Final Submittal

ST. LUCIE AUGUST 2004
EXAM NOS. 05000335/2004301
AND 05000389/2004301

AUGUST 9 - 20, 2004

PART 1 OF 2

1. Administrative Questions/JPMs
2. In-plant JPMs
3. Control Room JPMs (simulator JPMs)

NRC

JPMs

St. Lucie Plant

This document is removed from
Official Use Only Category on 8/20/04

Facility: Saint Lucie Date of Examination: NRC 2004
Examination Level (circle one): RO / SRO Operating Test Number: _____

Administrative Topic (see Note)	Describe activity to be performed.
Conduct of Operations	Primary Manual Calorimetric at 30% (Simulator) (New)
Conduct of Operations	Overtime Limitations for Plant Personnel (RO) (New) Shift Staffing Requirements (SRO) (New)
Equipment Control	Post Maintenance Test requirement for replacement of the Coupling Lube for the 2B CCW Pump. (SRO only) (New) Perform Data Calculations for Surveillance Code run of the 2B CCW Pump (New)
Radiation Control	Evaluate RWP for work to be performed (RO) (New) Duties and Responsibilities of Emergency Coordinator (Exposure Limits for Emergency Response Personnel) (SRO) (New)
Emergency Plan	Determine PARs during core melt scenario (SRO Only) (New)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.

Facility: Saint Lucie Date of Examination: NRC 2004
Exam Level (circle one): RO / SRO(I)

B.1 Control Room Systems (8 for RO, 7 for SRO-I)

System / JPM Title		Type Code*	Safety Function
~~a. 004 / Emergency Borate~~	~~1069A~~	~~DAS~~	~~I~~
b. 006 / Verify RAS – Unit 2	010A	DAS	II
c. 003 / Restart RCPs 2A1 & 2B2	New03	DS	IVp
d. 061 Initiate AFW to B S/G – Unit 2	New01A	NAS	IVs
e. 026 / Reset Containment Spray	006	DC	V
f. 012 / Respond to LP Range NI Ch Malfunction	1131	DS	VII
g. 036 / Respond to Alarms on Spent Fuel Monitors	1117A	DAS	VIII
h. 010 / Place LTOP in Service – Unit 1(RO Only)	1021	DLC	III
B.2 In Plant Systems			
i. 039 / Locally Close 1A MSIV – Unit 1	1191	DP	IVs
j. 075 / Restore 2B ICW Pump – Unit 2	New02	NP	VIII
k. 028 / Hydrogen Purge System Operation – Unit 1	098	MAPR	V

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

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.a

Perform Emergency Boration - Unit 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Perform emergency boration per reactivity control safety function contingency action of 2-EOP-01

Alternate Path: **Yes** __X__ **No** _____

Facility JPM #: 0821069A

K/A Rating: A2.14 3.8/3.9

Task Standard: Borating RCS ≥40 gpm with ≥1720 ppm boron concentration

Preferred Evaluation Location:

Simulator __X__ Control Room _____ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References: 2-EOP-01 "Standard Post Trip Actions"
2-ONP-02.2 "Emergency Boration"

Validation Time 5 minutes **Time Critical** No

Start Time _____

Candidate: _____
Name

Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:
2-EOP-01 "Standard Post Trip Actions"
2-ONP-02.2 "Emergency Boration"

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Directions to candidate for Simulator JPMs:

I will explain the initial conditions and state the task to be performed. All simulator JPM steps, including any communications, shall be performed for this JPM. You are to operate any plant equipment that is necessary for the completion of this JPM. The simulator will provide the cues as you perform this JPM. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

A reactor trip on Unit 2 has just occurred following a 45-day run at 100% power.

Initiating Cues:

You are the Board RCO. The US has directed you to perform the Standard Post-Trip Actions of 2-EOP-01.

START TIME: _____

1. DETERMINE Reactivity Control acceptance criteria are met: STEP 1A: Reactor power is lowering STANDARD: **VERIFY** reactor power **LOWERING** using redundant indications ***EXAMINER'S CUE: All reactor power indications are LOWERING and IN AGREEMENT** **EVALUATOR NOTE: During this scenario, an instructor should play the part of the Desk RCO and keep the annunciators acknowledged to allow the candidate to focus on the task at hand** COMMENTS:	_____ SAT _____ UNSAT
STEP 1B: Verify Startup Rate is negative. STANDARD: **VERIFY** Startup Rate is **NEGATIVE** using redundant indications ***EXAMINER'S CUE: All SUR indications are NEGATIVE and IN AGREEMENT** COMMENTS:	_____ SAT _____ UNSAT
STEP 1C: VERIFY a maximum of **ONE** CEA is NOT fully inserted.. STANDARD: Using Core Mimic, ADS CRT, and CEDS Control Panel, **DETERMINE** that CEAs 13, 37, and 45 are **FULLY WITHDRAWN** ***EXAMINER'S CUE: CEAs 13, 37, and 45 are FULLY WITHDRAWN** COMMENTS:	_____ SAT _____ UNSAT

STEP 1A.1(CA): PERFORM the following AS NECESSARY to insert CEAS. 1. Manually TRIP the Reactor STANDARD: MANUALLY push Reactor Trip pushbuttons on RTGB 204 ***EXAMINER'S NOTE:** **Candidate may not perform this step since Reactor Trip pushbuttons were already depressed to initiate the Reactor Trip.** ***EXAMINER'S CUE:** **Reactor trip pushbuttons are DEPRESSED; CEAs 13, 27, and 45 are FULLY WITHDRAWN** COMMENTS:	_____ SAT _____ UNSAT
STEP 1C.1(CA): INITIATE Emergency Boration to achieve adequate SDM. STANDARD: **ENTER** 2-ONP-02.02. ***EXAMINER'S CUE:** **None** COMMENTS:	_____ SAT _____ UNSAT
STEP 1: Place the Makeup Mode Selector Switch in MANUAL. (ONP-02.02) STANDARD: **POSITION** Makeup Mode Selector Switch to **MANUAL** ***EXAMINER'S CUE:** **Makeup Mode Selector Switch is in MANUAL** **EVALUATOR NOTE:** **Steps 1 through 5 may not be performed candidate notices that V2514 does not open in step 6.** COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Ensure V2525, Boron Load Control Valve is CLOSED. STANDARD: **ENSURE** V2525 is **CLOSED** ***EXAMINER'S CUE:** **V2525 shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT

STEP 3: Start 2A or 2B BA Pump. STANDARD: **POSITION** 2A or 2B BAM Pump control switch to **RUN** ***EXAMINER'S CUE:** **BAM Pump (2A or 2B) started by candidate shows Green light OFF, Red light ON** **EVALUATOR NOTE:** **Since the procedure doesn't specify which pump to run, either one is acceptable. Optimally, however, the candidate should start the pump associated with the Tech Spec designated BAM tank** COMMENTS:	_____ SAT _____ UNSAT
STEP 4: Close V2650, Tank 2A Recirc Valve. STANDARD: **POSITION** V2650 control switch to **CLOSE** ***EXAMINER'S CUE:** **V2650 shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 5: Close V2651, Tank 2B Recirc Valve. STANDARD: **POSITION** V2651 control switch to **CLOSE** ***EXAMINER'S CUE:** **V2651 shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 6: Open V2514 Emergency Borate. STANDARD: **POSITION** V2514 control switch to **OPEN** and **OBSERVE** that valve does NOT open. ***EXAMINER'S CUE:** **V2514 shows Green light ON, Red light OFF** **EVALUATOR NOTE:** **Faulted step – V2514 failed to open** COMMENTS:	_____ SAT _____ UNSAT

STEP 6A1: Open V2508, BA Gravity Feed B. STANDARD: **POSITION** V2508 control switch to **OPEN** ***EXAMINER'S CUE:** **V2508 shows Green light OFF, Red light ON** **EVALUATOR NOTE:** **Either step 6A1 or 6A2 satisfies CRITICAL STEP.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 6A2: Open V2509, BA Gravity Feed A. STANDARD: **POSITION** V2509 control switch to **OPEN** ***EXAMINER'S CUE:** **V2509 shows Green light OFF, Red light ON** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 6A3: Close V2501, VCT Outlet Valve. STANDARD: **POSITION** V2501 control switch to **CLOSE** ***EXAMINER'S CUE:** **V2501 briefly shows Green light ON, Red light OFF;** **then changes to Green light OFF, Red light ON (unless held in CLOSE)** COMMENTS:	_____ SAT _____ UNSAT
STEP 6A4: If VCT level is greater than 5%, then place and hold V2501 in the CLOSE position. STANDARD: **POSITION** V2501 switch to **CLOSE** and **HOLD** ***EXAMINER'S CUE:** **VCT level is 59%;** **V2501 shows Green light ON, Red light OFF (if held in CLOSED);** **otherwise, V2501 shows Green light OFF, Red light ON** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 6A5: Open Bkr 2-42118, V2501, at MCC-2B6. STANDARD: **DIRECT** SNPO to open Breaker 2-42118. Candidate should NOT release V2501 control switch from the **CLOSE** position UNTIL BOTH Red and Green lights go **OFF** **EXAMINER'S CUE: SNPO ACKNOWLEDGES and REPORTS that Breaker 2-42118 has been opened** **After SNPO opens breaker, then V2501 shows Green light OFF, Red light OFF** COMMENTS:		**CRITICAL STEP** _____ SAT _____ UNSAT
STEP (done): Notify US that task is complete. STANDARD: **NOTIFY** ANPS that (1) Reactivity Control has been verified and is being met with contingencies (V2514 wouldn't open) and (2) emergency boration is in progress due to three rods stuck out **EXAMINER'S CUE: US ACKNOWLEDGES. THIS JPM IS COMPLETE.** COMMENTS: **END OF TASK**		_____ SAT _____ UNSAT

STOP TIME: _____

SIMULATOR JPM SETUP

1. **RESTORE** IC-1, 100% power, MOL.
2. **UNFREEZE** simulator.
3. **SELECT** CONFIGURE and **CHANGE** to JPM.
4. **SELECT** Lesson 0821069A and **START** the lesson.
5. **TRIGGER** the step to stick out 3 CEAs and fail V2514.
6. **TRIGGER** the step for reactor trip. The simulator will automatically freeze after 10 seconds.
7. **MAKE** a SNAPSHOT if more than one student will be performing the JPM.
8. **FREEZE** simulator until student is ready. The audible alarms will be reinstated when the simulator is placed in RUN.
9. **TRIGGER** the step to open the breaker for V2501 when requested by the student.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

A reactor trip on Unit 2 has just occurred following a 45-day run at 100% power.

Initiating Cues:

You are the Board RCO. The US has directed you to perform the Standard Post-Trip Actions of 2-EOP-01.

FPL

ST. LUCIE UNIT 2

EMERGENCY OPERATING PROCEDURE

SAFETY RELATED

Procedure No.
2-EOP-01

Current Revision No.
23

Effective Date
01/29/04

Title:

STANDARD POST TRIP ACTIONS

SPTA

Responsible Department: **OPERATIONS**

REVISION SUMMARY:

Revision 23 - Incorporated PCR 03-2800 to incorporate operator feedback issues. (J. Martin, 11/18/03)

Revision 22 – Incorporated CEN-152, rev 5.2 and allowed procedure to conform with writer's guide. (J. R. Martin, 08/08/02)

Revision 21 – Made grammatical and formatting changes and changed S/G pressure. (Steve Napier, 10/03/01)

AND

THIS PROCEDURE HAS BEEN COMPLETELY REWRITTEN. This procedure has been rewritten to meet CEN 152 Revision 5.1 criteria. (Steve Napier, 08/10/01)

Revision	FRG Review Date	Approved By	Approval Date
0	12/23/85	D. A. Sager Plant General Manager	12/23/85
23	11/18/03	G. L. Johnston Plant General Manager	11/18/03
		N/A Designated Approver	
		N/A Designated Approver (Minor Correction)	

S_2_OPS	
DATE	
DOCT	PROCEDURE
DOCN	2-EOP-01
SYS	
COM	COMPLETED
ITM	23

1.0 PURPOSE

This procedure provides the immediate operator actions that must be accomplished after a Reactor trip has occurred or is required to have occurred. These actions are necessary to ensure the plant is placed in a stable, safe condition or configured to respond to a continuing emergency. This is the entry procedure for the entire EOP system.

2.0 ENTRY CONDITIONS

2.1 **ANY** of the following symptoms of a Reactor trip:

- Any valid Reactor trip alarm
- CEAs are fully inserted
- Rapid drop in Reactor power
- Reactor Trip Circuit Breakers open
- Any RPS trip setpoint exceeded

3.0 EXIT CONDITIONS

3.1 **BOTH** of the following conditions exist,

- **ALL** safety function acceptance criteria have been evaluated
- Chart 1, Diagnostic Flow Chart, has been reviewed to determine the appropriate Optimal or Functional Recovery Procedure required for use

4.0 OPERATOR ACTIONS

REACTIVITY CONTROL

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **1.** DETERMINE Reactivity Control acceptance criteria are met:	
A. VERIFY Reactor power is lowering.	**A.1** PERFORM the following **AS NECESSARY** to insert CEAs: **1.** Manually TRIP the Reactor. **2.** DEENERGIZE the CEDM MG Sets by opening **BOTH** of the following breakers: • LC 2A2, Bkr 2-40212, CEA Drive MG Set 2A • LC 2B2, Bkr 2-40511, CEA Drive MG Set 2B **3.** OPEN TCB-1 through TCB-8, at Rx Trip Swgr.
B. VERIFY Startup Rate is negative.	
C. VERIFY a maximum of **ONE** CEA is NOT fully inserted.	**C.1** INITIATE Emergency Boration to achieve adequate SDM.

4.0 OPERATOR ACTIONS (continued)

MAINTENANCE OF VITAL AUXILIARIES
(AC & DC POWER)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **2.** DETERMINE Maintenance of Vital Auxiliaries acceptance criteria are met:	
A. VERIFY the Turbine is tripped by **ALL** GVs and TVs indicate CLOSED.	**A.1** PERFORM **ALL** of the following: **1.** Manually TRIP the Turbine. **2.** VERIFY Turbine First Stage pressure indicates 0 psig. **3.** VERIFY Turbine speed is LOWERING. **A.2** If the Turbine is NOT tripped, Then PERFORM the following **AS NECESSARY** to isolate steam to the turbine: **1.** Locally TRIP the Turbine. **2.** CLOSE **BOTH** MSIVs.
B. When the Turbine is TRIPPED, Then VERIFY the Main Generator breakers are OPEN: • 8W49, Generator No. 2 East Breaker • 8W52, Generator No. 2 Mid Breaker • FB 2, Exciter Supply Breaker	**B.1** OPEN Main Generator breakers: • 8W49, Generator No. 2 East Breaker • 8W52, Generator No. 2 Mid Breaker • FB 2, Exciter Supply Breaker

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4.0 OPERATOR ACTIONS (continued)

MAINTENANCE OF VITAL AUXILIARIES
(AC & DC POWER)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)
C. VERIFY **ALL** Vital and Non-Vital AC buses transfer from Auxiliary to Start-up Transformers and are ENERGIZED.	**C.1** If **EITHER** Vital 4.16 KV Bus is NOT powered from offsite, Then ENSURE **BOTH** of the following: **1.** The associated EDG has STARTED. **2.** The associated EDG output breaker is CLOSED. **C.2** If **ANY** 6.9 KV or non-vital 4.16 KV bus is NOT powered from offsite, Then INITIATE action to RESTORE power to the bus. **C.3** If **NO** Vital 4.16 KV buses are energized, Then PERFORM **ALL** the following: **1.** CONTACT Unit 1 to determine power availability. **2.** NOTIFY Unit 1 to PERFORM Appendix W, Supplying Unit 2 with AC Power Using SBO Crosstie. **3.** PERFORM Appendix V, Receiving AC Power from Unit 1 Using SBO Crosstie.
D. VERIFY **ALL** Vital and Non-Vital DC Buses are ENERGIZED.	**D.1** If the 2AB DC Bus is de-energized, Then ALIGN the 2AB DC Bus to an energized Vital DC Bus.

4.0 OPERATOR ACTIONS (continued)

RCS INVENTORY CONTROL

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE
Rising Pressurizer level with concurrent lowering RCS Subcooled Margin are symptoms of a Pressurizer Steam Space LOCA.

☐ **3.** DETERMINE RCS Inventory Control acceptance criteria are met:

A. VERIFY **BOTH** of the following conditions exist,

- Pressurizer level is between 10 and 68%
- Pressurizer level is trending to between 30 and 35%

A.1 RESTORE and MAINTAIN Pressurizer level between 30 and 35% by performing **ANY** of the following:

1. ENSURE proper operation of the Pressurizer Level Control System.

2. Manually CONTROL Charging and Letdown.

4.0 OPERATOR ACTIONS (continued)

RCS PRESSURE CONTROL

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **4.** DETERMINE RCS Pressure Control acceptance criteria are met:	
A. VERIFY Pressurizer pressure is between 1800 and 2300 psia.	**A.1** If Pressurizer pressure is less than 2300 psia, and the PORV(s) are OPEN, Then PERFORM **ANY** of the following: **1.** OVERRIDE the open PORV(s). **2.** CLOSE the associated PORV block valve(s). **A.2** If Pressurizer pressure is less than 1736 psia, Then ENSURE **ALL** of the following: **1.** SIAS has ACTUATED. **2.** CIAS has ACTUATED. **3.** **ONE** RCP in **EACH** loop is stopped.
B. VERIFY Pressurizer pressure is trending to between 2225 and 2275 psia.	**B.1** RESTORE and MAINTAIN Pressurizer pressure between 2225 and 2275 psia by performing **ANY** of the following: **1.** ENSURE proper operation of the Pressurizer Pressure Control System. **2.** Manually OPERATE heaters and spray.
C. VERIFY RCS subcooling is at least 20°F.	**C.1** If RCS subcooling is less than 20°F or RCP(s) exhibit cavitation, Then STOP **ALL** RCPs. **C.2** COMMENCE a cooldown, not to exceed 100°F in **ANY** one hour to regain subcooling.

4.0 OPERATOR ACTIONS (continued)

CORE HEAT REMOVAL

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **5.** DETERMINE Core Heat Removal acceptance criteria are met:	
A. VERIFY at least **ONE** RCP is RUNNING and supplied with CCW.	**A.1** If CCW is LOST to the RCPs for greater than 10 minutes, Then STOP **ALL** RCPs.
B. VERIFY Loop ΔT is less than 10°F.	

4.0 OPERATOR ACTIONS (continued)

RCS HEAT REMOVAL

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **6.** DETERMINE RCS Heat Removal acceptance criteria are met:	
A. VERIFY at least **ONE** S/G has **BOTH** of the following conditions: • S/G level is between 20 and 90% NR • Feedwater is available <u>and</u> level is being restored to between 60 and 70% NR	**A.1** PERFORM **BOTH** of the following: **1.** ENSURE Main Feedwater flow is available. **2.** CONTROL Main Feedwater flow to restore S/G level to between 60 and 70% NR.
	A.2 PERFORM **BOTH** of the following: **1.** ENSURE Auxiliary Feedwater flow after AFAS actuation. **2.** CONTROL AFW flow to restore S/G level to between 60 and 70% NR.
B. <u>If</u> **EITHER** of the following conditions exist, • 2A or 2B AFW Pump is the **ONLY** source of Feedwater • Main or Auxiliary Feedwater flow can NOT be re-established <u>Then</u> STOP **ONE** RCP in **EACH** loop.	
(Continued on next page)	**(Continued on next page)**

4.0 OPERATOR ACTIONS (continued)

RCS HEAT REMOVAL

INSTRUCTIONS	CONTINGENCY ACTIONS
6. (continued)	**6.** (continued)
C. VERIFY RCS T_{AVG} is between 525 and 535°F.	**C.1** If RCS T_{AVG} is greater than 535°F, Then CONFIRM that at least **ONE** S/G is removing RCS heat: **1.** ENSURE feedwater is being restored to at least **ONE** S/G. **2.** ENSURE SBCS or ADVs are restoring RCS T_{AVG} to between 525 and 535°F.
	C.2 If RCS T_{AVG} is less than 525°F, Then CONFIRM S/G steam and feed rates are NOT excessive: **1.** ENSURE feed flow is NOT excessive. **2.** ENSURE SBCS or ADVs are restoring RCS T_{AVG} to between 525 and 535°F.
	C.3 If T_{COLD} is approaching or less than 500°F, Then PERFORM **BOTH** of the following: **1.** ENSURE at least **ONE** RCP is STOPPED. **2.** INITIATE Emergency Boration to achieve adequate SDM.

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4.0 OPERATOR ACTIONS (continued)

RCS HEAT REMOVAL

INSTRUCTIONS	CONTINGENCY ACTIONS
6. (continued)	**6.** (continued)
D. VERIFY S/G pressure is between 835 and 915 psig (850 and 930 psia).	**D.1** If S/G pressure is greater than 915 psig (930 psia), Then ENSURE the SBCS or ADVs are restoring S/G pressure to less than 915 psig (930 psia).
	D.2 If S/G pressure is less than 835 psig (850 psia), Then ISOLATE steam lines from the S/G: **1.** ENSURE SBCS valves are CLOSED. **2.** ENSURE ADVs are CLOSED.
	D.3 If S/G pressure is less than 735 psig (750 psia), Then CLOSE the MSIVs.
	D.4 If S/G pressure is less than 585 psig (600 psia), Then ENSURE MSIS has ACTUATED.
E. ENSURE the **FOUR** MSR TCV Block Valves are CLOSED.	**E.1** CLOSE **ALL** TCVs using the MSR Reheat Control Panel.
F. ENSURE the MSR Warmup Valves are CLOSED.	
G. If maintaining a vacuum is desired, Then ENSURE MV-08-814, Spillover Bypass Valve, is CLOSED.	

4.0 OPERATOR ACTIONS (continued)

CONTAINMENT CONDITIONS

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **7.** DETERMINE Containment Conditions acceptance criteria are met:	
A. VERIFY Containment pressure is less than 2 psig.	**A.1** If Containment pressure is at least 3.5 psig, Then ENSURE **ALL** of the following conditions exist, **1.** SIAS has ACTUATED. **2.** CIAS has ACTUATED. **3.** MSIS has ACTUATED. **4.** **ALL** available Containment Fan Coolers are RUNNING.
	A.2 If Containment pressure is at least 5.4 psig, Then ENSURE **BOTH** of the following conditions exist, **1.** CSAS has ACTUATED. **2.** **EACH** Containment Spray header flow is at least 2700 gpm.
B. VERIFY **NO** Containment Radiation Monitor alarms or rising trends: • CIS Radiation Monitors • Containment Atmospheric Monitors	**B.1** If Containment radiation is greater than 10R/hr, Then ENSURE CIAS has ACTUATED.

(Continued on next page) **(Continued on next page)**

4.0 OPERATOR ACTIONS (continued)

CONTAINMENT CONDITIONS

INSTRUCTIONS	CONTINGENCY ACTIONS
7. (continued)	**7.** (continued)
C. VERIFY Containment temperature is less than 120°F.	**C.1** ENSURE **ALL** available Containment Fan Coolers are RUNNING.
D. VERIFY **NO** secondary plant radiation alarms or rising trends: • Condenser Air Ejector Monitor • S/G Blowdown Monitors • Main Steamline Monitors	

/R23

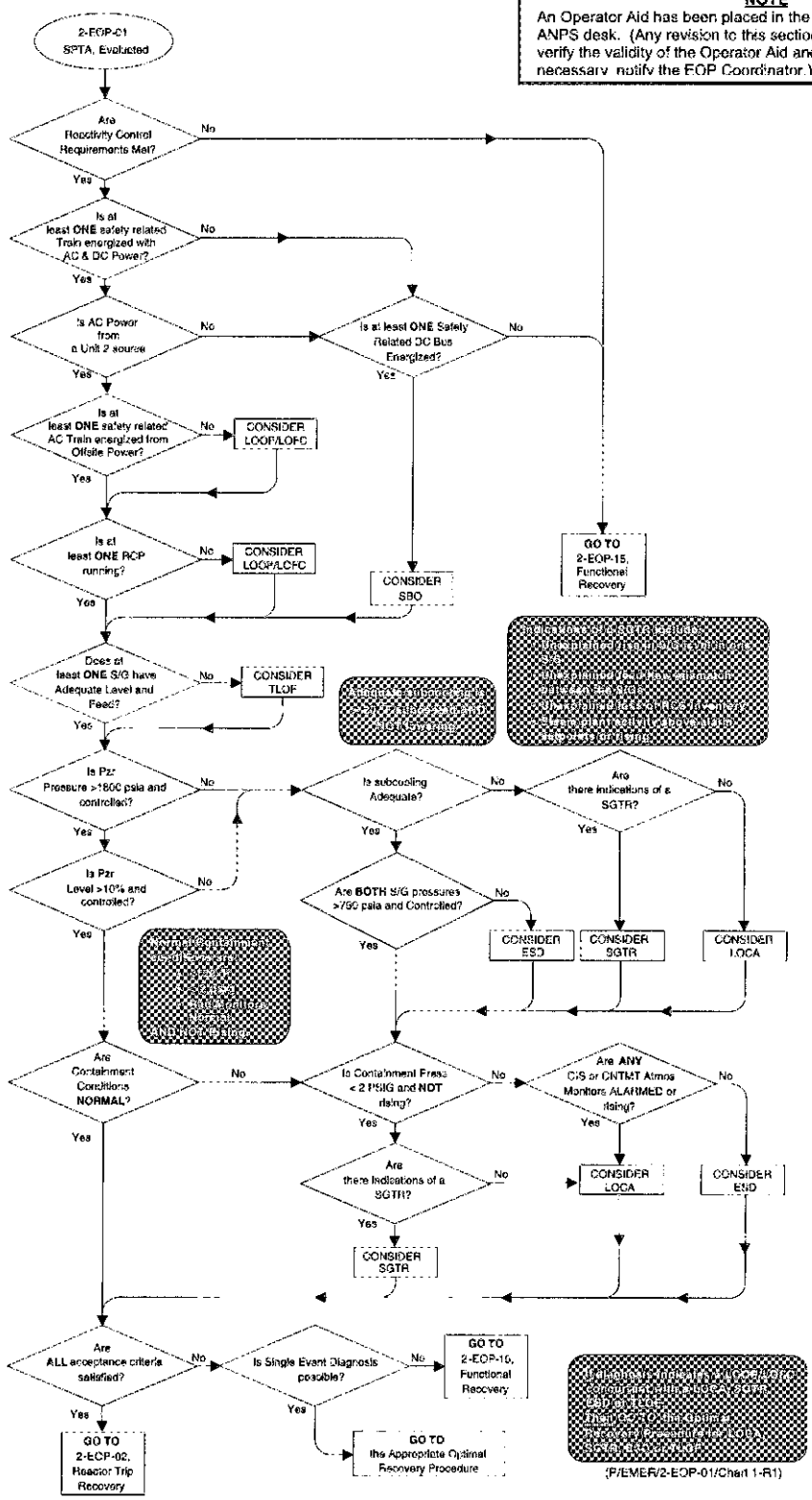
4.0 OPERATOR ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐* **8.** DIRECT a field operator to perform Secondary Plant Post Trip Actions. **REFER TO** Appendix X, Secondary Plant Post Trip Actions, Section 1.	
☐ **9.** <u>When</u> **ALL** safety function acceptance criteria have been EVALUATED, <u>Then</u> PERFORM **BOTH** of the following: **A.** DIAGNOSE the event. **REFER TO** Chart 1, Diagnostic Flow Chart. **B. GO TO the appropriate Emergency Operating Procedure.**	

END OF SECTION 4.0

CHART 1
DIAGNOSTIC FLOW CHART
(Page 1 of 1)

NOTE
An Operator Aid has been placed in the Unit 2 Control Room ANPS desk. (Any revision to this section of the procedure shall verify the validity of the Operator Aid and, if changes are necessary, notify the EOP Coordinator.)



(P/EMER/2-EOP-01/Chart 1-R1)

FPL	ST. LUCIE UNIT 2 OFF-NORMAL OPERATING PROCEDURE SAFETY RELATED	Procedure No. 2-ONP-02.02 Current Revision No. 4 Effective Date 03/25/04

Title:

EMERGENCY BORATION

Responsible Department: **OPERATIONS**

REVISION SUMMARY:

Revision 4 - Incorporated PCR 04-0210 to add note about potential reactivity effects contained in this procedure. (J. Folden, 02/14/04)

Revision 3A – Incorporated PCR 03-0815 for PCM 02042 to revise DDPS to DCS (Distributed Control System). (M.B. Gilmore, 04/09/03)

REVISION 3 – Revised shutdown margin requirements per Tech Spec. Amendment #105. (M. Gilmore, 04/13/00)

REVISION 2 – Added guidance for emergency boration from RWT contingency. (M. Gilmore, 11/02/99)

REVISION 1 – Changed entry conditions to reflect emergency boration while in Modes 3 and 4 without a reactor trip. (Gene Boyd, 10/05/99)

REVISION 0 – *Previously issued as 2-0250030.* This procedure provides more detailed direction and an easier to read format. Section 2.0 Included Tech Spec sections and headings and Included UFSAR section numbers and headings. Section 6.0 added the correct equipment nomenclature to all pumps and valves that are operated in this procedure. The purpose of this procedure is to provide instructions to inject concentrated boric acid solution into the Reactor Coolant System via the charging pumps. (Charlie Simpkins, 03/02/99)

Revision	FRG Review Date	Approved By	Approval Date
0	03/02/99	R. G. West Plant General Manager	03/02/99
4	02/13/04	G. L. Johnston Plant General Manager N/A Designated Approver N/A Designated Approver (Minor Correction)	02/14/04

S_2_OPS	
DATE	
DOCT	PROCEDURE
DOCN	2-ONP-02.02
SYS	
COM	COMPLETED
ITM	4

TABLE OF CONTENTS

1.0 PURPOSE

1.1 The purpose of this procedure is to provide instructions to inject concentrated boric acid solution into the Reactor Coolant System (RCS) via the charging pumps.

2.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, License Renewal, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on an attachment.

2.1 Technical Specifications

- Section 3.1.2.1 Boration Flow Paths Modes 5 and 6.
- Section 3.1.2.2 Boration Flow Paths Modes 1 thru 4.

2.2 Updated Final Safety Analysis Report (UFSAR)

- Section 7.4 Systems Required for Safe Shutdown.
- Section 7.4.1.2 CVCS Boron Addition.
- Section 9.3.4 Chemical and Volume Control System

2.3 Management Directives and Regulatory Commitments

- $¶_1$ CR 98-1016, 1A Boric Acid Makeup Pump Trip (PM 98-08-069)
- $¶_2$ CR 99-0952

2.4 Procedures

- C.E. Emergency Procedure F-EP-11

3.0 RECORDS REQUIRED

3.1 Normal Log Entries.

4.0 ENTRY CONDITIONS

ANY of the Following Conditions exist:

4.1 ¶2 Unanticipated or uncontrolled RCS cooldown in Modes 1 & 2 following a reactor trip or in Modes 3 & 4 as indicated by:

1. Uncontrolled decrease in RCS temperature.
2. Uncontrolled decrease in pressurizer pressure or level.
3. Uncontrolled decrease in secondary steam pressure.

4.2 Unexplained or uncontrolled reactivity increase as indicated by:

1. Abnormal increase in RCS temperature or Reactor power.
2. Abnormal increase in Reactor power or count rate when shut down.

4.3 Loss of shutdown margin due to excessive CEA insertion as indicated by:

1. Power dependent insertion alarm (DCS).
2. Power dependent insertion alarm (ADS).

4.4 More than one CEA NOT fully inserted following a Reactor Trip as indicated by:

1. The CEA Lower Electrical Limit lights (green) indicate more than one CEA NOT fully inserted.
2. The CEA Bottom lights (amber) indicate more than one CEA NOT fully inserted.
3. ADS Display indicates more than one CEA NOT fully inserted.

5.0 EXIT CONDITIONS

5.1 RCS cooldown and/or reactivity excursion has been terminated.

AND

5.2 Shutdown margin has been restored to within limits specified in the COLR.

6.0 OPERATOR ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE
This Procedure may contain steps that could adversely affect reactivity. ENSURE that proper consideration and appropriate briefings occur prior to performance of steps that could challenge reactivity.

1. ¶1 PLACE the Makeup Mode Selector switch in MANUAL.

2. ENSURE V2525, Boron Load Control Valve, is CLOSED.

3. START 2A or 2B BA Pump.

4. CLOSE V2650, Tank 2A Recirc. Valve

5. CLOSE V2651, Tank 2B Recirc Valve.

6. OPEN V2514, Emergency Borate.

6.

A. If V2514 fails to open, PERFORM the following:

1. OPEN V2508, BA Gravity Feed B.

2. OPEN V2509, BA Gravity Feed A.

3. CLOSE V2501 VCT Outlet Valve.

4. If VCT level is greater than 5%, Then PLACE and hold V2501 in the CLOSE position.

5. OPEN Bkr 2-42118, V2501, at MCC-2B6

/K4

6.0 OPERATOR ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS

6. (continued)

CAUTION

The RWT to Charging Pump Suction line shall not be used during a seismic event.

B. If the Boric Acid Makeup Tanks are unavailable or both Gravity Feed valves failed to open, Then perform the following:

1. OPEN V2504 VCT Bypass / Chrg Pp Suct from RWT.
2. CLOSE V2501 VCT Outlet Valve.
3. If the VCT level is greater than 5%, Then perform the following:
   - **a.** PLACE and hold V2504 VCT Bypass / Chrg Pp Suct from RWT in the OPEN position.
   - **b.** PLACE and hold V2501 VCT Outlet Valve in the CLOSED position.
   - **c.** OPEN Bkr 2-42036, V-2504, at MCC-2B5.
   - **d.** OPEN Bkr 2-42118, V-2501, at MCC-2B6.

6.0 OPERATOR ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS
	6. (continued) **B.** (continued) **4.** STOP the running BAM pumps. **5.** ENSURE V2508 BA Gravity Feed B CLOSED. **6.** ENSURE V2509 BA Gravity Feed A CLOSED. **7.** ENSURE V2514 Emergency Borate CLOSED.
7. If Unit 2 is in Mode 3 thru 6 with SIAS Blocked and Emergency Boration is **NOT** available, Then PERFORM the following: **A.** PERFORM Safety Function Status Check of the Low Mode Off Normal for the current plant condition. **B.** IMPLEMENT the Low Mode Off-Normal Operating Procedure if required.	

6.0 OPERATOR ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS
8. If the Emergency Boration is complete, Then PERFORM the following to restore the system to normal alignment:	
A. CLOSE V2514, Emergency Borate.	
B. ¶1 ENSURE the Makeup Mode Selector switch is in MANUAL	
C. STOP the running BAM pump and PLACE the control switch in AUTO.	
D. OPEN V2650, Tank 2A Recirc. Valve	
E. OPEN V2651, Tank 2B Recirc. Valve	
F. If Gravity Feed was used, Then PERFORM the following:	
1. CLOSE Bkr 2-42118, V2501, at MCC-2B6.	
2. OPEN V2501, VCT Outlet Valve.	
3. CLOSE V2508, BA Gravity Feed B.	
4. CLOSE V2509, BA Gravity Feed A.	
5. PLACE the Makeup Mode Selector switch in the desired position.	

