/Due Date

8.2.3 Maint. Mech.

Remove the damaged cable and pull new cable per 12MHP5021.082.004.

8.2.4 Maint. Mech.

Install lugs on the new cable per 12MHP5021.082.006.

8.2.5 Maint. Mech.

Perform a megger on the new cable per MHP5022.082.002.

\_\_\_\_\_  
Megger Serial No.

\_\_\_\_\_  
Calib. Date/Due Date

8.2.6 Maint. Mech.

Verify breaker 11B2 is racked out and tagged, and MCC EZC-B is de-energized.

8.2.7 Maint. Mech.

Terminate power feeds at breaker 11B2 per 12MHP5021.082.006, if new cable was pulled.

8.2.8 Maint. Mech.

Terminate power feeds at the MCC, ensuring proper phasing is maintained, per 12MHP5021.082.006. Remove temporary I.D. Tags. Sign-off on Attachment No. 3.

8.2.9 Maint. Supv.

Verify power feed is properly terminated at the MCC. Sign-off on Attachment No. 3.

8.2.10 Maint. Supv.

Verify all lifted leads have been properly re-terminated and all electrical jumpers have been removed, and all Temporary Modification I.D. Tags have been removed. Sign-off on Attachments No. 3 and No. 4.

8.2.11 Maint. Supv.

Notify the Shift Supervisor that normal power feed to MCC EZC-B is restored.

\_\_\_\_\_  
Performed By

\_\_\_\_\_  
Date

\_\_\_\_\_  
S.S.

\_\_\_\_\_  
Date

### 8.3 MOC EZC-C

#### 8.3.1 Maint. Mech.

Visually inspect the power feed to MOC EZC-C. If any damage is found, proceed directly to Step 8.3.3. Note any observations.

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

#### 8.3.2 Maint. Mech.

Perform a megger on the power cable per MHP5022.082.002.

If the megger is unacceptable, contact Maint. Supv. for resolution.

If the megger is acceptable, proceed directly to Step 8.3.6.

<u>Megger Serial No.</u>	<u>Calib. Date/Due Date</u>
--------------------------	-----------------------------

#### 8.3.3 Maint. Mech.

Remove the damaged cable and pull new cable per 12MHP5021.082.004.

#### 8.3.4 Maint. Mech.

Install lugs on the new cable per 12MHP5021.082.006.

#### 8.3.5 Maint. Mech.

Perform a megger on the new cable per MHP5022.082.002.

<u>Megger Serial No.</u>	<u>Calib. Date/Due Date</u>
--------------------------	-----------------------------

#### 8.3.6 Maint. Mech.

Verify breaker 11C6 is racked out and tagged, and MOC EZC-A is de-energized.

#### 8.3.7 Maint. Mech.

Terminate power feeds at breaker 11C6 per 12MHP5021.082.006, if new cable was pulled.

#### 8.3.8 Maint. Mech.

Terminate power feeds at the MOC, ensuring proper phasing is maintained, per 12MHP5021.082.006. Remove temporary I.D. Tags. Sign-off on Attachment No. 5.

#### 8.3.9 Maint. Supv.

Verify power feed is properly terminated at the MOC. Sign-off on Attachment No. 5.

8.3.10 Maint. Supv.

Verify all lifted leads have been properly re-terminated and all electrical jumpers have been removed, and all Temporary Modification I.D. Tags have been removed. Sign-off on Attachments No. 5 and No. 6.

8.3.11 Maint. Supv.

Notify the Shift Supervisor that normal power feed to MCC EZC-C is restored.

Performed By \_\_\_\_\_

Date \_\_\_\_\_

S.S. \_\_\_\_\_

Date \_\_\_\_\_

#### 8.4 MCC EZC-D

8.4.1 Maint. Mech.

Visually inspect the power feed to MCC EZC-D. If any damage is found, proceed directly to Step 8.4.3. Note any observations.

Notes: \_\_\_\_\_

8.4.2 Maint. Mech.

Perform a megger on the power cable per MEP5022.082.002.

If the megger is unacceptable, contact Maint. Supv. for resolution.

If the megger is acceptable, proceed directly to Step 8.4.6.

Megger Serial No. \_\_\_\_\_

Calib. Date/Due Date \_\_\_\_\_

8.4.3 Maint. Mech.

Remove the damaged cable and pull new cable per 12MHP5021.082.004.

8.4.4 Maint. Mech.

Install lugs on the new cable per 12MHP5021.082.006.

8.4.5 Maint. Mech.

Perform a megger on the new cable per MEP5022.082.002.

Megger Serial No. \_\_\_\_\_

Calib. Date/Due Date \_\_\_\_\_

8.4.6 Maint. Mech.

Verify breaker 11D6 is racked out and tagged, and MCC EZC-D is de-energized.



- |        |              |   |
|--------|--------------|---|
| 8.4.7  | Maint. Mech. | Terminate power feeds at breaker 11D6 per 12MHP5021.082.006, if new cable was pulled.   |
| 8.4.8  | Maint. Mech. | Terminate power feeds at the MCC, ensuring proper phasing is maintained, per 12MHP5021.082.006. Remove temporary I.D. Tags. Sign-off on Attachment No. 7.   |
| 8.4.9  | Maint. Supv. | Verify power feed is properly terminated at the MCC. Sign-off on Attachment No. 7.  |
| 8.4.10 | Maint. Supv. | Verify all lifted leads have been properly re-terminated and all electrical jumpers have been removed, and all Temporary Modification I.D. Tags have been removed. Sign-off on Attachments No. 7 and No. 8. |
| 8.4.11 | Maint. Supv. | Notify the Shift Supervisor that normal power feed to MCC EZC-D is restored.  |

_____ Performed By	_____ Date
-----------------------	---------------

_____ S.S.	_____ Date
---------------	---------------

#### 8.5 Temporary Feed Breaker

- |       |              |  |
|-------|--------------|--|
| 8.5.1 | Maint. Mech. | Verify the breaker is opened and tagged, and the output side of the breaker is de-energized.   |
| 8.5.2 | Maint. Mech. | Determinate the temporary power feed at the breaker.   |
| 8.5.3 | Maint. Mech. | Re-terminate the power cables to the output side of the breaker per applicable sections of 12MHP5021.082.006. Remove temporary I.D. tags. Signoff on Attachment No. 9. |
| 8.5.4 | Maint. Supv. | Verify the power cables are properly terminated at the breaker. Signoff on Attachment No. 9.   |
| 8.5.5 | Maint. Supv. | Verify all lifted leads have been properly re-terminated and all Temporary Modification I.D. Tags have been removed. Signoff on Attachment No. 9.                      |

8.5.6 Maint. Mech.

NOTE: Any fire barrier which was opened shall be repaired after the cable is removed.

Remove the temporary power feed.

9.0 ACCEPTANCE CRITERIA

- 9.1 Installation of the temporary power feeds shall be considered acceptable provided work is completed per this procedure and the containment valves functioned properly.
- 9.2 Final acceptance shall be achieved upon restoration of the normal power feeds to the MOCs and to the breaker used for the temporary feed breaker.
- 9.3 In the event that jumpers are not removed and/or lifted leads are not restored, a PNSRC evaluation shall be performed and the signoff completed on the appropriate attachment(s).

10.0 DATA COLLECTION

10.1 Maint. Supv.

Review entire procedure for completeness.

\_\_\_\_\_  
Maint. Supv.

\_\_\_\_\_  
Date

10.2 Maint. Supt.

Review of entire procedure.

\_\_\_\_\_  
Maint. Supt.

\_\_\_\_\_  
Date



LIFTED WIRE FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT: 1  
LOCATION: 4KV SWITCHGEAR ROOM  
EQUIPMENT AFFECTED: MOC EZC-A

7.2.3 &

8.1.8 TERM. BLOCK &

ITEM #	TERMINAL #	CABLE #/COMPONENT DESCRIPTION	LIFTED BY DATE	LANDED BY DATE
--------	------------	-------------------------------	----------------	----------------


7.2.4 THE ABOVE WIRES HAVE BEEN CORRECTLY LIFTED.

ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.1.9 PARTIAL RESTORATION: THE FOLLOWING WIRES HAVE BEEN RESTORED TO DESIGN CONFIGURATION.

ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.1.10 FINAL RESTORATION: ALL WIRES WHICH WERE LIFTED HAVE BEEN RESTORED TO DESIGN CONFIGURATION AND ALL TAGS HAVE BEEN REMOVED.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE LIFTED WIRES HAVE BEEN RESTORED AND A 10 CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.

ELECTRICAL JUMPER FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT: 1  
LOCATION: 4KV SWITCHGEAR ROOM  
EQUIPMENT AFFECTED: MOC EZC-A

7.2.5 &	JUMPER FROM	JUMPER TO	INSTALLED		REMOVED	
7.2.11	TERMINAL # AND/OR	TERMINAL # AND/OR	BY		BY	
ITEM #	CONTACT LOCATION	CONTACT LOCATION	DATE		DATE	

7.2.6 THE ABOVE JUMPERS HAVE BEEN CORRECTLY INSTALLED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

7.2.12 PARTIAL RESTORATION: THE FOLLOWING JUMPERS HAVE BEEN REMOVED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.1.10 FINAL RESTORATION: ALL JUMPERS WHICH WERE INSTALLED AND ALL TAGS  
HAVE BEEN REMOVED AND THE CIRCUIT RESTORED TO  
DESIGN CONFIGURATION.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE JUMPERS HAVE BEEN REMOVED AND A 10 CFR  
50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED  
BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDR.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.



## LIFTED WIRE FORM

UNIT: 1  
LOCATION: 4KV SWITCHGEAR ROOM  
EQUIPMENT AFFECTED: MOC EZC-B

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

[illegible]

7.3.4 THE ABOVE WIRES HAVE BEEN CORRECTLY LIFTED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.2.9 PARTIAL RESTORATION: THE FOLLOWING WIRES HAVE BEEN RESTORED TO DESIGN CONFIGURATION.

ITEM #	VERIFIED BY	DATE
--------	-------------	------

8.2.10 FINAL RESTORATION: ALL WIRES WHICH WERE LIFTED HAVE BEEN RESTORED TO DESIGN CONFIGURATION AND ALL TAGS HAVE BEEN REMOVED.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE LIFTED WIRES HAVE BEEN RESTORED AND A 10 CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY	PNSRC MTG	DATE

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.



ELECTRICAL JUMPER FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT: 1  
LOCATION: 4KV SWITCHGEAR ROOM  
EQUIPMENT AFFECTED: MCC EZC-B

7.3.5 &	JUMPER FROM	JUMPER TO	INSTALLED		REMOVED	
7.3.11	TERMINAL # AND/OR	TERMINAL # AND/OR	BY	DATE	BY	DATE
ITEM #	CONTACT LOCATION	CONTACT LOCATION				

7.3.6 THE ABOVE JUMPERS HAVE BEEN CORRECTLY INSTALLED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

7.3.12 PARTIAL RESTORATION: THE FOLLOWING JUMPERS HAVE BEEN REMOVED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.2.10 FINAL RESTORATION: ALL JUMPERS WHICH WERE INSTALLED AND ALL TAGS  
HAVE BEEN REMOVED AND THE CIRCUIT RESTORED TO  
DESIGN CONFIGURATION.  
VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE JUMPERS HAVE BEEN REMOVED AND A 10 CFR  
50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED  
BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.

LIFTED WIRE FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT: 1  
LOCATION: 4KV SWITCHGEAR ROOM  
EQUIPMENT AFFECTED: MOC EZC-C

7.4.3 &					
8.3.8	TERM. BLOCK &		LIFTED	LANDED	
ITEM #	TERMINAL #	CABLE #/COMPONENT DESCRIPTION	BY DATE	BY DATE	

7.4.4 THE ABOVE WIRES HAVE BEEN CORRECTLY LIFTED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.3.9 PARTIAL RESTORATION: THE FOLLOWING WIRES HAVE BEEN RESTORED TO  
DESIGN CONFIGURATION.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.3.10 FINAL RESTORATION: ALL WIRES WHICH WERE LIFTED HAVE BEEN  
RESTORED TO DESIGN CONFIGURATION AND ALL TAGS  
HAVE BEEN REMOVED.  
VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE LIFTED WIRES HAVE BEEN RESTORED AND A 10  
CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND  
APPROVED BY THE PNSRC PER PMI-1040.  
PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

[illegible]

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.

LIFTED WIRE FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT: 1  
LOCATION: 4KV SWITCHGEAR ROOM  
EQUIPMENT AFFECTED: MOC EZC-D

[illegible]

7.5.4 THE ABOVE WIRES HAVE BEEN CORRECTLY LIFTED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.4.9 PARTIAL RESTORATION: THE FOLLOWING WIRES HAVE BEEN RESTORED TO DESIGN CONFIGURATION.

ITEM # VERIFIED BY DATE

8.4.10 FINAL RESTORATION: ALL WIRES WHICH WERE LIFTED HAVE BEEN RESTORED TO DESIGN CONFIGURATION AND ALL TAGS HAVE BEEN REMOVED.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PMSRC REVIEW: NOT ALL THE LIFTED WIRES HAVE BEEN RESTORED AND A 10 CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED BY THE PMSRC PER PMI-1040.

PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.



ELECTRICAL JUMPER FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT: 1  
LOCATION: 4KV SWITCHGEAR ROOM  
EQUIPMENT AFFECTED: MOC EZC-D

7.5.5.4	JUMPER FROM	JUMPER TO	INSTALLED	REMOVED
7.5.11	TERMINAL # AND/OR	TERMINAL # AND/OR	BY	BY
ITEM #	CONTACT LOCATION	CONTACT LOCATION	DATE	DATE


7.5.6 THE ABOVE JUMPERS HAVE BEEN CORRECTLY INSTALLED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

7.5.12 PARTIAL RESTORATION: THE FOLLOWING JUMPERS HAVE BEEN REMOVED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

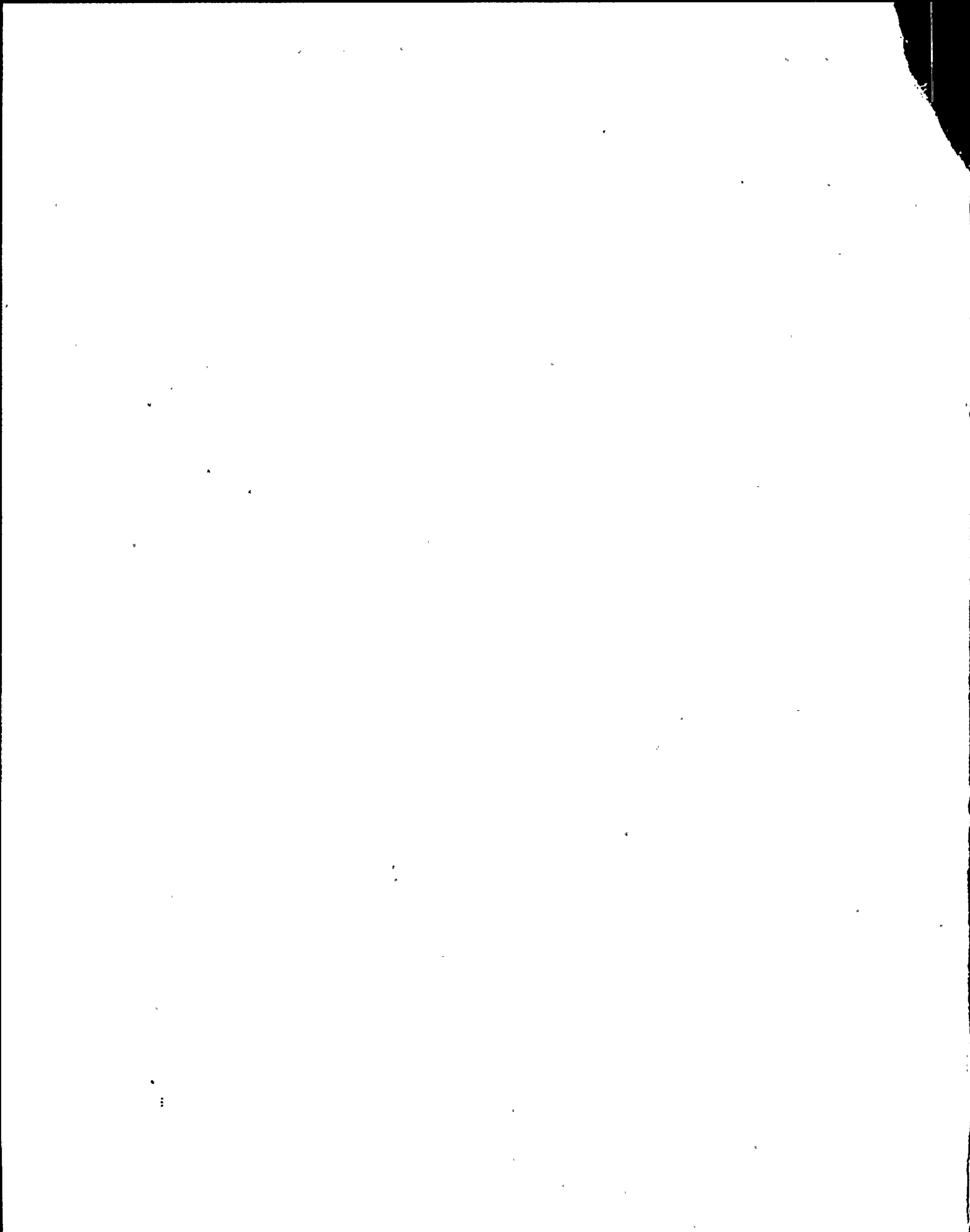
8.4.10 FINAL RESTORATION: ALL JUMPERS WHICH WERE INSTALLED AND ALL TAGS  
HAVE BEEN REMOVED AND THE CIRCUIT RESTORED TO  
DESIGN CONFIGURATION.

VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE JUMPERS HAVE BEEN REMOVED AND A 10 CFR  
50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND APPROVED  
BY THE PNSRC PER PMI-1040.

PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.



LIFTED WIRE FORM

MAINTENANCE DEPARTMENT  
CONTROLLED DOCUMENT  
COPY NO. \_\_\_\_\_

UNIT: 1  
LOCATION:  
EQUIPMENT AFFECTED:

7.1.3 &					
8.5.3	TERM. BLOCK &		LIFTED	LANDED	
ITEM #	TERMINAL #	CABLE #/COMPONENT DESCRIPTION	BY DATE	BY DATE	

7.1.4 THE ABOVE WIRES HAVE BEEN CORRECTLY LIFTED.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.5.4 PARTIAL RESTORATION: THE FOLLOWING WIRES HAVE BEEN RESTORED TO  
DESIGN CONFIGURATION.  
ITEM # \_\_\_\_\_ VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

8.5.5 FINAL RESTORATION: ALL WIRES WHICH WERE LIFTED HAVE BEEN  
RESTORED TO DESIGN CONFIGURATION AND ALL TAGS  
HAVE BEEN REMOVED.  
VERIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

9.3 PNSRC REVIEW: NOT ALL THE LIFTED WIRES HAVE BEEN RESTORED AND A 10  
CFR 50.59 SAFETY EVALUATION HAS BEEN PERFORMED AND  
APPROVED BY THE PNSRC PER PMI-1040.  
PNSRC REVIEW BY \_\_\_\_\_ PNSRC MTG \_\_\_\_\_ DATE \_\_\_\_\_

IF RESTORED, ATTACH THIS FORM TO THE PROCEDURE OR JOB ORDER.  
IF NOT, PLACE THIS FORM IN CONTROL ROOM BOOK.

# INDIANA & MICHIGAN ELECTRIC COMPANY DONALD C COOK NUCLEAR PLANT

## PROCEDURE COVER SHEET

Procedure No. \*\*1 THP 6030 IMP.304

Revision No. 0

TITLE PRESSURIZER PORV CABLE REPAIR

SCOPE OF REVISION

UNCONTROLLED  
DOCUMENT

C & I SECTION  
MAY 29 1986  
CONTROLLED DOCUMENT

SIGNATURES	REVISION NUMBER			
*****	Rev. 0			
PREPARED BY	<i>[Signature]</i> Schwartz			
DEPARTMENT HEAD APPROVAL	<i>[Signature]</i> 1/1/86			
INTERFACING DEPARTMENT HEAD CONCURRENCE	<i>[Signature]</i>			
QUALITY ASSURANCE SUPERVISOR APPROVAL	<i>[Signature]</i> M L 1/1/86			
PLANT NUCLEAR SAFETY COMMITTEE	<i>[Signature]</i> mtg #1911	B606130116 B60606 PDR ADOCK 05000315 F PDR		
PLANT MANAGER APPROVAL	<i>[Signature]</i>			
APPROVAL DATE	5/23/86			
EFFECTIVE DATE	5/29/86			

LIST OF EFFECTIVE PAGES

PAGE NUMBER

REVISION NUMBER/CS NUMBER

Page 1 of 8

Revision 0

Page 2 of 8

Revision 0

Page 3 of 8

Revision 0

Page 4 of 8

Revision 0

Page 5 of 8

Revision 0

Page 6 of 8

Revision 0

Page 7 of 8

Revision 0

Page 8 of 8

Revision 0

ATTACHMENT 1

Page 1 of 1

Revision 0

ATTACHMENT 2

Page 1 of 1

Revision 0

ATTACHMENT 3

Page 1 of 1

Revision 0



INDIANA & MICHIGAN ELECTRIC COMPANY  
DONALD C. COOK NUCLEAR PLANT

PRESSURIZER PORV CABLE REPAIR

1.0 OBJECTIVE

- 1.1 The purpose of this procedure is to provide instruction for the installation of an alternate power supply and control for the Unit-1 pressurizer PORVs (NRV-151, NRV-152 and NRV-153) in the event that fire damage to the PORV cables causes a loss of remote control from the Unit 1 Control Room
- 1.2 This procedure meets a portion of the requirements specified in 10 CFR 50 Appendix R.

2.0 REFERENCES

- 2.1 AEP Elementary Diagrams 1-98204, 2-98053.
- 2.2 AEP Wiring Diagrams 1-97504, 1-97511, 1-97522..
- 2.3 10 CFR 50, Appendix R, Section III, L.5.
- 2.4 PMI-2140, Temporary Modifications.
- 2.5 PMI-2270, Fire Protection.

3.0 EQUIPMENT REQUIRED

- 3.1 Pressurizer PORV alternate control boxes and cables.
- 3.2 Standard 6" flathead screwdriver or equivalent.
- 3.3 Fuses (10 AMP) and fuse pullers.
- 3.4 D.C. Voltmeter, Simpson 260 or equivalent.
- 3.5 Electrical jumpers.

#### 4.0 PREREQUISITES

- 4.1 Performance of this procedure may take place if remote control for any or all of the pressurizer PORVs (NRV-151, NRV-152, and NRV-153) is lost from the Unit 1 Control Room due to fire damage to the PORV cables. If remote control to all three (3) PORVs is not planned to be altered at this time, a N/A shall be placed as designated in the portions of this procedure which will not be performed.
- 4.2 Ensure a Security Guard is stationed at Security doors to be blocked open and that firewatches are stationed as necessary in the Unit 1 Reactor Cable Tunnel and in the Unit 2 Switchgear areas prior to routing cables.
- 4.3 Shift Supervisor (or Assistant Shift Supervisor) permission to begin work on the following valve controls: (cross out the valves not to be altered at this time)

NRV-151

NRV-152

NRV-153

SS/ASS \_\_\_\_\_

DATE \_\_\_\_\_

- 4.4 Obtain the Unit 1, Unit Supervisor (or designee) permission to begin work.

US \_\_\_\_\_

DATE \_\_\_\_\_

#### 5.0 PRECAUTIONS

- 5.1 When routing temporary cables, do not obstruct walkways. Cables shall be routed off to the side or overhead when possible.
- 5.2 Though the circuits being worked on are de-energized, other circuits in close proximity may have voltages present; observe all electrical safety precautions while working on or near energized equipment.
- 5.3 Ensure that all connections are clean and tight.

#### 6.0 DOCUMENTATION

- 6.1 Entries shall be made in the Control Rooms to document the modifications to be installed, and tags placed on the lifted leads, temporary cables and control switches (Reference PMI-2140).



6.2 Upon completion, this procedure shall be submitted to a C&I Engineer or designated alternate for review.

# 7.0 PORV ALTERNATE CONTROL INSTALLATION

7.1 Ensure that power for the pressurizer PORV (NRV-151, NRV-152 and NRV-153) control circuit(s) to be disconnected from Unit 1 are de-energized by ensuring that the associated circuit breaker in the Unit 1 Control Room is open (OFF position) and a clearance (if time permits) is in place. If the individual valve circuit breakers are not accessible, the control circuits can be de-energized by opening the supply breakers for the entire CCV-AB and CCV-CD distribution panels (MCAB circuit 16 for CCV-AB panel, valves NRV-151 and NRV-152 and MCCD circuit 16 for CCV-CD panel, valve NRV-153). This should only be done after consideration has been given for all other valves that will lose control power.

NA the signoff for the valve circuit(s) not to be altered.

NRV-151 Distribution panel CCV-AB circuit 79 OFF.  
(or Distribution Panel MCAB circuit 16 OFF.)

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-152 Distribution panel CCV-AB circuit 80 OFF.  
(or Distribution Panel MCAB circuit 16 OFF.)

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-153 Distribution panel CCV-CD circuit 79 OFF.  
(or Distribution Panel MCCD circuit 16 OFF.)

TECH \_\_\_\_\_ DATE \_\_\_\_\_

7.2 At the storage box for the pressurizer PORV alternate control equipment (located on the 591 level of the turbine building by the ramp leading down to the diesel room entrances) remove the applicable control boxes and cables. Each control box is labeled with the valve number it will be used for. The attached cables have been precut for correct length, lugged and labeled to aid in installation.



- 7.3 With the control box(es) remaining at the storage area, route the larger multiple wired cable(s) marked "valve control" down the ramp and up the stairs into the Reactor Cable Tunnel Area 3 through door 339 (ensure CO<sub>2</sub> is properly isolated and firewatch stationed). If NRV-153 control is not to be changed, NA step 7.4.1 and proceed to step 7.5.
- 7.4 To install the NRV-153 alternate valve control cable, bring the cable up to the terminal block box across from penetration 1-2C4 in Quadrant 3M. With power off to the NRV-153 control (from step 7.1), locate and disconnect all the wires of cable 8757G-1 from the terminal blocks in the box and connect the alternate valve control cable wires and jumpers in its place in accordance with the labeled wires and attachment #1. (Reference can be made to wiring diagram 1-97522).
- 7.4.1 Verify that cable 8757G-1 is disconnected and that the alternate valve control cable and jumper are installed.

TECH \_\_\_\_\_

DATE \_\_\_\_\_

- 7.4.2 If neither the NRV-151 or NRV-152 alternate valve control cables are to be installed, N/A signoffs for steps 7.6.1 and 7.7.1 and proceed to step 7.8. Otherwise continue with step 7.5.
- 7.5 To route either or both of the NRV-151 and NRV-152 alternate control cables, proceed into Reactor Cable Tunnel Quadrant 3N through door 323. Continue to pull the cable(s) through Quadrant 4 and into Quadrant 1 through door 333. If NRV-151 control is not to be changed, N/A the signoff in step 7.6.1 and proceed to step 7.7; otherwise, continue with step 7.6.
- 7.6 To install the NRV-151 alternate valve control cable, bring the cable up to the terminal block box across from penetration 1-4C1 in Quadrant 1. With power off the NRV-151 control (from step 7.1), locate and disconnect all the wires of cable 9705R-1 from the terminal block in the box and connect the alternate valve control cable wires and jumper in its place in accordance with the labeled wire and attachment #2. (Reference can be made to wiring diagram 1-97504).
- 7.6.1 Verify that cable 9705R-1 is disconnected and that the alternate valve control cable and jumper are installed.

TECH \_\_\_\_\_

DATE \_\_\_\_\_

7.6.2 If NRV-152 controls are not to be changed, N/A the signoff in step 7.7.1 and proceed to step 7.6; otherwise, continue with step 7.7.

7.7 Continue to pull the alternate control cable for NRV-152 up to the terminal block box across from penetration 1-1C4 in Quadrant 1. With power off the NRV-152 control (from step 7.1) locate and disconnect all the wires of cable 9706R-1 from the terminal block in the box and connect the alternate valve control cable and jumper in its place according to the labeled wires and Attachment #3. (Reference can be made to wiring diagram 1-97511).

7.7.1 Verify that cable 9706R-1 is disconnected and that the alternate valve control cable and jumper are installed.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

7.8 With the necessary alternate valve control cable(s) in place return to the storage area and verify that the alternate valve control switches are in the closed position. NA the signoff for the control switch(es) not to be used.

NRV-151 Alternate Control Switch in closed position.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-152 Alternate Control Switch in closed position.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-153 Alternate Control Switch in closed position.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

7.9 To obtain 250 VDC power from the Unit 2 Switchgear area, route the cable(s) marked "valve power" from the alternate control switch box(es) to be used, south along the 591 aisleway and up the stairs leading to elevation 609. Continue to route the cable(s) south through rollup door 242 and along the side of the 609 aisleway to security gate door 446 of the Unit 2 Switchgear Rooms. Ensure Unit 2 CO<sub>2</sub> is properly isolated and firewatch stationed. With a Security Guard stationed, have doors 446 and 344 opened and continue to route the cable(s) to the 250 VDC distribution cabinet DAB, located across from the AB battery room and next to the inverter area.

7.10 Remove the front panel cover from cabinet DAB (a ladder may be needed). Ensure that spare breakers 17, 19, and 21 are OFF and fuses are removed.

7.11 The following installations will be made with the NRV-151 power cable going to breaker 17, NRV-152 power cable to breaker 19 and NRV-153 power cable to breaker 21.

7.11.1 On the left side of cabinet DAB connect the valve power cable leads to the breaker fuse lugs with the positive (+) lead on the top lug and the negative (-) lead on the bottom lug.

7.11.1.1 Verify the valve power cables are connected to the proper breaker.  
N/A the signoff if the valve control is not being altered.

NRV-151 power cable connected to panel DAB circuit 17

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-152 power cable connected to panel DAB circuit 19

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-153 power cable connected to panel DAB circuit 21.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

7.11.2 Install the 10 AMP fuses (provided in the storage box) in panel DAB breaker circuits for each breaker that is being utilized (Two (2) fuses per breaker).

7.11.2.1 Verify the valve power fuses are installed. NA the signoff if the valve control is not being altered.

NRV-151 10 AMP fuses (2) are installed in panel DAB circuit 17.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-152 10 AMP fuses (2) are installed in panel DAB circuit 19

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-153 10 AMP fuses (2) are installed in panel DAB circuit 21.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

7.11.3 Notify the Unit 2 Control Room to have an Operator close the applicable circuit breaker(s) (ON position).

CAUTION: 250VDC is present at lugs and breaker fuses.

7.11.3.1 Verify the correct circuit breakers are in the ON position and take voltage readings across the cable lugs at the breaker fuses to ensure power is available.

NRV-151 circuit breaker 17 ON and voltage available.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-152 circuit breaker 19 ON and voltage available.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-153 circuit breaker 21 ON and voltage available.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

TECH \_\_\_\_\_ DATE \_\_\_\_\_

7.12 Replace the front panel cover on cabinet DAB as best as possible, with the valve power cable(s) running out of the bottom of the cabinet.

