

EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 1 of 8
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5-31-90

Joseph A. Widay  
PLANT SUPERINTENDENT

6-1-90  
EFFECTIVE DATE

CATEGORY 1.0

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

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EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 2 of 8
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A. PURPOSE - This procedure provides guidance in the event of a loss of RHR cooling at or above normal loop levels. (i.e. at indicated "B" loop levels of 64 inches or greater)

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from;

- a. FR-C.3, RESPONSE TO SATURATED CORE COOLING,
- b. AP-CCW.3, LOSS OF CCW - PLANT SHUTDOWN

2. SYMPTOMS - The symptoms of (Loss of RHR) are;

- a. Annunciator A-20, RESIDUAL HEAT REMOVAL LOOP LO FLOW 2900 GPM (Set at 400 GPM per 0-2.2 in RHR Cooling mode) alarm lit, or
- b. Annunciator J-9, SAFEGUARD BREAKER TRIP alarm lit, or
- c. Unexpected increase in RCS temperature while on RHR cooling, or
- d. Erratic or no flow on FI-626, RHR Loop Flow

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EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 3 of 8
------------------	-----------------------	-----------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: IF at any time during the performance of this procedure the indicated "B" loop level falls below 64 inches, THEN go to AP-RHR.2, LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS.

1 Check RHR Pumps:

- o RHR pumps - AT LEAST ONE RUNNING AND NO TRIP INDICATION

IF 2 RHR pumps were running AND 1 has tripped, THEN perform the following:

- a. Adjust cooling as necessary.
- b. IF S/G cooling also required, THEN go to Step 9.

IF 1 RHR pump was running AND has tripped, THEN start the other RHR pump AND go to Step 15.

IF all available RHR pumps have tripped, THEN perform the following:

- a. Reset and attempt to restart 1 RHR pump.
- b. IF RHR pump starts, THEN go to Step 7.
- c. IF RHR cannot be restored, THEN go to Step 9.

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CAUTION

DO NOT START A SECOND RHR PUMP UNTIL THE CAUSE OF THE ERRATIC FLOW OR LOSS OF FLOW ON THE FIRST PUMP HAS BEEN DETERMINED AND CORRECTED.

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2 Check RHR Flow:

IF an RHR pump(s) is running with less than 200 gpm flow OR erratic flow is indicated, THEN stop all running RHR pump(s) AND go to Step 4.

EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 4 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	<p>Verify CCW Operation:</p> <ul style="list-style-type: none"> <li>o CCW pumps - AT LEAST ONE RUNNING</li> <li>o CCW to RHR Hxs, MOV-738A AND MOV-738B - OPEN AS NECESSARY</li> <li>o CCW temperature and flow alarms - EXTINGUISHED</li> </ul>	<p>To restore CCW to RHR:</p> <ul style="list-style-type: none"> <li>o Start the standby CCW pump if it is not running.</li> <li>o Open MOV-738A <u>AND</u> MOV-738B as necessary.</li> </ul> <p><u>IF</u> CCW can <u>NOT</u> be restored, <u>THEN</u> continue attempts to restore CCW, refer to AP-CCW.3, LOSS OF CCW - PLANT SHUTDOWN <u>AND</u> go to Step 5.</p>
4	<p>Verify RHR Valve Alignment - NORMAL (Refer to Attachment A)</p>	<p><u>IF</u> RHR valve alignment not normal, <u>THEN</u> stop all running RHR pump(s) <u>AND</u> align valves per Attachment A as required <u>AND</u> start one RHR pump.</p>
5	<p>Check RCS Temperature:</p> <ul style="list-style-type: none"> <li>a. RCS temperature - STABLE OR DECREASING</li> <li>b. Go to Step 16</li> </ul>	<ul style="list-style-type: none"> <li>a. <u>IF</u> RCS closed, <u>THEN</u> go to Step 6, <u>OR IF</u> Rx vessel head removed, <u>THEN</u> go to Step 13.</li> </ul>
6	<p>Check PRZR Wide Range Level (LI-433) - GREATER THAN 0 INCHES</p>	<p>To restore desired PRZR level, perform the following:</p> <ul style="list-style-type: none"> <li>a. Direct A0 to manually open MOV-856 as required.</li> </ul> <p><u>IF</u> level can <u>NOT</u> be restored quickly enough, <u>THEN</u> manually open MOV-856 from the Control Board.</p> <ul style="list-style-type: none"> <li>b. <u>WHEN</u> desired level obtained, <u>THEN</u> close MOV-856.</li> </ul>