6.0 OPERATOR ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS

8. (continued)

G. If the RWT to Charging Pump Suction was used, Then perform the following:

1. CLOSE Bkr 2-42118, V-2501, at MCC-2B6.

2. CLOSE Bkr 2-42036, V-2504, at MCC-2B5.

3. OPEN V2501 VCT Outlet Valve.

4. CLOSE V2504 VCT Bypass / Chrg Pp Suct from RWT.

END OF SECTION 6.0

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.b

Verify RAS - Unit 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Verify RAS on Unit 2

Alternate Path: **Yes** X **No** _____

Facility JPM #: 0821010A

K/A Rating(s): A3.08 4.2/4.3

Task Standard: This JPM is complete when all components in Table 4 are in their required state, and the operator has verified continued HPSI flow to the core and notified the US of such, including any contingency actions taken.

Preferred Evaluation Location:

Simulator X Control Room _____ In-Plant _____

Preferred Evaluation Method:

Perform X Simulate _____

References: 2-EOP-99, Table 4, Recirculation Actuation Signal

Validation Time 5 minutes **Time Critical** No

Candidate: _____ Start Time _____
Name

Finish Time _____

Performance Rating: Sat _____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

2-EOP-99, Table 4, Recirculation Actuation Signal

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Directions to candidate for Simulator JPMs:

I will explain the initial conditions and state the task to be performed. All simulator JPM steps, including any communications, shall be performed for this JPM. You are to operate any plant equipment that is necessary for the completion of this JPM. The simulator will provide the cues as you perform this JPM. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

A loss of coolant accident (LOCA) is in progress at Unit 2. 2-EOP-3 is in progress.

Initiating Cues:

You are the Desk RCO. Recirculation Actuation Signal has actuated.

The US has directed you to verify RAS in accordance with 2-EOP-99, Table 4.

START TIME: _____

STEP 1: ENSURE Suction from Containment Sump A/B Valves OPEN ▪ MV-07-2A STANDARD: **ENSURE** MV-07-2A is **OPEN** ***EXAMINER'S CUE:** **MV-07-2A shows Green light OFF, Red light ON** COMMENTS:	_____ SAT _____ UNSAT
STEP 2: ENSURE Suction from Containment Sump A/B Valves OPEN ▪ MV-07-2B STANDARD: **ENSURE** MV-07-2B is **OPEN** ***EXAMINER'S CUE:** **MV-07-2B shows Green light OFF, Red light ON** COMMENTS:	_____ SAT _____ UNSAT
STEP 3: ENSURE Suction from RWT A/B Valves CLOSED ▪ MV-07-1A STANDARD: **ENSURE** MV-07-1A is **CLOSED** ***EXAMINER'S CUE:** **MV-07-1A shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 4: ENSURE Suction from RWT A/B Valves CLOSED ▪ MV-07-1B STANDARD: **ENSURE** MV-07-1B is **CLOSED** ***EXAMINER'S CUE:** **MV-07-1B shows Green light OFF, Red light ON** **EVALUATOR'S NOTE: Faulted Step – valve failed to auto close** COMMENTS:	_____ SAT _____ UNSAT

***Cues are to be used only if JPM performance is being simulated in the plant.**

STEP 5: ENSURE Suction from RWT A/B Valves CLOSED ▪ MV-07-1B STANDARD: **POSITION** MV-07-1B control switch to **CLOSE** ***EXAMINER'S CUE:** **MV-07-1B shows Green light ON, Red light OFF** **EVALUATOR'S NOTE: MV-07-1B takes 90 seconds to stroke closed** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 6: ENSURE LPSI Pumps STOPPED ▪ 2A LPSI Pump STANDARD: **OBSERVE** LPSI Pump 2A is still **RUNNING** ***EXAMINER'S CUE:** **LPSI Pump 2A shows Green light OFF, Red light ON** **If checked, the AMMETER shows 43 AMPS** **EVALUATOR'S NOTE: Faulted step – LPSI Pump 2A failed to auto stop** COMMENTS:	_____ SAT _____ UNSAT
STEP 7: ENSURE LPSI Pumps STOPPED ▪ 2A LPSI Pump STANDARD: **POSITION** LPSI Pump 2A control switch to **STOP** ***EXAMINER'S CUE:** **LPSI Pump 2A shows Green light ON, Red light OFF** **If checked, the AMMETER shows 0 AMPS** **EVALUATOR'S NOTE: Pump switch may be left in STOP or AUTO at student's discretion. If asked, ANPS desires switch returned to AUTO.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

***Cues are to be used only if JPM performance is being simulated in the plant.**

STEP 8: ENSURE LPSI Pumps STOPPED ▪ 2B LPSI Pump STANDARD: **ENSURE** LPSI Pump 2B is **OFF** ***EXAMINER'S CUE:** **LPSI Pump 2B shows Green light ON, Red light OFF** **If checked, the AMMETER shows 0 AMPS** COMMENTS:	_____ SAT _____ UNSAT
STEP 9: ENSURE Minimum Flow Header A/B Isolation Valves CLOSED ▪ V3495 STANDARD: **ENSURE** V3495 indicates **CLOSED** ***EXAMINER'S CUE:** **V3495 shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 10: ENSURE Minimum Flow Header A/B Isolation Valves CLOSED ▪ V3659 STANDARD: **ENSURE** V3659 indicates **CLOSED** ***EXAMINER'S CUE:** **V3659 shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 11: ENSURE Minimum Flow Header A/B Isolation Valves CLOSED ▪ V3496 STANDARD: **ENSURE** V3496 indicates **CLOSED** ***EXAMINER'S CUE:** **V3496 shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT

***Cues are to be used only if JPM performance is being simulated in the plant.**

STEP 12: ENSURE Minimum Flow Header A/B Isolation Valves CLOSED ▪ V3660 STANDARD: **ENSURE** V3660 indicates **CLOSED** ***EXAMINER'S CUE:** **V3360 shows Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP (done): NOTIFY US of task completion and contingencies. STANDARD: **NOTIFY** ANPS that RAS has been **VERIFIED** IAW 2-EOP-99, Table 4, and that (1) valve MV-07-1B did not auto close and had to be **CLOSED** manually and (2) LPSI Pump 2A did not auto stop and was manually **STOPPED**. **EXAMINER'S CUE:** **US ACKNOWLEDGES** COMMENTS: **END OF TASK**	_____ SAT _____ UNSAT

STOP TIME: _____

***Cues are to be used only if JPM performance is being simulated in the plant.**

Simulator Steup

1. **RESTORE** IC-29.
2. **SELECT** CONFIGURE and **CHANGE** to JPM CONFIGURATION.
3. **SELECT** Lesson 0821010A and **START** the lesson.
4. **UNFREEZE** the simulator. It will automatically freeze after MV-07-1A is fully closed. The audible alarms will reinitiate after the simulator is unfrozen.
5. **MAKE** a SNAPSHOT if more than one student will be taking the JPM.
6. **UNFREEZE** the simulator when the student is ready.
7. **ALL** annunciators that come in are balance of plant.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

A loss of coolant accident (LOCA) is in progress at Unit 2. 2-EOP-3 is in progress.

INITIATING CUES:

You are the Desk RCO. Recirculation Actuation Signal has actuated.

The US has directed you to verify RAS in accordance with 2-EOP-99, Table 4.

TABLE 4
RECIRCULATION ACTUATION SIGNAL
(Page 1 of 1)

	A Train (√)	B Train (√)
☐ **1.** ENSURE Suction from Containment Sump A/B Valves OPEN.		
• MV-07-2A	___	
• MV-07-2B		___
☐ **2.** ENSURE Suction from RWT A/B Valves CLOSED.		
• MV-07-1A	___	
• MV-07-1B		___
☐ **3.** ENSURE LPSI Pumps STOPPED.		
• 2A LPSI Pump	___	
• 2B LPSI Pump		___
☐ **4.** ENSURE Minimum Flow Header A/B Isolation Valves CLOSED.		
• V3495	___	
• V3659	___	
• V3496		___
• V3660		___

END OF TABLE 4

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.c

RESTART RCPS 2A1 AND 2B2 - UNIT 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: RESTART RCPs 2A1 AND 2B2 POST SGTR-UNIT 2

Alternate Path: Yes _____ No __X____

Facility JPM #: 0821120

K/A Rating: A1.07 3.4/3.4

Task Standard: This JPM is complete when the 2A1 and 2B2 RCPs are running, and the Unit Supervisor has been notified.

Preferred Evaluation Location:

Simulator __X____ Control Room _____ In-Plant _____

Preferred Evaluation Method:

Perform __X____ Simulate _____

- **References:** 2-EOP-09 "Loss of Offsite Power / Loss of Forced Circulation"
  2-NOP-01.02 "Reactor Coolant Pump Operation"

Validation Time ____20 minutes_____ **Time Critical** _No_

Start Time _____

Candidate: _____
Name

Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:
2-NOP-01.02 "Reactor Coolant Pump Operation"

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Directions to candidate for Simulator JPMs:

I will explain the initial conditions and state the task to be performed. All simulator JPM steps, including any communications, shall be performed for this JPM. You are to operate any plant equipment that is necessary for the completion of this JPM. The simulator will provide the cues as you perform this JPM. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

Unit 2 was tripped due to loss of CCW to the RCPs. 2-EOP-09 "Loss of Offsite Power / Loss of Forced Circulation" was entered. CCW to the RCPs was restored 20 minutes later.

Initiating Cues:

The Unit Supervisor directs you to restart the 2A1 and 2B2 RCPs in accordance with 2-NOP-01.02, Rector Coolant Pump Operation, Section 7.2, RCP Restart During EOP Implementation.

START TIME: _____

STEP 1: ENSURE the applicable portions of 2-NOP-01.02, Section 3.0, Prerequisites, have been completed. STANDARD: Ensure Section 3.0, Prerequisites is complete. **EXAMINER'S CUE: The Unit Supervisor has signed off all applicable steps of Section 3.0, Prerequisites.** COMMENTS:	_____ SAT _____ UNSAT
STEP 2: ENSURE Section 4.10, Precautions/Limitations, has been completed. STANDARD: ENSURE Section 4.10, Precautions/Limitations is complete. **EXAMINER'S CUE: The Unit Supervisor has reviewed Section 4.10, Precautions and Limitations.** COMMENTS:	_____ SAT _____ UNSAT
STEP 3: VERIFY **ALL** RCP alarms are CLEAR for the RCPs to be started or the alarms have been evaluated and dispositioned. STANDARD: Observe alarms are CLEAR for 2A1 and 2B2 RCPs or the alarms have been evaluated and dispositioned. **EXAMINER'S CUE: ALL alarms for the 2A1 and 2B2 RCPs have been evaluated and dispositioned.** COMMENTS:	_____ SAT _____ UNSAT

STEP 4: HPSI throttling criteria has been met and Pzr level is stable and controlled. STANDARD: ENSURE HPSI throttling criteria has been met and Pzr level is stable and controlled. **EXAMINER'S CUE: HPSI Throttling criteria is met and Pzr level is 33% and stable.** COMMENTS:	_____ SAT _____ UNSAT
STEP 5: RCS pressure and temperature are above the Normal Seal Requirements for RCP operation. STANDARD: VERIFY RCS pressure and temperature are above the Normal Seal Requirements for RCP operation in accordance with Appendix B Figure 6B of 2-NOP-01.02. **EXAMINER'S CUE: RCS pressure is 2250 psia and RCS T-cold is 529°F.** COMMENTS:	_____ SAT _____ UNSAT
STEP 6: VERIFY CBO flow is within the acceptable range for the RCPs to be started. STANDARD: **REFER TO** 2-NOP-01.02.Appendix A, RCP Seal Leakoff Flow Rate vs. RCS Pressure. **EXAMINER'S CUE: Leakoff Flow rates for 2A1 and 2B2 RCPs are 1.0 gpm each.** COMMENTS:	_____ SAT _____ UNSAT

STEP 7: VERIFY proper RCP seal pressure breakdown for the RCPs to be started. STANDARD: VERIFY proper RCP seal pressure breakdown for the RCPs to be started. **EXAMINER'S CUE: Each seal stage indicates pressure reduced across the seal by approximately 1/3.** COMMENTS:	_____ SAT _____ UNSAT
STEP 8: PLACE the control switches for the Oil Lift Pumps for the RCPs to be started in the RUN position. STANDARD: PLACE the control switch for the 2A1 RCP Oil Lift Pumps in the RUN position. **EXAMINER'S CUE: 2A1 RCP Oil Lift Pumps red lights on green lights off.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 9: If the amber permissive light does NOT come on in approximately 30 seconds, Then STOP the lift pumps and investigate. STANDARD: Verify the amber permissive light for 2A1 RCP is on. **EXAMINER'S CUE: The amber permissive light for 2A1 RCP is on.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 10: PLACE the control switches for the Oil Lift Pumps for the RCPs to be started in the RUN position. STANDARD PLACE the control switch for the 2B2 RCP Oil Lift Pumps in the RUN position. **EXAMINER'S CUE: 2B2 RCP Oil Lift Pumps red lights on green lights off.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 11: If the amber permissive light does NOT come on in approximately 30 seconds, Then STOP the lift pumps and investigate. STANDARD Verify the amber permissive light for 2B2 RCP is on. **EXAMINER'S CUE: The amber permissive light for 2B2 RCP is on.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 12: START one of the selected RCPs. STANDARD: Start 2A1 RCP and wait for running amps to return to normal. **EXAMINER'S CUE: 2A1 RCP red light on green light off with normal running amps.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 13: START one of the selected RCPs. STANDARD: Start 2B2 RCP and wait for running amps to return to normal. **EXAMINER'S CUE: 2B2 RCP red light on green light off with normal running amps.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 14: When the RCP motor amps return to normal, Then PLACE the Oil Lift Pump control switches to OFF. STANDARD: Place 2A1 and 2B2 RCP Oil Lift Pump Switches to OFF. **EXAMINER'S CUE: 2A1 and 2B2 RCP Oil Lift Pumps Red lights off Green lights on.** COMMENTS:	_____ SAT _____ UNSAT
STEP 15: PLACE the Oil Lift Pump control switches to AUTO. STANDARD: Place 2A1 and 2B2 RCP Oil Lift Pump Switches to AUTO. **EXAMINER'S CUE: 2A1 and 2B2 RCP Oil Lift Pump Switches are in AUTO.** COMMENTS:	_____ SAT _____ UNSAT

STEP 16 (done): NOTIFY the Unit Supervisor that 2A1 and 2B2 Reactor Coolant Pumps are running. STANDARD: NOTIFY the Unit Supervisor that 2A1 and 2B2 Reactor Coolant Pumps are running. **EXAMINER'S CUE: Unit Supervisor acknowledges 2A1 and 2B2 Rreactor Coolant Pumps are running.** COMMENTS:	_____ SAT _____ UNSAT

STOP TIME: _____

SIMULATOR JPM SETUP

1. **RESTORE** IC-1, 100% power, MOL.
2. **UNFREEZE** simulator.
3. **TRIP THE REACTOR** and **STOP ALL RCPS**.
4. **STOP ALL OIL LIFT PUMPS**
5. Allow Natural Circulation to develop.
6. **MAKE** a SNAPSHOT if more than one student will be performing the JPM.
7. **FREEZE** simulator until student is ready.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

Unit 2 was tripped due to loss of CCW to the RCPs. 2-EOP-09 "Loss of Offsite Power / Loss of Forced Circulation" was entered. CCW to the RCPs was restored 20 minutes later.

Initiating Cues:

The Unit Supervisor directs you to restart the 2A1 and 2B2 RCPs in accordance with 2-NOP-01.02, Rector Coolant Pump Operation, Section 7.2, RCP Restart During EOP Implementation.

FPL

ST. LUCIE UNIT 2

NORMAL OPERATING PROCEDURE

SAFETY RELATED

Procedure No.
2-NOP-01.02
Current Revision No.
7
Effective Date
02/24/04

Title:

REACTOR COOLANT PUMP OPERATION

Responsible Department: **OPERATIONS**

REVISION SUMMARY:

Revision 7 - Incorporated PCR 04-0240 to add precaution about potential reactivity effects contained in this procedure. (J. Folden, 01/29/04)

Revision 6C – Incorporated PCR 03-2767 to replace references to OP 0830021 with 2-NOP-23.02. (Joe Hessling, 10/02/03)

Revision 6B - Incorporated PCR 03-0886 for PCM 02042 to revise new DCS point numbers. (M. Gilmore, 04/09/03)

AND

Incorporated PCR 03-0891 to change procedure references. (R. Weller, 04/09/03)

AND

Incorporated PCR 03-0870 to change procedure references. (M. Gilmore, 04/09/03)

Revision 6A – Clarified purpose section, corrected procedure numbers and corrected component ID number. (K. Korth, 07/17/02)

Revision 6 – Incorporated new section for RCP restart during EOP implementation. (R.D. Brown, 11/27/01)

Revision 5 – Allowed RCS pressure to be as high as 1850 psia prior to starting the fourth RCP. (Dave Fields, 10/01/01)

Revision	FRG Review Date	Approved By	Approval Date
0	05/06/99	R. G. West Plant General Manager	05/06/99
7		N/A Plant General Manager	
		J. R. Martin Designated Approver	01/29/04
		N/A Designated Approver (minor correction)	

S_2_OPS	
DATE	
DOCT	PROCEDURE
DOCN	2-NOP-01.02
SYS	
COM	COMPLETED
ITM	7

TABLE OF CONTENTS

1.0 PURPOSE

1.1 This procedure provides the precautions, limitations and instructions for starting, operating and stopping the Reactor Coolant Pumps.

1.2 This procedure in conjunction with 2-NOP-01.05, Filling and Venting the RCS, provides the necessary guidance for operating each RCP for the 30 second and 1 minute RCS Fill and Vent sweeps and if necessary, the 10 minute sweeps. For the 30 second sweeps, two RCPs, one in each loop, are started and then stopped. The other two RCPs are subsequently operated. For the 1 minute sweeps, the RCPs are operated in the same sequence as the 30 second sweeps. For the 10 minute sweeps, three RCPs are started, then one is stopped and the fourth RCP is started. It is permissible to perform RCS fill and vent utilizing only 3 RCPs should one become unavailable.

1.3 This procedure in conjunction with the GOPs, provide the necessary guidance for starting and continuous operation of the RCPs for plant heatup. Initially, two RCPs are started. As RCS heatup continues, the third RCP is started and finally when RCS temperature is greater than 500°F, the fourth RCP is started.

1.4 Instructions for setting seal injection flows are also included in this procedure.

1.5 Instructions for RCP restart during emergency operating procedures have been provided in this procedure.

2.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, License Renewal, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on a data sheet.

2.1 Technical Specifications

- Section 3/4.4, Reactor Coolant System

2.2 Updated Final Safety Analysis Report (UFSAR)

- Section 5.2.5.1.8, RCP Seals
- Section 5.4.1, Reactor Coolant Pumps
- Section 9.2.2.3.1, CCW Performance Requirements and Capabilities
- Section 9.3.4.2.1.2, CVCS Normal Operation

2.3 Procedures

- OP 2-0310020, Component Cooling Water System – Normal Operation
- OP 2-0120027, Steam Generator cooling and Wet Lay-up
- 2-NOP-23.02, Steam Generator Blowdown System Operations
- OP 2-0700022, Auxiliary Feedwater System Operation
- 2-NOP-01.05, Filling and Venting the RCS
- 2-GOP-504, Reactor Plant Heatup – Mode 5 to Mode 4
- 2-GOP-403, Reactor Plant Heatup – Mode 4 to Mode 3
- 2-GOP-303, Reactor Plant Heatup – Mode 3 <1750 to Mode 3 >1750
- 2-GOP-302, Reactor Plant Startup - Mode 3 to Mode 2
- 2-ONP-01.07, Recovery From Dilution of RCS Loops
- OP 1250020, Valve, Breaker, Motor and Instrument Instructions
- 2-NOP-01.11,RCS Cleanup
- 2-ONP-01.01, Plant Condition 1 Steam Generator Heat Removal LTOP Not in Effect
- 2-ONP-01.02, Plant Condition 2 Steam Generator Heat Removal LTOP in Effect
- 2-GOP-502, Data Sheets Required for Heatup
- 0-NOP-53.01, 6900V And 4160V Breaker Operation

(continued on next page)

2.3 Procedures (continued)

- 2-NOP-01.01, Reactor Coolant System Initial Alignment
- OP 2-0010125A, Surveillance Data Sheets
- ONP 2-0120034, Reactor Coolant Pump

2.4 Miscellaneous Documents

- ¶2 2998-3855, Byron-Jackson Reactor Coolant Pump Instruction Manual
- 2998-2908, Allis-Chalmers Reactor Coolant Pump Motor Instruction Manual
- ¶1 2998-19781, Flowserve N9000 RCP Seals Instruction Manual
- ¶3 L-PEC-139, Rev 4, CE Calculation, Minimum Required Pressurizer Pressure for Reactor Coolant Pump Operation for Post-Core Conditions (Appendix B Curves)
- ¶5 Telephone conference on 1/27/99 between David Zagres of Flowserve and Pete Hansen of FPL, Subject: RCP Fill & Vent.
- ¶4 STAR 95-2117A, RCP Seal Pressure Instrumentation during Fill and Vent.
- ¶8 CR 98-1694, RCP Controlled Bleedoff, (PMAI 98-12-102)
- ¶6 DBD-RCS-2, RCS Design Basis Document
- ¶7 In House Event (IHE) 93-003, Unit 2 Shutdown Due to High Vibration in the 2A1 Reactor Coolant Pump.
- ¶9 CR 98-2034, Exceeding 12 Hour Operating Limit on RCPs at Low RCS pressure, (PMAI 98-12-133)
- ¶10 INPO SOER 94-2, Boron Dilution Events in Pressurized Water Reactors
- ¶11 PCM 99014, RCP Mech SU Seal Replacement With N9000 Seal
- ¶12 STAR 952064, RCP Oil Lift Pump RTGB Switch
- ¶13 CR 01-1454, Starting Criteria for Fourth RCP
- JPN-PSL-SENJ-93-001, Rev 1, Deletion of RCP Seal Injection

2.5 Plant Drawings

- 2998-G-078, Sh 107, Flow Diagram – Reactor Coolant System
- 2998-G-078, Sh 108, Flow Diagram – Reactor Coolant System
- 2998-G-078, Sh 110, Flow Diagram – Reactor Coolant System
- 2998-G-078, Sh 111A, Flow Diagram – Reactor Coolant Pump 2A1
- 2998-G-078, Sh 111B, Flow Diagram – Reactor Coolant Pump 2A2
- 2998-G-078, Sh 111C, Flow Diagram – Reactor Coolant Pump 2B1
- 2998-G-078, Sh 111D, Flow Diagram – Reactor Coolant Pump 2B2
- 2998-G-078, Sh 115, Flow Diagram – Reactor Coolant System (Seal Injection)

3.0 PREREQUISITES — INITIAL

3.1 Starting of an RCP has been directed by a plant procedure. _____ US

3.2 The Component Cooling Water System is aligned, to the extent necessary to supply cooling water to the RCPs, in accordance with OP 2-0310020, Component Cooling Water System – Normal Operation. _____ US

3.3 2-NOP-01.01, Reactor Coolant System Initial Alignment, has been completed. _____ US

3.4 6.9 KV Busses 2A1 and 2B1 are energized. _____ US

3.5 2-NOP-01.02, Appendix C, RCP Electrical Alignment, has been completed for the RCP(s) to be started. _____ US

4.0 PRECAUTIONS / LIMITATIONS

4.1 Reactor Coolant Pump

1. ¶12 RCP operation should be limited to 3 to 5 minutes until the RCS has been thoroughly vented.

2. ¶16 Due to fuel uplift concerns, the fourth RCP shall NOT be started until RCS temperature is greater than 500°F.

4.2 RCP Motor

1. If the motor starting limitations of OP 1250020, Valve, Breaker, Motor and Instrument Instructions, are exceeded, RCP motor damage could occur.

2. Unless an emergency condition exists, an RCP should NOT be tripped until motor amps have returned from the starting current level to the normal operating level.

4.3 RCP Seals

1. ¶1 RCP Seal Temperatures

A. Operation with seal cavity temperature above 250°F decreases seal operating life and should be kept to a minimum.

B. During start of an idle RCP when RCS temperature is greater than 450°F, lower seal cavity temperature may exceed 250°F. The RCP may be started provided lower seal cavity temperature is less than or equal to 300°F.

C. If lower seal cavity temperature is greater than 300°F on an idle RCP, the RCS should be cooled until lower seal cavity temperature is less than or equal to 250°F to minimize seal degradation. The pump should NOT be started until SCE has evaluated the condition of the seal.

D. If lower seal cavity or controlled bleedoff temperature increases to 250°F for 10 minutes or greater than 300°F at any time, on an operating RCP, seal damage could occur unless the RCP is stopped and the RCS is cooled until lower seal cavity and controlled bleedoff temperature is less than or equal to 250°F.

E. ¶7,13 If an RCP is idle, evaluate the expected duration prior to starting the RCP. For extended idle time, RCS pressure should be reduced to less than 1700 psia to maintain RCP lower cavity temperature less than 250°F. If the RCS pressure is between 1700 and 1850 psia following an RCP trip and all other conditions for starting the RCP are met, the RCP should be expeditiously restarted to minimize the time that lower cavity temperature is greater than 250°F.

2. ¶1,5 Seal injection is required to be in service when filling the RCS from below the Seal Cartridge to above the Seal Cartridge (approx 32.5 to 33.5 ft elev) to prevent contaminants on the surface of the Reactor Vessel water from entering the seals.

3. ¶5 Continued use of seal injection when filling above the level of the Seal Cartridge is not required.

4. ¶3 If the RCPs are operated below the minimum pressures or longer than the maximum 12 hour limit identified on Appendix B, Minimum RCS Pressure for RCP Operation, seal degradation can occur.

4.3 RCP Seals (continued)

5. ¶3 Operation in the "Seal Requirement Max 12 hours Operation" range of Appendix B, Minimum RCS Pressure for RCP Operation, is allowed only when the following conditions are satisfied:

A. CBO temperatures are monitored and do NOT exceed 130°F.

B. First stage seal temperature and all stage pressures are monitored.

6. ¶8 When an RCP is stopped, CBO low should be maintained until RCS temperature is less than 200°F.

7. Each seal stage should reduce the pressure across the seal by approximately 1/3. For Example, if RCS pressure is 310 psia and VCT pressure is 40 psia (25 psig), the total pressure across the seals is 270 psia (310 – 40 = 270). Each seal should reduce RCS pressure by approximately 90 psia (270 / 3 = 90).

4.4 CCW Flow

1. ¶1 If CCW flow is lost to an operating RCP, motor bearing and seal damage can occur unless CCW is re-established within 10 minutes.

2. ¶1 If CCW flow is lost and can not be re-established within 30 minutes, seal damage could occur unless CBO is isolated within 30 minutes of losing CCW.

3. ¶2 When an RCP is stopped, CCW flow to the RCP should be maintained until RCS temperature is less than 175°F.

4.5 When oil lift pumps are operating, the oil reservoir levels should be closely monitored to detect any oil leaks.

4.6 If CCW flow is isolated to the RCP oil reservoir coolers, the oil lift pumps should NOT be operated for more than 5 minutes. During maintenance, the oil lift pumps can be operated for longer periods without cooling water as long as the pump shaft can be rotated.

4.7 A Reactor Coolant Pump shall NOT be started when two RCS loops are idle unless S/G secondary side water temperature is less than 30°F (Tech Spec limit is 40°F) greater than RCS temperature. This restriction is to prevent an RCS overpressure condition from occurring. Reference Tech Specs 3.4.1.3.b and 3.4.1.4.1, Applicability.

4.8 If the RCS has been diluted since the RCPs were stopped, pockets of diluted water could be forced through the core when the RCPs are started which could result in localized criticality.

4.9 The RCS pressure / temperature limits of Technical Specifications 3.4.9 and Figures 3.4-2, 3.4-3 and 3.4-4 are applicable during RCP starts.

> **CAUTION**
> If the RCP Restart section is being entered from an EOP, Then ensure Natural Circulation has been in effect for 20 minutes prior to Restart, due to boron mixing concerns.

4.10 RCP Restart Criteria

1. ¶12 When CCW is lost to the RCPs for greater than 30 minutes, CBO shall be isolated and natural circulation cooldown shall be initiated within 4 hour to ensure the seals are operated within conditions for which qualification testing has proven the seals will maintain acceptable leakage levels. The RCPs shall NOT be restarted until reliability of the seals has been evaluated.

2. ¶1 If lower seal cavity or CBO temperatures remained greater than or equal to 250°F for greater than or equal to 10 minutes or greater than 300°F at any time, on an operating RCP, the RCP shall be shutdown and the RCS shall be cooled until lower seal cavity and CBO temperatures are less than or equal to 250°F. The RCPs shall NOT be restarted until reliability of the seals has been evaluated.

3. ¶1 When an RCP is tripped due to a loss of CCW, the RCP shall NOT be restarted unless **ALL** of the following conditions are met:

A. CCW flow is restored to the seals within 30 minutes.

B. CBO and Lower Seal Cavity temperatures are within limits.

C. CBO and Lower Seal Cavity temperatures did NOT exceed 300°F.

D. CBO flow is established.

4. ¶1 When an RCP is tripped due to a loss of CBO flow, the RCP shall NOT be restarted until **ALL** of the following conditions are met:

A. CCW flow to the seals is in service.

B. CBO and Lower Seal Cavity temperatures are within limits.

C. CBO and Lower Seal Cavity temperatures did NOT exceed 300°F.

D. CBO flow is re-established.

4.11 This Procedure may contain steps that could adversely affect reactivity. Ensure that proper consideration and appropriate briefings occur prior to performance of steps that could challenge reactivity.

4.12 Reactor Coolant Pump Operating Limits

NOTE

- The values in the Normal column are provided for information only and are not operating limits.
- The indicators listed in the Indicator column are for the 2A1 RCP. The other RCP instrument numbers are the same except for the third digit. Example:
  - 2A1 RCP instrument numbers: xx5x
  - 2A2 RCP instrument numbers: xx6x
  - 2B1 RCP instrument numbers: xx7x
  - 2B2 RCP instrument numbers: xx8x
- The indicators listed in the Indicator column are provided for information only and are not necessarily the only acceptable indications for the listed parameters. ERDADS and QSPDS also provide indication for many of the listed parameters.

1. The minimum and maximum values provided in Table 1 apply to continuous operation at normal temperature and pressure. The Reactor Coolant Pumps should be operated within the minimum and maximum values.

2. If any of the minimum or maximum limits of Table 1 are exceeded, SCE should be notified.

4.12 Reactor Coolant Pump Operating Limits (continued)

TABLE 1

PARAMETER	NORMAL	MIN	MAX	INDICATOR	ARP
RCS press	400 – 2250 psia	Refer to App B			
Upper Oil Reservoir lvl	+2" to –2"	-2"	+2"	LIA-1156	ARP J10, J14, J26, J30
Lower Oil Reservoir lvl	+2" to –2"	-2"	+2"	LIA-1157	ARP J10, J14, J26, J30
Upper Guide Bearing temp	110 -130° F		185°F	TI-1156	
Upper Thrust Bearing temp	135 -155°F		200°F	TIA-1158	ARP J3, J7, J19, J23
Down Thrust Bearing temp	115 -135° F		200°F	TIA-1159	ARP J3, J7, J19, J23
Lower Guide Bearing temp	120 -140° F		185°F	TI-1157	
Stator temp	170 -190° F		311°F	TI-1155	
CBO Outlet temp	135 -165° F		180°F[1]	TI-1154	
Lower Seal Cavity temp	105 -135° F		< 250°F[2]	TIA-1151	ARP J2, J6, J18, J22
CBO Cavity press	50 – 150 psig	25 psig[3]	150 psig	PIA-1153	ARP J2, J6, J18, J22
Upper Seal Cavity press	600 – 800 psig	545 psig[4]	945 to 1200 psig[5]	PIA-1152	ARP J2, J6, J18, J22
Middle Seal Cavity press	1350 –1550 psig	1200 psig[6]	1600 psig	PI-1151	
CBO Flow	0.9 – 1.0 gpm	0.75 gpm[7]	1.2 – 1.5[5] gpm	FIA-1150	ARP J2, J6, J18, J22
CCW Flow	200 gpm	190 gpm		FIA-1158	ARP J-11, J15, J27, J31

1 If CBO outlet temperature is greater than or equal to 250 ° F for 10 minutes, the RCP should be tripped.

2 During start of idle RCP when RCS temp is greater than 450° F, temp may be between 250 and 300° F.

3 When CBO is aligned to floor drains during initial pump runs for fill and vent, CBO pressure will be atmospheric (0 psig).

4 When the RCS is NOT at normal operating pressure, the Upper Seal Cavity pressure should be approximately 1/3 of RCS pressure.

5 Alarm is normally set at lower end of range. If middle seal fails, alarm may be reset to higher end of range.

6 When the RCS is NOT at normal operating pressure, the Middle Seal Cavity pressure should be approximately 2/3 of RCS pressure.

7 When RCS is NOT at normal operating pressure, Refer to Appendix A, RCP Seal Leak-Off Flow Rate vs RCS Pressure.

5.0 RECORDS REQUIRED

5.1 An approved copy of this procedure with each applicable step initialed shall be maintained in the plant files in accordance with QI-17-PSL-1, Quality Assurance Records.

5.2 Normal Log Entries

6.0 INSTRUCTIONS

A1/A2/B1/B2 (√)

6.1 Initial Conditions for Starting an RCP

NOTE

A single copy of this section can be used for preparing one, two, three or four RCPs for starting. By completing this section for each RCP, all four RCPs can be prepared for the 30 second fill and vent runs using only one copy of this section. However, new copies will have to be completed for the 1 minute and 10 minute runs. Separate copies of this section can be used for preparing the first two, the third and the fourth RCPs for continuous operation or, if desired, a single copy can be used for preparing for all of the continuous operation starts.

1. ENSURE Section 3.0, Prerequisites, has been completed. __/__/__/__

2. ENSURE Section 4.0, Precautions / Limitations, has been reviewed. __/__/__/__

NOTE

The preferred indication for RCP seal cavity pressures is ERDADS Display CP2. If seal pressures are not available on ERDADS and RCS pressure is less than 1000 psia, test gauges will have to be installed to provide seal pressure indication.

3. ¶4 If RCP seal pressure indication is NOT available on ERDADS Display CP2 and RCS pressure is less than 1000 psia, Then NOTIFY I&C to install test gauges with isolation valves for any seal pressure indication that is NOT available on ERDADS. __/__/__/__

_____ _____ _____

I&C Person Contacted Date Time

NOTE

This procedure may be continued without the following step being completed.

A. When notified by I&C that test gauges have been installed, Then identify the locations of the test gauges on Appendix D, RCP Seal Pressure Test Gauges. __/__/__/__

6.1 Initial Conditions for Starting an RCP (continued) INITIAL

CAUTION

If the RCS has been diluted since the RCPs were stopped, pockets of diluted water could be forced through the core when the RCPs are started which could result in localized criticality.

NOTE

2B1 Intermediate Loop can be sampled using a sample point on the letdown line when letdown is in service.

4. ¶10 If the RCS has been diluted or is suspected of being diluted since the RCPs were stopped, Then NOTIFY Chemistry to sample the following locations to check for uniform Boron concentration.