7.13 The following step will open the pressurizer PORVs. If plant conditions are not suitable to open the PORVs, N/A and explain the plant condition in the signoff in step 7.13.1. N/A the signoff(s) for valve controls not altered.

7.13.1 Check the alternate valve control operation by having an Operator place the alternate control switch(es) of each valve one at a time in the open position and verify the red open light comes on. The valve(s) may be left in the position desired.

NRV-151 alternate control switch to open and red light comes on.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-152 alternate control switch to open and red light comes on.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

NRV-153 alternate control switch to open and red light comes on.

TECH \_\_\_\_\_ DATE \_\_\_\_\_

7.14 Notify the Unit 1 Control Room that the pressurizer PORV alternate control(s) for (cross out the valve control not altered)

NRV-151  
NRV-152  
NRV-153

is installed and available for operation using the control switch located in Unit 1 on Turbine Building 591 elevation.

US(or designee) \_\_\_\_\_ DATE \_\_\_\_\_

7.15 Shift Supervisor (or Assistant Shift Supervisor) notified pressurizer PORV alternate control installation complete.

SS/ASS \_\_\_\_\_ DATE \_\_\_\_\_

8.0 Ensure all areas worked are clean and that proper log entries have been made.



ATTACHMENT 1

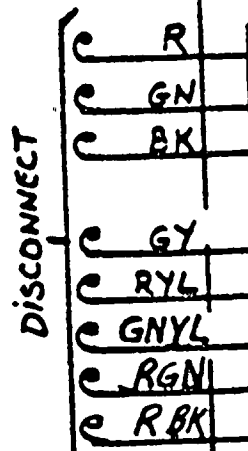
PENETRATION 1-2C4

Box B127

1-NRV-153

PENETRATION CONDUCTOR NO.	WIRE NO.
2-1	153+
2-2	153-R
2-3	153-G

2-4	153-4
2-5	153-5
2-6	PZAP
2-7	38
2-8	153+

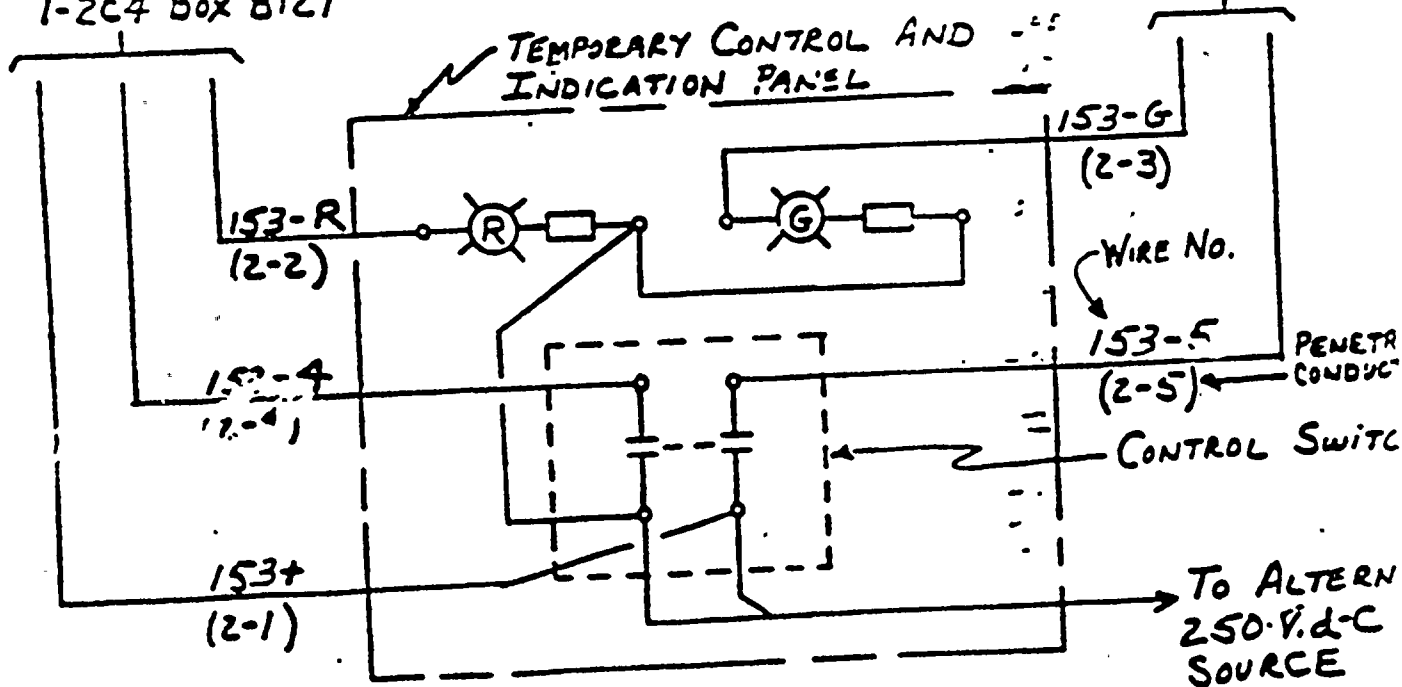


To PNL.  
"PRZ"

INSTALL  
JUMPER

To PENETRATION  
1-2C4 Box B127

To PENETRATION  
1-2C4 Box B12



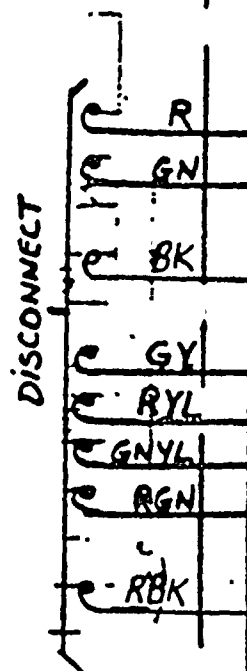
ATTACHMENT 2

PENETRATION 1-4C1

Box B129:

1-NRV-151

PENETRATION CONDUCTOR NO.	WIRE NO.
7-1	151+
7-2	151-R
7-4	151-G
7-6	151-4
7-7	151-5
7-8	P2AP
7-9	36
7-11	151+

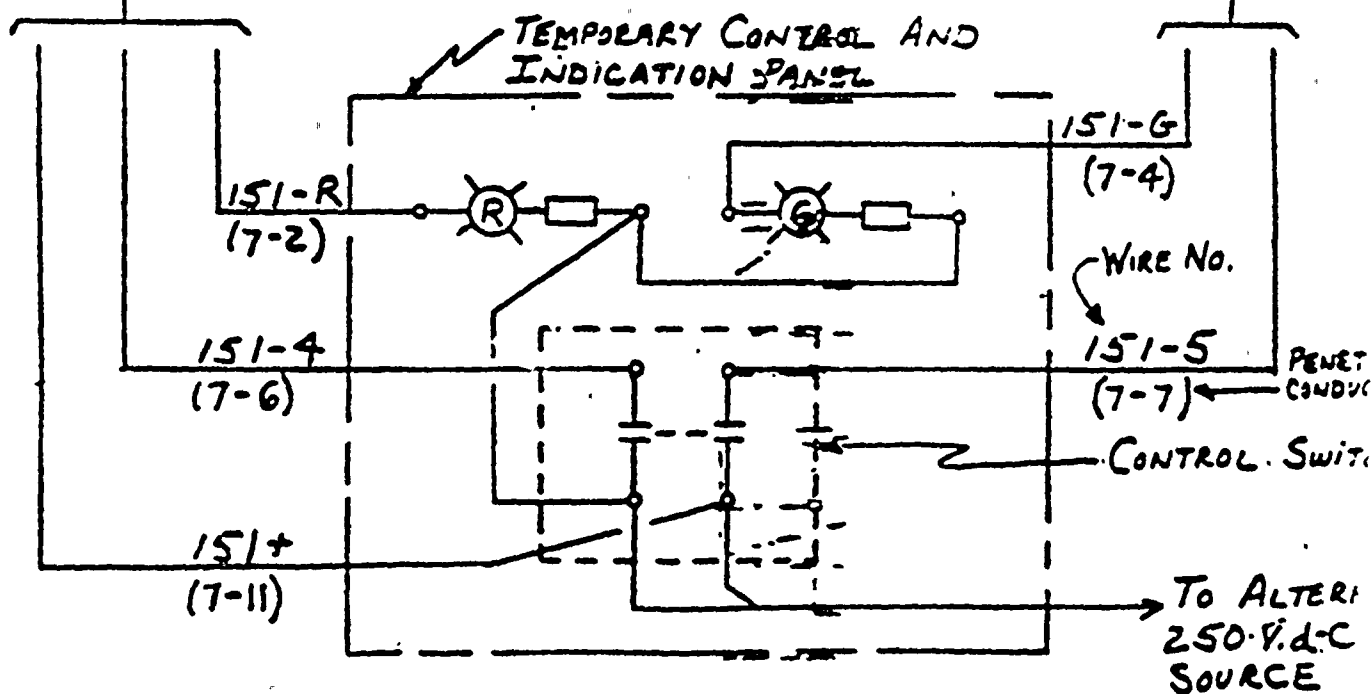


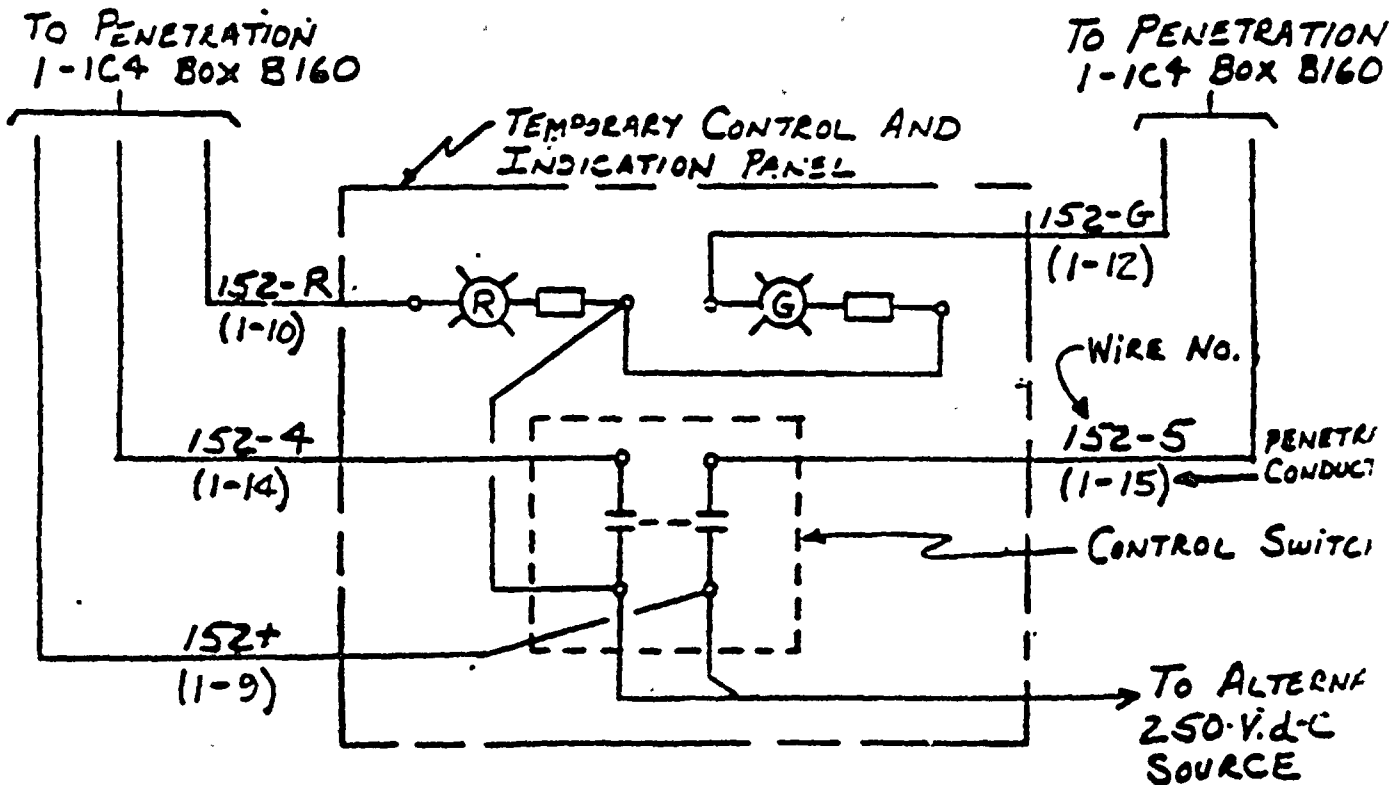
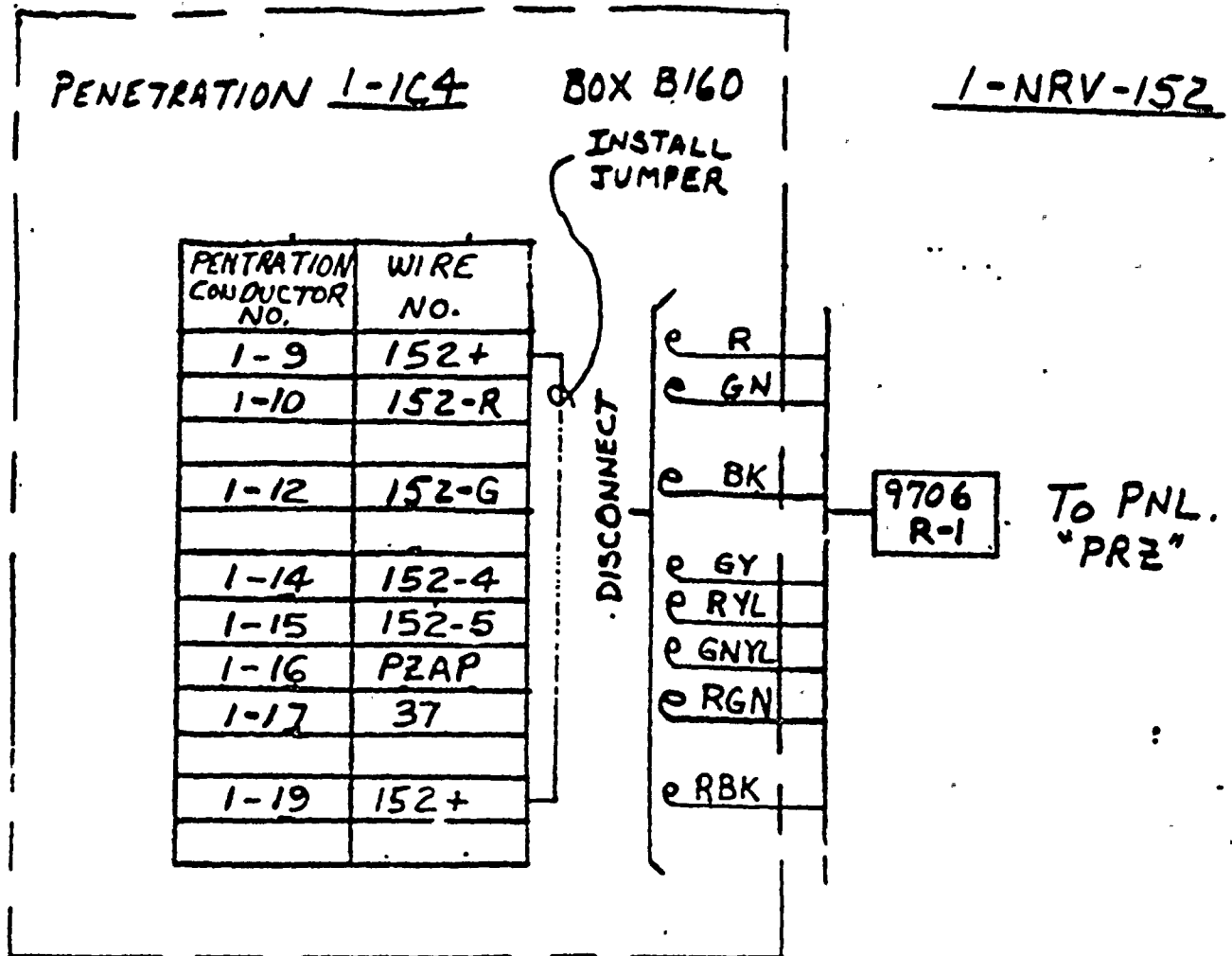
9705  
R-1

TO PNL.  
"PRZ"

TO PENETRATION  
1-4C1 BOX B129

TO PENETRATION  
1-4C1 BOX B12





# INDIANA & MICHIGAN ELECTRIC COMPANY DONALD C COOK NUCLEAR PLANT

## PROCEDURE COVER SHEET

\*\*1 THP 6030 IMP.305  
Procedure No.