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EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 5 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Start At Least 1 RHR Pump: o RHR pump(s) - RESET BREAKER AND START ONE PUMP	<u>IF</u> both RHR pumps will not start, <u>THEN</u> : o Notify electricians <u>AND</u> go to Step 9.
8	Check RHR Flow: a. RHR flow - AS DESIRED AND STABLE b. Go to Step 15	a. Go to Step 9.
9	Check RCP Status: a. RCP - AT LEAST ONE RUNNING	<u>IF</u> NO RCP running, <u>THEN</u> : a. Establish conditions for starting an RCP using Attachment RCP START, <u>AND</u> start one RCP. b. Go to Step 10.  <u>IF</u> an RCP cannot be started, <u>THEN</u> verify conditions for Natural Circulation using Attachment NC.
10	Check S/G Status: o Narrow range level in either S/G - GREATER THAN 17% -OR- o AFW flow - AT LEAST 200 GPM AVAILABLE	<u>IF</u> S/Gs are not operable, <u>THEN</u> : a. Place RCDT pumps in service (Refer to ER-RHR.1, RCDT PUMP OPERATION FOR CORE COOLING). b. Go to Step 15.

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EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 6 of 8
------------------	-----------------------	-----------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Establish Condenser Steam Dump:  o Steam dump - ESTABLISHED	<u>IF</u> the condenser is <u>NOT</u> available, <u>THEN</u> :  o Dump steam via S/G ARVs.
12	Check RCS Temperature:  a. RCS temperature - STABLE OR DECREASING  b. Go to Step 15	a. <u>IF</u> dumping steam does not provide adequate cooling, <u>THEN</u> initiate S/G blowdown from both S/Gs <u>AND</u> maintain both S/G levels stable by controlling AFW flow <u>AND</u> go to Step 15.
13	Check If 1 RHR Loop Is Operable:  a. RHR pumps - RUNNING OR START ONE b. RHR flow - GREATER THAN 200 GPM AND STABLE	<u>IF</u> NO RHR loops operable, <u>THEN</u> verify 1 or more containment recirculation fans running <u>AND</u> verify refueling cavity sweep fans running <u>AND</u> place RCDT pumps in operation (Refer to ER-RHR.1, RCDT PUMP OPERATION FOR CORE COOLING).
14	Check Refueling Cavity Level:  a. Refueling cavity level - GREATER THAN 23 FEET ABOVE Rx VESSEL FLANGE	a. Stop refueling <u>AND</u> increase refueling cavity level to greater than 23 feet (Refer to RF-2D, FILLING THE REFUELING CANAL) <u>AND</u> go to Step 15.

EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 7 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	<p>Verify Maintenance Notified And Continue Attempts To Restore Inoperable RHR Pumps Or RHR Flow:</p> <ul style="list-style-type: none"> <li>a. Maintenance - NOTIFIED</li> <li>b. Attempts continued - TO RESTORE INOPERABLE RHR PUMPS OR FLOW</li> </ul>	
16	<p>Establish Monitoring Of RCS Temperature:</p> <ul style="list-style-type: none"> <li>o RCS temperature - MONITORING ESTABLISHED</li> </ul>	
17	<p>Complete - NOTIFICATION TO HIGHER SUPERVISION</p>	
18	<p>Check Alternatives For Long Term Cooling:</p> <ul style="list-style-type: none"> <li>o Refer to ER-RHR.1, RCDT PUMP OPERATION FOR CORE COOLING</li> <li>o Consider establishing secondary heat sink</li> <li>o Consider RCS feed and bleed</li> </ul>	
19	<p>Check For Site Contingency Classification:</p> <ul style="list-style-type: none"> <li>o Site contingency classification - REFER TO SC-100, GINNA STATION EVENT EVALUATION AND CLASSIFICATION</li> </ul>	

EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 8 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check For NRC Reporting Requirements: <ul style="list-style-type: none"><li>o NRC reporting requirements - REFER TO 0-9.3, NRC IMMEDIATE NOTIFICATION</li></ul>	
21	Verify RHR Cooling: <ul style="list-style-type: none"><li>a. RHR cooling normal:<ul style="list-style-type: none"><li>o RHR cooling - RESTORED</li><li>o RCS temperature - STABLE OR DECREASING</li></ul></li><li>b. Return to REQUIRED PLANT OPERATION</li></ul>	a. Return to Step 1.
-END-		

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EOP:	TITLE:	REV: 8
AP-RHR.1	LOSS OF RHR	PAGE 1 of 1

ATTACHMENT A

NORMAL RHR COOLING VALVE ALIGNMENT

RHR Pump Suction From Loop A Hot Leg .....	MOV-700	Open
	MOV-701	Open
RHR Pump Discharge To Loop B Cold Leg .....	MOV-720	Open
	MOV-721	Open
RHR Letdown to CVCS .....	HCV-133	Open
RHR Pump Discharge Cross-Connect .....	V-709C	Open
	V-709D	Open
RHR HX Bypass .....	V-712A	Open
	V-712B	Open
	FCV-626	as desire
RHR HX Outlet 1A .....	HCV-625	as desire
RHR HX Outlet 1B .....	HCV-624	as desire
RHR Pump Suction From RWST .....	MOV-856	Closed
RHR Pump Suction Valves		
A RHR Pump .....	MOV-704A	Open
B RHR Pump .....	MOV-704B	Open

EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 1 of 1
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ATTACHMENT RCP START

- A) The following are prerequisites for starting an RCP:
- o RCP oil lift pump running (2 minutes)
  - o RCP oil lift pressure white light - LIT
- B) In addition, the following conditions should be met prior to starting an RCP:
- 1) Both PRZR spray valves closed - DEMAND AT 0%
  - 2) CCW in service and aligned to RCP
  - 3) RCP temperatures normal:
    - o Seal inlet temperature - LESS THAN 135°F
    - o CCW temperature and flow alarms - EXTINGUISHED
    - o Motor bearing temperatures - NORMAL  
(PPCS - GD RCPS or recorder, if selected)
  - 4) RCP seal injection in service
    - o Seal injection flow - GREATER THAN 6 gpm
    - o Labyrinth seal D/P - GREATER THAN 15 INCHES OF WATER
  - 5) RCP #1 seal D/P - GREATER THAN 220 psid
  - 6) RCP oil levels:
    - o Level alarms - EXTINGUISHED
    - o Level indicators - ON SCALE
  - 7) RCP seal return:
    - a) RCP #1 seal outlet valves open:
      - o AOV-270A for RCP A
      - o AOV-270B for RCP B
    - b) IF MOV-313, seal return isolation, open, THEN verify the following:
      - o VCT pressure - GREATER THAN 15 psig
      - o RCP #1 seal leakoff flow - BETWEEN 0.25 gpm AND 5.5 GPM
      - o RCP #2 seal standpipe low level alarm - EXTINGUISHED
    - c) IF MOV-313 closed, THEN verify other RCP #1 seal parameters normal prior to starting an RCP:
      - o RCP #1 seal inlet temperature
      - o RCP #1 seal D/P

NOTE: RCP oil lift pump should be stopped after RCP is running.



EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 1 of 1
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ATTACHMENT NC

NOTE: It may take several minutes following initial transient for natural circulation to develop.

The following conditions indicate natural circulation flow:

- o RCS subcooling based on core exit T/Cs - GREATER THAN REQUIREMENTS OF FIGURE MIN SUBCOOLING
- o S/G pressures - STABLE OR DECREASING
- o Core exit T/Cs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR S/G PRESSURE

The following equipment should be operating to support natural circulation and cooling:

- o Control rod shroud fans
- o PRZR heaters (Refer to ER-PRZR.1, RESTORATION OF PRZR HEATERS DURING BLACKOUT)
- o One Reactor Compartment Cooling Fan