- 2A SDC Loop _____ ppm Boron _____
- 2B SDC Loop _____ ppm Boron _____
- 2B1 Intermediate Loop _____ ppm Boron _____

A. If unacceptable Boron mixing is indicated, Then REFER TO 2-ONP-01.07, Recovery From Dilution of RCS Loops. _____

5. ENSURE proper CCW flow to the RCPs as follows:

A. ENSURE the following seal cooling water outlet valves are in the position indicated for the RCP(s) to be started.

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIAL
HCV-14-11A1	Seal Cooler HX Isol Valve	OPEN	
HCV-14-11A2	Seal Cooler HX Isol Valve	OPEN	
HCV-14-11B1	Seal Cooler HX Isol Valve	OPEN	
HCV-14-11B2	Seal Cooler HX Isol Valve	OPEN	

B. ENSURE the following annunciators are CLEARED for the RCP(s) to be started:

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIAL
J-11	2A1 RCP COOLING WTR FLOW LOW	CLEAR	
J-15	2B1 RCP COOLING WTR FLOW LOW	CLEAR	
J-27	2A2 RCP COOLING WTR FLOW LOW	CLEAR	
J-31	2B2 RCP COOLING WTR FLOW LOW	CLEAR	

6.1 Initial Conditions for Starting an RCP (continued) INITIAL

CAUTION

A Reactor Coolant Pump shall NOT be started when two loops are idle unless S/G secondary side water temperature is less than 30°F (Tech Spec limit is 40°F) greater than RCS temperature. This restriction is to prevent an RCS overpressure condition from occurring. Reference Tech Specs 3.4.1.3.b and 3.4.1.4.1, Applicability.

6. If NO RCPs are operating, Then ENSURE S/G secondary side water temperature is less than 30°F greater than RCS temperature as follows:

A. DETERMINE both S/G secondary side water temperatures by **ONE** of the following methods:

1. If S/G secondary side water temperatures have been determined within the last 8 hours, Then RECORD the last temperature values determined. _____

- 2A S/G _____ °F
- 2B S/G _____ °F

OR

2. ESTABLISH S/G blowdown from both S/Gs in accordance with **ONE** of the following procedures:

- OP 2-0120027, Steam Generator cooling and Wet Lay-up _____
- 2-NOP-23.02, Steam Generator Blowdown System Operations _____

a. When SGB temperatures have stabilized, Then RECORD the temperature for each header as indicated on DCS:

- Pt. T23A, 2A S/G _____ °F _____
- Pt. T23B, 2B S/G _____ °F _____

6.1 Initial Conditions for Starting an RCP (continued) INITIAL

6. A. 2. (continued)

b. If lowering S/G level is NOT desired, Then ISOLATE SGB as follows:

1. ADJUST FIC-23-12, SG 2A Blowdown Rate, to obtain the lowest flow possible. _____

2. ADJUST FIC-23-14, SG 2B Blowdown Rate, to obtain the lowest flow possible. _____

3. ALIGN the following valves as indicated:

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIALS
FCV-23-3	SG Blowdown 2A	CLOSED	
FCV-23-4	SG Blowdown 2A	CLOSED	
FCV-23-5	SG Blowdown 2B	CLOSED	
FCV-23-6	SG Blowdown 2B	CLOSED	

OR

CAUTION
Taking S/G secondary side water samples that have flowed through an in service sample cooler will result in invalid, non-conservative temperatures.

3. NOTIFY Chemistry to determine S/G secondary side water temperature by using sample flow that has NOT been cooled. _____

_____ _____ _____
Chemistry Person Notified Date Time

- 2A S/G _____ °F
- 2B S/G _____ °F

OR

6.1 Initial Conditions for Starting an RCP (continued) INITIAL

6. A. (continued)

4. If S/G secondary side water temperature can NOT be determined, Then PERFORM the following:

a. VERIFY the S/G secondary side is at atmospheric pressure. _____

CAUTION
Increasing RCS temperature to greater than 200°F will result in entering Mode 4.

b. REDUCE flow through the SDC HX(s) until RCS temperature is raised to between 185 and 190°F. _____

c. MARK the remainder of step 6.1.6 N/A and **GO TO STEP** 6.1.7. _____

B. RECORD the following RCS temperatures:

1. RECORD the following SDC HX outlet temperatures for the operating loop(s). _____

- TR-3351, 2A SDC HX outlet temp _____ °F
- TR-3352, 2B SDC HX outlet temp _____ °F

2. RECORD the lowest indicated RCS temperatures from the following QSPDS channels: _____

- A QSPDS _____ °F
- B QSPDS _____ °F

C. CALCULATE the differential temperature between the S/G secondary side and the RCS as follows: _____

_____	-	_____	=	_____ °F
Highest S/G temp (step 6.1.6.A.1, A.2 , A.3)	-	Lowest RCS temp (step 6.1.6.B)	=	ΔT.

6.1 Initial Conditions for Starting an RCP (continued) INITIAL

6. (continued)

CAUTION
A Reactor Coolant Pump shall NOT be started when two loops are idle unless S/G secondary side water temperature is less than 30° F (Tech Spec limit is 40°F) greater than RCS temperature. This restriction is to prevent an RCS overpressure condition from occurring. Reference Tech Specs 3.4.1.3.b and 3.4.1.4.1, Applicability.

D. If the S/G temperature is more than 30° F higher than RCS temperature, Then PERFORM the following:

1. REDUCE the differential temperature to less than 30°F by **ONE** or **BOTH** of the following methods:

CAUTION
Increasing RCS temperature to greater than 200° F will result in entering Mode 4.

a. REDUCE flow through the SDC HX(s) until **EITHER** of the following conditions is reached:

- RCS temperature is raised to 190° F. _____
- RCS temperature is within 30° F of S/G temperature. _____

AND / OR

b. FEED and BLEED the S/Gs, as necessary, in accordance with the following procedures until S/G secondary side water temperature is within 30°F of RCS temperature. _____

- OP 2-0700022, Auxiliary Feedwater System Operation
- OP 2-0120027, Steam Generator cooling and Wet Lay-up
- 2-NOP-23.02, Steam Generator Blowdown System Operations

2. REPEAT Steps 6.1.6.B and 6.1.6.C. _____

6.1 Initial Conditions for Starting an RCP (continued) A1/A2/B1/B2 (√)

NOTE
Direct visual inspection of the RCP is required for the first start after maintenance was performed in the Containment or on an RCP. Direct visual inspection for subsequent starts is at the discretion of the US.

7. If this is the first start of the RCP, or If directed by the US, Then DIRECT an operator to perform a general visual inspection of the RCP, including checks for the following: __/__/__/__

- Oil leaks around the motor reservoirs and oil collection piping
- Loose debris or water leakage around or inside the seal cooler tubing area
- All panels properly fastened (Lift pump panels may be off)
- All personnel are clear of the RCP

NOTE
- One Oil Lift Pump will supply sufficient oil pressure to protect the RCP bearings.
- The Oil Lift Pumps should be in operation for at least 30 seconds before the main RCP motor is started.
- ¶12 When the Oil Lift Pump control switches are placed in RUN, there is a possibility that the lift pump breakers will trip when the control switches are moved from AUTO to RUN. The possibility of the breaker tripping is reduced by rapidly operating the switch.
- The Oil Lift Pump control switch should be placed in RUN to ensure adequate oil pressure is available during RCP acceleration when starting.

8. PLACE the control switches for the Oil Lift Pumps for the RCP(s) to be started to the RUN position. __/__/__/__

6.1 Initial Conditions for Starting an RCP (continued) A1/A2/B1/B2 (√)

NOTE
The amber Permissive light is illuminated when CCW pressure to the seal cooler and oil coolers is greater than 30 psig and RCP oil pressure is greater than 1900 psig. The RCP will not start unless both of these conditions are satisfied.

9. If the amber permissive light does not come on in approximately 30 seconds, Then STOP the lift pumps and INVESTIGATE. __/__/__/__

10. If an operator is stationed to perform a general visual inspection of the RCPs, Then CHECK the oil system piping for leaks. __/__/__/__

11. When the desired RCS pressure for starting the RCP(s) has been established and If this is NOT the start of the fourth RCP in Mode 3, Then VERIFY acceptable RCS pressure as follows:

A. RECORD RCS pressure and cold leg temperature. __/__/__/__

	1st Run	2nd Run
•	Press _____ psia	Press _____ psia
•	Temp _____ °F	Temp _____ °F

B. DETERMINE the minimum acceptable RCS pressure for starting an RCP from the appropriate figure of Appendix B, Minimum RCS Pressure for RCP Operation, and RECORD the pressure. __/__/__/__

- 1st Run: Min Acceptable RCS Press _____ psia
- 2nd Run: Min Acceptable RCS Press _____ psia

C. ENSURE RCS pressure is greater than or equal to the Seal Requirements Max 12 Hours Operation pressure on the appropriate figure of Appendix B, Minimum RCS Pressure for RCP Operation, for the RCP(s) to be started. __/__/__/__

D. If RCS pressure is less than the Normal Seal Requirements pressure of Appendix B, Then PERFORM the following:

6.1 Initial Conditions for Starting an RCP (continued) A1/A2/B1/B2 (√)

11. D. (continued)

1. VERIFY CBO Outlet temperature is less than or equal to 130°F. __/__/__/__

2. MONITOR RCP seal temperatures and pressures frequently. __/__/__/__

NOTE

¶13 Only Step 6.1.12 or 6.1.13 will apply.

12. ¶6,7 If this is the start of the fourth RCP in Mode 3, Then VERIFY RCS pressure and cold leg temperature are in the following range: _____

- Pressure: Between 1500 psia to 1700 psia
- Temperature: Between greater than 500°F to less than 532°F

13. ¶13 If RCPs are being started following a plant trip, Then VERIFY RCS pressure, cold leg temperature, and RCP seal temperatures are in the following ranges: _____

- Pressure: Less than 1850 psia
- Temperature: Greater than 500°F
- RCP Seal Temperature: Less than 300°F

14. If RCPs are being started for RCS fill and vent, Then PERFORM the following:

A. ¶1,2 When the RCP seals have vented for at least 30 minutes, Then VERIFY a steady stream of flow from the seal vent lines listed below for the RCP(s) to be started:

COMPONENT ID	COMPONENT DESCRIPTION	CONDITION	PERF INITIAL
V1296	2A1 RCP Controlled Bleedoff Dwnstrm of FE-1150 Vent	STEADY FLOW	
V1297	2A2 RCP Controlled Bleedoff Dwnstrm of FE-1160 Vent	STEADY FLOW	
V1298	2B1 RCP Controlled Bleedoff Dwnstrm of FE-1170 Vent	STEADY FLOW	
V1299	2B2 RCP Controlled Bleedoff Dwnstrm of FE-1180 Vent	STEADY FLOW	

6.1 Initial Conditions for Starting an RCP (continued) A1/A2/B1/B2 (√)

15. If RCPs are being started for continuous operation, Then PERFORM the following:

A. ENSURE V2524, RCP Bleedoff, is OPEN. _____

B. ENSURE V2505, RCP Bleedoff, is OPEN. _____

C. ENSURE CBO flow is within the acceptable range of Appendix A, RCP Seal Leak-Off Flow Rate VS RCS Pressure, for the RCP(s) to be started. __/__/__/__

NOTE

- The preferred indication for RCP seal cavity pressures is ERDADS Display CP2. If seal pressures are not available on ERDADS and RCS pressure is less than 1000 psia, test gauges will have to be installed to provide seal pressure indication.
- Any of the following are acceptable for RCS pressure indication:
  - PI-1103
  - PI-1104
  - PI-1105
  - PI-1106
  - QSPDS

16. RECORD the following pressures for the RCP(s) to be started.

PRESSURE	RCP 2A1	RCP 2A2	RCP 2B1	RCP 2B2
CBO Cavity				
Upper Cavity				
Middle Cavity				
RCS				

6.1 Initial Conditions for Starting an RCP (continued) A1/A2/B1/B2 (√)

NOTE
Each seal stage should reduce the pressure across the seal by approximately 1/3. For Example, if RCS pressure is 310 psia and VCT pressure is 40 psia, the total pressure across the seals is 270 psia (310 - 40 = 270). Each seal should reduce RCS pressure by approximately 90 psia (270 / 3 = 90).

17. VERIFY proper RCP seal pressure break down. __/__/__/__

A. If proper RCP seal pressure break down has NOT occurred, Then PERFORM the following:

1. NOTIFY the following:

a. SM __/__/__/__

b. Operations Supervisor __/__/__/__

c. Shift Director __/__/__/__

d. SCE __/__/__/__

2. Postpone RCP operation until seal pressure breakdown has been evaluated by SCE. __/__/__/__

3. ENSURE the applicable Reactor Coolant loops / SDC trains status required by the following Tech Specs are satisfied: __/__/__/__

- 3.4.1.3
- 3.4.1.4.1
- 3.4.1.4.2

4. **GO TO** the appropriate plant procedure as directed by the US. __/__/__/__

6.1 Initial Conditions for Starting an RCP (continued) A1/A2/B1/B2 (√)

NOTE
Section 7.1, Setting RCP Seal Injection Flows, is normally only performed when work has been performed on the RCP seals or seal injection lines / valves.

18. If directed by the US, Then PERFORM Section 7.1, Setting RCP Seal Injection Flows.

19. PERFORM the following for the RCP(s) to be started:

A. ALIGN the following components as indicated in accordance with 0-NOP-53.01, 6900V And 4160V Breaker Operation.

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIAL
6.9 KV BUSS 2A1			
2-30104	Reactor Coolant Pump 2A1	RACKED IN	
	Trip Fuses	INSTALLED	
	Close Fuses	INSTALLED	
2-30105	Reactor Coolant Pump 2B2	RACKED IN	
	Trip Fuses	INSTALLED	
	Close Fuses	INSTALLED	
6.9 KV BUSS 2B1			
2-30204	Reactor Coolant Pump 2A2	RACKED IN	
	Trip Fuses	INSTALLED	
	Close Fuses	INSTALLED	
2-30205	Reactor Coolant Pump 2B1	RACKED IN	
	Trip Fuses	INSTALLED	
	Close Fuses	INSTALLED	

B. Document aligning the RCP breakers in accordance with 2-GOP-502, Data Sheets Required for Heatup. __/__/__/__

6.1 Initial Conditions for Starting an RCP (continued) A1/A2/B1/B2 (√)

20. ENSURE personnel that performed steps in this section have completed the information below: _____

Print Name	Signature	Initials	Date

21. **GO TO** the appropriate section listed below to start the selected RCP(s): __/__/__/__

- 6.2, Operating RCPs for RCS Fill and Vent
- 6.3, Starting RCPs for Continuous Operation

US Review_____ Date____/____/____

END OF SECTION 6.1

6.2 Operating RCPs for RCS Fill and Vent

A1/A2/B1/B2 (√)

CAUTION

The RCS pressure / temperature limits of Technical Specifications 3.4.9 and Figures 3.4-2, 3.4-3 and 3.4-4 are applicable during RCP starts.

NOTE

- This section is used in conjunction with 2-NOP-01.05, Filling and Venting the RCS, to operate the RCPs to remove air from the S/Gs and RCS.
- This section can also be used in conjunction with 2-NOP-01.11, RCS Cleanup, to operate the RCPs to perform RCS clean up.
- By completing this section for each RCP, all four RCPs can be operated for the 30 second fill and vent runs using only one copy of this section. However, new copies will have to be completed for the 1 minute and 10 minute runs.
- When performing RCS fill and vent 30 second and 1 minute runs, two RCPs, one in each loop, are normally started.

1. ENSURE Section 6.1, Initial Conditions for Starting an RCP, has been completed for the RCP(s) to be started. __/__/__/__

2. If starting the RCPs for the 30 second or 1 minute runs, Then PERFORM the following:

A. RECORD the RCPs to be started.

- 1st RUN RCP _____ RCP _____ _____
- 2nd RUN RCP _____ RCP _____ _____

NOTE

RCS pressure may drop rapidly when initial RCP runs are performed.

B. START one of the selected RCPs. __/__/__/__

C. When starting amps return to normal, Then START the other selected RCP. __/__/__/__

D. When the second RCP started has been operating for the appropriate time required by 2-NOP-01.05 or 2-NOP-01.11, Then STOP both RCPs: __/__/__/__

6.2 Operating RCPs for RCS Fill and Vent (continued) A1/A2/B1/B2 (√)

3. If starting the RCPs for the 10 minute run, Then PERFORM the following:

A. START RCP 2B1. _____

B. When starting amps return to normal, Then START RCP 2A1. _____

C. When starting amps return to normal, Then START RCP 2B2. _____

D. RECORD the time. Time _____ _____

E. STOP the oil lift pumps for the operating RCPs. _____

F. ADJUST PIC-2201, as necessary, to maintain RCS pressure greater than 265 psia. _____

G. If RCS pressure can NOT be maintained greater than 265 psia, Then PERFORM the following:

1. ENSURE at least one lift pump is operating for each RCP that is operating. _____

2. STOP all three RCPs. _____

NOTE
The Loose Parts Monitoring System may be useful in determining if the RCS is air-free.

H. When 5 minutes have elapsed, Then PERFORM the following:

NOTE
One Oil Lift Pump will supply sufficient oil pressure to protect the RCP bearings.

1. START the oil lift pumps for RCP 2B1 and ENSURE at least one oil lift pump is operating. _____

2. ENSURE at least one oil lift pump for RCP 2A2 is operating. _____

6.2 Operating RCPs for RCS Fill and Vent (continued) INITIAL

3. **H.** (continued)

3. STOP RCP 2B1. _____

4. START RCP 2A2. _____

5. When RCP 2A2 starting amps return to normal, Then STOP RCP 2A2 oil lift pumps. _____

I. When 10 minutes have elapsed from the start of the first three RCPs, Then PERFORM the following:

1. ENSURE at least one oil lift pump is operating for each RCP that is operating. _____

2. STOP all three RCPs. _____

4. If directed by the US, Then ALIGN the following components as indicated in accordance with 0-NOP-53.01, 6900V And 4160V Breaker Operation.

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIAL
6.9 KV BUSS 2A1			
2-30104	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2A1	RACKED OUT	
2-30105	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2B2	RACKED OUT	
6.9 KV BUSS 2B1			
2-30204	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2A2	RACKED OUT	
2-30205	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2B1	RACKED OUT	

6.2 Operating RCPs for RCS Fill and Vent (continued) INITIAL

NOTE

¶12 There is a possibility that the lift pump breakers will trip when the control switch is moved from RUN to OFF. The possibility of the breaker tripping is reduced by rapidly operating the switch.

5. When **BOTH** of he following conditions are satisfied:

A. The RCP has been stopped for at least 15 minutes.

B. The downward thrust bearing temperature is less than 140°F.

Then STOP the Oil Lift Pumps. _____

6. ENSURE personnel that performed steps in this section have completed the information below: _____

Print Name	Signature	Initials	Date
Print Name	Signature	Initials	Date
Print Name	Signature	Initials	Date
Print Name	Signature	Initials	Date

7. **RETURN TO** 2-NOP-01.05, Filling and Venting the RCS, or 2-NOP-01.11, RCS Cleanup, as appropriate. _____

US Review _____ Date _____

END OF SECTION 6.2

6.3 Starting RCPs for Continuous Operation INITIAL

CAUTION
The RCS pressure / temperature limits of Technical Specifications 3.4.9 and Tables 3.4-2, 3.4-3 and 3.4-4 are applicable during RCP starts.

NOTE
Normally the first two RCPs started are 2B1 and 2B2 to provide normal Pressurizer sprays.

1. ENSURE Section 6.1, Initial Conditions for Starting an RCP, has been completed for the RCP(s) to be started. _____

2. RECORD the RCP(s) to be started. RCP _____ RCP _____ _____

CAUTION
If an RCP is operated for more than 12 hours below the Normal Seal Requirement pressure of Appendix B, Minimum RCS Pressure for RCP Operation, seal degradation can occur.

3. ¶9 If RCS pressure is less than the Normal Seal Requirements pressure, of Appendix B, Minimum RCS Pressure for RCP Operation, for the RCP to be started, Then INITIATE a Data Sheet 30, Unscheduled Surveillance Tracking, in accordance with OP 2-0010125A, Surveillance Data Sheets, to track RCP operating time below the Normal Seal Requirement pressure. _____

4. If two RCPs are going to be started, Then PERFORM the following:

   A. START one of the selected RCPs. _____

   B. When starting amps return to normal, Then START the other selected RCP. _____

5. If only one RCP is going to be started, Then START the selected RCP. _____

6.3 Starting RCPs for Continuous Operation (continued) INITIAL

6. When the RCP(s) motor amps return to normal, Then PERFORM the following for the RCP(s) that was started:

A. PLACE the oil lift pump control switch(es) to OFF. _____

B. VERIFY the oil lift pumps STOP. _____

C. PLACE the oil lift pump control switch(es) to AUTO. _____

7. RECORD the following RCP seal pressures for the RCP(s) started.

PRESSURE	RCP 2A1	RCP 2A2	RCP 2B1	RCP 2B2
CBO Cavity				
Upper Cavity				
Middle Cavity				
RCS				

NOTE

Each seal stage should reduce the pressure across the seal by approximately 1/3. For Example, if RCS pressure is 310 psia and VCT pressure is 40 psia, the total pressure across the seals is 270 psia (310 - 40 = 270). Each seal should reduce RCS pressure by approximately 90 psia (270 / 3 = 90).

8. VERIFY proper RCP seal pressure break down. _____

A. If proper RCP seal pressure break down has not occurred, Then PERFORM the following:

1. REFER TO ONP 2-0120034, Reactor Coolant Pump. _____

2. NOTIFY the following:

a. SM _____

b. Operations Supervisor _____

c. Shift Director _____

d. SCE _____

6.3 Starting RCPs for Continuous Operation (continued) INITIAL

9. **RETURN TO** the appropriate plant procedure as directed by the US. _____

US Review_____ Date____/____/____

END OF SECTION 6.3

6.4 Stopping an RCP INITIAL

1. ENSURE the Reactor is tripped. _____

NOTE
One Oil Lift Pump will supply sufficient oil pressure to protect the RCP bearings.

2. PLACE the Oil Lift Pumps for the RCP to be stopped to RUN and VERIFY at least one of the lift pumps start. _____

3. STOP the RCP. _____

4. MONITOR RCP oil reservoir levels. _____

5. When **BOTH** of the following conditions are satisfied:

A. The RCP has been stopped for at least 15 minutes.

B. The downward thrust bearing temperature is less than 140°F.

Then STOP the Oil Lift Pumps. _____

C. If directed by the US, Then ALIGN the following components as indicated in accordance with 0-NOP-53.01, 6900V and 4160V Breaker Operation.

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIAL
6.9 KV BUSS 2A1			
2-30104	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2A1	RACKED OUT	
2-30105	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2B2	RACKED OUT	
6.9 KV BUSS 2B1			
2-30204	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2A2	RACKED OUT	
2-30205	Close Fuses	REMOVED	
	Trip Fuses	REMOVED	
	Reactor Coolant Pump 2B1	RACKED OUT	

6.4 Stopping an RCP (continued) INITIAL

6. ¶8 MAINTAIN CBO flow until RCS temperature is less than 200°F. _____

7. ¶2 MAINTAIN CCW flow to the RCP until RCS temperature is less than 175°F. _____

US Review_____ Date____/____/____

END OF SECTION 6.4

7.0 INFREQUENT OPERATIONS INITIAL

7.1 Setting RCP Seal Injection Flows

NOTE
This section is normally only performed when work has been performed on the RCP seals or seal injection lines / valves.

1. ENSURE the following valves are aligned as indicated:

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIALS
SE-02-1	Loop 2B1 Charging Isol	OPEN	
SE-02-2	Loop 2A2 Charging Isol	OPEN	

2. ENSURE at least two Charging Pumps are operating. _____

3. PLACE RCP Seal Injection Actuation switch in the OPEN position and VERIFY the following:

   A. V2598, RCP Seal Injection Charging Line Valve, is CLOSED. _____

   B. V2185, RCP Seal Injection Actuation Valve, is OPEN. _____

4. ALIGN the following valves as indicated to place the seal injection flow instruments in service:

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIALS
RCP 2A1			
V1600	FI-1196 Upstrm of FE-1196 Isol	OPEN	
V1604	FI-1196 Dwnstrm of FE-1196 Isol	OPEN	
RCP 2A2			
V1601	FI-1197 Upstrm of FE-1197 Isol	OPEN	
V1605	FI-1197 Dwnstrm of FE-1197 Isol	OPEN	
RCP 2B1			
V1602	FI-1198 Upstrm of FE-1198 Isol	OPEN	
V1606	FI-1198 Dwnstrm of FE-1198 Isol	OPEN	
RCP 2B2			
V1603	FI-1199 Upstrm of FE-1199 Isol	OPEN	
V1607	FI-1199 Dwnstrm of FE-1199 Isol	OPEN	

7.1 Setting RCP Seal Injection Flows (continued) INITIAL

5. ADJUST the following valves as necessary to establish 6 to 8 gpm seal flow to each RCP and RECORD the flow and valve position.

COMPONENT ID	COMPONENT DESCRIPTION	FLOW (6 - 8 gpm)	POSITION (Turns open)	PERF INITIALS
V1616	FE-1196 to 2A1 RCP Lower Seal Cavity Dwnstrm Isol			
V1617	FE-1197 to 2A2 RCP Lower Seal Cavity Dwnstrm Isol			
V1618	FE-1198 to 2B1 RCP Lower Seal Cavity Dwnstrm Isol			
V1619	FE-1199 to 2B2 RCP Lower Seal Cavity Dwnstrm Isol			

6. REPEAT the previous step, as necessary, to ensure that seal flow to each RCP is 6 to 8 gpm. _____

7. ALIGN the following valves as indicated:

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIALS	IV
RCP 2A1				
V1600	FI-1196 Upstrm of FE-1196 Isol	CLOSED		
V1604	FI-1196 Dwnstrm of FE-1196 Isol	CLOSED		
RCP 2A2				
V1601	FI-1197 Upstrm of FE-1197 Isol	CLOSED		
V1605	FI-1197 Dwnstrm of FE-1197 Isol	CLOSED		
RCP 2B1				
V1602	FI-1198 Upstrm of FE-1198 Isol	CLOSED		
V1606	FI-1198 Dwnstrm of FE-1198 Isol	CLOSED		
RCP 2B2				
V1603	FI-1199 Upstrm of FE-1199 Isol	CLOSED		
V1607	FI-1199 Dwnstrm of FE-1199 Isol	CLOSED		

US Review_____ Date____/____/____

END OF SECTION 7.1

7.2 RCP Restart During EOP Implementation — INITIAL

1. ENSURE the applicable portions of Section 3.0, Prerequisites, have been completed. _____

2. ENSURE Section 4.10, Precautions/Limitations, has been completed. _____

3. VERIFY **ALL** RCP alarms are CLEAR for the RCPs to be started or the alarms have been evaluated and dispositioned. _____

4. ENSURE HPSI throttling criteria has been met and Pzr level is stable and controlled. _____

CAUTION

If an RCP is operated for more than 12 hours below the Normal Seal Requirement pressure of Appendix B, Minimum RCS Pressure for RCP Operation, seal degradation can occur.

5. ¶9 VERIFY RCS pressure and temperature are above the Normal Seal Requirements for RCP operation. If RCS pressure and temperature are below this limit, Then initiate a Data Sheet 30, Unscheduled Surveillance Tracking, to track RCP operating time below the Normal Seal Requirement. **REFER TO** Appendix B, Minimum RCS Pressure for RCP Operation, Figure 6A or Figure 6B. _____

6. VERIFY CBO flow is within the acceptable range for the RCPs to be started. **REFER TO** Appendix A, RCP Seal Leakoff Flow Rate vs. RCS Pressure. _____

NOTE

Each seal stage should reduce the pressure across the seal by approximately 1/3.

7. VERIFY proper RCP seal pressure breakdown for the RCPs to be started. If proper RCP seal pressure breakdown has NOT occurred, Then **REFER TO** ONP 2-0120034, Reactor Coolant Pump. _____

7.2 RCP Restart During EOP Implementation (continued) INITIAL

NOTE

- One lift pump will supply sufficient oil pressure to protect the RCP bearings.
- The Oil Lift Pumps should be in operation for at least 30 seconds before the main RCP motor is started.
- ¶12 When the Oil Lift Pump control Switches are placed in RUN, there is a possibility that the lift pump breakers will trip when the control switches are moved from AUTO to RUN. The possibility of the breaker tripping is reduced by rapidly operating the switch.
- The Oil Lift Pump control switch should be placed in RUN to ensure adequate oil pressure is available during RCP acceleration when starting.

8. PLACE the control switches for the Oil Lift Pumps for the RCPs to be started in the RUN position. _____

NOTE

The amber permissive light is illuminated when CCW pressure to the seal cooler and oil coolers is greater than 30 psig and RCP oil pressure is greater than 1900 psig. The RCP will NOT start unless BOTH of these conditions are satisfied.

9. If the amber permissive light does NOT come on in approximately 30 seconds, Then STOP the lift pumps and investigate. _____

7.2 RCP Restart During EOP Implementation (continued) INITIAL

CAUTION

Pressurizer level and RCS pressure may change rapidly upon starting RCPs. The level and/or pressure excursion may be large enough to cause HPSI throttle criteria and/or RCP restart criteria to be lost. RCP operation may continue provided actions are taken to restore the out of bounds criteria **AND** safety function acceptance criteria are **NOT** being challenged.

NOTE

The Pressurizer should be at saturation conditions for RCP restart. This will help stabilize RCS pressure should a rapid out-surge from the Pressurizer occur.

10. PERFORM **BOTH** of the following

A. START one of the selected RCPs. _____

B. When starting amps return to normal, Then START the other selected RCP. _____

11. When the RCP motor amps return to normal, Then PERFORM **ALL** of the following:

A. PLACE the Oil Lift Pump control switches to OFF. _____

B. VERIFY the Oil Lift Pumps STOP. _____

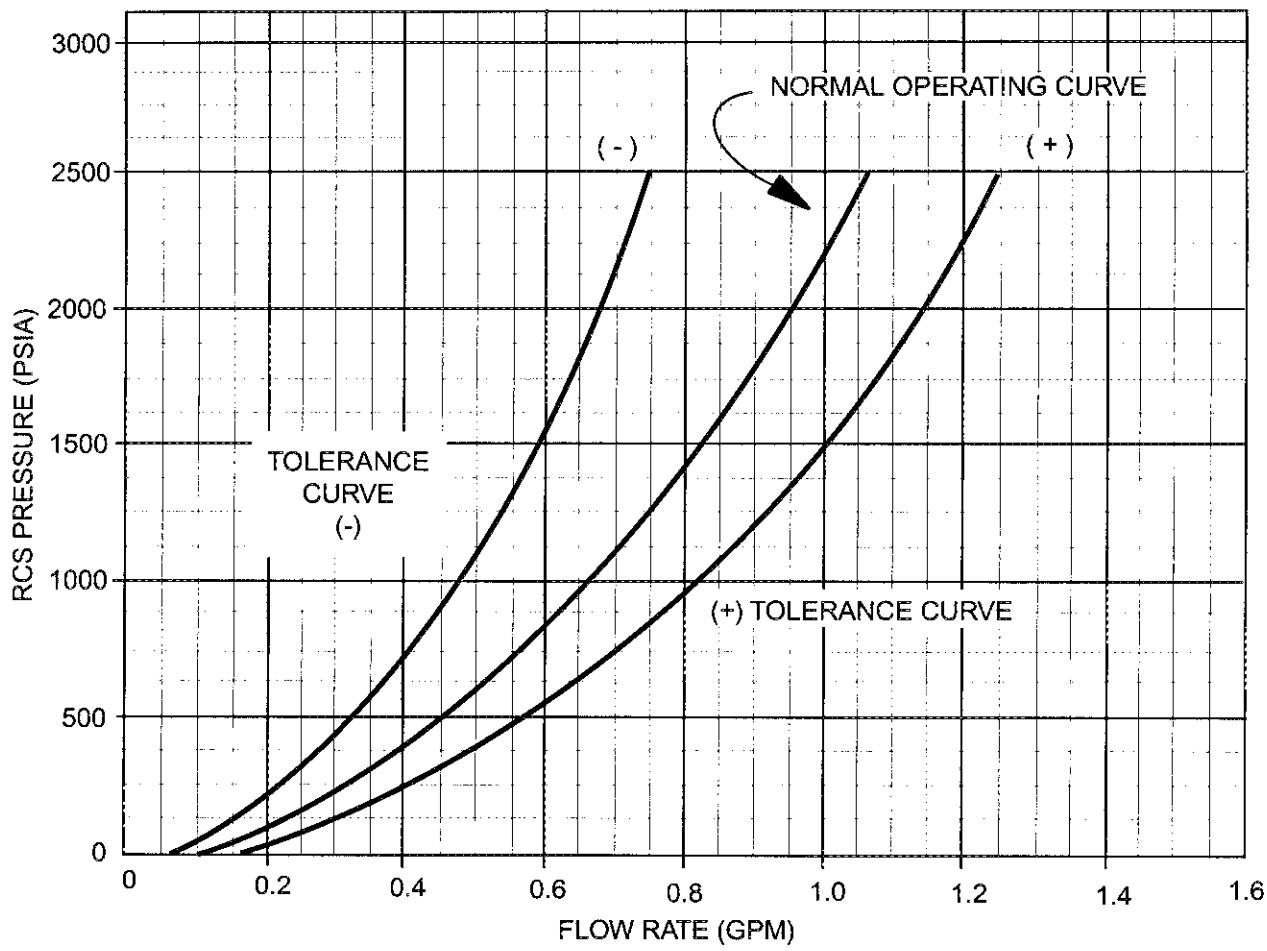
C. PLACE the Oil Lift Pump control switches to AUTO. _____

12. VERIFY RCP operating limits are satisfied. **REFER TO** Table 13, RCP Operating Limits, of 2-EOP-99. _____

US Review_____ Date____/____/____

END OF SECTION 7.2

APPENDIX A
RCP SEAL LEAKOFF FLOW RATE VS RCS PRESSURE
(Page 1 of 1)