Revision No. 0

**TITLE** APPENDIX R POST-FIRE REPOWERING OF  
IN-CONTAINMENT VALVES

**SCOPE OF REVISION**

**UNCONTROLLED  
DOCUMENT**

C & I SECTION  
MAY 29 1986  
CONTROLLED DOCUMENT

SIGNATURES	REVISION NUMBER			
*****	Rev. 0			
PREPARED BY	<i>[Signature]</i> Sharon Turner			
DEPARTMENT HEAD APPROVAL	<i>[Signature]</i> W. Gibson			
INTERFACING DEPARTMENT HEAD CONCURRENCE	<i>[Signature]</i> W/A			
QUALITY ASSURANCE SUPERVISOR APPROVAL	<i>[Signature]</i> J. McCallister			
PLANT NUCLEAR SAFETY COMMITTEE	<i>[Signature]</i> M. #1911	8606130117 PDR ADDCK 05000315 F	860606 PDR	
PLANT MANAGER APPROVAL	<i>[Signature]</i> W. Gibson			
APPROVAL DATE	5/22/86			
EFFECTIVE DATE	5/29/86			



LIST OF EFFECTIVE PAGES

PAGE NUMBER.

REVISION NUMBER/CS NUMBER

Page 1 of 18 .

Revision 0

Page 2 of 18

Revision 0

Page 3 of 18

Revision 0

Page 4 of 18

Revision 0

Page 5 of 18

Revision 0

Page 6 of 18

Revision 0

Page 7 of 18

Revision 0

Page 8 of 18

Revision 0

Page 9 of 18

Revision 0

Page 10 of 18

Revision 0

Page 11 of 18

Revision 0

Page 12 of 18

Revision 0

Page 13 of 18

Revision 0

Page 14 of 18

Revision 0

Page 15 of 18

Revision 0

Page 16 of 18

Revision 0

Page 17 of 18

Revision 0

Page 18 of 18

Revision 0

APPENDIX A

Page 1 of 31

Revision 0

Page 2 of 31

Revision 0

Page 3 of 31

Revision 0

Page 4 of 31

Revision 0

Page 5 of 31

Revision 0



PAGE NUMBER

REVISION NUMBER/CS NUMBER

Page 6 of 31

Revision 0

Page 7 of 31

Revision 0

Page 8 of 31

Revision 0

Page 9 of 31

Revision 0

Page 10 of 31

Revision 0

Page 11 of 31

Revision 0

Page 12 of 31

Revision 0

Page 13 of 31

Revision 0

Page 14 of 31

Revision 0

Page 15 of 31

Revision 0

Page 16 of 31

Revision 0

Page 17 of 31

Revision 0

Page 18 of 31

Revision 0

Page 19 of 31

Revision 0

Page 20 of 31

Revision 0

Page 21 of 31

Revision 0

Page 22 of 31

Revision 0

Page 23 of 31

Revision 0

Page 24 of 31

Revision 0

Page 25 of 31

Revision 0

Page 26 of 31

Revision 0

Page 27 of 31

Revision 0

Page 28 of 31

Revision 0

Page 29 of 31

Revision 0

Page 30 of 31

Revision 0

Page 31 of 31

Revision 0

INDIANA & MICHIGAN ELECTRIC COMPANY  
DONALD C. COOK NUCLEAR PLANT

APPENDIX R POST FIRE REPOWERING OF  
IN-CONTAINMENT VALVES, U-1

1.0 OBJECTIVE

1.1 Provision of a repair procedure for inside containment motor-operated valves requiring post-fire operation in the event of a loss of control from the Unit 1 Control Room. This procedure allows the alternative operation of these valves from outside of the containment and eliminates the need for plant personnel to enter the containment to manually operate these valves.

1.2 DISCUSSION

Sequence of events for repair and operation of a containment valve.

1.2.1 Maintenance will disconnect the power source from the motor control center (MCC) containing the motor starter for the valve to be repaired. An alternate power feed from a previously de-energized circuit, will be connected to the MCC by maintenance.

1.2.2 C&I will disconnect the external wiring from the applicable motor starter, and will connect a temporary valve control and indicating panel to the motor starter circuit.

1.2.3 Operations will then turn on the alternate power source, and operate the valve.

1.2.4 Operations turns off alternate power to the MCC.

1.2.5 C&I disconnects the temporary control and indicating panel from the motor starter circuit.

Step 1.2.2 will be repeated for the motor starter in the same MCC, for the next valve to be operated, followed by steps 1.2.3, 1.2.4 and 1.2.5, until all valves powered from the MCC have been operated.

1.2.6 Motor Control Centers may be de-energized and motor starters modified in any convenient order. One, or any number, of motor starters in an MCC may be modified as deemed necessary.

- 1.2.7 This post-fire repair procedure is intended to provide the plant operators with an alternative method of aligning the following inside-containment motor-operated valves from their associated motor control centers located in the engineered safety system and MCC Room at elevation 609 Ft. in the Auxiliary Building:

<u>Valve No.</u>	<u>Containment Valve Description</u>	<u>MCC</u>
IMO-110	Accumulator Isolation Valve	1-EZC-C
IMO-120	Accumulator Isolation Valve	1-EZC-B
IMO-130	Accumulator Isolation Valve	1-EZC-D
IMO-140	Accumulator Isolation Valve	1-EZC-A
IMO-128	RHR Inlet Isolation Valve	1-EZC-B
ICM-129	RHR Inlet Isolation Valve	1-EZC-C
NMO-151	Pressurizer PORV Block Valve	1-EZC-A
NMO-152	Pressurizer PORV Block Valve	1-EZC-B
NMO-153	Pressurizer PORV Block Valve	1-EZC-D
ICM-111	RHR Outlet Isolation Valve	1-EZC-C

- 1.2.8 This procedure is referenced in and should be used to supplement 12 OHP 4023.100.001, "Unit #1 Emergency Remote Shutdown" procedure.

### 1.3 ASSUMPTIONS

- 1.3.1 A loss of total plant off-site power for 72 hours.
- 1.3.2 A fire in any one of the following plant areas:
- (a) Control Room, or
  - (b) Control Room Cable Vault, or
  - (c) Auxiliary Cable Vault, or
  - (d) Switchgear Room Cable Vault

NOTE: As indicated in the "Objective" section of this procedure, the primary concern is loss of control from the Control Room. However, it is not the intent of this procedure to limit Control Room use. This procedure may be used for any fire which occurs outside of the fire areas containing the valves, motor control centers, electrical penetrations and valve cables (routed from a motor control center to a valve) as specified by this procedure.



## 2.0 REFERENCES

- 2.1 10 CFR 50, Appendix R, Section III L.
- 2.2 PMI-2270, Fire Protection.
- 2.3 PMI-2140, Temporary Modifications.
- 2.4 AEPSC Plant Drawings 1-97331, 1-97332, 1-1316, 1-1315.
- 2.5 \*\*12 OHP 4023.100.001, Unit #1 Emergency Remote Shutdown.
- 2.6 \*\*1 MHP 2140.082.005, Maintenance Procedure for Repowering Containment Valves.

## 3.0 PRECAUTIONS

- 3.1 When routing temporary cables, do not obstruct walkways. Cables shall be routed off to the side or overhead when possible.
- 3.2 Though the circuits being worked on are de-energized, other circuits in close proximity may have voltages present; observe all electrical safety precautions while working on or near energized equipment.
- 3.3 Ensure that all connections are clean and tight.
- 3.4 It is assumed that the equipment required by this procedure is available. Additionally, use of equipment required from the opposite (unaffected) unit should not impair safe continued operation or shutdown of that unit.

## 4.0 PREREQUISITES

- 4.1 This procedure is to interface with Maintenance Department procedure \*\*1 MHP 2140.082.005, "Maintenance Procedure for Repowering Containment Valves", which is the controlling procedure for containment valve repair.
- 4.2 Striped-tag clearances must be transferred to C&I from Maintenance Department prior to working on valve motor controls or associated circuitry.
  - 4.2.1 When the temporary valve control panel has been connected, Operations is to be informed that power may be turned on and the valve may be operated.



- 4.3 Verify that all terminals are de-energized prior to lifting or landing wires.

## 5.0 CONTAINMENT VALVE REPAIR PROCEDURE

- 5.1 Coordinate with Maintenance Department to determine which MCC has been de-energized and which motor starters will be modified.

5.1.1 Motor Starters may be modified in any order required, providing the MCC feeding the starters has been de-energized.

5.1.2 Any number, or all, valve motor starters in an MCC may be modified as deemed necessary.

5.1.3 Verification of lifted wire signatures will document which motor starters are modified.

- 5.2 Verify that a clearance has been taken on the MCC feeding the selected motor starters, and that the associated circuit breaker is open.

- 5.3 Open the Breaker compartment front door.

CAUTION: Verify that all terminals are de-energized prior to lifting or landing wires.

- 5.4 Lift the external wires listed, from their associated terminal points. This will disconnect the "low side" of the red and green indicating lights on panel "SIS" or "RHR". Independently verify lifted leads.

5.4.1 Verify MCC 1-EZC-A has been de-energized.

\_\_\_\_\_  
MAINT.

\_\_\_\_\_  
C&I

For IMO-140 and/or NMO-151 located in 1-EZC-A,  
disconnect the following external wires:  
MCC-1EZC-A

VALVE	TERM POINT NO.	WIRE NO.	VERIFY LIFTED WIRE		EXT. CABLE NO
			TECH 1	TECH 2	
IMO-140	12	12	_____	_____	9102R-1
	13	13	_____	_____	9102R-1
NMO-151	12	12	_____	_____	8676R-1
	13	13	_____	_____	8676R-1



5.4.2 Verify MCC 1-EZC-B has been de-energized.

MAINT.

C&I

For IMO-120, IMO-128 and NMO-152 located in 1-EZC-B, disconnect the following external wires:

VALVE	TERM POINT NO.	WIRE NO.	VERIFY LIFTED WIRE		EXT. CABLE NO
			TECH 1	TECH 2	
IMO-120	12	12			8870R-1
	13	13			8870R-1
IMO-128	1	11			8871R-1
NMO-152	12	12			8677R-1
	13	13			8677R-1

5.4.3 Verify MCC 1-EZC-C has been de-energized.

MAINT.

C&I

For IMO-110, ICM-129 and ICM-111 located in 1-EZC-C, disconnect the following external wires:

VALVE	TERM POINT NO.	WIRE NO.	VERIFY LIFTED WIRE		EXT. CABLE NO
			TECH 1	TECH 2	
IMO-110	12	12			8898G-1
	13	13			8898G-1
ICM-129	1	11			9082G-1
ICM-111	1	11			9083G-1

5.4.4 Verify MCC 1-EZC-D has been de-energized.

MAINT.

C&I



For IMO-130 and IMO-153 located in 1-EZC-D,  
disconnect the following external wires:

VALVE	TERM POINT NO.	WIRE NO.	VERIFY LIFTED WIRE		EXT. CABLE NO.
			TECH 1	TECH 2	
IMO-130	12	12	_____	_____	8624G-1
	13	13	_____	_____	8624G-1
IMO-153	12	12	_____	_____	8931G-1
	13	13	_____	_____	8931G-1

5.5 Connect wiring from the temporary control panel terminal points to MCC terminal points. Independently verify correct connections.

5.5.1 MCC 1-EZC-A

Valve IMO-140

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green light
12	_____	_____	10	_____	_____	"Low" side of red light



Valve NMO-151

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green light
12	_____	_____	10	_____	_____	"Low" side of red light

5.5.2 MCC 1-EZC-B

Valve IMO-120

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green light
12	_____	_____	10	_____	_____	"Low" side of red light



Valve IMO-128

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low contact opening circu
5	_____	_____	2	_____	_____	Control Switch - "Hig contact opening circu
10	_____	_____	6	_____	_____	Control Switch - "Hig contact closing circu
8A	_____	_____	8	_____	_____	Control Switch - "Low contact closing circu
13	_____	_____	9	_____	_____	"Low" side of green l
12	_____	_____	10	_____	_____	"Low" side of red lig

Valve IMO-152

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low contact opening circu
5	_____	_____	2	_____	_____	Control Switch - "Hig contact opening circu
10	_____	_____	6	_____	_____	Control Switch - "Hig contact closing circu
8A	_____	_____	8	_____	_____	Control Switch - "Low contact closing circu
13	_____	_____	9	_____	_____	"Low" side of green l
12	_____	_____	10	_____	_____	"Low" side of red lig

5.5.3 MCC 1-EZC-C

Valve IMO-110

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green lig
12	_____	_____	10	_____	_____	"Low" side of red light

Valve ICM-129

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green lig
12	_____	_____	10	_____	_____	"Low" side of red light



Valve ICH-111

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green lig
12	_____	_____	10	_____	_____	"Low" side of red light
5.5.4			<u>MCC 1-EZC-D</u>			

Valve IMO-130

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green lig
12	_____	_____	10	_____	_____	"Low" side of red light



Valve MM0-153

To Breaker Terminal Point Nos.	Verify Connections		From Temporary Control Panel Terminal Point Nos.	Verify Connections		Temporary Control Panel Function
	TECH 1	TECH 2		TECH 1	TECH 2	
3	_____	_____	3	_____	_____	Control Switch - "Low" contact opening circuit
5	_____	_____	2	_____	_____	Control Switch - "High" contact opening circuit
10	_____	_____	6	_____	_____	Control Switch - "High" contact closing circuit
8A	_____	_____	8	_____	_____	Control Switch - "Low" contact closing circuit
13	_____	_____	9	_____	_____	"Low" side of green lig
12	_____	_____	10	_____	_____	"Low" side of red light

5.6 The following external MCC wiring previously disconnected at the Breaker control wiring terminal points is to be spliced to wires from the temporary control panel:

5.6.1 MCC 1-EZC-A

Valve IMO-140

Brekaer External Wiring To Be Spliced - Wire No.	Spliced Wire Connections at the Temporary Control Panel-Terminal Point Nos.	Verify Correct Wires Spliced		Temporary Control Panel Function
		TECH 1	TECH 2	
4 (Previously dis- connected from Terminal No. 6)	1	_____	_____	Control Switch - "Hi, side contact opening circuit
10 (previously dis- connected from Terminal No. 2)	4	_____	_____	Control Switch - "Lo side contact opening circuit
3A (previously dis- connected from Terminal No. 11)	5	_____	_____	Control Switch - "Hi, side contact closing circuit
7 (previously dis- connected from Terminal No. 7)	7	_____	_____	Control Switch - "Lo side contact closing circuit
2 (previously dis- connected from Terminal No. 8)	11	_____	_____	Indicating Lights - "High" side

