

Job Performance Measure "D"

Facility: Vogtle

Task No: V-LO-TA-16001

Task Title: Start an RCP at NOPT-ALT path

JPM No: V-NRC-JP-13003-HL17

K/A Reference: 003A2.02 RO 3.7 SRO 3.9

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance _____ Actual Performance _____

Classroom _____ Simulator _____ Plant _____

NOTE: For time considerations, the students may be allowed to "pre-brief" this JPM and allowed to review 13003-1 prior to starting the JPM.

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions: Plant is in mode 3 at NOPT. RCP #2 was tagged out to perform a balance shot.

Maintenance is complete, the standby alignment has been verified.

RCP #2 has been hand-rotated, and visual inspection performed.

All personnel are out of Containment.

All remaining RCPs are in service.

Initiating Cue: The SS has directed you to "Start RCP # 2 using 13003-1, "Reactor Coolant Pump Operation".

Task Standard: Start an RCP per 13003-1, then shutdown per 13003-1 on failure of #1 seal.

Required Materials: SOP 13003-1, "Reactor Coolant Pump Operation" Ver. 45.0.
ARP 17008-1, "ARP for ALB08 on Panel 1A2 on MCB" Ver.18.0

General References: None

Time Critical Task: No

Validation Time: 15 minutes

SIMULATOR SETUP:

Simulator Setup:

1. Reset to IC # 214 for HL-17 NRC Exam.

Simulator Setup from Scratch:

1. Reset to IC # 4 (ready to pull critical).
2. Reset Hi Flux at Shutdown Alarm setpoints.
3. Unblock Hi Flux At Shutdown Alarms.
4. Open both breakers for RCP 2.
5. Insert Malfunction RP06B on Trigger 1 with a final value of 18.6% with a 10 sec ramp.
6. Establish stable plant conditions.
7. Ack/Reset alarms.
8. Freeze simulator.

Setup time from scratch: 10 minutes

Performance Information

Critical steps denoted with an asterisk and bolded.

Candidate reviews 13003-1

Standard: Candidate reviews 13003-1 precautions and limitations and selects section 4.1.2.

Comment:

Step 4.1.2 Starting an RCP.

Standard: Candidate chooses section.

Comment:

Step 4.1.2.1 When starting RCP 1, verify RCS pressure LESS than 1800 psig.

Standard: Candidate determines step is not applicable.

CUE: If CV is requested, "CV request noted."

Comment:

CAUTION

Following outages when all RCPs have been stopped, the potential exists that low boron concentration water may have accumulated in an RCS loop. This could result in a loss of core shutdown margin if this low boron water is injected into the core.

Standard: Candidate reads caution and determines it is not applicable.

Comment:

Step 4.1.2.2 **WHEN** starting the first RCP, Refer to 12001-C or 12002-C as appropriate to determine whether special actions are needed to assure adequate shutdown margin will be maintained during start of the idle pump.

Standard: Candidate determines step is not applicable.

Comment:

NOTE

The following steps should be repeated for each RCP to be started.

Standard: The candidate reads note.

Comment:

Step 4.1.2.3 Verify the RCP has been aligned to STANDBY per 11003-1, "Reactor Coolant Pump Alignment."

Standard: Candidate determines this step is complete from initial conditions.

CUE: If asked, "Refer to initial conditions".

Comment:

Step 4.1.2.4 **IF** in MODE 3 (T_{avg} greater than or equal to 350°F), Go to Step 4.1.2.7.

Standard: The candidate goes to step 4.1.2.7.

Comment:

NOTE

Step 4.1.2.7 is to be performed only if SGBD cannot be placed in service or SGBD temperature instrumentation for the RCP to be started is inoperable.

- 4.1.2.7 IF Steam Generator blowdown CANNOT be placed in service OR any loop SGBD TI is NOT available, perform the following:
- a. **Measure** the Steam Generator metal surface temperature with a contact pyrometer (Measure skin temperature on the lower handhole or other similar location on the lower shell.)
 - b. **Verify** the difference between Steam Generator skin temperature and RCS Tc for the RCP to be started is $\leq 10^{\circ}\text{F}$.
 - c. **Record** the measured Temperature difference for the RCP to be started in the Control Room Log (or the UOP in progress).
 - d. **Record** the Pyrometer ID number in the Control Room Log.

Standard: This step is N/A, SGBD is in service.