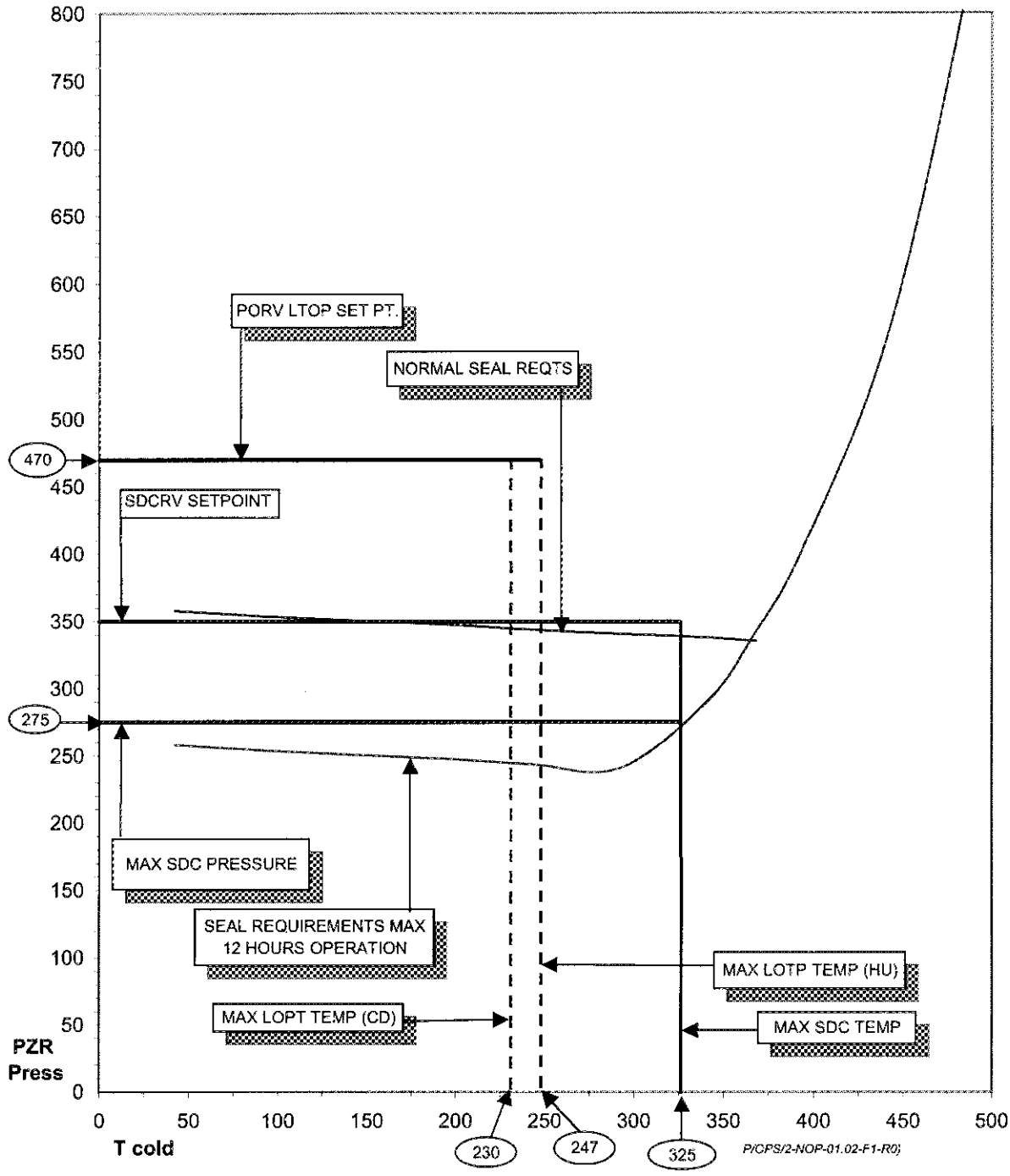
NOTE (1): FLOW RATE INSTRUMENTATION MAY BE UNRELIABLE BELOW 0.7 GPM

(P/OPS/2-NOP-01.02-Appen A-R0)

END OF APPENDIX A

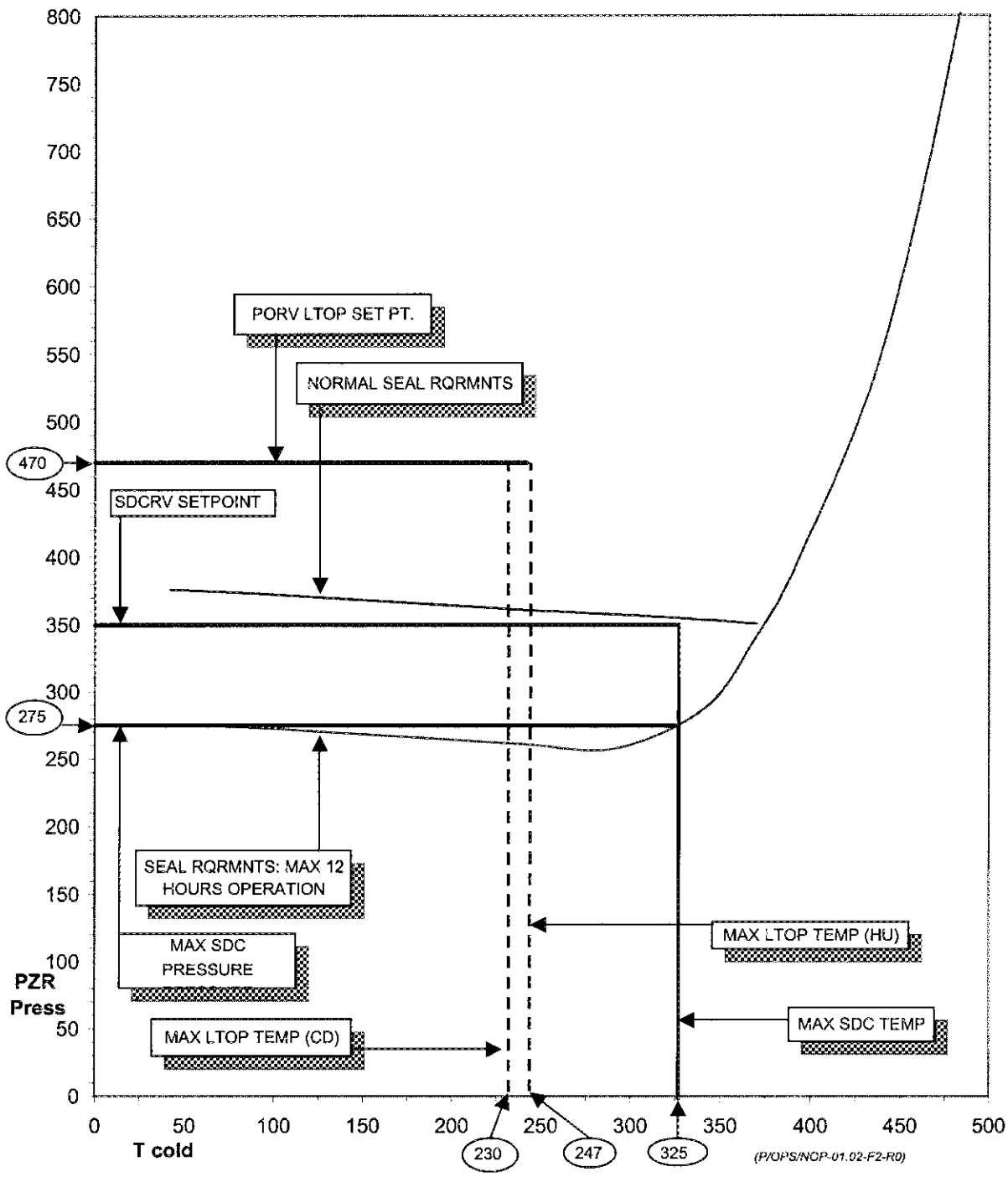
APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 1 of 10)

FIGURE 1
Two RCPs in Loop With PZR (RCPs 2B1 & 2B2)



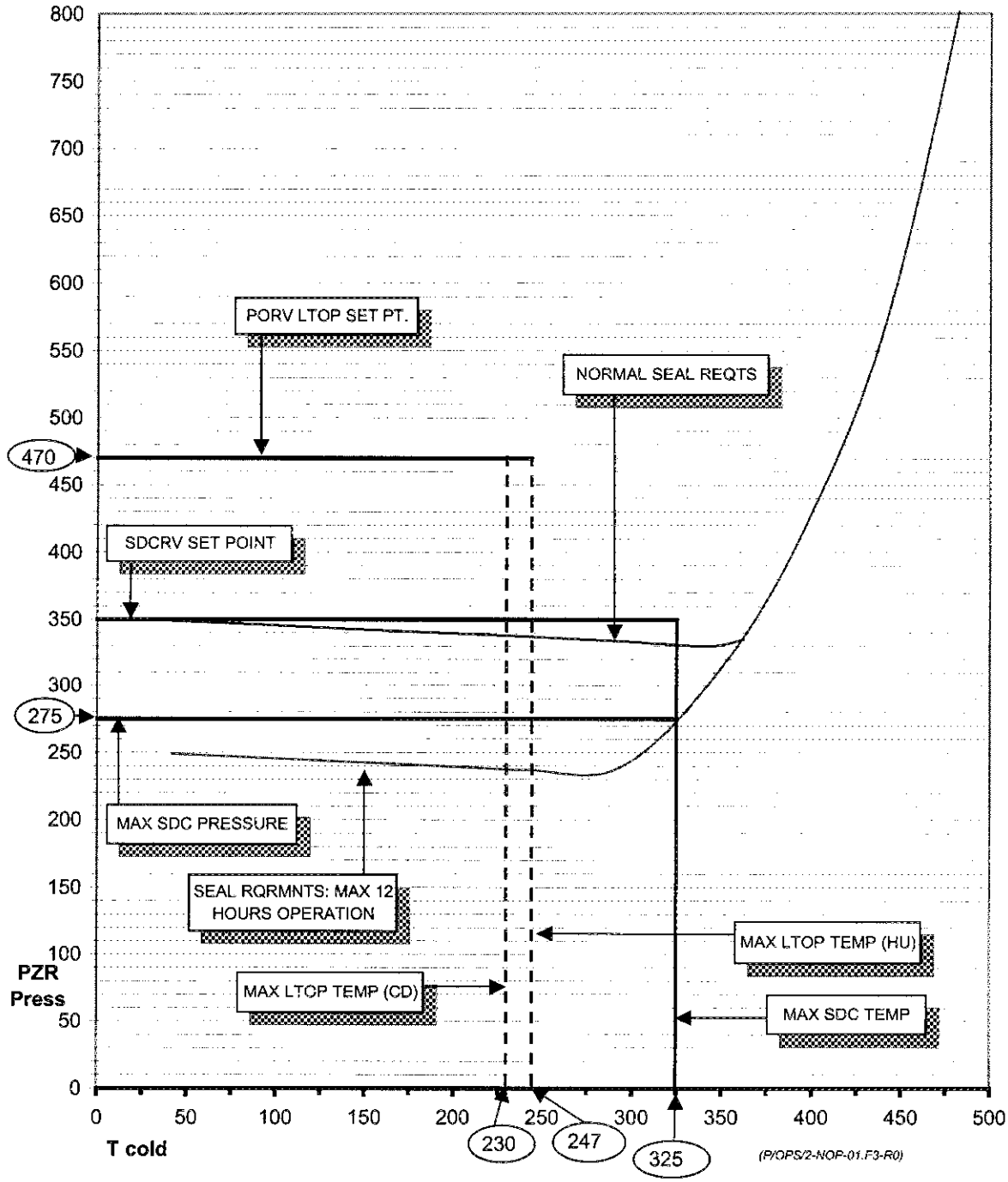
APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 2 of 10)

FIGURE 2
Two RCPs in Loop Without PZR (2A1 & 2A2)



APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 3 of 10)

FIGURE 3
THREE RCPs (2A1, 2B1 & 2B2)



APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
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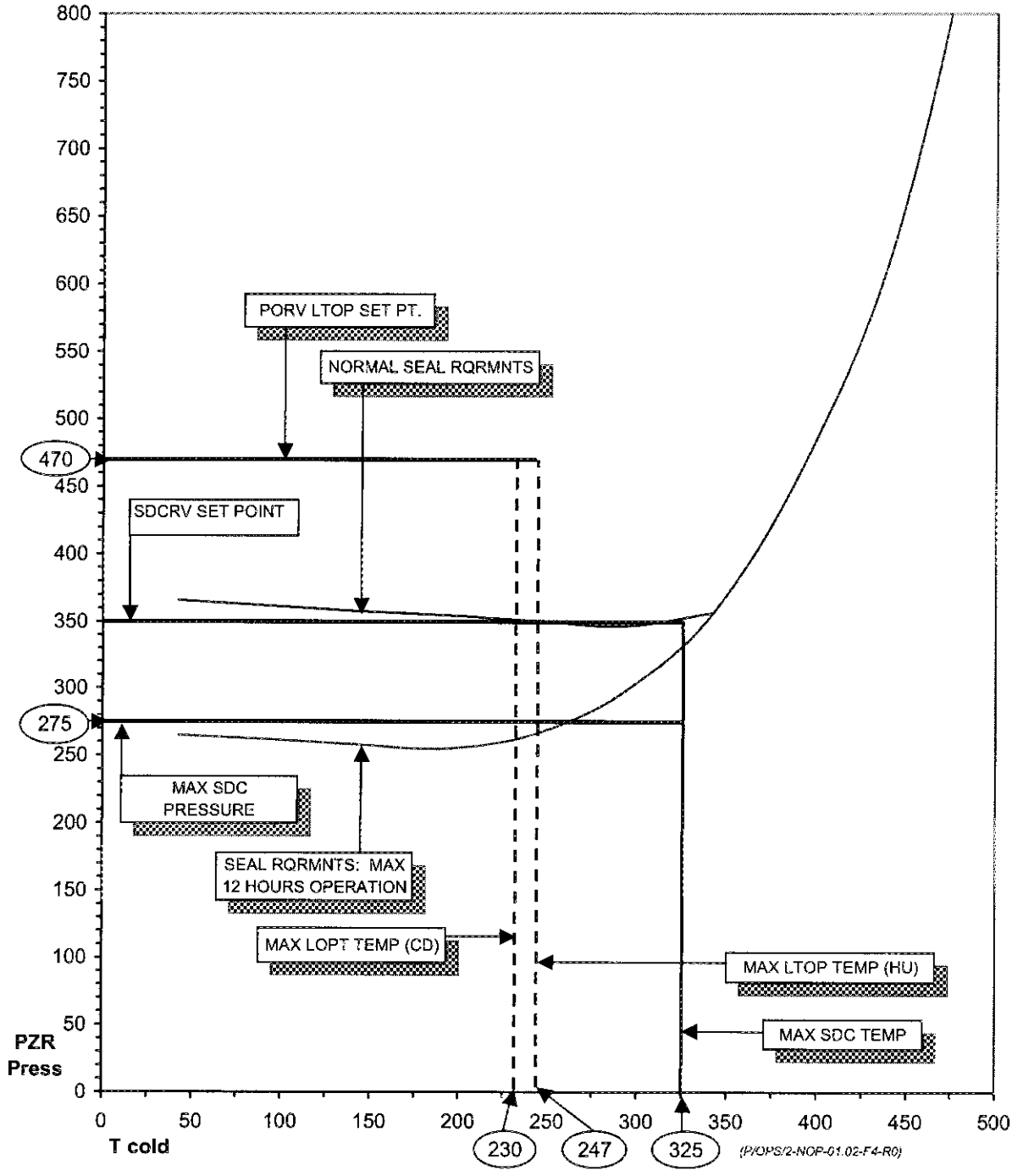
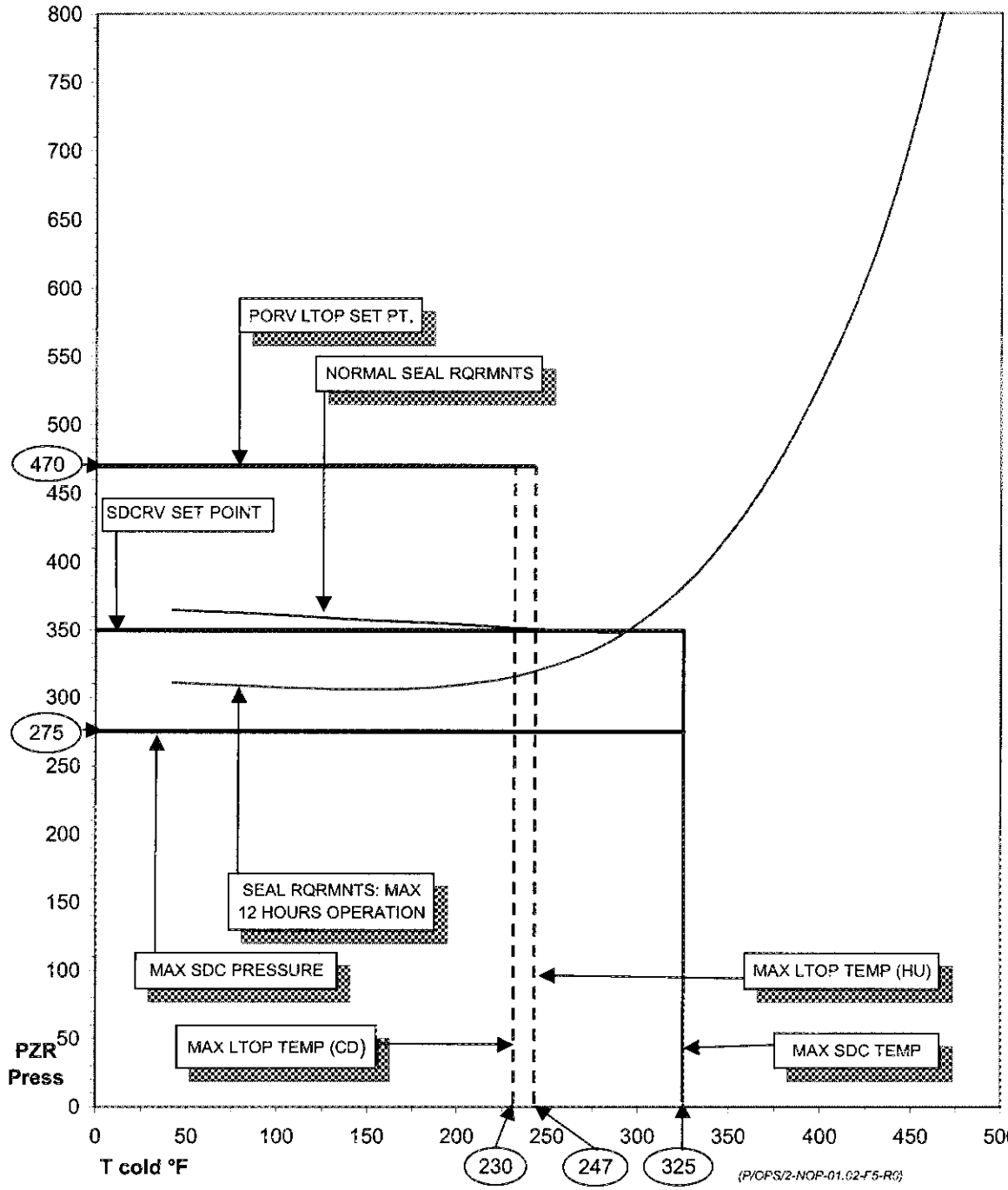
FIGURE 4
THREE RCPs (2A1, 2A2 & 2B2)



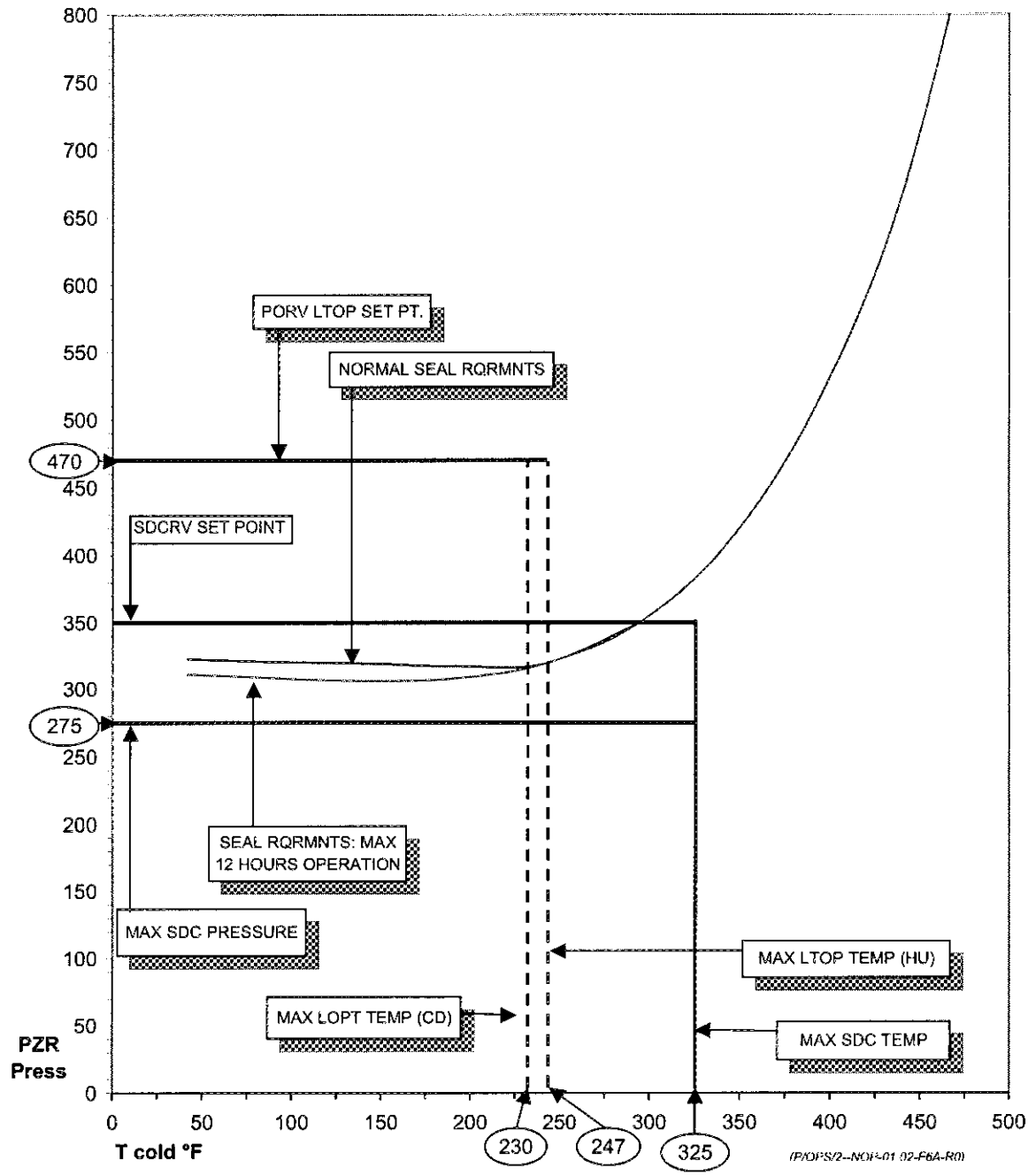
APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 5 of 10)

FIGURE 5
ANY 3 or 4 RCPs



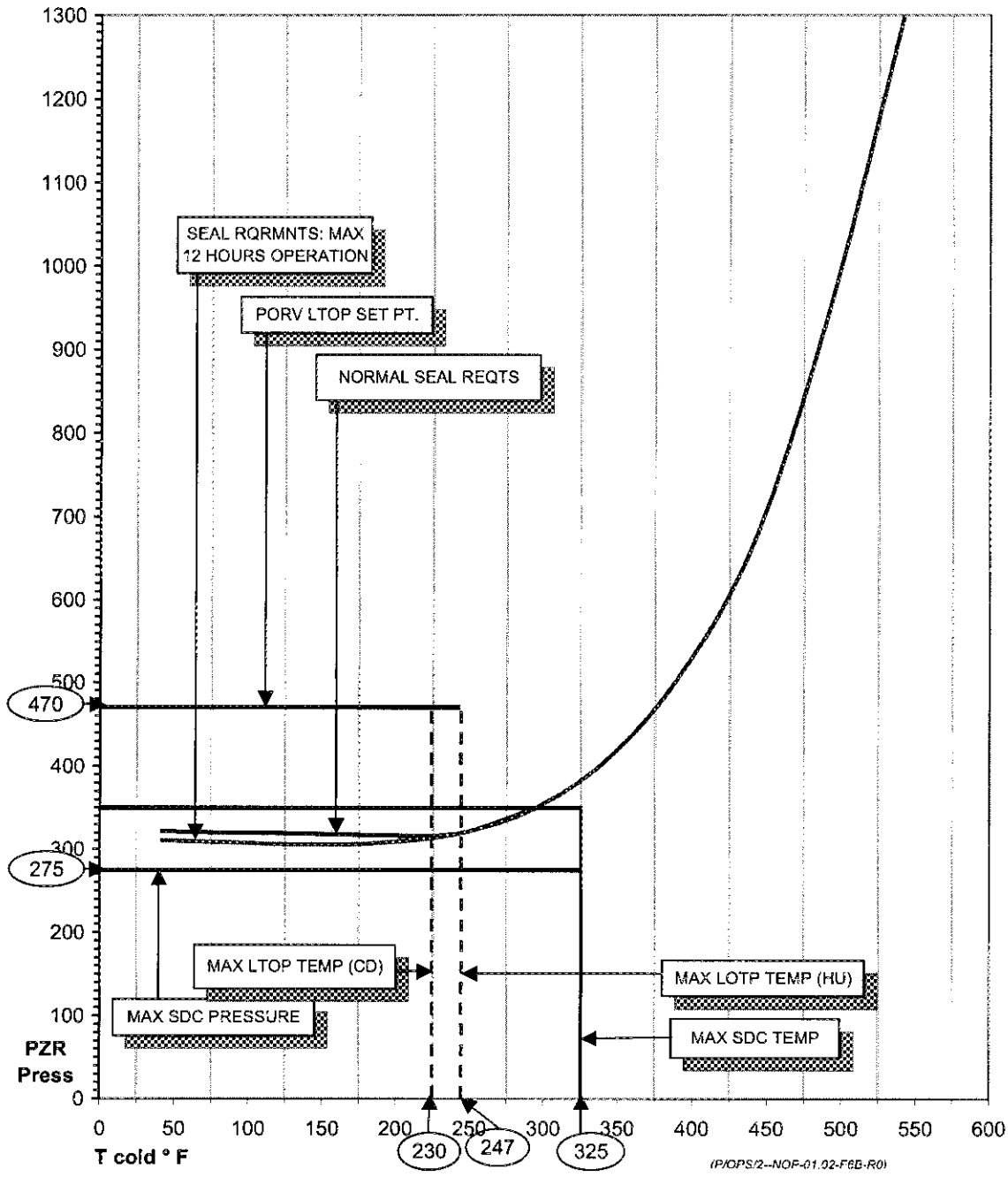
APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 6 of 10)

FIGURE 6A
ANY 2 RCPs IN OPPOSITE LOOPS



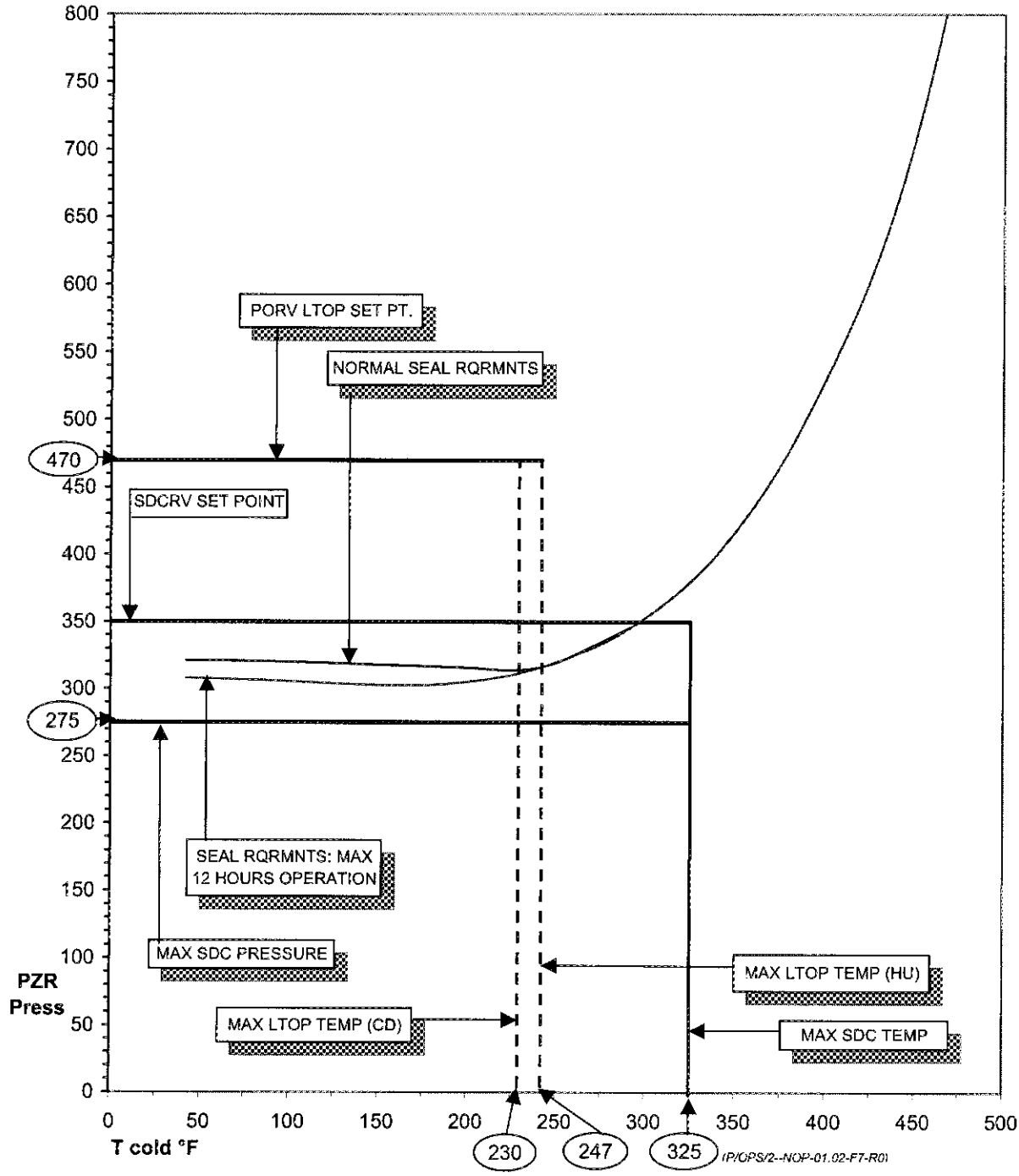
APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 7 of 10)

FIGURE 6B
ANY 2 RCPs IN OPPOSITE LOOPS



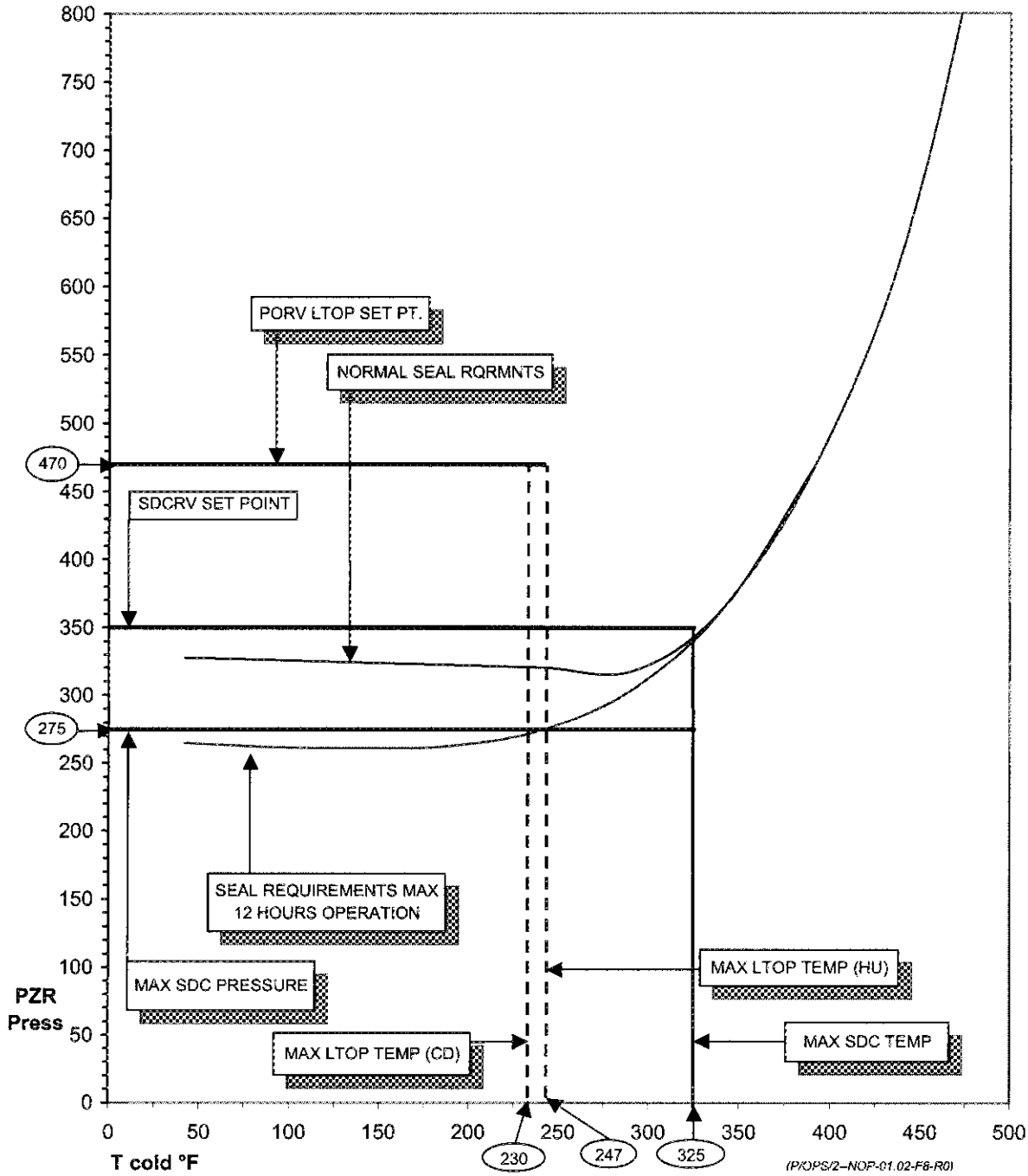
APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 8 of 10)

FIGURE 7
RCP 2B2 ONLY



APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
(Page 9 of 10)

FIGURE 8
ONE RCP (2A1 or 2A2)