Valve NMO-151

Breaker External Wiring To Be Spliced - Wire No.	Spliced Wire Connections at the Temporary Control Panel-Terminal Point Nos.	Verify Correct Wires Spliced		Temporary Control Panel Function
		TECH 1	TECH 2	
4 (Previously dis- connected from Terminal No. 6)	1	_____	_____	Control Switch - "Hi, side contact opening circuit
10 (previously dis- connected from Terminal No. 2)	4	_____	_____	Control Switch - "Lo side contact opening circuit
3A (previously dis- connected from Terminal No. 11)	5	_____	_____	Control Switch - "Hi, side contact closing circuit
7 (previously dis- connected from Terminal No. 7)	7	_____	_____	Control Switch - "Lo side contact closing circuit
2 (previously dis- connected from Terminal No. 8)	11	_____	_____	Indicating Lights - "High" side

5.6.2 MCC 1-EZC-B

Valve IMO-120

Breaker External Wiring To Be Spliced - Wire No.	Spliced Wire Connections at the Temporary Control Panel-Terminal Point Nos.	Verify Correct Wires Spliced		Temporary Control Panel Function
		TECH 1	TECH 2	
4 (Previously dis- connected from Terminal No. 6)	1	_____	_____	Control Switch - " side contact openi circuit
10 (previously dis- connected from Terminal No. 2)	4	_____	_____	Control Switch - " side contact openi circuit
3A (previously dis- connected from Terminal No. 11)	5	_____	_____	Control Switch - " side contact closi circuit
7 (previously dis- connected from Terminal No. 7)	7	_____	_____	Control Switch - " side contact closi circuit
2 (previously dis- connected from Terminal No. 8)	11	_____	_____	Indicating Lights "High" side

## Valve IMO-128

Breaker External Wiring To Be Spliced - Wire No.	Spliced Wire Connections at the Temporary Control Panel-Terminal Point Nos.	Verify Correct Wires Spliced		Temporary Control Panel Function
		TECH 1	TECH 2	
4 (Previously dis- connected from Terminal No. 6)	1	_____	_____	Control Switch - "H side contact openin circuit
10 (previously dis- connected from Terminal No. 2)	4	_____	_____	Control Switch - "L side contact openin circuit
3A (previously dis- connected from Terminal No. 11)	5	_____	_____	Control Switch - "H side contact closin circuit
7 (previously dis- connected from Terminal No. 7)	7	_____	_____	Control Switch - "L side contact closin circuit
2 (previously dis- connected from Terminal No. 8)	11	_____	_____	Indicating Lights - "High" side



Valve MMO-152

Breaker External Wiring To Be Spliced - Wire No.	Spliced Wire Connections at the Temporary Control Panel-Terminal Point Nos.	Verify Correct Wires Spliced		Temporary Control Panel Function
		TECH 1	TECH 2	
4 (Previously dis- connected from Terminal No. 6)	1	_____	_____	Control Switch - "side contact open circuit
10 (previously dis- connected from Terminal No. 2)	4	_____	_____	Control Switch - "side contact open circuit
3A (previously dis- connected from Terminal No. 11)	5	_____	_____	Control Switch - "side contact closing circuit
7 (previously dis- connected from Terminal No. 7)	7	_____	_____	Control Switch - "side contact closing circuit
2 (previously dis- connected from Terminal No. 8)	11	_____	_____	Indicating Lights "High" side



5.6.3 MCC 1-EZC-D

Valve IMO-130

Breaker External Wiring To Be Spliced - Wire No.	Spliced Wire Connections at the Temporary Control Panel-Terminal Point Nos.	Verify Correct Wires Spliced		Temporary Control Panel Function
		TECH 1	TECH 2	
4 (Previously dis- connected from Terminal No. 6)	1	_____	_____	Control Switch - "Hig side contact opening circuit
10 (previously dis- connected from Terminal No. 2)	4	_____	_____	Control Switch - "Low" side contact opening circuit
3A (previously dis- connected from Terminal No. 11)	5	_____	_____	Control Switch - "Hig side contact closing circuit
7 (previously dis- connected from Terminal No. 7)	7	_____	_____	Control Switch - "Low" side contact closing circuit
2 (previously dis- connected from Terminal No. 8)	11	_____	_____	Indicating Lights - "High" side



## Valve NMO-153

Breaker External Wiring To Be Spliced - Wire No.	Spliced Wire Connections at the Temporary Control Panel-Terminal. Point Nos.	Verify Correct Wires Spliced		Temporary Control Panel Function
		TECH 1	TECH 2	
4 (Previously dis- connected from Terminal No. 6)	1.	_____	_____	Control Switch - "High" side contact opening circuit
10 (previously dis- connected from Terminal No. 2)	4	_____	_____	Control Switch - "Low" side contact opening circuit
3A (previously dis- connected from Terminal No. 11)	5	_____	_____	Control Switch - "High" side contact closing circuit
7 (previously dis- connected from Terminal No. 7)	7	_____	_____	Control Switch - "Low" side contact closing circuit
2 (previously dis- connected from Terminal No. 8)	11	_____	_____	Indicating Lights - "High" side

6.0 When Operations has operated a valve by use of the temporary control panel, its MCC may be de-energized.

6.1 After verification of de-energization, the temporary control panel is disconnected from the compartment.

6.2 The temporary control panel may now be connected into another compartment after it has been de-energized.

6.3 The above sequence, steps 6.1 and 6.2, is repeated until all valves required to be operated have been operated.

6.4 Removal of the temporary control panel's wiring from the compartment does not require verification.

## 7.0 Restoration

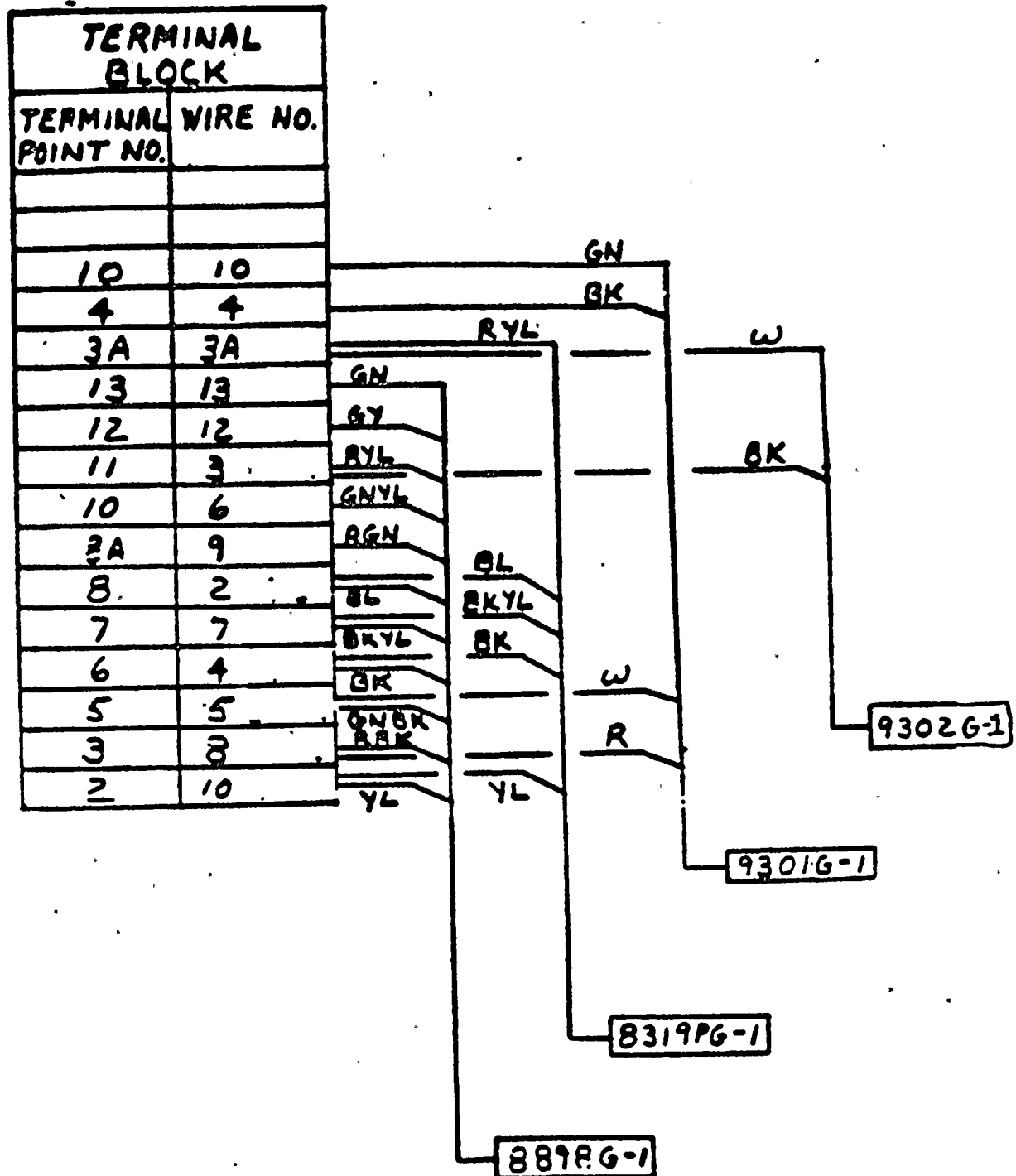
7.1 Restoration of Containment valves will be documented by job orders which restore the valves to their normal operational status, after mitigation of the fire.

7.2 REVIEWED BY \_\_\_\_\_ DATE \_\_\_\_\_

CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-BZC-C			
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	REMARKS
9302G-1	3A(W) 3(BK)	3A 11	
9301G-1	4(BK) 5(W) 10(GN) 8(R)	4 5 10 3	
8319PG-1	2(BL) 3A(RYL) 4(BK) 7(BKYL) 10(YL)	8 3A 6 7 2	WIRES 2, 3A, 4, 7, AND 10 CONTAINED IN CABLE 8319PG-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 11, 5, 1, 7 AND 4 RESPECTIVELY.
8898G-1	2(BL) 3(RYL) 4(BK) 5(GNBK) 6(GMYL) 7(BKYL) 8(RBK) 9(RGN) 10(YL) 12(GY) 13(GN)	8 11 6 5 10 7 3 8A 2 12 13	

WIRING TABULATION FOR SI ACCUMULATOR VALVE IMO-110



WIRING TO BE DISCONNECTED AT MCC 1-EZC-C

VALVE IMO-110

MCC 1-E2C-C

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
13	-
12	-
10	-
8A	-
5	-
3	-

TEMPORARY CONTROL & IND. PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
10	-
9	-
11	2
5	3A
1	4
7	7
4	10



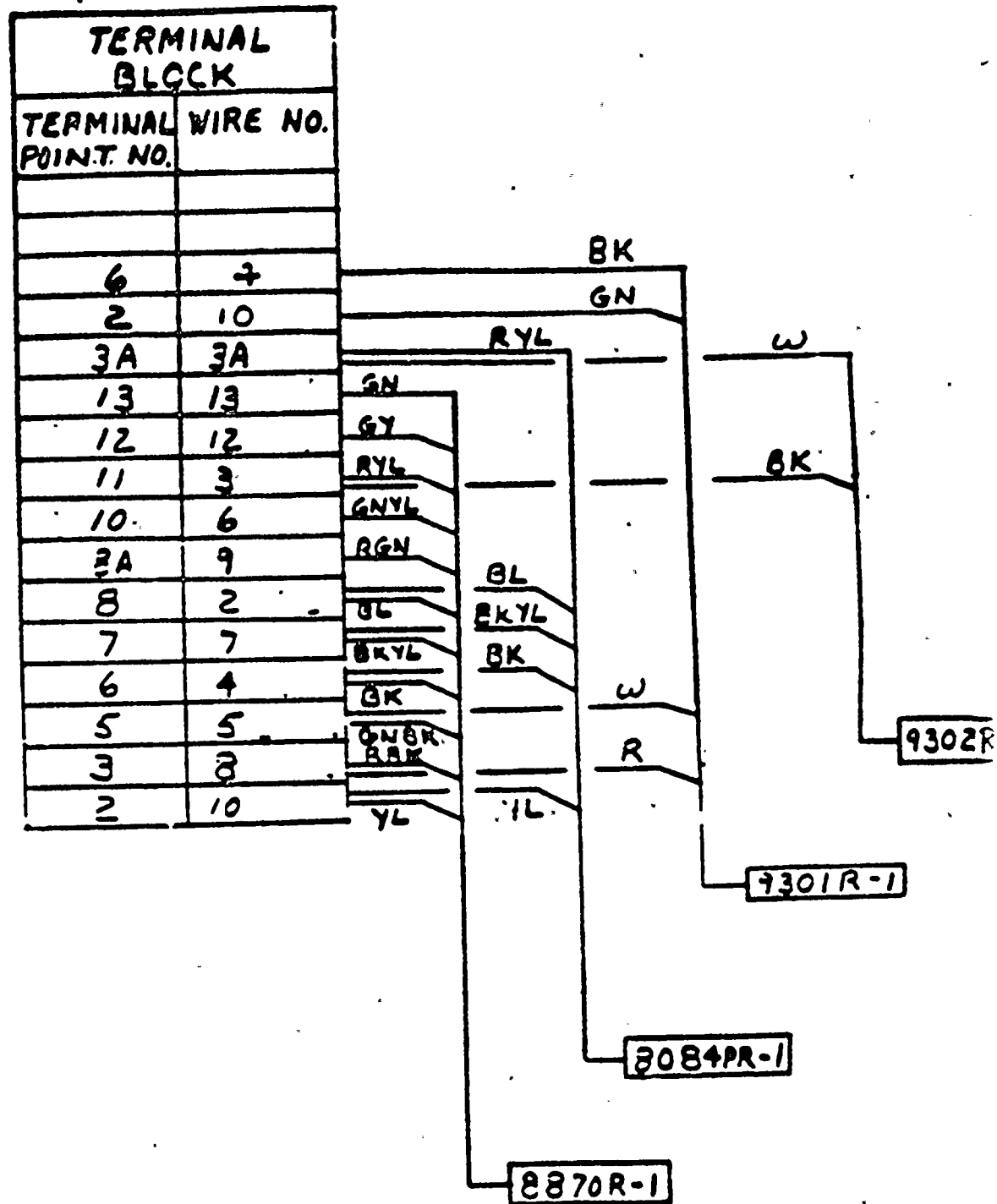
TEMPORARY JUMPERS

SPLICE (TYPICAL)

