

# **FINAL SUBMITTAL**

**TURKEY POINT EXAM  
50-250, 251/2000-301**

**NOVEMBER 27 - DECEMBER 1,  
DECEMBER 11 - 15, 2000**

**FINAL AS-GIVEN JPMs FOR EACH**

**WALK-THROUGH TEST**

Facility: Turkey PointDate of Examination: 12/11/00Exam Level (circle one): RO / SRO(I) / SRO(U)Operating Test No.: 1

## B.1 Control Room Systems

System / JPM Title		Type Code*	Safety Function
a.	Sys. 003/JPM #01050004309, Respond to a loss of RHR flow	(M) (A) (S) (L)	4
b.	Sys.008/JPM #R0300050, Investigate CCW High Radiation	(D) (L) (C)	8
c.	<b>Sys. 010/JPM #01041029301, Respond to Low Pressurizer Pressure</b>	(M) (A) (S)	3
d.	<b>Sys. 062/JPM #1002002100, Synchronize Main Generator to Line</b>	(D) (S) (L) (A)	6
e.	Sys. 001/JPM #1028010300, Perform a Dropped Rod Recovery	(D) (S) (A)	1
f.	<b>Sys. 029/JPM #1053002100, Initiate Containment Purge</b>	(C)	5
g.	Sys 015/JPM #1059026300/ Respond to Failure of Power Range N44	(C)(D)	7

## B.2 Facility Walk-Through

a.	<b>Sys. 006/JPM #24050032500, Realign Opposite Units' HHSI Pumps during Loss of All AC - with SI Required</b>	(D) (R)	2
b.	<b>Sys. 056/JPM #N0730041, Respond to Loss of Condenser Vacuum</b>	(D)	4
c.	Sys. 075/JPM #4010012300, Investigate Circulating Water Pump High Bearing Temperature	(D)	8

\* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Note: JPM's in **BOLD** and *Italics* are the five JPM's the SRO(U) applicants receive. RO and SRO(I) applicants receive all ten JPM's.

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

INVESTIGATE CCW HIGH RADIATION

4-ONOP-067

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, state the task to be performed, and will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

THE TASK YOU ARE TO PERFORM IS:

Investigate CCW high radiation

I will describe the general conditions for the task you will perform and provide the initiating cues.

INITIAL CONDITIONS:

You are the unit 4 RCO.

1. Unit 4 is cooling down on RHR with one RCP running
2. High radiation alarms are lit on PRMS channels R-17a and R-17b, and annunciator H-1/4 is lit.
3. 4-ONOP-067, radiological effluent release, has been obtained and the operability verification for the alarming channel(s) has been completed indicating a valid condition (step 2 is complete).

NOTE: This should kick the applicant into Step 3.

INITIATING CUES:

NOTE: Provide the operator with a copy of 4-ONOP-067 when giving the initiating cue.

Respond to the high radiation condition.



## INVESTIGATE CCW HIGH RADIATION

STEP 1: CHECK CCW SYSTEM FOR HIGH ACTIVITY (STEP 30, 4-ONOP-067)

STANDARD:

1. CHECK IF RCP THERMAL BARRIER FLOW = OR > 130 GPM, OR CHECK POSITION OF MOV-3-626

**CUE:** *RCP thermal barrier flow is 75 gpm.*

**CUE:** *MOV-4-626: Red light on, Green light off.*

2. USING THE PLANT PAGE, NOTIFIED PLANT PERSONNEL OF THE CCW SYSTEM "HIGH RADIATION" ALARM, WARNING PERSONNEL TO REMAIN CLEAR OF CCW SYSTEM PIPING

**CUE:** *Notification has been made*

3. VERIFIED CLOSED INDICATION FOR CCW HEAD TANK VENT, RCV-4-609 (VPB)

**CUE:** *RCV-4-609 Green light on and Red light off.*

4. DIRECTED CHEMISTRY TO SAMPLE CCW SYSTEM FOR ACTIVITY.

**CUE:** *Chemistry has been notified*

COMMENTS:

\_\_\_\_ SAT

\_\_\_\_ UNSAT

## INVESTIGATE CCW HIGH RADIATION

**STEP 2:** CHECK MOST PROBABLE RCS TO CCW LEAK SOURCES  
(STEPS 31/32, 4-ONOP-067)

**STANDARD:**

1. CHECKED FOR NORMAL CCW TEMPERATURES AND FLOWS  
OUT OF THE RCP THERMAL BARRIERS AS INDICATED BY  
THE FOLLOWING: (STEP 31, 4-ONOP-067)

- A. ANNUN: A 1/1, "RCP THERMAL BARR COOLING WATER  
HI FLOW - CLEAR

***CUE: A-1/1 NOT lit***

- B. ANNUN: A 1/2, "RCP THERMAL BARR COOLING WATER  
HI TEMP - CLEAR

***CUE: A-1/2 NOT lit***

- C. THERMAL BARRIER OUTLET FLOW FOR EACH RCP  
LESS THAN OR EQUAL TO 28 GPM (APPLICANT SHOULD  
USE ERDADS TO DETERMINE VALUES)

***CUE: Report 25 gpm for each flow indicator***

**COMMENTS:**

\_\_\_\_ SAT

\_\_\_\_ UNSAT

INVESTIGATE CCW HIGH RADIATION	
<p><u>(C) STEP 2 (Cont'd):</u> CHECK MOST PROBABLE RCS TO CCW LEAK SOURCES (STEPS 31/32, 4-ONOP-067)</p> <p><u>STANDARD:</u></p> <p>2. SNPO DIRECTED TO CHECK THE FOLLOWING HEAT EXCHANGERS CCW OUTLET TEMPERATURES AND FLOWS TO BE NORMAL: (STEP 32, 4-ONOP-067)</p> <p>A. NRHX: &lt; 140 DEG F AND &lt; 840 GPM</p> <p><b><i>CUE: As the SNPO, tell the operator that the non-regenerative heat exchanger temperature is 150 DEG and flow is 830 GPM</i></b></p>	

## INVESTIGATE CCW HIGH RADIATION

**(C) STEP 3: ISOLATE THE IDENTIFIED RCS TO CCW LEAKAGE SOURCE (STEP 32 RNO, 4-ONOP-067)**

**STANDARD:**

1. SHIFTED FROM NORMAL LETDOWN PATH TO EXCESS LETDOWN PER 4-OP-041.2, STEP 5.1.2.6, PRESSURIZER OPERATION. (STEP 32 RNO a, 4-ONOP-067)

NOTE: When applicant identifies the need for 4-OP-041.2, hand him the procedure.

2. CV-4-739 WAS OPENED

**CUE: CV-4-739 Red light on Green light off**

3. FLOW ON FI-4-624 VERIFIED TO BE  $\leq$  TO 238 GPM BY THE SNPO. (This step is NOT critical)

**CUE: Flow on FI-4-624 indicates ~ 230 gpm**

4. VERIFIED THE "EXCESS LETDOWN DIVERT VALVE" CONTROL SWITCH, CV-4-389, IS POSITIONED TO THE "VCT" (SWITCH IN NORMAL)

**CUE: CV-4-389 indicates positioned to the VCT**

5. OPENED THE EXCESS LETDOWN ISOL VALVE, CV-4-387

**CUE: CV-4-387 Red light on, Green light off**

6. SLOWLY OPENED, HCV-4-137 TO ALLOW THE EXCESS LETDOWN HEAT EXCHANGER TO WARM UP

\*\*\*\* NOTE: Hold the following CUE until requested \*\*\*\*

**CUE: HCV -4-137 is completely open and excess letdown HX temperature is < 195**

7. ISOLATE LETDOWN BY CLOSING CV-4-200 A,B,C

NOTE: If applicant fails to recognize that letdown must be isolated, issue the following cue to prompt him to do so:

**CUE: VCT level continues to drop (A 4/6 is in alarm)**

\_\_\_\_ SAT

\_\_\_\_ UNSAT

## INVESTIGATE CCW HIGH RADIATION

(C) STEP 3 (Cont'd): ISOLATE THE IDENTIFIED RCS TO CCW  
LEAKAGE SOURCE (STEP 32 RNO b,  
4-ONOP-067)

STANDARD:

1. DIRECTIONS WERE GIVEN TO THE SNPO TO PERFORM THE  
FOLLOWING AT THE NON-REGEN HX

- A. CLOSE, 4-777, NRHX CCW SUPPLY
- B. CLOSE, 4-780, NRHX CCW TEMP CONTROL VLV  
OUTLET
- C. CLOSE, 4-834, NRHX TEMP CONTROL VLV BYPASS

**CUE: SNPO acknowledges your directions to close the valves**

2. DIRECTIONS WERE GIVEN TO THE SNPO TO OPEN, 4-777A,  
NRHX SHELL SIDE VENT AT THE NON-REGEN HX

**CUE: SNPO acknowledges your direction to open 4-777A**

END OF JPM

\_\_\_\_ SAT

\_\_\_\_ UNSAT

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

You are the unit 4 RCO.

1. Unit 4 is cooling down on RHR with one RCP running
2. High radiation alarms are lit on PRMS channels R-17a and R-17b, and annunciator H-1/4 is lit.
3. 4-ONOP-067, radiological effluent release, has been obtained and the operability verification for the alarming channel(s) has been completed indicating a valid condition (step 2 is complete).

### INITIATING CUES:

1. Respond to the high radiation condition.

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

INITIATE CONTAINMENT PURGE

0-OP-053

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, state the task to be performed, and will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. While performing the task, explain each step BEFORE simulating the action. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

1. Unit 3 is in mode 5 and Unit 4 is in mode 1
2. All applicable prerequisites of O-OP-053 are satisfied
3. Containment purge release permit is approved
4. 4-OSP-206.1, Sect 7.8 has been completed

INITIATING CUE(S)

1. NPS directs the initiation of a containment purge on Unit 4.



JOB PERFORMANCE MEASURE WORKSHEET-SEQ #48A

JOB CLASSIFICATION: REACTOR CONTROL OPERATOR

JPM TITLE: INITIATE CONTAINMENT PURGE

JPM NUMBER:1053002100 JPM TYPE: NORMAL PATH

JPM REV. DATE: 11/07/00

NUCLEAR SAFETY IMPORTANCE:3.00

COMBINED IMPORTANCE:3.00

TIME VALIDATION:25 MINUTES

---

AN 'X' BELOW INDICATES THE APPLICABLE METHOD(S) OF TESTING WHICH MAY BE USED:

PERFORM:\_\_\_\_\_ SIMULATE:\_\_\_X\_\_\_ DISCUSS:\_\_\_X\_\_\_

INSTRUCTOR's INFORMATION

TASK STANDARDS:

1. ISOLATION VALVES OPEN AND PURGE FANS RUNNING IN ACCORDANCE WITH 0-OP-053, CONTAINMENT PURGE SYSTEM

REQUIRED MATERIALS:

1. 0-OP-053, CONTAINMENT PURGE SYSTEM
2. APPROVED CONTAINMENT PURGE RELEASE PERMIT

REFERENCES:

0-OP-053, CONTAINMENT PURGE SYSTEM

TERMINATING CUES:

5. When system has been properly lined up and fans started.

JOB PERFORMANCE MEASURE WORKSHEET-JPM #1053002100/SEQ #48A

EVALUATOR'S NOTES:

Hand the applicant the attached copy of attachment 5, Containment Purge Release Permit

- |                          |   |
|--------------------------|---|
| I. CCP No.:              | 12-00-01  |
| Date:                    | Today's Date  |
| Containment Number:      | 4   |
| Specific Activity:       | 3.0 E-4   |
| Tritium Activity:        | 1.5 E-6   |
| R-14 Background:         | 450   |
| Expected R-14 cpm:       | 28K   |
| Special Instructions:    | Terminate release and re-sample if R-14 exceeds 31K |
| II. R-14 Alarm Setpoint: | 42K   |
| III. Signatures          | Signed  |

( ) ELEMENT: 1

OBTAIN MATERIALS

STANDARDS:

1. 0-OP-053, CONTAINMENT PURGE SYSTEM, OBTAINED
2. PROCEDURE HAS BEEN PREVIOUSLY VERIFIED AGAINST OTSC INDEX
3. APPROVED CONTAINMENT PURGE RELEASE PERMIT OBTAINED

EVALUATOR'S NOTES:

1. Provide the operator with a procedure and a copy of the evaluator-prepared Containment Purge Release Permit.

( ) ELEMENT: 2

OBTAIN PERMISSION TO PURGE CONTAINMENT

STANDARDS:

1. PERMISSION OBTAINED FROM PLANT GENERAL MANAGER IN MODE 1.
2. NUCLEAR PLANT SUPERVISOR VERIFICATION POINT SIGNED

EVALUATOR'S NOTES:

NOTE: Procedure signed off (including NPS signature) through 5.1.1

(C) ELEMENT: 3

OBTAIN PRE-START DATA

STANDARDS:

1. PART A OF ATTACHMENT 3 OF O-OP-053 IS COMPLETED

EVALUATOR'S NOTES:

NOTE: See attachment 3 and cue as follows each block as the applicant identifies the locations. Use the filled out sheet as the cue sheet. **DO NOT GIVE THE FILLED OUT SHEET TO THE APPLICANT!**

(C) ELEMENT: 4

RESET R-14 TRIP SETPOINT

STANDARDS:

1. R-14 TRIP SETPOINT SET TO LIMIT PROVIDED ON THE CONTAINMENT PURGE RELEASE PERMIT (42 K)
2. R-14 TRIP SETPOINT RECORDED ON THE QA RECORD PAGE

EVALUATOR'S NOTES:

***CUE: The R 14 trip setpoint is reading 36K***

NOTE: This forces the applicant to adjust setpoint to 42K

(C) ELEMENT: 5

INSTALL PURGE ISOLATION VALVE FUSES

STANDARDS:

1. FUSES INSTALLED FOR THE PURGE ISOLATION VALVES:

POV-4-2600, FUSE XEP  
POV-4-2601, FUSE XLAG  
POV-4-2602, FUSE XEQ  
POV-4-2603, FUSE XLAH

EVALUATOR'S NOTES:

**CUE:** *If simulated, tell operator the fuses are installed.*

NOTES: Fuses are located behind vertical panel "B", (upside down).

Have applicant simulate at least one fuse block

**CUE:** *Green light lit for containment purge supply and exhaust fans*

(C) ELEMENT: 6

OPEN CONTAINMENT PURGE EXHAUST ISOLATION VALVES

STANDARDS:

- (C) 1. POSITIONED PURGE EXHAUST VALVES (POV 4-2602, 2603) CONTROL SWITCHES TO OPEN
- 2. VERIFIED VALVE POSITION INDICATIONS RED LIGHTS ON, GREEN LIGHTS OFF

EVALUATOR'S NOTES:

**CUE:** *Red light on Green light off*

(C) ELEMENT: 7

OPEN CONTAINMENT PURGE SUPPLY ISOLATION VALVES

STANDARDS:

- 1. VERIFIED CONTAINMENT DOORS/HATCHES CLOSED TO ATMOSPHERE
- 2. VERIFIED ON OPPOSITE UNIT THAT PURGE SUPPLY VALVES CLOSED OR DOORS/HATCHES CLOSED TO ATMOSPHERE

**CUE:** *After the applicant has identified the need to verify both containments are closed; tell the applicant both containments are closed as required.*

- (C) 3. POSITIONED PURGE SUPPLY VALVES (POV 4-2600, 2601) CONTROL SWITCHES TO OPEN
- 4. VERIFIED VALVE POSITION INDICATIONS RED LIGHTS ON, GREEN LIGHTS OFF

EVALUATOR'S NOTES:

**CUE:** *If simulated, after the applicant has identified the need to open the purge valves, tell the applicant that the required indications have been obtained.*

(C) ELEMENT: 8

START CONTAINMENT PURGE EXHAUST FAN

STANDARDS:

- (C) 1. POSITIONED CONTROL SWITCH TO START
- 2. VERIFIED FAN STARTS (FAN MOTOR & DAMPER RED LIGHTS ON)

EVALUATOR'S NOTES:

**CUE:** *Fan motor & damper red lights are on*

(C) ELEMENT: 9

START CONTAINMENT PURGE SUPPLY FAN

STANDARDS:

- 1. VERIFIED CONTAINMENT PURGE SUPPLY VALVES OPENED
- (C) 2. POSITIONED CONTROL SWITCH TO START
- 3. VERIFIED FAN STARTS (FAN MOTOR & DAMPER RED LIGHTS ON)

EVALUATOR'S NOTES:

**CUE:** *Fan motor & damper red lights are on*

ELEMENT: 10

VERIFY THE ALIGNMENT

STANDARDS:

- 1. VERIFIED PURGE SUPPLY FAN IS ON

2. VERIFIED PURGE EXHAUST FAN IS ON
3. VERIFIED SUPPLY DAMPER (MO 4-3411) IS OPEN
4. VERIFIED PURGE EXHAUST DAMPER (MO 4-3421) IS OPEN
5. VERIFIED PURGE EXHAUST VALVES (POV-4-2602,2603) ARE OPEN
6. VERIFIED PURGE SUPPLY VALVES (POV-4-2600, 2601) ARE OPEN

EVALUATOR'S NOTES:

**CUE:** *Tell the operator that required indications have been obtained.*

End of JPM

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

1. Unit 3 is in mode 5 and Unit 4 is in mode 1
2. All applicable prerequisites of 0-OP-053 are satisfied
3. Containment purge release permit is approved
4. 4-OSP-206.1, Sect 7.8 has been completed

### INITIATING CUE(S)

1. NPS directs the initiation of a containment purge on Unit 4.

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

RESPOND TO FAILURE OF POWER RANGE N-44

4-ONOP-059.8



DIRECTIONS TO APPLICANT:

I will explain the initial conditions, state the task to be performed, and will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. While performing the task, explain each step BEFORE simulating the action. To indicate that you have completed your assigned task return the handout sheet I provide you.

THE TASK YOU ARE TO PERFORM IS:

Respond to loss of power range instrumentation channel

INITIAL CONDITIONS:

1. Unit 4 is operating at 100% power
2. Rod control system selected to automatic rod control
3. No protective action bistables are in the tripped position

INITIATING CUE(S)

Received several NIS drawer alarms and the following annunciator alarms indicating an NIS channel failure

- B 6/4 NIS POWER RANGE CHANNEL DEVIATION
- B 2/3 POWER RANGE LOWER DET HI FLUX DEV/AUTO DEFEAT
- B 7/1 NIS/ RPI ROD DROP ROD STOP
- B 9/2 AXIAL FLUX TILT

JOB PERFORMANCE MEASURE WORKSHEET-SEQ #74A

JOB CLASSIFICATION: RCO

JPM TITLE: RESPOND TO LOSS OF POWER RANGE INSTRUMENTATION  
CHANNEL

JPM NUMBER:1059026300 JPM TYPE :NORMAL PATH

JPM REV. DT.:11/08/00

NUCLEAR SAFETY IMPORTANCE:2.50

COMBINED IMPORTANCE:3.00

TIME VALIDATION:10 MINUTES

---

AN 'X' BELOW INDICATES THE APPLICABLE METHOD(S) OF  
TESTING WHICH MAY BE USED:

PERFORM:\_\_\_\_\_ SIMULATE:\_\_\_X\_\_\_ DISCUSS:\_\_\_X\_\_\_

INSTRUCTOR's INFORMATION

TASK STANDARDS:

1. PLANT CONDITIONS STABILIZED
2. FAILED CHANNEL REMOVED FROM SERVICE

REQUIRED MATERIALS:

4-ONOP-059.8

REFERENCES:

4-ONOP-059.8, POWER RANGE NIS MALFUNCTION

TERMINATING CUES:

FAILED CHANNEL IS REMOVED FROM SERVICE

JOB PERFORMANCE MEASURE WORKSHEET-JPM #1059026300/SEQ #74A

(C) ELEMENT: 1

EVALUATE SYSTEM STATUS

STANDARDS:

1. FAILED CHANNEL IDENTIFIED
2. ROD CONTROL SELECTOR SWITCH POSITIONED IN MANUAL

EVALUATOR'S NOTES:

***CUE 1: The following pink BS lights are lit:***

- ***On the N-44 drawer: DROPPED ROD/ROD STOP***
- ***On Comparator & Rate drawer: CHANNEL DEVIATION***
- ***On Detector Current Comparator Drawer: LOWER SECTION DEVIATION***

***CUE 2: Rod control selector switch is positioned in manual.***

NOTE: Element 1 is an immediate action.

( ) ELEMENT: 2

OBTAIN REQUIRED OFF-NORMAL OPERATING PROCEDURE

STANDARDS:

4-ONOP-059.8 OBTAINED

EVALUATOR'S NOTES:

NOTE: When student identifies procedure it is permissible to provide a copy.

(C) ELEMENT: 3

REMOVE N-44 FROM SERVICE

STANDARDS:

1. "DROPPED ROD MODE SWITCH" FOR N-44 PLACED IN BYPASS
2. "ROD STOP BYPASS SWITCH" FOR N-44 PLACED IN BYPASS
3. "UPPER SECTION COMPARATOR DEFEAT SWITCH" POSITIONED TO N-44

4. "LOWER SECTION COMPARATOR DEFEAT SWITCH" POSITIONED TO N-44
5. "POWER MISMATCH BYPASS SWITCH" POSITIONED TO BYPASS N-44
6. "COMPARATOR CHANNEL DEFEAT SWITCH" POSITIONED TO N-44
7. INSTRUMENT POWER FUSES REMOVED FROM N-44B DRAWER WITHIN SIX HOURS

**CUE:** *6 hours is about to elapse.*

EVALUATOR'S NOTES:

**CUE:** *Confirm each switch positions as operator proceeds.*

( ) ELEMENT: 4

NOTIFY I&C

STANDARDS:

I&C DEPARTMENT NOTIFIED OF FAILURE

EVALUATOR'S NOTES:

**CUE:** *Acknowledge notification as I&C representative.*

( ) ELEMENT: 5

PERFORM QPTR

STANDARDS:

1. PERFORMED IF POWER >75%
2. PERFORMED AT LEAST ONCE PER 8 HOURS

EVALUATOR'S NOTES:

**CUE:** *Tell operator that QPTR will be performed by reactor engineering.*

EVALUATOR'S NOTES:

END OF JPM

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

1. Unit 4 is operating at 100% power
2. Rod control system selected to automatic rod control
3. No protective action bistables are in the tripped position

### INITIATING CUE(S)

Received several NIS drawer alarms and the following annunciator alarms indicating an NIS channel failure

- B 6/4 NIS POWER RANGE CHANNEL DEVIATION
- B 2/3 POWER RANGE LOWER DET HI FLUX DEV/AUTO DEFEAT
- B 7/1 NIS/ RPI ROD DROP ROD STOP
- B 9/2 AXIAL FLUX TILT

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250, 251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

PERFORM A DROPPED ROD RECOVERY

3-ONOP-028.3

Job Classification: RO  
JPM Title: Perform a Dropped Rod Recovery  
JPM Number: 1028010300  
JPM Type: Normal Path  
JPM Rev. Date: 11/09/00  
Nuclear Safety Importance: 4.00  
Combined Importance: 4.00  
Time Validation: 15 minutes  
Time Critical: NO

---

An "X" below indicates the applicable method(s) of testing which may be used:

PERFORM:   X        SIMULATE:             DISCUSS:       

Task Standards:

1. The Rod Control System will be operated to attempt retrieval of the affected RCC.
2. The unit will be manually tripped when the second rod drops.

Required Materials:

1. The key to the Rod Disconnect Switch Cabinet
2. 3-ONOP-028.3

References:

1. 3-ONOP-028.3, "Dropped RCC"

Terminating Cues:

The reactor is tripped and E-0 Immediate Operator Actions completed.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. The simulator will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet that I provided you.

INITIAL CONDITIONS:

You are the Unit 3 RCO.

1. Four hours ago while at 100% power, control rod L-5 dropped fully into the reactor
2. Load has been reduced to 70% power per Technical Specification 3.1.3.1.d.3.a
3. The reason for the dropped rod has been identified and corrected
4. 3-ONOP-028.3 has been completed up through step 13

INITIATING CUES:

In accordance with step 14 of 3-ONOP-028.3, the NPS directs you to retrieve the dropped rod using attachment 1.



PERFORM A DROPPED ROD RECOVERY	
<p><b>STEP 1:</b> OBTAIN 3-ONOP-028.3 WITH ATTACHMENT 1 FOR DROPPED ROD RECOVERY</p> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>OBTAINS 3-ONOP-028.3, TURNS TO STEP 14 AND CONFIRMS NEED TO PERFORM ATTACHMENT 1.</li> <li>PROCEEDS TO ATTACHMENT 1, "CAUTIONS" BEFORE STEP 1.</li> </ol> <p><b>COMMENTS:</b></p>	<p><b>Time Start:</b> _____</p> <p>_____ SAT</p> <p>_____ UNSAT</p>
<p><b>STEP 2:</b> REVIEW THE THREE CAUTIONS BEFORE STEP 1.</p> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>FOR FIRST CAUTION, ASKS THE NPS WHETHER THE DROPPED RCC HAS BEEN DROPPED AND RETRIEVED IN THE PREVIOUS 24 HOURS. <b>(SEE CUE 1 BELOW)</b> BASED ON <u>NEGATIVE</u> RESPONSE, DETERMINES PLANT GENERAL MANAGER PERMISSION NOT REQUIRED.</li> <li>NOTES THE SECOND CAUTION REGARDING POWER OPERATION WITH DROPPED RCC.</li> <li>FOR THIRD CAUTION, CHECKS PRMS-20 TO IDENTIFY IF IT SHOWS AN UNEXPECTED INCREASE DUE TO DROPPED RCC. DETERMINES IT IS <u>NORMAL</u>.</li> </ol> <p><b>COMMENTS:</b></p> <p><b>CUE 1:</b> <i>If asked, inform the applicant that this RCC has <u>not</u> been dropped and retrieved in the previous 24 hours.</i></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

PERFORM A DROPPED ROD RECOVERY	
<p><u>(C) STEP 3:</u> POSITION ROD MOTION CONTROL SELECTOR SWITCH TO SD BANK "B" (STEP 1)</p> <p><u>STANDARD:</u></p> <p>1. POSITIONS THE ROD MOTION CONTROL SELECTOR SWITCH TO SD BANK "B".</p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP 4:</u> ALIGN RCC LIFT COIL DISCONNECT SWITCHES FOR THE AFFECTED ROD BANK. (STEP 2)</p> <p><u>STANDARD:</u></p> <p>1. OBTAINS LIFT COIL DISCONNECT KEY AND USES IT TO OPEN THE LIFT COIL DISCONNECT BOX.</p> <p>2. PLACES THE LIFT COIL DISCONNECT SWITCHES TO THE "DISCONNECT" POSITION (TOGGLE SWITCH <u>DOWN</u>) ON ALL SD BANK "B" RCCs, EXCEPT FOR L-5.</p> <p>3. VERIFIES LIFT COIL DISCONNECT SWITCH FOR L-5 IS IN THE "CONNECT" POSITION (TOGGLE SWITCH <u>UP</u>).</p> <p><u>COMMENTS:</u></p> <p>NOTE: Standard # 3 is NOT critical unless operator moves the toggle switch from the "connect" position. This is a recoverable error.</p>	<p>____ SAT</p> <p>____ UNSAT</p>

PERFORM A DROPPED ROD RECOVERY	
<p><u>STEP 5:</u> RECORD APPLICABLE PRE-RETRIEVAL RCC INFORMATION. (STEP 3)</p> <p><u>STANDARD:</u></p> <p>1. RECORDS THE FOLLOWING INFORMATION ASSOCIATED WITH RCC L-5 IN THE RCO LOG BOOK:</p> <p>A. BANK _____</p> <p>B. GROUP _____</p> <p>C. POSITION _____ STEPS</p> <p><u>COMMENTS:</u></p> <p><b>NOTE:</b> Position above is as indicated by RCC's group demand step counter.</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>(C) STEP 6:</u> RESET APPLICABLE GROUP DEMAND STEP COUNTER TO ZERO. (STEP 4)</p> <p><u>STANDARD:</u></p> <p>1. MANUALLY SETS THE GROUP DEMAND COUNTER FOR SDB "B" GROUP 1 TO ZERO</p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 7:</u> EVALUATE IF THE DROPPED RCC IS IN A CONTROL BANK AND, IF SO, RESET THE PULSE ANALOG CONVERTER. (STEP 5)</p> <p><u>STANDARD:</u></p> <p>1. DETERMINES THAT BANK "B" IS A SD BANK AND THAT THE PULSE ANALOG CONVERTER MUST <b>NOT</b> BE RESET.</p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

## PERFORM A DROPPED ROD RECOVERY

**STEP 8:** OBSERVE THE FOUR CAUTIONS BEFORE STEP 6.

**STANDARD:**

1. NOTES FIRST TWO CAUTIONS CONCERN ALLOWABLE RATE OF ROD WITHDRAWAL. RECALLS FROM INITIAL CONDITIONS THAT 4 HOURS HAVE ELAPSED SINCE THE RCC WAS DROPPED. **(SEE CUE 1 BELOW)** INFORMS NPS THAT WITHDRAWAL RATE MAY NOT EXCEED 10 STEPS PER MINUTE. REQUESTS DESIRED RATE OF ROD WITHDRAWAL. **(SEE CUE 2 BELOW)**
2. NOTES THAT WITHDRAWAL RATE USED MUST BE APPROVED BY REACTOR SUPERVISOR. CONFIRMS NPS HAS REACTOR SUPERVISOR APPROVAL. **(SEE CUE 3 BELOW)**
3. NOTES 4<sup>TH</sup> CAUTION REGARDING A TRANSIENT REQUIRING ROD MOTION DURING RCC RETRIEVAL.

**COMMENTS:**

**CUE 1:** *If asked, tell the applicant that the rod drop occurred 4 hours ago.*

**CUE 2:** *When asked, tell the applicant to withdraw the rod at the maximum rate allowed by plant conditions. (Note: 10 steps/min. is max allowed)*

**CUE 3:** *If asked or called, tell the applicant that reactor supervisor approval for the specified rod speed has been obtained.*

\_\_\_\_ SAT

\_\_\_\_ UNSAT

PERFORM A DROPPED ROD RECOVERY	
<p><u>STEP 9:</u>      REVIEWS NOTES BEFORE STEP 6.</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1.      NOTES THE CONVERSION FACTOR FOR BORATION FLOW RATE TO REACTIVITY CHANGE.</li> <li>2.      NOTES THAT ANNUNCIATOR "B-9/4" AND THE RCC POWER CABINET "URGENT FAILURE" ALARM WILL ALARM FOR SDB GROUP 2 . INFORMS OTHER OPERATORS OF THESE EXPECTED ALARMS <u>BEFORE</u> THEY ARE RECEIVED. (Note this is the Group in SD Bank "B" with <u>all</u> lift coils disconnected)</li> <li>3.      NOTES THAT A BORATION MAY BE REQUIRED TO MAINTAIN Tavg EQUAL TO Tref.</li> </ol> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>(C) STEP 10:</u>    ATTEMPTS TO WITHDRAW THE DROPPED ROD. (STEP 6)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1.      ATTEMPTS TO WITHDRAW, BUT RECOGNIZES THAT ROD L-5 WILL NOT MOVE.</li> </ol> <p><u>COMMENTS:</u></p> <p><b>Booth Operator CUE:      Drop rod P-10 on examiner CUE</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

**PERFORM A DROPPED ROD RECOVERY****(C) STEP 11: RESPOND TO SECOND DROPPED ROD****STANDARD:**

1. MANUALLY TRIPS THE REACTOR (CRITICAL) AND  
TURBINE (NOT CRITICAL)
2. PERFORMS THE IMMEDIATE OPERATOR ACTIONS OF  
3-EOP-E-0 (ALL CRITICAL)
  - VERIFY REACTOR TRIP
  - VERIFY TURBINE TRIP
  - VERIFY POWER TO EMERGENCY 4KV BUSES
  - CHECK IF SI IS ACTUATED

**END OF JPM**

\_\_\_\_ SAT

\_\_\_\_ UNSAT

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

You are the Unit 3 RCO.

1. Four hours ago while at 100% power, control rod L-5 dropped fully into the reactor
2. Load has been reduced to 70% power per Technical Specification 3.1.3.1.d.3.a
3. The reason for the dropped rod has been identified and corrected
4. 3-ONOP-028.3 has been completed up through step 13

### INITIATING CUES:

In accordance with step 14 of 3-ONOP-028.3, the NPS directs you to retrieve the dropped rod using attachment 1.

## BOOTH OPERATOR INSTRUCTIONS

1. Reset IC 16
2. Reactor power → ROD CONTROL ROD POSITION → RODS FAILURE → SB3 40 → BLOWN FUSE TO STATIONARY GRIPPER COIL → SET TFLISB31 = T → B8 16 → DROPPED ROD TO SELECTED HEIGHT → ARM TVLIB86 = 0.0
3. TAKE SIMULATOR TO RUN AND STABILIZE POWER < 70% WITH Tavg 0.5 - 1 DEGREE F BELOW Tref.



Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

Respond to Loss of RHR Flow

IAW 3-ONOP-050

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed, the simulator will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

You are the Unit 3 RCO.

1. The unit is in mode 4 (RCS temp approx. 300 degrees F and RCS pressure approx. 300 psig).
2. The unit is on RHR cooling with 3A RHR pump in operation and 3B RHR pump in standby.
3. No required equipment is listed in the EOOS log.

INITIATING CUES:

Respond to plant conditions

## RESPOND TO LOSS OF RHR

STEP 1:      ACKNOWLEDGES ANNUNCIATOR, H 6/2 - "RHR HX HI/LO FLOW" AND VERIFIES ALARM BY CHECKING THE FOLLOWING:

NOTE:          Annunciator comes in due to the operating RHR pump, 3A, shaft shear.

\_\_\_\_\_ SAT

\_\_\_\_\_ UNSAT

STANDARD:

1.      CHECKED RHR FLOW INDICATION ON FI-3-605

NOTE:      Flow will be dropping off to no flow value.

2.      CHECKED DEMANDED POSITIONS OF HCV-3-758 AND FCV-3-605

NOTE:      The demanded position for HCV-3-758 will be unchanged from its initial value. The demanded position for FCV-3-605 will be full open.

3.      CHECKED POSITION INDICATING LIGHTS FOR MOV-3-750/751 AND MOV-3-744A/B FOR INTERMEDIATE INDICATION.

NOTE:      Both full open

4.      CHECKED RHR PUMP MOTOR AMMETER FOR OSCILLATING AMPS

NOTE:      Amps stable but low

COMMENTS:

NOTE:      Operator may obtain the ARP for annunciator H6/2 prior to obtaining / performing immediate actions of procedure 3-ONOP-050.