APPENDIX B
MINIMUM RCS PRESSURE FOR RCP OPERATION
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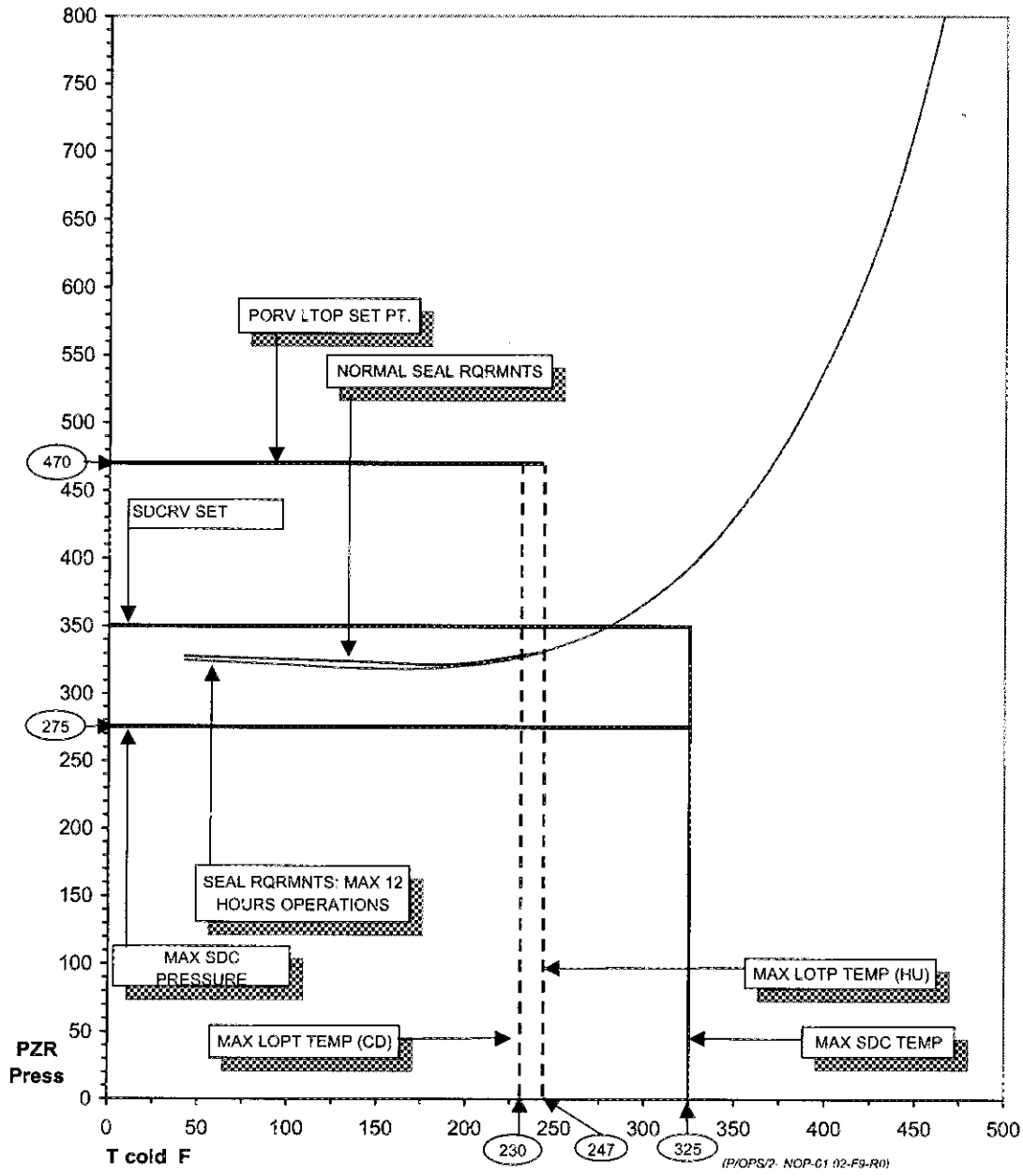
FIGURE 9
ANY ONE RCP



END OF APPENDIX B

APPENDIX C
RCP ELECTRICAL ALIGNMENT
(Page 1 of 1)

COMPONENT ID	COMPONENT DESCRIPTION	POSITION	PERF INITIAL
	RTGB SWITCH POSITIONS		
	2A1-A RCP Oil Lift Pump	OFF	
	2A1-B RCP Oil Lift Pump	OFF	
	2A2-A RCP Oil Lift Pump	OFF	
	2A2-B RCP Oil Lift Pump	OFF	
	2B1-A RCP Oil Lift Pump	OFF	
	2B1-B RCP Oil Lift Pump	OFF	
	2B2-A RCP Oil Lift Pump	OFF	
	2B2-B RCP Oil Lift Pump	OFF	
	480V MCC 2A5		
2-41229	2A1-A RCP Oil Lift Pump	ON	
2-41275	Reg Guide Fdr to 2A1-A RCP Oil Lift Pump	ON	
2-41275	Reg Guide Fdr to 2B1-B RCP Oil Lift Pump	ON	
2-41230	2B1-B RCP Oil Lift Pump	ON	
	480 V MCC 2B5		
2-42032	2A1-B RCP Oil Lift Pump	ON	
2-42074	Reg Guide Fdr to 2A1-B RCP Oil Lift Pump	ON	
2-42074	Reg Guide Fdr to 2B1-A RCP Oil Lift Pump	ON	
2-42029	2B1-A RCP Oil Lift Pump	ON	
	480V MCC 2A6		
2-41327	2A2-B RCP Oil Lift Pump	ON	
2-41376	Reg Guide Fdr to 2A2-B RCP Oil Lift Pump	ON	
2-41376	Reg Guide Fdr to 2B2-A RCP Oil Lift Pump	ON	
2-41328	2B2-A RCP Oil Lift Pump	ON	
	480V MCC 2B6		
2-42134	2A2-A RCP Oil Lift Pump	ON	
2-42195	Reg Guide Fdr to 2A2-A RCP Oil Lift Pump	ON	
2-42195	Reg Guide Fdr to 2B2-B RCP Oil Lift Pump	ON	
2-42133	2B2-B RCP Oil Lift Pump	ON	

END OF APPENDIX C

APPENDIX D
RCP SEAL PRESSURE TEST GAUGES
(Page 1 of 1)

TEST GAUGE LOCATION	INSTALLED (√)	PERF INITIALS
PT-1151, 2A1 RCP Middle Seal Cavity Press		
PT-1152, 2A1 RCP Upper Seal Cavity Press		
PT-1153, 2A1 RCP Controlled Bleedoff Press		
PT-1161, 2A2 RCP Middle Seal Cavity Press		
PT-1162, 2A2 RCP Upper Seal Cavity Press		
PT-1163, 2A2 RCP Controlled Bleedoff Press		
PT-1171, 2B1 RCP Middle Seal Cavity Press		
PT-1172, 2B1 RCP Upper Seal Cavity Press		
PT-1173, 2B1 RCP Controlled Bleedoff Press		
PT-1181, 2B2 RCP Middle Seal Cavity Press		
PT-1182, 2B2 RCP Upper Seal Cavity Press		
PT-1183, 2B2 RCP Controlled Bleedoff Press		

END OF APPENDIX D

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.d

Initiate AFW to B SG - Unit 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Initiate AFW to B SG – Unit 2

Alternate Path: **Yes** __X__ **No** _____

Facility JPM #: New

K/A Rating(s): A2.04 3.4/3.8

Task Standard: AFW flow has been restored to the S/G 2B with the 2B AFW Pump.

Preferred Evaluation Location:

Simulator __X__ Control Room _____ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References: 2-EOP-01 "Standard Post Trip Actions"

Validation Time __5 minutes__ **Time Critical** __No__

Start Time _____

Candidate: _____
Name

Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Directions to candidate for Simulator JPMs:

I will explain the initial conditions and state the task to be performed. All simulator JPM steps, including any communications, shall be performed for this JPM. You are to operate any plant equipment that is necessary for the completion of this JPM. The simulator will provide the cues as you perform this JPM. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

Unit 2 has tripped from 100% power 5 minutes ago. The 2C AFW Pump was Out of Service for Preventive Maintenance. AFAS 2 did NOT actuate when required.

Initiating Cues:

You are the Board RCO. The US has directed you to manually initiate AFAS-2 and then restore A and B S/G levels using Auxiliary Feedwater.

START TIME: _____

STEP 1:	Manually initiate AFAS-2 placing all four AFAS-2 INITIATION SWITCHES to the MANUAL position.	**CRITICAL STEP**
STANDARD:	**PLACE** all four AFAS-2 INITIATION SWITCHES to the **MANUAL** position	_____ SAT
	***EXAMINER'S CUE:** **All four AFAS-2 Initiation Switches are placed in MANUAL**	_____ UNSAT
COMMENTS:		
STEP 2:	OBSERVE valves OPEN MV-09-10, "Pump 2B Disch to S/G 2B" SE-09-3, "2B Pump Disch To 2B S/G Vlv Key 84" MV-09-12, "Pump 2C to S/G 2B" SE-09-5, "2C Pump Disch To 2B S/G Vlv Key 86"	_____ SAT
	OBSERVE 2B AFW Pump START	_____ UNSAT
	AND	
	OBSERVE flow on FI-09-2B or FR-09-2B, "Header B Flow & Pressure" and FI-09-2C or FR-09-2C, "Header C Flow & Pressure".	
STANDARD:	**OBSERVE** valves all B AFW Valves, 2B AFW Pump & flow indications on FI-09-2B and FI-09-2C	
	EXAMINER'S NOTE: **Faulted Step – 2B AFW Pump does NOT start, therefore NO Flow**	
	***EXAMINER'S CUE:** **MV-09-10, MV-09-12, SE-09-3 & SE-09-5 INDICATE Red lights ON, Green lights OFF.** **2B AFW Pump INDICATE Red lights OFF, Green lights ON.** **FI-09-2B/FR-09-2B indicates 0 gpm flow and FI-09-2C/FR-092C indicates 0 flow**	
COMMENTS:		

STEP 3: Manually start 2B AFW Pump from RTGB-202. STANDARD: **POSITION** the control switch for 2B AFW Pump to START. ***EXAMINER'S CUE:** **MV-09-11 indicates Green light OFF Red light ON, FI-09-2B/FR-09-2B indicates 320 gpm flow** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 4: Throttle AFW flow as necessary to restore and stabilize level between 60% and 70% narrow range (per Initiating Cue). STANDARD: **THROTTLE** MV-09-10 to ~220 gpm to restore SG 2B level between 60% and 70% narrow range ***EXAMINER'S CUE:** **MV-09-10 shows Green and Red lights ON;** **FI-09-2B indicates ~220 gpm,** **If asked: SG 2B level is rising.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 5: Throttle AFW flow as necessary to restore and stabilize level between 60% and 70% narrow range (per Initiating Cue). STANDARD: **THROTTLE** MV-09-9 to ~220 gpm to restore SG 2A level between 60% and 70% narrow range ***EXAMINER'S CUE:** **MV-09-9 shows Green and Red lights ON;** **FI-09-2A indicates ~220 gpm,** **If asked: SG 2A level is rising.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP (done):	Notify the US that AFAS-2 has been manually initiated, the 2B AFW Pump was manually started and AFW flow is restoring S/G levels).	
STANDARD:	**NOTIFY** the US that AFW flow has been **RESTORED** to the 2A and 2B S/G and S/G levels are being restored using AFW.	_____ SAT
	EXAMINER'S CUE: US ACKNOWLEDGES	_____ UNSAT
COMMENTS:		
	END OF TASK	

STOP TIME: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

Unit 2 has tripped from 100% power 5 minutes ago. The 2C AFW Pump was Out of Service for Preventive Maintenance. AFAS 2 did NOT actuate when required.

Initiating Cues:

You are the Board RCO. The US has directed you to manually initiate AFAS-2 and then restore A and B S/G levels using Auxiliary Feedwater.

Simulator Steup

1. **RESTORE** IC-1.
2. **SELECT** HLC_Exam > New01A.
3. **TRIGGER** "IC Setup"
4. **HANG** Clearance Info Tag on the MV-08-3, "2C AFW Pump Throttle / Trip"
5. **UNFREEZE** the Simulator
6. **TRIP** the Reactor
7. **WAIT** until AFAS-1 fully opens all A AFW Valves.
8. **FREEZE** the Simulator
9. Make a **SNAPSHOT** if more than one student is being tested on this JPM
10. **UNFREEZE** the Simulator when the Student is ready.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.e

Reset Containment Spray – Unit 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Reset Containment Spray – Unit 2

Alternate Path: **Yes** ____ **No** __X__

Facility JPM #: 0821006

K/A Rating(s): A4.05 3.5/3.5

Task Standard: Containment Spray is terminated.

Preferred Evaluation Location:

Simulator _____ Control Room __X__ In-Plant _____

Preferred Evaluation Method:

Perform _____ Simulate __X__

References: 2-EOP-99, Appendix P, "Restoration of Components Actuated by ESFAS"

Validation Time 10 minutes **Time Critical** No

Candidate: _____ Start Time _____
Name Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

2-EOP-99, Appendix P, "Restoration of Components Actuated by ESFAS"

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Directions to candidate for Simulator JPMs:

I will explain the initial conditions and state the task to be performed. All simulator JPM steps, including any communications, shall be performed for this JPM. You are to operate any plant equipment that is necessary for the completion of this JPM. The simulator will provide the cues as you perform this JPM. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

A Loss of Coolant Accident (LOCA) has occurred inside Unit 2 Containment. Containment pressure has decreased to < 3.5 psig and continues to lower. Containment Spray is not needed for Containment cooling. The 2A Hydrazine Pump was secured during 2-EOP-3 implementation. The 2B Hydrazine Pump has stopped on a Hydrazine Storage Tank Low-Low level signal (Annunciators S-10 and S-20 are illuminated). Containment Spray is no longer needed for iodine removal. The TSC has concurred with terminating Containment Spray.

Initiating Cues:

You are the Desk RCO. The US has directed you to terminate Containment Spray IAW 2-EOP-99, Appendix P, Restoration of Components Actuated By ESFAS. 2-EOP-99 Table 3 for verifying CSAS has been completed.

START TIME: _____

STEP 1: **ENSURE** Table 3, Containment Spray Actuation Signal, has been performed. STANDARD: CSAS is already **VERIFIED** per 2-EOP-99 Table 3. **EXAMINER'S CUE: All Table 3 components ACTUATED to expected POSITIONS (per Que)** COMMENTS:	_____ SAT _____ UNSAT
STEP 2: **PLACE** CSAS Actuation Handswitch to RESET. STANDARD: **POSITION** CSAS Channel A switch to **RESET** ***EXAMINER'S CUE: Red light OFF, Green light ON** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 3: **PLACE** CSAS Actuation Handswitch to RESET. STANDARD: **POSITION** CSAS Channel B switch to **RESET** ***EXAMINER'S CUE: Red light OFF, Green light ON.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 4: **VERIFY** the red actuation light clears and the green reset light illuminates (above the handswitch). STANDARD: **VERIFY** Channel A and Channel B green lights are lit and Channel A and Channel B red lights are extinguished. ***EXAMINER'S CUE:** **Channel A and Channel B Green lights are lit and Red lights are Extinguished** COMMENTS:	_____ SAT _____ UNSAT
STEP 5: **VERIFY** Annunciator S-7, CSAS Channel A/B Actuation, is NOT Illuminated. STANDARD: **VERIFY** Annunciator S-7 is Extinguished ***EXAMINER'S CUE:** **Annunciator S-7 is NOT illuminated** **Note – S-7 will not clear until BOTH Trains are RESET** COMMENTS:	_____ SAT _____ UNSAT
STEP 6: **STOP** Both Containment Spray Pumps. STANDARD: **POSITION** 2A CS pump control switch to **STOP** ***EXAMINER'S CUE:** **2A CS Pump indicates Green light ON, Red light OFF.** **Following Alarms:** • **S-57 "2A CS Pump Bkr Failure/ CSAS OVRD"** • **ESFAS BYPASS STATUS: A side "Contain Spy #6"** **If asked, Amps and FI-07-1A flow indicate 0** **EVALUATOR'S NOTE: If the control switch is placed in Auto at this time, the Critical Step is NOT Unsat. The control switch is placed back in Auto per step 13** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 7: **STOP** Both Containment Spray Pumps. STANDARD: **POSITION** 2B CS pump control switch to **STOP** ***EXAMINER'S CUE:** **2B CS Pump indicates Green light ON, Red light OFF.** **Following Alarms:** • **S-58 "2B CS Pump Bkr Failure/ CSAS OVRD"** • **ESFAS BYPASS STATUS: B side "Contain Spy #6"** **If asked, Amps and FI-07-1B flow indicate 0** **EVALUATOR'S NOTE: If the control switch is placed in Auto at this time, the Critical Step is NOT Unsat. The control switch is placed back in Auto per step 13** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 8: **CLOSE** Containment Spray Header Valves. ▪ FCV-07-1A STANDARD: **POSITION** FCV-07-1A control switch to **CLOSE/RESET.** Then return to **AUTO** ***EXAMINER'S CUE:** **FCV-07-1A indicates Green light ON, Red light OFF** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 9: **CLOSE** Containment Spray Header Valves. ▪ FCV-07-1B STANDARD: **POSITION** FCV-07-1B control switch to **CLOSE/RESET.** Then return to **AUTO** ***EXAMINER'S CUE:** **FCV-07-1B indicates Green light ON, Red light OFF** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 10: **VERIFY** Hydrazine Pumps STOPPED. STANDARD: **VERIFY** 2A and 2B Hydrazine Pumps have **STOPPED** ***EXAMINER'S CUE:** **2A and 2B Hydrazine Pumps indicate Green lights ON, Red lights OFF.** **If checked, FI-07-2-1 or FR-07-2-2 indicates 0 flow** COMMENTS:	_____ SAT _____ UNSAT
STEP 11: **VERIFY** Hydrazine Pump Discharge Valves are CLOSED. ▪ SE-07-3A STANDARD: **VERIFY** Valve SE-07-3A is **CLOSED** ***EXAMINER'S CUE:** **SE-07-3A indicates Green lights ON, Red lights OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 12: **VERIFY** Hydrazine Pump Discharge Valves are CLOSED. ▪ SE-07-3B STANDARD: **VERIFY** Valve SE-07-3B is **CLOSED** ***EXAMINER'S CUE:** **SE-07-3B indicates Green lights ON, Red lights OFF** COMMENTS:	_____ SAT _____ UNSAT

STEP 13: **RESTORE** Containment Spray Pump control switches to AUTO. STANDARD: **POSITION** 2A and 2B Containment Spray Pump control switches to **AUTO** ***EXAMINER'S CUE:** **2A Containment Spray Pump control switch is in AUTO.** **Following Alarms Clear:** • **S-57 "2A CS Pump Bkr Failure/ CSAS OVRD"** • **ESFAS BYPASS STATUS: A side "Contain Spy #6** **2B Containment Spray Pump control switch is in AUTO.** **Following Alarms Clear:** • **S-58 "2B CS Pump Bkr Failure/ CSAS OVRD"** • **ESFAS BYPASS STATUS: B side "Contain Spy #6** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP (done): Notify US that CSAS has been terminated. STANDARD: **NOTIFY** US. **EXAMINER'S CUE:** **US acknowledges** COMMENTS: **END OF TASK**	_____ SAT _____ UNSAT

STOP TIME: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

A Loss of Coolant Accident (LOCA) has occurred inside Unit 2 Containment. Containment pressure has decreased to < 3.5 psig and continues to lower. Containment Spray is not needed for Containment cooling. The 2A Hydrazine Pump was secured during 2-EOP-3 implementation. The 2B Hydrazine Pump has stopped on a Hydrazine Storage Tank Low-Low level signal (Annunciators S-10 and S-20 are illuminated). Containment Spray is no longer needed for iodine removal. The TSC has concurred with terminating Containment Spray.

Initiating Cues:

You are the Desk RCO. The US has directed you to terminate Containment Spray IAW 2-EOP-99, Appendix P, Restoration of Components Actuated By ESFAS. 2-EOP-99 Table 3 for verifying CSAS has been completed.

Simulator Steup

1. **RESTORE** IC-29. Do not unfreeze the Simulator.
2. **SELECT** CONFIGURE and **CHANGE** to JPM CONFIGURATION
3. **SELECT** the lesson for 0821006 and **START** the lesson.

> **NOTE: DO NOT TRIGGER STEP 2 006A FOR JPM 006**

4. **UNFREEZE** the Simulator. The Simulator will automatically freeze when the setup is complete.
5. Make a **SNAPSHOT** if more than one student will be taking the JPM.
6. **UNFREEZE** the Simulator when the student is ready to begin. Audible alarms will be restored when the Simulator is unfrozen.

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 6 of 16)

SECTION 4: CSAS RESET and COMPONENT RESTORATION

	A Train (√)	B Train (√)
☐ **1.** ENSURE Table 3, Containment Spray Actuation Signal, has been performed.		
☐ **2.** Place CSAS Actuation Handswitch to RESET.	___	___
☐ **3.** VERIFY the red actuation light clears and the green reset light illuminates. (above the handswitch)	___	___

NOTE
Annunciator S-7 will NOT clear until **BOTH** trains of CSAS have been reset.

☐ **4.** VERIFY annunciator S-7, CSAS Channel A/B Actuation, is NOT illuminated.		
☐ **5.** STOP Containment Spray Pump(s).	___	___
☐ **6.** CLOSE Containment Spray Header Valves.		
• FCV-07-1A	___	
• FCV-07-1B		___
☐ **7.** VERIFY Hydrazine Pumps STOPPED.		
• 2A Hydrazine Pump	___	
• 2B Hydrazine Pump		___
☐ **8.** VERIFY Hydrazine Pump Discharge Valves are CLOSED.		
• SE-07-3A	___	
• SE-07-3B		___
☐ **9.** RESTORE Containment Spray Pump control switches to AUTO.	___	___

End of Section 4

/K29

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 1 of 16)

NOTE

These sections may be performed as needed based on plant conditions.

Section 1 - SIAS Block and Reset
Section 2 - CIAS Reset
Section 3 - MSIS Block and Reset
Section 4 - CSAS Reset and Component Restoration
Section 5 - System / Component Restoration
- 5.1 – Instrument Air
- 5.2 – Component Cooling Water
- 5.3 – Emergency Diesel Generators / Pzr Heaters
- 5.4 – Charging and Letdown
- 5.5 – Safety Injection
- 5.6 – Ventilation
- 5.7 – Miscellaneous Components
  - A. - Containment Sample
  - B. - Steam Generator Blowdown
  - C. - Containment Waste Gas
  - D. - Reactor Drain Tank
  - E. - ICW to TCW Heat Exchangers
  - F. - RCP Bleedoff
  - G. - Primary Water to Containment
  - H. - SIAS Reset Pushbuttons on RTGB-206

SECTION 1: SIAS BLOCK and RESET

NOTE

Reset of SIAS will not be possible until containment pressure is lowered below SIAS actuation setpoint.

☐ **1.** VERIFY the following plant parameters:

- ☐ Containment pressure is less than 3.4 psig (3 out of 4 safety channels) and NOT rising.
- ☐ Annunciator Q-3, Cntmt Press SIAS Channel Trip, is NOT illuminated.

☐ **2.** ENSURE Table 1, Safety Injection Actuation Signal, has been completed.

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 2 of 16)

SECTION 1: SIAS BLOCK and RESET (continued) A Train (√) B Train (√)

☐ **3.** If **BOTH** of the following conditions are met,

- SIAS Block Permissive amber lights (above the keyswitches) are illuminated ___ ___
- Annunciator R-8, SIAS Channel A/B Actuation Block Permissive, is illuminated ___ ___

Then **BLOCK** SIAS as follows:

A. PLACE SIAS BLOCK Channel Keyswitch to BLOCK. ___ ___

B. VERIFY SIAS Channel Actuation Blocked Alarm is illuminated. R-9___ R-10___

CAUTION
If Appendix J, Restoration of CCW and CBO to the RCPs, has been performed then resetting of SIAS will CLOSE the associated train 'N' Header Valves.

☐ **4.** **RESET** SIAS as follows:

A. PLACE SIAS Manual Actuation Handswitch to RESET. ___ ___

B. VERIFY the red actuation light clears and the green reset light illuminates. (above the handswitch) ___ ___

NOTE
Annunciator R-6 will NOT clear until **BOTH** trains of SIAS have been reset.

☐ **C.** VERIFY Annunciator R-6, SIAS Channel A/B Actuation, is NOT illuminated.

End of Section 1

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 3 of 16)

SECTION 2: CIAS RESET A Train (√) B Train (√)

NOTE
CIAS can NOT be blocked. ALL of the following plant parameters MUST be met or reset of CIAS will not be possible.

☐ **1.** VERIFY the following plant parameters:

- ☐ Containment pressure is less than 3.4 psig and NOT rising.
- ☐ Annunciator P-13, Cntmt Press High CIS Channel Trip, is NOT illuminated.
- ☐ Containment radiation is less than 8 R/hr and NOT rising.
- ☐ Annunciator P-5, Cntmt Rad High CIS Channel Trip, is NOT illuminated.
- ☐ The associated SIAS Channel is NOT actuated or has been reset.

☐ **2.** ENSURE Table 2, Containment Isolation Actuation Signal, has been performed.

NOTE
With the Spent Fuel Pool Area Radiation Monitors in alarm, the Shield Building Ventilation System will automatically align its suction to the Spent Fuel Pool **WHEN** the CIAS signal is **RESET**.

☐ **3.** **RESET** CIAS as follows:

A. PLACE CIAS Manual Actuation Handswitch to RESET. ___ ___

B. VERIFY the red actuation light clears and the green reset light illuminates. (above the handswitch) ___ ___

NOTE
Annunciator P-3 will NOT clear until **BOTH** trains of CIAS have been reset.

☐ **C.** VERIFY Annunciator P-3, CIAS Channel A/B Actuation is NOT illuminated.

End of Section 2

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 4 of 16)

SECTION 3: MSIS BLOCK and RESET A Train (√) B Train (√)

CAUTION
MSIS actuation will stabilize safety functions on a fault downstream of the MSIV(s). Unless there is high confidence in the reason for MSIS actuation, consideration should be given to allowing the signal to remain actuated.

NOTE
MSIS actuation from high containment pressure can NOT be blocked.

☐ **1.** VERIFY **BOTH** of the following:

- ☐ Containment pressure is less than 3.4 psig (3 out of 4 safety channels) and not rising.
- ☐ S/G pressure(s) has NOT been lowered by a known or suspected fault.

☐ **2.** ENSURE Table 5, Main Steam Isolation Signal, has been performed.

☐ **3.** If **BOTH** of the following conditions are met,

- MSIS Block permissive amber lights (above the keyswitches) are illuminated ___ ___
- MSIS Actuation Block Permissive Annunciator is illuminated P-18___ P-20___

Then **BLOCK** MSIS as follows:

A. PLACE MSIS Block Channel Keyswitch to BLOCK. ___ ___

B. VERIFY MSIS Actuation Blocked Annunciator is illuminated. P-8___ P-10___

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 5 of 16)

SECTION 3: MSIS BLOCK and RESET (continued) A Train (√) B Train (√)

☐ **4. RESET** MSIS as follows:

A. PLACE MSIS Actuation Handswitch to RESET. ___ ___

B. VERIFY the red actuation light clears and the green reset light illuminates. (above the handswitch) ___ ___

C. VERIFY MSIS Channel Actuation annunciator is not illuminated. P-7___ P-9___

End of Section 3

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS

(Page 7 of 16)

A Train (√) B Train (√)

NOTE
It may NOT be possible to restore all components within a system due to unusual plant conditions associated with the event (LOOP, degraded electrical, Equipment Clearance Order, etc.)

SECTION 5: SYSTEM / COMPONENT RESTORATION

1. Instrument Air

☐ **A.** If a LOOP has occurred,
Then RESTORE Instrument Air in accordance with Appendix H, Operation of the 2A and 2B Instrument Air Compressors.

☐ **B.** RESTORE instrument air to containment by PLACING the control switch for HCV-18-1 to CLOSE / OVERRIDE and then to OPEN.

2. Component Cooling Water

☐ **A.** RESTORE CCW to the 'N' header from the desired train(s) by placing the control switches for the following Isolation Valves to CLOSE and then to OPEN.

- HCV-14-8A ____
- HCV-14-9 ____
- HCV-14-8B ____
- HCV-14-10 ____

(continued on next page)

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 8 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

A Train (√) B Train (√)

2. (continued)

☐ **B.** If Appendix J has NOT been performed,
Then RESTORE CCW to containment and the RCPs by placing control switches for the following valves to OPEN / RESET and then to AUTO.

- HCV-14-1 ____
- HCV-14-6 ____
- HCV-14-2 ____
- HCV-14-7 ____

☐ **C.** If Appendix J has been performed,
Then PLACE the control switches for the following valves to AUTO.

- HCV-14-1 ____
- HCV-14-6 ____
- HCV-14-2 ____
- HCV-14-7 ____

☐ **D.** RESTORE CCW to the Spent Fuel Pool Heat Exchanger(s) by placing the keyswitch for **ONE** train to LOCKED CLOSED and return to OPEN.

- MV-14-18 / MV-14-20 ____
- MV-14-17 / MV-14-19 ____

(continued on next page)

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RESTORATION OF COMPONENTS ACTUATED BY ESFAS
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SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

A Train (√) B Train (√)

2. (continued)

☐ **E.** If Containment Spray Termination criteria is met, Then isolate CCW to the SDC Heat Exchanger(s) by PLACING the control switch(es) to CLOSE.

- HCV-14-3A ___
- HCV-14-3B ___

3. Emergency Diesel Generators / Pzr Heaters

☐ **A.** If the EDG output breakers are OPEN, Then perform **ALL** of the following:

1. STOP the EDG(s). ___ ___
2. CLOSE the Pressurizer Heater Transformer breakers(s) by PLACING the control switch to TRIP and then to CLOSE. ___ ___

☐ **3.** RESET Non-Essential Loads Breaker(s) on the following MCCs.

- 480V MCC 2A5 ___
- 480V MCC 2A6 ___
- 480V MCC 2A8 ___
- 480V MCC 2B5 ___
- 480V MCC 2B6 ___
- 480V MCC 2B8 ___

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 10 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

4. Charging and Letdown.

☐ **A.** ENSURE the Inventory Control Safety Function is configured to support loss of Charging.

☐ **B.** PLACE **ALL** charging pumps in STOP.

☐ **C.** CLOSE V2508, BA Gravity Feed 2B.

☐ **D.** CLOSE V2509, BA Gravity Feed 2A.

☐ **E.** STOP BA Pump 2A and RETURN switch to AUTO.

☐ **F.** STOP BA Pump 2B and RETURN switch to AUTO.

☐ **G.** CLOSE V2514, Emergency Borate.

☐ **H.** OPEN V2650, BA Tank 2A Recirc Valve, by placing the control switch to CLOSE and then to OPEN.

☐ **I.** OPEN V2651, BA Tank 2B Recirc Valve, by placing the control switch to CLOSE and then to OPEN.

☐ **J.** If suction from the VCT is desired,
Then perform the following:

☐ **1.** ENSURE VCT level is between 45% to 65%.

☐ **2.** OPEN V2501, VCT Outlet Valve, by placing its control switch to CLOSE / RESET and then to OPEN.

☐ **3.** RESTORE Charging and Letdown.
REFER to 2-ONP-02.03, Charging and Letdown.

(continued on next page)

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 11 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued) A Train (√) B Train (√)

4. (continued)

☐ **K.** If suction from the RWT is desired,
Then perform the following:

☐ **1.** ENSURE adequate level in RWT.

☐ **2.** ENSURE V2504, Refuel Water to Charging Pumps, is OPEN.

☐ **3.** PLACE Breaker 2-42036, Refueling Water to Charging Pumps V-2504, to the OFF position.

☐ **4.** PLACE breaker 2-42119, Vol Cont Tank Outlet to Chg Pps V-2501, to the OFF position.

☐ **5.** PLACE all Charging Pumps in AUTO.

5. Safety Injection.

☐ **A.** CLOSE the following HPSI Header Loop Isolation Valves for each HPSI Pump that is NOT RUNNING.

- HCV-3617 ____
- HCV-3627 ____
- HCV-3637 ____
- HCV-3647 ____
- HCV-3616 ____
- HCV-3626 ____
- HCV-3636 ____
- HCV-3646 ____

(continued on next page)

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 12 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

A Train (√) B Train (√)

5. (continued)

☐ **B.** If plant conditions permit,
Then STOP the HPSI Pump(s) and RETURN the control switch(es) to AUTO.

- HPSI Pump 2A ___
- HPSI Pump 2B ___

☐ **C.** CLOSE the LPSI Header Loop Isolation Valves for EACH LPSI Pump that is NOT RUNNING:

- HCV-3615 ___
- HCV-3625 ___
- HCV-3635 ___
- HCV-3645 ___

☐ **D.** If plant conditions permit,
Then STOP the LPSI Pump(s) and RETURN the control switch(es) to AUTO.

- LPSI Pump 2A ___
- LPSI Pump 2B ___

6. Ventilation.

☐ **A.** If containment temperature is less than 120°F,
Then ENSURE only **THREE** Containment Fan Coolers are RUNNING.
REFER TO 2-NOP-25.04 Containment Fan Cooler Operation.

(continued on next page)

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 13 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

A Train (√) B Train (√)

6. (continued)

☐ **B.** ENSURE only **ONE** RAB Main Supply Fan is RUNNING.

- HVS-4A ___
- HVS-4B ___

☐ **C.** STOP **BOTH** ECCS Exhaust Fans.

- HVE-9A ___
- HVE-9B ___

☐ **D.** VERIFY the following dampers **OPEN**.

- D-5A ___
- D-6A ___
- D-7A ___
- D-8A ___
- D-9A ___
- D-12A ___
- D-5B ___
- D-6B ___
- D-7B ___
- D-8B ___
- D-9B ___
- D-12B ___

(continued on next page)

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 14 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

	A Train (√)	B Train (√)

6. (continued)

☐ **E.** VERIFY the following dampers **CLOSE**.

• D-1	___	
• D-2	___	
• D-3		___
• D-4		___
• D-13	___	
• D-14	___	
• D-15		___
• D-16		___

☐ **F.** START **ONE** RAB Main Exhaust Fan.

• HVE-10A	___	
• HVE-10B		___

☐ **G.** RESTORE Fuel Pool Ventilation System.
REFER TO 2-ONP-26.02, Area Radiation Monitors.

☐ **H.** RESTORE the Shield Building Ventilation System.
REFER TO 2-NOP-25.01, Shield Building Ventilation System Operation.

☐ **I.** RESTORE the Control Room Ventilation System.
REFER TO 2-ONP-25.02, Ventilation Systems.

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 15 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

A Train (√) B Train (√)

7. Miscellaneous Components.

☐ **A.** OPEN Containment Sample Isolation Valves by PLACING the hand switch to CLOSE and then to OPEN.

- FCV-26-2/4/6 ___
- FCV-26-1/3/5 ___

☐ **B.** Restore Steam Generator Blowdown and Sample systems as necessary.
REFER TO OP-0830021, Blowdown System Operation.

☐ **C.** OPEN the Waste Gas Cntmt Isol valves by PLACING the control switch to OPEN RESET.

- V6750 ___
- V6718 ___

☐ **D.** OPEN Reactor Drain Tank Cntmt Isol valves by PLACING the control switch to RESET.

- V6341 ___
- V6342 ___

☐ **E.** OPEN the ICW to the TCW Heat Exchanger valves by PLACING the control switch to CLOSE and then OPEN.

- MV-21-3 ___
- MV-21-2 ___

(continued on next page)

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 16 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued) A Train (√) B Train (√)

7. (continued)

☐ **F.** If **BOTH** of the following conditions exist,

- RCP Bleedoff was NOT isolated as a result of the loss of CCW to the RCP seals for greater than 30 minutes
- CBO or Lower Seal temperature is less than 250°F

Then ALIGN RCP Controlled Bleed-off to the VCT as follows:

☐ **1.** OPEN V2505, RCP Bleedoff Cntmt Isol, by placing the control switch to RESET.

☐ **2.** OPEN V2524, RCP Bleed Cntmt Isol, by placing the control switch to RESET.

☐ **3.** ENSURE V2507, RCP Bleedoff Relief Stop Vlv, is CLOSED.

☐ **G.** ALIGN Primary water to the Containment by PLACING HCV-15-1, Primary Water to Containment to CLOSE and then to OPEN.

☐ **H.** DEPRESS the **TWO** SIAS reset pushbuttons on RTGB-206.