WIRING TO BE CONNECTED

VALVE IMO-110

8319PG-1



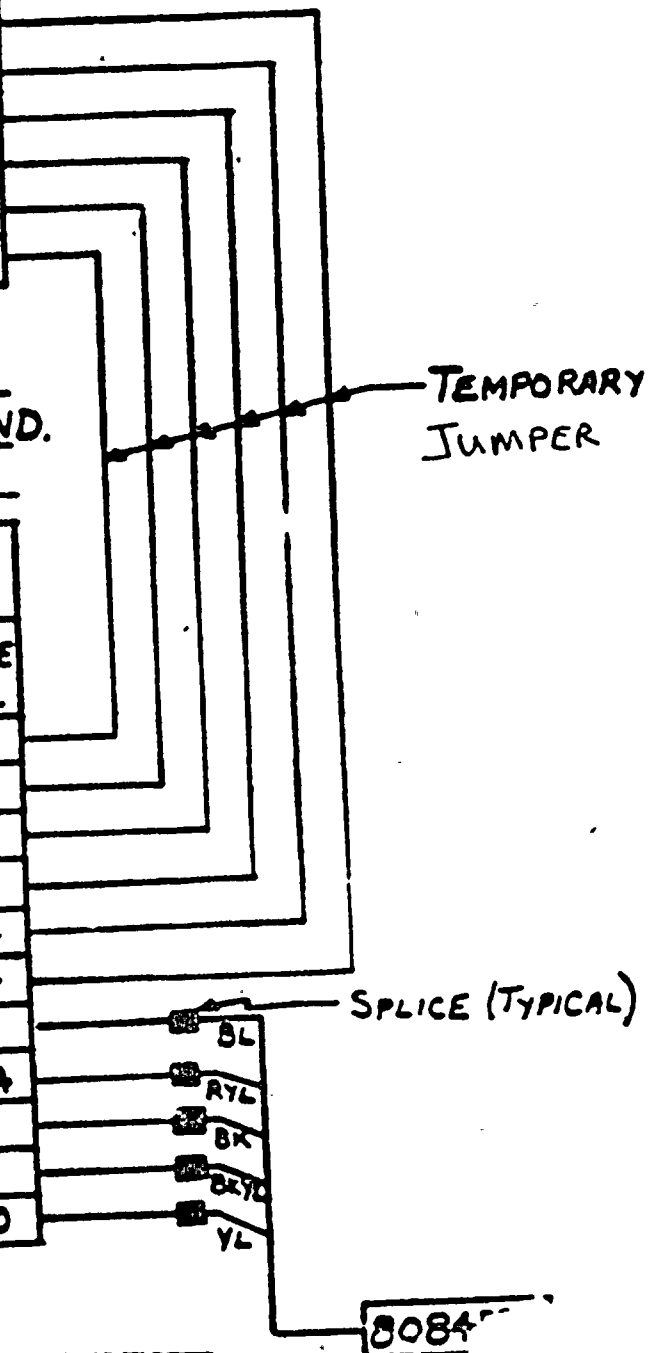
WIRING TO BE DISCONNECTED AT MCC 1-EZC-B

VALVE IMO-120

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
13	-
12	-
10	-
8A	-
5	-
3	-

TEMPORARY  
CONTROL CIND.  
PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
10	-
9	-
11	2
5	3A
1	4
7	7
4	10



WIRING TO BE CONNECTED

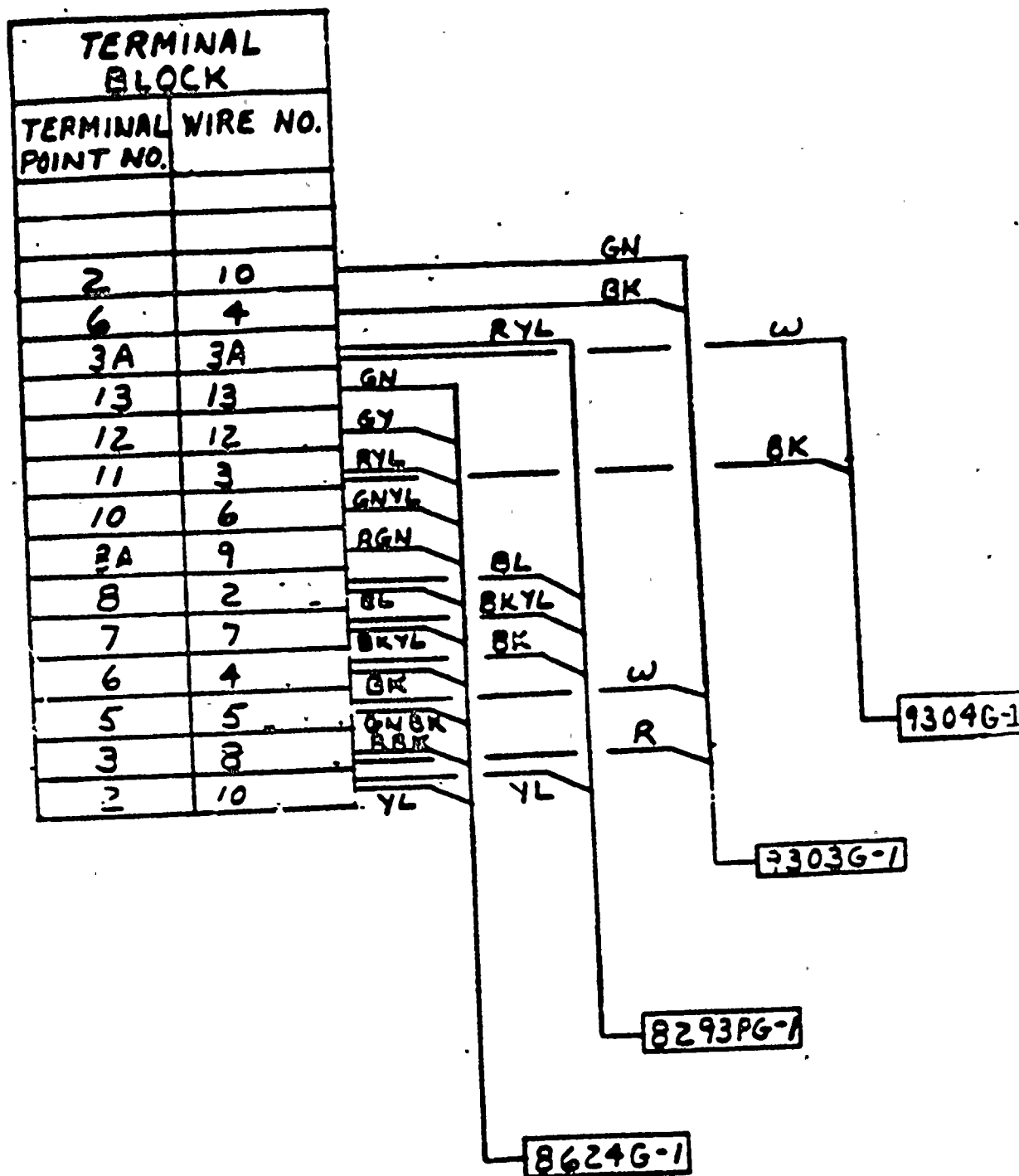
VALVE IMO-120



CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-D			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
9304G-1	3A(W) 3(BK)	3A 11	
9303G-1	4(BK) 5(W) 10(GN) 8(R)	6 5 2 3	
8293PG-1	2(BL) 3A(RYL) 4(BK) 7(BKYL) 10(YL)	8 3A 6 7 2	WIRES 2, 3A, 6, 7, AND 10 CONTAINED IN CABLE 8293PG-1. ST. BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 11, 5, 1, 7 AND 4 RESPECTIVELY.
8624G-1	2(BL) 3(RYL) 4(BK) 5(GNBK) 6(GNYL) 7(BKYL) 8(RBK) 9(RGN) 10(YL) 12(GY) 13(GN)	8 11 6 5 10 7 3 8A 2 12 13	

WIRING TABULATION FOR SI ACCUMULATOR VALVE IMO-130



WIRING TO BE DISCONNECTED AT MCC 1-EZC-D

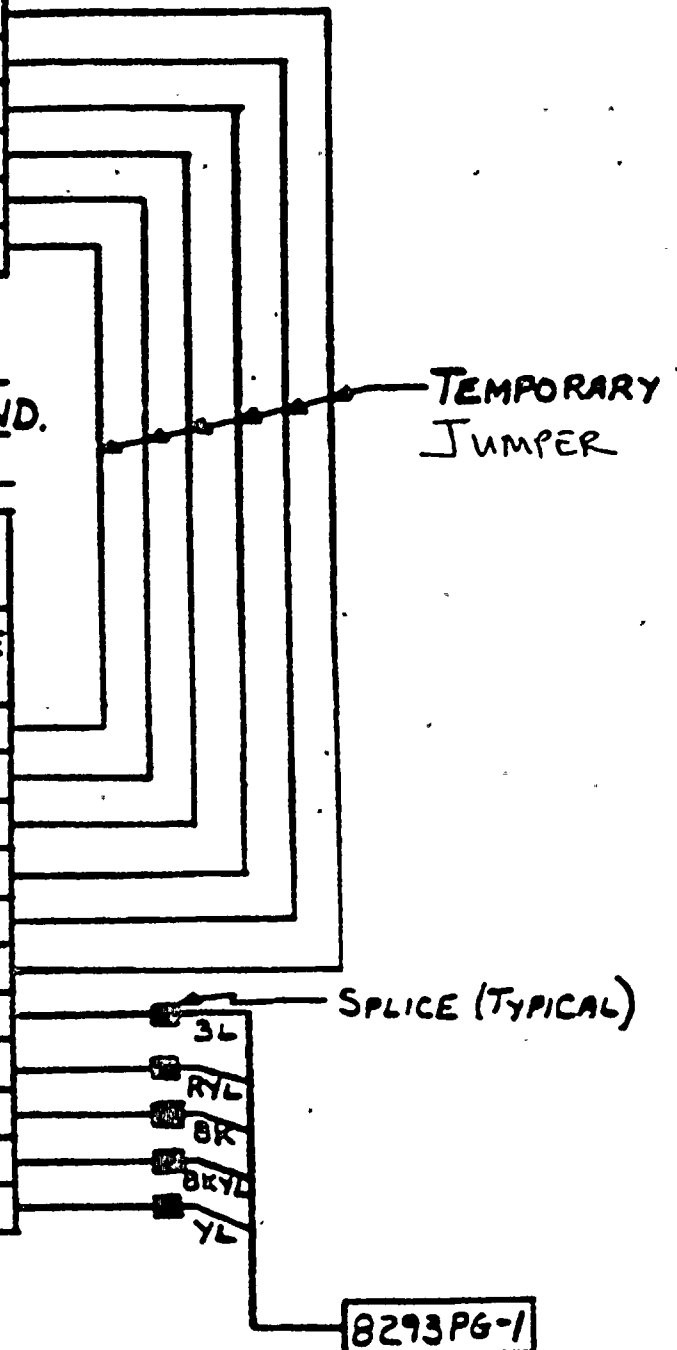
VALVE IMO-130



TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
13	-
12	-
10	-
8A	-
5	-
3	-

TEMPORARY  
CONTROL & IND.  
PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
10	-
9	-
11	2
5	3A
1	4
7	7
4	10

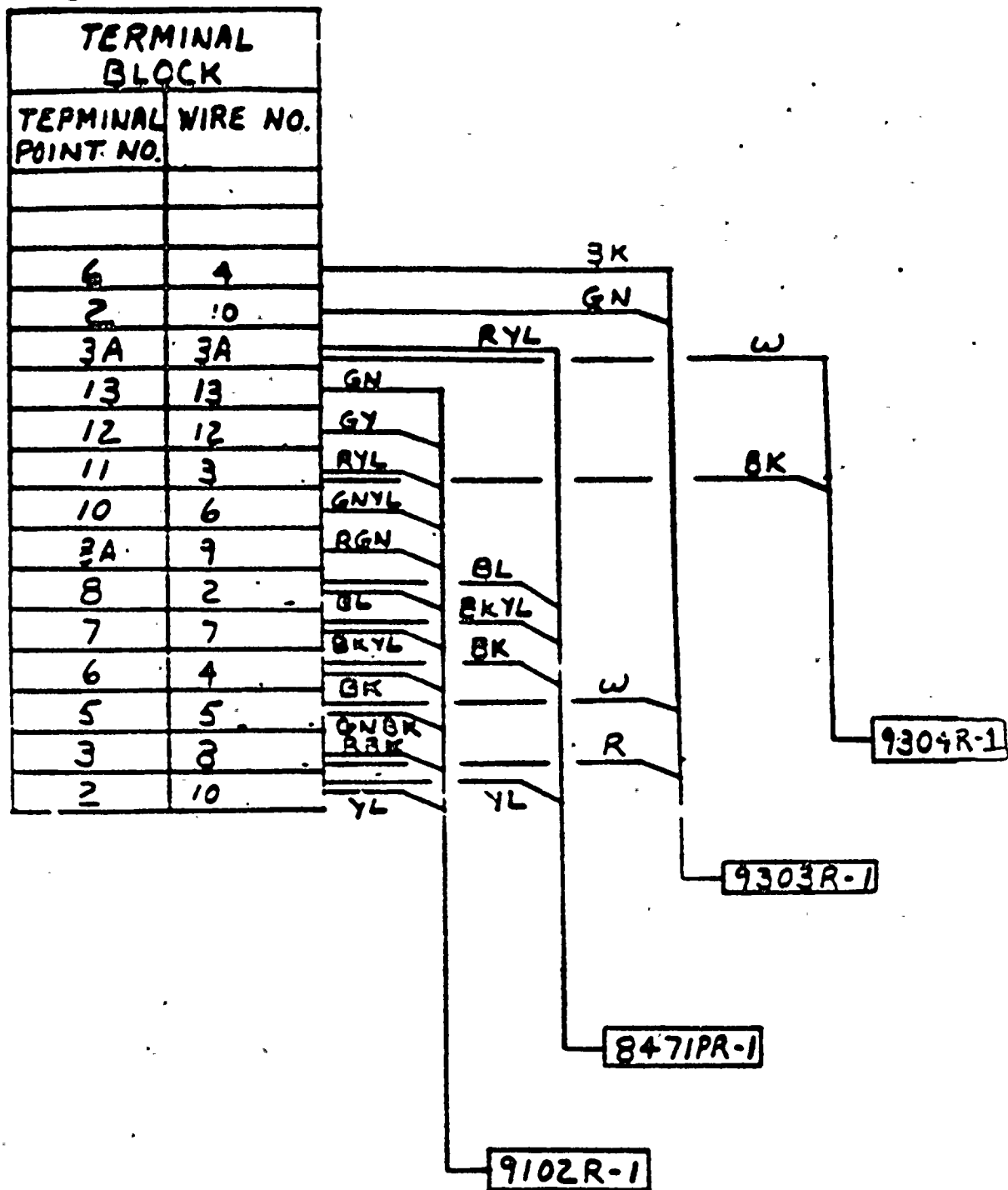


VALVE IMO-130

# CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-A			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
9304R-1	3A(W) 3(BK)	3A 11	
9303R-1	4(BK) 5(W) 10(GN) 8(R)	6 5 2 3	
8471PR-1	2(BL) 3A(RYL) 4(BK) 7(BKYL) 10(YL)	8 3A 6 7 2	WIRES 2, 3A, 4, 7, AND 10 CONTAINED IN CABLE 8471PR-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 11, 5, 1, 7 AND 4 RESPECTIVELY.
9102R-1	2(BL) 3(RYL) 4(BK) 5(GNBK) 6(GNYL) 7(BKYL) 8(RBK) 9(RGN) 10(YL) 12(GY) 13(GN)	8 11 6 5 10 7 3 8A 2 12 13	

