SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

NUCLEAR OPERATIONS

INFORMATION ONLY

FIRE EMERGENCY PROCEDURE

FEP-2.1

TRAIN A SHUTDOWN FROM HOT STANDBY TO COLD SHUTDOWN DUE TO FIRE

REVISION 2

SAFETY RELATED

Dennis A. Baker — DISCIPLINE SUPERVISOR — 6-30-95 DATE

Gary E. Willis — APPROVAL AUTHORITY — 6-30-95 DATE

RECORD OF CHANGES

CHANGE LETTER	TYPE CHANGE	APPROVAL DATE	CANCELLATION DATE	CHANGE LETTER	TYPE CHANGE	APPROVAL DATE	CANCELLATION DATE
A	P	08/06/96					
B	P	10/22/97					

CONTINUOUS USE

Continuous Use of Procedure Required.
Read Each Step Prior to Performing.

9809290302 980924
PDR ADOCK 05000395
P PDR

NUCLEAR OPERATIONS

COPY NO. 1

SAP-139
ATTACHMENT IV
PAGE 1 OF 3
REVISION 17

PROCEDURE DEVELOPMENT FORM - A

I. DATE: 8-20-97 PROC. # FSP-2.1 REV. # 2 CHG. B COMM. # ____
TITLE: TRAIN A SHUTDOWN FROM HOT STANDBY TO COLD SHUTDOWN DUE TO FIRE

NEW PROC ___ CHANGE ✓ PERMANENT ✓
REVISION ___ RESTRICTED ___ FROM _____ TO _____

SAFETY RELATED ✓
QUALITY RELATED ___
NON-SAFETY RELATED ___

II. **DESCRIPTION:** Decorporate XV6-8133A AND XV6-8133B POWER Lockouts

REASON FOR CHANGE: ECR-50004

Originator — STANLEY CATHREN Sign/Print

III. **WILL THIS REVISION/CHANGE/NEW PROCEDURE:**

	* YES	NO	N/A
1. Result in significant increased personnel radiation exposure? (ALARA review)	___	✓	
2. Result in a release of effluents to the Environment?	___	✓	
3. Degrade the effectiveness of the Radiation Emergency Plan?	___	✓	
4. Degrade the safeguards effectiveness of the Physical Security, Safeguards Contingency or Training and Qualification Plans?	___	✓	___

*** If any question 1 through 4 is answered "YES", refer to appropriate section of procedure for direction.**

REQUIRED REVIEW AND COMMENT:

✓ QR OM () NL&OE () CHS () GMNPO ()
() OPS () MNTS () HPS () GMES ()
() QA () NPS () SCE () GMNSS ()
() QC () TU () DE () ()

REQUESTED REVIEWS:

✓ Rad Branch
✓ Surveillance Branch

Discipline Supervisor — 9/16/97 Date

IV. **10CFR50.59 SCREENING REVIEW/SAFETY EVALUATION**

✓ REQUIRED ☐ EXEMPT ✓ PSRC SUPPORTING DOCUMENT: ECR 50004

Discipline Supervisor concurrence

V. **TEMPORARY APPROVAL:**

QUALIFIED REVIEWER _____ DATE _____
TELECON BY _____
SHIFT SUPERVISOR _____ DATE _____

QA REVIEW _____ DATE _____
TELECON BY _____
FINAL APPROVAL REQUIRED BY: DATE _____

VI. **DISCIPLINE SUPERVISOR FINAL REVIEW:**

PSRC REVIEW PRIOR TO IMPLEMENTATION? YES ___ NO ✓
TRAINING REQUIRED? YES ___ NO ✓
IF YES, PRIOR TO PROCEDURE IMPLEMENTATION? YES ___ NO ___
P/CAP AFFECTED? YES ___ NO ✓
COMMENTS RESOLVED: Discipline Supervisor 10/6/97 Date
TRAINING COMPLETED: Discipline Supervisor 10/6/97 Date

VII. **P/CAP ACCEPTABLE?**

C. YES ___ NO ___ NL&OE Date
N. YES ___ NO ___ RESP. MGR. 10/6/97 Date

VIII. **FINAL QA REVIEW (As Applicable)**

QA Concurrence 10/6/97 Date

IX. **APPROVAL AUTHORITY:**

Approval/Concurrence 10/22/97 Date

X. **PSRC REVIEW:**

A. REVIEWED BY:

PSRC Chairman Date

COMMENTS: YES ___ NO ___

B. PSRC COMMENTS RESOLVED:

Responsible Manager Date

PSRC Chairman Date

NUCLEAR OPERATIONS

COPY NO. 1

PROCEDURE DEVELOPMENT FORM - A

I. DATE: 07/01/96 PROC. # FEP - 2.1 REV. # 2 CHG. A COMM. #

TITLE: TRAIN A SHUTDOWN FROM HOT STANDBY TO COLD SHUTDOWN DUE TO FIRE

NEW PROC ___ CHANGE X PERMANENT X SAFETY RELATED X

REVISION ___ RESTRICTED ___ FROM ___ TO ___ QUALITY RELATED ___

NON-SAFETY RELATED ___

II. DESCRIPTION: Change Attachments VIA and VIB to indicate Speed Switches are locked

REASON FOR CHANGE:

Operations Management decision to lock CCW speed switches due to personnel safety concerns.