RESPOND TO LOSS OF RHR	
<p><u>STEP 2:</u> DISPATCH SNPO TO LOCALLY MONITOR PUMPS (STEP 1 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. DIRECTED SNPO TO OBTAIN RADIO</li> <li>2. DIRECTED SNPO TO LOCALLY MONITOR RHR PUMP</li> <li>3. DIRECTED SNPO TO MAINTAIN COMMUNICATIONS</li> <li>4. DIRECTED SNPO TO STAY NEAR RHR PUMP</li> </ol> <p><u>COMMENTS:</u></p> <p>NOTE: Performed without reference to procedure</p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>STEP 3:</u> DIRECT STA TO MONITOR HEATUP RATE (STEP 2 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. STA DIRECTED TO MONITOR HEATUP RATE</li> </ol> <p><u>COMMENTS:</u></p> <p>NOTE: Performed without reference to procedure</p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>STEP 4:</u> CHECK MOV-750/751 OPEN (STEP 3 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. MOV-750/751 VERIFIED OPEN</li> </ol> <p><u>COMMENTS:</u></p> <p>NOTE: Performed without reference to procedure</p>	<p>____ SAT</p> <p>____ UNSAT</p>

RESPOND TO LOSS OF RHR	
<p><u>STEP 5:</u> OBTAIN 3-ONOP-050</p> <p><u>STANDARD:</u></p> <p>1. PROCEDURE OBTAINED</p> <p>2. STEPS 1 THROUGH 3 HAVE BEEN VERIFIED</p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>STEP 6:</u> VERIFY MOV-744A/744B OPEN (STEP 4 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. MOV-744A/744B VERIFIED OPEN</p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>

RESPOND TO LOSS OF RHR	
<p><u>(C) STEP 7:</u> CHECK RHR PUMPS RUNNING (STEP 5 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. AT LEAST ONE RHR PUMP VERIFIED TO BE OPERATIONAL</p> <p>NOTES: RHR pump 3A may still be running as indicated by the red light with low amps, at this point the applicant should secure the operating RHR pump.</p> <p>If the applicant secured the pump already, the green light indication and zero amps will be indicated for both RHR pumps.</p> <p>At this step in the procedure, the required condition is to have NO RHR pumps running and the applicant transitions to the RNO column of step 5 of 3-ONOP-050.</p> <p><u>COMMENTS:</u></p> <p>NOTE: If the applicant had not previously stopped the 3A RHR pump, it is a critical standard that the pump be stopped at this time. If the pump was stopped earlier, this element is not critical.</p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP 8:</u> CLOSE HCV-758 (STEP 5, RNO a, OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. CLOSED HCV-758</p> <p>NOTE: This valve must be manually closed by adjusting its potentiometer until the controller demand is zero.</p> <p><u>COMMENTS:</u></p> <p>NOTE: Have booth operator report back as the SNPO to notify the RCO that the 3A RHR pump has a sheared shaft.</p>	<p>____ SAT</p> <p>____ UNSAT</p>

RESPOND TO LOSS OF RHR	
<p><u>(C) STEP 9:</u> CLOSE FCV-605 (STEP 5,RNO b, OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. CLOSED FCV-605</p> <p>NOTE: This valve must be manually closed by adjusting its potentiometer until the controller demand is zero OR by placing its controller in manual and forcing closed with the down arrow pushbutton.</p> <p><u>COMMENTS:</u></p> <p>NOTE: STEP 5,RNO c, OF 3-ONOP-050, Verify MOV-750 and MOV-751 are open, has previously been verified open. There is no change in their condition.</p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP 10:</u> START AN RHR PUMP (STEP 5,RNO d &amp; e, OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. RESTART OF PREVIOUSLY OPERATING PUMP WAS NOT ATTEMPTED</p> <p>NOTE: The applicant should not attempt to start the 3A RHR pump because the shaft is sheared.</p> <p>2. STARTED THE "B" RHR PUMP</p> <p><u>COMMENTS:</u></p> <p>NOTE: The Previously operating pump will not start and may direct the TO to rack its breaker out. Applicant may put switch in PTL.</p> <p>NOTE: Standard 1 is not critical to this element.</p>	<p>____ SAT</p> <p>____ UNSAT</p>

## RESPOND TO LOSS OF RHR

(C) STEP 11: RETURN FCV-605 TO AUTO AT THE DESIRED FLOW (STEP 5, RNO g, OF 3-ONOP-050)

STANDARD:

1. FCV-605 RETURNED TO AUTOMATIC OPERATION AT THE DESIRED FLOW
- (C) 2. RETURN FLOW TO > 3000 GPM
3. RETURN FCV-65 TO AUTO

**NOTE:** Minimum acceptable flow is 3000 GPM to clear annunciator H 6/2.

Desired flow is between 3500 and 3700 GPM.

If FCV-605 potentiometer setting was not changed in step 9, depressing the AUTO pushbutton on FC-605 will automatically return flow to the pre-event value.

If FCV-605 potentiometer setting was changed in step 9, the applicant will have to adjust the potentiometer setting to obtain the desired flow.

COMMENTS:

\_\_\_\_\_ SAT

\_\_\_\_\_ UNSAT



RESPOND TO LOSS OF RHR	
<p><u>(C) STEP 12:</u> OPEN HCV-758 AS NECESSARY TO CONTROL RCS TEMPERATURE (STEP 5, RNO h, OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>4. HCV-758 ADJUSTED TO CONTROL RCS TEMPERATURE</p> <p><u>COMMENTS:</u></p> <p>NOTE: This step is only critical if RCS temperatures are increasing. If necessary, the applicant will adjust the HCV-758 potentiometer while monitoring RCS loop temperature to stabilize RCS temperature.</p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>STEP 13:</u> VERIFY RHR PUMP NOT CAVITATING. (STEP 6 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. RUNNING RHR PUMP AMPS - STABLE</p> <p>2. RHR FLOW - STABLE</p> <p>3. RHR PUMP NOISE LEVEL - NORMAL</p> <p><u>COMMENTS:</u></p> <p>BOOTH OPERATOR-AS SNPO:</p> <p><b>CUE:</b> <i>Report back that the operating pump sounds normal.</i></p> <p>NOTE: At this point when the booth operator reports that the RHR pump is operating properly, valve FCV-605 will slowly start to shut while in auto. The valve will close to a position that will allow a maximum of 2800 GPM, this is below the low flow annunciator H-6/2 setpoint (3000 GPM).</p>	<p>____ SAT</p> <p>____ UNSAT</p>

RESPOND TO LOSS OF RHR	
<p><u>(C) STEP 14:</u> VERIFY AUTOMATIC RHR FLOW CONTROL OPERATION (STEP 7 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. DETERMINED THAT FCV-605 IS NOT MAINTAINING DESIRED FLOW IN AUTOMATIC</p> <p>NOTE: Due to the failure of the auto control function of FCV-605, the applicant will transition to RNO column of step 7 of 3-ONOP-050.</p> <p>2. APPLICANT GOES TO STEP 8</p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>(C) STEP 15:</u> MANUALLY CONTROL FCV-605 THEN GOTO STEP 10 OF 3-ONOP-050. (STEP 8 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>3. FCV-605 TAKEN TO MANUAL</p> <p>NOTE: Applicant will take the FCV-605 controller to manual and manually adjust the signal to control flow between 3500 and 3700 GPM.</p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

RESPOND TO LOSS OF RHR	
<p><b>STEP 16:</b> NOTIFIES APPROPRIATE PERSONNEL TO CORRECT FAILURE OF RHR FLOW CONTROL (STEP 10 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>4. NOTIFIES APPROPRIATE PERSONNEL</p> <p>NOTE: Applicant will contact I&amp;C to report the problem with FCV-605.</p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><b>STEP 17:</b> VERIFY RHR PUMP NOT CAVITATING AND GO TO STEP 14 OF 3-ONOP-050. (STEP 11 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. RUNNING RHR PUMP AMPS - STABLE</p> <p>2. RHR FLOW - STABLE</p> <p>3. RHR PUMP NOISE LEVEL - NORMAL</p> <p>4. APPLICANT GOES TO STEP 14 OF 3-ONOP-050</p> <p><u>COMMENTS:</u></p> <p>BOOTH OPERATOR-AS SNPO:</p> <p><b>CUE:</b> <i>Report back that the operating pump sounds normal.</i></p>	<p>____ SAT</p> <p>____ UNSAT</p>

RESPOND TO LOSS OF RHR	
<p><u>STEP 18:</u> ESTABLISH RHR FLOW (STEP 14 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. APPLICANT TRANSITIONS TO STEP 15 OF 3-ONOP-050.</p> <p>NOTE: Step 14.a states to check RHR pumps - ALL STOPPED. This transitions the applicant to the RNO which directs the applicant to step 15 of 3-ONOP-050.</p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 19:</u> INCREASE RHR FLOW. (STEP 15 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <p>1. ADJUST FCV-605 TO GET RHR FLOW ABOVE 3000 GPM</p> <p>NOTE: Applicant will verify the FCV-605 controller is manually adjusted so that the valve is controlling flow between 3500 and 3700 GPM, again verify no pump cavitation, and go to step 18 in 3-ONOP-050</p> <p>2. VERIFY RHR PUMP NOT CAVITATING</p> <p>3. GOTO STEP 18 OF 3-ONOP-050</p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

RESPOND TO LOSS OF RHR	
<p><u>STEP 20:</u> MAINTAIN STABLE PLANT CONDITIONS (STEP 18 OF 3-ONOP-050)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"><li>1. RCS TEMPERATURE VERIFIED TO BE STABLE OR DECREASING</li><li>2. Tavg MAINTAINED AT DESIRED TEMPERATURE</li></ol> <p><u>COMMENTS:</u></p> <p>END OF JPM</p>	<p>____ SAT</p> <p>____ UNSAT</p>

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

You are the Unit 3 RCO.

1. The unit is in mode 4 (RCS temp approx. 310 degrees F and RCS pressure approx. 350 PSIG).
2. The unit is on RHR cooling with 3A RHR pump in operation and 3B RHR pump in standby.
3. No required equipment is listed in the EOOS log

### INITIATING CUES:

Respond to plant conditions

### **SIMULATOR IC SETUP**

1. IC-30, Adjust FCV-605 as needed to achieve 3500-3700 gpm
2. Step 1: SYS MAT → SAFETY SYSTEM → RHR PROCESS → P3A → RHR PP 3A → SHEARED SHAFT → TFMUM01S = T
3. Step 13: STYL INST → A305 → RHR & CCW (800) → OVERRIDE → RHR HX BYPASS FLOW FCV 605 POTENTIOMETER → FC-605C SETPT 0-10 → VALUE -. SET IAM1S150 = 1.05/30

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

RESPOND TO LOW PRESSURIZER PRESSURE FOLLOWING  
DRAINING OF PRT

3-ONOP-041.5



DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed, the simulator will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

You are the Unit 3 RCO.

UNIT 3 is currently in MODE 1 at 35% reactor power.

Pressurizer relief tank (PRT) level is required to be lowered

Applicable prerequisites have been satisfied

INITIATING CUES:

You have been directed to drain the PRT to 76%. The ANPS desires to drain the PRT before reducing PRT pressure.

RESPOND TO LOW PZR PRESS FOLLOWING PRT DRAINING	
<p>INITIATING CUES:</p> <p>Annunciator A-7/1: PRT HI/LO LEVEL HIGH PRESSURE/TEMP</p> <p><u>TASK STANDARDS:</u></p> <ol style="list-style-type: none"> <li>1. RESPOND TO A-7/1 BY IMPLEMENTING 3-OP-041.3, PRT</li> <li>2. RESPOND TO PRESSURIZER PRESSURE MALFUNCTION BY IMPLEMENTING 3-ONOP-041.5</li> </ol> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 1:</u> RESPOND TO ANNUNCIATOR A 7/1</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. OBTAIN 3-ARP-097.CR, A 7/1</li> <li>2. VERIFIES PRT HI LEVEL BY OBSERVING LI-3-470</li> <li>3. TRANSITIONS TO 3-OP-041.3, PRT</li> </ol> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

RESPOND TO LOW PZR PRESS FOLLOWING PRT DRAINING	
<p><u>STEP2:</u> DRAIN THE PRT</p> <p><u>STANDARD:</u></p> <p>1. OBTAIN 3-OP-041.3, SECTION 7.1</p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP 3:</u> CLOSE THE RCDT TO PUMP SUCTION VALVE</p> <p><u>STANDARD:</u></p> <p>1. DIRECT THE SNPO TO CLOSE LCV-3-1003A, RCDT TO PUMP SUCTION VALVE</p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP 4:</u> OPEN THE PRT DRAIN VALVE</p> <p><u>STANDARD:</u></p> <p>1. PLACE THE CONTROL SWITCH FOR CONTROL VALVE CV-3-523 TO OPEN</p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>

RESPOND TO LOW PZR PRESS FOLLOWING PRT DRAINING	
<p><u>(C) STEP 5:</u> START RCDT PUMP</p> <p><u>STANDARD:</u></p> <p>1. DIRECT THE SNPO TO START 3A OR 3B RCDT PUMP</p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><b>BOOTH: IMPLEMENT THESE FAILURES WHEN PRT LEVEL DECREASES TO 80%</b></p> <p>Booth: - Insert conditional failure to fail PCV 3-456 OPEN when PT - 3-445 fails high.</p> <ul style="list-style-type: none"> <li>- Fail MOV -3-535, Block Valve as is.</li> <li>- Insert failure of reactor to auto trip.</li> <li>- Fail pressure transmitter PT-3-445 high, after SNPO returns LCV-3-1003A to AUTO.</li> </ul>	

## RESPOND TO LOW PZR PRESS FOLLOWING PRT DRAINING

STEP 6: CHECK PZR PRESSURE CONTROL INSTRUMENT LOOP NOT FAILED (IMMEDIATE ACTION STEP 1 OF 3-ONOP-041.5.)

\_\_\_\_ SAT

STANDARD:

1. COMPARE PT-3-444 WITH PT-3-445 AND DETERMINE THAT PT-3-445 HAS FAILED HIGH.

\_\_\_\_ UNSAT

COMMENTS:

NOTE: Applicant is now in the RNO for step 1b of 3-ONOP-041.5

NOTE: Applicant should perform this from memory

(C) STEP 7: TAKE REQUIRED ACTIONS TO STABILIZE PRESSURE TRANSIENT (IMMEDIATE ACTION STEP 1b OF 3-ONOP-041.5.)

\_\_\_\_ SAT

STANDARD:

1. ATTEMPT TO CLOSE PCV-3-456 AND MOV-3-535

\_\_\_\_ UNSAT

COMMENTS:

NOTE: Applicant should perform this from memory

## RESPOND TO LOW PZR PRESS FOLLOWING PRT DRAINING

(C) STEP 8: TAKE MANUAL ACTION TO TRIP THE REACTOR

STANDARD:

1. IF PRESSURIZER PRESSURE CANNOT BE MAINTAINED ABOVE 2000 PSIG THEN:
  - TRIP THE REACTOR AND TURBINE AND PERFORM THE I/As OF E-0
    - \* VERIFY REACTOR TRIP
    - \* VERIFY TURBINE TRIP
    - \* VERIFY POWER TO EMERGENCY 4 KV BUSES
    - \* CHECK IF SI IS ACTUATED

\_\_\_\_ SAT

\_\_\_\_ UNSAT

COMMENTS:

NOTE: Applicant should perform this from memory

END OF JPM

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

You are the Unit 3 RCO.

UNIT 3 is currently in MODE 1 at 35% reactor power.

Pressurizer relief tank (PRT) level is required to be lowered

Applicable prerequisites have been satisfied

### INITIATING CUES:

You have been directed to drain the PRT to 76%. The ANPS desires to drain the PRT before reducing PRT pressure.

### BOOTH OPERATOR INSTRUCTIONS

1. Reset IC 26
2. FILL PRT TO ABOVE HIGH LEVEL ALARM SETPOINT PER 3 OP-041.3, SECTION 7.2, STEP 7.2.2.1 AND 2. VENT PRT USING CV-3-549 AS NEEDED TO LIMIT PRESSURE BELOW THE HIGH PRESSURE SETPOINT.
3. MOV-3-535 FAIL AS IS: PRESSURIZER LEVEL → MOV 535 → FAIL AS IS → SET TFHV 535F = T.
4. AUTO REACTOR TRIP FAIL = SIM CTL → SPECIAL CONTROLS → ATWS - AMSAC FUNCTIONAL → REACTOR POWER → ROD CONTROL ROD POSITION → ROD SPEED TO LOGIC CABINET → RXB → BREAKER FAILS AS IS → SET TFL 2XBSE = F/IML2CRXT → RECALL → RXA → BREAKER FAILS AS IS → SET TFL2XASE = F/IML2CRXT.
5. PT445 FAIL HIGH AND PCV-3-456 FAIL OPEN: PRESSURIZER LEVEL → P445 → PT445 → FAIL HIGH → TFH1TU45 = T/H1: LI18 LE80.0 → RECALL → RECALL → PORV 456 → FAIL OPEN → TFHV4560 = T/TFH1TU45.
6. IN STEP 3: When directed to close LCV - 3 - 1003A, use SYS MAT → WASTE DISPOSAL → LIQUID WASTE DISPOSAL → LCV 1003A → LOCAL HAND SWITCH → SET TAA21003 = 0.
7. IN STEP 5: To start/stop 3A RCDT pump: SYS MAT → WASTE DISPOSAL → LIQUID WASTE DISPOSAL → A RCDT PUMP → LOCAL HAND SWITCH → SET TAA2PTA = 2.



Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)

3-GOP-301

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed, the simulator will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

You are the Unit 3 BOP.

1. A reactor startup is in progress with the unit in mode 2
2. All prerequisites are complete
3. Turbine speed is at 1800 rpm
4. Turbine trip test has been completed within surveillance interval
5. The requirements of enclosure 2 to 3-GOP-301 are met
6. The Unit 3 RCO will operate plant controls not related to the turbine generator

INITIATING CUES:

You are directed by the NPS to manually synchronize the main generator to the line beginning at step 5.52.3 of 3-GOP-301

SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)	
<p><u>STEP 1:</u> CHECK POSITION OF THE MAIN EXCITER DC REGULATOR (STEP 5.52.3 OF 3-GOP-301)</p> <p><u>START TIME:</u></p> <p>_____</p> <p><u>STANDARD:</u></p> <p>1. VERIFIES MAIN EXCITER DC REGULATOR CONTROL IS IN FULL LOWER POSITION (4-8%)</p> <p><u>COMMENTS:</u></p> <p>NOTE: The DC regulator control will be in the full lower position.</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>(C) STEP 2:</u> CLOSE EXCITER FIELD BREAKER (STEP 5.52.4 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <p>1. CLOSSES EXCITER FIELD BREAKER</p> <p>2. VERIFIES EXCITER FIELD AMMETER AT 60-70 AMPS</p> <p><u>COMMENTS:</u></p> <p>NOTE: Standard #2 is not critical</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 3:</u> VERIFY GENERATOR VOLTAGE READINGS IN BAND (STEP 5.52.5 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <p>1. CHECKS GENERATOR VOLTAGE READINGS ARE 13-17 KV</p> <p><u>COMMENTS:</u></p> <p>NOTE: Generator voltage readings will be in the range of 13KV to 17KV.</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)	
<p><u>(C) STEP 4:</u> INCREASE GENERATOR VOLTAGE (STEPS 5.52.6 &amp; 5.52.7 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. SLOWLY INCREASES GENERATOR VOLTAGE WITH DC REGULATOR IN <u>SMALL</u> STEPS</li> <li>2. VERIFIES EXCITER FIELD AMMETER RESPONSE</li> <li>3. VERIFIES GENERATOR VOLTMETERS INDICATE EQUAL VALUES</li> <li>4. RAISES VOLTAGE TO BETWEEN 21.5 AND 22.5 KV</li> <li>5. VERIFIES EXCITER FIELD AMPS BETWEEN 100-120 AMPS</li> </ol> <p><u>COMMENTS:</u></p> <p>NOTE: Standards #2, 3 and 5 are not critical</p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP5:</u> PLACE VOLTAGE REGULATOR CONTROL SWITCH IN TEST (STEP 5.52.8 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. PLACES VOLTAGE REGULATOR CONTROL SWITCH IN TEST POSITION</li> </ol> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>

SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)	
<p><u>(C) STEP 6:</u> ESTABLISH AUTOMATIC VOLTAGE CONTROL (STEPS 5.52.9 &amp; 5.52.10 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. SLOWLY ADJUSTS AC REGULATOR CONTROL TO NULL THE VOLTAGE REGULATOR OUTPUT METER</li> <li>2. PLACES THE VOLTAGE REGULATOR CONTROL SWITCH IN THE "ON" POSITION</li> </ol> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>STEP 7:</u> OBTAIN REQUIRED MATERIALS</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. OBTAINS SYNCHRONIZATION PLUG</li> </ol> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP 8:</u> PLACE THE GENERATOR SYNCHRONIZATION SWITCH FOR THE EAST GENERATOR GCB IN MANUAL (STEP 5.52.11 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. INSERTS THE SYNCHRONIZING PLUG IN THE GENERATOR SYNCHRONIZING EAST BUS CONTROL SWITCH</li> <li>2. POSITIONS THE GENERATOR SYNCHRONIZING EAST BUS CONTROL SWITCH TO MANUAL (CRITICAL)</li> </ol> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>

## SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)

(C) STEP 9: ADJUST TURBINE SPEED TO MAKE SYNCHROSCOPE ROTATE SLOWLY IN "FAST" DIRECTION (STEP 5.52.12 OF 3-GOP-301)

STANDARD:

1. IF NECESSARY, ADJUSTS GENERATOR GOVERNOR SPEED CHANGER CONTROL IN THE "DECREASE" DIRECTION TO SLOW MAIN TURBINE SPEED
2. ADJUSTS UNTIL SYNCHROSCOPE INDICATOR IS ROTATING SLOWLY IN "FAST" DIRECTION

COMMENT:

\_\_\_\_ SAT

\_\_\_\_ UNSAT

(C) STEP 10: ADJUST AC REGULATOR CONTROL TO MATCH INCOMING VOLTAGE TO RUNNING VOLTAGE (STEP 5.52.13 OF 3-GOP-301)

STANDARD:

1. ADJUSTS, AS NECESSARY, AC REGULATOR CONTROL SWITCH IN THE "INCREASE" DIRECTION
2. ADJUSTS VOLTAGE UNTIL INCOMING VOLTAGE IS APPROXIMATELY EQUAL TO RUNNING VOLTAGE
3. RECOGNIZES STEP 5.53 ACTIONS AS N/A (APPLY TO "AUTO" SYNCHRONIZATION ONLY)
4. GOES TO STEP 5.54.1 TO PERFORM "MANUAL" SYNCHRONIZATION PER INITIAL CONDITIONS

COMMENT:

\_\_\_\_ SAT

\_\_\_\_ UNSAT

SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)	
<p><u>(C) STEP 11:</u> PLACE GENERATOR SYNCHRONIZING EAST BUS CONTROL IN "MANUAL" POSITION (STEP 5.54.1 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. PLACES GENERATOR SYNCHRONIZING EAST BUS CONTROL IN "MANUAL" POSITION</li> </ol> <p><u>COMMENT:</u></p> <p>NOTE: This step is not critical <u>if</u> the control switch was <u>not</u> changed after the previous 3 actions were completed.</p>	
<p><u>STEP 12:</u> VERIFY "INADVERTENT PROTECTION SCHEME ARMED" AMBER LIGHT IS LIT (STEP 5.54.2 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. VERIFIES THE "INADVERTENT PROTECTION SCHEME ARMED" AMBER LIGHT ABOVE THE SYNCHROSCOPE IS LIT</li> </ol>	
<p><u>STEP 13:</u> VERIFY CORRECT TURBINE SPEED ESTABLISHED FOR MANUAL SYNCHRONIZATION (STEP 5.54.3 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. CHECKS TURBINE SPEED (SYNCHROSCOPE MOVING SLOWLY IN THE CLOCKWISE [FAST] DIRECTION)</li> <li>2. ADJUSTS, IF NECESSARY, TO HAVE SYNCHROSCOPE MOVING SLOWLY IN CLOCKWISE DIRECTION (SHOULD <u>NOT</u> BE NECESSARY)</li> </ol> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>

SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)	
<p><u>(C) STEP 14:</u>     PERFORM MANUAL SYNCHRONIZATION (STEP 5.54.4 &amp; 5.54.5 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1.     CLOSES THE GENERATOR GCB EAST BREAKER WHEN SYNCHROSCOPE INDICATES BETWEEN 5 MINUTES BEFORE 12 O'CLOCK AND EXACTLY 12 O'CLOCK</li> <li>2.     VERIFIES THE EAST BUS BREAKER INDICATES CLOSED (RED ON; GREEN OFF)</li> </ol> <p><u>COMMENTS:</u></p> <p>NOTE:     Standard 2 is not critical to performing step 14.</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 15:</u>     TURN SYNCHROSCOPE OFF (STEP 5.54.6 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1.     PLACES THE SYNCHROSCOPE SWITCH IN THE "OFF" POSITION</li> <li>2.     REMOVES THE SYNCHROSCOPE PLUG FROM THE PANEL</li> </ol> <p><u>COMMENT:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 16:</u>     VERIFY GENERATOR AMPS WITHIN 2 PERCENT ON ALL THREE PHASES (STEP 5.54.7 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1.     VERIFIES GENERATOR AMPS ARE WITHIN 2 % ON ALL 3 PHASES</li> </ol> <p><u>COMMENT:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>



SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)	
<p><u>STEP 17:</u>    VERIFY THE "INADVERTENT PROTECTION SCHEME ARMED" AMBER LIGHT OFF (STEP 5.54.8 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <p>1.    VERIFIES THE "INADVERTENT PROTECTION SCHEME ARMED" AMBER LIGHT ABOVE THE SYNCHROSCOPE IS OFF</p> <p><u>COMMENT:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>(C) STEP 18:</u>    INCREASE TURBINE LOAD TO 40 MWe (STEP 5.55 OF 3-GOP-301)</p> <p><u>STANDARD:</u></p> <p>1.    INCREASES UNIT LOAD TO APPROXIMATELY 40 MWe IN INCREMENTS OF ABOUT 10 MW</p> <p><u>COMMENT:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

**SYNCHRONIZE MAIN GENERATOR TO LINE (MANUAL SYNC)**

(C) STEP 19:      RESPOND TO UNCONTROLLED TURBINE LOAD  
                         INCREASE

STANDARD:

1.      TRIP THE REACTOR AND PERFORM I/As OF E-0
  - VERIFY REACTOR TRIP
  - VERIFY TURBINE TRIP
  - VERIFY POWER TO THE 4 KV BUSES
  - CHECK IF SI IS ACTUATED.

COMMENTS:

END OF JPM

\_\_\_\_ SAT

\_\_\_\_ UNSAT

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

You are the Unit 3 BOP.

1. A reactor startup is in progress with the unit in mode 2
2. All prerequisites are complete
3. Turbine speed is at 1800 rpm
4. Turbine trip test has been completed within surveillance interval
5. The requirements of enclosure 2 to 3-GOP-301 are met
6. The Unit 3 RCO will operate plant controls not related to the turbine generator

### INITIATING CUES:

You are directed by the NPS to manually synchronize the main generator to the line beginning at step 5.52.3 of 3-GOP-301

## BOOTH OPERATOR INSTRUCTIONS

1. Reset IC 20
2. STYL INST -> A302 -> TURBINE & GEN (766) -> OVERRIDE -> GEN GOV -> GOVERNOR CONTROL RAISE POSITION -> STATUS INULCN2R = T WHEN LOAD APPROX 20 MWE.

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

CIRCULATING WATER PUMP HIGH BEARING TEMPERATURE

DIRECTIONS TO APPLICANT:

I will describe the general conditions for the task you will perform and provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

You are the ANPO.

1. All 4 unit 3 circulating water pumps are running

INITIATING CUES:

You have been directed by the RCO to investigate the 3B1 "CIRC WATER PUMP MOTOR BEARING HIGH TEMP" ALARM."

The RCO directs you to check the following parameters at the 3B1 CWP and report back to the CR:

- TS-3-4113, 4114 and 4115  $\geq$  96 C
- Bearing oil level
- Pump/motor vibration/noise

CIRCULATING WATER PUMP HIGH BEARING TEMPERATURE	
<p><u>(C) STEP 1:</u> VERIFY 3B1 CIRCULATING WATER PUMP BEARING HIGH TEMPERATURE ANNUNCIATOR ALARM TO BE VALID</p> <p><u>STANDARD:</u></p> <p>AT 3B1 CIRCULATING WATER PUMP, CHECKED ALL THREE (3) TEMPERATURE INDICATORS FOR INDICATION OF BEARING TEMPERATURE <math>\Rightarrow</math> 96 DEG C OR 205 DEG F</p> <p><b>CUE:</b> <i>When the operator has identified the need to check each of the temperature indicators, tell the operator that the lower motor bearing (TS 3-4113) indicates 97 deg. C. and is slowly increasing. The other two (2) indicators (TS 3- 4114, 4115) are reading 96 deg. C. and are also slowly increasing.</i></p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>
<p><u>(C) STEP 2:</u> EVALUATE OPERATING CONDITIONS ON THE AFFECTED CIRCULATING WATER PUMP</p> <p><u>STANDARD:</u></p> <p>(C) 1. CHECKED BEARING OIL LEVEL INDICATION</p> <p><b>CUE:</b> <i>All of the pump motor bearing oil levels indicate low</i></p> <p>2. OBSERVED PUMP FOR ELEVATED PUMP/MOTOR VIBRATION/NOISE</p> <p><b>CUE:</b> <i>The pump is exhibiting no abnormal noises or vibration</i></p> <p><u>COMMENTS:</u></p>	<p>____ SAT</p> <p>____ UNSAT</p>

## CIRCULATING WATER PUMP HIGH BEARING TEMPERATURE

(C) STEP 3: NOTIFY RCO OF AFFECTED CIRCULATING WATER PUMP "AS FOUND" CONDITION

STANDARD:

1. THE RCO WAS NOTIFIED OF THE FOLLOWING "AS FOUND" CONDITIONS FOR 3B1 CIRCULATING WATER PUMP:

- A. VALID ALARM ALL THREE BEARINGS
- B. HIGHEST AT 209 DEG F (97 DEG C) LOWER BEARING
- C. BEARING TEMPS SLOWLY INCREASING
- D. ALL OIL LEVEL ARE LOWER THAN NORMAL

COMMENTS:

NOTE: The operator's report may not be as detailed as indicated in the standards; however, the operator should tell the RCO that the alarm is valid and is due to low oil level.

**CUE:** *The RCO has taken the 3B1 Circ Water Pump control switch to stop.*

**CUE:** *If asked, hand the applicant the attached copy of 3-OP-010, Section 7.2.*

\_\_\_\_ SAT

\_\_\_\_ UNSAT



CIRCULATING WATER PUMP HIGH BEARING TEMPERATURE	
<p><u>STEP 4:</u>      PERFORM CIRCULATING WATER PUMP SHUTDOWN INSPECTION PER 3 OP 010, Section 7.2</p> <p><u>STANDARD:</u></p> <p>1.      VERIFIED THAT 3B1 CIRCULATING WATER PUMP DISCHARGE MOV-1414 CLOSES COMPLETELY</p> <p><i>CUE: The valve is indicating in the closed position</i></p> <p>NOTE: IF THE APPLICANT VERIFIES THAT THE 3B1 CIRCULATING WATER PUMP SHAFT STOPS AND DOESN'T ROTATE BACKWARDS;</p> <p><i>CUE: The pump shaft has stopped.</i></p> <p><i>CUE: The pump shaft is not rotating backwards.</i></p> <p><u>COMMENTS:</u></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 5:</u> COMPLETE ADMINISTRATIVE REQUIREMENTS</p> <p><u>STANDARD:</u></p> <p>1.      LOGGED ANY PWO'S WRITTEN AND THE ACTIONS TAKEN TO CORRECT THE ALARM CONDITION IN THE ANPO LOG BOOK</p> <p><u>COMMENTS:</u></p> <p>END OF JPM</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

You are the ANPO.

1. All 4 unit 3 circulating water pumps are running

### INITIATING CUES:

You have been directed by the RCO to investigate the 3B1 "CIRC WATER PUMP MOTOR BEARING HIGH TEMP" ALARM."

The RCO directs you to check the following parameters at the 3B1 CWP and report back to the CR:

- TS-3-4113, 4114 and 4115  $\geq$  96 C
- Bearing oil level
- Pump/motor vibration/noise

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

RESPOND TO LOSS OF CONDENSER VACUUM

3-ONOP-014

DIRECTIONS TO APPLICANT:

During the performance of this task, I will tell you which steps to simulate or discuss. Explain each step BEFORE you do it. Do you understand my directions to you? If you have any questions, ask them now and I will answer them. During the test, I cannot answer questions. When you complete all the steps correctly, you will pass this Job Performance Measure.

I will explain the initial conditions, state the task to be performed, and provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

You are the Unit 3 NPO.

1. Unit 3 is operating in mode 1 at 100% power
2. The west SJAE bank is in service

INITIATING CUES:

RCO notifies the NPO of decreasing condenser vacuum on Unit 3

RESPOND TO LOSS OF CONDENSER VACUUM	
<p><u>(C) STEP 1:</u> PLACE HOGGING JET IN SERVICE</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. ELEMENT PERFORMED WITHOUT REFERENCE</li> <li>2. STEAM SUPPLY TO HOGGING JET VALVE, 3-30-043, OPENED</li> <li>3. STEAM SUPPLY TO HOGGING JET VALVE, 3-30-044, SLOWLY OPENED</li> <li>4. 250 TO 260 PSIG ON 3 PI-1597, HOGGING JET SUPPLY PRESSURE ESTABLISHED</li> <li>5. CONDENSER AIR REMOVAL TO HOGGING JET VALVE, 3-30-010, OPENED</li> <li>6. RCO NOTIFIED THAT THE SJAE HOGGING JET WAS IN SERVICE</li> </ol> <p><u>COMMENTS:</u></p> <p>NOTE: Standard #6 is not critical to element.</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><u>STEP 2:</u> OBTAIN THE PROCEDURE</p> <p><u>STANDARD:</u></p> <ol style="list-style-type: none"> <li>1. CORRECT PROCEDURE OBTAINED</li> </ol> <p><u>COMMENTS:</u></p> <p>NOTE: After the Operator has identified the applicable procedure, provide the procedure</p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

RESPOND TO LOSS OF CONDENSER VACUUM	
<b>STEP 3: CLOSE THE HOGGING JET DRAIN</b>  1. VALVE 3-30-045 CLOSED  <b>CUE: Vac is still slowly being lost</b>	____ SAT   ____ UNSAT
<b>(C) STEP 4: PLACE THE EAST SJAE IN SERVICE</b>  <b>STANDARD:</b>  1. EAST SECONDARY JET STEAM STOP ISOLATION VALVE, 3-30-036, OPENED  2. EAST SECONDARY JET AIR REMOVAL ISOLATION VALVE, 3-30-042, OPENED  3. EAST PRIMARY JET STEAM SUPPLY ISOLATION VALVE, 3-30-009, OPENED  4. VACUUM IS VERIFIED BEING DRAWN ON THE SJAE BY INDICATION AT PI-3-1407.  <b>CUE: Vac is being drawn</b>  5. EAST PRIMARY JET AIR REMOVAL ISOLATION VALVE, 3-30-008, OPENED  6. CONDENSER VACUUM IS VERIFIED BEING MAINTAINED BY THE SJAEs AT PI-3-1407.  <b>CUE: Vac = 26 inches</b>  <b>COMMENTS:</b>  NOTE: All steps critical except 4 and 6.    END OF JPM	____ SAT   ____ UNSAT

**APPLICANT'S IC SHEET**

**INITIAL CONDITIONS:**

You are the Unit 3 NPO.

1. Unit 3 is operating in mode 1 at 100% power
2. The west SJAE bank is in service

**INITIATING CUES:**

RCO notifies the NPO of decreasing condenser vacuum on Unit 3

Developed for the Turkey Point, December 2000, Initial Examination  
Examination Report # 50-250,251/2000-301



U.S. Nuclear Regulatory Commission

Region II

Title:

REALIGN UNIT 4 HHSI PUMPS TO UNIT 3 RWST DURING A LOSS  
OF ALL AC POWER WITH SI REQUIRED ON UNIT 3

3-EOP-ECA-0.2



DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. During the performance of this task, I will tell you which steps to simulate or discuss. Explain each step BEFORE you do it. Do you understand my directions to you? I will provide the initiating cues. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

You are the SNPO being dispatched from the control room.

1. Only one HHSI pump is available on Unit 3 which has experienced an SI signal.
2. Operators are performing 3-EOP-ECA-0.2, "Loss of All Ac Power Recovery with SI Required."
3. The Unit 4 RCO has been directed to perform Attachment 1 of 3-EOP-ECA-0.2 for Unit 3.

INITIATING CUES:

1. Perform 3-EOP-ECA-0.2, Attachment 1, to align Unit 4 HHSI pump suction to the Unit 3 RWST.
2. Notify the Unit 4 RCO when local valve manipulations of Attachment 1 are complete.

## REALIGN UNIT 4 HHSI PUMPS TO UNIT 3 RWST

(C) STEP 1:    LOCALLY OPEN THE HHSI CROSS-TIE VALVES

STANDARD:

3.     HIGH-HEAD SI PUMP SUCTION HEADER SECTIONALIZING VALVE 870A HAS BEEN "OPENED" LOCALLY

\_\_\_\_\_ SAT

4.     SI PUMP SUCTION CROSS-CONNECT VALVE 870B HAS BEEN "OPENED" LOCALLY

\_\_\_\_\_ UNSAT

5.     HIGH-HEAD SI PUMP MINI FLOW RECIRC CROSS-CONNECT VALVES (892A AND 892B) HAVE BEEN "UNLOCKED" AND "OPENED" LOCALLY

COMMENTS:

NOTE: These are ORANGE locks that are opened with an ECCS key. Normal keys ("A" key) will NOT work.