WIRING TABULATION FOR SI ACCUMULATOR VALVE IMO-140



WIRING TO BE DISCONNECTED AT MCC 1-EZC-A

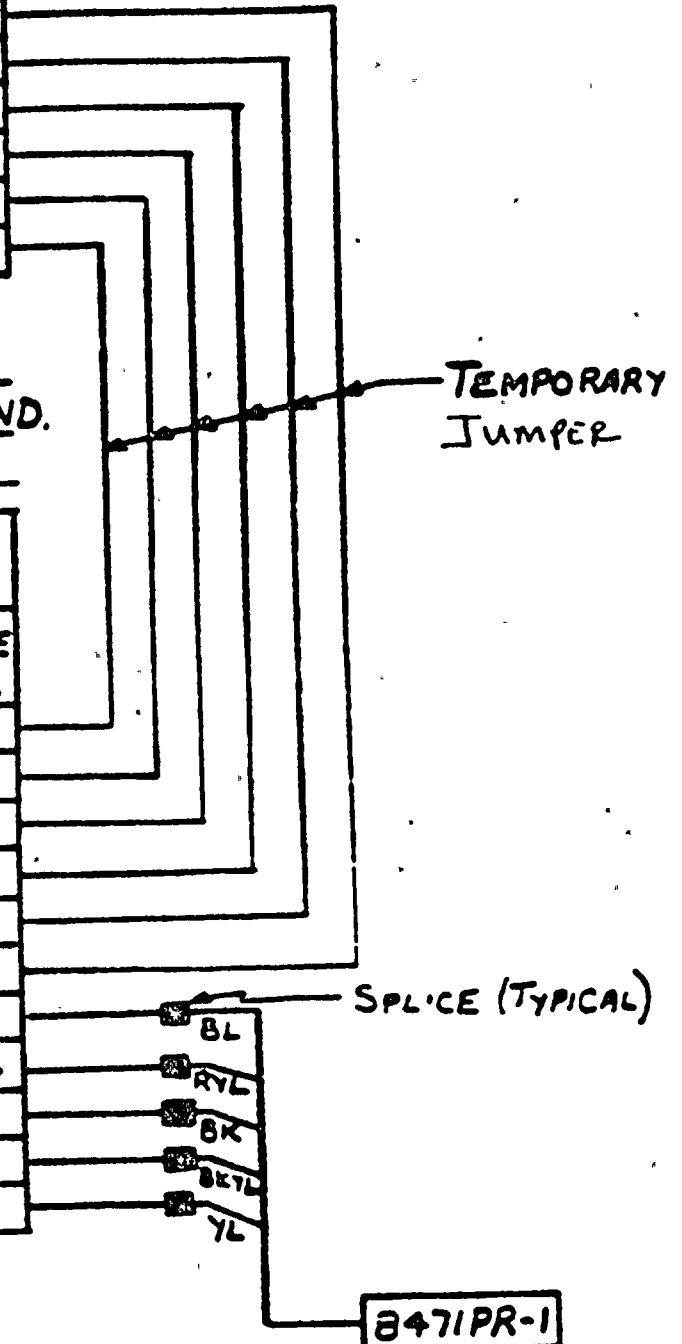
VALVE IMO-140



TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
13	-
12	-
10	-
8A	-
5	-
3	-

TEMPORARY CONTROL & IND. PANEL

TERMINAL POINTS	
TERMINAL POINT No	WIRE No.
3	-
2	-
8	-
6	-
10	-
9	-
11	2
5	3A
1	4
7	7
4	10



WIRING TO BE CONNECTED

VALVE IMO-140



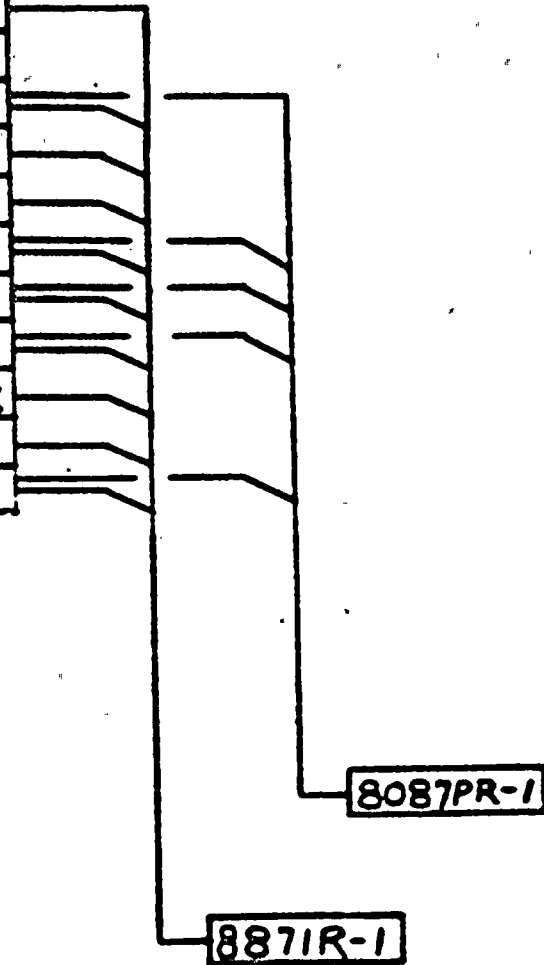
CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-B			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
8087PR-1	2(BL)	8	WIRES 3, 4, 7 AND 10 CONTAINED IN CABLE 8087PR-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 5, 1, 7 AND 4 RESPECTIVELY.
	3(RYL)	11	
	4(BK)	6	
	7(BKYL)	7	
	10(YL)	2	
8871R-1	2(BL)	8	
	3(RYL)	11	
	4(BK)	6	
	5(GNBK)	5	
	6(GNYL)	10	
	7(BKYL)	7	
	8(RBK)	3	
	9(RGN)	8A	
	10(YL)	2	
	11(GN)	1	

WIRING TABULATION FOR RHR INLET ISOLATION VALVE IMO-128

WIRING TABULATION FOR RHR INLET ISOLATION VALVE IMO-128

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO. & COLOR
1	11 GN
11	3 RYL
10	6 GNYL
9A	9 RGN
8	2 BL
7	7 BKYL
6	4 BK
5	5 GNBK
3	8 RBK
2	10 YL



WIRING TO BE DISCONNECTED AT MCC 1-EZC-B

VALVE IMO-128

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
10	-
8A	-
5	-
3	-

TEMPORARY  
CONTROL & IND.  
PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
5	3
1	4
7	7
4	10

TEMPORARY JUMPER

SPLICE (TYPICAL)

WIRING TO BE CONNECTED

VALVE IMO-128

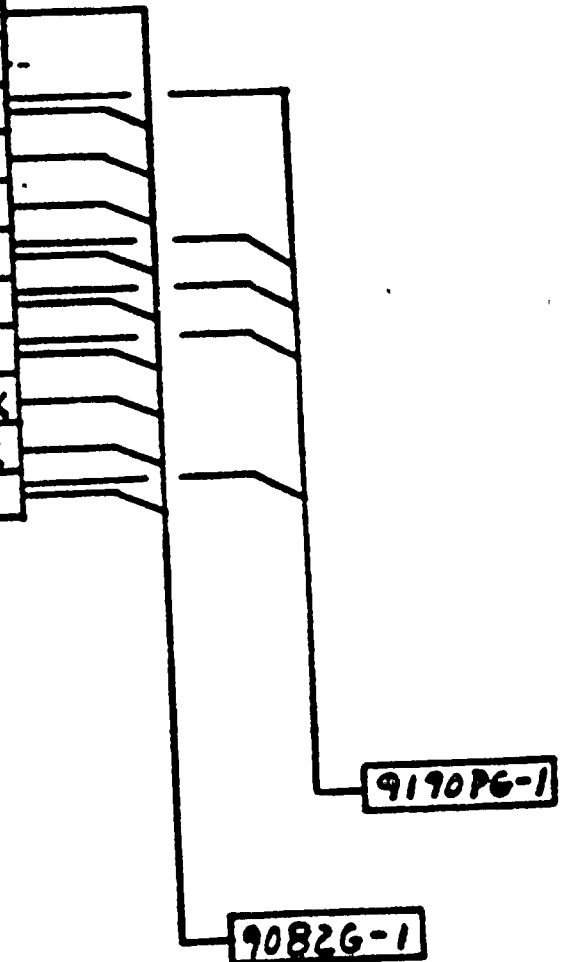
8087PR-1

CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-C			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
9190PG-1	2(BL)	8	WIRES 3, 4, 7 AND 10 CONTAINED IN CABLE 9190PG-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 5, 1, 7, AND 4 RESPECTIVELY.
	3(RYL)	11	
	4(BK)	6	
	7(BKYL)	7	
	10(YL)	2	
9082G-1	2(BL)	8	
	3(RYL)	11	
	4(BK)	6	
	5(G' BK)	5	
	6(GNYL)	10	
	7(BKYL)	7	
	8(RBK)	3	
	9(RGN)	8A	
	10(YL)	2	
	11(GN)	1	

WIRING TABULATION FOR RHR INLET ISOLATION VALVE ICM-129

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO. & COLOR
1	11 GN
12	
11	3 RYL
10	6 GNYL
9A	9 RGN
8	2 BL
7	7 BKYL
6	4 BK
5	5 GNBK
3	8 RBK
2	10 YL



WIRING TO BE DISCONNECTED AT MCC 1-EZC-C

VALVE ICM-129



MCC 1-EEC-C

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
10	-
8A	-
5	-
3	-

TEMPORARY  
 CONTROL & IND.  
 PANEL

TERMINAL POINTS	
TERMINAL POINT No.	WIRE No.
3	-
2	-
8	-
6	-
5	3
1	4
7	7
4	10

TEMPORARY JUMPER

SPLICE (TYPICAL)

WIRING TO BE CONNECTED

VALVE ICM-129

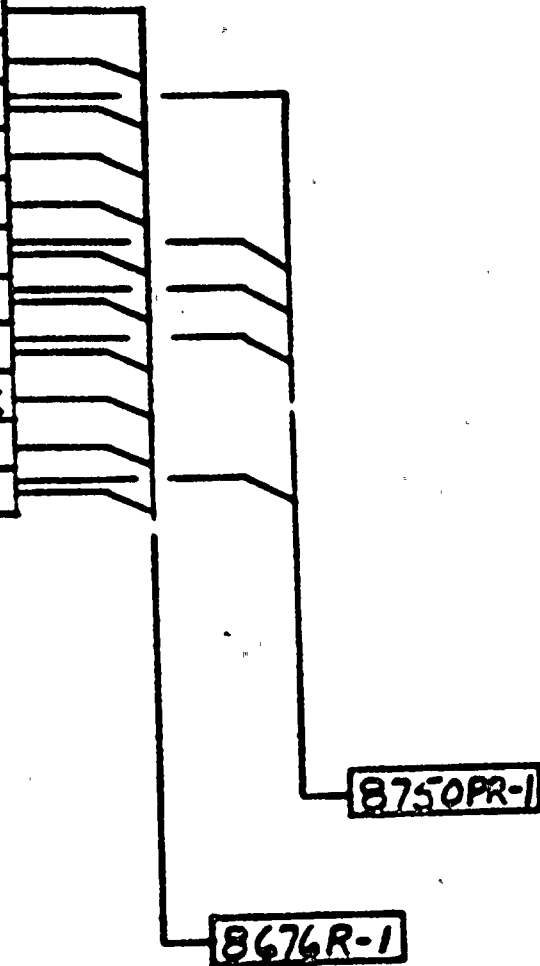
CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-A			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
8750PR-1	2(BL)	8	WIRES 2, 3, 4, 7 AND 10 CONTAINED IN CABLE 8750PR-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 11, 5, 1, 7 AND 4 RESPECTIVELY.
	3(RYL)	11	
	4(BK)	6	
	7(BKYL)	7	
	10(YL)	2	
8676R-1	2(BL)	8	
	3(RYL)	11	
	4(BK)	6	
	5(GNBK)	5	
	6(GNYL)	10	
	7(BKYL)	7	
	8(RBK)	3	
	9(RGN)	8A	
	10(YL)	2	
	12(GY)	12	
	13(GN)	13	

WIRING TABULATION FOR PRESSURIZER PORV BLOCK VALVE NMO-151



TERMINAL BLOCK		
TERMINAL POINT NO.	WIRE NO.	COLOR
13	13	GN
12	12	GY
11	3	RYL
10	6	GNYL
9A	9	RGN
8	2	BL
7	7	BKYL
6	4	BK
5	5	GNBK
3	8	RBK
2	10	YL



WIRING TO BE DISCONNECTED AT MCC 1-EZC-A

VALVE NMO-151

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
13	-
12	-
10	-
8A	-
5	-
3	-

TEMPORARY  
CONTROL & IND.  
PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
10	-
9	-
11	2
5	3
1	4
7	7
4	10

TEMPORARY  
JUMPER

SPLICE (TYPICAL)

EL  
RYL  
BK  
BYL  
YL

8750PR-1

WIRING TO BE CONNECTED

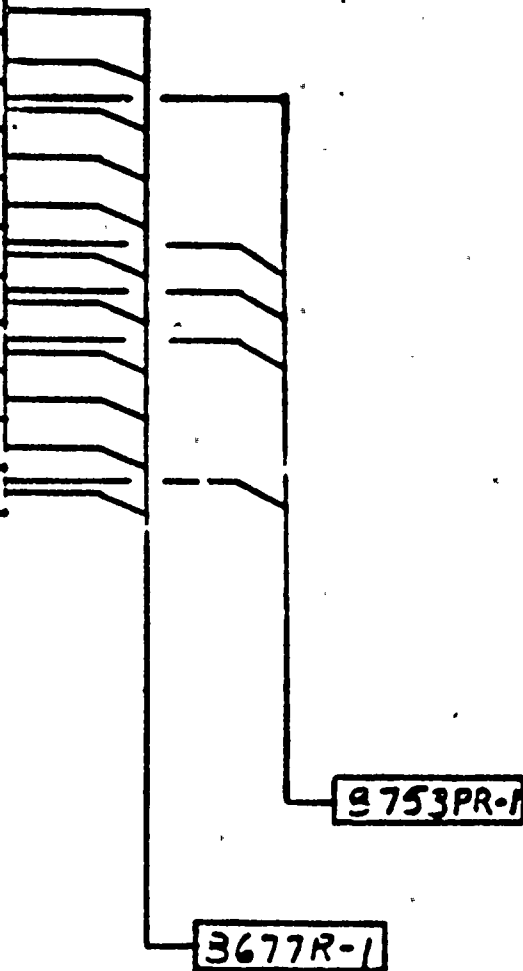
VALVE NMO-151

CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-B			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
8753PR-1	2(BL)	8	WIRES 2, 3, 4, 7 AND 10 CONTAINED IN CABLE 8750PR-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 11, 5, 1, 7 AND 4 RESPECTIVELY.
	3(RYL)	11	
	4(BK)	6	
	7(BKYL)	7	
	10(YL)	2	
8677R-1	2(BL)	8	
	3(RYL)	11	
	4(BK)	6	
	5(GNBK)	5	
	6(GNYL)	10	
	7(BKYL)	7	
	8(RBK)	3	
	9(RGN)	8A	
	10(YL)	2	
	12(GY)	12	
	13(GN)	13	

WIRING TABULATION FOR PRESSURIZER PORV BLOCK VALVE NMO-152

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO. & COLOR
13	13 GN
12	12 GY
11	3 RYL
10	6 GNYL
9A	9 RGN
8	2 BL
7	7 BKYL
6	4 BK
5	5 GNBK
3	3 RBK
2	10 YL