RPerrill
Originator

III. WILL THIS REVISION/CHANGE/NEW PROCEDURE:

	* YES	NO	N/A
1. Result in significant increased personnel radiation exposure? (ALARA review)	___	X	
2. Result in a release of effluents to the Environment?	___	X	
3. Degrade the effectiveness of the Radiation Emergency Plan?	___	___	X
4. Degrade the safeguards effectiveness of the Physical Security, Safeguards Contingency or Training and Qualification Plans?	___	___	X

*** If any question 1 through 4 is answered "YES", refer to appropriate section of procedure for direction.**

REQUIRED REVIEW AND COMMENT:

( ) OPS ( ) NL&OE ( ) CHS ( ) GMNPO X Tom Keckeisen
( ) MNTS ( ) P&S ( ) HPS ( ) GMES ( ) ___
( ) QA ( ) NPS ( ) MNT ( ) GMNSS ( ) ___
( ) QC ( ) TS ( ) DE X QR (OPS) ( ) ___

Discipline Supervisor 7/1/96 Date

IV. 10CFR50.59 SCREENING REVIEW/SAFETY EVALUATION

X REQUIRED ☐ EXEMPT ☐ PSRC SUPPORTING DOCUMENT: ___

Discipline Supervisor concurrence

V. TEMPORARY APPROVAL:

QUALIFIED REVIEWER ___ DATE ___ QA REVIEW ___ DATE ___

TELECON BY ___ TELECON BY ___

SHIFT SUPERVISOR ___ DATE ___ FINAL APPROVAL REQUIRED BY: DATE ___

VI. DISCIPLINE SUPERVISOR FINAL REVIEW:

TRAINING REQUIRED? YES ___ NO ✓

IF YES, PRIOR TO PROCEDURE IMPLEMENTATION? YES ___ NO ___

P/CAP AFFECTED? YES ___ NO ✓

COMMENTS RESOLVED: Discipline Supervisor 8/6/96 Date

VII. P/CAP ACCEPTABLE?

C. YES ___ NO ___ NL&OE N/A / Date

N. YES ___ NO ___ RESP. MGR. / Date

VIII. FINAL QA REVIEW (As Applicable)

N/A

QA Concurrence Date

IX. APPROVAL AUTHORITY:

Approval/Concurrence 8/6/96 Date

X. PSRC REVIEW:

A. REVIEWED BY:

PSRC Chairman / Date

COMMENTS: YES ___ NO ___

B. PSRC COMMENTS RESOLVED:

Responsible Manager / Date

PSRC Chairman / Date

TABLE OF CONTENTS

1.0 PURPOSE

This procedure describes the steps necessary to take the plant from Hot Standby to Cold Shutdown after a fire, using Train A equipment.

2.0 INITIAL CONDITIONS

2.1 Reactor conditions are as follows:

a. All Rods are inserted.

b. Reactor is subcritical.

c. Shutdown Margin is satisfied.

2.2 Reactor Coolant System conditions are as follows:

a. Seal Injection is established.

b. Natural Circulation is established.

c. RCS Subcooling is greater than 30°F.

2.3 Plant systems in service are as follows:

a. Diesel Generator A is supplying XSW1DA loads.

b. Train A CVCS is supplying Reactor Coolant Pump seals.

c. Steam Dumps or one or more PORV's are supplying secondary heat removal.

d. Train A Service Water System is running.

e. Train A HVAC Chilled Water System is running.

f. Train A Reactor Building Cooling System is in service.

g. Train A Emergency Feedwater is in service.

h. Train A Component Cooling System is in service.

2.4 The following plant systems may be in service:

a. BOP electrical busses may be energized.

b. Station Instrument Air may be supplying the Instrument Air system.

c. CVCS Letdown may be controlling Pressurizer level between 25% and 50%.

d. Pressurizer heaters may be controlling Pressurizer pressure between 2200 psig and 2300 psig.

CAUTION 3.0

In the event of an emergency not covered by an approved written procedure, operating personnel have the authority to take action to minimize personnel injury or damage to the facility, and to protect the public health and safety. Such actions shall be documented by the operating personnel.

NOTE 3.0

a. If any electrical component will not operate from the specified location, attempts should be made to control it per Attachment VIII, IX, X, or XI. CHG B

b. Due to the potential for electrical shorts due to fire, each component that is operated remotely should be checked periodically to ensure that it is in the desired position.

c. During the cooldown phase, a simultaneous plant support systems recovery will be taking place. This procedure was written for the worst case. If alternate control locations for a given component are working, they may be used.

EXAMPLE: To close XVG8888A(B), if power is available to both vital buses the valves may be closed from the Main Control Board or from the 480V MCC using the proper attachment.

3.0 OPERATOR ACTIONS

3.1 Monitor LI-3621A, CST LEVEL, and fill the CST when needed as follows:

a. If power is available to XMC1A4X, then fill the CST from Demineralized Water per SOP-208, Condensate System.

b. If level decreases to six feet, transfer Emergency Feed Pump suction to Service Water as follows:

1) Open XVG01037A-EF, EF SERVICE WATER HDR A XCONN ISOL VALVE (IB-412).

2) Open XVG01008-EF, TURB DR EF PUMP SW A SUCT XCONN VALVE (IB-412).

3) Open XVG01001A-EF, MTR DR EF PUMP A SW A SUCT XCONN VALVE (IB-412).

3.2 Have I&C install temperature monitoring equipment for the RHR and Component Cooling Heat Exchangers per Attachments IV and V, if needed.

3.3 Have maintenance install the necessary air supplies and temporary tubing for RHR valve control per Attachment III, if needed.