The ECCS key is obtained from the SNPO work station (break glass)

**REALIGN UNIT 4 HHSI PUMPS TO UNIT 3 RWST**

(C) STEP 2: CLOSE 4-864C

STANDARD:

1. RWST OUTLET 4-864C IS UNLOCKED AND CLOSED AS DIRECTED

COMMENTS:

NOTE: This is a BLUE lock that is opened with an ECCS key. Normal keys ("A" key) will NOT work.

The ECCS key is obtained from the SNPO work station (break glass)

\_\_\_\_ SAT

\_\_\_\_ UNSAT

REALIGN UNIT 4 HHSI PUMPS TO UNIT 3 RWST	
<p><u>(C) STEP 3:</u> NOTIFY RCO</p> <p><u>STANDARD:</u></p> <p>1. RCO NOTIFIED OF ALIGNMENT COMPLETION</p> <p><u>COMMENTS:</u></p> <p>END OF JPM</p>	<p>____ SAT</p> <p>____ UNSAT</p>

## APPLICANT'S IC SHEET

### INITIAL CONDITIONS:

You are the SNPO.

1. Only one HHSI pump is available on Unit 3 which has experienced an SI signal.
2. Operators are performing 3-EOP-ECA-0.2, "Loss of All AC Power Recovery with SI Required."
3. The Unit 4 RCO has been directed to perform Attachment 1 of 3-EOP-ECA-0.2 for Unit 3.

### INITIATING CUES:

1. Perform 3-EOP-ECA-0.2, Attachment 1, to align Unit 4 HHSI pump suction to Unit 3 RWST.
2. Notify the Unit 4 RCO when local valve manipulations of Attachment 1 are complete.

# **FINAL SUBMITTAL**

**TURKEY POINT EXAM  
50-250, 251/2000-301**

**NOVEMBER 27 - DECEMBER 1,  
DECEMBER 11 - 15, 2000**

**FINAL AS GIVEN  
OPERATOR ACTIONS**

**F.1.g - FORM ES-D-2  
OPERATOR ACTIONS**

Facility: Turkey Point

Scenario No.: 1Op-Test No.: 1Examiners: C. Payne

Operators: \_\_\_\_\_

M. SykesM. Miller

Initial Conditions: Mode 1, 75% RTP (IC-16)

Turnover: Power level is at 75% following a unit power reduction for maintenance on the 3B SGFP and lube oil system. All testing was completed and the system returned back to service. Equipment OOS --- "C" Charging Pump is out of service for motor ground (at this power, both Charging Pumps "A" & "B" will be running), I&C has Steam Dump selector switch selected to the MANUAL (Steam Pressure) mode due to problem with TC-408H, (Tavg input to Turbine Trip Summator). The "B" SI Accumulator level is slightly low out of the green band following chemistry sampling. Raise accumulator level back to the middle of the band and then raise power to 100%.

Event No.	Malf. No.	Event Type*	Event Description
	Pre-insert		MOV-3-433, 3C MSR Main Steam Stop, fails open; 3C CCW pump shaft shear. (Both actuate on LOOP).
1		N/RCO	Raise SI Accumulator 3B to middle of normal band. (High pressure alarm may come in and/or be addressed by ARP "H 2/3".)
2		R/RCO	Increase power from 75% to 100%.
3		I/RCO	VCT level transmitter LT-115 fails high (loss of automatic make-up). [ <i>Insert malfunction during a dilution activity after reactivity change is satisfied</i> ]
4		C/BOP	Loss of 3D 4KV bus (bkr 3AD06 opens) which results in loss of power to 3C ICW Pump.
5		C/RCO	Charging pump 3A fails due to bearing failure.
6		I/RCO	Median Tavg fails high.
7		I/BOP	S/G 3A Narrow Range level [LT-478] fails high.
8		ALL	Dual Unit LOOP, Loss of All Charging Flow (due to loss of EDG 3B).
8A		M/C/All	Two adjacent control rods stick full out on reactor trip (will respond with Emergency Boration per 3-ONOP-046.1).
8B		M/C/All	EDG 3B trips after charging flow initiated per Step 4, ES-0.1.

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

**Initial Conditions:**

1. Initial condition Mode 1 at 75% RTP.

**Turnover:**

1. Power level is at 75%.
2. Accumulator '3B' level is slightly low out of the green band at ~ 6530 gal and pressure is at 610 psig. Annunciators H-2/3, ACCUM B HI/LO PRESS, and H-2/4, ACCUM B HI/LO LEVEL, are lit. The Accumulator needs to be filled to a level of ~ 6700 gal and pressure restored.
3. Power increase to 100% is desired.

**Equipment OOS ---**

1. 3C Coolant Charging Pump is out of service for motor ground and the breaker is racked out.
2. The Steam Dump selector switch is in manual (Steam Pressure mode) control due to a problem with TC-408H, (Tavg input to Turbine Trip Summator).
3. PRN1 channel N-41 upper detector failed.

**Synopsis:**



Op-Test No.: 1 Scenario No.: 1 Event No.: 1 Page 2 of 27

Event Description: Fill the '3B' Accumulator using 3-OP-064, section 7.1.

Time	Position	Applicant's Actions or Behavior
	RCO	Step 7.1.1.1 - Verifies initial conditions of section 3.0 are satisfied.
	RCO	Step 7.1.1.2 - Verifies level in Accumulator '3B' needs to be increased.
	RCO	Step 7.1.1.3 - Verifies RCS temperature > 380 F
	RCO	Step 7.1.1.4 - Verifies or has breaker 30737 (MOV-3-869) placed in 'ON'.
	RCO	Step 7.1.1.5 - Verifies '3B' Accumulator pressure is at least 150 psig.
	RCO	<p>Reads Cautions before Section 7.1.2:</p> <ul style="list-style-type: none"> <li>• If water addition during normal plant operations is required to make up for a 50 gallon loss within 4 hours, the System Engineer or JPN should be notified for evaluation.</li> <li>• Operations of the safety Injection pump on minimum flow for more than 5 minutes may result in severe pump damage. Coordination to establish flowpath to accumulators as soon as possible is essential.</li> <li>• In Modes 1, 2, or 3 with the RCS pressure greater than 1000 psig, Technical Specifications require accumulator levels to be in the range of 6520 to 6820 gallon, however, to account for possible instrument inaccuracies, the required range has been administratively established at 6552 to 6788 gallons.</li> <li>• Technical Specifications require accumulator pressure to be maintained in the range of 600 to 700 psig.</li> <li>• Accumulator pressure will increase while filling. The Accumulator 700 psig relief may lift if the accumulator is filled excessively.</li> <li>• In Modes 1, 2, or 3 with the RCS pressure greater than 1000 psig, no more than one accumulator makeup valve shall be opened at the same time.</li> </ul>

Op-Test No.: 1 Scenario No.: 1 Event No.: 1Page 3 of 27

Event Description: Fill the '3B' Accumulator using 3-OP-064, section 7.1.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Reads NOTE before Section 7.1.2:</p> <ul style="list-style-type: none"> <li>If required to add a large volume (greater than 1000 gallons) to the Accumulators, 3-883R must be fully opened. Filling with 3-883R throttled two turns open will allow 85 gpm flow, extended HHSI Pump operation at this flow rate may cause pump damage.</li> </ul>
	RCO	Step 7.1.2.1 - Record initial level on QA Record Page.
	RCO	Step 7.1.2.2 - Open the Accum Makeup Valve for '3B' Accumulator, CV-3-851B
	RCO	Step 7.1.2.3 - Start or verify running a Safety Injection Pump <b>AND</b> document on QA Record Page.
	RCO	<p>Reads Step 7.1.2.4 NOTE</p> <ul style="list-style-type: none"> <li>A second operator should be utilized to operate MOV-3-869 to allow sufficient time to perform the self-checking process.</li> </ul>
	RCO	<p>Step 7.1.2.4 - Establish flow to the accumulator as follows:</p> <ol style="list-style-type: none"> <li>Open the Loop 3A and 3B Hot Leg SI Isol, MOV-3-869</li> <li>Will N/A this step.</li> </ol>
	RCO	Step 7.1.2.5 - <b>WHEN</b> accumulator level has increased to between 6560 and 6780 gallons, <b>THEN</b> close MOV-3-869.
	RCO	Step 7.1.2.6 - <b>IF</b> filling another accumulator is <b>NOT</b> required, <b>THEN</b> stop the Safety Injection Pump <b>AND</b> verify the control switch is in the mid position.
	RCO	Step 7.1.2.7 - Close the Accum Makeup Valve CV-3-851B
	RCO	Steps 7.1.2.8 - 9 should be N/A'd.
	RCO	Step 7.1.2.10 - Document affect accumulator on QA Record Page.

Page 4 of 27[illegible]

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 5 of 27

Event Description: Increase Reactor power from 75% per 3-GOP-301

Time	Position	Applicant's Actions or Behavior
	<b>ANPS</b>	Directs power increase per 3-GOP-301, Hot Standby to Power Operation.
	<b>ANPS</b>	Specifies ramp rate for power increase. (3-GOP-301 Precaution 4.35)
	<b>ANPS</b>	Directs RCO to increase power using dilution per 0-OP-046. (3-GOP-301, Step 5.70)
	<b>ANPS</b>	Directs RCO to increase power using the control rods (if required) while maintaining axial flux within limits. (3-GOP-301 Step 5.70)
	<b>ANPS</b>	Directs BOP to increase turbine load as required to maintain Tavg matched with Tref. (3-GOP-301 Step 5.70)
	<b>ANPS</b>	Maintains command and control of the evolution.
	<b>ANPS</b>	Notifies the Chemistry Department must sample the RCS. (0-OP-046, Step 5.3.2.12)
	<b>RCO</b>	Performs 0-OP-046, CVCS - Boron Concentration Control, as directed by the ANPS.
	<b>RCO</b>	Step 5.3.1.1 - Verifies initial conditions for starting the dilution.
	<b>RCO</b>	Reads Cautions before Step 5.3.2.1: <ul style="list-style-type: none"> <li>• Error margins exist for the Boric Acid and Primary Water flow transmitters, with Primary Water being the greatest. Extreme care needs to be exercised to ensure that an excessive reduction in RCS boron concentration does not occur due to this fact.</li> <li>• When less than 1% power, an independent Verification of Boron Reduction change calculation should be performed to ensure SDM requirements are not challenged.</li> </ul>
	<b>RCO</b>	Reads NOTES before Step 5.3.2.1:

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 6 of 27

Event Description: Increase Reactor power from 75% per 3-GOP-301

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>VCT level is 14.15 gallons/% level indication.</li> <li>Attachment 5 of this procedure may be used to assist in calculating dilution requirements for power or temperature changes.</li> </ul>
	RCO	<p>Step 5.3.2.1.a - Determine the approximate quantity of primary water required to change reactivity by the desired amount. (May be by the day to day activities OR using the plant curve book)</p> <p>Step 5.3.2.1.b - N/A's this step since are &gt; 1% power.</p>
	RCO	Step 5.3.2.1.c - Set the Primary Water Totalizer to determined amount of water.
	RCO	Step 5.3.2.2 - Adjust the setpoint on the Primary Water Controller, FCV-3-114A to the desired flow rate.
	RCO	<p>Reads NOTES before Step 5.3.2.3:</p> <ul style="list-style-type: none"> <li><u>DILUTE</u> is the <u>preferred</u> switch position, since impact to the RCP seals is minimized due to preheating of water in the VCT, and to ensure RCS hydrogen concentration is maintained.</li> <li>ALT DILUTE is recommended only when rapid load change or rod movement requires compensation.</li> </ul>
	RCO	Step 5.3.2.3 - Place the Reactor Makeup Selector Switch in the DILUTE position.
	RCO	<p>Step 5.3.2.4 - Turn the RCS Makeup Control Switch to the START position <b>AND</b> perform the following:</p> <ol style="list-style-type: none"> <li><b>IF</b> the Reactor Makeup Selector Switch is in the Dilute position <b>AND</b> FCV-3-114B, Blender to VCT valve closes due to flow deviation, <b>THEN</b> place FCV-3-114B switch to OPEN.</li> <li>This step is N/A'd.</li> </ol>
	RCO	Step 5.3.2.5 - Verify expected primary water flow rate by observing Chart Recorder FR-3-113 <b>AND</b> ensure that it is

Op-Test No.: 1 Scenario No.: 1 Event No.: 2Page 7 of 27

Event Description: Increase Reactor power from 75% per 3-GOP-301

Time	Position	Applicant's Actions or Behavior
		consistent with the flow rate determined in Substep 5.3.2.2.
	RCO	Step 5.3.2.6 - If necessary to <b>manually</b> stop the dilution places the RCS Makeup Control Switch in the STOP position.
	RCO	Steps 5.3.2.7 - When the dilution has stopped verifies the following switches are in auto and the valves are closed:  a. Boric Acid to Blender, FCV-3-113 b. Primary Water to Blender, FCV-3-114A c. Blender to Charging Pump Suction, FCV-3-113B d. Blender to VCT, FCV-3-114B
	RCO	Step 5.3.2.8 - Places the Reactor Makeup Selector Switch to AUTO.
	RCO	Step 5.3.2.9 - Turns the RCS Makeup Control Switch to START.
	RCO	Reports status to the ANPS.
	BOP	Increases turbine load as directed by the ANPS, maintaining Tavg matched with Tref (3-GOP-301 step 5.70).
	BOP	Reports status to ANPS.

Op-Test No.: 1 Scenario No.: 1 Event No.: 3 Page 8 of 27

Event Description: VCT level transmitter LT-115 fails high (loss of automatic make-up)

Time	Position	Applicant's Actions or Behavior
		<p><b><i>[Insert malfunction during a dilution activity <u>after</u> reactivity change is satisfied]</i></b></p> <p>Indication: Annunciator A-4/6 'VCT HI/LO LEVEL'</p>
	RCO	<p>Responds per ARP "A 4/6": (Operator may manually stop the dilution while responding to this event.)</p> <p>Check VCT level, LI-3-115, indication. Verifies LI-3-115 has failed by comparing to one of the following:</p> <ul style="list-style-type: none"> <li>- LC-3-112A in AUTO, adjust setpoint to just get 0% demand, then read pot setting</li> <li>- Cross check of LC-3-112A on ERDADS CVCS display</li> <li>- Dispatch an NPO to locally read LC-3-112A</li> </ul> <p>After verifying that LT-3-115 has failed high, then take LCV-3-115A control switch to VCT position</p> <p>Takes action using 3-ONOP-046.4, Malfunction of Boron Concentration Control System.</p>
	RCO	<p>Verify all actions of 3-ONOP-046.4 steps 1 - 2.c complete.</p> <p>Step 2.d - Perform manual makeup as necessary using 0-OP-046, CVCS - BORON CONCENTRATION CONTROL.</p> <p>Step 2.e - Reports equipment failure to I &amp; C.</p>
	RCO	<p>Inform ANPS of plant status.</p>

Event Description: VCT level transmitter LT-115 fails high (loss of automatic make-up)

O:\Turkey Point Examination Bank\Initial Exam 2000-301\Draft operating exam\Draft Simulator Scenarios\TP 2000-301 (SDR) Scenario 1b Form ES-D-2 Operator Actions.wpd



Op-Test No.: 1 Scenario No.: 1 Event No.: 4 Page 10 of 27

Event Description: Loss of 3D 4KV bus (bkr 3AD06 opens) which results in loss of power to 3C ICW Pump and Annunciator "I 4/4" ICW HEADER A/B LO PRESS.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Responds per ARP "I 4/4":</p> <p>Step 1.a - Checks ICW header pressure indicators, PI-3-1619 and/or -1620 less than or equal to 11 psig.</p>
	BOP	<p>Step 2.a - Starts 3A ICW pump per 3-OP-019 steps 5.2.2.5 to 5.2.2.7 (or per 3-ONOP-019, Step 4 to <u>xxx</u>.)</p> <p>a. Verifies the pump motor amps decreases to less than 49 amps.</p> <p>b. Verifies the discharge pressure of the pump started is between 11 and 35 psig (3-OP-019 step 5.2.2.7)</p>
	BOP	<p>Recognize loss of 3D 4KV bus and goes to 3-ONOP-004.5, LOSS OF 3D 4KV BUS</p>
	BOP	<p>Step 1 - Checks 3D 4KV Bus Lockout Relay - RESET</p> <p>Step 2 - Checks 3A and 3B 4KV Buses energized</p> <p>Step 3 - Disconnects Loads from 3D 4KV Bus</p> <p>a. 3C ICW pump and 3C CCW pump.</p> <p>Step 4 - Consults with ANPS to determine source or power for 3D 4KV Bus, Desired source is 3A 4KV Bus.</p> <p>Step 5 - Reenergizes 3D 4KV Bus from 3A 4KV Bus</p> <p>a. Open feeder bkr to 3D 4KV Bus, 3AB19</p> <p>b. Open supply bkr from 3D 4KV Bus, 3AD06</p> <p>c. Close supply bkr from 3A 4KV Bus, 3AD01</p> <p>d. Close feeder bkr 3D 4KV Bus, 3AA17</p>

Op-Test No.: 1 Scenario No.: 1 Event No.: 4 Page 11 of 27

Event Description: Loss of 3D 4KV bus (bkr 3AD06 opens) which results in loss of power to 3C ICW Pump and Annunciator "I 4/4" ICW HEADER A/B LO PRESS.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Step 6 - Goes to Step 8 per this step.</p> <p>Step 8 - Verifies 3D 4KV Bus is aligned to an energized bus</p> <p>Step 9 - Locally verifies no breaker targets exist on the 3D 4 kv bus breakers.</p> <p>Step 10 - Restart required components supplied by 3D 4KV Bus as directed by the ANPS.</p> <p>– May restart 3C ICW pump and place 3A ICW pump in standby.</p>
	ANPS	Recognize loss of 3D 4KV bus and goes to 3-ONOP-004.5, LOSS OF 3D 4KV BUS
	ANPS	<p>Determines 3A 4KV bus as desired power source for reenergizing 3D 4KV Bus (3-ONOP-004.5 step 4.c)</p> <p>Identifies required components supplied by 3D 4KV Bus to be restarted (3-ONOP-004.5 step 10)</p>
	ANPS	Refer to Tech Spec 3.7.2 and 3.7.3
	ANPS	Maintains command and control of evolution.
	RCO	Assists BOP as directed by the ANPS

Event Description: Charging pump 3A fails due to bearing failure.

Time	Position	Applicant's Actions or Behavior
	<b>RCO</b>	<p>Responds to Annunciator "A-6/1", CHARGING PUMP A MOTOR OVERLOAD.</p> <p>Step 1 - Verifies alarm by checking if 3A charging pump has tripped.</p>
	<b>RCO</b>	<p>Responds to Annunciator A-5/1, CHARGING PUMP A TRIP.</p> <p>Step 1 - Verifies alarm by checking charging pump is tripped and reduced charging flow</p> <p>Step 2</p> <ol style="list-style-type: none"> <li>Verifies adequate suction source, VCT level &gt; 4% and flow path</li> <li>N/A because no other charging pumps are available.</li> <li>Takes 3A pump switch to STOP.</li> <li>Tells ANPS to refer to T.S.</li> <li>Refers to 3-ONOP-047.1, LOSS OF CHARGING FLOW IN MODES 1 THROUGH 4</li> </ol>
	<b>RCO</b>	<p>Performs actions of 3-ONOP-047.1 as directed by ANPS:</p> <p>Step 4.1 - N/A because no other charging pumps are available (Immed. Action).</p> <p>Step 4.2 - Isolate the 60 GPM letdown orifice (Immed. Action).</p> <p>Step 4.3 - N/A because Excess L/D is not in service.</p>
	<b>ANPS</b>	Dispatch an operator to determine cause of Charging Pump failure. (3-ONOP-047.1 step 5.1)
	<b>ANPS</b>	Refers to Tech Spec 3.1.2.1; 3.1.2.2; and 3.1.2.3
	<b>ANPS</b>	Maintains command and control of evolution.
	<b>BOP</b>	Assists RCO as directed by the ANPS

Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Page 13 of 27

Event Description: Median Tavg fails high

Time	Position	Applicant's Actions or Behavior
	RCO	Performs actions of ARP B-4/4:  Step 1 - Determine that median Tavg has failed high by instrument checks
	RCO	Takes manual control of rods to prevent continued insertion (ARP B-4/4 step 3.a and ARP B-8/1 step 2.a Immediate action step 4.3.1 of 3-ONOP-028, Reactor Control System Malfunction)
	RCO	Takes manual control of the Master Charging Pump Controller or individual Charging Pump Controller (ARP A-9/3 step 2.a and Immediate action step 4.2 of 3-ONOP-041.6, Pressurizer Level Control Malfunction)
	RCO	a. Adjust rods to maintain Tavg equal to Tref (3-ONOP-028 step 5.4.1)  b. Notify I&C department to investigate failure (3-ONOP-028 step 5.4.2)  c. Operates rods in manual until problem is corrected. (3-ONOP-028 step 5.4.3)
	ANPS	Notify I&C department to investigate failure (3-ONOP-028 step 5.4.2)
	ANPS	Refers to Tech Spec 3.3.1, 3.1.1.4, 3.2.1.1, and 3.2.5
	ANPS	Maintains command and control of evolution.
	BOP	Assists RCO as directed by the ANPS

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 14 of 27

Event Description: S/G 3A Narrow Range level [LT-478] fails high

Time	Position	Applicant's Actions or Behavior
	<b>BOP</b>	<p>Carries out the actions of 3-ARP-097.CR for ANN. "C 6/1"</p> <ol style="list-style-type: none"> <li>1. Identifies LI-3-478 failed high by comparison to programmed level and determines alarm not valid</li> <li>2. Manually controls 3A S/G Feed Reg Valve returning 3A S/G level to program</li> <li>3. When directed by ANPS, verifies LT-3-476 operable and selects it for 3A S/G level control</li> <li>4. When directed by ANPS, verifies 3A S/G level near program &amp; returns 3A S/G Feed Reg Valve to auto</li> <li>5. Informs ANPS of plant status</li> </ol>
	<b>ANPS</b>	Directs BOP to respond per ARP "C 6/1".
	<b>ANPS</b>	When S/G actual is matched to program level, directs BOP to select LT-3-476 for level control.
	<b>ANPS</b>	Refers to T.S. 3.3.1 and 3.3.3. Recognizes that LT-3-478 is not a safety channel. Does <u>not</u> trip any bistables.
	<b>RCO</b>	Assists BOP as directed by the ANPS.

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Page 15 of 27

**Event Description:** Dual Unit Loss of Offsite Power (LOOP) with 2 stuck rods and 3C MSR steam stop valve stuck open. Also 3B CCW pump will have a sheared shaft. After transition to ES-0.1, EDG 3B trips once charging flow is restored per step 4.

Time	Position	Applicant's Actions or Behavior
	RCO	Identify Unit 3 LOOP and Rx trip. Inform crew.
	ANPS	Direct crew in performance of EOP's.
	RCO/ BOP	<p>Perform Immediate Actions of E-0 (1<sup>st</sup> four steps - may also be performed in parallel with BOP):</p> <p>Verify Rx trip:</p> <ul style="list-style-type: none"> <li>- checks all rod bottom lights ON and identifies 2 rods stuck out. (No immediate action required now, so may not report this fact until ES-0.1)</li> <li>- notes RTB's and bypass breakers are open.</li> <li>- notes all RPI's indicate "zero" except for 2 stuck rods.</li> <li>- confirms that neutron flux is decreasing on PRNI's and IRNI's.</li> </ul>
	BOP/ RCO  <b>Critical</b>	<p>Verify Turbine trip:</p> <ul style="list-style-type: none"> <li>- checks all turbine stop valves are closed.</li> <li>- checks all MSR steam valves CLOSED and identifies 3C MSR stop valve did not close. Per RNO attempts to manual close the stop valve. When this does not work, operator must close <u>all</u> MSIV's and <u>bypass</u> valves.</li> <li>- checks Mid and East GCB's open after 30 second delay.</li> </ul>
	BOP/ RCO	<p>Verify Power to Emergency 4KV buses:</p> <ul style="list-style-type: none"> <li>- checks both "A" and "B" 4KV buses are energized.</li> <li>- checks the "D" 4KV bus is aligned to an energized 4KV bus.</li> <li>- checks Load Centers 3A, 3B, 3C, 3D &amp; 3H are energized.</li> </ul>
	RCO/ BOP	<p>Check if SI is Actuated:</p> <ul style="list-style-type: none"> <li>- identifies no SI annunciator is ON.</li> <li>- identifies no SI equipment auto started</li> </ul>

**Event Description:** → Dual Unit Loss of Offsite Power (LOOP) with 2 stuck rods and 3C MSR steam stop valve stuck open. Also 3B CCW pump will have a sheared shaft. After transition to ES-0.1, EDG 3B trips once charging flow is restored per step 4.

Time	Position	Applicant's Actions or Behavior
	RCO	May isolate letdown flow due to initial loss of charging flow during the LOOP and/or due to initiating Emergency Boration flow.
	ANPS	Determines that no SI is present <u>nor</u> is required.  Directs RNO actions of E-0, step 4, to stabilize plant: <ul style="list-style-type: none"> <li>- Tavg 543° to 550°</li> <li>- PZR pressure 2220 psig to 2250 psig</li> <li>- AFW flow &gt; 345 gpm until S/G levels 6% to 50%</li> <li>- monitor proper steam dump operation</li> <li>- close MFW isolation MOVs</li> </ul>
	<b>Critical</b>	Transition to ES-0.1, step 1.  Monitors Critical Safety Functions using 3-EOP-F-0.
	RCO/ BOP	Monitor foldout page criteria immediately upon entering ES-0.1.
	RCO	Informs ANPS of 2 stuck rods. Reports that foldout page directs Emergency Boration per 3-ONOP-046.1 until termination criteria met.
	ANPS <b>Critical</b>	Directs RCO to Emergency Borate RCS per 3-ONOP-046.1 while continuing to direct actions of ES-0.1.
	RCO	Commences Emergency Boration per foldout page and/or ANPS direction. <b>(See Event 8A actions)</b>
	BOP	Checks at least two AFW pumps running.
	BOP	Maintain RCS Cold Leg Temperature <ul style="list-style-type: none"> <li>- checks Tc ≥ 525°F</li> <li>- checks Tc stable at 547°F <u>or</u> trending to 547°F <u>or</u> stable at post trip value (&lt; 547°F).</li> </ul>

**Event Description:** Dual Unit Loss of Offsite Power (LOOP) with 2 stuck rods and 3C MSR steam stop valve stuck open. Also 3B CCW pump will have a sheared shaft. After transition to ES-0.1, EDG 3B trips once charging flow is restored per step 4.

Time	Position	Applicant's Actions or Behavior
	BOP	Check Feedwater Status: <ul style="list-style-type: none"> <li>- checks RCS average temperatures &lt; 554°F</li> <li>- stops all but one main feedwater pump</li> <li>- verifies main feedwater flow control valves CLOSED</li> <li>- verifies feedwater isolation valves CLOSED (MOV-3-1407, 1408, 1409).</li> <li>- verifies all S/G levels &gt; 6% NR</li> </ul>
	RCO	Verify All Control Rods - Fully Inserted <ul style="list-style-type: none"> <li>- identifies 2 control rods stuck full out</li> <li>- initiates Emergency Boration per 3-ONOP-046.1. (See Event 8A actions)</li> </ul>
	<b>EXAM NOTE:</b>	<p>Once RCO has initiated Emergency Boration flow, the loss of 3B EDG event should be implemented at this point. (See Event 8B for RCO actions when loss of charging flow is identified)</p> <p>ANPS and BOP will continue in ES-0.1.</p>
	ANPS	Continues to direct action per Step 5, ES-0.1.
	BOP	Recognizes and reports loss of 3B EDG to ANPS.
	RCO	Verify Charging - In Service: <ul style="list-style-type: none"> <li>- Recognizes and reports loss of 3B Charging Pump (as well as <u>ALL</u> charging flow), due to 3B EDG loss, to ANPS.</li> </ul> <p>May recommend implementation of 3-ONOP-047.1 to respond to the loss of all charging.</p>
	ANPS	Directs RNO actions for Step 5, ES-0.1.



Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Page 18 of 27

**Event Description:** Dual Unit Loss of Offsite Power (LOOP) with 2 stuck rods and 3C MSR steam stop valve stuck open. Also 3B CCW pump will have a sheared shaft. After transition to ES-0.1, EDG 3B trips once charging flow is restored per step 4.

Time	Position	Applicant's Actions or Behavior
	RCO	Performs RNO actions of Step 5, ES-0.1, per ANPS direction: <ul style="list-style-type: none"> <li>- verifies VCT makeup set for auto control</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>- checks off-site power, confirms off-site power not available and reports that 3B EDG is not available</li> <li>- checks adequate 3B EDG capacity, reports that loading capacity is not the cause of the charging problem.</li> <li>- reports that shedding non-essential loads will not improve or correct problem with 3B EDG</li> </ul>
	RCO	<ul style="list-style-type: none"> <li>- when asked about starting one Charging Pump, reports none are available until power is restored to 3B 4KV bus</li> <li>- when asked about adjusting charging flow with HCV-3-121 and charging pump speed, reports the action is not applicable due to loss of all charging pumps</li> </ul>
	ANPS	<p>Because charging flow can not be established, directs RCO to perform actions of 3-ONOP-047.1 to establish SI flow <u>while continuing to direct actions of ES-0.1.</u></p> <p>Dispatches an NPO to check out 3B EDG.</p>
	BOP	<p>Check PZR level &gt; 15%:</p> <ul style="list-style-type: none"> <li>- PZR level will reach this level</li> <li>- ANPS directs RNO actions</li> </ul> <p>RNO Actions:</p> <ul style="list-style-type: none"> <li>- verifies letdown isolated</li> <li>- verifies excess letdown isolated</li> <li>- verifies PZR heaters OFF</li> <li>- acknowledges need to control charging to restore PZR level &gt; 15%</li> </ul>

**Event Description:** Dual Unit Loss of Offsite Power (LOOP) with 2 stuck rods and 3C MSR steam stop valve stuck open. Also 3B CCW pump will have a sheared shaft. After transition to ES-0.1, EDG 3B trips once charging flow is restored per step 4.

Time	Position	Applicant's Actions or Behavior
	ANPS	Notes that once PZR level is restored to > 15%, Steps 7 & 8 of ES-0.1 must be performed.  Continues to Step 9.
	BOP	Verify All 4 KV Buses Energized by Offsite Power (A, B, D & C buses): <ul style="list-style-type: none"> <li>– reports that none of the buses are energized by offsite power</li> <li>– ANPS directs RNO actions</li> </ul> RNO Actions: <ul style="list-style-type: none"> <li>– verifies at least 2 ICW pumps running</li> <li>– verifies at least 1 CCW pump running</li> </ul>
	ANPS	<ul style="list-style-type: none"> <li>– calls System Dispatcher to restore offsite power to Unit 3 startup transformer <u>and</u> 3C transformer</li> <li>– notes that once offsite power is restored, then offsite power to the 4 KV buses will be restored using 3-ONOP-004.1</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>– checks that 3A EDG capacity is adequate to run one computer room chiller</li> <li>– starts one computer room chiller</li> </ul>
	ANPS	Continues ES-0.1 at Step 10.
	BOP	Verify PZR Backup Group Heater Lockouts - RESET: <ul style="list-style-type: none"> <li>– verifies A 4KV bus energized</li> <li>– checks and reports that offsite power <u>was</u> lost to A 4KV bus</li> <li>– ANPS directs RNO actions</li> </ul>

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Page 20 of 27

**Event Description:** Dual Unit Loss of Offsite Power (LOOP) with 2 stuck rods and 3C MSR steam stop valve stuck open. Also 3B CCW pump will have a sheared shaft. After transition to ES-0.1, EDG 3B trips once charging flow is restored per step 4.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>RNO Actions:</p> <ul style="list-style-type: none"> <li>- places group A PZR backup group heater control switch to OFF</li> <li>- directs NPO to go to Unit 3 West Electrical Penetration room</li> <li>- directs NPO to reset group A backup PZR heater lockout relay</li> <li>- ANPS returns to Step 10, Expected Actions</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>- checks and reports B 4KV bus is <u>not</u> energized from startup transformer</li> <li>- ANPS directs RNO actions:</li> </ul> <p>RNO Actions:</p> <ul style="list-style-type: none"> <li>- places group B PZR backup group heater control switch to OFF</li> <li>- directs NPO to get Key 29 and go to 3D Load Center room</li> <li>- directs NPO to place PZR backup heater 3B key switch to EMERGENCY</li> <li>- ANPS returns to Step 10, Expected Actions</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>- checks and reports that neither A nor B 4KV buses are energized by offsite power</li> <li>- ANPS directs RNO actions:</li> </ul> <p>RNO Actions:</p> <ul style="list-style-type: none"> <li>- checks EDG capacity and reports that 3A EDG capacity is adequate</li> <li>- 3B EDG is still tripped</li> <li>- ANPS continues with Step 11</li> </ul>



Op-Test No.: 1 Scenario No.: 1 Event No.: 8APage 22 of 27Event Description: Two adjacent control rods stick full out on Rx Trip. Perform Emergency Boration per 3-ONOP-046.1.

Time	Position	Applicant's Actions or Behavior
	RCO	Perform actions of 3-ONOP-046.1, Emergency Boration.
	RCO	Initiate Emergency Boration of RCS: <ul style="list-style-type: none"><li>- checks one charging pump operating. Identifies none are running. Recalls 3A Charging Pump is inoperable (Event 5) and restarts 3B Charging Pump.</li><li>- turns Makeup Control Switch to STOP</li><li>- manually starts either Boric Acid Pump 3A or 3B</li><li>- opens Emergency Boration Valve, MOV-3-350</li><li>- opens Charging Flow to Regen HX valve, HCV-3-121</li><li>- opens Loop A Charging Isolation valve, CV-3-310A</li><li>- establishes emergency boration flow:<ul style="list-style-type: none"><li>• FI-3-110 : &gt; 60 gpm</li><li>• FI-3-122: &gt; 45 gom</li></ul></li></ul>
	RCO	NOTE: May isolate letdown flow due to initial loss of charging flow during the LOOP and/or due to initiating Emergency Boration flow.
	RCO	Stop any Charging Pump operating on full flow recirculation: <ul style="list-style-type: none"><li>- recognizes that only one Charging Pump is operational and that one is being used for Emergency Boration</li><li>- continues to next step</li></ul>
	RCO	Respond to Reactivity Increase at Power: <ul style="list-style-type: none"><li>- notes that power is below the Point of Adding Heat</li><li>- performs RNO and goes to Step 4</li></ul>

Op-Test No.: 1 Scenario No.: 1 Event No.: 8APage 23 of 27

Event Description: Two adjacent control rods stick full out on Rx Trip. Perform Emergency Boration per 3-ONOP-046.1.