WIRING TO BE DISCONNECTED AT MCC 1-EZC-B

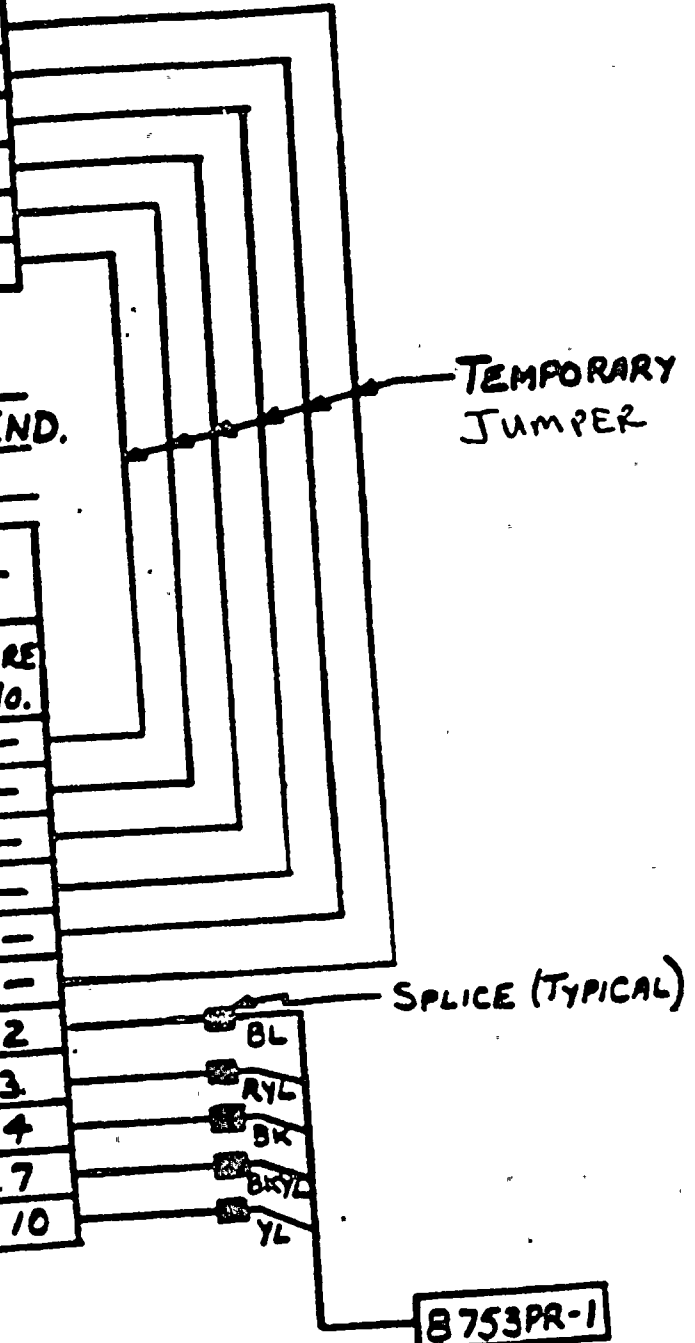
VALVE NMO-152



TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
13	-
12	-
10	-
8A	-
5	-
3	-

TEMPORARY  
CONTROL & IND.  
PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
10	-
9	-
11	2
5	3
1	4
7	7
4	10



WIRING TO BE CONNECTED

VALVE NMO-152

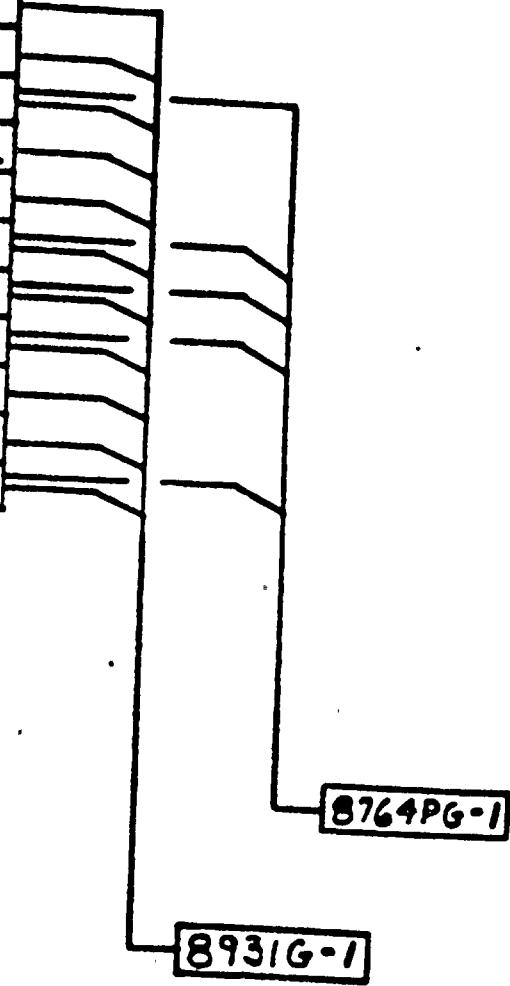
CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-D			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
8764PG-1	2(BL)	8	WIRES 2, 3, 4, 7 AND 10 CONTAINED IN CABLE 8764PG-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 11, 5, 1, 7 AND 4 RESPECTIVELY.
	3(RYL)	11	
	4(BK)	6	
	7(BKYL)	7	
	10(YL)	2	
8931G-1	2(BL)	8	
	3(RYL)	11	
	4(BK)	6	
	5(GNBK)	5	
	6(GNYL)	10	
	7(BKYL)	7	
	8(RBK)	3	
	9(RGN)	8A	
	10(YL)	2	
	12(GY)	12	
	13(GN)	13	

WIRING TABULATION FOR PRESSURIZER PORV BLOCK VALVE NMO-153



TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO. & COLOR
13	13 GN
12	12 GY
11	3 RYL
10	6 GNYL
9A	9 RGN
8	2 BL
7	7 BKYL
6	4 BK
5	5 GNBK
3	8 RBK
2	10 YL



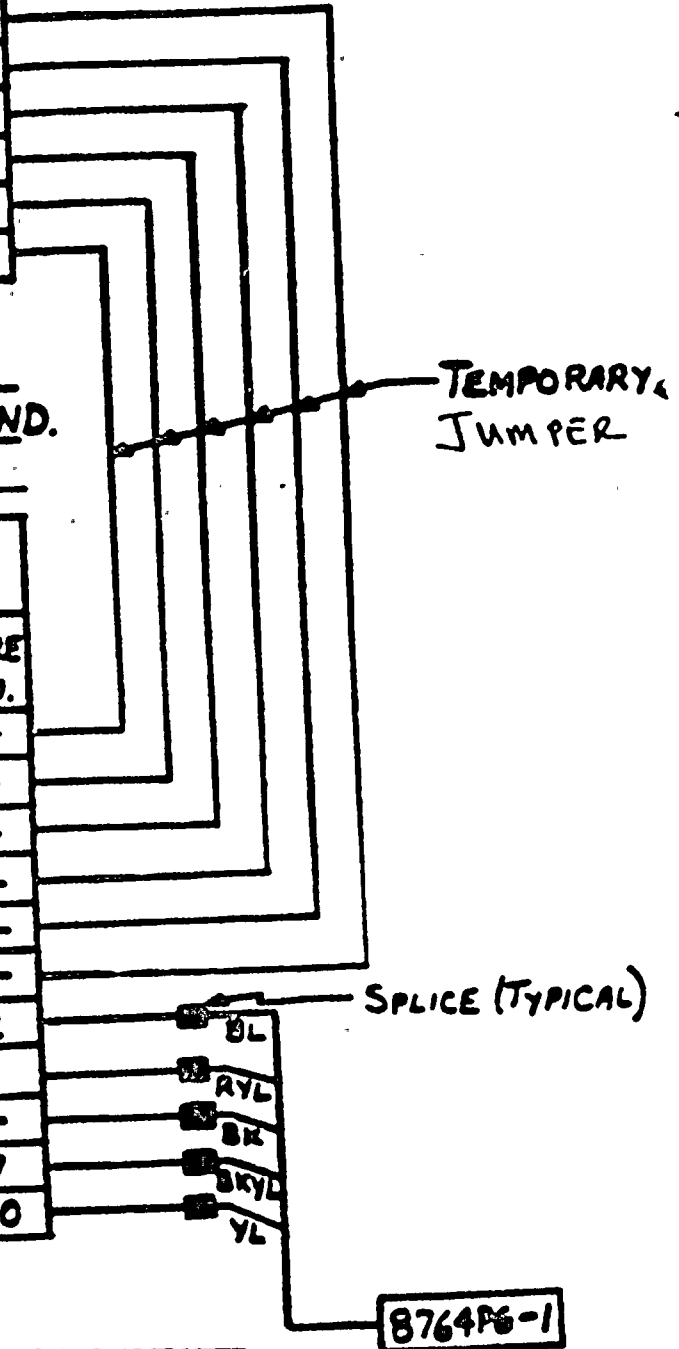
WIRING TO BE DISCONNECTED AT MCC 1-EZC-D

VALVE NMO-153

TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
13	-
12	-
10	-
8A	-
5	-
3	-

TEMPORARY  
CONTROL & IND.  
PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
10	-
9	-
11	2
5	3
1	4
7	7
4	10



WIRING TO BE CONNECTED

VALVE NMO-153

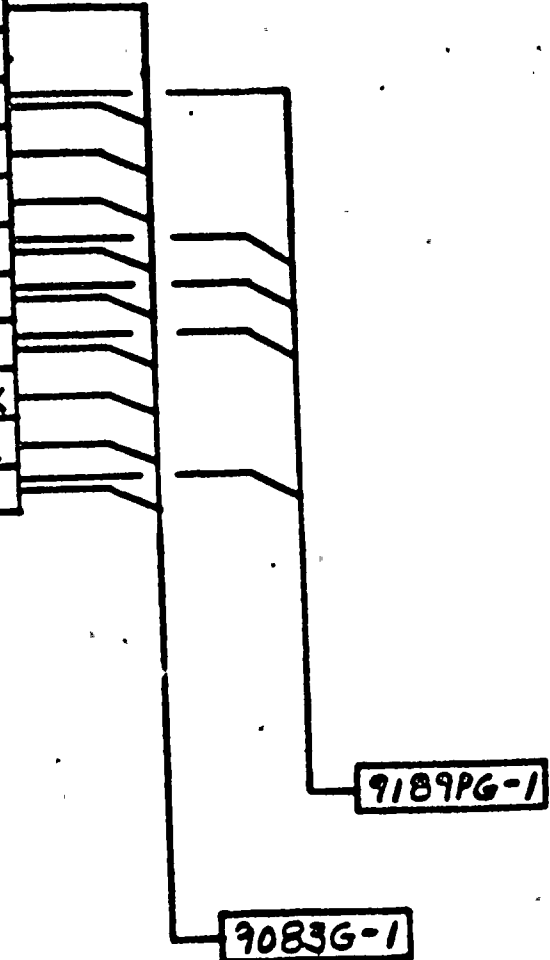
CONTAINMENT VALVES REPAIR PROCEDURE

WIRES TO BE DISCONNECTED AT MCC 1-EZC-C			REMARKS
CABLE NO.	WIRE NO. (COLOR CODE)	TERMINAL POINT NO.	
9189PG-1	2(BL)	8	WIRES 3, 4, 7 AND 10 CONTAINED IN CABLE 9189PG-1 MUST BE DIS- CONNECTED AND THEN SPliced TO A NEW WIRE FOR CONNECTION TO THE TEMPORARY CONTROL PANEL AT TERMINAL POINTS 5, 1, 7 AND 4 RESPECTIVELY.
	3(RYL)	11	
	4(BK)	6	
	7(BKYL)	7	
	10(YL)	2	
9083G-1	2(BL)	8	
	3(RYL)	11	
	4(BK)	6	
	5(GNBK)	5	
	6(GNYL)	10	
	7(BKYL)	7	
	8(RBK)	3	
	9(RGN)	8A	
	10(YL)	2	
	11(GN)	1	

WIRING TABULATION FOR RHR OUTLET ISOLATION VALVE ICM-111



TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO. & COLOR
1	11 GN
11	3 RYL
10	6 GNYL
8A	9 RGN
8	2 BL
7	7 BKYL
6	4 BK
5	5 GNBK
3	8 RBK
2	10 YL



WIRING TO BE DISCONNECTED AT MCC 1-EZC-C

VALVE ICM-111



TERMINAL BLOCK	
TERMINAL POINT NO.	WIRE NO.
10	-
8A	-
5	-
3	-

TEMPORARY CONTROL & IND. PANEL

TERMINAL POINTS	
TERMINAL POINT NO.	WIRE NO.
3	-
2	-
8	-
6	-
5	3
1	4
7	7
4	10

TEMPORARY JUMPER

SPLICE (TYPICAL)

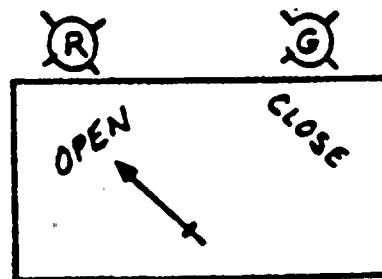
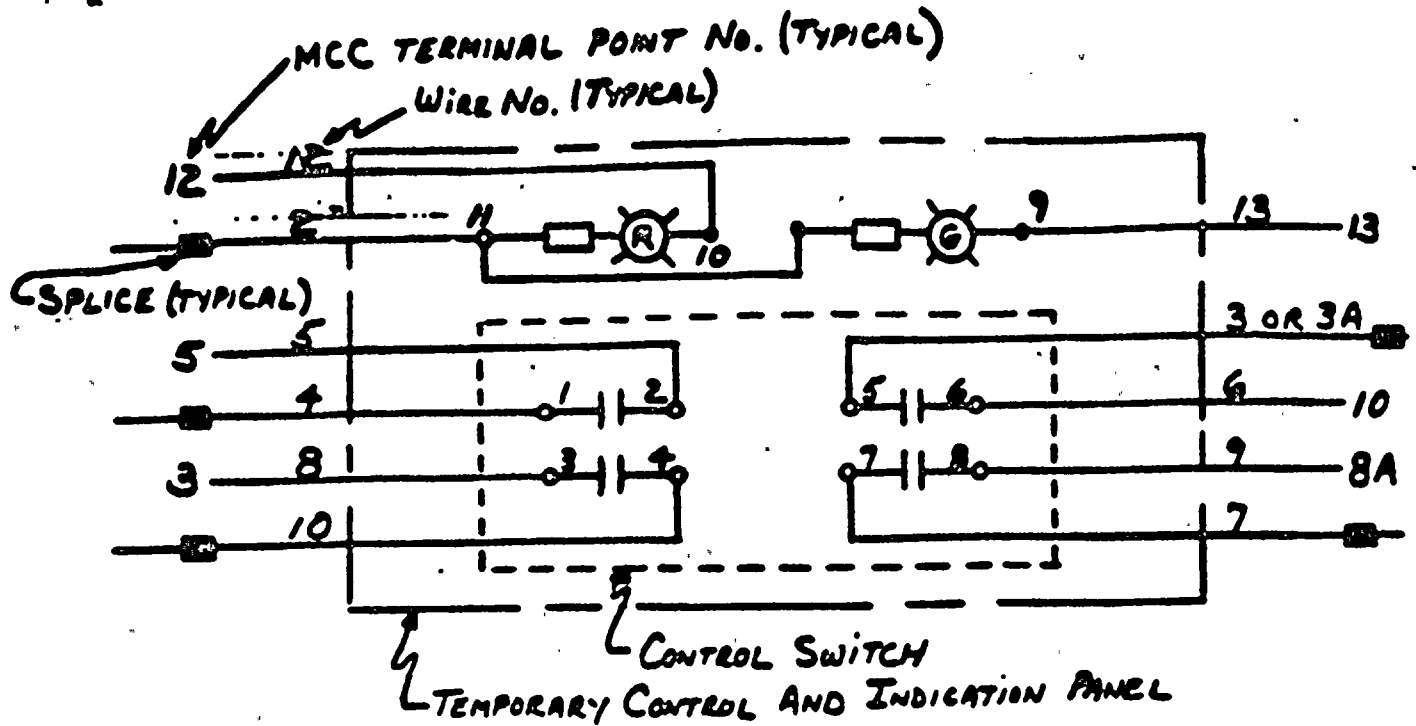
RYL  
BK  
BK  
YL

9189PG-1

WIRING TO BE CONNECTED

VALVE ICM-111





OPEN-CLOSE TYPE SWITCH  
WITH MAINTAINED CONTACTS

CONTACT NOS.	SWITCH POSITION		CONTACT FUNCTION
	OPEN	CLOSE	
1-1-2	X		"HIGH" SIDE OPENING CIRCUIT
3-1-4	X		"LOW" SIDE OPENING CIRCUIT
5-1-6		X	"HIGH" SIDE CLOSING CIRCUIT
7-1-8		X	"LOW" SIDE CLOSING CIRCUIT

X - DENOTES CONTACT CLOSED

TEMPORARY CONTROL AND INDICATION PANEL

TYPICAL WIRING AND SWITCH DEVELOPMENT