- Check Valve Leakage A Reset ___
- Check Valve Leakage B Reset ___

End of Section 7

END OF APPENDIX P

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.f

LR NI Channel Malfunction – Unit 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Respond to a Linear Power Range Malfunction – Unit 2

Alternate Path: **Yes** ____ **No** __X__

Facility JPM #: 0821131

K/A Rating(s): A4.03 3.6/3.6

Task Standard: RPS Channel A bistables 1,7 & 10 are bypassed.

Preferred Evaluation Location:

Simulator __X__ Control Room ____ In-Plant ____

Preferred Evaluation Method:

Perform __X__ Simulate ____

References: 2-ONP-99.01, "Loss of Tech Spec Instrumentation"
2-ARP-01-L (Applicable pages)

Validation Time __10 minutes__ **Time Critical** __No__

Candidate: _____ Start Time _____
Name
Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

2-ONP-99.01, "Loss of Tech Spec Instrumentation"
2-ARP-01-L (Applicable pages)

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Directions to candidate for Simulator JPMs:

I will explain the initial conditions and state the task to be performed. All simulator JPM steps, including any communications, shall be performed for this JPM. You are to operate any plant equipment that is necessary for the completion of this JPM. The simulator will provide the cues as you perform this JPM. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

The plant is operating at 100% power, steady state conditions..

Initiating Cues:

The following annunciators are in alarm condition:

A. L-9 Reactor Pwr. Lvl. Hi Chnl Trip
B. L-17 Reactor Pwr. Lvl. Hi Channel Pre-Trip
C. L-22 Local Power Density Chnl. Trip
D. L-30 Local Power Density Chnl. Pre-Trip
E. L-34 Nuc/ΔT Deviation
F. L-36 TM/LP Chnl. Trip
G. L-44 TM/LP Chnl. Pre-Trip
H. H-1 TM/LP Chnl. A Setpoint High/Low

Perform actions as required in response to the listed annunciators.

START TIME: _____

STEP 1:	Compare meter indications on all channels to determine the validity of the alarm/indication.	
STANDARD:	Meter indications on the local drawer meters and on RTGB-204 are compared and it is determined that there is significant disagreement between channel 'A' and other channels, which indicates a valid failure of Linear Range Safety N! Channel A. Determine 'A' Chnl failed Hi.	_____ SAT _____ UNSAT
	***EXAMINER'S CUE: LINEAR RANGE SAFETY CANNEL 'A' INDICATIONS DO NOT MATCH THE OTHER CHANNELS.**	
COMMENTS:		
STEP 2:	If a malfunction of a Linear Range Safety Channel (RPS A, B, C, or D) has occurred, Then, perform the following per 2-ONP-99.01, "Loss of Tech Spec Instrumentation":	
STEP 3:	Place the failed channel Variable High Power, TM/LP, and LPD Trip unit bistables in Bypass or Trip.	**CRITICAL STEP**
STANDARD:	The failed channel Variable High Power, TM/LP, and LPD trip unit bistables are placed in the bypass condition.	_____ SAT
	***EXAMINER'S CUE: RPS CHANNEL 'A' VARIABLE HIGH POWER, TM/LP, AND LPD BISTABLES AMBER LIGHTS #1, #7, AND #10 ARE ON.**	_____ UNSAT
COMMENTS:		

STEP 4:	If power level is greater than or equal to 15%, Then place the affected channel loss load trip bistable in Bypass or Trip.	**CRITICAL STEP**
STANDARD:	It is determined that power level is greater than or equal to 15%, and the affected channel LOSS LOAD trip bistable is placed in the bypass or tripped condition.	_____ SAT
	***EXAMINER'S CUE: RPS CHANNEL 'A' LOSS LOAD TRIP BISTABLE AMBER LIGHT #8 IS ON.**	_____ UNSAT
COMMENTS:		
STEP 5:	If power level is at or between 10^{-4}% and 15%, Then place the HI RATE bistable in the bypassed or tripped condition.	
STANDARD:	It is determined that power level is greater than 15%, and the HI RATE bistable **IS NOT** placed in the bypassed condition.	_____ SAT
	***EXAMINER'S CUE: CHANNEL 'A' HI RATE BISTABLE IS NOT IN THE BYPASS OR TRIPPED CONDITION.**	_____ UNSAT
COMMENTS:		
STEP 6:	Declare the failed channel out of service.	
STANDARD:	Linear Range Safety Channel 'A' is placed in the OOS Log and RCO Log.	
	***EXAMINER'S CUE: ACKNOWLEDGE LINEAR RANGE SAFETY CHANNEL 'A' DECLARED OUT OF SERVICE AND IN THE OOS AND RCO LOG.**	_____ SAT
	EVALUATOR' NOTE: ELECTRONIC OOS LOG IS NOT AVAILABLE ON THE SIMULATOR	_____ UNSAT
COMMENTS:		
STEP 7:	Notify the I&C Department as soon as practical.	
STANDARD:	The I&C Department is notified of the problem as soon as practical.	_____ SAT
	***EXAMINER'S CUE: ACKNOWLEDGE NOTIFICATION OF I&C DEPARTMENT.**	
COMMENTS:		_____ UNSAT

STEP 8: If power level is >75%, Then notify Reactor Engineering to determine Azimuthal Tilt once per 12 hours using the incore detectors. STANDARD: Reactor Engineering has been notified to determine Azimuthal Power Tilt once per 12 hours using the incore detectors. ***EXAMINER'S CUE: ACKNOWLEDGE NOTIFICATION OF REACTOR ENGINEERING.** **EXAMINER'S NOTE: FOR RO: END OF TASK** COMMENTS:	_____ SAT _____ UNSAT
SRO EVALUATE ONLY STEP 9: Refer to Technical Specifications, Table 3.3-1 and Section 3.2.4 to ensure compliance with all applicable actions. STANDARD: Referring to Technical Specification Table 3.3-1 and Section 3.2.4, ANPS is notified to ensure compliance with all applicable actions. ***EXAMINER'S CUE: ACKNOWLEDGE REFERENCE TO TECHNICAL SPECIFICATIONS.** **ACTION 2# - a.** **With the number of channels OPERABLE one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may continue provided the inoperable channel is placed in the bypassed or tripped condition within 1 hour. If the inoperable channel is bypassed, the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6m. The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN.** COMMENTS: **SRO - END OF TASK**	_____ SAT _____ UNSAT

STOP TIME: _____

Simulator Steup

1. **RESTORE** IC set for 100% power, MOL. **UNFREEZE** the Simulator.
2. Set **CONFIGURE** to JPM and **START** the lesson for 0821131.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

The plant is operating at 100% power, steady state conditions..

Initiating Cues:

The following annunciators are in alarm condition:

A. L-9 Reactor Pwr. Lvl. Hi Chnl Trip
B. L-17 Reactor Pwr. Lvl. Hi Channel Pre-Trip
C. L-22 Local Power Density Chnl. Trip
D. L-30 Local Power Density Chnl. Pre-Trip
E. L-34 Nuc/ΔT Deviation
F. L-36 TM/LP Chnl. Trip
G. L-44 TM/LP Chnl. Pre-Trip
H. H-1 TM/LP Chnl. A Setpoint High/Low

Perform actions as required in response to the listed annunciators.

FPL

ST. LUCIE UNIT 2

OFF-NORMAL OPERATING PROCEDURE

SAFETY RELATED

Procedure No.
2-ONP-99.01
Current Revision No.
16A
Effective Date
06/24/04

Title:

LOSS OF TECH SPEC INSTRUMENTATION

Responsible Department: **OPERATIONS**

REVISION SUMMARY:

Revision 16A - Incorporated PCR 04-1889 to change designation of RTGB-206. (David Pottorff, 06/03/04)

Revision 16 - Incorporated PCR 03-3134 for MA 03-10-077 and PLA 132 to revise A.F.A.S. criteria per new Tech Spec license amendment. (M.B. Gilmore, 10/30/03)

Revision 15A - Incorporated PCR 03-2417 to add comma and delete a word in note. (Clyde Price, 08/25/03)

Revision 15 - Incorporated PCR 03-1648 to add step to ensure tech spec compliance. (Clyde Price, 07/12/03)

Revision 14 - Incorporated TC 03-063 to remove requirement of bypassing high sur bistable with TSA in place. (T. Bolander, 06/20/03)

Revision 13 - Added step to ensure deviation entry is made for power ratio calculator switch positions. (R. Brown, 11/26/02)

Revision 12 – Added detailed guidance for jumpering (tripping) undervoltage relays. (J. R. Martin, 09/06/02)

Revision 11 – Removed reference to the RMSS and moved RPS specific instrumentation from Section 4.3 to Section 4.4. (Adam Scales, 12/07/00)

Revision	FRG Review Date	Approved By	Approval Date
0	03/07/97	J. Scarola Plant General Manager	03/10/97
16A	10/30/03	G. L. Johnston Plant General Manager	10/30/03
		N/A Designated Approver	
		W. L. Parks Designated Approver (Minor Correction)	06/03/04

S_2_OPS	
DATE	
DOCT	PROCEDURE
DOCN	2-ONP-99.01
SYS	
COM	COMPLETED
ITM	16A

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To provide direction, in conjunction with the referenced Technical Specifications, for RPS, ESFAS and AFAS safety channel bypass or trip in the event of an instrument failure.

2.0 ENTRY CONDITIONS

2.1 Wide Range Nuclear Instrumentation:

1. Alarms

- Annunciator L-33, Start-up Rate High Channel Pre Trip
- Annunciator L-25, Start-up Rate High Channel Trip
- Annunciator L-40, NI Channel Inoperative

2. Significant disagreement between channels located on the local drawer meters or on RTGB 204.

No easy way to determine voltage indication without I&C Department. "New Style" NI drawers have no direct read meters like the control and start-up NIs.

3. NI drawer Log Trouble light ON.

2.2 Linear Range Nuclear Instrumentation:

1. Alarms

- Annunciator K-14, RRS Selected Inoperative
- Annunciator L-9, Reactor Power High Channel Trip
- Annunciator L-17, Reactor Power High Channel Pre Trip
- Annunciator L-22, Local Power Density Channel Trip
- Annunciator L-30, Local Power Density Channel Pre Trip
- Annunciator L-34, Nuclear / ΔT Power Channel Deviation
- Annunciator L-36, TM / LP Channel Trip
- Annunciator L-40, NI Channel Inoperative
- Annunciator L-43, Reactor Power Ratio Deviation
- Annunciator L-44, TM/LP Channel Pre Trip

2. Significant disagreement between channels indicated on the local drawer meters or on RTGB-204.

3. LR NI Drawer loss of power to the drawer. No easy way to tell if detector has high voltage (or low voltage) without I&C.

4. LR NI drawer LINEAR trouble light lit.

2.3 ESFAS channels

1. Automatic Test Insertion (ATI) fault

2. Failed indication occurring on **ANY** of the following vital instrumentation channels:

- Reactor Coolant Flow
- Pressurizer Level
- Pressurizer Pressure
- RCS T_{cold} Instrument
- RCS T_{hot} Instrument
- Containment Pressure
- Containment Radiation
- Component Cooling Water to RCP Seals
- Turbine EH Fluid Pressure
- Steam Generator Level
- Steam Generator Pressure
- Feedwater Header Pressure
- 4160 / 480V AC Vital Bus Undervoltage
- 4160 / 480V AC Vital Bus Degraded Voltage

3. Any failed or failing indication causing an alarm whose annunciator summary actions direct the user to this procedure.

3.0 EXIT CONDITIONS

3.1 **ALL** of the following conditions occur:

- Applicable Tech Spec LCO action requirements complied with.
- Affected / malfunctioning channel properly bypassed or tripped as applicable to instructions.
- No unexplained alarms or abnormal conditions exist outside of initiating malfunction.

4.0 OPERATOR ACTIONS

4.1 Diagnostic

INSTRUCTIONS	CONTINGENCY ACTIONS
1. If a process measurement channel malfunction / failure occurs, Then COMPARE all redundant meter indication channels to determine the validity of the alarm/indication.	**1.1** If redundant instrumentation shows actuation logic is COMPLETE and actuation has NOT occurred, Then PERFORM the following: **A.** MANUALLY TRIP the Reactor. **B.** MANUALLY TRIP the Turbine. **C.** **GO TO 2-EOP-01**, Standard Post Trip Actions.

END OF SECTION 4.1

4.2 Nuclear Instrumentation Malfunction

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE

If reactor power is between 10^{-4}% and 15% power and 2 or more channels indicate greater than 1.3 DPM startup rate, a CWP is initiated and when greater than 2.49 DPM a reactor trip will occur.

1. If a wide range NI channel has failed, Then PERFORM the following:

A. PLACE the failed channel high rate trip unit bistable in the bypass or tripped condition.

B. ENSURE compliance with all applicable actions in Technical Specifications on all affected channels.

C. NOTIFY I&C Department as soon as practical.

2. If a Linear Range NI malfunction of a Control Channel (RRS 9 or 10) has been determined, Then PERFORM the following:

A. ENSURE operable RRS is selected.

B. PLACE the failed channel toggle switch (channel 9 or 10) in the OUT position (At the rear of RPS cabinet D, Power Ratio Calculator).

C. ENSURE a deviation entry is made in accordance with 2-0010123, Administrative Control of Valves, Locks and Switches.

D. VERIFY annunciator L-43, Reactor Pwr. Ratio Calculator Deviation, clears.

E. NOTIFY the I&C Department as soon as practical.

4.2 Nuclear Instrumentation Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE

The linear range power drawer provides trip signals to the Variable High Power, Local Power Density (LPD), and Thermal Margin / Low Pressure (TM / LP) bistables and automatic bypasses for the High Startup Rate (HI RATE) and Loss of Load (LOSS LOAD) trip functions. Additionally, a CEA Withdrawal Prohibit (CWP) is initiated by two out of four pretrips on these trip bistables.

3. If a malfunction of a Linear Range Safety Channel (RPS A, B, C, or D) has occurred, Then PERFORM the following:

A. PLACE the failed channel Variable High Power, TM / LP, and LPD Trip unit bistables in Bypass or Trip.

B. If power level is greater than or equal to 15%, Then PLACE the affected channel LOSS LOAD trip bistable in Bypass or Trip.

C. If power level is at or between 10^{-4}% and 15%, Then PLACE the HI RATE bistable in Bypass or Trip unless the linear range safety channel input into the HI RATE bistable has been removed under the TSA process.

D. DECLARE the failed channel out of service.

E. NOTIFY the I&C Department as soon as practical.

F. If power level is greater than or equal to 75%, Then NOTIFY Reactor Engineering to determine Azimuthal Tilt once 12 hours using the Incore Detectors.

4.2 Nuclear Instrumentation Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
3. (continued) **G.** REFER to Technical Specifications, Table 3.3-1 and Section 3.2.4 to ensure compliance with all applicable actions.	

END OF SECTION 4.2

4.3 ESFAS Channel Malfunction

INSTRUCTIONS	CONTINGENCY ACTIONS
1. If the failed instrumentation is NOT required in the current plant mode, Then DO NOT CHANGE mode and PERFORM the following:	
A. BYPASS or TRIP the affected channel(s).	
B. REFER to the applicable Tech Spec for requirements on the affected channel(s).	
C. DO NOT ENTER the mode specified in Tech Specs until all requirements for the affected channel(s) have been met.	
D. INITIATE NPWOs for the faulty instrument channel(s) and NOTIFY the Maintenance Supervisor.	

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE

If a channel is placed in TRIP or BYPASS, the following log entries may be necessary:

- Key Log entry (if a Bypass key is removed from a cabinet)
- Deviation in AP 2-0010123 Data Sheets
- Equipment OOS for affected protection channel

2. VERIFY normal operation of the following instrumentation:

2.

CAUTION

Operation may continue for up to 48 hours with one 4160 / 480V AC Safety Related Under-voltage Relay failed, or operation may continue if EM places the failed relay in TRIP and the minimum channels operable requirement of Tech Spec 3.3.2, Table 3.3-3, is verified within one hour.

NOTE

4160 / 480V AC Safety Related Bus Under-voltage relays are covered by Tech Spec 3.3.2, Table 3.3-3.

A. 4160 / 480V AC Safety Related Bus Under-voltage relays are NORMAL:

- 4160V Bus 2A3
- 4160V Bus 2B3
- 480V Bus 2A2
- 480V Bus 2B2

A.1 CONTACT the EM Supervisor to have EM PERFORM **ONE** of the following:

1. BEGIN repairs on the failed Under-voltage relay, to be completed within 48 hours.
2. ¶2 PLACE the affected Under-voltage relay in TRIP and VERIFY minimum channels operable within 1 hour. REFER to Appendix B, Undervoltage Relay Trip.

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

CAUTION

The ESFAS keyswitch and bistable trip unit to which it applies do NOT, in some instances, directly line up. It is necessary to verify the labels of the bypass key, key switch, and actuation trip unit being placed in Bypass to ensure that the correct trip unit is bypassed.

NOTE

- RWT level indications are covered by Tech Spec 3.3.2, Table 3.3.-3.
- ESFAS cabinet door key, key 114, is required for bypassing ESFAS.

B. Refueling Water tank Level instrumentation indication LIS-07-2A / B / C / D.	**B.1** PERFORM **ONE** of the following: **1.** BYPASS the affected RAS channel using key 131. **2.** PLACE the affected ESFAS trips units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE

- Tech Spec action requirements for an inoperable channel process measurement circuit include the placing of all associated functional units (that is, trip units that also receive an input from the affected instrument), in BYPASS or TRIP, as applicable, within one hour of declaring the inoperable channel inoperable.
- PZR pressure indicators are covered by Tech Spec 3.3.1, Table 3.3-1 for RPS and Tech Spec 3.3.2, Table 3.3-3 for ESFAS.
- ESFAS cabinet door key, key 114, is required for bypassing ESFAS.
- ATWS is NOT an RPS or ESFAS trip unit, placing ATWS in TRIP is NOT required.

C. Pressurizer pressure instrumentation indication PI-1102A/B/C/D.

C.1 PERFORM **ONE** of the following:

1. BYPASS the following channels affected by the failed Pressurizer pressure instrument:

- Hi Pzr Press RPS trip unit (key 106)
- TM/Lo Press RPS trip unit (key 107)
- Pzr Press SIAS (key 132)
- Pzr Press ATWS (key 157)

OR

2. PLACE the affected RPS and ESFAS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE

- Containment radiation monitors are covered by Tech Spec 3.3.2, Table 3.3-3.
- ESFAS cabinet door key, key 114, is required for bypassing ESFAS.

D. Containment radiation instrumentation indication: • RIS-26-3-2 (MA) • RIS-26-4-2 (MB) • RIS-26-5-2 (MC) • RIS-26-6-2 (MD)	**D.1** PERFORM **ONE** of the following: **1.** BYPASS the CIS channel affected by the failed radiation monitor using key 130. OR **2.** PLACE the affected ESFAS trip unit in TRIP in accordance with Appendix A, Placing Trip Units in Trip

/R16A

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE

- Containment pressure monitors are covered by Tech Spec 3.3.1, Table 3.3-1 for RPS and Tech Spec 3.3.2, Table 3.3-3 for ESFAS.
- ESFAS cabinet door key, key 114, is required for bypassing ESFAS.
- Containment Pressure SIAS and MSIS share the same bistable and isolation modules.

E. Containment Pressure instrumentation indication PIS-07-2A/B/C/D.

E.1 PERFORM **ONE** of the following:

1. BYPASS the following channels affected by the failed Containment Pressure instrument:

- Hi Cntmt Press RPS trip unit (key 109)
- Cont Press SIAS (key 127)
- Cntmt Press CIS (key 129)
- Cntmt Press CSAS (key 128)

OR

2. PLACE the affected RPS and ESFAS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE

- Feedwater Header Pressure instrumentation indicators are covered by Tech Spec 3.3.2, Table 3.3-3 for ESFAS.
- ESFAS cabinet door key, key 114, is required for bypassing ESFAS.

F. ¶1 Feedwater Header Pressure instrumentation indication:

- PI-09-9A/B/C/D
- PI-09-10A/B/C/D

F.1 PERFORM **ONE** of the following:

1. BYPASS the following channels affected by the failed Feedwater Header Pressure instrument:

- AFAS-1 and AFAS-2 AFAS cabinet door key 202

  chan A – key 203

  chan B – key 204

  chan C – key 205

  chan D – key 206

OR

CAUTION

¶1 An AFAS channel in the TRIPPED condition is limited to 48 hours in accordance with OPS-503, Technical Specification Guidance.

NOTE

Tech Spec action requirements for an inoperable channel process measurement circuit include the placing of all associated functional units (that is, trip units that also receive an input form the affected instrument), in BYPASS or TRIP, as applicable, within one hour of declaring the inoperable channel inoperable.

2. PLACE the affected RPS and ESFAS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

/KT.6

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE

- S/G pressure indicators are covered by Tech Spec 3.3.1, Table 3.3-1 for RPS and Tech Spec 3.3.2, Table 3.3-3 for ESFAS.
- ESFAS cabinet door key, key 114, is required for bypassing ESFAS.

G. Steam Generator Pressure instrumentation indication:

- PI-8013A/B/C/D
- PI-8023A/B/C/D

G.1. PERFORM **ONE** of the following:

1. BYPASS the following channels affected by the failed S/G pressure instrument:

- Lo Press S/G trip unit (key 105)
- TM/Lo Press RPS trip unit (key 107)
- AFAS-1 and AFAS-2
- AFAS cabinet door key 202
  chan A – key 203
  chan B – key 204
  chan C – key 205
  chan D – key 206
- If SG-2A, Then 2A S/G Press MSIS (key 134)
- If SG-2B, Then 2B S/G Press MSIS (key 136)

OR

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
	2. **G.1** (continued)

CAUTION

¶1 An AFAS channel in the TRIPPED condition is limited to 48 hours in accordance with OPS-503, Technical Specification Guidance.

NOTE

- ¶1 It is preferable to leave the AFAS trip units in BYPASS if it is necessary to place the RPS and ESFAS trip units in TRIP.
- Tech Spec action requirements for an inoperable channel process measurement circuit include the placing of all associated functional units (that is, trip units that also receive an input form the affected instrument), in BYPASS or TRIP, as applicable, within one hour of declaring the inoperable channel inoperable.

2. PLACE the affected RPS, AFAS and ESFAS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

/K16

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE

- S/G level indicators are covered by Tech Spec 3.3.1, Table 3.3-1 for RPS and Tech Spec 3.3.2, Table 3.3-3 for ESFAS.
- ESFAS cabinet door key, key 114, is required for bypassing ESFAS.

H. Steam Generator Level instrumentation indication:

- LIC-9013A/B/C/D
- LIC-9023A/B/C/D

H.1 PERFORM **ONE** of the following:

1. BYPASS the following channels affected by the failed instrument:

- Lo Lvl SG RPS trip unit (key 104)
- If SG-2A, Then AFAS-1
- If SG-2B, Then AFAS-2
  AFAS cabinet door key 202
  chan A – key 203
  chan B – key 204
  chan C – key 205
  chan D – key 206
- Place the affected channel steam generator Hi Lvl Override Keyswitch to Override.
  chan A – key 15
  chan B – key 16
  chan C – key 17
  chan D – key 18

OR

4.3 ESFAS Channel Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
	2. **H.1** (continued)

CAUTION

¶1 An AFAS channel in the TRIPPED condition is limited to 48 hours in accordance with OPS-503, Technical Specification Guidance.

NOTE

¶1 It is preferable to leave the AFAS trip units in BYPASS if it is necessary to place the RPS and ESFAS trip units in TRIP.

2. PLACE the affected RPS and AFAS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip and place the affected channel steam generator Hi Level Override Keyswitch to override.
chan A – key 15
chan B – key 16
chan C – key 17
chan D – key 18

END OF SECTION 4.3

/K16

4.4 RPS Specific Instrumentation Malfunction

INSTRUCTIONS	CONTINGENCY ACTIONS
1. If the failed instrumentation is NOT required in the current plant mode, Then DO NOT CHANGE mode and PERFORM the following:	
A. BYPASS or TRIP the affected channel(s).	
B. REFER to the applicable Tech Spec for requirements on the affected channel(s).	
C. Do NOT enter the mode specified in Tech Specs until all requirements for the affected channel(s) have been met.	
D. INITIATE NPWOs for the faulty instrument channel(s) and NOTIFY the Maintenance Supervisor.	

4.4 RPS Specific Instrumentation Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE

If a channel is placed in TRIP or BYPASS, the following log entries may be necessary:

- Key log (if bypass key is removed from cabinet)
- Deviation in AP 2-0010123 Data Sheets
- Equipment OOS for affected protection channel

2. VERIFY normal operation of the following instrumentation:

NOTE

RCS T_{cold} indicators are covered by Tech Spec 3.3.1, Table 3.3-1.

A. RCS T_{cold} instrumentation indication TI-2201A/B/C/D.

A.1 PERFORM **ONE** of the following:

1. BYPASS the following channels affected by the failed T_{cold} instrument:

- Hi Pwr RPS trip unit (key 101)
- TM/Lo Press RPS trip unit (key 107)
- Loc Pwr Den RPS trip unit (key 110)

OR

2. PLACE the affected RPS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

4.4 RPS Specific Instrumentation Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE
RCS T_{hot} indicators are covered by Tech Spec 3.3.1, Table 3.3-1.

B. RCS T_{hot} instrumentation indication TI-1102A/B/C/D.	**B.1** PERFORM **ONE** of the following: **1.** BYPASS the following channels affected by the failed T_{hot} instrument: • Hi Pwr RPS trip unit (key 101) • TM/Lo Press RPS trip unit (key 107) • Loc Pwr Den RPS trip unit (key 110) OR **2.** PLACE the affected RPS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

NOTE
Turbine EH fluid pressure indicators are covered by Tech Spec 3.3.1, Table 3.3-1.

C. Turbine EH fluid pressure.	**C.1** PERFORM **ONE** of the following: **1.** BYPASS the affected Loss Load RPS channel using key 108. OR **2.** PLACE the affected RPS trip unit in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

4.4 RPS Specific Instrumentation Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)

NOTE

- TM/LP setpoint is generated by the RPS Core Protection Calculator, based on various inputs (e.g., RCS Cold Leg Temperature, Axial Shape Index, Q-Power and Flow Dependent Setpoint Selector Switch position on RPS Calibration and Instrumentation Panel). However, the setpoint should never fall below the Tech Spec minimum value of 1900 psia.
- TM/LP setpoint defaults to 2500 psia when Asymmetric Steam Generator Pressure is detected.
- TM/LP Setpoint may be read directly from the RPS channel by adding 1500 psia to the RPS Calibration and Instrumentation Panel DVM reading when the meter input is selected to "P TRIP".

D. TM/LP Setpoint PIA-1102A/B/C/D	**D.1** If TM/LP setpoint failure is caused by any of the following input signal failures, Then PERFORM instructions in this procedure for the specific instrument that has failed: • RCS T_{HOT} • RCS T_{COLD} • Linear Range Safety Channel (ASI and/or Q Power) • Steam Generator Pressure (Asymmetric S/G Pressure)

4.4 RPS Specific Instrumentation Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)
	D.2 If TM/LP setpoint failure is caused by the TM/LP Setpoint Generator (i.e., all input signals are normal), Then PERFORM **ONE** of the following: **1.** BYPASS the affected TM/Lo Press RPS trip unit using key 107. OR **2.** PLACE the affected TM/LP RPS trip unit in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

NOTE
RCS flow indicators are covered by Tech Spec 3.3.1, Table 3.3-1.

E. RCS flow instrumentation indication PDI-1101A/B/C/D.	**E.1** PERFORM **ONE** of the following: **1.** BYPASS the affected RPS channel using key 103. **2.** PLACE the affected RPS trip units in TRIP in accordance with Appendix A, Placing Trip Units in Trip.

4.4 RPS Specific Instrumentation Malfunction (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	**2.** (continued)
NOTE CCW flow to RCP seals indicators are covered by Tech Spec 3.3.1, Table 3.3-1.	
F. CCW flow to RCP seals instrumentation indication FIS-14-15A/B/C/D.	**F.1** PERFORM **ONE** of the following: **1.** BYPASS the affected RPS trip unit using key 111 OR **2.** PLACE the affected RPS trip unit in TRIP in accordance with Appendix A, Placing Trip Units in Trip.
3. INITIATE NPWOs for failed instrument channel(s) and NOTIFY the applicable Maintenance Supervisor.	
4. ENSURE proper log entries have been completed (i.e., deviation, equipment OOS, etc.).	
5. NOTIFY Operations Supervisor of channel failure.	

END OF SECTION 4.4

5.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, License Renewal, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on an attachment.

5.1 Technical Specifications

- Section 3.3.1
- Section 3.3.2

5.2 Updated Final Safety Analysis Report (UFSAR)

- Section 7.2, Reactor Protective System
- Section 7.3, Engineered Safety Features Systems

5.3 Management Directives and Regulatory Commitments

- $¶_1$ CR 97-1772, AFAS Channel Tripped Condition
- $¶_2$ PMAI #PM02-04-023 and 024, OOS Determinations

5.4 Procedures

- AP 2-0010123, Administrative Control of Valves, Locks and Switches
- OPS-503, Technical Specification Guidance
- 2-EOP-01, Standard Post Trip Actions
- 2-IMP-09.09, Auxiliary Feedwater Actuation System Place Channel in Trip Condition

/R16

5.5 Miscellaneous Documents

- 2998-G-078, Sh. 109 & 110, Reactor Coolant System
- 2998-G-079, Sh. 1, Main Steam
- 2998-G-088, Sh. 1 & 2, Containment Spray and Refueling Water Systems

6.0 RECORDS REQUIRED

6.1 RCO Chronological Log entries.

APPENDIX A
PLACING TRIP UNITS IN TRIP
(Page 1 of 1)

NOTE
The trip units should only be pulled out of the panel far enough to ensure they are disconnected but NOT far enough to be removed from the panel.

1. If placing an RPS trip unit in TRIP, Then PERFORM the following:
   - **A.** LOOSEN the upper and lower bistable trip unit hold down screws.
   - **B.** Slowly PULL the trip unit out until it begins to slide freely.
2. If placing an ESFAS isolation module in TRIP, Then PERFORM the following:
   - **A.** LOOSEN the upper and lower isolation module hold down screws.
   - **B.** Slowly PULL the module out until it begins to slide freely.

NOTE
AFAS isolation modules are placed in TRIP by I&C Department in accordance with 2-IMP-09.09, Auxiliary Feedwater Actuation System Place Channel in Trip Condition.

3. If required to place an AFAS isolation module in TRIP, Then CONTACT I&C Department.

END OF APPENDIX A

APPENDIX B
UNDERVOLTAGE RELAY TRIP
(Page 1 of 7)

CAUTION

Prior to placing jumper(s) on failed relay, verify that no other undervoltage relays are in the tripped condition (i.e. no u/v relay targets or pickup LEDs are on).

NOTE

Only the failed relay should be jumpered. Relays NOT placed in trip should be N/A.

1. If a 4160V Switchgear 2A3 Undervoltage Relay has failed, Then TRIP the failed relay by jumpering as directed in the following table(s):

PSB-1 RELAYS ON 4.16kV BUS CUBICLE 2A3-11
4160 VOLT EMERGENCY BUS 2A3 UNDERVOLTAGE RELAYS
(LOSS OF VOLTAGE)

FAILED RELAY	JUMPER		JUMPER LOCATION	PERF INITIAL	IV INITIAL
	FROM	TO			
27-1/954	11	12	BACK OF RELAY (CWD 949)		
27-2/954	11	12	BACK OF RELAY (CWD 949)		

PSB-1 RELAY CABINET 2A
4160 VOLT EMERGENCY BUS 2A3 UNDERVOLTAGE RELAYS
(DEGRADED VOLTAGE)

FAILED RELAY	JUMPER		JUMPER LOCATION	PERF INITIAL	IV INITIAL
	FROM	TO			
27N-A/2A3/1831	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27N-B/2A3/1831	14	15	BACK OF RELAY (SEE CWD 1836)		
27N-C/2A3/1831	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27DX-2A3/1836	*	*	NONE (SEE CWD 1836)	_____	_____

* DO NOT JUMPER TERMINALS – REPAIR OR REPLACE RELAY / CIRCUIT

APPENDIX B
UNDERVOLTAGE RELAY TRIP
(Page 2 of 7)

CAUTION

Prior to placing jumper(s) on failed relay, verify that no other undervoltage relays are in the tripped condition (i.e. no u/v relay targets or pickup LEDs are on).

NOTE

Only the failed relay should be jumpered. Relays NOT placed in trip should be N/A.

2. If a 4160V Switchgear 2B3 Undervoltage Relay has failed, Then TRIP the failed relay by jumpering as directed in the following table(s):

PSB-1 RELAYS ON 4.16kV BUS CUBICLE 2B3-1
4160 VOLT EMERGENCY BUS 2B3 UNDERVOLTAGE RELAYS
(LOSS OF VOLTAGE)

FAILED RELAY	JUMPER		JUMPER LOCATION	PERF INITIAL	IV INITIAL
	FROM	TO			
27-1/964	11	12	BACK OF RELAY (CWD 950)		
27-2/964	11	12	BACK OF RELAY (CWD 950)		

PSB-1 RELAY CABINET 2B
4160 VOLT EMERGENCY BUS 2B3 UNDERVOLTAGE RELAYS
(DEGRADED VOLTAGE)

FAILED RELAY	JUMPER		JUMPER LOCATION	PERF INITIAL	IV INITIAL
	FROM	TO			
27N-A/2B3/1831	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27N-B/2B3/1831	14	15	BACK OF RELAY (SEE CWD 1837)		
27N-C/2B3/1831	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27DX-2B3/1837	*	*	NONE (SEE CWD 1837)	------	------

* DO NOT JUMPER TERMINALS – REPAIR OR REPLACE RELAY / CIRCUIT

APPENDIX B
UNDERVOLTAGE RELAY TRIP
(Page 3 of 7)

CAUTION

Prior to placing jumper(s) on failed relay, verify that no other undervoltage relays are in the tripped condition (i.e. no u/v relay targets or pickup LEDs are on).

NOTE

- Only the failed relay should be jumpered. Relays NOT placed in trip should be N/A.
- 27N Relays are for Degraded Voltage Protection.
- 27I Relays are for Loss of Voltage Protection.

3. If a 480V Load Center 2A2 Undervoltage Relay has failed, Then TRIP the failed Relay by jumpering as directed in the following table:

PSB-1 RELAY CABINET 2A
480 VOLT EMERGENCY BUS 2A2 UNDERVOLTAGE RELAYS

FAILED RELAY	JUMPER FROM	JUMPER TO	JUMPER LOCATION	PERF INITIAL	IV INITIAL
27N-A/2A2/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27N-B/2A2/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27N-C/2A2/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27I-A/2A2/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27I-B/2A2/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27I-C/2A2/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27NX/2A2/1836	*	*	NONE (SEE CWD 1836)	———	———
27IX/2A2/1836	*	*	NONE (SEE CWD 1836)	———	———

* DO NOT JUMPER TERMINALS -- REPAIR OR REPLACE RELAY / CIRCUIT

APPENDIX B
UNDERVOLTAGE RELAY TRIP
(Page 4 of 7)

CAUTION

Prior to placing jumper(s) on failed relay, verify that no other undervoltage relays are in the tripped condition (i.e. no u/v relay targets or pickup LEDs are on).