Time	Position	Applicant's Actions or Behavior
	RCO	Determine Stuck Rod Criteria following Rx Trip: <ul style="list-style-type: none"><li>– notes ONOP was entered from EOP network</li><li>– confirms 2 or more rods are still stuck out</li><li>– notes that boration must continue at <math>\geq 60</math> gpm for at least 78 minutes (39 minutes per stuck rod using BAST water)</li></ul>
	RCO	Determine Uncontrolled Cooldown Criteria following Rx Trip: <ul style="list-style-type: none"><li>– checks RCS average temperature and identifies it is <math>&gt; 525^{\circ}\text{F}</math></li><li>– perform RNO and goes to Step 7</li></ul>
	RCO	Stop Dilution: <ul style="list-style-type: none"><li>– verifies FCV-3-114A is CLOSED</li><li>– notes that power is below Point of Adding Heat</li><li>– notes that boration must continue at <math>\geq 60</math> gpm for 9 minutes using the BAST water</li><li>– confirms that dilution is STOPPED</li></ul> <p>NOTE: Applicant should recognize that stuck rod criteria (above) is more limiting</p>
	RCO	Reports to ANPS that Emergency Boration has been implemented per 3-ONOP-046.1 and that boration must continue for a total of 78 minutes from initiation.
	RCO	Performs actions as directed by ANPS.  (See either Event 8 or Event 8B actions depending on when this action is completed)

Op-Test No.: 1 Scenario No.: 1 Event No.: 8BPage 24 of 27Event Description: 3B EDG trip (after charging flow is initiated per ES-0.1, Step 4)

Time	Position	Applicant's Actions or Behavior
	RCO	Performs Immediate Actions per 3-ONOP-047.1 (Steps 4.1 - 4.3):  Attempts to reestablish charging: <ul style="list-style-type: none"><li>- notes that no operable charging pumps are available</li><li>- notes that no other charging pumps are available</li><li>- continues to next step</li></ul>
	RCO	Isolates Letdown by Closing the following Orifice Isolation Valves: <ul style="list-style-type: none"><li>- if not done earlier, closes valves CV-3-200A, 200B &amp; 200C</li></ul>
	RCO	Closes Excess Letdown and RCP Seal Return Isolation Valve, MOV-3-6386.
	RCO	Performs Subsequent Actions per 3-ONOP-047.1.  Dispatch operator to determine cause of Charging Pump failure: <ul style="list-style-type: none"><li>- recognizes cause of Charging Pump failure is due to 3B EDG loss</li><li>- ensures an NPO is sent to check out 3B EDG</li><li>- may also send an NPO to check out 3B Charging Pump</li><li>- may also call Electrical Dept. to expedite 3C Charging Pump restoration</li></ul>
	RCO	Informs ANPS of need to refer to 0-EPIP-20101 for Emergency Coordinator duties.
	RCO	Checks that Rx is shutdown and goes to Step 5.17, ONOP-047.1.

Op-Test No.: 1 Scenario No.: 1 Event No.: 8B Page 25 of 27

Event Description: 3B EDG trip (after charging flow is initiated per ES-0.1, Step 4)

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Shutdown Rx as follows:</p> <p>Observes NOTE regarding use of E-0.</p> <p>Performs the following:</p> <ul style="list-style-type: none"> <li>- verifies Rx power &lt; 5%</li> <li>- verifies Tav<sub>g</sub> stable</li> <li>- identifies PZR level is not stable, but slowly decreasing</li> <li>- verifies S/G levels are stable</li> <li>- records time and Control Bank D rod position just before Rx trip in RCO log</li> <li>- observes NOTE before Step 5.17.1.6 and recognizes that action to correct the 2 stuck control rods is in progress</li> <li>- informs ANPS of need to assess adequate SDM</li> <li>- recognizes that RTBs and bypass breakers are already open and all but 2 rod bottom lights are lit</li> </ul>
	RCO	<p>Performs the following actions once Rx power reaches <math>5 \times 10^{-11}</math> amps:</p> <ul style="list-style-type: none"> <li>- verifies "POWER ABOVE P-6" status light goes out</li> <li>- verifies the "10<sup>5</sup> CPS TRIP BLOCKED" status light goes out</li> <li>- verifies SR hi voltage re-energizes</li> <li>- selects which SR channel(s) to monitor on NIS recorder</li> <li>- recognizes that SR channels automatically reinstated as required and that 3-ONOP-059.7 does not need to be implemented</li> </ul>
	RCO	<p>Verifies the S/G Steam Dump to Atmosphere Valves open as required to maintain Tav<sub>g</sub> at 547°F</p>



Op-Test No.: 1 Scenario No.: 1 Event No.: 8B Page 26 of 27

Event Description: 3B EDG trip (after charging flow is initiated per ES-0.1, Step 4)

Time	Position	Applicant's Actions or Behavior
	RCO	Closely Monitors the following parameters: <ul style="list-style-type: none"> <li>- containment pressure</li> <li>- containment sump level</li> <li>- containment radiation (R-3-11 &amp; R-3-12)</li> </ul>
	RCO	Notes that if a substantial increase in the above parameters occurs, a manual SI is required and E-0 must be entered.
	RCO	Observes CAUTIONS before Step 5.21. Notes that cautions 2 - 5 are applicable to this condition.  Evaluates if PZR spray is available to depressurize the RCS. <ul style="list-style-type: none"> <li>- determines that no RCPs are running due to the LOOP event</li> <li>- goes to next step</li> </ul>
	RCO	Because PZR spray is not available, performs the following actions: <ul style="list-style-type: none"> <li>- manually initiates Containment Isolation Phase A</li> <li>- depressurizes the RCS to 1950 psig using a PZR PORV</li> </ul>
	RCO	Verifies permissive to block "BLOCK LOW PZR PRESS SI" status light is on.
	RCO	Blocks the Low PZR Pressure SI signal.
	RCO	Verifies the "LOW PZR PRESS SI BLOCKED" status light is on.
	RCO	Opens the HHSI Cold Leg Injection Valve, MOV-3-843A.

Op-Test No.: 1 Scenario No.: 1 Event No.: 8B Page 27 of 27

Event Description: 3B EDG trip (after charging flow is initiated per ES-0.1, Step 4)

[illegible]

Op-Test No.: 1 Scenario No.: 1 - Event No.: 8B Page 27 of 27

Event Description: 3B EDG trip (after charging flow is initiated per ES-0.1, Step 4)

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Observes NOTE before Step 5.27.</p> <p>Starts the 3A SI Pump.</p> <p><b>(3B SI Pump not available due to loss of 3B EDG)</b></p>
	RCO	<p>Observes CAUTION before Step 5.28 regarding need to closely monitor PZR level and FI-3-943 to identify SI pump injection.</p> <p>Continues to depressurize the RCS using a PZR PORV until one of the following conditions occurs:</p> <ul style="list-style-type: none"> <li>- PZR level increasing</li> <li>- flow indication thru FI-3-943</li> <li>- RCS pressure reaches 1350 psig</li> <li>- RCS subcooling based on CETs is &lt; 30°F</li> </ul>
	RCO	<p>Observes NOTE before Step 5.29 regarding RCS pressure increasing as PZR level increases. Controls pressure at SI injection pressure using PORV.</p> <p>When PZR level approaches 30% of span, closes MOV-3-843A.</p>
	RCO	Stops HHSI pump and places in STANDBY.
	<b>Terminating Cue:</b>	<b>Once RCO achieves one of the above conditions, the scenario may be terminated at Examiner discretion.</b>

Procedure No.:

0-ADM-202

Procedure Title:

Shift Relief and Turnover

Page:

16

Approval Date:

8/17/99

## ATTACHMENT 1

(Page 1 of 2)

## NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST

Relief Time: XX:XXDate: XX/XX/XXOff-going NPS: Taylor

Oncoming NPS: \_\_\_\_\_

Off-going U-3 ANPS: K. Miller

Oncoming U-3 ANPS: \_\_\_\_\_

Off-going U-4 ANPS: Adamson

Oncoming U-4 ANPS: \_\_\_\_\_

Oncoming SRO assigned ANPS ONOP-105 duties: \_\_\_\_\_

U-3 Mode 1 Power Level 75% U-4 Mode 1 Power Level 100**PART 1 - To be completed by Off-going NPS/ANPS****Unit 3 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

-3C Charging Pump OOS - Motor ground - No TS LCO entry yet. (TS 3.1.2.3) - Clearance info tag hung  
 - Condenser steam dump mode selector in MANUAL - TC-3-408 H OOS. - Caution tag hung

**Unit 3 Evolutions (Completed, In Progress, Planned)**

-3-GOP-301 in use for return to 100% power following 3B SGFP maintenance - procedure complete thru step 5.94. Power on hold at 75% for shift turnover. 3B SGFP testing complete & back in service  
 -Need to fill 3B Accumulator - see below.

**Unit 3 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

-Need to fill 3B Accumulator - ann. H-4/2 in for low level. Increase level back into green band after shift turnover. Cause of slow level drop under investigation. 3-OP-064 provided.  
 -Condenser steam dumps in MANUAL (see above). - ann - C-8/3 in.

**Unit 4 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

No equipment out of service

**Unit 4 Evolutions (Completed, In Progress, Planned)**

Maintain 100% power.

**Unit 4 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

None.

## ATTACHMENT 1

**(Page 2 of 2)**

**NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST**

### Common Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)

No equipment out of service.

## Common Evolutions and Common General Information

None planned - no info of note.

**PART 2 - To be reviewed by Oncoming NPS/ANPS/WCCS prior to shift relief (Check box)**

<u>NPS</u>	<u>U-3 ANPS</u>	<u>U-4 ANPS</u>	<u>WCCS</u>	<u>ANPS In WCC</u>	#	<u>NPS</u>	<u>U-3 ANPS</u>	<u>U-4 ANPS</u>	<u>WCCS</u>	<u>ANPS In WCC</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Control Room Deficiency Logs
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All EOOS Logs
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Special Instruction Book
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Watch stander OOS Book
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In compliance with license restriction, if any*
											Review Clearances Issued for last 24 hours
											Both RCO Logbooks
											Night Order Book
											Controlled Key Log
											SCBA corrective lenses readily available if corrective lenses required by license*

**Shift Responsibility Turned Over By (a) And Accepted By (b):**

**NPS (sign) (a)**

(b)

**U-3 ANPS (sign) (a)** \_\_\_\_\_

(b)

**U-4 ANPS (sign) (a)** \_\_\_\_\_

(b)

**WCCS**

(b)

## ANPS in WCC

(b)

**PART 3 - To be reviewed/accomplished by NPS/ANPS shortly after assuming shift (Check box)**

	U-3	U-4	
<u>NPS</u>	<u>ANPS</u>	<u>ANPS</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Red Book (Surveillance Requirements)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduct Shift Briefing (include Night Orders, Special Instructions, Operator Work Around Aggregate Effects)

**PART 4 - To be reviewed/accomplished by NPS/ANPS prior to the end of the shift (Check box)**

	U-3 ANPS	U-4 ANPS	Task
<input type="checkbox"/>			Check all shift mailboxes for unresolved Tech Spec related procedure problems (midshift only)
<input type="checkbox"/>		<input type="checkbox"/>	Update Red Book (Surveillance Requirements)
<input type="checkbox"/>		<input type="checkbox"/>	Review and sign Operator Logs

\* Required prior to accepting the shift responsibility

Procedure No.:  <b>0-ADM-202</b>	Procedure Title:  <b>Shift Relief and Turnover</b>	Page: <b>19</b> Approval Date: <b>8/17/99</b>
--	--	--

**ATTACHMENT 3**  
(Page 1 of 1)  
**RCO - UNIT DUTY**  
**SHIFT RELIEF CHECKLIST**

Relief Time: xx:xx Date: xx/xx/xx Unit # 3  
Off-going RCO: (print name) Robertson Oncoming RCO: (print name) \_\_\_\_\_

**PART 1 - To be completed by Off-going RCO**

Unit 3 Mode: 1 75 % Power \* 539 Gross MWe \*(<sup>\*</sup> Record N/A in Modes 2-6)  
Unit 4 Mode: 1 100 % Power \* 752 Gross MWe \*(<sup>\*</sup> Record N/A in Modes 2-6)  
Source Range: N31 or N32 N/A cps \*\* Intermediate Range: N35 or N36 N/A amp\*\*  
(\*\*Record "N/A" in Mode 1)

Tavg 566 °F Pressure 2240 psig RCS Boron 770 ppm  
RCS Leakage 0.02 gpm Determined Date xx/xx/xx Time xx:xx  
GRP in progress # N/A Tank # N/A LRP in progress # N/A Tank # N/A  
Cmtt Purge Permit in progress # N/A  
WTP ☐ OOS ☒ In Service to DWST

Boric Acid Storage Tk Levels A 7400 B 7400 C 7400

Accumulator Reference Level/Date A 6640 / xx/xx/xx B 6555 / xx/xx/xx C 6635 / xx/xx/xx

**Abnormal Annunciator Status Reason:**

H-2/4 3B cold leg accumulator slow level decrease - cause under investigation. Fill after shift turnover back into green band. 3-OP-064 provided.  
C-8/3 Condenser steam dump mode selector switch → MANUAL. TC-3-408H under repair. Caution tag hung.

**Major EOOS/LCOs:**

- 3C charging pump OOS - motor ground - TS 3.1.2.3 LCO not entered. - clearance info tag hung.  
- TC-3-408H - see ann. C-8/3 item above.

**Operations, Procedures, Transients, or Significant Maintenance in Progress:**

- Returning to 100% power following 3B SGFP maintenance (repairs + testing complete). Power discussion on hold @ 75% for shift turnover - 3-GOP-301 complete thru step 5.94  
- Refill 3B cold leg accumulator - see above

**PART 2 - To be Reviewed/completed by Oncoming RCO prior to shift relief (Check box)**

- |  |   |
|--|---|
| <input type="checkbox"/> RCO Logbook   | <input type="checkbox"/> In compliance with license restrictions, if any*   |
| <input type="checkbox"/> RCO Logs Abnormal/Noted readings  | <input type="checkbox"/> SCBA corrective lenses readily available if corrective lenses required by license*   |
| <input type="checkbox"/> TSA Logbook   | <input type="checkbox"/> If on overtime this shift or on overtime on the next shift in this position, or if a shift trade is involved, sign overtime sheet* |
| <input type="checkbox"/> Walk Down Control Boards  | <input type="checkbox"/> Control Room Deficiency Log  |
| <input type="checkbox"/> Clearance Book (in Modes 1-4) for clearances issued since last shift worked.    | <input type="checkbox"/> EOOS Logbooks (All)  |
| (No check required in Modes 5-6)   | <input type="checkbox"/> Watch Station Cleanliness  |
| <input type="checkbox"/> Watchstander Out-of-Service Book  | <input type="checkbox"/> Special Instruction Book   |
| <input type="checkbox"/> Check blending station controllers are set for current RCS boron concentration. | <input type="checkbox"/> Review Annunciator Status Sheets   |

\* Required prior to accepting shift responsibility.

Shift Responsibility Turned Over By: \_\_\_\_\_

Shift Responsibility Accepted By: \_\_\_\_\_

\*/MBS/dt/bvc/bvc

0-OP-046

CVCS - Boron Concentration Control

Approval Date:

8/8/00

## ATTACHMENT 5

(Page 1 of 3)

## REACTIVITY WORKSHEET

**NOTE***Boric Acid Thumb Rules are as follows:*

10pcm = 1ppm

10 gallons = 1ppm

1 gallon = 1pcm

**PART 1: Power Change Only (N/A if not applicable)**1) **Rod Worth (A)**

Plant Curve Book, Section 2, Figure 5

Withdrawal rods = plus (+) reactivity

Insert rods = minus (-) reactivity

Calculate change in rod worth as follows:

$$\begin{array}{rcl}
 [ \underline{71} \text{ pcm} ] & - & [ \underline{0} \text{ pcm} ] = (+/-) \underline{71} \text{ pcm} \\
 \text{Present Rod Worth} & - & \text{Desired Rod Worth} = (+/-) \text{ (A)}
 \end{array}$$

2) **Power Defect (B)**

Plant Curve Book, Section 2, Figure 6A

Raise Power = minus (-) reactivity

Lower Power = plus (+) reactivity

Calculate change in power defect as follows:

$$\begin{array}{rcl}
 [ \underline{1386} \text{ pcm} ] & - & [ \underline{1801} \text{ pcm} ] = (+/-) \underline{415} \text{ pcm} \\
 \text{Present Pwr Defect} & - & \text{Desired Pwr Defect} = (+/-) \text{ (B)}
 \end{array}$$

3) **Calculate the Desired Change in pcm (C)**

$$\begin{array}{rcl}
 [ (+/-) \underline{71} \text{ pcm} ] & + & [ (+/-) \underline{415} \text{ pcm} ] = (+/-) \underline{344} \text{ pcm} \\
 \text{(A)} & & \text{(B)} \quad \quad \quad \text{(C)}
 \end{array}$$

75 → 100%

11/30/00  
00/00/11  
11/29/00  
2 JAN 2  
XIX NRC  
XIX NRC

## ATTACHMENT 5

(Page 2 of 3)

## REACTIVITY WORKSHEET

## 4) Integral Boron Worth

Plant Curve Book, Section 2, Figure 7A

Boration = minus (-) reactivity

Dilution = plus (+) reactivity

Calculate Desired Boron Concentration ( $C_B$ ) as follows:Check current boron concentration ( $C_B$ ) = ppm

$$[(-) \underline{6982} \text{ pcm}] - [(+) \underline{344} \text{ pcm}] = (+) \underline{6638} \text{ pcm}$$

$$\text{Present boron worth (C)} = \text{Desired boron worth}$$

$$\text{from Sect 2, Fig 7A}$$

Determine desired  $C_B$  from Section 2, Figure 7A = 730 ppm**NOTE**

50,790 is the nominal volume of the RCS and the CVCS. BAST ppm is the most recent BAST concentration or a nominal value of 5664 ppm.

- 5) **IF** desired Boron Concentration is less than the current Boron Concentration, **THEN** calculate the dilution required as follows:

$$50,790 \times \ln \left[ \frac{\text{Current } C_B \text{ in ppm}}{\text{Desired } C_B \text{ in ppm}} \right] = \text{Gallons of Primary Water}$$

$$50,790 \times \ln \left[ \frac{\underline{770} \text{ ppm}}{\underline{730} \text{ ppm}} \right] = \underline{2709} \text{ Gallons of Primary Water}$$

- 6) **IF** desired Boron Concentration is higher than the current Boron Concentration, **THEN** calculate the boration required as follows:  $\mu\text{A}$

$$50,790 \times \ln \left[ \frac{[\text{BAST ppm}] - [\text{Present RCS ppm}]}{[\text{BAST ppm}] - [\text{Desired RCS ppm}]} \right] = \text{Gal of Boric Acid}$$

$$50,790 \times \ln \left[ \frac{[\text{ } \text{ ppm}] - [\text{ } \text{ RCS ppm}]}{[\text{ } \text{ ppm}] - [\text{ } \text{ RCS ppm}]} \right] = \text{ } \text{ Gallons Gal of Boric Acid}$$



0-OP-046

CVCS - Boron Concentration Control

Approval Date:

8/8/00

## ATTACHMENT 5

(Page 3 of 3)

## REACTIVITY WORKSHEET

## PART 2: Temperature Change Only (N/A if not applicable) N/A

1) Temperature change requirements

To raise temperature, refer to Plant Curve Book, Section 3, Figure 2B.

To lower temperature, refer to Plant Curve Book, Section 2, Figures 9 and 9A.

Determine desired temperature change: (+/-) \_\_\_\_\_ °F

To dilute: [ \_\_\_\_\_ °F ] x [ \_\_\_\_\_ gal/°F ] = \_\_\_\_\_ gal Water  
Sect 3, Fig 2BTo borate: [ \_\_\_\_\_ °F ] x [ \_\_\_\_\_ pcm/°F ] = \_\_\_\_\_ pcm  
Sect 2, Fig 9/9A

[ \_\_\_\_\_ pcm ] x [ gal/pcm ] = \_\_\_\_\_ gal of Boric Acid

FINAL PAGE

# MASTER

Appendix D

Scenario Outline

Form ES-D-1

Facility: Turkey Point	Scenario No.: <u>2</u>	Op-Test No.: <u>1</u>
Examiners: <u>C. Payne</u> <u>M. Sykes</u> <u>M. Miller</u>	Operators: _____ (Position) _____	
Initial Conditions: Mode 1, 75% RTP (IC-16)		
Turnover: Power level is at 75% RTP. Equipment OOS --- Charging Pump 3C is out of service for motor ground (at this power both Charging Pumps 3A & 3B will be running), I&C has Steam Dump selector switch selected to the MANUAL (Steam Pressure) mode due to problem with TC-408H, Circ Water pump 3B2 is secured to repair breaker 3AB18. Need to add 5000 gallons of borated water to RWST.		

Event No.	Malf. No.	Event Type*	Event Description
1		N/RCO	Make-up 5000 gal of borated water to RWST. (0-OP-046, section 7.5)
2		I/RCO	Pressurizer level channel, LT-460, fails low. Restore normal letdown after swap channels. (ARP A 8/3, A 9/4, B 3/1, 3-ONOP-041.6, 3-ONOP-49.1, T.S. 3.2.5, 3.4.3)
3		C/BOP	Circ water pump 3B1 loss of lube oil indication causing motor bearing high temperature. Must lower reactor power to <60% & secure SJAE suction before securing the pump. (ARP I 2/4, 3-OP-10)
4		R/RCO	Decrease power to 60%
5		C/BOP	Loss of 3D Load Center (3AB14 opens). <b>(Do after event 4 between 65-70% power)</b> (ARP F7/4, Bkr List, T.S. 3.8.3.1)
6		C/RCO	Master pressure controller, PC-3-444J, fails high. PORV PCV-455C opens. When PORV is manually closed by operator, it leaks by. MOV-536 block valve will not close if attempted by operator. (ARP A 4/1, 7/1, 9/2, 9/5, 3-ONOP-041.5, T.S. 3.3.1, 3.3.2)
7			Primary leak (15-20 gpm) greater than T.S. (Charging already maximized, pressurizer level will not be a problem). Manual reactor trip when determined Rx pressure cannot be maintained > 2000 psig.
8		M/All	SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched.
		M/All	Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG)

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Op-Test No.: 1 Scenario No.: 2 Event No.: 1 Page 1 of 24Event Description: Make-up 5000 gal of borated water to RWST. (3-OP-046, section 7.5)

Time	Position	Applicant's Actions or Behavior
	ANPS	Direct RCO to initiate a borated make-up of 5000 gallons to the RWST per 3-OP-046, section 7.5.
	RCO	<p>Obtain and review copy of 3-OP-046, section 7.5.</p> <ol style="list-style-type: none"> <li>1. Verifies initial conditions are met.</li> <li>2. Determines approx. boric acid and primary water flows and volumes needed to achieve desire blend concentration.</li> <li>3. Verifies closed the following valves: FCV-113B, FCV-114B, MOV-350, manual valve 3-356.</li> <li>4. Places control switches for FCV-113B and FCV-114B in the CLOSE position.</li> <li>5. Verifies MOV-350 is closed.</li> <li>6. Unlocks and opens manual valve 3-365A and open manual valve 3-365B to M/U to the RWST.</li> <li>7. Places Rx M/U selector switch to BORATE.</li> <li>8. Places controllers for FCV-113A and FCV-114A in MANUAL.</li> <li>9. Places control switch for FCV-113A to AUTO.</li> <li>10. Sets Boric Acid Totalizer and Primary Water Totalizer to volumes determined above.</li> <li>11. Places a Boric Acid Pump in AUTO.</li> <li>12. Turns RCS M/U control switch to START.</li> <li>13. Places control switch for FCV-114A to OPEN.</li> <li>14. Adjusts flow controllers for FCV-113A (BA) and FCV-114A (PW) to flows determined above.</li> <li>15. Verifies proper flow by observing RWST level increase and BAST and PWST tank levels decrease.</li> <li>16. Adds 5000 gallons to borated water to the RWST.</li> </ol>
	RCO	<p>After RWST M/U is complete, performs the following actions:</p> <ol style="list-style-type: none"> <li>1. Closes FCV-113A.</li> <li>2. Stops the Boric Acid Pump.</li> <li>3. Flushes the RWST fill line with approx. 100 gal. of primary water.</li> </ol>

Page 2 of 24

Event Description: Make-up 5000 gal of borated water to RWST. (3-OP-046, section 7.5)

[illegible]

Op-Test No.: 1      Scenario No.: 2      Event No.: 2      Page 3 of 24

Event Description: Pressurizer level channel, LT-3-460, fails low. Restore normal letdown after swap channels.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Recognizes and reports failure of LT-3-460.</p> <ul style="list-style-type: none"><li>- Annunciator A-8/4, PZR LO-LO LEVEL ALERT</li><li>- LT-3-460 fails low</li><li>- Letdown isolates</li><li>- PZR heaters deenergize</li></ul> <p>Responds as directed by the ANPS.</p> <ol style="list-style-type: none"><li>1. Compares level to other PZR LTs.</li><li>2. Verifies no off-normal conditions on LT-3-459/461.</li><li>3. Performs immediate actions of 3-ONOP-041.6:<ol style="list-style-type: none"><li>a. Checks pressurizer level indicators and selects channel I/III for PZR level control.</li><li>b. Checks pressurizer level following program per 3-ONOP-041.6, Enclosure 1 or place LC-3-459F/individual charging pump controllers in manual. (May stop one charging pump.)</li></ol></li><li>4. Performs subsequent actions of 3-ONOP-041.6 as directed by ANPS:<ol style="list-style-type: none"><li>a. Ensures LR-3-459 selected to channel I or III.</li><li>b. Restores letdown. (Opens LCV-3-460, CV-3-200A, and CV-3-200B or 200C)</li><li>c. Restarts charging pump (if stopped above).</li><li>d. Restores normal pressurizer heater control by turning group heater control switch to ON (spring returns to AUTO).</li><li>e. Maintains pressurizer level on program per 3-ONOP-041.6, Enclosure 1.</li></ol></li></ol>
	ANPS	<p>Directs compensatory action IAW 3-ONOP-041.6 and 049.1:</p> <ol style="list-style-type: none"><li>1. Verifies RCO determination of PZR LT status.</li><li>2. Determines which bistables to trip (BS-3-460A1/2 in rack 11) and effects on plant of tripping bistables. Provides this info for RCO/BOP guidance.</li><li>3. Notifies NPS of LT-3-460 status.</li><li>4. Verifies correct indication received for each bistable tripped.</li><li>5. Ensures I&amp;C is notified of LT-3-460 failure and PWO initiated.</li></ol>

Op-Test No.: 1      Scenario No.: 2      Event No.: 2      Page 4 of 24

Event Description: Pressurizer level channel, LT-3-460, fails low. Restore normal letdown after swap channels.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Monitors plant parameters and assists RCO as directed by ANPS.</p> <p>Trips bistables IAW 3-ONOP-049.1.</p> <ul style="list-style-type: none"><li>a. BS-3-460A-1 in rack 11</li><li>b. BS-3-460A-2 in rack 11</li></ul> <p>Assists in restoration of letdown by manually controlling PCV-3-145, if required.</p>
	RCO	<p>Checks 3-ARP-097.CR for any actions associated with alarms "A 8/3", "A 9/4", "B 3/1".</p> <p>Determines no other action required that wasn't covered by the ONOP.</p>
	ANPS	<p>Refers to T.S. 3.3.1, 3.2.5 and 3.4.3</p> <p>Determines that T.S. 3.3.1 for PZR level, Action 13 applies and that bistables need to be tripped within next 6 hrs.</p> <p>Determines that T.S. 3.2.5 was only due to transient and will be exited and PZR pressure is restored.</p> <p>Determines Action "a" applies for T.S. 3.4.3 and that heaters need to be restored within 72 hrs or be in at least HOT STANDBY within the next 6 hrs and in HOT SHUTDOWN within the following 6 hrs.</p>



Op-Test No.: 1

Scenario No.: 2

Event No.: 3

Page 6 of 24

Event Description: Circ water pump 3B1 loss of lube oil indication causing motor bearing high temperature. Must lower reactor power to <60% & secure SJAЕ suction before securing the pump.

[illegible]



Op-Test No.: 1      Scenario No.: 2      Event No.: 4      Page 7 of 24

**Event Description:** Decrease reactor power to 60%.

[illegible]

Op-Test No.: 1      Scenario No.: 2      Event No.: 5      Page 8 of 24

Event Description: Loss of 3D Load Center (3AB14 opens). (Do after event 3 between 65-70% power).

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports annunciator "F 7/4" (480V XFMR A/B/C/D LO VOLTAGE).
	Crew	Determines based on annunciator received, loss of MCR lighting, and breaker 3AB14 indication that a loss of 3D Load Center has occurred.
	ANPS	Directs BOP to perform actions of 3-ARP-097.CR for annunciator "F 7/4".
	RCO	Monitors plant parameters and assists BOP as directed by ANPS.
	BOP	<p>Reviews and performs actions of 3-ARP-097.CR for annunciator "F 7/4".</p> <ol style="list-style-type: none"> <li>1. Verifies alarm by checking load center voltmeters (VPA).</li> <li>2. Checks voltmeters on load centers, 4160V bus (console) and 240kV bus (VPA).</li> <li>3. Identifies breaker 3AB14 tripped open.</li> <li>4. Sends NPO to check out 3AB14.</li> <li>5. Determines 3D load center cannot be restored based on NPO report. (Overcurrent relay target visible on LC.)</li> <li>6. Informs ANPS of need to notify Elec. Dept, Load Dispatcher, and Prot. &amp; Control Dept.</li> <li>7. Informs ANPS to refer to T.S. 3.8.3.1 for additional actions.</li> </ol>
	ANPS	<p>Calls Elec. Dept, Load Dispatcher, and Prot. &amp; Control Dept. re: loss of 3D load center.</p> <p>Refers to T.S. 3.8.3.1.</p> <p>Determines Action "a" applies and that need to reenergize the load center within 8 hrs or be in at least HOT STANDBY within the next 6 hrs and in COLD SHUTDOWN within the following 30 hrs.</p>

Event Description: Master pressure controller, PC-3-444J, fails high. PORV PCV-455C opens. When PORV is manually closed by operator, it leaks by. MOV-536 block valve will not close if attempted by operator.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Recognizes and reports RCS and PZR pressure decreasing.</p> <ul style="list-style-type: none"> <li>- No PZR pressure channels indicate failed or abnormal</li> <li>- PORV PCV-455C indicates open with no high pressure condition</li> </ul> <p>Responds as directed by the ANPS. Performs immediate actions of 3-ONOP-041.5:</p> <ol style="list-style-type: none"> <li>1. Compares PZR pressure transmitters PT-3-444 and PT-3-445.</li> <li>2. Verifies no off-normal conditions. Checks both PORVs closed.</li> <li>3. Identifies PORV PVC-455C open.</li> <li>4. Verifies PZR pressure is &lt; 2335 psig.</li> <li>5. Manually attempts closing PORV PCV-455C.</li> <li>6. Identifies PORV leaking by based on Accoustic Monitors, attempts to close block valve MOV-536.</li> <li>7. Identifies block valve will not close.</li> <li>8. Checks PZR spray valves closed.               <ol style="list-style-type: none"> <li>a. Places PCV-3-455A in MANUAL and CLOSE.</li> <li>b. Places PCV-3-455B in MANUAL and CLOSE.</li> <li>c. Verifies CV-3-311 (Aux Spray) is CLOSED.</li> </ol> </li> </ol> <p>Evaluates PZR pressure control equipment and identifies master pressure controller PC-3-444 has failed high.</p>
	ANPS	<p>Directs RCO in performance of actions in 3-ONOP-41.5.</p> <p>When it is determined that PZR pressure cannot be maintained, directs RCO/BOP to trip Rx and perform immediate operator actions of E-0. <b>(See next event for actions.)</b></p> <p>Directs BOP to call I&amp;C and Electrical Dept. to investigate problem.</p> <p>Informs NPS of plant status.</p>



Event Description: Primary leak (20 gpm) greater than T.S. (Charging already maximized, pressurizer level will not be a problem.) Initiate manual reactor trip before Rx pressure reaches 2000 psig.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Performs subsequent actions of 3-ONOP-041.5 as directed by ANPS:</p> <ol style="list-style-type: none"><li>1. Check PZR safety valves closed.</li><li>2. Check PZR pressure stable or increasing.</li><li>3. Identifies PZR pressure slowly decreasing.</li><li>4. Check pressure &gt; 2000 psig. Initiates efforts to maintain pressure above 2000 psig.</li><li>5. Checks PZR heaters ON.</li><li>6. Determines if PZR heaters can control pressure. Identifies pressure decrease has slowed.</li><li>7. Checks if PORV is leaking and identifies noise indicated on acoustic monitor and elevated temperatures.</li><li>8. Reports to ANPS that PZR pressure cannot be maintained and still slowly decreasing.</li></ol> <p>Identifies PZR level is being adequately maintained in control band.</p> <p>May discuss need to perform a T.S. required shutdown due to high RCS leakage (leak rate will not allow a fast shutdown to be completed.)</p> <p>Concludes that PZR pressure cannot be maintained &gt; 2000 psig. Recommends Rx trip and entry into E-0.</p>
	ANPS	<p>Directs RCO in performance of subsequent actions to 3-ONOP-041.5.</p> <p>When it is determined that PZR pressure cannot be maintained &gt; 2000 psig, directs RCO/BOP to trip Rx and manually initiate SI.</p> <p>Transitions to E-0 and directs crew performance. <b>(See next event for actions)</b></p>
	BOP	<p>Monitors plant conditions based on indicating parameters.</p> <p>Assists RCO as directed.</p>

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	ANPS	Directs operators in performance of E-0:
	RCO	<p>Manually attempts to trip reactor with both handswitches.</p> <p>Checks Rx tripped. Identifies Rx is NOT tripped.</p> <ul style="list-style-type: none"> <li>- rod bottom lights NOT lit.</li> <li>- RTBs and bypass breakers NOT open.</li> <li>- RPIs NOT at zero.</li> <li>- Neutron flux NOT decreasing.</li> </ul>
	ANPS	<p>Transitions to FR-S.1.</p> <p>Monitors Critical Safety Functions using 3-EOP-F-0.</p> <p>Directs RCO and BOP is actions of FR-S.1.</p>
	RCO	<p>Performs actions of FR-S.1 as directed by ANPS.</p> <p>Verify Rx Trip:</p> <ul style="list-style-type: none"> <li>- checks rod bottom lights NOT lit.</li> <li>- checks RTBs and bypass breakers NOT open.</li> <li>- checks RPIs NOT at zero.</li> <li>- checks neutron flux NOT decreasing.</li> </ul>
	ANPS	Goes to RNO for Step 1.
	RCO  <b>CRITICAL</b>	<p>Attempts to manually trip Rx (again).</p> <p>Manually inserts control rods.</p>
	ANPS	Goes to Step 2.
	BOP	<p>Verify Turbine Trip:</p> <ul style="list-style-type: none"> <li>- checks all turbine stop valves CLOSED</li> <li>- identifies no indication for MT stop valves (due to AMSAC)</li> </ul>

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	ANPS	Goes to RNO for Step 2.
	BOP	<ul style="list-style-type: none"> <li>- manually trips turbine</li> <li>- determines turbine trip status still unknown</li> <li>- closes all MSIVs and bypass valves</li> </ul>
	ANPS	Goes to Step 3.
	BOP	Checks AFW pumps - ALL running: <ul style="list-style-type: none"> <li>- identifies AFW pumps not running</li> </ul>
	ANPS	Goes to RNO for Step 3.
	BOP	<ul style="list-style-type: none"> <li>- starts AFW by opening MOV-3-1403, MOV-3-1404, &amp; MOV-3-1405</li> </ul>
	ANPS	Goes to Step 4.
	RCO	Initiate Emergency Boration of RCS: <ul style="list-style-type: none"> <li>- checks at least one Charging Pumps running - NO</li> <li>- identifies need to reset SI (SI was initiated either manually by crew or automatically on Low PZR pressure)</li> <li>- resets SI and starts 3A Charging Pump</li> <li>- verifies makeup system is stopped</li> <li>- manually starts Boric Acid Pump 3A or 3B</li> <li>- opens Emergency Boration Valve, MOV-3-350</li> <li>- opens Charging Flow to Regen HX valve, HCV-3-121</li> <li>- verifies Loop A Charging Isolation, CV-3-310A is open</li> <li>- establishes emergency boration flow as indicated by FI-3-110 &gt; 60 gpm and FI-3-122 &gt; 45 gpm</li> </ul>
	RCO	Checks PZR Pressure - < 2335 psig.
	BOP	Verifies Containment Ventilation - ISOLATED.