Comment:

***Step 4.1.2.8 Start the RCP Oil Lift Pump for the associated RCP to be started.**

Standard: The candidate places 1HS-0556 to START and releases and verifies:

Red light - ON
Green light - OFF
Blue light - ON after a short delay

Comment:

Step 4.1.2.9 IF maintenance was performed on the RCP to be started OR the RCP has been shutdown for an extended outage, perform the following:

- a. Visually inspect the applicable RCP by checking the following items:
 - No visible oil leaks.
 - Pump free from obstructions.
 - No excess external seal leakage.
 - The oil level in the RCP Oil Drain Tank is less than 1 inch in the sight glass to be able to collect any subsequent leakage during operation.
- b. The applicable RCP **SHOULD** be hand-rotated and verified that free rotation and proper seal parameters are met.

c. Obtain Engineering concurrence PRIOR to start of ANY RCP that will not hand rotate.

Standard: The candidate determines this step completed from initial conditions.

CUE: If asked, “Refer to initial conditions”.

Comment:

Step 4.1.2.10 Establish the required conditions for starting an RCP as listed in Table 1.

TABLE 1 - RCP PRESTART CONDITIONS

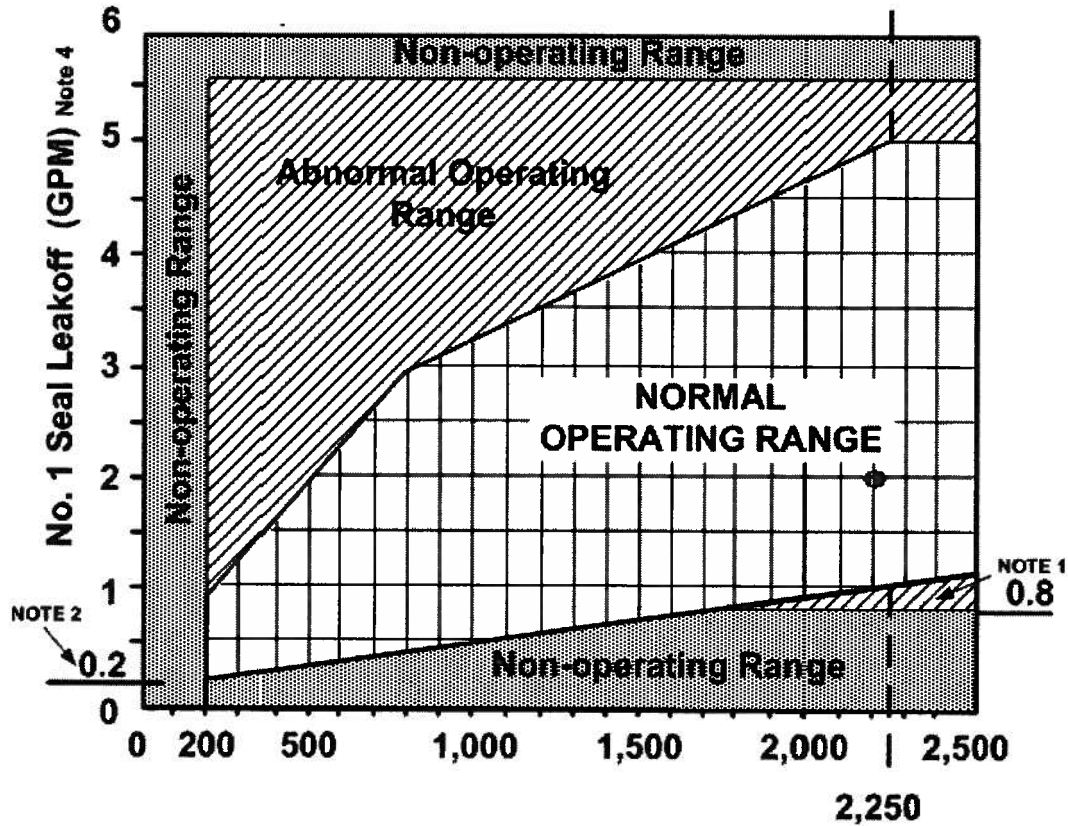
| ITEM | REQUIRED VALUE |
|--|------------------------------|
| Number 1 Seal Flow | 8-13 gpm |
| Number 1 Seal Leakoff | Within Figure 2 |
| Number 1 Seal DP | >200 psid |
| Standpipe Level - ALB08: A02-D02, A03-D03 | No Alarm |
| Upper & Lower Oil Rsvr Lvl - ALB11: A05-D05, A06-D06 | *No Alarm |
| ACCW Total Flow from RCP - ALB04: D02 1) Lube Oil & Motor Coolers - ALB04: A03-D03 2) Thermal Barrier Heat Exchanger - ALB04: A05-D05 | **No Alarm **No Alarm |
| ACCW Temperature At RCP 1) Lube Oil & Motor Coolers - ALB04: A04-D04 2) Thermal Barrier Heat Exchanger - ALB61: A01 | **No Alarm **No Alarm |
| VCT Pressure | >18 psig |

* An RCP start is permitted at the discretion of the Unit Shift Supervisor, if the actual level is not decreasing.