3.4 Borate the Reactor Coolant System per Attachment II.

3.5 If Pressurizer level cannot be maintained using Seal Injection flow, then control Pressurizer level as follows:

a. Open XVG08108-CS, CHARGING PUMPS DISCHARGE HDR ISOL VALVE (AB-412 W. Pen.).

b. Open XVG08107-CS, CHARGING PUMPS DISCHARGE HDR ISOL VALVE (AB-412 W. Pen.).

c. Control level by throttling FCV-122, CHG FLOW, to maintain level between 25% and 50% on LI-459A, PZR LEVEL.

d. If level cannot be controlled with FCV-122, CHG FLOW, from the Main Control Board, establish level using one of the following methods:

1) Establish control using FCV-122 at the CREP.

2) Establish manual control as follows:

a. Close XVG08402B-CS, CHG HDR FLOW CONTROL INLET ISOL VALVE (AF-412 W. Pen.).

b. Throttle open XVT08403-CS, FCV0122-CS BYPASS, as necessary (AB-412 W. Pen.).

NOTE 3.6

1. Steam Generator B and its associated instrumentation must be relied upon for Train A shutdown. Steam Generators A & C can be used for cooldown, however, primary reliance should be placed on PCV-2010, B SD/PWR RELIEF, and PI-2010, MS LINE B PRESS.
2. Any Steamline Power Relief Valve which fails to operate from the Main Control Board may be operated locally.

3.6 Continue Natural Circulation cooldown to less than 350°F as follows:

a. Throttle open the following valves to establish a cooldown rate of less than 50°F per hour:

1) PCV-2000, A SD/PWR RELIEF, from the Main Control Board or AB-436 W. Pen.

2) PCV-2010, B SD/PWR RELIEF, from the Main Control Board or IB-436 E. Pen.

3) PCV-2020, C SD/PWR RELIEF, from the Main Control Board or IB-436 E. Pen.

b. Maintain the following conditions:

1) Cooldown rate less than 50°F per hour.

2) RCS TH decreasing on TI-423, LOOP B TH.

3) RCS subcooling increasing as determined by the following:

a) TI-423, LOOP B TH.

b) PI-403, RCS WR PRESS

c) Steam Tables.

4) Log data on Attachment XII at least once per 30 minutes.

CAUTION 3.7

Reactor Coolant System pressure should be maintained greater than or equal to 1000 psig until Reactor Coolant System temperature is less than 350°F and the Accumulator Discharge Valves are closed. Pressurizer heater BU GRP I can be energized to maintain pressure.

3.7 Decrease Pressurizer pressure to 1000 psig as follows:

a. Maintain less than 1600 psid between PI-403, WR PRESS (RCS), and PI-2010, MS LINE C PRESS.

b. Maintain at least 130°F subcooling as determined by the following:

a) TI-423, LOOP B TH.

b) PI-403, RCS WR PRESS.

c) Steam Tables.

c. If at least two CRDM fans can be started per Attachment VII then maintain at least 80°F subcooling.

d. De-energize Pressurizer Backup Heaters.

e. If Charging and Instrument Air are available, CVCS alternate spray may be used by closing disconnect switch DS-13 to allow operation of PVT-8145, PZR SPRAY FR CVCS.

3.8 Close the following valves:

a. XVG08808A-SI, SI ACCUMULATOR A DISCH HEADER VALVE (RB-412).

b. XVG08808B-SI, SI ACCUMULATOR B DISCH HEADER VALVE (RB-412).

c. XVG08808C-SI, SI ACCUMULATOR C DISCH HEADER VALVE (RB-436).

3.9 Depressurize the Reactor Coolant System to between 350 psig and 400 psig on PI-403, WR PRESS RCS.

CAUTION 3.10 and 3.11

Reactor Coolant System temperature should be maintained greater than 300°F until all four RHR loop suctions (MVG-8701A and B, MVG-8702 A and B) are open.

3.10 Check RHR boron concentration as follows:

a. Ensure the following valves are closed:

1) XVG08888A-SI, COLD LEG INJECTION HEADER ISOL VALVE (AB-412 W. Pen.).

2) XVG08889-SI, HOT LEG INJECTION HEADER ISOL VALVE (AB-412 W. Pen.).

3) XVG08701A-RH, RH HEADER A ISOLATION VALVE (IRC) (RB-412).

4) XVG08702A-RH, RH INLET HEADER A ISOLATION VALVE (RB-412).

5) XVT08720A-RH, LETDOWN HDR RH RETURN HDR A INLET VALVE (AB-412, RHR Hx A Room).

6) XVG08887A-SI, LOW HEAD INJECTION HDR A XCONN VALVE (AB-412 W. Pen.).

b. Open the following valves:

1) XVG08809A-SI, REFUEL WTR STG TK RH PUMP A SUCTION VLV (AB-397).

2) FCV00602A-RH, RHR PUMP A MINIFLOW VALVE (AB-397).

3) HCV00603A-RH, RHR HEAT EXCHANGER A OUTLET VALVE, per Attachment III (AB-412, RHR Hx A Room).

4) FCV00605A-RH, RHR HEAT EXCHANGER A BYPASS VALVE, per Attachment III (AB-412, RHR Hx A Room).

c. Start Component Cooling Pump A, XPP0001A-CC, or Component Cooling Pump C, XPP0001C-CC in slow per Attachment IX (XSW1DA, IB-463).

d. Open XVB09503A-CC, RH HEAT EXCHANGER A CC INLET VALVE (AB-436).

e. Start Residual Heat Removal Pump A, XPP0031A-RH per Attachment VIII (XSW1DA1 06A, IB-463).

f. Check boron concentration as follows:

1) Recirculate the RHR loop for ten minutes.