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Page 14 of 24

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	ANPS	<p>Reads CAUTION before Step 7. Because SI has actuated and once Rx is subcritical, directs BOP to verify SI equipment aligned using Steps 1 - 16 of E-0.</p> <p>Continues directing actions per FR-S.1.</p>
	RCO	<p>Check If Following Trips Have Occurred:</p> <ul style="list-style-type: none"> <li>- checks reactor is still not tripped</li> </ul>
	ANPS  <b>Critical</b>	<p>Goes to RNO for Step 7.</p> <p>Calls NPO to 3B MCC room to locally trip Rx as follows:</p> <ul style="list-style-type: none"> <li>- opens 3A and 3B RTBs</li> </ul> <p>Continues with Step 7, Expected Response.</p>
	BOP	<ul style="list-style-type: none"> <li>- checks that MT still not indicated tripped but MSIVs were closed earlier</li> <li>- checks Mid and East GCBs are OPEN</li> <li>- checks S/G levels in at least one S/G in &gt; 6%</li> <li>- controls feed flow to maintain NR level between 15% &amp; 50%</li> </ul>
	ANPS	<p>After RCO reports Rx tripped, (NPO reports RTBs have been opened) directs BOP to perform Steps 1 - 16 of E-0 (<b>See pages 16 - 18 for E-0 actions</b>) while continuing directing RCO in actions of FR-S.1.</p>
	RCO	<p>Verify All Dilution Paths - Isolated:</p> <ul style="list-style-type: none"> <li>- checks FR-3-113 indicates no Primary Water flow</li> </ul>



Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Check for Reactivity Insertion From Uncontrolled RCS Cooldown:</p> <ul style="list-style-type: none"> <li>- determines RCS temperatures are not decreasing in an uncontrolled manner <b>OR</b></li> <li>- determines no S/G pressure is decreasing in an uncontrolled manner</li> </ul> <p><b>NOTE: The RCO should identify abnormal levels and pressures in #2 and #3 S/G's as compared to #1 S/G due to 3B and 3C RCPs tripping when the LOOP/LOCA response of "B" sequencer occurs upon the loss of 3D Load Center.</b></p>
	RCO	Verifies MSIVs <u>and</u> Bypass Valves are CLOSED
	RCO	<p>Identify Faulted S/Gs:</p> <ul style="list-style-type: none"> <li>- determines pressures in all S/Gs are not decreasing in an uncontrolled manner <b>AND</b></li> <li>- determines no S/G is completely depressurized</li> </ul>
	ANPS	<p>Goes to RNO for Step 12.</p> <p>Goes to Step 14.</p> <p>Reads CAUTIONS before Step 14 regarding AFW pump operations.</p>
	RCO	Checks Core Exit TC's - < 1200°F
	RCO	<p>Verifies Rx Subcritical:</p> <ul style="list-style-type: none"> <li>- confirms PR channels are &lt; 5%</li> <li>- confirms IR channels have negative SUR</li> </ul>
	ANPS	Returns to Step 1 of E-0

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	ANPS	<p>Directs the response to reactor trip per 3-EOP-E-0, "Reactor Trip or Safety Injection."</p> <p>Monitors E-0 Foldout Page items.</p> <p><b>NOTE: The BOP should have performed Steps 1 - 16 earlier in the scenario per direction from ANPS. Therefore, the performance of these steps here should proceed fairly quickly.</b></p>
	RCO	<p>Performs Immediate Actions in response to reactor trip per E-0:</p> <p>Verifies Reactor trip (E-0, Step 1):</p> <ul style="list-style-type: none"> <li>▶ checks all rod bottom lights ON</li> <li>▶ checks RTBs and Bypass breakers OPEN</li> <li>▶ checks all RPI's indicate zero</li> <li>▶ checks neutron flux decreasing</li> </ul>
	ANPS	Obtains verification of reactor trip.
	BOP	<p>Performs Immediate Actions in response to reactor trip per E-0:</p> <p>Verifies Turbine trip (E-0, Step 2):</p> <ul style="list-style-type: none"> <li>▶ checks all turbine stop valves are closed</li> <li>▶ checks all MSR steam valves are closed</li> <li>▶ checks Mid and East GCBs open after 30 second delay</li> </ul> <p>Verifies Power to Emergency 4 KV Buses (E-0, Step 3)</p> <ul style="list-style-type: none"> <li>▶ checks both "A" and "B" 4KV buses are energized</li> <li>▶ checks the "D" 4KV bus is aligned to an energized 4KV bus</li> <li>▶ checks Load Centers 3A, 3B, 3C, &amp; 3H are energized.</li> </ul> <p>Reports 3D Load Center does not have power available and a LOOP/LOCA response was initiated on the "B" sequencer</p> <ul style="list-style-type: none"> <li>▶ identifies that "B" sequencer load stripping occurred (including both 3B &amp; 3C RCPs)</li> <li>▶ identifies SI loads have sequenced onto the 3B EDG</li> <li>▶ monitors 3B EDG loading</li> </ul>

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	ANPS	Determines electric plant status.
	RCO	Checks if SI is actuated/required (E-0, Step 4): <ul style="list-style-type: none"> <li>▶ determines SI actuated on low PZR pressure setpoint</li> <li>▶ checks RCS subcooling based on exit TCs &lt;30F</li> <li>▶ determines PZR level can not be maintained &gt;12%</li> <li>▶ informs ANPS of plant status</li> </ul>
	RCO	Recognizes that SI is required. Manually initiates SI and containment isolation Phase A (if SI has not occurred automatically). (E-0, Step 4 RNO b)
	ANPS	Directs manual SI/Phase A initiation if required.
	BOP	Verifies feed water isolation. (E-0, Step 5)
	RCO	Verifies containment isolation Phase A. (E-0, Step 6)
	BOP	Verifies AFW pumps running. (E-0, Step 7)
	RCO	Verifies SI pumps running. (E-0, Step 8)
	RCO	Verifies proper CCW system operation. (E-0, Step 9)
	BOP	Verifies proper ICW operation. (E-0, Step 10)
	RCO	Verifies containment cooling. (E-0, Step 11)
	RCO	Verifies Containment <u>and</u> Control Room ventilation isolation. (E-0, Step 12)

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	BOP	Verifies that Main Steamlines do not require isolation. (E-0, Step 13)
	RCO	Monitors containment pressure to verify containment spray is not required. (E-0, Step 14)
	RCO	Verifies SI valve amber lights are ALL BRIGHT (E-0, Step 15)
	BOP	Verifies EDG's are running. (E-0, Step 16)
	RCO	Resets SI. (E-0, Step 17)
	RCO	Realign SI system (E-0, Step 18): <ul style="list-style-type: none"> <li>▸ observes that Unit 3 high-head SI pumps, both running</li> <li>▸ stops both Unit 4 high-head SI pumps and places them in standby</li> </ul>
	BOP	Directs SNPO to place Containment Post Accident Hydrogen Monitoring System in service. (E-0, Step 19)  After SNPO actions are complete, realigns switches QR-81 & QR-82.
	RCO	Verifies SI flow (E-0, Step 20): <ul style="list-style-type: none"> <li>▸ observes RCS pressure is NOT &lt; 1600 psig</li> <li>▸ transitions to Step 21 (E-0, Step 20 RNO c)</li> </ul>
	BOP	Verifies proper AFW valve alignment. (E-0, Step 21)
	BOP	Verifies proper AFW flow (E-0, Step 22): <ul style="list-style-type: none"> <li>▸ observes narrow range level in on S/G &gt; 6% (E-0, Step 22.a)</li> <li>▸ controls feed flow to maintain S/G narrow range levels between 6% and 50% (E-0, Step 22.b)</li> </ul>

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	RCO	Checks RCP seal cooling - no thermal barrier alarms. (E-0, Step 23)
	BOP	<p>Observes RCS cold leg temperature is stable -OR- trending to 547°F (E-0, Step 24)</p> <p>If temperature is decreasing (E-0, Step 24 RNO a):</p> <ul style="list-style-type: none"> <li>▶ stops dumping steam</li> <li>▶ limits total feed water flow to 345 gpm until narrow range level in at least one S/G &gt; 6%</li> </ul>
	RCO/ BOP	<p>Checks RCP cooling (E-0, Step 25):</p> <ul style="list-style-type: none"> <li>▶ identifies only 3A RCP is running</li> <li>▶ checks RCS subcooling <math>\geq 25^{\circ}\text{F}</math></li> </ul>
	RCO/ BOP	<p>Re-establishes RCP cooling (E-0, Step 25.c):</p> <ul style="list-style-type: none"> <li>▶ verifies SI reset</li> <li>▶ resets containment isolation Phase A</li> <li>▶ opens CCW to Normal Containment Cooler Valves <ul style="list-style-type: none"> <li>- MOV-3-1417</li> <li>- MOV-3-1418</li> </ul> </li> <li>▶ Resets and starts normal containment coolers</li> </ul>
	RCO	Checks Letdown, PZR PORVs, and Spray Valves (Normal and Aux) closed. (E-0, Step 26)
	BOP	<p>Checks if S/Gs are NOT faulted (E-0, Step 27):</p> <ul style="list-style-type: none"> <li>▶ observes pressure in all S/Gs satisfactory</li> </ul>
	BOP	<p>Checks if S/G tubes are NOT ruptured (E-0, Step 28):</p> <ul style="list-style-type: none"> <li>▶ observes condenser air ejector radiation is normal, R-15</li> <li>▶ observes S/G blowdown radiation is normal, R-19</li> <li>▶ observes ERDADS or local DAM1 monitor readings are normal</li> <li>▶ observes local steamline radiation readings are normal</li> </ul>

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	RCO	Checks if RCS is intact (E-0, Step 29): <ul style="list-style-type: none"> <li>▸ observes that the RCS is not intact by: <ul style="list-style-type: none"> <li>– Containment radiation</li> <li>– Containment pressure</li> <li>– Containment sump level (LI-3-6308A &amp; LI-3-6308B)</li> </ul> </li> <li>▸ informs the ANPS</li> </ul>
	ANPS Critical	With the information that the RCS is NOT intact, transitions to 3-EOP-E-1, "Loss of Reactor or Secondary Coolant," Step 1. (E-0, Step 29 RNO 2)
	ANPS	Monitors Critical Safety Functions using 3-EOP-F-0 as directed by E-0, Step 29 RNO 1.
	ANPS	Directs the response to loss of reactor coolant per E-1.  Monitors 3-EOP-E-1 Foldout Page items.
	RCO	Monitors conditions to determine if RCPs should be stopped (E-1, Step 1): <ul style="list-style-type: none"> <li>▸ observes RCS subcooling is NOT less than 25°F [65°F] and goes to Step 2 per RNO</li> </ul>
	RCO	Checks that S/Gs are NOT faulted. (E-1, Step 2)
	BOP	Maintains S/G levels (E-1, Step 3): <ul style="list-style-type: none"> <li>▸ narrow range level &gt; 6% [32%]</li> <li>▸ controls feed flow to maintain narrow range level between 15% [32%] and 50%</li> </ul>
	BOP	Monitors secondary radiation (E-1, Step 4): <ul style="list-style-type: none"> <li>▸ directs Chemistry to take S/G activity samples</li> <li>▸ direct Chemistry to take DAM1 monitor readings</li> <li>▸ directs HP to take RAD readings on steamlines</li> <li>▸ determines secondary radiation normal near routine ops value</li> </ul>

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	RCO	Checks PORVs and Block valves (E-1, Step 5): <ul style="list-style-type: none"> <li>▸ verifies power available to the block valves</li> <li>▸ verifies PORVs closed</li> <li>▸ verifies at least one block valve open</li> </ul>
	RCO	Verifies SI is reset. (E-1, Step 6)
	RCO	Resets containment isolation Phase A and Phase B (E-1, Step 7)
	RCO	Verifies instrument air to containment (E-1, Step 8) <ul style="list-style-type: none"> <li>▸ verifies CV-3-2803 open</li> <li>▸ verifies instrument air pressure &gt;95 psig</li> </ul>
	BOP	Checks power to charging pumps from offsite. (E-1, Step 9) <ul style="list-style-type: none"> <li>▸ identifies only 3A Charging Pump power is aligned from offsite</li> <li>▸ notes 3B Charging Pump power is aligned to 3B EDG</li> <li>▸ notes 3B EDG capacity is sufficient to carry current SI loads</li> </ul>
	RCO	Checks if charging flow established (E-1, Step 10): <ul style="list-style-type: none"> <li>▸ observes 3A Charging Pump is still running (Step 10.a)</li> <li>▸ places RCS Makeup Control Switch in STOP (Step 10.b)</li> <li>▸ establishes maximum charging flow (Step 10.c): <ul style="list-style-type: none"> <li>▸ starts 3B Charging Pump</li> <li>▸ adjusts charging pump speed controller(s)</li> <li>▸ adjusts charging flow to maintain seal injection flow</li> </ul> </li> <li>▸ verifies charging pump suction auto transfers to the RWST (Step 10.d)</li> </ul>
	ANPS	Checks criteria for SI termination (E-1, Step 11): <ul style="list-style-type: none"> <li>▸ RCS subcooling &gt;30F [210F] (Step 11.a)</li> <li>▸ secondary heat sink available (Step 11.b)</li> <li>▸ RCS pressure &gt;1600 psig and increasing/stable (Step 11.c) <ul style="list-style-type: none"> <li>– this is not the case, goes to E-1, Step 12 (Step 11.c RNO)</li> </ul> </li> </ul>

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Checks if containment spray should be stopped (E-1, Step 12):</p> <ul style="list-style-type: none"> <li>▸ observes that spray pumps are not running (Step 12.a)</li> <li>▸ notes need to observe CAUTION before Step 13 and goes to Step 13 (Step 12.a RNO)</li> </ul>
	RCO	<p>Checks if RHR pumps should be stopped (E-1, Step 13):</p> <ul style="list-style-type: none"> <li>▸ checks RCS pressure is &gt; 250 psig and stable -or- increasing</li> </ul> <p><b>NOTE: RCS pressure may be close to stable and/or slightly decreasing. If stable, continue to next action. If decreasing, skip to the next block of actions.</b></p> <ul style="list-style-type: none"> <li>▸ verifies SI reset</li> <li>▸ stops RHR pumps and places in standby</li> </ul>
	RCO/ BOP	<p>Checks RCS and S/G pressures (E-1, Step 14):</p> <ul style="list-style-type: none"> <li>▸ verifies S/G pressures are stable or increasing</li> <li>▸ verifies RCS pressure is stable or decreasing</li> </ul> <p><b>NOTE: If RCS pressure is determined to be increasing, crew will return to Step 1. Will perform Steps 1 - 14 until RCS pressure is decreasing and then will proceed to Step 15.</b></p>
	BOP	<p>Checks if diesel generators should be stopped (E-1, Step 15):</p> <ul style="list-style-type: none"> <li>▸ verifies the A 4KV bus is energized by offsite power but notes the B 4KV bus is loaded on 3B EDG (Step 15.a)</li> <li>▸ directs System Dispatcher to restore offsite power to Unit 3 startup transformers <u>and</u> the 3C transformer (Step 15.a RNO)</li> <li>▸ <u>when</u> offsite power has been restored to <u>either</u> the startup transformer <u>or</u> the 3C transformer <u>then</u> restores offsite power to the 4KV buses using 3-ONOP-004.1 (Step 15.a RNO)</li> <li>▸ stops the unloaded diesel generators and places them in standby (Step 15.b)</li> </ul> <p><b>NOTE: Crew may opt to complete 3-ONOP-004.1 <u>before</u> continuing in E-1. If this occurs, Chief Examiner will evaluate whether to restore offsite power and observe ONOP-004.1 actions <u>in lieu of</u> the remainder on E-1.</b></p>



Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Verifies cold leg recirculation capability (E-1, Step 16):</p> <ul style="list-style-type: none"> <li>▶ observes both RHR pumps are available</li> <li>▶ directs SNPO to locally unlock and close the following breakers: <ul style="list-style-type: none"> <li>– 30605 for MOV-3-864B</li> <li>– 30615 for MOV-3-750</li> <li>– 30616 for MOV-3-862B</li> <li>– 30621 for MOV-3-866B</li> <li>– 30626 for MOV-3-863B</li> </ul> </li> <li>▶ directs SNPO to locally unlock and close the following breakers: <ul style="list-style-type: none"> <li>– 30712 for MOV-3-864A</li> <li>– 30720 for MOV-3-862A</li> <li>– 30726 for MOV-3-863A</li> <li>– 30731 for MOV-3-751</li> <li>– 30732 for MOV-3-866A</li> </ul> </li> </ul>
	BOP	<p>Directs SNPO to locally verify Radiation Shield doors are closed (E-1, Step 17):</p> <ul style="list-style-type: none"> <li>▶ containment spray pump room</li> <li>▶ charging pump room</li> </ul>
	RCO/ BOP	<p>Initiate Evaluation of Plant Status (E-1, Step 18):</p> <ul style="list-style-type: none"> <li>▶ verifies aux building radiation is normal</li> <li>▶ verifies containment H2 monitors are in service</li> <li>▶ directs Chemistry to align PASS for on-line sampling <u>and</u> analysis of the RCS</li> <li>▶ verifies ECCS components are operating properly</li> </ul>
	RCO	<p>Check If RCS Cooldown and Depressurization Required (E-1, Step 19):</p> <ul style="list-style-type: none"> <li>▶ determines RCS pressure is &gt; 250 psig (Step 19.a)</li> </ul>
	ANPS Critical	Goes to 3-EOP-ES-1.2, "Post LOCA Cooldown and Depressurization," Step 1.

Op-Test No.: 1      Scenario No.: 2      Event No.: 8      Page 24 of 24

Event Description: SBLOCA with ATWS. (AMSAC failure, must close MSIVs due to no Mn Turb trip indication.) Open RTBs after Emerg Boration flow established and NPO dispatched. Loss of 3D Load Center results in initiating LOOP/LOCA response of "B" sequencer and equipment (load stripping [including 3B & 3C RCPs], loads 3B EDG, and sequencing of SI loads onto the EDG). Perform E-0, FRP-S.1, E-1 and end in ES-1.2.

[illegible]

## ATTACHMENT 1

(Page 1 of 2)

## NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST

Relief Time: xx:xxDate: xx/xx/xxOff-going NPS: TaylorOncoming NPS: Off-going U-3 ANPS: K. MillerOncoming U-3 ANPS: Off-going U-4 ANPS: AdamsenOncoming U-4 ANPS: Oncoming SRO assigned ANPS ONOP-105 duties: U-3 Mode 1 Power Level 75% U-4 Mode 1 Power Level 100**PART 1 - To be completed by Off-going NPS/ANPS****Unit 3 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

- 3C Charging Pump COS - Motor ground - No TS LCO entry yet. (TS 3.1.2.3) - Clearance info tag hung.
- Condenser steam dump mode selector in MANUAL - TC-3-408H COS. - Caution tag hung
- 3B2 Circulating Water Pump COS - Repairs to bkr 3AB18. 3-OP-010 provided for pump restart when repairs complete.

**Unit 3 Evolutions (Completed, In Progress, Planned)**

- 3-GOP-301 in use for return to 100% power following 3B SGFP maintenance. - procedure complete thru step 5.94. Power on hold at 75% for shift turnover. 3B SGFP testing complete & back in service.
- Need to add 5000 gal to <sup>unit 3</sup> RWST - see below.

**Unit 3 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

- Need to fill RWST (unit 3) - ann G-8/2 in for low level (~321k gal). Add 5000 gal blended makeup following shift turnover. RWST boron concentration currently 2000 ppm. O-OP-046 provided.
- Condenser steam dumps in MANUAL (see above) - ann. C-8/3 in.

**Unit 4 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

No equipment out of service.

**Unit 4 Evolutions (Completed, In Progress, Planned)**

Maintain 100% power.

**Unit 4 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

None.

00163/11  
2  
CAN XIX

0-ADM-202

Shift Relief and Turnover

Approval Date:

5/9/00

## ATTACHMENT 1

(Page 2 of 2)

## NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST

## Common Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)

No equipment out of service.

## Common Evolutions and Common General Information

None planned - no info of note.

**PART 2** - To be reviewed by Oncoming NPS/ANPS/WCCS prior to shift relief (Check box)

NPS	U-3 ANPS	U-4 ANPS	WCCS	ANPS In WCC		NPS	U-3 ANPS	U-4 ANPS	WCCS	ANPS In WCC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Control Room Deficiency Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Review Clearances Issued for last 24 hours
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All EOOS Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Both RCO Logbooks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Special Instruction Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Night Order Book
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Watch stander OOS Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Controlled Key Log
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In compliance with license restriction, if any*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCBA corrective lenses readily available if corrective lenses required by license*

## Shift Responsibility Turned Over By (a) And Accepted By (b):

NPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

U-3 ANPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

U-4 ANPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

WCCS

(b) \_\_\_\_\_

ANPS in WCC

(b) \_\_\_\_\_

**PART 3** - To be reviewed/accomplished by NPS/ANPS shortly after assuming shift (Check box)

NPS	U-3 ANPS	U-4 ANPS	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Red Book (Surveillance Requirements)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduct Shift Briefing (include Night Orders, Special Instructions, Operator Work Around Aggregate Effects)

**PART 4** - To be reviewed/accomplished by NPS/ANPS prior to the end of the shift (Check box)

NPS	U-3 ANPS	U-4 ANPS	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Check all shift mailboxes for unresolved Tech Spec related procedure problems (midshift only)
	<input type="checkbox"/>	<input type="checkbox"/>	Update Red Book (Surveillance Requirements)
	<input type="checkbox"/>	<input type="checkbox"/>	Review and sign Operator Logs

\* Required prior to accepting the shift responsibility

Procedure No.:  <b>0-ADM-202</b>	Procedure Title:  <b>Shift Relief and Turnover</b>	Page: <b>19</b>
		Approval Date: <b>8/17/99</b>

**ATTACHMENT 3**  
(Page 1 of 1)  
**RCO - UNIT DUTY**  
**SHIFT RELIEF CHECKLIST**

Relief Time: xx:xx Date: xx/xx/xx Unit # 3

Off-going RCO: (print name) Robertson Oncoming RCO: (print name) \_\_\_\_\_

**PART 1 - To be completed by Off-going RCO**

Unit 3 Mode: 1 75 % Power \* 536 Gross MWe (\* Record N/A in Modes 2-6)  
Unit 4 Mode: 1 100 % Power \* 752 Gross MWe (\* Record N/A in Modes 2-6)  
Source Range: N31 or N32 N/A cps \*\* Intermediate Range: N35 or N36 N/A amp\*\*  
(\*\*Record "N/A" in Mode 1)

Tavg 566 °F Pressure 2240 psig RCS Boron 770 ppm

RCS Leakage 0.02 gpm Determined Date xx/xx/xx Time xx:xx

GRP in progress # N/A Tank # N/A LRP in progress # N/A Tank # N/A

Ctmt Purge Permit in progress # N/A

WTP ☐ OOS ☒ In Service to DWST.

Boric Acid Storage Tk Levels A 7400 B 7400 C 7400

Accumulator Reference Level/Date A 6640 1xx/xx/xx B 6680 1xx/xx/xx C 6635 1xx/xx/xx

**Abnormal Annunciator Status Reason:**

G-8/2 RWST level @ 321k gal, Add 5000 gal blended makeup following shift turnover. RWST boron concentration = 2000 ppm, O-CP-046 provided.  
C-8/3 Condenser steam dump mode selector switch → MANUAL. TC-3-408H under repair. Caution tag hung.

**Major EOOS/LCOs:**

-3C Charging pump OOS- motor ground - TS 3.1.2.3 LCO not entered. Clearance info tag hung.  
-TC-3-408H - see ann. C-8/3 item above.  
-3B2 Circulating water pump OOS for 3AB18 breaker repair. 3-CP-010 provided for pump restart when breaker fixed.

**Operations, Procedures, Transients, or Significant Maintenance in Progress:**

-Returning to 100% power following 3B SCFP maintenance (repairs & testing complete). Power ascension on hold @ 75% for shift turnover - 3-CP-301 complete thru step 5.94.  
- Add 5000 gal blended flow to RWST - see above.

**PART 2 - To be Reviewed/completed by Oncoming RCO prior to shift relief (Check box)**

- |  |   |
|--|---|
| <input type="checkbox"/> RCO Logbook   | <input type="checkbox"/> In compliance with license restrictions, if any*   |
| <input type="checkbox"/> RCO Logs Abnormal/Noted readings  | <input type="checkbox"/> SCBA corrective lenses readily available if corrective lenses required by license*   |
| <input type="checkbox"/> TSA Logbook   | <input type="checkbox"/> If on overtime this shift or on overtime on the next shift in this position, or if a shift trade is involved, sign overtime sheet* |
| <input type="checkbox"/> Walk Down Control Boards  | <input type="checkbox"/> Control Room Deficiency Log  |
| <input type="checkbox"/> Clearance Book (in Modes 1-4) for clearances issued since last shift worked. (No check required in Modes 5-6) | <input type="checkbox"/> EOOS Logbooks (All)  |
| <input type="checkbox"/> Watchstander Out-of-Service Book  | <input type="checkbox"/> Watch Station Cleanliness  |
| <input type="checkbox"/> Check blending station controllers are set for current RCS boron concentration.                               | <input type="checkbox"/> Special Instruction Book   |
|  | <input type="checkbox"/> Review Annunciator Status Sheets   |

\* Required prior to accepting shift responsibility.

Shift Responsibility Turned Over By: \_\_\_\_\_

Shift Responsibility Accepted By: \_\_\_\_\_

\*MBS/dt/bvc/bvc

0-OP-046

CVCS - Boron Concentration Control

Approval Date:

8/8/00

## ATTACHMENT 5

(Page 1 of 3)

## REACTIVITY WORKSHEET

NOTE*Boric Acid Thumb Rules are as follows:*

10pcm = 1ppm

10 gallons = 1ppm

1 gallon = 1pcm

## PART 1: Power Change Only (N/A if not applicable)

1) Rod Worth (A)

Plant Curve Book, Section 2, Figure 5

Withdrawal rods = plus (+) reactivity

Insert rods = minus (-) reactivity

Calculate change in rod worth as follows:

$$\begin{array}{rcl}
 [ \underline{71} \text{ pcm} ] & - & [ \underline{0} \text{ pcm} ] = (+/-) \underline{71} \text{ pcm} \\
 \text{Present Rod Worth} & - & \text{Desired Rod Worth} = (+/-) \text{ (A)}
 \end{array}$$

2) Power Defect (B)

Plant Curve Book, Section 2, Figure 6A

Raise Power = minus (-) reactivity

Lower Power = plus (+) reactivity

Calculate change in power defect as follows:

$$\begin{array}{rcl}
 [ \underline{1386} \text{ pcm} ] & - & [ \underline{1801} \text{ pcm} ] = (+/-) \underline{415} \text{ pcm} \\
 \text{Present Pwr Defect} & - & \text{Desired Pwr Defect} = (+/-) \text{ (B)}
 \end{array}$$

3) Calculate the Desired Change in pcm (C)

$$[ (+/-) \underline{71} \text{ pcm} ] + [ (+/-) \underline{415} \text{ pcm} ] = (+/-) \underline{344} \text{ pcm}$$

(A) (B) (C)

75 → 100%

00/63/11 11/29/00  
XIX DEC 2 2000  
XIX DEC 2 2000

**ATTACHMENT 5**  
(Page 2 of 3)

**REACTIVITY WORKSHEET**

**4) Integral Boron Worth**

Plant Curve Book, Section 2, Figure 7A

Boration = minus (-) reactivity

Dilution = plus (+) reactivity

Calculate Desired Boron Concentration ( $C_B$ ) as follows:

Check current boron concentration ( $C_B$ ) =      ppm

$$\begin{array}{rcl}
 [ (-) \underline{6982} \text{ pcm} ] - [ (+) \underline{344} \text{ pcm} ] & = & (+) \underline{6638} \text{ pcm} \\
 \text{Present boron worth} & \text{(C)} & = \text{Desired boron worth} \\
 \text{from Sect 2, Fig 7A} & & 
 \end{array}$$

Determine desired  $C_B$  from Section 2, Figure 7A = 730 ppm

**NOTE**

50,790 is the nominal volume of the RCS and the CVCS. BAST ppm is the most recent BAST concentration or a nominal value of 5664 ppm.

- 5) **IF** desired Boron Concentration is less than the current Boron Concentration, **THEN** calculate the dilution required as follows:

$$\begin{array}{l}
 50,790 \times \ln \left[ \frac{\text{Current } C_B \text{ in ppm}}{\text{Desired } C_B \text{ in ppm}} \right] = \text{Gallons of Primary Water} \\
 50,790 \times \ln \left[ \frac{\underline{770} \text{ ppm}}{\underline{730} \text{ ppm}} \right] = \underline{2709} \text{ Gallons} \\
 \hspace{15em} \text{Gallons of Primary Water}
 \end{array}$$

- 6) **IF** desired Boron Concentration is higher than the current Boron Concentration, **THEN** calculate the boration required as follows:  $\mu/A$

$$\begin{array}{l}
 50,790 \times \ln \left[ \frac{[\text{BAST ppm}] - [\text{Present RCS ppm}]}{[\text{BAST ppm}] - [\text{Desired RCS ppm}]} \right] = \text{Gal of Boric Acid} \\
 50,790 \times \ln \left[ \frac{[\text{ } \text{ ppm}] - [\text{ } \text{ RCS ppm}]}{[\text{ } \text{ ppm}] - [\text{ } \text{ RCS ppm}]} \right] = \text{ } \text{Gallons} \\
 \hspace{15em} \text{Gal of Boric Acid}
 \end{array}$$

ATTACHMENT 5  
(Page 3 of 3)

## REACTIVITY WORKSHEET

## PART 2: Temperature Change Only (N/A if not applicable) N/A

1) Temperature change requirements

To raise temperature, refer to Plant Curve Book, Section 3, Figure 2B.

To lower temperature, refer to Plant Curve Book, Section 2, Figures 9 and 9A.

Determine desired temperature change: (+/-) \_\_\_\_\_ °F

To dilute: [ ] °F x [ ] gal/°F = [ ] gal Water  
Sect 3, Fig 2BTo borate: [ ] °F x [ ] pcm/°F = [ ] pcm  
Sect 2, Fig 9/9A

[ ] pcm x [ ] gal/pcm = [ ] gal of Boric Acid

FINAL PAGE



# MASTER

Appendix D

Scenario Outline

Form ES-D-1

Facility: Turkey Point	Scenario No.: <u>3</u>	Op-Test No.: <u>1</u>
Examiners: <u>C. Payne</u> <u>M. Sykes</u> <u>M. Miller</u>	Operators: _____ (Position) _____	
Initial Conditions: Mode 1, 100% RTP (IC-1)		
Turnover: Power level is at 100% RTP. The previous shift, CVCS relief valve, RV-3-203, had failed and Excess Letdown was placed in service to facilitate repairs. Repairs are complete and it is desired to secure Excess Letdown and return CVCS to Normal Letdown. Equipment OOS --- 3C Charging Pump is out of service for motor ground (at this power 3B Charging Pump will be running), I&C has Steam Dump selector switch selected to MANUAL (Steam Pressure) mode due to problem with TC-408H.		

Event No.	Malf. No.	Event Type*	Event Description
Preinsert		M/C/All	3A SI Pump shaft shear.
Preinsert		M/C/All	Phase B relay CIB1 fails to actuate (3 valves fail to close).
1		N/RCO	Secure excess L/D, place normal L/D in service following repair of RV-3-203.
2		C/RCO	Loop C Pzr spray controller fails high resulting in spray valve going full open.
3		C/BOP	Loss of TPCW pump due to motor overload.
4		I/RCO	VCT LT-3-115 fails low.
5		I/BOP	Steam pressure channel PT-3-1606 fails high (S/G "A" atmospheric steam dump) and ADV sticks open after BOP takes the controller to manual. (Raises Rx power by 2%.) Must decrease MT load to restore reactor power to 100%. After power decrease, local isolation of ADV will be allowed.
6		C/BOP	Charging pump controller failure as a result of PZR LT-3-459 failing high.
7		R/RCO	3C S/G tube leak rate begins and increases to 200 gpd. Crew will enter 3-ONOP-071.2 and perform rapid power decrease.
8		M/All	"C" S/G faulted (inside containment) & ruptured (600 gpm).
		M/All	Perform FRP-P.1 (Red path) and FRP-Z.1 (Orange path)

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Event Description: Secure excess L/D, place normal L/D in service following repair of RV-3-203.

[illegible]





Op-Test No.: 1      Scenario No.: 3      Event No.: 4      Page 4 of 18

Event Description: LT-3-115 fails low (VCT level instrument).

Time	Position	Applicant's Actions or Behavior
	<b>RCO</b>	<p>Responds to annunciator alarm A-4/6, VCT HI / LO LEVEL.</p> <p>Recognizes unexplained Auto Makeup to the VCT.</p> <p>Observes level indication on LT-3-115 is ZERO. (ARP Step 1.a)</p> <p>Adjusts LC-3-112A pot to just get 0% demand, then reads pot setting. (ARP Step 1.b)</p> <p>Concludes that LT-3-115 has failed low. Refers to 3-ONOP-046.4, "Malfunction of Boron Concentration Control System". (ARP Step 2.e)</p>
	<b>RCO</b>	<p>Verifies 3-ONOP-046.4, Step 1 was completed by performing the steps of the ARP.</p> <p>Verifies that LT-3-115 has failed low per Step 3 of 3-ONOP-046.4:</p> <ul style="list-style-type: none"> <li>- LI-3-112 is stable or increasing</li> <li>- LI-3-115 is abnormally low</li> <li>- Performs manual makeup as necessary</li> </ul>
	<b>ANPS</b>	<p>Checks CVCS display on ERDADS for LI-3-112 level indication and observes normal VCT level. (ARP Step 2.a)</p> <p>May dispatch an operator to check local level on LI-3-112. (ARP Step 2.a)</p> <p>Reports the LI-3-115 failure to I&amp;C.</p> <p>Maintains command and control of the evolution.</p>
	<b>BOP</b>	Assists the RCO as directed by the ANPS.

Op-Test No.: 1      Scenario No.: 3      Event No.: 5      Page 5 of 18

Event Description: Steam pressure Channel PT-3-1606 fails high (S/G "A" atmospheric steam dump) and ADV sticks open after BOP takes the controller to manual. (Raises Rx power by 2%.) Must decrease MT load to restore reactor power to 100%. After power decrease, local isolation of ADV will be allowed.

Time	Position	Applicant's Actions or Behavior
	<b>RCO</b>	Observes Tav <sub>g</sub> decrease and Reactor power increase.  May drive rods in manually to maintain power below 100%.
	<b>BOP</b>	Observes 3A S/G Atmospheric Dump valve is full open.  Takes manual control of the 3A S/G Atmospheric Dump valve and drives valve demand to zero to close the valve. <b>(The Atmospheric Dump valve sticks open.)</b>  Dispatches an operator to close the manual isolation valve for the 3A S/G Atmospheric Dump valve.  Observes that the Steam Pressure Channel PT-3-1606 has failed high.
	<b>BOP</b>	Reduces Main Turbine load to maintain reactor power less than 100%.
	<b>BOP</b>	Receives confirmation from the field operator that the manual isolation valve for the 3A S/G Atmospheric Dump valve has been closed.
	<b>ANPS</b>	Concludes from the indications given that the Steam Pressure Channel PT-3-1606 has failed high.
	<b>ANPS</b>	Notifies I&C of the Steam Pressure Channel PT-3-1606 failure.
	<b>ANPS</b>	Maintains command and control of the evolution.

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Page 6 of 18

Event Description: Charging pump controller failure as a result of LT-3-459 failing high.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Responds to the following annunciator alarms:</p> <ul style="list-style-type: none"> <li>- A-8/3, PZR PROTECTION HI LEVEL</li> <li>- A-9/3, PZR CONTROL HI/LO LEVEL</li> </ul>
	RCO	<p>Takes Immediate Actions of 3-ONOP-041.6, "Pressurizer Level Control Malfunction".</p> <ul style="list-style-type: none"> <li>- Checks pressurizer level indicators LI-3-459A, LI-3-460 and LI-3-461 and determines that LT-3-459 has failed high (ONOP-041.6, Step 4.1)</li> <li>- Places the CHANNEL SELECT PRESSURIZER LEVEL CONTROL switch in a position that does NOT include the defective channel. (Channel III II position) (ONOP-041.6, Step 4.1.1)</li> </ul>
	RCO	<p>Observes that Master Charging Pump controller response has failed, pressurizer level not following programmed level.</p> <ul style="list-style-type: none"> <li>- Places the MASTER CHARGING PUMP CONTROLLER in MANUAL to maintain programmed level (ONOP-041.6, Step 4.2) <b>(This fails.)</b></li> <li>- Places the individual CHARGING PUMP CONTROLLER in MANUAL for 3A charging pump and maintains programmed level.</li> </ul>
	RCO	<p>Reviews 3-ONOP-049.1 for bistables to be tripped for the failed channel.</p>
	RCO	<p>Observes correct indications received for each bistable placed in trip.</p>
	BOP	<p>Assists the RCO as directed by the ANPS.</p>
	BOP	<p>Trips bistables IAW 3-ONOP-049.1:</p> <ul style="list-style-type: none"> <li>► BS-3-459A-1 and BS-3-459A-2</li> </ul>

Op-Test No.: 1      Scenario No.: 3      Event No.: 6      Page 7 of 18

Event Description: Charging pump controller failure as a result of LT-3-459 failing high.