** With Westinghouse and Operations management approval, RCPs may be started without ACCW flow to perform 30 second and 1 minute air sweeps per 13001-1, "Reactor Coolant System Filling and Venting" or to verify proper rotation following electrical maintenance (less than 1 minute). General Manager approval will be required for starting RCPs without ACCW for any other operation. RCP operation without ACCW cooling for more than 10 minutes is prohibited.

FIGURE 2

NO. 1 SEAL NORMAL OPERATING RANGE



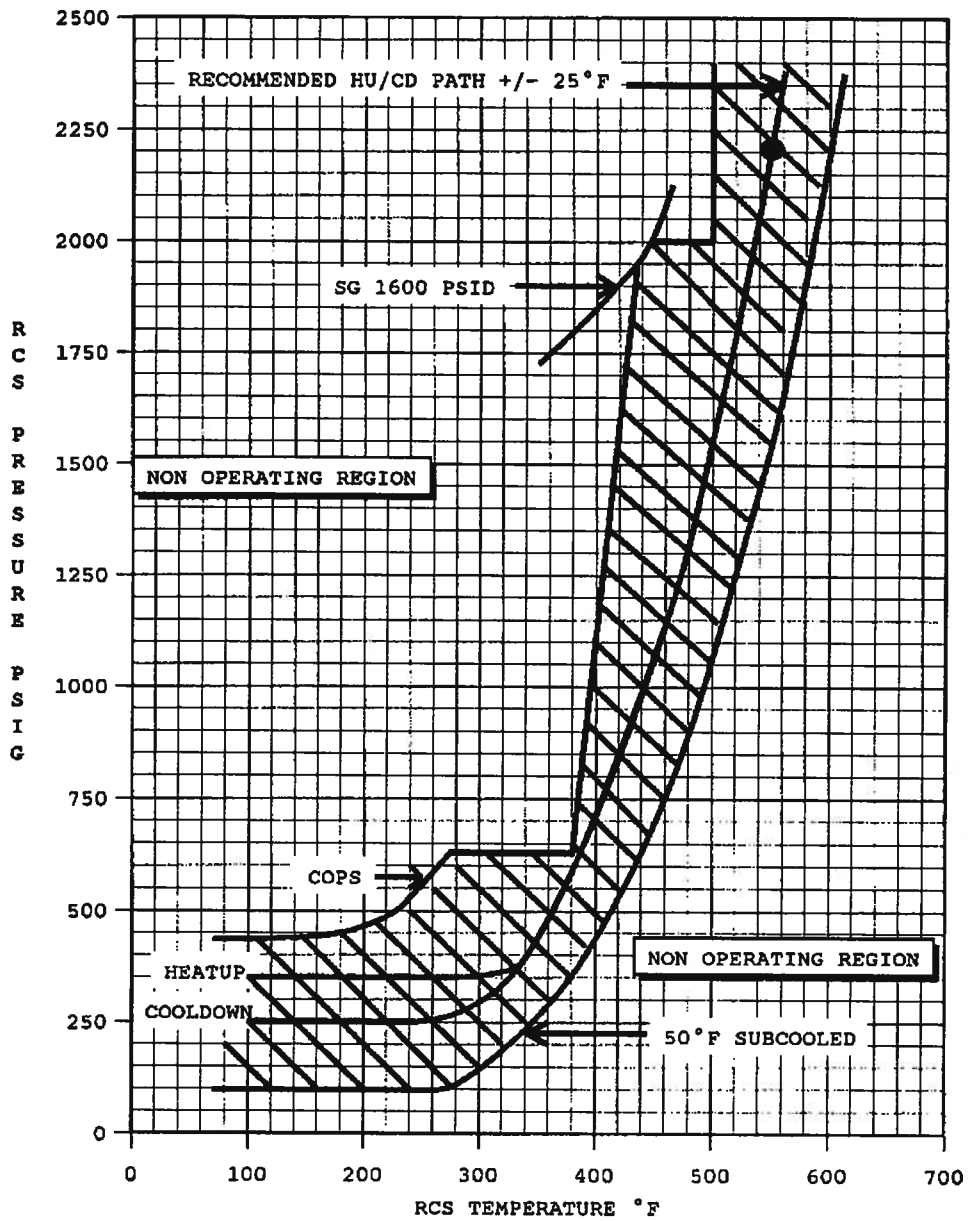
No. 1 Seal Differential Pressure (PSI) NOTE 3