2) Direct Chemistry to sample RHR Train A for boron concentration.

3) If RHR boron concentration is greater than Reactor Coolant System concentration, proceed to step 3.11.

g. If RHR boron concentration is less than RCS boron concentration, establish letdown as follows:

1) Open XVT08720A-RH, LETDOWN HDR RH RETURN HDR A INLET VALVE (AB-412, RHR Hx A Room).

2) Close XVT08720B-RH, LETDOWN HDR RH RETURN HDR B INLET VALVE (AB-412, RHR Hx B Room).

3) Open XVT08409-CS, LTDN HDR PRESS CONT VLV BYPASS VALVE, three turns (AB-424).

4) Close XVG08408A-CS, LTDN HDR PRESS CONT VLV INLET ISOL VLV (AB-424).

NOTE 3.10.g.5)

Full air applied to LCV00115A-CS positions it to divert to the RHUT and venting LCV00115A-CS aligns it to the VCT.

5) Divert LCV00115A-CS, VOLUME CONTROL TANK LEVEL CONTROL, to the Recycle Holdup Tank per Attachment III (AB-436 [illegible] n Valve Gallery).

6) Open HCV00142-CS, RH SYS CLEANUP HDR FLOW CONTROL VALVE, per Attachment III (AB-424).

7) Maintain letdown until RHR boron concentration is greater than Reactor Coolant System boron concentration.

8) Close HCV00142-CS, RH SYS CLEANUP HDR FLOW CONTROL VALVE, per Attachment III.

9) Align LCV00115A-CS, VOLUME CONTROL TANK LEVEL CONTROL, to the Volume Control Tank per Attachment III.

3.11 When Reactor Coolant System temperature and pressure are less than 350°F and 400 psig, shift RHR suction to the loops as follows:

a. Stop Residual Heat Removal Pump A per Attachment VIII (XSW1DA1 06A, IB-463).

b. Close XVG08809A-SI, REFUEL WTR STG TK RH PUMP A SUCTION VLV (AB-397).

c. Open XVG08701A-RH, RH HEADER A ISOLATION VALVE (IRC) (RB-412).

d. Open XVG08702A-RH, RH INLET HEADER A ISOLATION VALVE (RB-412).

e. Open XVG08888A-SI, COLD LEG INJECTION HEADER ISOL VALVE (AB-412 W. Pen.).

f. Close HCV00603A-RH, RHR HEAT EXCHANGER A OUTLET VALVE, per Attachment III.

g. Start Residual Heat Removal Pump A, XPP0031A-RH per Attachment VIII (XSW1DA1 06A, IB-463).

h. Slowly open HCV00603A-RH, RHR HEAT EXCHANGER A OUTLET VALVE, while simultaneously closing FCV00605A-RH, RHR HEAT EXCHANGER A BYPASS VALVE, to obtain a cooldown rate of less than 50°F per hour per Attachment III.

i. Monitor RHR and Component Cooling temperatures per Attachments IV and V to ensure the following:

1) Maintain Component Cooling Heat Exchanger temperature less than 120°F.

2) If more Component Cooling water flow is needed through the RHR Heat Exchanger perform the following:

a) Throttle or secure flow to non-essential components.

b) Shift pump speed per Attachment VIA or VIB.

j. Open the following Train B RHR loop suctions for overpressure protection:

1) XVG08701B-RH, RH HEADER B ISOLATION VALVE (IRC) (RB-412).

2) XVG08702B-RH, RH INLET HEADER B ISOLATION VALVE (RB-412).

k. Cool down to less than 200°F.

l. Log data on Attachment XII at least once per 30 minutes.

3.12 When no longer needed, shut down Motor Driven Emergency Feedwater Pump A (XSW1DA 13, IB-463) per Attachment IX, and the Turbine Driven Emergency Feedwater Pump (IB-412) per Attachment I.

CAUTION 3.13

A bubble should be maintained in the Pressurizer for pressure control, if possible.

3.13 Maintain the following conditions:

a. Reactor Coolant System pressure to between 200 psig and 300 psig on PI-403, RCS WR PRESS.

b. Pressurizer level between 25% and 70% on LI-459A, PZR LEVEL.

c. If Pressurizer heaters are not available, go solid to maintain pressure control to prevent drawing a bubble in the Reactor Vessel.

d. Reactor Coolant System temperature less than 200° on ITE00604A, RH PUMP A DISCHARGE TEMPERATURE ELEMENT.

3.14 Establish plant ventilation per Attachment VII.

4.0 FINAL CONDITIONS

4.1 Reactor Coolant System conditions are as follows:

a. Temperature is less than 200°F.

b. Pressure is between 200 psig and 300 psig, being maintained with RHR and Pressurizer heaters, if available.

4.2 There is a steam bubble in the Pressurizer, if Pressurizer heaters are available.

4.3 Necessary repairs are being made to the fire damaged components.

5.0 REVISION SUMMARY

5.1 Incorporated Change A.

5.2 Updated format.

5.3 Deleted step 3.10.c since this refers to valves which are no longer in the plant.

TURBINE DRIVEN EMERGENCY FEEDWATER PUMP SHUTDOWN

1. Set HC-2034B, TD EFP SPEED CNTRL, to slow (CREP).
2. CLOSE PVG-2030, STEAM TO TD EFP (CREP).
3. Open the following valves from the CREP or locally after the Emergency Feedwater Pump turbine has stopped.
   a. IFV-3536, TD EFP TO SG A.
   b. IFV-3546, TD EFP TO SG B.
   c. IFV-3556, TD EFP TO SG C.
4. Open the following valves (IB-412):
   a. XVT02804A-MS, EF PUMP TURBINE CASING STEAM DRAIN VLV.
   b. XVT02804B-MS, EF PUMP TURBINE CASING STEAM DRAIN VLV.
5. Open XVT02803A-MS, EF PP TURB MS THROTTLE VLV DRAIN VLV A, two turns (IB-412).