[illegible]



Op-Test No.: 1      Scenario No.: 3      Event No.: 7      Page 8 of 18

Event Description: 3C S/G tube leak rate begins and increases to 200 gpd. Crew will enter 3-ONOP-071.2 and perform a rapid power decrease.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Responds to annunciator alarm H-1/4, PRMS HI RADIATION.</p> <p>Checks the PRMS channels and determines alarm is on R-15.</p> <p>Recognizes that R-15 is indicative of a S/G tube leak.</p>
	BOP/RCO	<p>Recommends entering 3-ONOP-071.2, "Steam Generator Tube Leakage."</p>
	ANPS	<p>Recognizes that R-15 is indicative of a S/G tube leak and enters 3-ONOP-071.2, "Steam Generator Tube Leakage."</p> <p>Directs the actions of ONOP-071.2 and monitors the Foldout Page.</p>
	BOP	<p>Verifies High Alarm ON for PRMS channel R-15 and may observe that R-19 has elevated reading but not alarming. (ONOP-071.2, Step 1)</p>
	BOP	<p>Checks the R-15 alarm is valid as follows: (ONOP-071.2, Step 2)</p> <ul style="list-style-type: none"> <li>- checks R-15 readout <math>\geq</math> alarm setpoint</li> <li>- checks channel operability <ul style="list-style-type: none"> <li>- depresses and holds the FAIL/TEST pushbutton on the R-15 channel</li> <li>- checks the readout equal to 288K or 289K</li> <li>- releases the FAIL/TEST pushbutton</li> </ul> </li> <li>- observes the CAUTION prior to Step 6 and goes to Step 6 of ONOP-071.2</li> </ul>
	ANPS	<p>Directs that plant parameters be monitored. (ONOP-071.2, Step 6)</p>
	RCO	<p>Monitors PZR level and maintains it stable or increasing by:</p> <ul style="list-style-type: none"> <li>- increasing charging rate</li> <li>- reducing letdown flow</li> </ul>
	BOP	<p>Checks the R-19 HI alarm is clear.</p>
	ANPS	<p>Requests the STA report to the control room.</p>

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 9 of 18

Event Description: 3C S/G tube leak rate begins and increases to 200 gpd. Crew will enter 3-ONOP-071.2 and perform a rapid power decrease.

Time	Position	Applicant's Actions or Behavior
	ANPS	<p>Directs the STA to approximate the tube leakage using the following (May perform this if the STA does not get to the control room) (ONOP-071.2, Step 7):</p> <ul style="list-style-type: none"> <li>- 3-OSP-041.1, "RCS Leak Rate Calculation"</li> <li>- SJAЕ SPING ACTIVITY VS SG TUBE LEAKAGE curve in the plant curve book (<math>2.3E-4 \mu\text{Ci/cc}</math>)</li> <li>- R-15 ACTIVITY VS SG TUBE LEAKAGE curve in the plant curve book (<math>9.38E3</math> counts)</li> </ul>
	BOP	<p>Attempts to identify the leaking S/G (ONOP-071.2, Step 8)</p> <p>Observes increasing radiation levels on R-15, R-19, SPING and DAM1.</p>
	ANPS	<p>Monitors the Primary to Secondary leak rate to perform the required actions (ONOP-071.2, Step 9):</p> <ul style="list-style-type: none"> <li>- checks Primary to Secondary leak rate Greater than Tech Spec limits</li> </ul> <p>Performs Attachment 1 of ONOP-071.2 to determine the Shutdown rate. (ONOP-071.2, Step 9 RNO)</p>
	ANPS	<p>Determines if operation may continue (ONOP-071.2, Step 1 of Attachment 1):</p> <ul style="list-style-type: none"> <li>- determines that Tube leakage in any S/G has NOT increased at a rate Less Than 60 gpd in 1 hour</li> <li>- returns to Step 10 of ONOP-071.2 AND must place the unit in MODE 3 within one hour (ONOP-071.2, Step 1.a, RNO a of Attachment 1)</li> </ul>
	ANPS	<p>Determines that a load reduction is required by attachment 1 and conducts a shift brief. (ONOP-071.2, Step 10)</p>
	ANPS	<p>Notifies the Load Dispatcher that a load reduction is commencing. (ONOP-071.2, Step 11)</p>
	ANPS	<p>Makes required notifications. (ONOP-071.2, Step 12)</p>

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 10 of 18

Event Description: 3C S/G tube leak rate begins and increases to 200 gpd. Crew will enter 3-ONOP-071.2 and perform a rapid power decrease.

Time	Position	Applicant's Actions or Behavior
	ANPS	Determines the rate of load reduction and informs the RCO and BOP to commence the load reduction.
	RCO	Maintains the Control Rods above insertion limits. (ONOP-071.2, Step 13.a)
	RCO/BOP	Maintains Tavg within $\pm 3F$ of Tref. (ONOP-071.2, Step 13.a)
	RCO	Establishes the desired boration rate and determines the approximate amount of boric acid per Step 13.b of ONOP-071.2 to be 170 gallons per 10% power change. (ONOP-071.2, Step 13.b)
	BOP	Reduces turbine load at the rate specified by the ANPS.
	RCO/BOP	Monitors proper plant response to the load reduction.
	ANPS	Maintains command and control of the evolution.
	Crew	Notifies that the S/G tube leak rate has gone to 600 gpm and is beyond the capacity of the charging pumps.
	ANPS	Per the foldout page of ONOP-071.2, Step 1.b, the reactor must be tripped.
	ANPS <i>CRITICAL</i>	Directs the Reactor and Turbine be tripped and the actions of E-0 be taken by the BOP and RCO.  Directs the RCO manually initiate SI and Phase A.
	RCO	Manually Trips the reactor and initiates Immediate Action of E-0.
	BOP	Manually Trips the Main Turbine and initiates Immediate Actions of E-0.

Op-Test No.: 1      Scenario No.: 3      Event No.: 8      Page 11 of 18

Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

Time	Position	Applicant's Actions or Behavior
	ANPS	Directs the response to reactor trip per 3-EOP-E-0, "Reactor Trip or Safety Injection."  Monitors E-0 Foldout Page items.
	RCO	Performs Immediate Actions in response to reactor trip per E-0:  Verifies Reactor trip (E-0, Step 1): <ul style="list-style-type: none"> <li>▶ checks all rod bottom lights ON</li> <li>▶ checks RTBs and Bypass breakers OPEN</li> <li>▶ checks all RPI's indicate zero</li> <li>▶ checks neutron flux decreasing</li> </ul>
	ANPS	Obtains verification of reactor trip.
	BOP	Performs Immediate Actions in response to reactor trip per E-0:  Verifies Turbine trip (E-0, Step 2): <ul style="list-style-type: none"> <li>▶ checks all turbine stop valves are closed</li> <li>▶ checks all MSR steam valves are closed</li> <li>▶ checks Mid and East GCBs open after 30 second delay</li> </ul> Verifies Power to Emergency 4 KV Buses (E-0, Step 3) <ul style="list-style-type: none"> <li>▶ checks both "A" and "B" 4KV buses are energized</li> <li>▶ checks the "D" 4KV bus is aligned to an energized 4KV bus</li> <li>▶ checks Load Centers 3A, 3B, 3C, 3D &amp; 3H are energized.</li> </ul>
	ANPS	Determines electric plant status.
	RCO	Checks if SI is actuated/required (E-0, Step 4): <ul style="list-style-type: none"> <li>▶ checks SI actuation setpoints -OR-</li> <li>▶ checks RCS subcooling based on exit TCs &lt;30F -OR-</li> <li>▶ PZR level can not be maintained &gt;12%</li> <li>▶ informs ANPS of plant status</li> </ul>
	RCO	Recognizes that SI is required due to decreasing PZR level and manually initiates SI and containment isolation Phase A (if SI has not occurred automatically). (E-0, Step 4 RNO b)

Op-Test No.: 1      Scenario No.: 3      Event No.: 8      Page 12 of 18

Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

Time	Position	Applicant's Actions or Behavior
	ANPS	Directs manual SI/Phase A initiation, if required.
	BOP	Verifies feed water isolation. (E-0, Step 5)
	RCO	Verifies containment isolation Phase A. (E-0, Step 6)
	BOP	Verifies AFW pumps running. (E-0, Step 7)
	RCO	Verifies SI pumps running (E-0, Step 8):
	RCO	Verifies proper CCW system operation. (E-0, Step 9)
	BOP	Verifies proper ICW operation. (E-0, Step 10)
	RCO	Verifies containment cooling. (E-0, Step 11):
	RCO	Verifies containment <u>and</u> control room ventilation isolation. (E-0, Step 12)
	BOP	Verifies that Main Steamlines do not require isolation. (E-0, Step 13)
	RCO	Monitors containment pressure and verifies containment spray is required since containment pressure has gone above 20 psig (E-0, Step 14 and Step 14.a, RNO a): <ul style="list-style-type: none"> <li>- if containment spray has not initiated then manually initiate containment spray</li> <li>- verifies containment isolation Phase B has actuated</li> <li>- checks the containment isolation phase B valve lights and determines that not all valves have closed</li> <li>- manually closes the valves that did not close</li> <li>- stops the RCPs</li> </ul>
	RCO	Verifies SI valve amber lights are ALL BRIGHT (E-0, Step 15)
	BOP	Verifies EDG's are running. (E-0, Step 16)

Op-Test No.: 1      Scenario No.: 3      Event No.: 8      Page 13 of 18

Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

Time	Position	Applicant's Actions or Behavior
	RCO	Resets SI. (E-0, Step 17)
	RCO	<p>Realigns SI system (E-0, Step 18 and Step 18.a, RNO a):</p> <ul style="list-style-type: none"> <li>▶ observes that Unit 3 high-head SI pumps, only one running. Observes zero amps on 3A SI pump and secures 3A SI pump.</li> <li>▶ stops one Unit 4 high-head SI pumps and places it in standby.</li> <li>▶ directs Unit 4 RCO to align Unit 4 high-head SI pump suction to Unit 3 RWST using E-0 Attachment 1</li> </ul>
	BOP	Directs SNPO to place Containment Post Accident Hydrogen Monitoring System in service. (E-0, Step 19)
	RCO	<p>Verifies SI flow (E-0, Step 20):</p> <ul style="list-style-type: none"> <li>▶ observes RCS pressure is &lt; 1600 psig</li> <li>▶ observes high-head SI pump flow</li> <li>▶ observes RCS pressure is NOT &lt; 250psig [650 psig]</li> <li>▶ transitions to Step 21 of E-0 from Step 20 RNO c</li> </ul>
	BOP	Verifies proper AFW valve alignment. (E-0, Step 21)
	BOP	<p>Verifies proper AFW flow (E-0, Step 22):</p> <ul style="list-style-type: none"> <li>▶ observes narrow range level in all S/G's &lt;6% [32%] and verifies total AFW flow is &gt; 345 gpm (E-0, Step 22.a, RNO a.1)</li> <li>▶ controls feed flow to maintain S/G narrow range levels between 6% [32%] and 50% (E-0, Step 22.b)</li> </ul>
	RCO	<p>Checks RCP seal cooling (E-0, Step 23 and Step 23 RNO):</p> <ul style="list-style-type: none"> <li>– observes Annunciator A-1/3, RCP THERMAL BARR COOLING WATER LO FLOW, is alarming</li> <li>– verifies RCPs are tripped</li> <li>– verifies SI is reset</li> <li>– starts one charging pump at minimum speed for seal injection</li> <li>– adjusts charging flow to Regen Heat Exchanger to maintain seal injection flow</li> </ul>

Op-Test No.: 1      Scenario No.: 3      Event No.: 8      Page 14 of 18

Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

Time	Position	Applicant's Actions or Behavior
	RCO  BOP	Observes RCS cold leg temperature is NOT stable -OR- trending to 547°F (E-0, Step 24 and Step 24, RNO) <ul style="list-style-type: none"> <li>observes temperature is decreasing and performs the following: <ul style="list-style-type: none"> <li>stops dumping steam</li> <li>limits total feed flow to 345 gpm until narrow range level greater than 6% [32%] in at least one S/G</li> </ul> </li> </ul>
	RCO	Checks RCP cooling (E-0, Step 25 and Step 25.a, RNO a): <ul style="list-style-type: none"> <li>no RCPs are running, goes to Step 26 of E-0</li> </ul>
	RCO	Checks Letdown, PZR PORVs, and Spray Valves closed. (E-0, Step 26)
	BOP	Checks if S/Gs are NOT faulted (E-0, Step 27): <ul style="list-style-type: none"> <li>checks pressure in all S/G and observes that 3C S/G pressure is decreasing in an uncontrolled manner and informs the ANPS</li> </ul>
	ANPS	With the information that pressure in 3C S/G is decreasing in an uncontrolled manner, transitions to 3-EOP-E-0, Step 27.a, RNO a.
	ANPS  <i>CRITICAL</i>	Monitors the Critical Safety Functions using 3-EOP-F-0, "Critical Safety Function Status Trees" (E-0, Step 27, RNO a.1): <ul style="list-style-type: none"> <li>observes a RED status on the INTEGRITY tree and transitions to 3-EOP-FR-P-1, "Response to Imminent Pressurized Thermal Shock Condition"</li> </ul>
	RCO	Checks RCS pressure greater than 250 psig [650 psig] (FR-P.1, Step 1)
	BOP	Observes RCS cold leg temperatures decreasing and tries to stop the cooldown (FR-P.1, Step 2 and Step 2, RNO) <ul style="list-style-type: none"> <li>verifies S/G steam dump to atmosphere valves closed</li> <li>verifies steam dump to condenser valves closed</li> <li>controls feed flow to non-faulted S/G to stop RCS cooldown. Maintains total feed flow greater than 345 gpm until narrow range level greater than 6% [32%] in at least one non-faulted S/G.</li> </ul>

Op-Test No.: 1      Scenario No.: 3      Event No.: 8      Page 15 of 18

Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Minimizes cooldown from the faulted S/G, 3C (FR-P.1, Step 3)</p> <ul style="list-style-type: none"> <li>- verifies RCS cold leg is decreasing</li> <li>- verifies the 3C S/G main steamline and bypass valve are closed</li> <li>- verifies SI reset</li> <li>- repositions AFW steam supply cross-connect valves to provide steam from intact S/Gs to all AFW pumps. Maintains steam flow to AFW pumps while repositioning cross-connect valves <ul style="list-style-type: none"> <li>- AFSS-3-006</li> <li>- AFSS-3-007</li> </ul> </li> <li>- dispatches an operator to perform the following: <ul style="list-style-type: none"> <li>- opens AFW pump steam supply MOV breakers on 3C S/G</li> <li>- closes AFW pump steam supply MOV on 3C S/G</li> </ul> </li> <li>- controls feed flow at 25 gpm to the non-faulted S/Gs</li> <li>- isolates feedwater to 3C S/G</li> </ul>
	RCO	<p>Checks PRZ PORV block valves (FR-P.1, Step 4)</p> <ul style="list-style-type: none"> <li>- power to block valves available</li> <li>- at least one block valve open</li> </ul>
	RCO	<p>Checks PZR PORVs should be closed. (FR-P.1, Step 5)</p> <ul style="list-style-type: none"> <li>- checks Overpressure Mitigation system and observes it is not in service (FR-P.1, Step 5.a, RNO a) and goes to Step 5.d.</li> <li>- checks PZR pressure &lt; 2335 psig (FR-P.1, Step 5.d)</li> <li>- checks PZR PORVs closed (FR-P.1, Step 5.e)</li> </ul>
	RCO	<p>Checks the High-head SI pumps are running. (FR-P.1, Step 6)</p>
	ANPS	<p>Checks if SI should be terminated (FR-P.1, Step 7):</p> <ul style="list-style-type: none"> <li>- observes RCS subcooling is NOT &gt; 80F [260F] (FR-P.1, Step 7, RNO) and goes to FR-P.1, Step 27</li> </ul>
	RCO	<p>Checks if an RCP should be started (FR-P.1, Step 27):</p> <ul style="list-style-type: none"> <li>- verifies all RCPs are stopped</li> <li>- observes RCS subcooling is not &gt; 30F [210F] and goes to FR-P.1, Step 32 (FR-P.1, Step 27 RNO)</li> </ul>



Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

Time	Position	Applicant's Actions or Behavior
	ANPS	<p>Determines if RCS temperature soak is required (FR-P.1, Step 32)</p> <ul style="list-style-type: none"> <li>- verifies that the RCS cooldown rate has been greater than 100F in any 60 minute period</li> <li>- records start time of the soak</li> <li>- notifies crew that can not cooldown the RCS until temperature has been stable for 1 hour</li> <li>- notifies the crew that can not increase RCS pressure during the 1 hour soak</li> <li>- notifies the crew that procedure actions can be performed that will not affect the soak</li> <li>- notifies the crew that RCS cooldown is permitted after the 1 hour soak has been completed</li> </ul>
	RCO	Maintains RCS pressure and cold leg temperatures within the limits of FR-P.1 FIGURE 1 limits. (FR-P.1, Step 32)
	BOP	Maintains cooldown rate in RCS cold legs less than 50F in any 60 minute period during subsequent recovery actions. (FR-P.1, Step 32)
	ANPS	Returns to Procedure and step in effect (FR-P.1, Step 33), 3-EOP-E-0, Step 27, RNO a.1.
	ANPS <i>CRITICAL</i>	<p>Monitors the Critical Safety Functions using 3-EOP-F-0, "Critical Safety Function Status Trees." (E-0, Step 27, RNO a.1)</p> <ul style="list-style-type: none"> <li>- observes an ORANGE path on the CONTAINMENT tree and transitions to 3-EOP-FR-Z-1, "Response to High Containment Pressure."</li> </ul>
	RCO	<p>Checks the status of the RCPs (FR-Z.1, Step 1):</p> <ul style="list-style-type: none"> <li>- verifies all RCPs OFF</li> <li>- verifies all normal containment coolers OFF</li> </ul>
	RCO	Verifies containment isolation Phase A. (FR-Z.1, Step 2)
	RCO	Verifies containment isolation Phase B. (FR-Z.1, Step 3)

Op-Test No.: 1      Scenario No.: 3      Event No.: 8      Page 17 of 18

Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

Time	Position	Applicant's Actions or Behavior
	BOP	Verifies containment and control room ventilation isolation. (FR-Z.1, Step 4)
	BOP	Checks cold leg recirculation capability available. (FR-Z.1, Step 5)
	RCO	Verifies adequate containment spray pump suction during injection phase (FR-Z.1, Step 6): <ul style="list-style-type: none"> <li>- RWST level &gt; 155k gallons</li> <li>- RWST outlet isolation valves OPEN <ul style="list-style-type: none"> <li>- MOV-3-864A</li> <li>- MOV-3-864B</li> </ul> </li> </ul>
	ANPS	Goes to FR-Z.1, Step 8. (FR-Z.1, Step 6)
	RCO	Verifies proper containment spray pump alignment (FR-Z.1, Step 8): <ul style="list-style-type: none"> <li>- dispatches an operator to locally verify containment spray pump suction and discharge isolation valves OPEN</li> <li>- verifies containment spray pumps at least one running</li> <li>- checks if second containment spray pump should be running <ul style="list-style-type: none"> <li>- RWST &gt; 155k gallons</li> <li>- Containment pressure &gt; 14 psig</li> <li>- verifies second containment spray pump running</li> </ul> </li> <li>- verifies containment spray isolation valves on running containment spray pumps OPEN <ul style="list-style-type: none"> <li>- MOV-3-880A for CSP A</li> <li>- MOV-3-880B for CSP B</li> </ul> </li> </ul>
	RCO	Verifies proper CCW system operation. (FR-Z.1, Step 9)
	RCO	Verifies containment cooling. (FR-Z.1, Step 10)
	BOP	Verifies main steamline isolation and bypass valves CLOSED. (FR-Z.1, Step 11)
	BOP	Checks if feed flow should be isolated to any S/G. (FR-Z.1, Step 12)

Event Description: 3C S/G faulted (inside containment) & ruptured (600 gpm). Perform FR-P.1 (Red path) and FR-Z.1 (Orange path). 3A SI Pump shaft shears and Phase B relay CIB1 fails to actuate (3 valves fail to close).

[illegible]



Procedure No.:  <b>0-ADM-202</b>	Procedure Title:  <b>Shift Relief and Turnover</b>	Page: <b>17</b>
		Approval Date: <b>5/9/00</b>

**ATTACHMENT 1**  
(Page 2 of 2)  
**NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST**

**Common Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

No equipment out of service.

**Common Evolutions and Common General Information**

None planned - no info of note.

**PART 2 - To be reviewed by Oncoming NPS/ANPS/WCCS prior to shift relief (Check box)**

<u>NPS</u>	<u>U-3 ANPS</u>	<u>U-4 ANPS</u>	<u>WCCS</u>	<u>ANPS in WCC</u>		<u>NPS</u>	<u>U-3 ANPS</u>	<u>U-4 ANPS</u>	<u>WCCS</u>	<u>ANPS in WCC</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Control Room Deficiency Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Review Clearances Issued for last 24 hours
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All EOOS Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Both RCO Logbooks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Special Instruction Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Night Order Book
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Watch stander OOS Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Controlled Key Log
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In compliance with license restriction, if any*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCBA corrective lenses readily available if corrective lenses required by license*

**Shift Responsibility Turned Over By (a) And Accepted By (b):**

NPS (sign) (a) \_\_\_\_\_ (b) \_\_\_\_\_

U-3 ANPS (sign) (a) \_\_\_\_\_ (b) \_\_\_\_\_

U-4 ANPS (sign) (a) \_\_\_\_\_ (b) \_\_\_\_\_

WCCS \_\_\_\_\_ (b) \_\_\_\_\_

ANPS in WCC \_\_\_\_\_ (b) \_\_\_\_\_

**PART 3 - To be reviewed/accomplished by NPS/ANPS shortly after assuming shift (Check box)**

<u>NPS</u>	<u>U-3 ANPS</u>	<u>U-4 ANPS</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Red Book (Surveillance Requirements)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduct Shift Briefing (include Night Orders, Special Instructions, Operator Work Around Aggregate Effects)

**PART 4 - To be reviewed/accomplished by NPS/ANPS prior to the end of the shift (Check box)**

<u>NPS</u>	<u>U-3 ANPS</u>	<u>U-4 ANPS</u>	
<input type="checkbox"/>			Check all shift mailboxes for unresolved Tech Spec related procedure problems (midshift only)
	<input type="checkbox"/>	<input type="checkbox"/>	Update Red Book (Surveillance Requirements)
	<input type="checkbox"/>	<input type="checkbox"/>	Review and sign Operator Logs

\* Required prior to accepting the shift responsibility

Procedure No.:  <b>0-ADM-202</b>	Procedure Title:  <b>Shift Relief and Turnover</b>	Page: <b>19</b>
		Approval Date: <b>10/20/00</b>

### ATTACHMENT 3

(Page 1 of 1)

### RCO - UNIT DUTY SHIFT RELIEF CHECKLIST

Relief Time: XX:XX Date: XX/XX/XX Unit # 3

Off-going RCO (print name) Robertson Oncoming RCO: (print name) \_\_\_\_\_

#### PART 1 - To be completed by Off-going RCO

Unit 3 Mode: 1 100 % Power \* 754 Gross MWe (\* Record N/A in Modes 2-6)  
 Unit 4 Mode: 1 100 % Power \* 752 Gross MWe (\* Record N/A in Modes 2-6)  
 Source Range: N31 or N32 N/A cps \*\* Intermediate Range: N35 or N36 N/A amp\*\*  
 (\*\*Record "N/A" in Mode 1)

Tavg 574 °F Pressure 2240 psig RCS Boron 700 ppm  
 RCS Leakage 0.02 gpm Determined Date XX/XX/XX Time XX:XX  
 GRP in progress # N/A Tank # N/A LRP in progress # N/A Tank # N/A  
 Cmtt Purge Permit in progress # N/A  
 WTP ☐ OOS ☒ In Service to DWST

Boric Acid Storage Tk Levels A 7400 B 7400 C 7400

Accumulator Reference Level/Date A 6640 1xx/xx/xx B 6680 1xx/xx/xx C 6635 1xx/xx/xx

#### Abnormal Annunciator Status Reason:

C-8/3 Condenser steam dump mode selector switch > MANUAL. TC-3-408H under repair. Caution tag hung

#### Major EOOS/LCOs:

-3C charging pump OOS - motor ground - TS 3.1.2.3 LCO not entered - clearance info tag hung.  
-TC-3-408H - see ann. C-8/3 item above.  
-RV-3-203 repair complete - see below.

#### Operations, Procedures, Transients, or Significant Maintenance in Progress:

-Excess letdown in service & normal letdown secured. Since RV-3-203 repaired, place normal letdown  
in service and secure excess letdown using guidance of 3-QP-047 sect. 7.13 & 7.15 respectively  
-Maintain 100 % power.

#### PART 2 - To be Reviewed/completed by Oncoming RCO prior to shift relief (Check box)

- |  |   |
|--|---|
| <input type="checkbox"/> RCO Logbook   | <input type="checkbox"/> In compliance with license restrictions, if any*   |
| <input type="checkbox"/> RCO Logs Abnormal/Noted readings  | <input type="checkbox"/> SCBA corrective lenses readily available if corrective lenses required by license*   |
| <input type="checkbox"/> TSA Logbook   | <input type="checkbox"/> If on overtime this shift or on overtime on the next shift in this position, or if a shift trade is involved, sign overtime sheet* |
| <input type="checkbox"/> Walk Down Control Boards  | <input type="checkbox"/> Control Room Deficiency Log  |
| <input type="checkbox"/> Clearance Book (in Modes 1-4) for clearances issued since last shift worked. (No check required in Modes 5-6) | <input type="checkbox"/> EOOS Logbooks (All)  |
| <input type="checkbox"/> Watchstander Out-of-Service Book  | <input type="checkbox"/> Watch Station Cleanliness  |
| <input type="checkbox"/> Check blending station controllers are set for current RCS boron concentration.                               | <input type="checkbox"/> Special Instruction Book   |
|  | <input type="checkbox"/> Review Annunciator Status Sheets   |

\* Required prior to accepting shift responsibility.

#### PART 3 - To be accomplished by RCO prior to end of shift (Check box)

- ☐ Notify NWE of any schedule or status changes and ensure the Overtime Manager is updated.

Shift Responsibility Turned Over By: \_\_\_\_\_

Shift Responsibility Accepted By: \_\_\_\_\_

Facility: Turkey PointScenario No.: 4Op-Test No.: 1
 Examiners: C. Payne  
M. Sykes  
M. Miller

 Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: Mode 1, 65% RTP (IC-24mod)

Turnover: Power level is at 65% returning from a unit power reduction for maintenance on the 3B SGFP and lube oil system. All testing was completed and the system returned back to service. Equipment OOS --- 3C Charging Pump is out of service for motor ground (at this power, both Charging Pump 3A & 3B will be running), I&C has Steam Dump selector switch selected to the MANUAL (Steam Pressure) mode due to problem with TC-408H, (Tavg input to Turbine Trip Summator), 3D Normal Containment Cooler breaker is racked out for inspection, PRN1 Channel N-41 upper detector failed. The crew will be directed to perform the monthly operability test of 3A RHR pump and then raise power as soon as possible back to 100% to meet load demand.

Event No.	Malf. No.	Event Type*	Event Description
1		N/RCO	Perform RHR pump 3A monthly operability test, 3-OSP-050.2. During the test, the pump will be declared inoperable and taken out of service due to high pump vibrations.
2		C/BOP	3B SGFP fails to trip on lube oil lo pressure. Manually trip the pump and the main turbine fails to auto runback to 45% load. BOP will manually reduce load sufficiently to stabilize the plant. (ARP D 6/5, ARP D 6/2, 3-ONOP-089.)
3		C/BOP	Respond to 480 volt transformer 3B ground/high temp alarm due to high amps on the 3B Normal Containment Cooler Fan. Crew shifts MCC loads, identifies high amps on 3B NCC (or it trips on motor O/L), and shifts to 3D NCC. (ARP F 7/3, Breaker List, P&ID 5610TE1591, ARP I 9/6)
4		I/RCO	PT-3-456 Fails High. (ARP A 8/1, 3-ONOP-049.1, T.S. 3.3.1 & 3.3.2, 3.0.3). Can not trip Ch II OT&T or a Rx trip results.
5		C/RCO	3A RCP #1 seal leakage (5.6 gpm) resulting in a fast load reduction.
6		R/RCO	Reduce power per 3-ONOP-100 due to 3A RCP #1 seal high leakoff.
7		ALL	3A RCP #1 seal failure, Rx trip required.
8		M/C/All	SBLOCA/Safety Injection with 3B Sequencer failure (3B RHR pump breaker fails, request replace with spare bkr)
8A		M/C/All	Loss of Emergency Coolant Recirculation (install spare 3B RHR pump breaker at ECA-1.1, step 10, then go back to E-1)

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Op-Test No.: 1 Scenario No.: 4 Event No.: 1 Page 1 of 21

Event Description: Perform RHR pump 3A monthly operability test, 3-OSP-0505.2. During the test the pump will be declared inoperable and taken out of service due to high pump vibration.

Time	Position	Applicant's Actions or Behavior
	<b>RCO</b>	Verifies the following valves are locked open: <ul style="list-style-type: none"> <li>▶ RWST Outlet Isolation MOV-3-864A</li> <li>▶ RWST Outlet Isolation MOV-3-864B</li> <li>▶ RWST Suction Stop MOV-3-862A</li> <li>▶ RWST Suction Stop MOV-3-862B</li> </ul>
	<b>RCO</b>	Opens MOV-3-749A and time the stroke (typically 1 min 55 sec).
	<b>RCO</b>	Verifies 'A' CCW flow increase on FI-3-613A.
	<b>RCO</b>	Records RWST level (Unit 3 Tech Spec value $\geq 320k$ gallons).
	<b>RCO</b>	Starts 3A RHR pump and record start time. <ul style="list-style-type: none"> <li>▶ Starts 5 minute steady state run time</li> </ul>
	<b>NOTE</b>	<b>Two (2) minutes into the run, the SNPO calls in that 3A RHR pump is vibrating excessively and extremely noisy and recommends securing the pump.</b>
	<b>RCO</b>	Stops the 3A RHR pump (May place the pump control switch in pull-to-lock position).
	<b>RCO</b>	Closes MOV-3-749A.
	<b>ANPS</b>	Directs RCO/BOP to take actions to disable 3A RHR pump.
	<b>ANPS</b>	May request the SNPO rack out the breaker for the 3A RHR pump.
	<b>ANPS</b>	Maintains command and control of the evolution.



Op-Test No.: 1      Scenario No.: 4      Event No.: 1      Page 2 of 21

Event Description: Perform RHR pump 3A monthly operability test, 3-OSP-0505.2. During the test the pump will be declared inoperable and taken out of service due to high pump vibration.

[illegible]

Op-Test No.: 1      Scenario No.: 4      Event No.: 2      Page 3 of 21

Event Description: 3B SGFP fails to trip on low lube oil pressure, annunciator D-6/5. Also, the Main Turbine automatic runback fails. Operators should manually trip the 3B SGFP and manually run back the Main Turbine.

Time	Position	Applicant's Actions or Behavior
	<b>BOP</b>	Responds to annunciator alarm D-6/5, SGFP B LUBE OIL LO PRESSURE TRIP.
	<b>BOP</b>	Secures the 3B SGFP.
	<b>BOP/ RCO</b>	Observes that an automatic runback of the Main Turbine should have occurred and has failed.
	<b>BOP, Critical</b>	Manually runs back the Main Turbine to $\leq 60\%$ per 3-ONOP-089.
	<b>BOP</b>	Directs SNPO to locally check the condition of the 3B SGFP.
	<b>RCO</b>	Monitors plant parameters.
	<b>RCO/ BOP</b>	Stabilizes the plant at a new lower power level.
	<b>RCO</b>	Assists BOP as directed.
	<b>RCO</b>	Maintains Tavg/Tref within $\pm 3F$ .
	<b>RCO</b>	Maintains Rods in AUTO and ensures proper rod response.
	<b>ANPS</b>	Directs securing the 3B SGFP on receiving annunciator "D-6/5".
	<b>ANPS</b>	Observes that an automatic runback of the Main Turbine should have occurred and has failed.
	<b>ANPS</b>	Determines new power level (45-60%) that is within the capacity of one SGFP, and directs power be reduced to this level.

Op-Test No.: 1      Scenario No.: 4      Event No.: 2      Page 4 of 21

Event Description: 3B SGFP fails to trip on low lube oil pressure, annunciator D-6/5. Also the Main Turbine automatic runback fails. Operators should manually trip the 3B SGFP and manually run back the Main Turbine.

[illegible]

Op-Test No.: 1      Scenario No.: 4      Event No.: 3      Page 5 of 21

Event Description: 480 volt transformer 3B ground/high temp alarm due to high amps on the 3B Normal Containment Cooler Fan. Crew shifts MCC loads, identifies high amps on 3B NCC (or it trips on motor O/L), and shifts to 3D NCC.

Time	Position	Applicant's Actions or Behavior
	<b>BOP</b>	Responds to annunciator alarm "F-7/3", 480V XFMR A/B/C/D GROUND/HI TEMP.
	<b>BOP</b>	Attempts to identify the transformer with the problem.
	<b>BOP</b>	Dispatches SNPO to check local temperatures and ground indications at each 480 volt transformer.
	<b>BOP</b>	Observes 3B Containment Cooler Fan has high amp indication.
	<b>RCO</b>	Stops 3B Containment Cooler Fan.
	<b>RCO</b>	Assists the BOP as directed by the ANPS.
	<b>RCO/ BOP</b>	Checks containment and RCP temperatures are within specification.
	<b>RCO/ BOP</b>	Contacts Electrical Maintenance to check the status of 3D Containment Cooler Fan. May start 3D Containment Cooler Fan to limit temperature increase.
	<b>ANPS</b>	Ensures SNPO is dispatched to check local temperatures and ground indications at each 480 volt transformer.
	<b>ANPS</b>	Directs the RCO to stop 3B Containment Cooler Fan.
	<b>ANPS</b>	Determines if 3D Containment Cooler Fan should be started.
	<b>ANPS</b>	Maintains command and control of the evolution.