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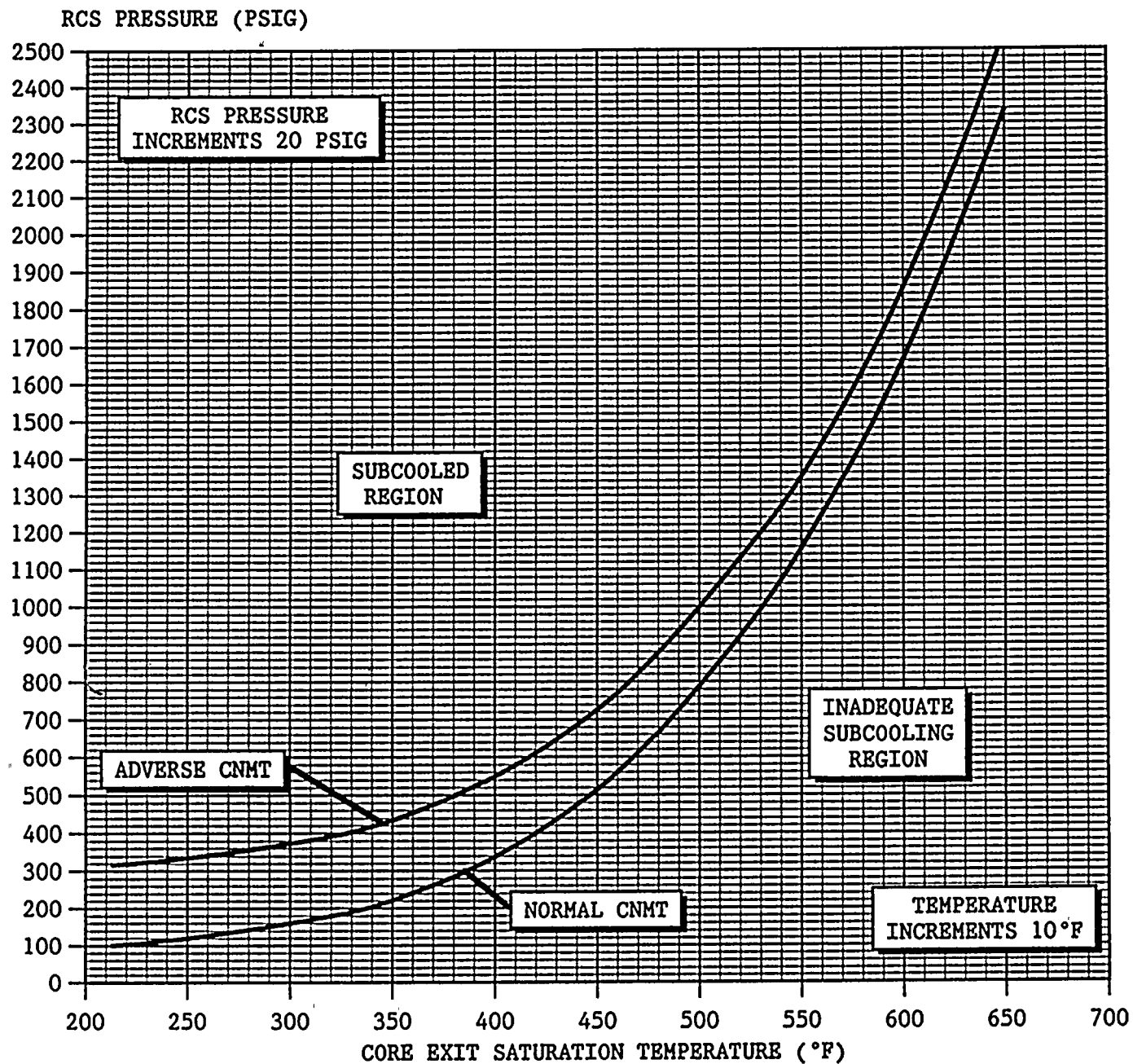
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EOP: AP-RHR.1	TITLE: LOSS OF RHR	REV: 8 PAGE 1 of 1
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FIGURE MIN SUBCOOLING

NOTE: Subcooling Margin = Saturation Temperature From Figure  
Below [-] Core Exit T/C Indication



EOP: ATT-3.0	TITLE: ATTACHMENT CI/CVI	REV: 3 PAGE 1 of 3
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Superintendent *Paul M. ...* Date 7-26-94

NOTE: Locked valve key may be required for local operations.