> NOTE 6
>
> XVT02865-MS, EF PUMP TURB MAIN STEAM THROTTLE VALVE, will trip on pump shutdown due to low lube oil pressure if adequate oil pressure was developed to arm the trip. The valve may be reset without the lube oil available; the low oil pressure trip will re-arm automatically on subsequent pump start when adequate oil pressure is developed.

6. Reset and open XVT02865-MS, EF PUMP TURB MAIN STEAM THROTTLE VALVE as follows (IB-412):
   a. Turn the trip valve handwheel fully clockwise to raise the trip latch.
   b. Engage the overspeed manual trip linkage.
   c. Disengage the low oil pressure trip linkage from the trip latch lever.
   d. Turn the trip valve handwheel fully counterclockwise to open the trip valve.

CAUTION 7

The EF PUMP TURBINE SPEED CONTROL GOVERNOR VLV must be reset after shutdown or the turbine may trip on overspeed if restarted within 30 minutes.

7. Reset the EF PUMP TURBINE SPEED CONTROL GOVERNOR VLV as follows (IB-412):

   a. Rotate the manual adjustment knob fully counterclockwise.

   b. Rotate the manual adjustment knob fully clockwise.

8. Set HC-2034B, TD EFP SPEED CNTRL, to FAST (CREP).

NOTE 9

Starting the Emergency Feedwater Pump will result in cooldown of Steam Generators B and C.

9. If it is desired to restart the Emergency Feedwater Pump, perform the following:

   a. Open PVG-2030, STEAM TO TD EFP (CREP).

   b. Close XVT02803A-MS, EF PP TURB MS THROTTLE VLV DRAIN VLV A (IB-412).

   c. Close XVT02804A-MS, EF PUMP TURBINE CASING STEAM DRAIN VLV (IB-412).

   d. Close XVT02804B-MS, EF PUMP TURBINE CASING STEAM DRAIN VLV (IB-412).

BORATION OF THE REACTOR COOLANT SYSTEM

1. Obtain present boron concentration_____ppm.

2. Calculate the boron concentration required for cold, Xenon free shutdown. Indicate results below:

   Boron concentration required_____ppm.

> NOTE 3 and 4
>
> If the following step cannot be performed, Step 4 should be performed.

3. Borate the Reactor Coolant System as follows:

   a. Start XPP-13A, BA XFER PP A.

   b. Open XVT08104-CS, EMERGENCY BORATE VALVE (AB-436).

   c. Verify emergency boration flow on FI-110, EMERG BORATE FLOW GPM.

   d. Close XVT08104-CS, EMERGENCY BORATE VALVE (AB-436), when the required amount of acid has been added.

4. Borate the Reactor Coolant System as follows if Step 3 was unsuccessful:

   a. Gravity feed boric acid to the Charging Pump suction as follows:

      1) Open XVD08329-CS, CHARGING/SI PUMPS SUCTION HEADER VALVE (AB-448).

      2) Open XVD08331-CS, CHARGING/SI PUMPS SUCT HDR ISOL VALVE (AB-448).

   b. Verify Boric Acid Tank level is decreasing.

   c. When the required amount of acid has been added, perform the following:

      1) Close XVD08329-CS, CHARGING/SI PUMPS SUCTION HEADER VALVE (AB-448).

      2) Close XVD08331-CS, CHARGING/SI PUMPS SUCT HDR ISOL VALVE (AB-448).

5. Direct Chemistry to sample the Reactor Coolant System boron concentration. Indicate results:

   Boron concentration_____ppm.

6. If boron concentration does not meet the shutdown requirements, continue to borate per Step 3 or 4 until the required boron concentration is obtained.

LOCAL OPERATION OF AIR OPERATED VALVES

1. Establish communications between the Control Room and valve operating personnel.

2. Isolate the air supply to the valve to be operated.

> NOTE 3
>
> Temporary tubing for bypassing valves is located in the CREP Emergency kit.

3. Install temporary tubing to bypass the I/P converter.

4. Install a temporary air bottle if necessary.

5. Open the bottle supply isolation valve or the normal air supply.

6. Regulate the valve by adjusting the regulator to increase air pressure.

7. Regulate the vent valve on the temporary tubing to decrease the air pressure.

LOCAL MONITORING OF RHR TEMPERATURE

1. Locate RTD ITE00604A, RH PUMP A DISCHARGE TEMPERATURE ELEMENT (AB-374).

2. Establish communications between the Control Room and temperature monitoring personnel.

3. Remove the RTD head.

4. Disconnect the field leads.

5. Connect a Digital Multimeter to the RTD leads and read the resistance. Use long leads to locate the meter outside the RHR pump room.