Op-Test No.: 1      Scenario No.: 4      Event No.: 4      Page 6 of 21

Event Description: PT-3-456 fails high (during bistable tripping can not trip CH II OTDT or a reactor trip will result)

Time	Position	Applicant's Actions or Behavior
	RCO	Responds to annunciator alarm "A-8/1", PZR PROTECTION HI PRESS.
	RCO	Recognizes failure of the protection channel PT-3-456.
	RCO	Refers to 3-ONOP-049.1 for bistables to be tripped.
	RCO Critical	Recognizes that bistables 3-422-C1 and 3-422-C2 can not be tripped without resulting in a reactor trip. Notifies the ANPS.
	RCO	Verifies proper annunciator respons to bistables tripped.
	BOP	Assists RCO as directed by the ANPS.
	BOP/ RCO	Trips bistables specified in 3-ONOP-049.1 as directed by the ANPS.
	BOP	Verifies proper annunciator respons to bistables tripped.
	ANPS	Recognizes failure of the protection channel PT-3-456.
	ANPS	Refers to 3-ONOP-049.1 for the bistables to be tripped.
	ANPS Critical	Recognizes that bistables 3-422-C1 and 3-422-C2 can not be tripped without causing a reactor trip.
	ANPS	Directs tripping bistables specified in 3-ONOP-049.1: <ul style="list-style-type: none"> <li>▶ 3-456-A</li> <li>▶ 3-456-B</li> <li>▶ 3-456-C</li> <li>▶ 3-456-D</li> </ul>

Page 7 of 21

Event Description: PT-3-456 fails high (during bistable tripping can not trip CH II OTDT or a reactor trip will result)

[illegible]

Op-Test No.: 1      Scenario No.: 4      Event No.: 5      Page 8 of 21

Event Description: 3A RCP #1 seal leakage (5.6 GPM) results in a need for a fast load reduction

Time	Position	Applicant's Actions or Behavior
	RCO	Responds to annunciator alarm "A-1/5", RCP SEAL LEAK-OFF HI FLOW.
	RCO	Verifies alarm by checking the following: <ul style="list-style-type: none"> <li>► checks seal leak-off greater than 5 GPM as indicated on FR-3-154B.</li> <li>► checks charging flow / seal injection flow normal.</li> </ul>
	RCO	Refers to 3-ONOP-041.1, "Reactor Coolant Pump Off-Normal."
	RCO	Check For Proper Seal Injection Flow (Step 1, ONOP-041.1).
	RCO	Checks number one seal leak-off flow within limits of 3-ONOP-041.1, Enclosure (1). Determines flow is above limits and goes to Step 16. (Step 2, ONOP-041.1 RNO)
	RCO	Checks if any RCP number one seal Leak-off flow(s), FR-3-154A , greater than upper limit of enclosure (1). Determines that 3A RCP flows are above limits. (Step 16, ONOP-041.1)
	RCO	Checks 3A RCP Seal Bypass Valve, CV-3-307 closed. (Step 17, ONOP-041.1)
	RCO	Checks all RCP number one seal leak-off flows on FR-3-154A are less than 6 GPM. (Step 18, ONOP-041.1)
	RCO	Checks all RCP number one seal leak-off flows on FR-3-154A are less than or equal to 5.5 GPM. (Step 19.a, ONOP-041.1)
	RCO	Performs the following per ONOP-041.1, Step 19.a RNO a.: <ul style="list-style-type: none"> <li>► commences unit shutdown using 3-ONOP-100, "Fast Load Reduction."</li> </ul>

Page 9 of 21

\_\_\_\_\_

[illegible]



Op-Test No.: 1      Scenario No.: 4      Event No.: 6      Page 10 of 21

Event Description: Reduce power per 3-ONOP-100, "Fast Load Reduction," due to 3A  
RCP #1 seal high leakoff.

[illegible]

Op-Test No.: 1      Scenario No.: 4      Event No.: 7      Page 11 of 21

Event Description: 3A RCP #1 seal failure results in a small break LOCA, Reactor trip required.

[illegible]

Op-Test No.: 1      Scenario No.: 4      Event No.: 8      Page 12 of 21

Event Description: SBLOCA/Safety Injection with 3B sequencer failure (3B RHR pump breaker fails, request replace with spare breaker)

Time	Position	Applicant's Actions or Behavior
	ANPS	<p>Directs the response to reactor trip per 3-EOP-E-0, "Reactor Trip or Safety Injection."</p> <p>Monitors E-0 Foldout Page items.</p>
	RCO	<p>Performs Immediate Actions in response to reactor trip per E-0:</p> <p>Verifies Reactor trip (E-0, Step 1):</p> <ul style="list-style-type: none"> <li>▶ checks all rod bottom lights ON</li> <li>▶ checks RTBs and Bypass breakers OPEN</li> <li>▶ checks all RPI's indicate zero</li> <li>▶ checks neutron flux decreasing</li> </ul>
	ANPS	Obtains verification of reactor trip.
	BOP	<p>Performs Immediate Actions in response to reactor trip per E-0:</p> <p>Verifies Turbine trip (E-0, Step 2):</p> <ul style="list-style-type: none"> <li>▶ checks all turbine stop valves are closed</li> <li>▶ checks all MSR steam valves are closed</li> <li>▶ checks Mid and East GCBs open after 30 second delay</li> </ul> <p>Verifies Power to Emergency 4 KV Buses (E-0, Step 3)</p> <ul style="list-style-type: none"> <li>▶ checks both "A" and "B" 4KV buses are energized</li> <li>▶ checks the "D" 4KV bus is aligned to an energized 4KV bus</li> <li>▶ checks Load Centers 3A, 3B, 3C, 3D &amp; 3H are energized.</li> </ul>
	ANPS	Determines electric plant status.
	RCO	<p>Checks if SI is actuated/required (E-0, Step 4):</p> <ul style="list-style-type: none"> <li>▶ checks SI actuation setpoints -OR-</li> <li>▶ checks RCS subcooling based on exit TCs &lt;30F -OR-</li> <li>▶ PZR level can not be maintained &gt;12%</li> <li>▶ informs ANPS of plant status</li> </ul>

Op-Test No.: 1      Scenario No.: 4      Event No.: 8      Page 13 of 21

Event Description: SBLOCA/Safety Injection with 3B sequencer failure (3B RHR pump breaker fails, request replace with spare breaker)

Time	Position	Applicant's Actions or Behavior
	RCO	Recognizes that SI is required due to decreasing PZR level and manually initiates SI and containment isolation Phase A (if SI has not occurred automatically). (E-0, Step 4 RNO b)
	ANPS	Directs manual SI/Phase A initiation if required.
	BOP	Verifies feed water isolation. (E-0, Step 5)
	RCO	Verifies containment isolation Phase A. (E-0, Step 6)
	BOP	Verifies AFW pumps running. (E-0, Step 7)
	RCO	Verifies SI pumps running (E-0, Step 8): <ul style="list-style-type: none"> <li>▸ observes no RHR pumps running (3A RHR pump out of service from event #1)</li> <li>▸ attempts to manually start 3B RHR pump (does not start due to breaker failure)</li> <li>▸ informs ANPS</li> </ul>
	RCO	Verifies proper CCW system operation. (E-0, Step 9)
	BOP	Verifies proper ICW operation. (E-0, Step 10)
	RCO	Verifies containment cooling. (E-0, Step 11): <ul style="list-style-type: none"> <li>▸ observes only one emergency containment cooler fan running (two required) and one emergency containment filter fan running (two required.)</li> <li>▸ starts one additional emergency containment cooler fan</li> <li>▸ starts one emergency containment filter fan</li> </ul>
	RCO	Verifies containment <u>and</u> control rm. ventilation isolation. (E-0, Step 12)

Op-Test No.: 1      Scenario No.: 4      Event No.: 8      Page 14 of 21

Event Description: SBLOCA/Safety Injection with 3B sequencer failure (3B RHR pump breaker fails, request replace with spare breaker)

Time	Position	Applicant's Actions or Behavior
	BOP	Verifies that Main Steamlines do not require isolation. (E-0, Step 13)
	RCO	Monitors containment pressure to verify containment spray is not required. (E-0, Step 14)
	RCO	Verifies SI valve amber lights are ALL BRIGHT (E-0, Step 15)
	BOP	Verifies EDG's are running. (E-0, Step 16)
	RCO	Resets SI. (E-0, Step 17)
	RCO	Realign SI system (E-0, Step 18): <ul style="list-style-type: none"> <li>▸ observes that Unit 3 high-head SI pumps, only one running. Manually starts 3B SI pump.</li> <li>▸ stops both Unit 4 high-head SI pumps and places them in standby.</li> </ul>
	BOP	Directs SNPO to place Containment Post Accident Hydrogen Monitoring System in service. (E-0, Step 19)
	RCO	Verifies SI flow (E-0, Step 20): <ul style="list-style-type: none"> <li>▸ observes RCS pressure is NOT &lt; 1600 psig</li> <li>▸ transitions to Step 21 of E-0 from Step 20 RNO c</li> </ul>
	BOP	Verifies proper AFW valve alignment. (E-0, Step 21)
	BOP	Verifies proper AFW flow (E-0, Step 22): <ul style="list-style-type: none"> <li>▸ observes narrow range level in all S/G's &lt;6% and verifies total AFW flow is &gt; 345 gpm (E-0, Step 22.a RNOa.1)</li> <li>▸ controls feed flow to maintain S/G narrow range levels between 6% and 50% (E-0, Step 22.b)</li> </ul>

Op-Test No.: 1      Scenario No.: 4      Event No.: 8      Page 15 of 21

Event Description: SBLOCA/Safety Injection with 3B sequencer failure (3B RHR pump breaker fails, request replace with spare breaker)

Time	Position	Applicant's Actions or Behavior
	RCO	Checks RCP seal cooling (E-0, Step 23): <ul style="list-style-type: none"> <li>▸ observes 3A RCP seal cooling is NOT normal due to the failed seal and not due to loss of CCW flow</li> </ul>
	BOP	Observes RCS cold leg temperature is stable -OR- trending to 547°F (E-0, Step 24)
	RCO/ BOP	Checks RCP cooling. (E-0, Step 25)
	RCO/ BOP	Re-establishes RCP cooling (E-0, Step 25.c): <ul style="list-style-type: none"> <li>▸ verifies SI reset</li> <li>▸ resets containment isolation Phase A</li> <li>▸ opens CCW to Normal Containment Cooler Valves <ul style="list-style-type: none"> <li>– MOV-3-1417</li> <li>– MOV-3-1418</li> </ul> </li> <li>▸ Resets and starts normal containment coolers</li> </ul>
	RCO	Checks Letdown, PZR PORVs, and Spray Valves closed. (E-0, Step 26)
	BOP	Checks if S/Gs are NOT faulted (E-0, Step 27): <ul style="list-style-type: none"> <li>▸ observes pressure in all S/Gs satisfactory</li> </ul>
	BOP	Checks if S/G tubes are NOT ruptured (E-0, Step 28): <ul style="list-style-type: none"> <li>▸ observes condenser air ejector radiation is normal, R-15</li> <li>▸ observes S/G blowdown radiation is normal, R-19</li> <li>▸ observes ERDADS or local DAM1 monitor readings are normal</li> <li>▸ observes local steamline radiation readings are normal</li> </ul>

Op-Test No.: 1 Scenario No.: 4 Event No.: 8 Page 16 of 21

Event Description: SBLOCA/Safety Injection with 3B sequencer failure (3B RHR pump breaker fails, request replace with spare breaker)

Time	Position	Applicant's Actions or Behavior
	RCO	Checks if RCS is intact (E-0, Step 29): <ul style="list-style-type: none"> <li>▸ observes that the RCS is not intact by: <ul style="list-style-type: none"> <li>- Containment radiation</li> <li>- Containment pressure</li> <li>- Containment sump level</li> </ul> </li> <li>▸ informs the ANPS</li> </ul>
	ANPS Critical	With the information that the RCS is NOT intact, transitions to 3-EOP-E-1, "Loss of Reactor or Secondary Coolant," Step 1 per E-0, Step 29 RNO 2.
	ANPS	Monitors Critical Safety Functions using 3-EOP-F-0 as directed by E-0, Step 29 RNO 1.
	ANPS	Directs the response to loss of reactor coolant per E-1.  Monitors 3-EOP-E-1 Foldout Page items.
	RCO	Monitors conditions to determine if RCPs should be stopped (E-1, Step 1): <ul style="list-style-type: none"> <li>▸ observes RCS subcooling is NOT less than 25°F [65°F] and goes to Step 2 per RNO</li> </ul>
	RCO	Checks that S/Gs are NOT faulted. (E-1, Step 2)
	BOP	Maintains S/G levels (E-1, Step 3): <ul style="list-style-type: none"> <li>▸ narrow range level &gt; 6% [32%]</li> <li>▸ controls feed flow to maintain narrow range level between 15% [32%] and 50%</li> </ul>
	BOP	Monitors secondary radiation (E-1, Step 4): <ul style="list-style-type: none"> <li>▸ directs Chemistry to take S/G activity samples</li> <li>▸ direct Chemistry to take DAM1 monitor readings</li> <li>▸ directs HP to take RAD readings on steamlines</li> </ul>

Op-Test No.: 1      Scenario No.: 4      Event No.: 8      Page 17 of 21

Event Description: SBLOCA/Safety Injection with 3B sequencer failure (3B RHR pump breaker fails, request replace with spare breaker)

Time	Position	Applicant's Actions or Behavior
	RCO	Checks PORVs and Block valves (E-1, Step 5): <ul style="list-style-type: none"> <li>▸ verifies power available to the block valves</li> <li>▸ verifies PORVs closed</li> <li>▸ verifies at least one block valve open</li> </ul>
	RCO	Verifies SI is reset. (E-1, Step 6)
	RCO	Resets containment isolation Phase A and Phase B (E-1, Step 7)
	RCO	Verifies instrument air to containment (E-1, Step 8) <ul style="list-style-type: none"> <li>▸ verifies CV-3-2803 open</li> <li>▸ verifies instrument air pressure &gt;95 psig</li> </ul>
	BOP	Checks power to charging pumps from offsite. (E-1, Step 9)
	RCO	Checks if charging flow established (E-1, Step 10): <ul style="list-style-type: none"> <li>▸ observes no charging pumps running and starts at least one charging pump (Step 10.a, RNO a.2)</li> <li>▸ places RCS Makeup Control Switch in STOP (Step 10.b)</li> <li>▸ establishes maximum charging flow (Step 10.c) <ul style="list-style-type: none"> <li>– starts additional charging pumps</li> <li>– adjust charging pump speed controller(s)</li> <li>– adjust charging flow to maintain seal injection flow</li> </ul> </li> <li>▸ verifies charging pump suction auto transfers to the RWST (Step 10.d)</li> </ul>
	ANPS	Checks criteria for SI termination (E-1, Step 11): <ul style="list-style-type: none"> <li>▸ RCS subcooling &gt;30F [210F] (Step 11.a)</li> <li>▸ secondary heat sink available (Step 11.b)</li> <li>▸ RCS pressure &gt;1600 psig and increasing/stable (Step 11.c) <ul style="list-style-type: none"> <li>– this is not the case, goes to E-1, Step 12 (Step 11.c RNO)</li> </ul> </li> </ul>



Op-Test No.: 1      Scenario No.: 4      Event No.: 8      Page 18 of 21

Event Description: SBLOCA/Safety Injection with 3B sequencer failure (3B RHR pump breaker fails, request replace with spare breaker)

Time	Position	Applicant's Actions or Behavior
	RCO	Checks if containment spray should be stopped (E-1, Step 12): <ul style="list-style-type: none"> <li>▸ observes that spray pumps are running (Step 12.a)</li> <li>▸ verifies that emergency containment filter spray valves are closed (Step 12.b)</li> <li>▸ observes that containment temperature is &lt;122°F (Step 12.b)</li> <li>▸ observes containment pressure is &lt; 14 psig (Step 12.b)</li> <li>▸ resets containment spray signal (Step 12.c)</li> <li>▸ stops the containment spray pumps and places in standby (Step 12.d)</li> <li>▸ closes containment spray isolation valves (Step 12.e)               <ul style="list-style-type: none"> <li>– MOV-3-880A</li> <li>– MOV-3-880B</li> </ul> </li> </ul>
	RCO	Checks if RHR pumps should be stopped (E-1, Step 13): <ul style="list-style-type: none"> <li>▸ observes there are no RHR pumps running</li> </ul>
	RCO/ BOP	Checks RCS and S/G pressures (E-1, Step 14): <ul style="list-style-type: none"> <li>▸ verifies S/G pressures are stable or increasing</li> <li>▸ verifies RCS pressure is stable or decreasing</li> </ul>
	BOP	Checks if diesel generators should be stopped (E-1, Step 15): <ul style="list-style-type: none"> <li>▸ verifies the A and B 4KV buses are energized by offsite power (Step 15.a)</li> <li>▸ stops the unloaded diesel generators and places them in standby (Step 15.b)</li> </ul>
	RCO <b>Critical</b>	Verifies cold leg recirculation capability (E-1, Step 16): <ul style="list-style-type: none"> <li>▸ observes that there are currently no RHR pumps available</li> <li>▸ informs the ANPS</li> </ul>
	ANPS <b>Critical</b>	With the information that there are NO RHR pumps available, transitions to 3-EOP-E-1.1, "Loss of Emergency Coolant Recirculation," Step 1. (E-1, Step 16 RNO)

Op-Test No.: 1      Scenario No.: 4      Event No.: 8A      Page 19 of 21

Event Description: Loss of Emergency Coolant Recirculation (install spare 3B RHR pump breaker at ECA-1.1 step 10, then go back to E-1 step 16)

Time	Position	Applicant's Actions or Behavior
	ANPS	Directs the response to loss of emergency coolant recirculation per 3-EOP-E-1.1, "Loss of Emergency Coolant Recirculation."
	ANPS	Reads CAUTION prior to Step 1, ECA-1.1: <ul style="list-style-type: none"> <li>▶ if emergency coolant recirculation capability is restored during this procedure, further recovery actions shall continue by returning to procedure and step in effect</li> </ul>
	RCO	Checks cold leg recirculation capability - available (ECA-1.1, Step 1) <ul style="list-style-type: none"> <li>▶ verifies RHR pump suction from RWST</li> <li>▶ verifies at least one flow path from containment recirc sump to an RHR pump available</li> <li>▶ verifies NO RHR pumps available</li> </ul>
	ANPS	Directs actions to manually or locally operate equipment to establish emergency coolant recirculation capability (ECA-1.1, Step 1 RNO)
	ANPS Critical	Directs SNPO to investigate the problem with 3B RHR pump: <ul style="list-style-type: none"> <li>▶ SNPO reports that the problem is with the 3B RHR breaker and a spare breaker will be installed</li> </ul>
	RCO	Adds makeup to RWST as necessary to extend its time as a suction source (ECA-1.1, Step 2): <ul style="list-style-type: none"> <li>▶ stops the makeup system</li> <li>▶ dispatches an operator to: <ul style="list-style-type: none"> <li>– verifies manual emergency boration isolation closed</li> <li>– opens blender discharge to RWST stop valve</li> <li>– opens blender discharge to RWST</li> </ul> </li> <li>▶ places control switch for FCV-3-113A in AUTO</li> <li>▶ places control switch for FCV-3-114A in OPEN</li> </ul>

Op-Test No.: 1      Scenario No.: 4      Event No.: 8A      Page 20 of 21

Event Description: Loss of Emergency Coolant Recirculation (install spare 3B RHR pump breaker at ECA-1.1 step 10, then go back to E-1 step 16)

Time	Position	Applicant's Actions or Behavior
	RCO	<ul style="list-style-type: none"> <li>▶ places control switch for FCV-3-113B in CLOSE</li> <li>▶ places control switch for FCV-3-114B in CLOSE</li> <li>▶ verifies emergency boration valve MOV-3-350 CLOSED</li> <li>▶ places auto-manual station for FCV-3-113A in MANUAL</li> <li>▶ places auto-manual station for FCV-3-114A in MANUAL</li> <li>▶ places reactor makeup selector switch in BORATE</li> <li>▶ adjusts boric acid totalizer to provide the maximum amount of boric acid possible</li> <li>▶ starts makeup system</li> <li>▶ adjusts primary water and boric acid flow controllers to achieve a 1.5 to 1 blend while providing maximum makeup flow</li> <li>▶ repeats as necessary to maintain desired RWST level</li> </ul>
	BOP	Maintains S/G levels (ECA-1.1, Step 3): <ul style="list-style-type: none"> <li>▶ narrow range level &gt; 6% [32%]</li> <li>▶ controls feed flow to maintain narrow range level between 15% [32%] and 50%</li> </ul>
	RCO/BOP	Initiates RCS cooldown to Cold Shutdown (ECA-1.1, Step 4): <ul style="list-style-type: none"> <li>▶ maintains cooldown rate in RCS cold legs less than 100°F/hr</li> <li>▶ dumps steam to condenser from intact S/Gs</li> </ul>
	RCO	Verifies emergency containment coolers - only two running. (ECA-1.1, Step 5)
	BOP	Checks computer room chillers - at least one running. (ECA-1.1, Step 6)
	RCO	Checks RWST level - greater than 60k gallons. (ECA-1.1, Step 7)
	ANPS	Determines containment spray requirements. (ECA-1.1, Step 8): <ul style="list-style-type: none"> <li>▶ determines number of containment spray pumps required from table in ECA-1.1               <ul style="list-style-type: none"> <li>– no spray pumps required (RWST &gt; 155K gal and Containment Pressure &lt; 14psig)</li> </ul> </li> </ul>

Page 21 of 21

---

[illegible]

Procedure No.:  <b>0-ADM-202</b>	Procedure Title:  <b>Shift Relief and Turnover</b>	Page: <b>16</b> Approval Date: <b>8/17/99</b>
--	--	--

**ATTACHMENT 1**  
(Page 1 of 2)  
**NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST**

Relief Time: xx:xx Date: xx/xx/xx

Off-going NPS: Taylor Oncoming NPS: \_\_\_\_\_  
 Off-going U-3 ANPS: K. Miller Oncoming U-3 ANPS: \_\_\_\_\_  
 Off-going U-4 ANPS: Adamson Oncoming U-4 ANPS: \_\_\_\_\_

Oncoming SRO assigned ANPS ONOP-105 duties: \_\_\_\_\_

U-3 Mode 1 Power Level 65% U-4 Mode 1 Power Level 100%

**PART 1 - To be completed by Off-going NPS/ANPS**

**Unit 3 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

- 3C Charging Pump COS-Motor ground - No TS LCO entry yet. (TS 3.1.2.3) - clearance info tag hung
- 3D NCC - breaker 0829 OFF & opened for engineering inspection (can be restored on request) - clearance info tag hung
- PRN-41 upper detector failed low - taken COS per 3-ONOP-059.8 - I&C troubleshooting/repair later in your shift. TS 3.3.1 applies.
- Condenser steam dump mode selector in MANUAL - TC-3-408H COS - caution tag hung

**Unit 3 Evolutions (Completed, In Progress, Planned)**

- 3-GOP-301 in use for return to 100% power following 3B SGFP maintenance - procedure complete thru step 5.94. Power on hold at 65% for shift turnover. 3B SGFP testing complete & back in service.
- Need to perform monthly surveillance on 3A RARP per 3-OSP-050.2 sect 7.1. NWE will run test from aux bldg.
- 3DNCC bkr 0829 inspection & PRN-41 upper detector troubleshooting/repair. TC-3-408H troubleshooting/repair.

**Unit 3 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

- PRN-41 taken COS per 3-ONOP-059.8. Ann J-7/4, B-3/5, 3/6, 5/5, 6/1, 6/5 & 8/4 due to failure & removal from service.
- Condenser steam dumps in MANUAL (see above) - ann C-0/3 in.

**Unit 4 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

No equipment out of service

**Unit 4 Evolutions (Completed, In Progress, Planned)**

Maintain 100% power.

**Unit 4 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

None

XIX NRC 4 11/28/00

0-ADM-202

Shift Relief and Turnover

Approval Date:

5/9/00

## ATTACHMENT 1

(Page 2 of 2)

## NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST

## Common Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)

No equipment out of service.

## Common Evolutions and Common General Information

None planned - no info of note.

**PART 2 - To be reviewed by Oncoming NPS/ANPS/WCCS prior to shift relief (Check box)**

NPS	U-3 ANPS	U-4 ANPS	WCCS	ANPS In WCC		NPS	U-3 ANPS	U-4 ANPS	WCCS	ANPS In WCC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Control Room Deficiency Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Review Clearances Issued for last 24 hours
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All EOOS Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Both RCO Logbooks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Special Instruction Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Night Order Book
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Watch stander OOS Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Controlled Key Log
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In compliance with license restriction, if any*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCBA corrective lenses readily available if corrective lenses required by license*

**Shift Responsibility Turned Over By (a) And Accepted By (b):**

NPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

U-3 ANPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

U-4 ANPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

WCCS

(b) \_\_\_\_\_

ANPS in WCC

(b) \_\_\_\_\_

**PART 3 - To be reviewed/accomplished by NPS/ANPS shortly after assuming shift (Check box)**

NPS	U-3 ANPS	U-4 ANPS	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Red Book (Surveillance Requirements)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduct Shift Briefing (include Night Orders, Special Instructions, Operator Work Around Aggregate Effects)

**PART 4 - To be reviewed/accomplished by NPS/ANPS prior to the end of the shift (Check box)**

NPS	U-3 ANPS	U-4 ANPS	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Check all shift mailboxes for unresolved Tech Spec related procedure problems (midshift only)
	<input type="checkbox"/>	<input type="checkbox"/>	Update Red Book (Surveillance Requirements)
	<input type="checkbox"/>	<input type="checkbox"/>	Review and sign Operator Logs

\* Required prior to accepting the shift responsibility

0-ADM-202

Shift Relief and Turnover

Approval Date:

8/17/99

## ATTACHMENT 3

(Page 1 of 1)

RCO - UNIT DUTY  
SHIFT RELIEF CHECKLISTRelief Time: xx:xx Date: xx/xx/xx Unit # 3Off-going RCO: (print name) Robertson Oncoming RCO: (print name) \_\_\_\_\_

## PART 1 - To be completed by Off-going RCO

Unit 3 Mode: 1 65 % Power \* 463 Gross MWe (\*\* Record N/A in Modes 2-6)  
Unit 4 Mode: 1 100 % Power \* 752 Gross MWe (\*\* Record N/A in Modes 2-6)Source Range: N31 or N32 N/A cps \*\* Intermediate Range: N35 or N36 N/A amp \*\*  
(\*\*Record "N/A" in Mode 1)Tavg 563 °F Pressure 2240 psig RCS Boron 810 ppmRCS Leakage 0.02 gpm Determined Date xx/xx/xx Time xx:xxGRP in progress # N/A Tank # N/A LRP in progress # N/A Tank # N/ACtmt Purge Permit in progress # N/AWTP ☐ OOS ☒ In Service to DWSTBoric Acid Storage Tk Levels A 7400 B 7400 C 7400Accumulator Reference Level/Date A 6640 1xx/xx/xx B 6680 1xx/xx/xx C 6635 1xx/xx/xx

## Abnormal Annunciator Status Reason:

- J-7/A, B-3/5, 3/6, 5/5, 4/1, 4/5 & 8/A due to PEN 41 failure & removal from service per 3-CNCP-059.8
- C-8/3 Condenser steam dump mode selector switch → MANUAL. TC-3-408H under repair. Caution tag hung.

## Major EOOS/LCOs:

- 3C charging pump OOS - motor ground - TS 3.1.2.3 LCO not entered - clearance info tag hung
- 3D NCC - breaker CB29 OFF & opened for engineering inspection (can be restored on request) - clearance info tag hung
- PEN 41 upper detector failed low - taken OOS per 3-CNCP-059.8 - I&C troubleshooting/repair later this shift. (TS 3.3.1)
- TC-3-408H - see ann C-8/3 item above.

## Operations, Procedures, Transients, or Significant Maintenance in Progress:

- Returning to 100% power following 3B SGFP maintenance (repairs & testing complete). Power ascension on hold @ 65% for shift turnover - 3-GOP 301 Complete thru step 5.94.
- Perform monthly surveillance on 3A RHRP per 3-OSP-050.2 sect 7.1 after shift turnover. NWE will run test from aux. bldg.
- 3D NCC bkr CB29 inspection. PEN 41 & TC-3-408H troubleshooting/repair.

## PART 2 - To be Reviewed/completed by Oncoming RCO prior to shift relief (Check box)

- |   |   |
|---|---|
| <input type="checkbox"/> RCO Logbook  | <input type="checkbox"/> In compliance with license restrictions, if any*   |
| <input type="checkbox"/> RCO Logs Abnormal/Noted readings   | <input type="checkbox"/> SCBA corrective lenses readily available if corrective lenses required by license*   |
| <input type="checkbox"/> TSA Logbook  | <input type="checkbox"/> If on overtime this shift or on overtime on the next shift in this position, or if a shift trade is involved, sign overtime sheet* |
| <input type="checkbox"/> Walk Down Control Boards   | <input type="checkbox"/> Control Room Deficiency Log  |
| <input type="checkbox"/> Clearance Book (in Modes 1-4) for clearances issued since last shift worked.<br>(No check required in Modes 5-6) | <input type="checkbox"/> EOOS Logbooks (All)  |
| <input type="checkbox"/> Watchstander Out-of-Service Book   | <input type="checkbox"/> Watch Station Cleanliness  |
| <input type="checkbox"/> Check blending station controllers are set for current RCS boron concentration.                                  | <input type="checkbox"/> Special Instruction Book   |
|   | <input type="checkbox"/> Review Annunciator Status Sheets   |

\* Required prior to accepting shift responsibility.

Shift Responsibility Turned Over By: \_\_\_\_\_

Shift Responsibility Accepted By: \_\_\_\_\_

\*/MBS/dt/bvc/bvc

0-OP-046

CVCS - Boron Concentration Control

119

Approval Date:

8/8/00

## ATTACHMENT 5

(Page 1 of 3)

## REACTIVITY WORKSHEET

NOTE*Boric Acid Thumb Rules are as follows:*

10 pcm = 1 ppm

10 gallons = 1 ppm

1 gallon = 1 pcm

**PART 1: Power Change Only (N/A if not applicable)**1) Rod Worth (A)

Plant Curve Book, Section 2, Figure 5

Withdrawal rods = plus (+) reactivity

Insert rods = minus (-) reactivity

Calculate change in rod worth as follows:

$$\begin{array}{rcl} [141 \text{ pcm}] & - & [0 \text{ pcm}] = (+/-) 141 \text{ pcm} \\ \text{Present Rod Worth} & - & \text{Desired Rod Worth} = (+/-) (A) \end{array}$$

2) Power Defect (B)

Plant Curve Book, Section 2, Figure 6A

Raise Power = minus (-) reactivity

Lower Power = plus (+) reactivity

Calculate change in power defect as follows:

$$\begin{array}{rcl} [206 \text{ pcm}] & - & [1780 \text{ pcm}] = (+/-) 574 \text{ pcm} \\ \text{Present Pwr Defect} & - & \text{Desired Pwr Defect} = (+/-) (B) \end{array}$$

3) Calculate the Desired Change in pcm (C)

$$[ (+/-) 141 \text{ pcm} ] + [ (+/-) 574 \text{ pcm} ] = (+/-) 433 \text{ pcm}$$

(A) (B) (C)

 11/28/00  
 XIX REC 4



0-OP-046

CVCS - Boron Concentration Control

Approval Date:

8/8/00

## ATTACHMENT 5

(Page 2 of 3)

## REACTIVITY WORKSHEET

## 4) Integral Boron Worth

Plant Curve Book, Section 2, Figure 7A

Boration = minus (-) reactivity

Dilution = plus (+) reactivity

Calculate Desired Boron Concentration ( $C_B$ ) as follows:Check current boron concentration ( $C_B$ ) = ppm

$$\begin{array}{rcl}
 [ (-) \overset{7328}{\cancel{69548}} \text{ pcm} ] - [ (+) \overset{433}{\cancel{433}} \text{ pcm} ] & = & (+) \overset{6895}{\cancel{6533}} \text{ pcm} \\
 \text{Present boron worth} & \text{(C)} & = \text{Desired boron worth} \\
 \text{from Sect 2, Fig 7A} & & 
 \end{array}$$

Determine desired  $C_B$  from Section 2, Figure 7A = 760 ppm**NOTE**

50,790 is the nominal volume of the RCS and the CVCS. BAST ppm is the most recent BAST concentration or a nominal value of 5664 ppm.

- 5) **IF** desired Boron Concentration is less than the current Boron Concentration, **THEN** calculate the dilution required as follows:

$$\begin{array}{l}
 50,790 \times \ln \left[ \frac{\text{Current } C_B \text{ in ppm}}{\text{Desired } C_B \text{ in ppm}} \right] = \text{Gallons of Primary Water} \\
 50,790 \times \ln \left[ \frac{\overset{810}{\text{ppm}}}{\underset{760}{\text{ppm}}} \right] = \frac{\underset{3236}{\text{Gallons}}}{\text{Gallons of Primary Water}}
 \end{array}$$

- 6) **IF** desired Boron Concentration is higher than the current Boron Concentration, **THEN** calculate the boration required as follows: N/A

$$\begin{array}{l}
 50,790 \times \ln \left[ \frac{[\text{BAST ppm}] - [\text{Present RCS ppm}]}{[\text{BAST ppm}] - [\text{Desired RCS ppm}]} \right] = \text{Gal of Boric Acid} \\
 50,790 \times \ln \left[ \frac{[\text{ } \text{ppm}] - [\text{ } \text{RCS ppm}]}{[\text{ } \text{ppm}] - [\text{ } \text{RCS ppm}]} \right] = \text{ } \text{Gallons} \\
 \text{Gal of Boric Acid}
 \end{array}$$

## ATTACHMENT 5

(Page 3 of 3)

## REACTIVITY WORKSHEET

## PART 2: Temperature Change Only (N/A if not applicable)

1) Temperature change requirements N/A

To raise temperature, refer to Plant Curve Book, Section 3, Figure 2B.

To lower temperature, refer to Plant Curve Book, Section 2, Figures 9 and 9A.

Determine desired temperature change: (+/-) \_\_\_\_\_ °F

To dilute: [ \_\_\_\_\_ °F ] x [ \_\_\_\_\_ gal/°F ] = \_\_\_\_\_ gal Water  
Sect 3, Fig 2BTo borate: [ \_\_\_\_\_ °F ] x [ \_\_\_\_\_ pcm/°F ] = \_\_\_\_\_ pcm  
Sect 2, Fig 9/9A

[ \_\_\_\_\_ pcm ] x [ gal/pcm ] = \_\_\_\_\_ gal of Boric Acid

FINAL PAGE

# MASTER

Appendix D

Scenario Outline

Form ES-D-1

Facility: Turkey Point      Scenario No.: 5      Op-Test No.: 1

Examiners: C. Payne      Operators: \_\_\_\_\_  
M. Sykes      \_\_\_\_\_  
M. Miller      \_\_\_\_\_

Initial Conditions:      Mode 1, 35% RTP (IC-26)

Turnover:      Power level is at 35% RTP. Equipment OOS --- Charging Pump 3C is out of service for motor ground (at this power 3A & 3B Charging Pumps will be running), I&C has Steam Dump selector switch selected to MANUAL (Steam Pressure) mode due to problem with TC-408H.

Event No.	Malf. No.	Event Type*	Event Description
1		R/RCO	Raise reactor power to 100%.
2		C/RCO	CVCS relief valve, RV-203, fails open requiring Normal Letdown to be manually isolated.
3		N/RCO	Place Excess Letdown in service.
4		I/RCO	Instrument TE-432C fails low (Loop C Tcold temperature element).
5		I/BOP	PT-475 fails low (S/G 3A MS pressure) which feeds FI-474 (S/G 3A steam flow) and causes a low steam flow signal.
6		C/RCO/ BOP	Control rod L11 drops.
7		C/BOP	SGFP 3A bearing high temperature, swap to SGFP 3B. Discharge check valve 20-118 on SGFP 3A sticks open after discharge MOV-3-1420 fails open on motor O/L.
8		M/All	Major steam line break downstream of MSIVs. All MSIVs fail open causing all S/G to be faulted.
		M/All	Perform ECA-2.1 until step 17.

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

**Initial Conditions:**

1. Initial condition Mode 1 at 35% RTP.

**Turnover:**

1. Power level is at 35%.
2. Power increase to 100% is desired.

**Equipment OOS ---**

1. Charging Pump 3C is out of service for motor ground and the breaker is racked out.
2. I&C has Steam Dump selector switch selected to MANUAL (Steam Pressure) mode due to problem with TC-408H, (Tavg input to Turbine Trip Summator).

**Synopsis:**

Op-Test No.: 1 Scenario No.: 5 Event No.: 1 Page 2 of 22Event Description: Raise reactor power to 100%

Time	Position	Applicant's Actions or Behavior
	ANPS	<p>Conducts crew brief.</p> <p>Directs power increase IAW 3-GOP-301 using dilution and/or control rods.</p> <p>Notifies load dispatcher of load increase.</p>
	ANPS	Specifies ramp rate for power increase. (3-GOP-301, Precaution 4.35)
	ANPS	Directs RCO to increase power using dilution per 0-OP-046. (3-GOP-301, Step 5.70)
	ANPS	Directs RCO to increase power using the control rods (if required) while maintaining axial flux within limits. (3-GOP-301 Step 5.70)
	ANPS	Directs BOP to increase turbine load as required to maintain Tavg matched with Tref. (3-GOP-301 Step 5.70)
	ANPS	Maintains command and control of the evolution.
	ANPS	Notifies the Chemistry Department must sample the RCS. (0-OP-046, Step 5.3.2.12)
	RCO	Performs 0-OP-046, CVCS - "Boron Concentration Control," as directed by the ANPS.
	RCO	Step 5.3.1.1 - Verifies initial conditions for starting the dilution.