NOTE

- Only the failed relay should be jumpered. Relays NOT placed in trip should be N/A.
- 27N Relays are for Degraded Voltage Protection.
- 27I Relays are for Loss of Voltage Protection.

4. If a 480V Load Center 2A5 Undervoltage Relay has failed, Then TRIP the failed Relay by jumpering as directed in the following table:

PSB-1 RELAY CABINET 2A
480 VOLT EMERGENCY BUS 2A5 UNDERVOLTAGE RELAYS

FAILED RELAY	JUMPER FROM	JUMPER TO	JUMPER LOCATION	PERF INITIAL	IV INITIAL
27N-A/2A5/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27N-B/2A5/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27N-C/2A5/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27I-A/2A5/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27I-B/2A5/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27I-C/2A5/1833	14	15	BACK OF RELAY (SEE CWD 1836)		
	11	12			
27NX/2A5/1836	*	*	NONE (SEE CWD 1836)	-----	-----
27IX/2A5/1836	*	*	NONE (SEE CWD 1836)	-----	-----

* DO NOT JUMPER TERMINALS – REPAIR OR REPLACE RELAY / CIRCUIT

APPENDIX B
UNDERVOLTAGE RELAY TRIP
(Page 5 of 7)

CAUTION

Prior to placing jumper(s) on failed relay, verify that no other undervoltage relays are in the tripped condition (i.e. no u/v relay targets or pickup LEDs are on).

NOTE

- Only the failed relay should be jumpered. Relays NOT placed in trip should be N/A.
- 27N Relays are for Degraded Voltage Protection.
- 27I Relays are for Loss of Voltage Protection.

5. If a 480V Load Center 2B2 Undervoltage Relay has failed, Then TRIP the failed Relay by jumpering as directed in the following table:

PSB-1 RELAY CABINET 2B
480 VOLT EMERGENCY BUS 2B2 UNDERVOLTAGE RELAYS

FAILED RELAY	JUMPER FROM	JUMPER TO	JUMPER LOCATION	PERF INITIAL	IV INITIAL
27N-A/2B2/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27N-B/2B2/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27N-C/2B2/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27I-A/2B2/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27I-B/2B2/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27I-C/2B2/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27NX/2B2/1837	*	*	NONE (SEE CWD 1837)	-----	-----
27IX/2B2/1837	*	*	NONE (SEE CWD 1837)	-----	-----

* DO NOT JUMPER TERMINALS -- REPAIR OR REPLACE RELAY / CIRCUIT

APPENDIX B
UNDERVOLTAGE RELAY TRIP
(Page 6 of 7)

CAUTION

Prior to placing jumper(s) on failed relay, verify that no other undervoltage relays are in the tripped condition (i.e. no u/v relay targets or pickup LEDs are on).

NOTE

- Only the failed relay should be jumpered. Relays NOT placed in trip should be N/A.
- 27N Relays are for Degraded Voltage Protection.
- 27I Relays are for Loss of Voltage Protection.

6. If a 480V Load Center 2B5 Undervoltage Relay has failed, Then TRIP the failed Relay by jumpering as directed in the following table:

PSB-1 RELAY CABINET 2A
480 VOLT EMERGENCY BUS 2A2 UNDERVOLTAGE RELAYS

FAILED RELAY	JUMPER FROM	JUMPER TO	JUMPER LOCATION	PERF INITIAL	IV INITIAL
27N-A/2B5/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27N-B/2B5/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27N-C/2B5/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27I-A/2B5/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27I-B/2B5/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27I-C/2B5/1834	14	15	BACK OF RELAY (SEE CWD 1837)		
	11	12			
27NX/2B5/1837	*	*	NONE (SEE CWD 1837)	-----	-----
27IX/2B5/1837	*	*	NONE (SEE CWD 1837)	-----	-----

* DO NOT JUMPER TERMINALS – REPAIR OR REPLACE RELAY / CIRCUIT

APPENDIX B
UNDERVOLTAGE RELAY TRIP
(Page 7 of 7)

Satisfactory performance of the above steps assures
Conformance with the applicable Technical Specifications.

_____
US / SM

END OF APPENDIX B

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTIVE INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each reactor protective instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-1.

4.3.1.2 The logic for the bypasses shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceding 92 days. The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.

4.3.1.3 The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

TABLE 3.3-1

REACTOR PROTECTIVE INSTRUMENTATION

	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1.	Manual Reactor Trip	4 4	2 2	4 4	1, 2 3*, 4*, 5*	1 5
2.	Variable Power Level – High	4	2(a)(d)	3	1, 2	2#
3.	Pressurizer Pressure – High	4	2	3	1, 2	2#
4.	Thermal Margin/Low Pressure	4	2(a)(d)	3	1, 2	2#
5.	Containment Pressure – High	4	2	3	1, 2	2#
6.	Steam Generator Pressure – Low	4/SG	2/SG(b)	3/SG	1, 2	2#
7.	Steam Generator Pressure Difference – High	4	2(a)(d)	3	1, 2	2#
8.	Steam Generator Level – Low	4/SG	2/SG	3/SG	1, 2	2#
9.	Local Power Density – High	4	2(c)(d)	3	1	2#
10.	Loss of Component Cooling Water to Reactor Coolant Pumps	4	2	3	1, 2	2#
11.	Reactor Protection System Logic	4	2	3	1, 2 3*, 4*, 5*	2# 5
12.	Reactor Trip Breakers	4	2(f)	4	1, 2 3*, 4*, 5*	4 5
13.	Wide Range Logarithmic Neutron Flux Monitor					
	a. Startup and Operating – Rate of Change of Power – High	4	2(e)(g)	3	1, 2	2#
	b. Shutdown	4	0	2	3, 4, 5	3
14.	Reactor Coolant Flow – Low	4/SG	2/SG(a)(d)	3/SG	1, 2	2#
15.	Loss of Load (Turbine Hydraulic Fluid Pressure – Low)	4	2(c)	3	1	2#

TABLE 3.3-1 (Continued)

TABLE NOTATION

* With the protective system trip breakers in the closed position, the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.

The provisions of Specification 3.0.4 are not applicable.

(a) Trip may be manually bypassed below 0.5% of RATED THERMAL POWER in conjunction with (d) below; bypass shall be automatically removed when Wide Range Logarithmic Neutron Flux power is greater than or equal to 0.5% of RATED THERMAL POWER.

(b) Trip may be manually bypassed below 705 psig; bypass shall be automatically removed at or above 705 psig.

(c) Trip may be bypassed below 15% of RATED THERMAL POWER; bypass shall be automatically removed when Power Range Neutron Flux power is greater than or equal to 15% of RATED THERMAL POWER.

(d) Trip may be bypassed during testing pursuant to Special Test Exception 3.10.3.

(e) Trip may be bypassed below 10^{-4}% and above 15% of RATED THERMAL POWER; bypass shall be automatically removed when Wide Range Logarithmic Neutron Flux power is $\geq 10^{-4}$% and Power Range Neutron Flux power $\leq$ 15% of RATED THERMAL POWER.

(f) Each channel shall be comprised of two trip breakers; actual trip logic shall be one-out-of-two taken twice.

(g) There shall be at least two decades of overlap between the Wide Range Logarithmic Neutron Flux Monitoring Channels and the Power Range Neutron Flux Monitoring Channels.

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and/or open the protective system trip breakers.

TABLE 3.3-1 (Continued)

ACTION STATEMENTS

ACTION 2 - a. With the number of channels OPERABLE one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may continue provided the inoperable channel is placed in the bypassed or tripped condition within 1 hour. If the inoperable channel is bypassed, the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6m. The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN.

b. With the number of channels OPERABLE one less than the Minimum Channels OPERABLE, STARTUP and/or POWER OPERATION may continue provided the following conditions are satisfied:

1. Verify that one of the inoperable channels has been bypassed and place the other inoperable channel in the tripped condition within 1 hour.

2. All functional units affected by the bypassed/tripped channel shall also be placed in the bypassed/tripped condition.

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:

Process Measurement Circuit	Functional Unit Bypassed
1. Safety Channel – Nuclear Instrumentation	
Wide Range	Rate of Change of Power – High (RPS)
Linear Range	Variable Power Level – Hgh (RPS) Local Power Density – High (RPS) Thermal Margin/Low Pressure (RPS)
2. Pressurizer Pressure -	Pressurizer Pressure – High (RPS) Thermal Margin/Low Pressure (RPS) Pressurizer Pressure – Low (ESF)
3. Containment Pressure -	Containment Pressure – High (RPS) Containment Pressure – High (ESF)
4. Steam Generator Pressure -	Steam Generator Pressure – Low (RPS) Thermal Margin/Low Pressure (RPS) AFAS-1 and AFAS-2 (AFAS) Steam Generator Pressure – Low (ESF)
5. Steam Generator Level -	Steam Generator Level – Low (RPS) If SG-2A, then AFAS-1 (AFAS) If SG-2B, then AFAS-2 (AFAS)

TABLE 3.3-1 (Continued)

ACTION STATEMENTS

ACTION 2 - (Continued)

6. Cold Leg Temperature	Variable Power Level – High (RPS) Thermal Margin/Low Pressure (RPS) Local Power Density – High (RPS)
7. Hot Leg Temperature	Variable Power Level – High (RPS) Thermal Margin /Low Pressure (RPS) Local Power Density – High (RPS)

ACTION 3 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes*. Verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable, within 1 hour and at least once per 12 hours thereafter.

ACTION 4 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirements, STARTUP and/or POWER OPERATION may continue provided the reactor trip breakers of the inoperable channel are placed in the tripped condition within 1 hour, otherwise, be in at least HOT STANDBY within 6 hours; however, one channel may be bypassed for up to 1 hour, provided the trip breakers of any inoperable channel are in the tripped condition, for surveillance testing per Specification 4.3.1.1.

ACTION 5 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement restore the inoperable channel to OPERABLE status within 48 hours or open the reactor trip breakers within the next hour.

---

* Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SHUTDOWN MARGIN.

POWER DISTRIBUTION LIMITS

3/4.2.4 AZIMUTHAL POWER TILT – T_q

LIMITING CONDITION FOR OPERATION

3.2.4 The AZIMUTHAL POWER TILT (T_q) shall not exceed 0.03.

APPLICABILITY: MODE 1*.

ACTION:

a. With the indicated AZIMUTHAL POWER TILT determined to be > .030 but ≤ 0.10, either correct the power tilt within 2 hours or determine within the next 2 hours and at least once per subsequent 8 hours, that the TOTAL PLANAR RADIAL PEAKING FACTOR (F^T_{xy}) and the TOTAL INTEGRATED RADIAL PEAKING FACTOR (F^T_r) are within the limits of Specifications 3.2.2 and 3.2.3.

b. With the indicated AZIMUTHAL POWER TILT determined to be > 0.10, operation may proceed for up to 2 hours provided that the TOTAL INTEGRATED RADIAL PEAKING FACTOR (F^T_r) and TOTAL PLANAR RADIAL PEAKING FACTOR (F^T_{xy}) are within the limits of Specification 3.2.2 and 3.2.3. Subsequent operation for the purpose of measurement and to identify the cause of the tilt is allowable provided the THERMAL POWER level is restricted to ≤ 20% of the maximum allowable THERMAL POWER level for the existing Reactor Coolant Pump combination.

SURVEILLANCE REQUIREMENTS

4.2.4.1 The provisions of Specification 4.0.4 are not applicable.

4.2.4.2 The AZIMUTHAL POWER TILT shall be determined to be within the limit by:

a. Calculating the tilt at least once per 7 days.

b. Using the incore detectors to determine the AZIMUTHAL POWER TILT at least once per 12 hours when one excore channel is inoperable and THERMAL POWER is > 75% of RATED THERMAL POWER.

---

* See Special Test Exception 3.10.2.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.g

Respond to Alarms on Spent Fuel Monitors – Unit 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Respond to high radiation alarm on Spent Fuel Monitors – Unit 2

Alternate Path: **Yes** __X__ **No** _____

Facility JPM #: 0821117A

K/A Rating(s): AK2.02 3.4/3.9

Task Standard: Fuel Handling Building ventilation line-up has been verified including contingency actions in accordance with 2-ONP-26.02.

Preferred Evaluation Location:

Simulator __X__ Control Room _____ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References: 2-ONP-26.02 "Area Radiation Monitors"

Validation Time __10 minutes__ **Time Critical** __No__

Candidate: _____ Start Time _____
Name Finish Time _____

Performance Rating: Sat _____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

2-ONP-26.02 "Area Radiation Monitors"

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Directions to candidate for Simulator JPMs:

I will explain the initial conditions and state the task to be performed. All simulator JPM steps, including any communications, shall be performed for this JPM. You are to operate any plant equipment that is necessary for the completion of this JPM. The simulator will provide the cues as you perform this JPM. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

Unit 2 is in Mode 1, Refueling preparations are being made in the Fuel Handling Building with spent fuel movement in the spent fuel pool. Spent Fuel Pool Radiation Monitors, GAG007, GAG009, GAG011, and GAG012 are in High Alarm and GAG008 and GAG010 are in Alert Alarm. 2-ONP-26.02 is being implemented. The alarms have been verified valid. The spent fuel movement has been suspended, the FHB has been evacuated and Security has been notified to ensure all personnel have evacuated the FHB.

Initiating Cues:

You are the Desk RCO. The ANPS has directed you to perform step 4.2.2.D starting at step 1 of 2-ONP-26.02 "Area Radiation Monitors".

START TIME: _____

VERIFY the following fans are OFF:	
STEP 1: HVS-6, Fuel Pool Supply Fan STANDARD: **ENSURE** HVS-6 is **OFF** ***EXAMINER'S CUE:** **HVS-6 indicates Green lights ON, Red lights OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 2: HVS-7, Fuel Handling Bldg Supply Fan STANDARD: **ENSURE** HVS-7 is **OFF** ***EXAMINER'S CUE:** **HVS-7 indicates Green lights ON, Red lights OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 3: HVE-15, Fuel Handling Bldg Exhaust Fan STANDARD: **ENSURE** HVS-15 is **OFF** ***EXAMINER'S CUE:** **HVS-15 indicates Green lights ON, Red lights OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 4: HVE-16A, Fuel Pool Exhaust Fan STANDARD: **ENSURE** HVS-16A is **OFF** ***EXAMINER'S CUE:** **HVS-16A indicates Green lights ON, Red lights OFF** COMMENTS:	_____ SAT _____ UNSAT

STEP 5: HVE-16B, Fuel Pool Exhaust Fan STANDARD: **ENSURE** HVS-16B is **OFF** ***EXAMINER'S CUE: HVS-16B indicates Green lights ON, Red lights OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 6: HVE-17, Fuel Bldg Swgr Area Exhaust Fan (local indication only) STANDARD: **DIRECT** the SNPO to verify HVS-17 is **OFF** ***EXAMINER'S CUE: SNPO reports that HVS-17 is OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 7: VERIFY the following FHB dampers are CLOSED: • D-33, Fuel Hdlg Bldg Inlet Damper • D-35, Fuel Hdlg Bldg Outlet Damper • D-29, Fuel Pool Inlet Damper • D-31, Fuel Pool Outside Damper • D-34, Fuel Hdlg Bldg Inlet Damper • D-36, Fuel Hdlg Bldg Outlet Damper • D-30, Fuel Pool Inlet Damper • D-32, Fuel Pool Outlet Damper STANDARD: **VERIFY** Dampers D-29 through D-36 are **CLOSED** ***EXAMINER'S CUE: Dampers D-29 through D-36 indicate Green light ON, Red light OFF as each damper is verified.** COMMENTS:	_____ SAT _____ UNSAT

VERIFY the following components are aligned as indicated:	
STEP 8: FCV-25-30, Fuel Handling Emerg Vent Vlv, is OPEN. STANDARD: **OBSERVE** FCV-25-30 **CLOSED** ***EXAMINER'S CUE:** **FCV-25-30 indicates Green light ON, Red Light OFF** **EVALUATOR'S NOTE: Faulted Step FCV-25-30 failed to auto OPEN** COMMENTS:	_____ SAT _____ UNSAT
STEP 9: PERFORM the following on the HVCB: • OPEN FCV-25-30 at the HVAC panel STANDARD: **POSITION** FCV-25-30 control switch to **OPEN** ***EXAMINER'S CUE:** **FCV-25-30 indicates Green light OFF, Red Light ON. X-4 Alarms as delta-P lowers** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 10: FCV-25-32, SBVS Isolation Valve, is CLOSED. STANDARD: **OBSERVE** FCV-25-32 **OPEN** ***EXAMINER'S CUE:** **FCV-25-32 indicates Green light OFF, Red Light ON** **EVALUATOR'S NOTE: Faulted Step FCV-25-32 failed to auto CLOSE** COMMENTS:	_____ SAT _____ UNSAT

STEP 11: PERFORM the following on the HVCB: • CLOSE FCV-25-32 at the HVAC panel STANDARD: **POSITION** FCV-25-32 control switch to **CLOSED** ***EXAMINER'S CUE:** **FCV-25-32 indicates Green light ON, Red Light OFF V-20 Alarms** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 12: HVE-6A, SBVS Exhaust Fan, is ON. STANDARD: **ENSURE** HVE-6A is **ON** ***EXAMINER'S CUE:** **HVE-6A indicates Green light OFF, Red light ON** COMMENTS:	_____ SAT _____ UNSAT
STEP 13: FCV-25-31, Fuel Handling Emerg Vent Vlv., is OPEN. STANDARD: **OBSERVE** FCV-25-31 **CLOSED** ***EXAMINER'S CUE:** **FCV-25-31 indicates Green light ON, Red Light OFF** **EVALUATOR'S NOTE: Faulted Step FCV-25-31 failed to auto OPEN** COMMENTS:	_____ SAT _____ UNSAT
STEP 14: PERFORM the following on the HVCB: • OPEN FCV-25-31 at the HVAC panel STANDARD: **POSITION** FCV-25-31 control switch to **OPEN** ***EXAMINER'S CUE:** **FCV-25-31 indicates Green light OFF, Red Light ON.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 15: FCV-25-33, SBVS Isolation Valve, is CLOSED. STANDARD: **OBSERVE** FCV-25-33 **OPEN** ***EXAMINER'S CUE:** **FCV-25-33 indicates Green light OFF, Red Light ON** **EVALUATOR'S NOTE: Faulted Step FCV-25-33 failed to auto CLOSE** COMMENTS:	_____ SAT _____ UNSAT
STEP 16: PERFORM the following on the HVCB: • CLOSE FCV-25-33 at the HVAC panel STANDARD: **POSITION** FCV-25-33 control switch to **CLOSED** ***EXAMINER'S CUE:** **FCV-25-33 indicates Green light ON, Red Light OFF V-21 Alarms** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 17: HVE-6B, SBVS Exhaust Fan, is ON. STANDARD: **ENSURE** HVE-6B is **ON** ***EXAMINER'S CUE:** **HVE-6B indicates Green light OFF, Red light ON** COMMENTS:	_____ SAT _____ UNSAT

STEP (done):	NOTIFY the ANPS that the Fuel Handling Building ventilation line-up has been verified in accordance with 2-ONP-26.02 and FCV-25-30 and FCV-25-31 had to be manually opened, FCV-25-32 and FCV-25-33 had to be manually closed.	_____ SAT
STANDARD:	**NOTIFY** the ANPS that the Fuel Handling Building ventilation line-up has been **VERIFIED** and FCV-25-30 and FCV-25-31 had to be manually **OPENED** and FCV-25-32 and FCV-25-33 had to be manually **CLOSED**	_____ UNSAT
	EXAMINER'S CUE: ANPS ACKNOWLEDGES	
COMMENTS:		
	END OF TASK	

STOP TIME: _____

Simulator Setup

1. **RESTORE** IC-1.
2. **UNFREEZE** and run the simulator for a few minutes.
3. **FREEZE** the simulator.
4. Select **CONFIGURE** and change to JPM Configuration.
5. **SELECT** lesson 0821117A and **START** the lesson.
6. **UNFREEZE** and run the simulator.
7. **TRIGGER** step 1 for JPM 0821117A.
8. **ACKNOWLEDGE** the PC-11.
9. **MAKE** a **SNAPSHOT** if there is more than one Student.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

Unit 2 is in Mode 1, Refueling preparations are being made in the Fuel Handling Building with spent fuel movement in the spent fuel pool. Spent Fuel Pool Radiation Monitors, GAG007, GAG009, GAG011, and GAG012 are in High Alarm and GAG008 and GAG010 are in Alert Alarm. 2-ONP-26.02 is being implemented. The alarms have been verified valid. The spent fuel movement has been suspended, the FHB has been evacuated and Security has been notified to ensure all personnel have evacuated the FHB.

Initiating Cues:

You are the Desk RCO. The ANPS has directed you to perform step 4.2.2.D starting at step 1 of 2-ONP-26.02 "Area Radiation Monitors".

FPL

ST. LUCIE UNIT 2

OFF-NORMAL OPERATING PROCEDURE

SAFETY RELATED

Procedure No.
2-ONP-26.02

Current Revision No.
2

Effective Date
02/25/03

Title:

AREA RADIATION MONITORS

Responsible Department: **OPERATIONS**

REVISION SUMMARY:

Revision 2 – Incorporated PCR 02-2689 for CR 02-2367 to provide additional guidance on response to a containment evacuation alarm. (J.R. Martin, 02/02/03)

Revision 1 – Revised the procedure to reflect the proper actuation on both trains for the six Spent Fuel Pool Area Radiation Monitors. (Bill Scott, 10/28/99)

Revision 0 – *Previously issued as ONOP 2-1120030.* This procedure provides instructions for responding to alert, high radiation and failure alarms on the Area Radiation monitors. (Alvin Robertson, 05/11/99)

Revision	FRG Review Date	Approved By	Approval Date
0	05/11/99	R.G. West Plant General Manager	05/11/99
2	01/30/03	R.E. Rose Plant General Manager N/A Designated Approver	02/02/03

S__2_OPS	
DATE	
DOCT	PROCEDURE
DOCN	2-ONP-26.02
SYS	
COM	COMPLETED
ITM	2

TABLE OF CONTENTS

1.0 PURPOSE

1.1 Provide instructions for responding to alert, high radiation, containment evacuation, and failure alarms on the Area Radiation monitors. /R2

2.0 ENTRY CONDITIONS

2.1 An ALERT or HIGH alarm exists on at least one of the Area Radiation monitors.

2.2 A FAIL condition exists on at least one of the Area Radiation monitors.

2.3 Increasing radiation trends on any of the Area Radiation monitors.

2.4 Annunciator P-5, CNTMT RAD HIGH CIS CHANNEL TRIP, is alarmed.

2.5 Annunciator P-15, CNTMT RAD HIGH CIS CHANNEL PRE TRIP, is alarmed

2.6 Containment evacuation alarm has sounded. /R2

3.0 EXIT CONDITIONS

3.1 The affected monitor is inoperable and alarm is determined to be invalid.

3.2 The high activity alarm has cleared and the proper actions have been taken and / or appropriate procedures have been implemented to address the plant condition.

4.0 OPERATOR ACTIONS

4.1 Containment Isolation Radiation Monitors

INSTRUCTIONS **CONTINGENCY ACTIONS**

NOTE

If a containment evacuation alarm sounds with personnel inside containment, the Radiation Protection Manager or on-site designee must approve re-entry into the containment.

1. If a containment evacuation alarm has actuated and personnel are in the containment, Then:

   A. ANNOUNCE over the Gaitronics for all personnel to leave their work in a safe condition and evacuate the containment.

   B. NOTIFY HP to commence an evaluation of the containment radiological conditions.

   C. CONTACT Security to perform personnel accountability for the evacuation.

   D. ANNOUNCE over Gaitronics restoration of containment access when advised by Radiation Protection Manager that radiological conditions are safe for return to work.

4.1 Containment Isolation Radiation Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE

A Containment Isolation signal is generated when at least two of the following monitors exceed the HIGH alarm setpoint:
RC-26-3 / RC-26-4 / RC-26-5 / RC-26-6

2. DETERMINE alarm validity:

A. VERIFY PC-11 channel display for the affected channel is NOT blue (indicating system or equipment failure) or magenta (indicating PC-11 communications failure).

B. VERIFY PC-11 channel indication agrees with indication on the Control Room monitor for the affected channel (i.e., alert or high alarm):

- RC-26-3, CIS
- RC-26-4, CIS
- RC-26-5, CIS
- RC-26-6, CIS

C. VERIFY increased or increasing trend for the affected channel:

- RR-26-3, CIS
- RR-26-4, CIS
- RR-26-5, CIS
- RR-26-6, CIS

D. If only one CIS monitor is alarmed, Then CHECK the other CIS monitors for increasing radiation level trends.

2.1 If the alarm is NOT valid, Then **GO TO Appendix A,** Inoperable Monitor.

4.1 Containment Isolation Radiation Monitors (continued)

INSTRUCTIONS **CONTINGENCY ACTIONS**

NOTE
If a containment evacuation alarm sounds with personnel inside containment, the Radiation Protection Manager or on-site designee must approve re-entry into the containment.

3. If a valid alarm exists, Then PERFORM the following:

A. If at least one CIS monitor is in a HIGH alarm condition and a containment evacuation alarm has NOT sounded, Then PERFORM the following:

1. MANUALLY ACTUATE the Containment Evacuation alarm.

2. If personnel are in Containment, Then PERFORM the following:

a. ANNOUNCE over the Gaitronics for all personnel to leave their work in a safe condition and evacuate the containment.

b. NOTIFY HP to commence an evaluation of the containment radiological conditions.

c. CONTACT Security to perform personnel accountability for the evacuation.

4.1 Containment Isolation Radiation Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
3. A. 2. (continued)	
d. ANNOUNCE over Gaitronics restoration of containment access when advised by Radiation Protection Manager that radiological conditions are safe for return to work.	
B. If at least two CIS monitors are in a HIGH alarm condition, Then PERFORM the following:	
1. VERIFY CIAS is actuated.	**1.1** MANUALLY ACTUATE CIAS.
2. ADVISE Unit 1 of the CIAS actuation.	
C. NOTIFY Health Physics to perform applicable surveys.	
D. ATTEMPT to identify and isolate the source of increased activity.	
E. REFER TO EPIP-00, Discovery & Identification of an Emergency Condition (Including Chemical, Fire and Natural Emergencies).	
F. If excessive RCS leakage is indicated, Then **GO TO ONOP 2-0120031,** Excessive Reactor Coolant System Leakage.	
G. If alarm is due to fuel handling accident, Then **GO TO ONOP 2-1600030,** Accidents Involving New or Spent Fuel.	

END OF SECTION 4.1

/R2

4.2 Fuel Handling Building Radiation Monitors

INSTRUCTIONS

1. DETERMINE alarm validity:

A. VERIFY PC-11 channel display for the affected channel is NOT blue (indicating system or equipment failure) or magenta (indicating PC-11 communications failure)

B. VERIFY PC-11 channel indication agrees with indication on the Control Room monitor for the affected channel (i.e., alert or high alarm):

- RC-26-7, Spent Fuel
- RC-26-8, Spent Fuel
- RC-26-9, Spent Fuel
- RC-26-10, Spent Fuel
- RC-26-11, Spent Fuel
- RC-26-12, Spent Fuel

C. VERIFY increased or increasing trend for the affected channel:

- RR-26-7-9-11, Spent Fuel
- RR-26-8-10-12, Spent Fuel

D. If only one FHB monitor is alarmed, Then CHECK the other FHB monitors for increasing radiation levels.

2. If a valid alarm exists, Then PERFORM the following:

A. If fuel movement is in progress, Then SUSPEND fuel movement.

CONTINGENCY ACTIONS

1.1 If the alarm is NOT valid, Then **GO TO Appendix A,** Inoperable Monitor.

4.2 Fuel Handling Building Radiation Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS

2. (continued)

B. EVACUATE the fuel pool area and INSTRUCT personnel to remain on the landing outside the Fuel Handling Building door until monitored for contamination.

C. CONTACT Security to ensure all personnel have exited the FHB.

NOTE

There are a total 6 Spent Fuel Pool Area monitors divided into 2 groups. Two out of three HIGH alarms on either train will initiate all actions.

SA Train	SB Train
RC-26-7 (GAG-007)	RC-26-8 (GAG-008)
RC-26-9 (GAG-009)	RC-26-10 (GAG-010)
RC-26-11 (GAG-011)	RC-26-12 (GAG-012)

D. If **EITHER** of the following conditions exists:

- Two or more SA Train FHB monitors are in HIGH alarm condition
- Two or more SB Train FHB monitors are in HIGH alarm condition

Then PERFORM the following:

4.2 Fuel Handling Building Radiation Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. D. (continued)	
1. VERIFY the following fans are OFF: • HVS-6, Fuel Pool Supply Fan • HVS-7, Fuel Handling Bldg Supply Fan • HVE-15, Fuel Handling Bldg Exhaust Fan • HVE-16A, Fuel Pool Exhaust Fan • HVE-16B, Fuel Pool Exhaust Fan • HVE-17, Fuel Bldg Swgr Area Exhaust Fan (local indication only)	**1.1** STOP the following fans at the HVAC panel or locally as conditions allow: • HVS-6, Fuel Pool Supply Fan • HVS-7, Fuel Handling Bldg Supply Fan • HVE-15, Fuel Handling Bldg Exhaust Fan • HVE-16A, Fuel Pool Exhaust Fan • HVE-16B, Fuel Pool Exhaust Fan • HVE-17, Fuel Bldg Swgr Area Exhaust Fan
2. VERIFY the following FHB dampers are CLOSED: • D-33, Fuel Hdlg Bldg Inlet Damper • D-35, Fuel Hdlg Bldg Outlet Damper • D-29, Fuel Pool Inlet Damper • D-31, Fuel Pool Outside Damper • D-34, Fuel Hdlg Bldg Inlet Damper • D-36, Fuel Hdlg Bldg Outlet Damper • D-30, Fuel Pool Inlet Damper • D-32, Fuel Pool Outlet Damper	**2.1** PULL the following fuses to FAIL CLOSED the applicable dampers (located behind the HVAC panel): • 120V AC SA F-21 (D-29/D-31) • 120V AC SA F-80 (D-33/D-35) • 120V AC SB F-21 (D-30/D-32) • 120V AC SB F-80 (D-34/D-36)

4.2 Fuel Handling Building Radiation Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. D. (continued)	
3. VERIFY the following components are aligned as indicated:	**3.1** PERFORM the following on the HVCB:
• FCV-25-30, Fuel Handling Emerg Vent Vlv, is OPEN.	• OPEN FCV-25-30 at the HVAC panel
• FCV-25-32, SBVS Isolation Valve, is CLOSED.	• CLOSE FCV-25-32 at the HVAC panel
• HVE-6A, SBVS Exhaust Fan, is ON.	• START HVE-6A at the HVAC panel
• FCV-25-31, Fuel Handling Emerg Vent Vlv., is OPEN.	• OPEN FCV-25-31 at the HVAC panel.
• FCV-25-33, SBVS Isolation Valve, is CLOSED.	• CLOSE FCV-25-33 at the HVAC panel.
• HVE-6B, SBVS Exhaust Fan, is ON.	• START HVE-6B at the HVAC panel.

4.2 Fuel Handling Building Radiation Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	
E. NOTIFY Health Physics to perform applicable surveys.	
F. ATTEMPT to identify and isolate the source of increased activity.	
G. REFER TO EPIP-00, Discovery & Identification of an Emergency Condition (Including Chemical, Fire and Natural Emergencies).	
H. If alarm is due to fuel handling accident, Then **GO TO ONOP 2-1600030,** Accidents Involving New or Spent Fuel.	
I. If the following conditions exist: • FHB alarm condition has been corrected • Affected FHB monitors are NOT in a HIGH alarm condition Then PERFORM Appendix B, Fuel Pool Ventilation Restoration.	

END OF SECTION 4.2

4.3 Local Area Radiation Monitors

INSTRUCTIONS

1. DETERMINE alarm validity:

A. VERIFY PC-11 channel display for the affected channel is NOT blue (indicating system or equipment failure) or magenta (indicating PC-11 communications failure)

B. If the channel in alarm has a monitor in the Control Room, Then VERIFY PC-11 channel indication agrees with indication on the Control Room monitor (i.e., alert or high alarm).

C. VERIFY increased or increasing trend for the affected channel.

2. If the alarm is valid, Then PERFORM the following:

A. ANNOUNCE evacuation of the affected area over the plant page.

B. NOTIFY Health Physics to perform applicable surveys.

C. ATTEMPT to identify and isolate the source of increased activity.

D. REFER TO EPIP-00, Discovery & Identification of an Emergency Condition (Including Chemical, Fire and Natural Emergencies).

CONTINGENCY ACTIONS

1.1 If the alarm is NOT valid, Then **GO TO Appendix A,** Inoperable Monitor.

END OF SECTION 4.3

5.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, License Renewal, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on a data sheet.

/R2

5.1 Technical Specifications

- §1 Section 3.3.3.1, Radiation Monitoring

5.2 Updated Final Safety Analysis Report (UFSAR)

- Section 12.3.4, Area Monitoring

5.3 Procedures

- EPIP-00, Discovery & Identification of an Emergency Condition (Including Chemical, Fire and Natural Emergencies)
- ONOP 2-0120031, Excessive Reactor Coolant System Leakage
- ONOP 2-1600030, Accidents Involving New or Spent Fuel
- 2-NOP-26.02, Area Radiation Monitors

5.4 Miscellaneous Documents

- 2998-G-879 sheet 3, HVAC Control Diagrams

6.0 RECORDS REQUIRED

6.1 Normal Log Entries shall be maintained in the plant files in accordance with QI-17-PSL-1, Quality Assurance Records.

APPENDIX A
INOPERABLE MONITOR
(Page 1 of 1)

1. NOTIFY Health Physics to perform the following:
   - **A.** CHECK local operation of the affected monitor (if accessible).
   - **B.** §1 PERFORM surveys of the affected area as required (if accessible).
2. If required, Then NOTIFY I&C to check the affected monitor.
3. REFER TO 2-NOP-26.02, Area Radiation Monitors, for operating instructions.
4. If **ANY** of the following monitors are inoperable:
   - Fuel Storage Pool Area
   - Containment – Isolation
   - Control Room Isolation
   - Containment Area – High Range

   Then REFER TO Technical Specification 3.3.3.1, Radiation Monitoring, for required actions.