6. Convert resistance to °F using the chart on Page 2 of this Attachment.

RESISTANCE TEMPERATURE TABLE

FOR

PLATINUM RESISTANCE THERMOMETER-ELEMENTS
(100 OHMS AT 32°F)

Temp. °F	Resistance OHMS	Tem °F	Resistance OHMS	Temp. °F	Resistance OHMS	Temp. °F	Resistance OHMS
		+170	130.02	+480	194.95	+800	258.32
		+180	132.17	+490	196.98	+810	260.24
		+190	134.31	+500	199.02	+820	262.16
		+200	136.46	+510	201.05	+830	264.08
		+210	138.59	+520	203.07	+840	265.99
		+212	139.02	+530	205.09	+850	267.89
		+220	140.73	+540	207.11	+860	269.79
		+230	142.86	+550	209.13	+870	271.69
		+240	144.99	+560	211.14	+880	273.59
		+250	147.11	+570	213.15	+890	275.48
		+260	149.23	+580	215.15	+900	277.37
		+270	151.34	+590	217.15	+910	279.25
		+280	153.46	+600	219.15	+920	281.14
		+290	155.57	+610	221.14	+930	283.01
		+300	157.67	+620	223.13	+940	284.89
		+310	159.77	+630	225.12	+950	286.76
		+320	161.87	+640	227.10	+960	288.62
		+330	163.96	+650	229.08	+970	290.49
+32	100.00	+340	166.06	+660	231.05	+980	292.35
+40	101.76	+350	168.14	+670	233.02	+990	294.20
+50	103.96	+360	170.23	+680	234.99	+1000	296.05
+60	106.15	+370	172.31	+690	236.96	+1020	299.75
+70	108.34	+380	174.38	+700	238.92	+1040	303.43
+80	110.52	+390	176.46	+710	240.87	+1060	307.09
+90	112.70	+400	178.52	+720	242.82	+1080	310.09
+100	114.88	+410	180.59	+730	244.78	+1100	314.38
+110	117.05	+420	182.65	+740	246.72	+1120	318.00
+120	119.22	+430	184.71	+750	248.67	+1140	321.61
+130	121.39	+440	186.76	+760	250.60	+1160	325.20
+140	123.55	+450	188.82	+770	252.54	+1180	328.78
+150	125.71	+460	190.86	+780	254.47	+1200	332.34
+160	127.87	+470	192.91	+790	256.40		

LOCAL MONITORING OF COMPONENT COOLING WATER TEMPERATURE

CAUTION V

Component Cooling Water Heat Exchanger discharge temperature should not exceed 120°F.

1. Establish communications between the Control Room and temperature monitoring personnel.
2. Locate thermocouple ITE07052, CC HEAT EXCH A OUTLET CLG WTR TEMP ELEM (IB-412).
3. Remove the thermocouple head.
4. Disconnect the field leads.
5. Connect the thermocouple to a Doric Trendicator, Model 410 or equivalent.
6. Read temperature directly from the Doric Trendicator display.

SHIFTING COMPONENT COOLING PUMP A, XPP-1A-CC TO FAST SPEED

1. Trip Component Cooling Pump A per Attachment IX (XSW1DA 08, IB-463).

2. Shift Component Cooling Pump A to fast speed as follows:

   a. Verify the CC PP A-XPP1A breaker is open as indicated by the illuminated green light on XES2001A-CC, COMP. COOLING PUMP "A" SPEED SWITCH.

> NOTE 2.b
>
> Operations Safety Lock Keys are located as follows:
>
> 1) CRS Keybox (CB-463).
>
> 2) FEP Keybox (IB-436).

CHG A

   b. Remove Safety Locks from the slow and fast speed switches.

> CAUTION 2.c
>
> Speed switch operation with breaker XSW1DA 08, CC PUMP A XPP0001A-CC (IB-463), closed may result in serious personal injury.

   c. Open the slow speed switch (center cubicle).

   d. Remove both interlock keys from the slow speed switch and insert one in each of the fast speed switches (outer cubicles).

   e. Close both fast speed switches.

   f. Reinstall Safety Locks removed in Step 2.b.

CHG A

   g. Inform the Control Room that Component Cooling Pump A is aligned for fast speed operation.

3. Start Component Cooling Pump A per Attachment IX (XSW1DA 08, IB-463).

SHIFTING COMPONENT COOLING PUMP C, XPP-1C-CC TO FAST SPEED

1. Trip Component Cooling Pump C per Attachment IX (XSW1DA 07, IB-463).

2. Shift Component Cooling Pump C to fast speed as follows:

   a. Verify the CC PP C-XPP1C breakers are open as indicated by the illuminated green light on XES2001C-CC, COMP. COOLING PUMP "C" SPEED SWITCH.

> NOTE 2.b
>
> Operations Safety Lock Keys are located as follows:
>
> 1) CRS Keybox (CB-463).
>
> 2) FEP Keybox (IB-436).

CHG A

   b. Remove Safety Locks from the slow and fast speed switches.

   c. Select "A" CHANNEL SOURCE XSW 1DA (left outer cubicle).

> CAUTION 2.d
>
> Speed switch operation with breaker XSW1DA 07, CC PUMP C XPP0001C-CC (IB-463), closed may result in serious personal injury.

CHG A

   d. Open the slow speed switch (center cubicle).

   e. Remove both interlock keys from the slow speed switch and insert one in each of the fast speed switches (right and left of center cubicle).

   f. Close both fast speed switches.

   g. Reinstall Safety Locks removed in Step 2.b.

CHG A

   h. Inform the Control Room that Component Cooling Pump C is aligned for fast speed operation.