<u>AUTO ISOL VALVE</u>	<u>ALTERNATE ISOL</u>	<u>ALTERNATE ISOL LOCATION</u>
AOV-200A	AOV-371/133	MCB
AOV-200B	AOV-371/133	MCB
AOV-202	AOV-371/133	MCB
AOV-5392	V-5397/5410	IB BASEMENT CLEAN SIDE
AOV-371	V-204A/820	NRHX ROOM (locked area)
MOV-313	V-315A/315C	SWRF ROOM (reach rods)
AOV-9227	V-9225	IB BASEMENT CLEAN SIDE
AOV-508	AOV-548/550A/550B	MCB
AOV-5738	V-5701	IB BASEMENT CLEAN SIDE
AOV-5737	V-5702	IB BASEMENT CLEAN SIDE
AOV-5735	V-5733	SAMPLE HOOD
AOV-5736	V-5734	SAMPLE HOOD
SOV-921	V-928A	INSIDE A H2 MON PNL (AFW PUMP AREA) (key 59)
SOV-922	V-928B	INSIDE A H2 MON PNL (AFW PUMP AREA) (key 59)
SOV-923	V-929A	INSIDE B H2 MON PNL (AFW PUMP AREA) (key 59)
SOV-924	V-929B	INSIDE B H2 MON PNL (AFW PUMP AREA) (key 59)
AOV-539	V-546	BY SFP HX
AOV-1789	V-1655	BY SFP HX
AOV-1786	AOV-1787	MCB
AOV-1787	AOV-1786	MCB
AOV-1721	AOV-1003A/1003B/1722	WASTE DISPOSAL PANEL/AB SUB-BASEMENT

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ATT-3.0

ATTACHMENT CI/CVI

REV: 3

PAGE 2 of 3

AUTO ISOL VALVEALTERNATE ISOLALTERNATE ISOL LOCATION

AOV-1003A

AOV-1721

WASTE DISPOSAL PANEL

AOV-1003B

AOV-1721

WASTE DISPOSAL PANEL

AOV-1597

V-1596

IB BASEMENT CLEAN SIDE

AOV-1598

AOV-1599

MCB

AOV-1599

AOV-1598

MCB

MOV-813

MOV-817

MCB

MOV-814

V-815A

AB INT LEVEL

AOV-1723

AOV-1728

WASTE DISPOSAL PANEL

AOV-1728

AOV-1723

WASTE DISPOSAL PANEL

AOV-951

AOV-966A

MCB

AOV-953

AOV-966B

MCB

AOV-955

AOV-966C

MCB

AOV-959

V-957

PRIMARY SAMPLE ROOM

AOV-966A

V-956F

SAMPLE HOOD

AOV-966B

V-956E

SAMPLE HOOD

AOV-966C

V-956D

SAMPLE HOOD

AOV-846

V-8629/944A

BY SFP HX

AOV-8418

V-5021

IB BASEMENT CLEAN SIDE

AOV-7971

AOV-7970

MCB REAR

AOV-7970

AOV-7971

MCB REAR

AOV-7445

AOV-7478

MCB REAR

AOV-7478

AOV-7445

MCB REAR

EOP:

TITLE:

ATT-3.0

ATTACHMENT CI/CVI

REV: 3

PAGE 3 of 3

AUTO ISOL VALVEALTERNATE ISOLALTERNATE ISOL LOCATION

PEVO-5879	N/A FLANGED	
PSVO-5869	N/A FLANGED	
MOV-7443	N/A FLANGED	
MOV-7444	N/A FLANGED	
SOV-1B *(10214S1)	V-1080A	SAMPLE HOOD
SOV-2B *(10214S)	V-1080A	SAMPLE HOOD
SOV-3B *(10211S1)	V-1076B	SAMPLE HOOD
SOV-5B *(10213S1)	V-1084B	SAMPLE HOOD
SOV-1A *(10215S1)	V-1080A	SAMPLE HOOD
SOV-2A *(10215S)	V-1080A	SAMPLE HOOD
SOV-3A *(10205S1)	V-1076A	IB BASEMENT CLEAN SIDE
SOV-5A *(10209S1)	V-1084A	IB BASEMENT CLEAN SIDE

\*NOTE: Valves normally deenergized with manual isolation valve locked closed.