END OF APPENDIX A

APPENDIX B
FUEL POOL VENTILATION RESTORATION
(Page 1 of 2)

1. RESET the Fuel Pool High Radiation interlocks as follows (HVAC Panel):

   A. PRESS the Fuel Pool HVAC HI RAD A Reset pushbutton.

   B. PRESS the Fuel Pool HVAC HI RAD B Reset pushbutton.

2. STOP the operating Shield Building Exhaust Fan(s):

   - HVE-6A, SBVS Exhaust Fan
   - HVE-6B, SBVS Exhaust Fan

3. ENSURE the following components are positioned as indicated:

COMPONENT ID	COMPONENT NAME	POSITION
FCV-25-32	SBVS Isolation Valve	OPEN
FCV-25-30	Fuel Handling Emerg Vent Vlv	CLOSED
FCV-25-11	Outside Cooling Air to SBVS	CLOSED
D-29	Fuel Pool Inlet Damper	OPEN
D-31	Fuel Pool Outside Damper	OPEN
D-33	Fuel Hdlg Bldg Inlet Damper	OPEN
D-35	Fuel Hdlg Bldg Outlet Damper	OPEN
FCV-25-33	SBVS Isolation Valve	OPEN
FCV-25-31	Fuel Handling Emerg Vent Vlv	CLOSED
FCV-25-12	Outside Cooling Air to SBVS	CLOSED
D-30	Fuel Pool Inlet Damper	OPEN
D-32	Fuel Pool Outlet Damper	OPEN
D-34	Fuel Hdlg Bldg Inlet Damper	OPEN
D-36	Fuel Hdlg Bldg Outlet Damper	OPEN

4. PLACE Fuel Pool Ventilation in service as follows:

   A. START a Fuel Pool Exhaust Fan:

   - HVE-16A, Fuel Pool Exhaust Fan
   - HVE-16B, Fuel Pool Exhaust Fan

   B. VERIFY HVS-6, Fuel Pool Supply Fan, starts.

APPENDIX B
FUEL POOL VENTILATION RESTORATION
(Page 2 of 2)

5. NOTIFY the SNPO to place Fuel Handling Building Ventilation in service as follows:

A. START HVE-15, Fuel Handling Bldg Exhaust Fan.

B. VERIFY HVS-7, Fuel Handling Bldg Supply Fan, starts.

C. START HVE-17, Fuel Handling Bldg Swgr Area Exhaust Fan.

END OF APPENDIX B

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.h

Place LTOP in Service – Unit 1

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Place Low Temperature Overpressure Protection in Service on Unit 1.

Alternate Path: **Yes** _____ **No** __X___

Facility JPM #: 0821021

K/A Rating(s): A4.03 4.0/3.8

Task Standard: LTOP has been placed in service.

Preferred Evaluation Location:

Simulator _____ Control Room __X____ In-Plant _____

Preferred Evaluation Method:

Perform _____ Simulate __X____

References: 1-GOP-305 "Reactor Plant Cooldown – Hot Standby to Cold Shutdown"

Validation Time ___10 minutes_____ **Time Critical** _No_

Candidate: _____ Start Time _____
Name Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

1-GOP-305 "Reactor Plant Cooldown – Hot Standby to Cold Shutdown"

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

Unit 1 experienced a LOCA from a full power condition. 1-EOP-3 is being implemented. RCS temperature is 290°F and Pressurizer pressure is 500 psia. Annunciator H-15, PORV LOW RANGE CONDITION SELECT LOW, is in alarm.

Initiating Cues:

You are the Desk RCO. The ANPS has directed you to place LTOP in service in accordance with 1-GOP-305, Reactor Plant Cooldown – Hot Standby to Cold Shutdown.

START TIME: _____

When RCS temperature is less than 304°F, but greater than 281°F, Then place LTOP in service as follows:	
STEP 1: Verify Annunciator H-15, "PORV Low Range Condition Select Low," is in alarm. STANDARD: **VERIFY** Annunciator H-15 is in **ALARM** (per Initial Condition) **EXAMINER'S CUE: Annunciator H-15 is in ALARM** COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Verify Annunciator H-21, "Przr Relief Valve Anticipatory Alarm," is NOT in alarm. STANDARD: **VERIFY** Annunciator H-21is **NOT** in **ALARM** **EXAMINER'S CUE: Annunciator H-21 is CLEAR** COMMENTS:	_____ SAT _____ UNSAT
Perform the following for V1402, "PORV":	
STEP 3: CLOSE V1403, "PORV Block Vlv." STANDARD: **POSITION** V1403 to **CLOSED** **EXAMINER'S CUE: V1403 indicates Green light ON, Red light OFF** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 4: PLACE the selector switch for PORV V1402 in the LOW RANGE position. STANDARD: **POSITION** HS-1402 mode selector switch to **LOW RANGE** **EXAMINER'S CUE: HS-1402 mode switch is in LOW RANGE** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 5: Verify PORV V1402 did NOT open. STANDARD: **VERIFY** that PORV V1402 remains **CLOSED** **EXAMINER'S CUE: V1402 indicates Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 6: OPEN V1403, "PORV Block Vlv." STANDARD: **POSITION** V1403 to **OPEN** **EXAMINER'S CUE: V1403 indicates Green light OFF, Red light ON** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
Perform the following for V1404, "PORV":	
STEP 7: CLOSE V1405, "PORV Block Vlv." STANDARD: **POSITION** V1405 to **CLOSED** **EXAMINER'S CUE: V1405 indicates Green light ON, Red light OFF** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 8: PLACE the selector switch for PORV V1404 in the LOW RANGE position. STANDARD: **POSITION** HS-1404 mode selector switch to **LOW RANGE** **EXAMINER'S CUE: HS-1404 mode switch is in LOW RANGE** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 9: Verify PORV V1404 did NOT open. STANDARD: **VERIFY** that PORV V1404 remains **CLOSED** **EXAMINER'S CUE: V1404 indicates Green light ON, Red light OFF** COMMENTS:	_____ SAT _____ UNSAT
STEP 10: OPEN V1405, "PORV Block Vlv." STANDARD: **POSITION** V1405 to **OPEN** **EXAMINER'S CUE: V1405 indicates Green light OFF, Red light ON** **H-15 Clears** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 11: Perform testing of PORVs V1402 and V1403 in accordance with Data Sheet 24, "Valve Testing Procedures," of OP-1-0010125A, "Surveillance Data Sheets." STANDARD: **DETERMINE** PORV testing will be **PERFORMED** later **EXAMINER'S CUE: PORV testing will be PERFORMED later** COMMENTS:	_____ SAT _____ UNSAT

STEP (done): NOTIFY the ANPS that LTOP has been placed in service. STANDARD: **NOTIFY** the ANPS that LTOP has been placed **IN SERVICE.** **EXAMINER'S CUE: ANPS ACKNOWLEDGES** COMMENTS: **END OF TASK**	_____ SAT _____ UNSAT

STOP TIME: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

Unit 1 experienced a LOCA from a full power condition. 1-EOP-3 is being implemented. RCS temperature is 290°F and Pressurizer pressure is 500 psia. Annunciator H-15, PORV LOW RANGE CONDITION SELECT LOW, is in alarm.

Initiating Cues:

You are the Desk RCO. The ANPS has directed you to place LTOP in service in accordance with 1-GOP-305, Reactor Plant Cooldown – Hot Standby to Cold Shutdown.

INITIAL

CAUTION

- ¶4 The amount of time the SDC System is operated with RCS temperature above 300°F should be minimized. Prolonged operation at elevated temperatures may result in undesirable rates of LPSI Pump seal degradation.
- LTOP is required to be placed in service with a setpoint of 530 psia prior to lowering RCS temperature to less than or equal to 281°F. Ref: Tech Spec 3.4.13.

NOTE

If common train ECCS work is required, the following step may be bypassed until the completion of the work. The cooldown may continue using the ADVs or SBCS.

6.30 Place the SDC System in service in accordance with 1-NOP-03.05, Shutdown Cooling. _____

6.31 Direct ENG / CSI to perform the applicable portion of Appendix B, RCS / Pressurizer Nozzle Penetration Checks, of OP 1-0120022, Reactor Coolant System Leak Test, as soon as practical. _____ US

6.32 If continued RCP operation is desired, Then MAINTAIN RCS pressure between 265 psia and the minimum RCS pressure for RCP operation as determined from 1-NOP-01.02, Appendix B. _____

CAUTION

Motor Stator Temperatures of the operating RCPs should be closely monitored as RCS temperature decreases. Stator temperature shall be maintained below 311°F.

6.33 Continue to operate the RCPs to cool down the Steam Generators. _____

6.34 When RCS temperature is less than 304°F, but greater than 281°F, Then place LTOP in service as follows:

1. Verify Annunciator H-15, PORV Low Range Condition Select Low, is in alarm. _____

2. Verify Annunciator H-21, Przr Relief Valve Anticipatory Alarm, is NOT in alarm. _____

6.34 (continued) INITIAL

3. Perform the following for V1402, PORV:

A. CLOSE V1403, PORV Block Vlv. _____

B. PLACE the selector switch for PORV V1402 in the LOW RANGE position. _____

C. Verify PORV V1402 did NOT open. _____

D. OPEN V1403, PORV Block Vlv. _____

4. Perform the following for V1404, PORV:

A. CLOSE V1405, PORV Block Vlv. _____

B. PLACE the selector switch for PORV V1404 in the LOW RANGE position. _____

C. Verify PORV V1404 did NOT open. _____

D. OPEN V1405, PORV Block Vlv. _____

5. Perform testing of PORVs V1402 and V1403 in accordance with Data Sheet 24, Valve Testing Procedures, of OP-1-0010125A, Surveillance Data Sheets. _____

6.35 §1 Prior to decreasing RCS temperature below 270°F, remove one HPSI Pump from service for compliance with Technical Specification 3.5.3.b as follows:

1. If the 1A HPSI Pump is to be removed from service, Then perform the following:

A. LOCK CLOSED V3656, HPSI Pump 1A Discharge. ___/___ IV

B. Perform Section 3A: 1A HPSI Pump of Appendix D, Cooldown Configuration Control. _____

OR

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.i

Locally Close 1A MSIV – Unit 1

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Locally Close 1A S/G Main Steam Isolation Valve IAW EOP-99 - Unit 1

Alternate Path: **Yes** _____ **No** __X__

Facility JPM #: 0821191

K/A Rating(s): A4.01 2.9/2.8

Task Standard: 1A MSIV, HCV-08-1A is closed..

Preferred Evaluation Location:

Simulator _____ Control Room _____ In-Plant __X__

Preferred Evaluation Method:

Perform _____ Simulate __X__

References: 1-EOP-99, Appendix I, "MSIV Local Closure"

Validation Time __7 minutes__ **Time Critical** __No__

Candidate: _____ Start Time _____
Name Finish Time _____

Performance Rating: Sat _____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

1-EOP-99, Appendix I, "MSIV Local Closure"

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

Unit 1 has experienced a reactor trip due to a steam line break on the "A" steam generator. 1-EOP-05 is being implemented. The "A" MSIV cannot be closed from the Control Room.

Initiating Cues:

You are the NPO. The ANPS has directed you to locally close the 1A MSIV, HCV-08-1A, in accordance with 1-EOP-99, Appendix I.

START TIME: _____

	The following steps are to be used when local closure of HCV-08-1A or HCV-08-1B is desired.	
STEP 1:	A. To locally CLOSE HCV-08-1A, "1A S/G MSIV": 1. CLOSE V18444, "Instrument Air Supply to HCV-08-1A." (1C AFW Pump room, west end, overhead.) STANDARD: **OBTAIN** a ladder and **POSITION** the handwheel for V18444 to **CLOSE** **EXAMINER'S CUE: V18444 ROTATED until hard stop is reached** **EVALUATOR'S NOTE: Student may simulate obtaining a ladder.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 2:	A. To locally CLOSE HCV-08-1A, "1A S/G MSIV": 2. OPEN V18974, "HCV-08-1A South Accumulator Drain." (1A MSIV Control Valve platform under accumulators.) STANDARD: **POSITION** handwheel for V18974 to **OPEN** **EXAMINER'S CUE: V18974 ROTATED until hard stop is reached.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 3:	VERIFY HCV-08-1A, 1A S/G MSIV, is CLOSED STANDARD: **VERIFY** HCV-08-1A is **CLOSED** **EXAMINER'S CUE: HCV-08-1A indicates CLOSED** COMMENTS:	_____ SAT _____ UNSAT

STEP (done):	Notify the Control Room that HCV-08-1A, 1A S/G MSIV, has been closed per 1-EOP-99, Appendix I.	
STANDARD:	**NOTIFY** the Control Room that HCV-08-1Ais **CLOSED**	_____ SAT
	EXAMINER'S CUE: ANPS ACKNOWLEDGES.	_____ UNSAT
COMMENTS:		
	END OF TASK	

STOP TIME: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

Unit 1 has experienced a reactor trip due to a steam line break on the "A" steam generator. 1-EOP-05 is being implemented. The "A" MSIV cannot be closed from the Control Room.

Initiating Cues:

You are the NPO. The ANPS has directed you to locally close the 1A MSIV, HCV-08-1A, in accordance with 1-EOP-99, Appendix I.

APPENDIX I
MSIV LOCAL CLOSURE
(Page 1 of 1)

☐ **1.** To locally CLOSE HCV-08-1A, 1A S/G MSIV, PERFORM the following:

- ☐ **A.** CLOSE V18444, Instrument Air Supply to HCV-08-1A. (1C AFW Pump room, west end in overhead)
- ☐ **B.** OPEN V18974, HCV-08-1A South Accumulator Drain. (1A MSIV Control Valve platform under accumulators)

☐ **2.** To locally CLOSE HCV-08-1B, 1B S/G MSIV, PERFORM the following:

- ☐ **A.** CLOSE V18440, Instrument Air Supply to HCV-08-1B. (1A/1B AFW Pump room, west end in overhead)
- ☐ **B.** OPEN V18973, HCV-08-1B North Accumulator Drain. (1B MSIV Control Valve platform under accumulators)

END OF APPENDIX I

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.j

Restore 2B ICW Pump – Unit 2

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Restore 2B ICW Pump – Unit 2

Alternate Path: **Yes** _____ **No** __X___

Facility JPM #: New

K/A Rating(s): A4.01 3.2/3.2

Task Standard: 2B ICW Pump operating on the B Header.

Preferred Evaluation Location:

Simulator _____ Control Room _____ In-Plant __X___

Preferred Evaluation Method:

Perform _____ Simulate __X____

References: OP 2-0640020, "Intake Cooling Water System Operation"

Validation Time ___10 minutes____ **Time Critical** _No_

Candidate: _____ Start Time _____
Name Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

OP 2-0640020, "Intake Cooling Water System Operation"

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

The 2C ICW is currently running and aligned to the 2B ICW Header. Maintenance is complete on the 2B ICW Pump.

Initiating Cues:

You are the Unit 2 ANPO. The US has directed you to start the 2B ICW Pump on a pressurized header IAW OP 2-0640020, Appendix B.

START TIME: _____

STEP 2: Starting the 2B ICW pump on a pressurized header:	
STEP 2A: Check the 2B ICW pump motor for proper lube oil level. STANDARD: **CHECK** 2B ICW Pump motor for proper lube oil level **EXAMINER'S CUE: 2B ICW Pump oil levels are ½ full** COMMENTS:	_____ SAT _____ UNSAT
STEP 2B: Ensure locked open SB 21209, 2B ICW Pump Disch. Valve. STANDARD: **UNLOCK and Rotate SB 21209** in the **Counter Clockwise** direction until pointer is in the **OPEN** position, **LOCK SB 21209**. **EXAMINER'S CUE: SB 21209 is: UNLOCKED, ROTATED to OPEN, LOCKED (Not Critical)** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 2C: Close SH 21207, PI-21-5B Isol. For 2B ICW Pp. Dish. Press. STANDARD: **Rotate** SH 21207 in Clockwise direction until hardstop is reached. **EXAMINER'S CUE: Valve is ROTATED to hard stop** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 2D: Close the local instrument isolation for PT-21-8B, 2B ICW Hdr. Pressure Transmitter. STANDARD: **Rotate** local instrument isolation for PT-21-8B in Clockwise direction until hardstop is reached. **EXAMINER'S CUE: Valve is ROTATED to hard stop** COMMENTS:	_____ SAT _____ UNSAT

STEP 2E: Start 2B ICW pump. STANDARD: **NOTIFY** the Control Room that 2B ICW Pump is ready to **START** **EXAMINER'S CUE: Control Room Acknowledges and REPORTS the 2B ICW Pump has been Started** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 2F: Slowly open SH 21207, PI-21-5B Isol. For 2B ICW Pp. Dish. Press. STANDARD: **POSITION** SH 21207, PI-21-5B Isol. For 2B ICW Pp. Dish. Press. **SLOWLY** to **OPEN** **EXAMINER'S CUE: Valve is SLOWLY positioned to OPEN** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 2G: Slowly open local instrument isolation for PT-21-8B, 2B ICW Hdr. Pressure Transmitter. STANDARD: **POSITION** local instrument isolation for PT-21-8B, 2B ICW Hdr. Pressure Transmitter, **SLOWLY** to **OPEN** **EXAMINER'S CUE: Valve is SLOWLY positioned to OPEN** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 2H: When system pressure and pump amps stabilize, Then stop the 2C ICW pump and place the control switch to the PULL TO LOCK position. STANDARD: **NOTIFY** the Control Room that the local pressure gauge has been **OPENED** and the pressure indication is **STABLE** **EXAMINER'S CUE: Control Room informs you that 2B ICW Header pressure and 2B ICW Pump Amps are STABLE and that the 2C ICW Pump has been placed to PULL-TO-LOCK** **If asked, local pressure indication, PI-21-5B, indicate 41 psig and stable.** COMMENTS:	_____ SAT _____ UNSAT

STEP 2I: Align Sodium Hypochlorite to the inservice ICW pumps as per 0-NOP-40.01, Hypochlorite System Operation. STANDARD: **DETERMINE** alignment of Sodium Hypochlorite will be performed later. **EXAMINER'S CUE: Alignment of Sodium Hypochlorite will be performed later.** COMMENTS:	_____ SAT _____ UNSAT
STEP 2J: Perform the following valve lineup to verify components are properly positioned. SH 21207, PI-21-5B Isol: Open PT-21-8B Local inst isol: Open STANDARD: **DETERMINE** Valve IV will be performed later. **EXAMINER'S CUE: Valve IV will be performed later.** COMMENTS:	_____ SAT _____ UNSAT

STOP TIME: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

The 2C ICW is currently running and aligned to the 2B ICW Header. Maintenance is complete on the 2B ICW Pump.

Initiating Cues:

You are the Unit 2 ANPO. The US has directed you to start the 2B ICW Pump on a pressurized header IAW OP 2-0640020, Appendix B.

APPENDIX B
STARTING THE 2B INTAKE COOLING WATER PUMP
(Page 1 of 3)

INITIAL

1. Starting the 2B ICW pump on a depressurized header:

A. Check the 2B ICW pump motor for proper lube oil level. _____

B. Throttle open SB 21209, 2B ICW Pump Disch. Valve to 10 turns open. _____

C. Close SH 21207, PI-21-5B Isol. for 2B ICW Pp. Disch Press. _____

D. Close the local instrument isolation for PT-21-8B, B ICW Hdr. Pressure Transmitter. _____

E. Start 2B ICW pump. _____ RCO

F. Slowly open SH 21207, PI-21-5B Isol. for 2B ICW Pp. Disch. Press. _____

G. As pressure begins to rise in the B ICW Hdr., slowly open SB 21209, 2B ICW Pump Disch. Valve until valve is fully open, then lock open SB 21209. _____

H. Slowly open the local instrument isolation for PT-21-8B, B ICW Hdr. Pressure Transmitter. _____

I. Walk system completely and vent all air from piping and heat exchanger through the following valves as required for the B ICW header:

1. SH 21337 2B CCW Hx Strainer SS-21-1B Vent _____

2. SH 21244 2B CCW Hx Tube Side Inlet Vent _____

3. SH 21245 2B CCW Hx Outlet 1" Vent _____

4. SH 21363 2B TCW Hx Strainer SS-21-4B Vent _____

5. SH 21218 2B TCW Hx Tube Side Outlet Vent _____

6. SH 21219 2B TCW Hx Tube Side Inlet Vent _____

APPENDIX B
STARTING THE 2B INTAKE COOLING WATER PUMP
(Page 2 of 3)

1. (continued) INITIAL

J. Align Sodium Hypochlorite to the inservice ICW pumps as per 0-NOP-40.01, Hypochlorite System Operation.

K. Perform the following valve lineup to verify components are properly positioned:

VALVE NUMBER	COMPONENT NAME	POSITION	IV
SB21209	2B ICW Pump Disch Valve	LOCK OPEN	
SH21207	PI-21-5B Isol	OPEN	
N/A	PT-21-8B Local Inst Isol	OPEN	
SH21337	2B CCW Hx Strainer SS-21-2B Vent	CLOSED	
SH21244	2B CCW Hx Tubeside Inlet Vent	CLOSED	
SH21245	2B CCW Hx Outlet Line Vent	CLOSED	

2. Starting the 2B ICW pump on a pressurized header:

A. Check the 2B ICW pump motor for proper lube oil level. _____

B. Ensure locked open SB 21209, 2B ICW Pump Disch. Valve. _____

C. Close SH 21207, PI-21-5B Isol. for 2B ICW Pp. Disch. Press. _____

D. Close the local instrument isolation for PT-21-8B, B ICW Hdr. Pressure Transmitter. _____

E. Start 2B ICW pump. _____ RCO

F. Slowly open SH 21207, PI-21-5B Isol. for 2B ICW Pp. Disch. Press. _____

G. Slowly open the local instrument isolation for PT-21-8B, B ICW Hdr. Pressure Transmitter. _____

APPENDIX B
STARTING THE 2B INTAKE COOLING WATER PUMP
(Page 3 of 3)

2. (continued) INITIAL

H. When system pressure and pump amps stabilize, Then stop the 2C ICW pump and place control switch to PULL TO LOCK position.

RCO

I. Align Sodium Hypochlorite to the inservice ICW pumps as per 0-NOP-40.01, Hypochlorite System Operation.

J. Perform the following valve lineup to verify components are properly positioned:

VALVE NUMBER	COMPONENT NAME	POSITION	IV
SH21207	PI-21-5B Isol	OPEN	
N/A	PT-21-8B Local Inst Isol	OPEN	

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST. LUCIE NUCLEAR PLANT

B.1.k

Hydrogen Purge System Operation – Unit 1

CANDIDATE _____

EXAMINER _____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE
ST LUCIE NUCLEAR PLANT

Task: Hydrogen Purge System Operation - Unit 1

Alternate Path: **Yes** X **No** _____

Facility JPM #: 0821098 (Modified)

K/A Rating(s): A2.02 3.5/3.9

Task Standard: This JPM is complete when the Hydrogen Purge System is in operation with 95 CFM flowrate established.

Preferred Evaluation Location:

Simulator _____ Control Room _____ In-Plant X

Preferred Evaluation Method:

Perform _____ Simulate X

References: 1-EOP-99, Appendix N, Hydrogen Purge System Operation

Validation Time 20 minutes **Time Critical** No

Candidate: _____ Start Time _____
Name

Finish Time _____

Performance Rating: Sat ____ Unsat ___ Peformance Time _____

Examiner: _____ **Signature:** _____

Tools/Equipment/ Procedures Needed:

- 1-EOP-99, Appendix N, Hydrogen Purge System Operation
- SNPO Keys

Read to Candidate

Directions to candidate for In-Plant or Control Room JPMs:

I will explain the initial conditions and state the task to be performed. All in-plant or control room JPM steps, including any communications, shall be simulated for this JPM. Under no circumstances, unless directed by the examiner, are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you finish your assigned task by returning the handout sheet I provided you.

Initial Conditions:

The unit is engaged in mitigating a LOCA. SIAS has been reset and HVE-10B is running. The TSC and Chemistry have given permission to place the Hydrogen Purge System in operation to ventilate the Containment.

Initiating Cues:

You are the SNPO. You have been directed by the ANPS to locally operate the Hydrogen Purge system IAW 1-EOP-99, Appendix N. Establish a 95 CFM flowrate using HVE-7B.

Note to Examiner:

Initiating cue identifies student as SNPO. Since on-shift SNPO would have key for Purge Valve Room on 19'.5' elevation, the examiner will obtain key prior to start of JPM and give to student when discussing tools needed for this task.

START TIME: _____

Operate the Containment Hydrogen Purge System as follows:	
STEP 1: ENSURE that HVE- 10A OR HVE-10B, "RAB Main Exhaust Fan" is RUNNING. STANDARD: **ENSURE** HVE-10A or HVE-10B is **RUNNING** **EXAMINER'S CUE: HVE-10B is ROTATING** COMMENTS:	_____ SAT _____ UNSAT
STEP 2: VERIFY lock CLOSED V25015 "Pen. P-58 to HVE-7A /7B Gate - Filter Bypass." STANDARD: **VERIFY** V25015 is **LOCKED CLOSED** **EXAMINER'S CUE: V25015 handwheel ROTATED until hard stop REACHED and LOCKED.** **EVALUATOR'S NOTE: Penetration 58 is between filter train and containment wall** COMMENTS:	_____ SAT _____ UNSAT
STEP 3: VERIFY lock CLOSED V-25-16 "Pen. P-58 to HVE-7A /7B Gate - Filter Bypass." STANDARD: **VERIFY** V-25-16 is **LOCKED CLOSED** **EXAMINER'S CUE: V-25-16 handwheel ROTATED until hard stop REACHED and LOCKED** **EVALUATOR'S NOTE: Penetration 58 is between filter train and containment wall** COMMENTS:	_____ SAT _____ UNSAT

STEP 4: CLOSED FCV-25-9, Pen-57 to HVE-7 Intake STANDARD: **CLOSE** FCV-25-9, Pen-57 to HVE-7 Intake **EXAMINER'S CUE: FCV-25-9 indicates OPEN** **FCV-25-9 indications do NOT change when close pushbutton in Box B1117 is depressed.** **EVALUATOR'S NOTE: Faulted step, IF ASKED Control Room authorizes manual operation of energized MOV** COMMENTS:	_____ SAT _____ UNSAT
STEP 4A: CLOSED FCV-25-9, Pen-57 to HVE-7 Intake STANDARD: **CLOSE** FCV-25-9, Pen-57 to HVE-7 Intake **EXAMINER'S CUE: Engage clutch on FCV-25-9 and begin rotating handwheel in the close direction. Handwheel is rotated until hard stop. Pointer on FCV-25-9 indicates CLOSE** **EVALUATOR'S NOTE: Clutch can be released once valve motion is observed.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 5: UNLOCK and OPEN V25013 "Pen. P-57 to HVE-7A /7B Gate Suction." STANDARD: **UNLOCK** and **OPEN** V25013 **EXAMINER'S CUE: V25013 handwheel UNLOCKED and ROTATED until hard stop REACHED** **EVALUATOR'S NOTE: Penetration 57 is between filter train and containment wall** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 6: UNLOCK and OPEN V-25-14, "Pen. P-57 to HVE-7A /7B Gate Suction." STANDARD: **UNLOCK** and **OPEN** V-25-14 **EXAMINER'S CUE: V-25-14 handwheel UNLOCKED and ROTATED until hard stop REACHED** **EVALUATOR'S NOTE: Penetration 57 is between filter train and containment wall** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 8: VERIFY CLOSED V-25-18, "HVE-7A /7B Disch. Gate to SBVS." STANDARD: **VERIFY** V-25-18 is **CLOSED** **EXAMINER'S CUE: V-25-18 handwheel ROTATED until hard stop REACHED** **EVALUATOR'S NOTE: V-25-18 is located next to V-25-17 in overhead** COMMENTS:	_____ SAT _____ UNSAT
STEP 9: OPEN V-25-17, "HVE-7A/7B Disch. Gate to vent stack." STANDARD: **POSITION** V-25-17 to **OPEN** **EXAMINER'S CUE: V-25-17 handwheel ROTATED until hard stop REACHED** **EVALUATOR'S NOTE: Valve is above HVE-7 filter train north end** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 10: UNLOCK and OPEN V25011, "Makeup Air Before Pen. 56 Gate". STANDARD: **UNLOCK** and **OPEN** V25011 **EXAMINER'S CUE: V25011 handwheel UNLOCKED and ROTATED until hard stop REACHED** **EVALUATOR'S NOTE: Located in the Purge valve room, 19.5' between the RAB and Fuel Handling Bldg** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 11: UNLOCK and OPEN V-25-12, "Makeup Air Before Pen. 56 Gate". STANDARD: **UNLOCK** and **OPEN** V-25-12 **EXAMINER'S CUE: V-25-12 handwheel UNLOCKED and ROTATED until hard stop REACHED** **EVALUATOR'S NOTE: Located in the Purge valve room, 19.5' between the RAB and Fuel Handling Bldg** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 12: PARTIALLY OPEN FCV-25-10, "HVS-4 Plenum to HVE-7 Intake." STANDARD: **POSITION** FCV-25-10 to **PARTIAL OPEN** **EXAMINER'S CUE: FCV-25-10 pushbutton DEPRESSED momentarily** **EVALUATOR'S NOTE: Control panel is located on column near north end of the 6A filter train** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 13: START hydrogen purge fan HVE-7A OR (HVE-7B). STANDARD: **DEPRESS** START pushbutton for HVE-7A OR (HVE-7B) **EXAMINER'S CUE: HVE-7A (HVE-7B) is ROTATING.** **EVALUATOR'S NOTE: Control panel is located on column next to fans** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 14: THROTTLE OPEN FCV-25-9, Pen-57 to HVE-7 Intake, to obtain between 90 and 100 CFM on FR-25-1, Local Flow Recorder STANDARD: **ADJUST** FCV-25-9 using manual handwheel for desired flowrate of between **90** and **100 cfm** **EXAMINER'S CUE: FR-25-1 INDICATES approximately 95 cfm** **If asked, Flow was 0 cfm before Adjustment** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 15: REQUEST Control Room Monitor TR-25-2 STANDARD: **MONITOR** TR-25-2 in the Control Room ▪ Point 3, Before Hydrogen Purge Charcoal Absorber (TE-25-18) ▪ Point 4, Hydrogen Purge Charcoal Absorber (TE-25-19) ▪ Point 5, Hydrogen Purge Charcoal Absorber (TE-25-20) ▪ Point 6, After Hydrogen Purge Charcoal Absorber (TE-25-21) **EXAMINER'S CUE: Control Room informs you that TR-25-2 is Indicating 190°F and Increasing. RCO DIRECTS you to ADJUST flow to MAINTAIN temperature at <190°F.** **If asked, Alarm Setpoint is 190°F.** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 16: ADJUST FCV-25-10 to maintain charcoal absorber temperature below alarm setpoint on TR-25-2 (RTGB-106). STANDARD: **OPEN** FCV-25-10 as necessary to **MAINTAIN** temperature <190°F **EXAMINER'S CUE: Open Pushbutton DEPRESSED momentarily, Control Informs you that TR-25-2 is INDICATING 175°F and Stable** **EVALUATOR'S NOTE: Located on the east side of the filter train, Indications by local TE: TI-25-HVE-7-1 and TI-25-HVE-7-2** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP (done): Periodically Check vent stack radiation monitor. STANDARD: **REQUEST** Control Room to **MONITOR** Eberline points for the Plant Vent Radiation Monitor. **EXAMINER'S CUE: Control Room Informs you that they will Monitor Plant Vent Radiation levels** COMMENTS: **END OF TASK**	_____ SAT _____ UNSAT

STOP TIME: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Initial Conditions:

The unit is engaged in mitigating a LOCA. SIAS has been reset and HVE-10B is running. The TSC and Chemistry have given permission to place the Hydrogen Purge System in operation to ventilate the Containment.

Initiating Cues:

You are the SNPO. You have been directed by the ANPS to locally operate the Hydrogen Purge system IAW 1-EOP-99, Appendix N. Establish a 95 CFM flowrate using HVE-7B.

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HYDROGEN PURGE SYSTEM OPERATION
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CAUTION
Close coordination between the Technical Support Center and the Control Room is required to ensure personnel safety with regard to radioactive release rates, exposure and potential for hydrogen burn / explosion.

☐ **1.** ENSURE **ONE** RAB Main Exhaust Fan, HVE-10A (B), is RUNNING, if available.

☐ **2.** VERIFY the following valves are LOCKED CLOSED:
- ☐ V25015, Pen.58 to HVE-7A / 7B Gate – Filter Bypass
- ☐ V-25-16, Pen. 58 to HVE-7A / 7B Gate – Filter Bypass

☐ **3.** CLOSE FCV-25-9, Pen. 57 to HVE-7 Intake.

☐ **4.** UNLOCK and OPEN the following valves:
- ☐ V25013, Pen. 57 to HVE-7A / 7B Gate Suction
- ☐ V-25-14, Pen. 57 to HVE-7A / 7B Gate Suction

☐ **5.** VERIFY V-25-18, HVE-7A / 7B Disch. Gate to SBVS, is CLOSED.

☐ **6.** OPEN V-25-17, HVE-7A / 7B Disch. Gate to Vent Stack.

☐ **7.** UNLOCK and OPEN the following valves:
- ☐ V25011, Makeup Air Before Pen. 56 Gate (19.5' Elev.)
- ☐ V-25-12, Makeup Air Before Pen. 56 Gate (19.5' Elev.)

NOTE
Hydrogen Purge Fans will not operate if FCV-25-10 position is between full closed and approximately 10% open.

☐ **8.** ENSURE FCV-25-10, HVS-4 Plenum to HVE-7 Intake, is THROTTLED OPEN.

☐ **9.** START **ONE** Hydrogen Purge Fan.
- ☐ HVE-7A

  OR
- ☐ HVE-7B

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HYDROGEN PURGE SYSTEM OPERATION
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☐ **10.** THROTTLE OPEN FCV-25-9, Pen. 57 to HVE-7 Intake, to obtain between 90 and 100 cfm on FR-25-1, Local Flow recorder.

NOTE

- High charcoal temperatures are postulated to occur only as a result of restricted air flows rates less than 55 cfm.
- Iodine desorption occurs at approximately 300°F and charcoal ignition at approximately 640°F

☐ **11.** MONITOR the following on TR-25-2 in the Control Room

- Point 3, Before Hydrogen Purge Charcoal Absorber (TE-25-18)
- Point 4, Hydrogen Purge Charcoal Absorber (TE-25-19)
- Point 5, Hydrogen Purge Charcoal Absorber (TE-25-20)
- Point 6, After Hydrogen Purge Charcoal Absorber (TE-25-21)

NOTE

Hydrogen Purge Fans will not operate if FCV-25-10 position is between full closed and approximately 10% open.

☐ **12.** ADJUST FCV-25-10, HVS-4 Plenum to HVE-7 Intake, to maintain charcoal absorber temperatures below the alarm setpoints on TR-25-2.

☐ **13.** MONITOR Plant Stack radiation levels and Containment hydrogen concentration during purge operation.

END OF APPENDIX N

8.6 Manual Operation of Motor Operated Valves

1. Manual operation of MOVs should NOT be a routine method of operation.

CAUTION
When the motor is operating, Then manually engaging the MOV clutch may result in clutch damage.

2. Unless the MOV is an "inching-type" MOV, Then the electrical power must be removed (the MCC breaker placed in the OFF position) from the MOV prior to manual operation. Operation of MOVs with the breaker ON (energized) is permitted if called for by specific plant evolutions / procedures. (i.e., Maintenance Procedures, PMT, etc.)

3. Do NOT use valve handle extensions, valve wrenches, cheater bars or leverage devices on MOVs to assist manual operation of the valve.

4. Do NOT use an air wrench on an MOV unless authorized by the SM.

CAUTION
Do not use excessive force when engaging the clutch lever.

5. Engage the MOV clutch for manual operation by rotating and holding the clutch lever **while** turning the handwheel.

NOTE
It may be necessary to turn the handwheel several times prior to observing valve motion.

6. When valve motion is observed, Then release the clutch lever to avoid possible internal damage to the gear mechanism.

CAUTION
The clutch will disengage when the valve is stroked electrically. Never attempt to manually disengage the clutch lever.

7. When an MOV is operated manually, Then it shall be declared Out-of-Service in accordance with 0-NOP-100.01, "Equipment Out-of-Service," until the MOV is stroked electrically.