3. Start Component Cooling Pump C per Attachment IX (XSW1DA 07 IB-463).

ESTABLISHING PLANT VENTILATION

1. If power is restored to the BOP busses start the following fans:

   a. Two of the following per Attachment VIII.

      1. CRDM COOLING SYS FAN A XFN0067A-AH (XSW1A3 01C).
      2. CRDM COOLING SYS FAN B XFN0067B-AH (XSW1B3 02D).
      3. CRDM COOLING SYS FAN C XFN0067C-AH (XSW1C3 02D).
      4. CRDM COOLING SYS FAN D XFN0067D-AH (XSW1A3 03A).

   b. One of the following per Attachment X:

      1. SECONDARY CMPT LOOP A COOLING FAN A XFN0068A-AH (XMC1A3X 11EH).
      2. SECONDARY COMPARTMENT LOOP A COOLING FAN B XFN0068B-AH (XMC1B3Y 03AD).
      3. SEC COMPT (LOOP A) COOLING FAN C XFN0068C-AH (XMC1C3X 08AE).

   c. One of the following per Attachment X:

      1. SECONDARY COMPT LOOP B COOLING FAN A XFN0069A-AH (XMC1A3X 10CF).
      2. SECONDARY COMPARTMENT LOOP B COOLING FAN B XFN0069B-AH (XMC1B3Y 03EH).
      3. SEC COMPT (LOOP B) COOLING FAN C XFN0069C-AH (XMC1C3X 02EH).

   d. One of the following per Attachment X:

      1. SECONDARY COMPT LOOP C COOLING FAN A XFN0070A-AH (XMC1A3X 09AD).
      2. SECONDARY COMPARTMENT LOOP C COOLING FAN B XFN0070B-AH (XMC1B3Y 03IL).
      3. SEC COMPT (LOOP C) COOLING FAN C XFN0070C-AH (XMC1C3X 02IL).

480V BREAKER OPERATION

1. Local opening of breakers is accomplished as follows:

   a. For electrically operated types, disable the breaker closing ability by positioning the charging power switch on the breaker front to OFF.

   b. Depress the TRIP pushbutton (left pushbutton where two exist).

   c. Verify the breaker trips and remains open.

2. Local closing of manual type breakers (large closing handle) is accomplished as follows:

   a. Pull down the closing handle.

   b. Verify the breaker closes and remains closed.

   c. Investigate the cause if the breaker does not remain closed.

3. Local closing of electrically operated type breakers is accomplished as follows:

   a. Open the panel directly behind the breaker on back of the switchgear.

   b. Open both the CLOSE CP BRKR and the TRIP CP BRKR for the breaker to be operated.

   c. Verify the breaker closing springs are charged.

   d. If the breaker closing springs are discharged, perform Step 1) or 2) for the appropriate size breaker as follows:

      1) For 2000 or 3000 amp frame sizes, charge the springs as follows:

         a) Insert a manual spring charging handle into the slot in the breaker fro.

         b) Pump the handle until the breaker indicates charged.

2) For 600 and 1600 amp frame sizes, charge the springs as follows:

a) Open the door on the breaker cubicle.

b) Engage a manual charging handle into the slots of the pawl carrier.

NOTE 3.d.2).c)

The pawl carrier is located on the breaker, on centerline, between the silver colored charging motor on the right and the black auxiliary switch assembly on the left. Occasionally, the charging motor will coast to a stop in such a position that the driving pawl does not engage the next tooth on the ratchet wheel.

When the driving pawl is not engaged on the ratchet wheel, a screwdriver blade should be inserted along the right side of the pawl carrier against the roller on the charging motor output eccentric and the roller should be pushed to manually rotate it. The charging handle should be inserted.

c) Pump handle until the breaker indicates charged.

e. Lift (or pull) the manual CLOSE lever.

f. Verify the breaker closes and remains closed.

7.2 KV BREAKER OPERATION

1. Perform local opening of breakers as follows:

   a. Open the door to the appropriate switchgear cubicle.

   b. Open the Closing Power breaker RRP (located on the right hand side of the cubicle).

   c. Depress the MANUAL TRIP lever on the breaker.

   d. Verify the breaker trips and remains open.

2. Perform local closing of breakers as follows:

> CAUTION 2.a
>
> If any relay flags are tripped, closing of breaker with no protection could be a personnel hazard.

   a. Verify no relays have tripped on the associated breaker.

   b. Open the door to the appropriate switchgear cubicle.

   c. Verify the closing springs are charged.

   d. If the closing springs are not charged, perform the following:

      1) Open the Closing Power breaker RRP (located on the right hand side of the cubicle):

      2) Use a ratchet and 5/8" socket to turn the charging motor until the breaker indicates charged.

   e. Depress the MANUAL CLOSE pushbutton on the breaker.

   f. Verify the breaker closes and remains closed.

   g. If the breaker does not close, perform the following:

      1) Disconnect and tape all leads at terminals 361, 363 and 364 on terminal board C.

      2) Charge the springs per Step 2.d above.

      3) Ensure the Trip Power breaker RRT (located on the right hand side of the cubicle) is closed.

      4) Depress the MANUAL CLOSE pushbutton on the breaker.

      5) Verify the breaker closes and remains closed.

OPERATION OF EQUIPMENT FROM 480 VOLT MOTOR CONTROL CENTERS

NOTE X

This attachment is developed to operate pump motors, fan motors, or any continually operating piece of equipment, not motor operated valves.

1. Locate the appropriate cubicle in the Motor Control Center.
2. Position the breaker to OFF (RESET).
3. Open the cubicle door.
4. Remove the fuse from the cubicle.