EOP:

ATT-3.1

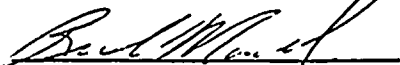
TITLE:

ATTACHMENT CNMT CLOSURE

REV: 2

PAGE 1 of 2

Superintendent



Date

7-26-94

- A) Ensure at least one door closed in EACH CNMT airlock:
- o Equipment airlock
  - o Personnel airlock
- B) Verify valves in column 1 closed. IF any valve NOT closed, THEN evaluate penetration and isolate as necessary (Refer to column 2).

NOTE: Locked valve key may be required for local operation.

<u>COLUMN 1</u> <u>AUTO ISOL VALVE</u>	<u>COLUMN 2</u> <u>ALTERNATE ISOL</u>	<u>ALTERNATE ISOL LOCATION</u>
AOV-5392 (IA)	V-5397/5410	IB CLEAN BSMT
AOV-371 (L/D)	V-204A/820	NRHX ROOM (locked area)
MOV-313 (RCP Seal)	V-315A/315C	SWRF ROOM (reach rods)
AOV-9227 (Fire Sys)	V-9225	IB CLEAN BSMT
AOV-508 (DI Water)	AOV-548/550A/550B	MCB
AOV-5738 (S/G B/D)	V-5701	IB CLEAN BSMT
AOV-5737 (S/G B/D)	V-5702	IB CLEAN BSMT
AOV-5735 (S/G samp)	V-5733	SAMPLE HOOD
AOV-5736 (S/G samp)	V-5734	SAMPLE HOOD
AOV-539 (PRT gas)	V-546	BY SFP HX
AOV-1789 (RCDT to gas anal)	V-1655	BY SFP HX
AOV-1786 (RCDT/VH)	AOV-1787 (V-1716A)	BY SFP HX
AOV-1721 (RCDT pumps)	AOV-1003A/1003B/1722	WASTE PANEL/AB SUB-BASEMENT
AOV-1597 (CNMT rad)	V-1596	IB CLEAN BSMT
AOV-1598 (CNMT rad)	AOV-1599	MCB
MOV-813 (CCW)	CCW SYSTEM INTACT	AUX BLDG INT (BY RWST)



<u>COLUMN 1</u> <u>AUTO ISOL VALVE</u>	<u>COLUMN 2</u> <u>ALTERNATE ISOL</u>	<u>ALTERNATE ISOL LOCATION</u>
MOV-814 (CCW)	CCW SYSTEM INTACT	AUX BLDG INT (BY RWST)
AOV-1723 (CNMT sump)	AOV-1728	WASTE PANEL
AOV-846 (ACCUM N2)	V-8629/944A	BY SFP HX
AOV-8418 (DI water)	V-5021	IB CLEAN BSMT
AOV-7970 (Mini purge)	AOV-7971	MCB REAR
AOV-7445 (Mini purge)	AOV-7478	MCB REAR
MOV-7443 (Leak test)	Notify S/G office and locally close valve	
MOV-7444 (Leak test)	Flanged except for ILRT	
AOV-5879 (Purge)	Purge Exhaust Fan OFF	
AOV-5869 (Purge)	Purge Supply Fan OFF	
C) Verify both S/Gs intact in CNMT <u>OR</u> steam and feed headers isolated outside CNMT (Refer to O-15.2, REQUIRED VALVE LINEUP FOR REACTOR HEAD REMOVAL, for specific guidance).		
D) Evaluate and isolate any other known openings from CNMT to the outside atmosphere. Contact Outage Coordinator or Maintenance Manager and refer to O-2.3.1A, CONTAINMENT CLOSURE CAPABILITY IN TWO HOURS DURING REDUCED RCS INVENTORY OPERATION, for additional guidance.		
E) Verify fuel transfer flange installed or gate valve, V-650J, closed.		
F) Contact S/G office to ensure that S/G maintenance penetration is isolated (no openings to outside).		