Op-Test No.: 1 Scenario No.: 5 Event No.: 1Page 3 of 22Event Description: Raise reactor power to 100%

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Reads Cautions before Step 5.3.2.1:</p> <ul style="list-style-type: none"><li>• Error margins exist for the Boric Acid and Primary Water flow transmitters, with Primary Water being the greatest. Extreme care needs to be exercised to ensure that an excessive reduction in RCS boron concentration does not occur due to this fact.</li><li>• When less than 1% power, an independent Verification of Boron Reduction change calculation should be performed to ensure SDM requirements are not challenged.</li></ul>
	RCO	<p>Reads NOTES before Step 5.3.2.1:</p> <ul style="list-style-type: none"><li>• VCT level is 14.15 gallons/% level indication.</li><li>• Attachment 5 of this procedure may be used to assist in calculating dilution requirements for power or temperature changes.</li></ul>
	RCO	<p>Step 5.3.2.1.a - Determine the approximate quantity of primary water required to change reactivity by the desired amount. (May be by the day to day activities OR using the plant curve book)</p> <p>Step 5.3.2.1.b - N/A's this step since are &gt; 1% power.</p>
	RCO	<p>Step 5.3.2.1.c - Set the Primary Water Totalizer to determined amount of water.</p>
	RCO	<p>Step 5.3.2.2 - Adjust the setpoint on the Primary Water Controller, FCV-3-114A to the desired flow rate.</p>

Op-Test No.: 1 Scenario No.: 5 Event No.: 1Page 4 of 22Event Description: Raise reactor power to 100%

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Reads NOTES before Step 5.3.2.3:</p> <ul style="list-style-type: none"><li>• <u>DILUTE</u> is the <u>preferred</u> switch position, since impact to the RCP seals is minimized due to preheating of water in the VCT, and to ensure RCS hydrogen concentration is maintained.</li><li>• ALT DILUTE is recommended only when rapid load change or rod movement requires compensation.</li></ul>
	RCO	Step 5.3.2.3 - Place the Reactor Makeup Selector Switch in the DILUTE position.
	RCO	<p>Step 5.3.2.4 - Turn the RCS Makeup Control Switch to the START position <u>AND</u> perform the following:</p> <p><u>IF</u> the Reactor Makeup Selector Switch is in the Dilute position <u>AND</u> FCV-3-114B, Blender to VCT valve closes due to flow deviation, <u>THEN</u> place FCV-3-114B switch to OPEN.</p> <ul style="list-style-type: none"><li>o This step is N/A'd.</li></ul>
	RCO	Step 5.3.2.5 - Verify expected primary water flow rate by observing Chart Recorder FR-3-113 <u>AND</u> ensure that it is consistent with the flow rate determined in Substep 5.3.2.2.
	RCO	Step 5.3.2.6 - If necessary to <u>manually</u> stop the dilution places the RCS Makeup Control Switch in the STOP position.

Page 5 of 22[illegible]



Op-Test No.: 1 Scenario No.: 5 Event No.: 2Page 6 of 22Event Description: CVCS relief valve, RV-3-203, fails open requiring Normal Letdown to be manually isolated.

Time	Position	Applicant's Actions or Behavior
	RCO	Responds to annunciator A 5/6 'CVCS LP LTDN LINE RELIEF HI TEMP' Step 1.a - Verifies temperature is > 150F on TI-3-141
	RCO	Step 2.a - Verifies CV-3-204 OPEN
	RCO	Step 2.b - Attempts to reseal RV-3-203 as follows: <ul style="list-style-type: none"><li>- Closes all letdown orifices (may secure a Charging Pump)</li><li>- Checks PCV-3-145 operates properly</li><li>- Checks TI-3-141 NOT increasing</li><li>- Opens the required number of orifices while controlling PCV-3-145 (Most likely will open the 45 GPM orifice)</li></ul>
	RCO	Step 2.c - Determines that RV-3-203 did NOT reseal by TI-3-141 temperature increasing
	RCO	Step 2.d - Performs the following to isolate the RV-3-203 relief valve: <ul style="list-style-type: none"><li>- Closes all letdown orifices</li><li>- Closes LCV-3-460</li><li>- Minimizes charging flow</li></ul>
	RCO	Step 2.d - Establishes Excess Letdown (See next event for details)
	BOP	Reads actions of ARP "A 5/6".
	BOP	Assists RCO as directed by the ANPS.
	ANPS	Manitains command and control of the evolution.



Op-Test No.: 1 Scenario No.: 5 Event No.: 3 Page 8 of 22

Event Description: Place Excess Letdown in service

Time	Position	Applicant's Actions or Behavior
	<b>RCO</b>	Places excess letdown in service per 3-OP-047 or 3-OP-041.2.
	<b>RCO</b>	Verifies excess letdown heat exchanger outlet valve, CV-3-739, is OPEN.
	<b>RCO</b>	Verifies $\leq 238$ gpm CCW flow. Verifies excess letdown divert to WDS valve, CV-3-389, is aligned to the VCT.
	<b>RCO</b>	Opens excess letdown isolation valve, CV-3-387.
	<b>RCO</b>	Slowly opens excess letdown flow controller, HCV-3-137, allowing the heat exchanger to warmup.
	<b>RCO</b>	IF VCT divert to hold-up tank, LCV-3-115A, reaches 100% divert position (RED light ON, GREEN light OFF), THEN align excess letdown divert to WDS, CV-3-389, to the RCDT (switch to DIVERT).
	<b>ANPS</b>	Maintains command and control of the evolution.
	<b>BOP</b>	Assists the RCO as directed.

Op-Test No.: 1 Scenario No.: 5 Event No.: 4Page 9 of 22Event Description: Instrument TE-432C fails low (Loop C Tcold temperature element)

Time	Position	Applicant's Actions or Behavior
	<b>RCO</b>	Responds to the following annunciator alarms: <ul style="list-style-type: none"><li>- B 4/6 'TAVG DEVIATION'</li><li>- B 5/6 'ΔT DEVIATION'</li><li>- J 9/5 'RTD CHANNEL III FAILURE'</li></ul>
	<b>RCO</b>	Recognizes RCS 'C' loop Tc RTD failed low and responds as directed by ANPS: <ul style="list-style-type: none"><li>- Contact I&amp;C to check loop 'C' temperature data point in EAGLE 21</li><li>- Compares to other RCS TI's</li><li>- Verifies no off-normal conditions on 'A' and/or 'B' loop RCS temperature indications</li></ul>
	<b>RCO</b>	Notifies ANPS of failure.
	<b>ANPS</b>	Directs compensatory actions IAW 3-ONOP-049.1: <ul style="list-style-type: none"><li>- Verifies RCO determination of RCS RTD's status</li><li>- Determines which bistables to trip and effects on plant.</li></ul> Provides this information to RCO/BOP for guidance
	<b>ANPS</b>	After I&C checks and reports the EAGLE 21 and identifies loop C Tc failed low, can take time to evaluate alarms and restore normal MCR indications.
	<b>ANPS</b>	Determines T.S. required action to trip bistables.
	<b>ANPS</b>	Directs the BOP/RCO to trip bistables specified in 3-ONOP-049.1.
	<b>ANPS</b>	Observes correct indications received for each bistable placed in trip.
	<b>ANPS</b>	Maintains command and control of the evolution.

Page 10 of 22

\_\_\_\_\_

[illegible]

Op-Test No.: 1 Scenario No.: 5 Event No.: 5Page 11 of 22

Event Description: PT-475 fails low (S/G 3A MS pressure) which feeds FI-474 (S/G 3A steam flow) and causes a low steam flow signal.

Time	Position	Applicant's Actions or Behavior
	<b>BOP</b>	Responds to the following annunciators: <ul style="list-style-type: none"><li>- C 4/1 'FEED&gt;STEAM'</li><li>- C 5/1 'SG A STEAM&gt;FEED'</li><li>- C 9/3 'MAIN STEAMLINE HI DP'</li></ul>
	<b>BOP</b>	Recognizes that PT-475 (SG 3A MS PRESSURE) has failed low.
	<b>BOP</b>	Takes manual control of 3A SG FRV to control level and returns level to program.
	<b>BOP</b>	Selects operable channel and returns FRV control to AUTO per ANPS direction.
	<b>BOP</b>	Informs ANPS of plant status.
	<b>ANPS</b>	Verifies response to PT-475 failure consistent with ARP's.
	<b>ANPS</b>	Directs compensatory actions IAW 3-ONOP-049.1: <ul style="list-style-type: none"><li>- has BOP select operable channel</li><li>- has BOP return FRV control to AUTO</li><li>- determines which bistables to trip and effects on plant provides information to RCO/BOP for guidance</li></ul>
	<b>ANPS</b>	Determines T.S. required action to trip bistables.
	<b>ANPS</b>	Directs the BOP/RCO to trip bistables specified in 3-ONOP-049.1.
	<b>ANPS</b>	Observes correct indications received for each bistable placed in trip.
	<b>ANPS</b>	Maintains command and control of the evolution.

Page 12 of 22

---

[illegible]

Op-Test No.: 1 Scenario No.: 5 Event No.: 6Page 13 of 22Event Description: Control rod L11 drops

Time	Position	Applicant's Actions or Behavior
	<b>RCO</b>	Verifies number of rods dropped and reports to the ANPS.
	<b>RCO</b>	Establishes steady state primary: <ul style="list-style-type: none"> <li>– coordinates with the BOP to maintain <math>t_{avg}</math> within 3F of <math>T_{ref}</math> by adjusting turbine load control</li> <li>– does not increase power using rods until after dropped recovery</li> <li>– verifies PZR level and pressure returns to program</li> </ul>
	<b>RCO</b>	Informs ANPS of plant status.
	<b>BOP</b>	Assists RCO as directed by ANPS.
	<b>BOP</b>	Establishes steady state secondary: <ul style="list-style-type: none"> <li>– coordinates with RCO to maintain <math>T_{avg}</math> within 3F of <math>T_{ref}</math> by adjusting turbine load</li> <li>– verifies Steam Generator levels return to program</li> </ul>
	<b>BOP</b>	Informs ANPS of plant status.
	<b>ANPS</b>	Directs response per 3-ONOP-028.3: <ul style="list-style-type: none"> <li>– declares the dropped rod inoperable</li> <li>– determines the most limiting T.S. condition</li> <li>– evaluates AFD using ERDADS and directs crew to respond per 3-ONOP-059.4 if outside T.S. limits</li> <li>– directs QPTR calculation per 3-OSP-059.10 and directs crew to respond per 3-OSP-059.9 if outside T.S. limits</li> <li>– notifies I&amp;C and Reactor Engineering of dropped rod</li> <li>– verifies shutdown margin is adequate within 1 hour</li> </ul>
	<b>ANPS</b>	Maintains command and control of the evolution.



Op-Test No.: 1 Scenario No.: 5 Event No.: 7Page 14 of 22

Event Description: SGFP 3A bearing high temperature, swap to SGFP 3B. Discharge check valve 20-118 on SGFP 3A sticks open after discharge MOV-3-1420 fails to close due to motor O/L.

Time	Position	Applicant's Actions or Behavior
	<b>BOP</b>	Responds to annunciator D 5/4 'SGFP A MOTOR BRG HI TEMP'.
	<b>BOP</b>	Start 3B SGFP (idle pump) and secure 3A SGFP.
	<b>BOP</b>	Recognize steam flow>feed flow.  Recognize gradual reduction in steam generator level for A/B/C steam generators (Due to feed flow bypassing the S/G through idle SGFP "A" discharge check valve (stuck open)).
	<b>BOP</b>	Attempts to close MOV-3-1420 to stop feedwater loss through the 3A SGFP.  MOV-3-1420 fails to close. <ul style="list-style-type: none"> <li>identifies annunciator D 5/6 "SGFP "A" DISCHARGE MOV MOTOR OVERLOAD".</li> </ul> Recognizes that S/G levels are approaching trip setpoints and can not be recovered, recommends tripping reactor.
	<b>BOP</b>	Implements Immediate Actions of E-0. (See Event #8 for details)
	<b>ANPS</b>	Recognize that S/G levels can not be recovered.
	<b>ANPS</b> <i>CRITICAL</i>	Directs reactor trip and implementation of E-0. (See Event #8 for details)
	<b>ANPS</b>	Maintains command and control of the evolution.

Page 15 of 22

Event Description: SGFP 3A bearing high temperature, swap to SGFP 3B. Discharge check valve 20-118 on SGFP 3A sticks open after discharge MOV-3-1420 fails to close due to motor O/L.

[illegible]

Op-Test No.: 1 Scenario No.: 5 Event No.: 8Page 16 of 22

Event Description: Major steam line break downstream of MSIVs. All MSIVs fail open causing all S/G to be faulted.

Time	Position	Applicant's Actions or Behavior
	ANPS	Directs the response to reactor trip per 3-EOP-E-0, "Reactor Trip or Safety Injection."  Monitors E-0, Fold Out Page Items.
	RCO	Performs Immediate Actions in response to reactor trip per E-0: <ul style="list-style-type: none"><li>▸ Verifies Reactor trip (E-0 step 1)</li></ul>
	ANPS	Obtains verification of reactor trip.
	BOP	Performs Immediate Actions in response to reactor trip per E-0: <ul style="list-style-type: none"><li>▸ verifies Turbine trip (E-0 step 2)</li><li>▸ verifies power to Emergency 4 KV Buses (E-0 step 3)</li></ul>
	ANPS	Determines electric plant status.
	RCO	Checks if SI is actuated/req'd (NO annunciators on) (E-0 step 4): <ul style="list-style-type: none"><li>▸ Checks SI actuation setpoints -OR-</li><li>▸ Checks RCS subcooling based on exit TCs &lt;30F -OR-</li><li>▸ PZR level can not be maintained &gt;12%</li><li>▸ Informs ANPS of plant status</li></ul>
	RCO	Recognizes that SI is required due to decreasing PZR level and manually initiates SI and containment isolation phase A. (If SI has not occurred automatically) (E-0 step 4 RNO b)
	ANPS	Directs manual SI/Phase A initiation if required.
	BOP	Performs prompt actions of E-0: <ul style="list-style-type: none"><li>▸ Verifies feed water isolation (E-0 step 5)</li><li>▸ Verifies AFW pumps running (E-0 step 7)</li><li>▸ Verifies proper ICW operation (E-0 step 10)</li></ul>

Op-Test No.: 1 Scenario No.: 5 Event No.: 8Page 17 of 22

Event Description: Major steam line break downstream of MSIVs. All MSIVs fail open causing all S/G to be faulted.

Time	Position	Applicant's Actions or Behavior
	RCO	Performs prompt actions of E-0: <ul style="list-style-type: none"><li>▸ Verifies containment isolation phase A (E-0 step 6)</li><li>▸ Verifies SI pumps running (E-0 step 8)</li><li>▸ Verifies proper CCW system operation (E-0 step 9)</li><li>▸ Verifies containment cooling (E-0 step 11)</li><li>▸ Verifies containment AND control room ventilation isolation (E-0 step 12)</li></ul>
	BOP	Checks if Main Steamlines should be isolated (E-0 step 13): <ul style="list-style-type: none"><li>▸ NO main steamline isolation signal has actuated (E-0 step 13 RNO b)</li></ul> <p>May recognize that main steamline isolation will be/is required and that the MSIV's are open and will attempt to manually close (MSIV's will not close). (E-0 step 13 RNO c)</p>
	RCO	Monitors containment pressure to verify containment spray is not required. (E-0 step 14)
	RCO	Verifies SI valve amber lights are ALL BRIGHT. (E-0 step 15)
	BOP	Verifies EDG's are running. (E-0 step 16)
	RCO	Resets SI. (E-0 step 17)
	RCO	Realign SI system (E-0 step 18): <ul style="list-style-type: none"><li>▸ verifies unit 3 high-head SI pumps - 2 running</li><li>▸ stops both unit 4 high-head SI pumps AND places in standby</li></ul>
	BOP	Directs SNPO to place Containment Post Accident Hydrogen Monitoring System in service. (E-0 step 19)

Op-Test No.: 1 Scenario No.: 5 Event No.: 8 Page 18 of 22

Event Description: Major steam line break downstream of MSIVs. All MSIVs fail open causing all S/G to be faulted.

Time	Position	Applicant's Actions or Behavior
	RCO	<p>Verifies SI flow (E-0 step 20):</p> <ul style="list-style-type: none"> <li>▸ observes RCS pressure is &lt; 1600 psig</li> <li>▸ observes high-head SI pump flow</li> <li>▸ observes that RCS pressure is NOT &lt;250 psig</li> </ul> <p>Transitions to step 21 of E-0 from step 20 RNO c.</p>
	BOP	Verifies proper AFW valve alignment. (E-0 step 21)
	BOP	<p>Verifies proper AFW flow. (E-0 step 22)</p> <ul style="list-style-type: none"> <li>▸ observes narrow range level in all S/G's &lt;6% and verifies total AFW flow is &gt; 345 gpm (E-0 step 22.a RNOa.1)</li> <li>▸ controls feed flow to maintain S/G narrow range levels between 6% and 50% (E-0 step 22.b)</li> </ul>
	RCO	Checks RCP seal cooling. (E-0 step 23)
	BOP	<p>Observes RCS cold leg temperature is NOT stable -OR- trending to 547F (E-0 step 24):</p> <ul style="list-style-type: none"> <li>▸ verifies temperature is decreasing due to excessive steam flow and attempts to close main steamline isolation and bypass valves (attempts fail) (E-0 step 24 RNO a.3)</li> </ul>
	RCO/BOP	<p>Checks RCP cooling. (E-0 step 25)</p> <p>Reestablishes RCP cooling: (E-0 step 25.c)</p> <ul style="list-style-type: none"> <li>▸ verifies SI reset</li> <li>▸ resets containment isolation phase A</li> <li>▸ open sCCW to Normal Containment Cooler Valves <ul style="list-style-type: none"> <li>- MOV-3-1417</li> <li>- MOV-3-1418</li> </ul> </li> <li>▸ reset and start normal containment coolers</li> </ul>
	RCO	Checks Letdown, PZR PORVs, and Spray Valves closed. (E-0 step 26)

Op-Test No.: 1 Scenario No.: 5 Event No.: 8Page 19 of 22Event Description: Major steam line break downstream of MSIVs. All MSIVs fail open causing all S/G to be faulted.

Time	Position	Applicant's Actions or Behavior
	BOP	Checks if S/Gs are faulted (E-0 step 27): <ul style="list-style-type: none"> <li>▸ observes pressure in all S/Gs are decreasing in an uncontrolled manner and informs ANPS.</li> </ul>
	ANPS <i>CRITICAL</i>	With the information that pressure in all S/Gs is decreasing in an uncontrolled manner and that the MSIVs will not shut, transitions to 3-EOP-E-2, "Faulted Steam Generator Isolation," Step 1 per 3-EOP-E-0 step 27.a, RNO a.2.
	ANPS	Directs the response to S/Gs pressure decreasing per E-2: <ul style="list-style-type: none"> <li>– monitors 3-EOP-E-2 Fold Out Page Items</li> </ul>
	BOP	Re-verifies the Main Steamline Isolation and Bypass Valves on the faulted S/Gs are not closed and that manual attempts will not work. (E-2 step 1)
	BOP	Checks if any S/G is not faulted (E-2 step 2): <ul style="list-style-type: none"> <li>▸ observes pressure in all S/Gs decreasing in an uncontrolled manner and informs the ANPS (E-2 step 2.a)</li> </ul>
	ANPS	Transitions to 3-EOP-ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," Step 1. (E-2 step 2 RNO a)
	ANPS	Directs the response to all S/Gs being faulted per ECA-2.1. <ul style="list-style-type: none"> <li>– monitors 3-EOP-ECA-2.1 Fold Out Page Items</li> </ul>
	BOP	Checks secondary pressure boundary (ECA-2.1 step 1.a): <ul style="list-style-type: none"> <li>▸ attempts to close the MSIVs by pulling/haveing pulled the fuses for one train of solenoids for each MSIV (behind console) (ECA-2.1 step 1.a RNO)</li> <li>▸ dispatches an operator to locally close MSIVs or block valves one loop at a time (ECA-2.1 step 1.a RNO)</li> </ul>
	ANPS	Provides direction to manually attempt main steamline isolation.

Op-Test No.: 1 Scenario No.: 5 Event No.: 8Page 20 of 22Event Description: Major steam line break downstream of MSIVs. All MSIVs fail open causing all S/G to be faulted.

Time	Position	Applicant's Actions or Behavior
	BOP	Continues check of secondary press. boundary (ECA-2.1 step 1): <ul style="list-style-type: none"><li>▶ feedwater control and bypass valves closed</li><li>▶ feedwater isolation valves closed<ul style="list-style-type: none"><li>– MOV-3-1407</li><li>– MOV-3-1408</li><li>– MOV-3-1409</li></ul></li><li>▶ S/G steam dump to atmosphere valves closed</li><li>▶ S/G blowdown isolation valves closed</li><li>▶ S/G sample valves closed</li></ul>
	BOP	Isolates steam supply to AFW pumps (ECA-2.1 step 2): <ul style="list-style-type: none"><li>▶ establishes an alternate source of feedwater (step 2.a)<ul style="list-style-type: none"><li>– resets feed isolation and starts the standby S/G feedwater system</li></ul></li><li>▶ dispatches an operator to perform the following: (step 2.b)<ul style="list-style-type: none"><li>– opens AFW pump steam supply MOV breakers on all S/Gs</li><li>– closes AFW pump steam supply MOVs on all S/Gs</li></ul></li></ul>
	BOP/RCO	Controls feed flow to minimize RCS cooldown (ECA-2.1 step 3): <ul style="list-style-type: none"><li>▶ observes cooldown rate in RCS cold legs &gt;100F (step 3.a)<ul style="list-style-type: none"><li>– decreases feed flow to 25 gpm to each S/G (go to step 3.c of ECA-2.1) (step 3.a RNO a)</li></ul></li><li>▶ observes RCS hot leg temperatures decreasing (step 3.c)</li></ul>
	ANPS	Directs control of feed flow to control RCS cooldown.
	RCO	Checks if RCPs should be stopped (ECA-2.1 step 4): <ul style="list-style-type: none"><li>▶ verifies RCS subcooling is NOT &lt;25F (goes to step 5 of ECA-2.1) (step 4.c RNO c)</li></ul>
	BOP	Checks CST level above 10%. (ECA-2.1 step 5)
	RCO	Checks PZR PORVs and block valves closed. (ECA-2.1 step 6)

Op-Test No.: 1 Scenario No.: 5 Event No.: 8Page 21 of 22

Event Description: Major steam line break downstream of MSIVs. All MSIVs fail open causing all S/G to be faulted.

Time	Position	Applicant's Actions or Behavior
	BOP	Checks secondary radiation (ECA-2.1 step 7): <ul style="list-style-type: none"><li>▸ directs Chemistry to take S/G activity samples</li><li>▸ direct Chemistry to take DAM1 monitor readings</li><li>▸ directs HP to take RAD readings on steamlines</li></ul>
	RCO	Checks if RHR pumps should be stopped (ECA-2.1 step 8): <ul style="list-style-type: none"><li>▸ observes RHR pumps are running, RCS pressure is above 250 psig and stable/increasing.</li><li>▸ verifies SI reset</li><li>▸ stops the RHR pumps and places in standby</li></ul>
	RCO	Checks if containment spray pumps should be stopped (ECA-2.1 step 9): <ul style="list-style-type: none"><li>▸ verifies none running (go to step 10 of ECA-2.1) (ECA-2.1 step 9.a RNO a)</li></ul>
	RCO	Verifies RWST level is >155k gallons. (ECA-2.1 step 10)
	RCO	Verifies that SI is reset. (ECA-2.1 step 11)
	RCO/BOP	Resets containment isol. Phase A and Phase B. (ECA-2.1 step 12)
	RCO	Verifies instrument air to containment (ECA-2.1 step 13): <ul style="list-style-type: none"><li>▸ verifies CV-3-2803 open</li><li>▸ verifies instrumnet air pressure &gt;95 psig</li></ul>
	RCO	Checks if accumulators should be isolated (ECA-2.1 step 14): <ul style="list-style-type: none"><li>▸ verifies NO RCS hot leg temperatures &lt;340F (go to step 15 of ECA-2.1) (ECA-2.1 step 14.a RNO a)</li></ul>
	BOP	Checks power to charging pumps from offsite. (ECA-2.1 step 15)





Procedure No.:

0-ADM-202

Procedure Title:

Shift Relief and Turnover

Page:

16

Approval Date:

8/17/99

## ATTACHMENT 1

(Page 1 of 2)

## NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST

Relief Time: xx:xx

Date:

xx/xx/xx

Off-going NPS:

Taylor

Oncoming NPS:

Off-going U-3 ANPS:

K. Miller

Oncoming U-3 ANPS:

Off-going U-4 ANPS:

Adamsen

Oncoming U-4 ANPS:

Oncoming SRO assigned ANPS ONOP-105 duties: \_\_\_\_\_

U-3 Mode

1

Power Level

39%

U-4 Mode

1

Power Level

100%**PART 1 - To be completed by Off-going NPS/ANPS****Unit 3 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

- 3C charging pump - motor ground - no TS LCO entry yet (TS 3.1.2.3) - clearance info tag hung
- Condenser steam dump mode selector in MANUAL - TC-3-408H OOS - caution tag hung

**Unit 3 Evolutions (Completed, In Progress, Planned)**

- 3-GCP 301 in use for return to 100% power following condenser tube leak repair & secondary chemistry cleanup - procedure complete thru step 5.82. Power on hold at 39% for shift turnover. Secondary chemistry satisfactory for return to full power. Plant outages elsewhere necessitate prompt return to 100% for afternoon/evening peak.

**Unit 3 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

- Condenser steam dumps in MANUAL (see above) - ann C-8/3 in.
- Other annunciators normal for 39% power.

**Unit 4 Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)**

No equipment out of service

**Unit 4 Evolutions (Completed, In Progress, Planned)**

Maintain 100% power.

**Unit 4 General Info (Abnormal Lineups, Offnormal Conditions, Admin)**

None.

11/27/00  
S CAN XIX

0-ADM-202

Shift Relief and Turnover

Approval Date:

5/9/00

## ATTACHMENT 1

(Page 2 of 2)

## NPS/ANPS/WCCS SHIFT RELIEF CHECKLIST

## Common Plant/Equipment Status (EOOS, LCOs, Compensatory Measures)

No equipment out of service

## Common Evolutions and Common General Information

None planned - no info of note.

**PART 2 - To be reviewed by Oncoming NPS/ANPS/WCCS prior to shift relief (Check box)**

NPS	U-3 ANPS	U-4 ANPS	WCCS	ANPS In WCC		NPS	U-3 ANPS	U-4 ANPS	WCCS	ANPS In WCC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Control Room Deficiency Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Review Clearances issued for last 24 hours
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All EOOS Logs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Both RCO Logbooks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Special Instruction Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Night Order Book
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Watch stander OOS Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Controlled Key Log
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In compliance with license restriction, if any*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCBA corrective lenses readily available if corrective lenses required by license*

**Shift Responsibility Turned Over By (a) And Accepted By (b):**

NPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

U-3 ANPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

U-4 ANPS (sign) (a) \_\_\_\_\_

(b) \_\_\_\_\_

WCCS

(b) \_\_\_\_\_

ANPS in WCC

(b) \_\_\_\_\_

**PART 3 - To be reviewed/accomplished by NPS/ANPS shortly after assuming shift (Check box)**

NPS	U-3 ANPS	U-4 ANPS	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Red Book (Surveillance Requirements)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduct Shift Briefing (include Night Orders, Special Instructions, Operator Work Around Aggregate Effects)

**PART 4 - To be reviewed/accomplished by NPS/ANPS prior to the end of the shift (Check box)**

NPS	U-3 ANPS	U-4 ANPS	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Check all shift mailboxes for unresolved Tech Spec related procedure problems (midshift only)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Update Red Book (Surveillance Requirements)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Review and sign Operator Logs

\* Required prior to accepting the shift responsibility

0-ADM-202

## Shift Relief and Turnover

## ATTACHMENT 3

(Page 1 of 1)

RCO - UNIT DUTY  
SHIFT RELIEF CHECKLISTRelief Time: XX:XX Date: XX/XX/XX Unit # 3Off-going RCO: (print name) Robertson Oncoming RCO: (print name) \_\_\_\_\_

## PART 1 - To be completed by Off-going RCO

Unit 3 Mode: 1 39 % Power \* 254 Gross MWe (\* Record N/A in Modes 2-6)  
Unit 4 Mode: 1 100 % Power \* 752 Gross MWe (\* Record N/A in Modes 2-6)Source Range: N31 or N32 N/A cps \*\* Intermediate Range: N35 or N36 N/A amp\*\*  
(\*\*Record "N/A" in Mode 1)Tavg 555 °F Pressure 2240 psig RCS Boron 900 ppmRCS Leakage 0.02 gpm Determined Date XX/XX/XX Time XX:XXGRP in progress # N/A Tank # N/A LRP in progress # N/A Tank # N/AClmt Purge Permit in progress # N/AWTP ☐ OOS ☒ In Service to DWSTBoric Acid Storage Tk Levels A 7400 B 7400 C 7400Accumulator Reference Level/Date A 6640 1 XX/XX/XX B 6680 1 XX/XX/XX C 6635 1 XX/XX/XX

## Abnormal Annunciator Status Reason:

C-8/3 Condenser steam dump mode selector switch → MANUAL. TC-3-408H under repair. Caution tag hung.  
Other annunciators normal for 39% power.

## Major EOOS/LCOs:

- 3C charging pump ops - motor ground - TS 3.1.2.3 LCO not entered - clearance info tag hung.  
- TC-3-408H - see ann C-8/3 item above.

## Operations, Procedures, Transients, or Significant Maintenance in Progress:

- Returning to 100% following condenser tube leak repair; secondary chemistry cleanup. 3-GOP-301 complete thru  
step 5.82. Power on hold at 39% for shift turnover. Secondary chemistry satisfactory for <sup>return</sup> to  
full power. Prompt return to power needed for afternoon/evening peak load due to plant outages elsewhere.

## PART 2 - To be Reviewed/completed by Oncoming RCO prior to shift relief (Check box)

- ☐ RCO Logbook
- ☐ RCO Logs Abnormal/Noted readings
- ☐ TSA Logbook
- ☐ Walk Down Control Boards
- ☐ Clearance Book (in Modes 1-4) for clearances issued since last shift worked. (No check required in Modes 5-6)
- ☐ Watchstander Out-of-Service Book
- ☐ Check blending station controllers are set for current RCS boron concentration.

- ☐ In compliance with license restrictions, if any\*
- ☐ SCBA corrective lenses readily available if corrective lenses required by license\*
- ☐ If on overtime this shift or on overtime on the next shift in this position, or if a shift trade is involved, sign overtime sheet\*
- ☐ Control Room Deficiency Log
- ☐ EOOS Logbooks (All)
- ☐ Watch Station Cleanliness
- ☐ Special Instruction Book
- ☐ Review Annunciator Status Sheets

\* Required prior to accepting shift responsibility.

Shift Responsibility Turned Over By: \_\_\_\_\_

Shift Responsibility Accepted By: \_\_\_\_\_

\*/MBS/dt/bvc/bvc

## ATTACHMENT 5

(Page 1 of 3)

## REACTIVITY WORKSHEET

NOTE*Boric Acid Thumb Rules are as follows:*

10 pcm = 1 ppm

10 gallons = 1 ppm

1 gallon = 1 pcm

## PART 1: Power Change Only (N/A if not applicable)

1) Rod Worth (A)

Plant Curve Book, Section 2, Figure 5

Withdrawal rods = plus (+) reactivity

Insert rods = minus (-) reactivity

Calculate change in rod worth as follows:

$$\begin{array}{rcl}
 [ \underline{306} \text{ pcm} ] & - & [ \underline{0} \text{ pcm} ] = (+/-) \underline{306} \text{ pcm} \\
 \text{Present Rod Worth} & - & \text{Desired Rod Worth} = (+/-) \quad (A)
 \end{array}$$

2) Power Defect (B)

Plant Curve Book, Section 2, Figure 6A

Raise Power = minus (-) reactivity

Lower Power = plus (+) reactivity

Calculate change in power defect as follows:

$$\begin{array}{rcl}
 [ \underline{748} \text{ pcm} ] & - & [ \underline{1737} \text{ pcm} ] = (+/-) \underline{989} \text{ pcm} \\
 \text{Present Pwr Defect} & - & \text{Desired Pwr Defect} = (+/-) \quad (B)
 \end{array}$$

3) Calculate the Desired Change in pcm (C)

$$[ (+/-) \underline{306} \text{ pcm} ] + [ (+/-) \underline{989} \text{ pcm} ] = (+/-) \underline{683} \text{ pcm}$$

(A)                      (B)                      (C)

0-OP-046

CVCS - Boron Concentration Control

Approval Date:

8/8/00

## ATTACHMENT 5

(Page 2 of 3)

## REACTIVITY WORKSHEET

## 4) Integral Boron Worth

Plant Curve Book, Section 2, Figure 7A

Boration = minus (-) reactivity

Dilution = plus (+) reactivity

Calculate Desired Boron Concentration ( $C_B$ ) as follows:Check current boron concentration ( $C_B$ ) = ppm

$$[(-) \underline{8098} \text{ pcm}] - [(+) \underline{683} \text{ pcm}] = (+) \underline{7415} \text{ pcm}$$

Present boron worth (C) = Desired boron worth  
from Sect 2, Fig 7A

Determine desired  $C_B$  from Section 2, Figure 7A = 820 ppm**NOTE**

50,790 is the nominal volume of the RCS and the CVCS. BAST ppm is the most recent BAST concentration or a nominal value of 5664 ppm.

- 5) **IF** desired Boron Concentration is less than the current Boron Concentration, **THEN** calculate the dilution required as follows:

$$50,790 \times \ln \left[ \frac{\text{Current } C_B \text{ in ppm}}{\text{Desired } C_B \text{ in ppm}} \right] = \text{Gallons of Primary Water}$$

$$50,790 \times \ln \left[ \frac{\underline{900} \text{ ppm}}{\underline{820} \text{ ppm}} \right] = \underline{4728} \text{ Gallons}$$

Gallons of Primary Water

- 6) **IF** desired Boron Concentration is higher than the current Boron Concentration, **THEN** calculate the boration required as follows:  $\ln(A)$

$$50,790 \times \ln \left[ \frac{[\text{BAST ppm}] - [\text{Present RCS ppm}]}{[\text{BAST ppm}] - [\text{Desired RCS ppm}]} \right] = \text{Gal of Boric Acid}$$

$$50,790 \times \ln \left[ \frac{[\text{ } \text{ ppm}] - [\text{ } \text{ RCS ppm}]}{[\text{ } \text{ ppm}] - [\text{ } \text{ RCS ppm}]} \right] = \text{ } \text{ Gallons}$$

Gal of Boric Acid

0-OP-046

CVCS – Boron Concentration Control

8/8/00

## ATTACHMENT 5

(Page 3 of 3)

## REACTIVITY WORKSHEET

## PART 2: Temperature Change Only (N/A if not applicable)

1) Temperature change requirements N/A

To raise temperature, refer to Plant Curve Book, Section 3, Figure 2B.

To lower temperature, refer to Plant Curve Book, Section 2, Figures 9 and 9A.

Determine desired temperature change: (+/-) \_\_\_\_\_ °F

To dilute: [ \_\_\_\_\_ °F ] x [ \_\_\_\_\_ gal/°F ] = \_\_\_\_\_ gal Water  
Sect 3, Fig 2BTo borate: [ \_\_\_\_\_ °F ] x [ \_\_\_\_\_ pcm/°F ] = \_\_\_\_\_ pcm  
Sect 2, Fig 9/9A

[ \_\_\_\_\_ pcm ] x [ gal/pcm ] = \_\_\_\_\_ gal of Boric Acid

FINAL PAGE