CAUTION 5

a. Line side terminals of breaker will be energized and should not be shorted or grounded.

b. This installation bypasses all equipment protection interlocks except breaker overcurrent protection.

5. Disconnect the existing feed (Wire No. 3) from the contactor coil.
6. Connect one end of a jumper to the hot side of the fuse holder (Wire No. X1).
7. Connect the free end of the jumper to the contactor coil where the feed wire (Wire No. 3) was removed.
8. Close the cubicle door.
9. Use the breaker ON-OFF handle to operate the equipment.

REMOTE OPERATION OF VALVES FROM 480V MOTOR CONTROL CENTERS

NOTE 1

MVG-8106 and 8133A are Power Lockout valves. Power Lockout valves require both Power Lockout and Valve Motor starter relays to be actuated simultaneously for remote operation. MVG-8106 starter relays are located in XMC1DA2Y 01DG and XMC1DA2Y 13AC. MVG-8133A starter relays are located in XMC1DA2Y 04IL and XMC1DA2Y 07IJ. CHG B

1. Locate the Motor Control Center Cubicle(s) for the valve to be operated.
2. Position the breaker(s) to OFF/RESET).
3. Open the cubicle door(s).
4. Remove the control power fuse for motor starter with fuse pullers.
5. Locate the two motor starter relays in the appropriate cubicle.
6. Place a clamp-on ammeter around one of the following:
   a. One heavy wire connected between the top of the motor starter relays and the circuit breaker.
   b. One field motor lead.
7. Perform Step 7.a for digital ammeters or Step 7.b for analog ammeters as follows:
   a. When using digital ammeters, perform the following:
      1) Ensure switch on face of meter is in C position.
      2) Depress and hold the red pushbutton on the meter side.
      3) Verify the display lights up.
   b. When using analog ammeters, perform the following:
      1) Ensure meter pointer is unlocked (switch to left).
      2) Set Meter Scale to 0-6A.
8. Close the circuit breaker(s).
9. If applicable, actuate the Power Lockout relay contactor and hold. CHG B

NOTE 10

a. Starting current for large valves may cause the ammeter to indicate full scale. Current should stabilize on scale within 1-2 seconds at the nominal value of running current listed for the valve on Attachment XIII.

b. While the motor is running, the meter will read low.

c. When the valve is at the end of its travel, the motor stalls at about five times its running current.

10. Actuate the desired motor starter contactor (left contactor to close the valve or right contactor to open the valve) by depressing through the appropriate slot with a screwdriver blade.

11. Observe current on the ammeter for the following:

    a. If current remains high, release contactor; valve is in the required position already.

    b. If low, release contactor when current begins to rise sharply.

12. If applicable, release the Power Lockout relay contactor. CHG B

13. Re-open the circuit breaker(s).

14. Remove the ammeter and close the cubicle door(s).

COOLDOWN DATA SHEET

TIME	COOLDOWN RATE	LOOP B T_{H} TI-423	RCS PRESS PI-403	RCS SUBCOOLING	STEAMLINE POWER RELIEFS % OPEN			RHR TEMP ITE 00604A
					A	B	C	

NOTE: Data should be logged every 30 minutes while cooling down and once per hour while maintaining stable plant conditions.

NOMINAL RUNNING CURRENT FOR MOTOR OPERATED VALVES

VALVE #	RUNNING CURRENT (AMPS)	VALVE #	RUNNING CURRENT (AMPS)
XVB09503A-CC	0.75	XVG08000A-RC	3.5
XVB09503B-CC	0.75	XVG08000B-RC	3.5
XVB09524A-CC	0.75	XVG08000C-RC	3.5
XVB09524B-CC	0.75	XVG08701A-RH	4.4
XVB09525A-CC	0.75	XVG08701B-RH	3.5
XVB09525B-CC	0.75	XVG08702A-RH	3.8
XVB09526A-CC	0.75	XVG08702B-RH	5.1
XVB09526B-CC	0.75	XVG08706A-RH	3.5
XVG09568-CC	0.80	XVG08706B-RH	3.5
XVG09600-CC	0.39	XVG08801A-SI	3.5
XVG09606-CC	0.95	XVG08801B-SI	3.5
XVG09625-CC	0.80	XVG08812A-SI	13.8*
XVG09626-CC	0.95	XVG08812B-SI	13.8*
XVG08106-CS	3.5	XVG03001A-SP	2.4
XVG08107-CS	3.5	XVG03001B-SP	2.4
XVG08108-CS	3.5	XVB03106A-SW	0.39
XVG08131A-CS	2.4	XVB03106B-SW	0.39
XVG08131B-CS	2.4	XVG03103A-SW	2.3
XVG08132A-CS	3.5	XVG03103B-SW	2.3
XVG08132B-CS	3.5	XVG03107A-SW	2.8
XVG08133A-CS	3.5	XVG03107B-SW	2.8
XVG08133B-CS	3.5	XVG03108A-SW	2.3
XVT08100-CS	2.3	XVG03108B-SW	2.3
XVT08102A-CS	2.3	XVG03108C-SW	2.3
XVT08102B-CS	2.3	XVG03108D-SW	2.3
XVT08102C-CS	2.3	XVG03109A-SW	2.3
XVT08109A-CS	2.3	XVG03109B-SW	2.3
XVT08109B-CS	2.3	XVG03109C-SW	2.3
XVT08109C-CS	2.3	XVG03109D-SW	2.3

* Will require setting ammeter to higher scale.