1. If the No. 1 seal leak rates are outside the normal (1.0-5.0 gpm) but within the operating limits ((0.8-5.5 gpm), continue pump operation. VERIFY that seal injection flow exceeds No. 1 seal leak rate for the affected RCP. Closely monitor pump and seal parameters and contact Engineering for further instructions.
2. Minimum startup requirements are 0.2 gpm at 200 PSID differential across the No. 1 seal. For startups at differential pressures greater than 200 PSID, the minimum No. 1 seal leak rate requirements are defined in the NO. 1 SEAL NORMAL OPERATING RANGE (e.g., at 1000 psi differential pressure, do not start the RCP with less than 0.5 gpm).
3. No.1 Seal Differential Press = RCS WR Press – VCT Press.
4. Per Westinghouse Technical Bulletin ESBU-TB-93-01-R1, total #1 seal leakoff is the sum of #1 seal leakoff and #2 seal leakoff. #1 seal leakoff is read directly at the MCB and #2 seal leakoff can be obtained from instrumentation in Containment.

Standard: The candidate verifies all conditions are met.

Comment:

Step 4.1.2.11 Verify the RCS conditions are acceptable for RCP operation per the RCS Pressure-Temperature Curve in the UOPS.



Standard: The candidate verifies condition in acceptable range.

Comment:

Step 4.1.2.12 Verify NO vibration alarms for the associated RCP to be started.

Standard: The candidate verifies alarms ALB08-E04, ALB08-E05, and ALB08-F05 are clear.

Comment:

CAUTION

An RCP shall NOT be started if its associated Steam Generator secondary water temperature is greater than 10°F above its RCS loop temperature.

Standard: The candidate reads caution and determines RCP can be started.

Comment:

Step 4.1.2.13 Verify the RCP Oil Lift Pump has been running for at least two minutes.

Standard: The candidate verifies condition met.

Comment:

Step 4.1.2.14

IF starting the first RCP with a bubble in the Pressurizer, perform the following to minimize Pressurizer surge line temperature changes:

- a. Raise flow through the in-service RHR heat exchanger to establish a slightly lowering trend in RCS temperature,
- b. Lower charging flow to establish a slightly lowering trend in Pressurizer level.

Standard: The candidate reads step and determines it not applicable.

Comment:

Step 4.1.2.15 Verify personnel clear of RCP to be started.

Standard: Candidate reads step and determines it is met.

CUE: If asked , “Refer to initial conditions”.

Comment:

NOTE

If an RCP (or RCP motor) will be started without ACCW cooling, per limitation 2.1.6, RCP parameters, especially bearing temperatures, should be monitored closely while the pump is running.

Standard: Candidate reads step and determines it is not applicable.

Comment:

***Step 4.1.2.16 Start the RCP by placing the RCP 1E Control Switch in START and then placing the RCP Non-1E Control Switch in START:**

| <u>RCP</u> | <u>1E Control Switch</u> | <u>Non-1E Control Switch</u> |
|------------|--------------------------|------------------------------|
| Loop 2 | 1-HS-0496A | 1-HS-0496B |

Standard: 1) Candidate places 1-HS-0496A to START and releases and verifies:

Green light - OFF
Amber light - OFF
Red light - ON

2) Candidate places 1-HS-0496B to START and releases and verifies:

Green light - OFF
Amber light - OFF
Red light - ON

NOTE: Proper sequence and closure of both handswitches are critical.

NOTE to Simulator Operator: Insert Trigger 1 after both switches are placed in Start.

Comment:

ALB08-B05 RCP 2 CONTROLLED LKG HI/LO FLOW alarms

Standard: Candidate responds to alarm using 17008-1 for window B05.

NOTE to examiner: The candidate may go directly to 13003-1 section 4.2.1 for seal abnormality if they diagnose the seal abnormality. If this occurs go to step 4.2.1.1 on page 13.

Comment:

NOTE

RCP 2 No. 1 seal water leakoff high range flow may be monitored using computer point F0160.

Standard: Candidate reads note.

Comment:

17008-1 step 1 Observe seal injection flow and seal leakoff flow, as well as excess letdown temperature and pressure for indication of an actual seal anomaly.

Standard: Candidate checks indications and determines an actual seal anomaly is present due to hi #1 seal leakoff flow.

Comment:

17008-1 step 2 IF a seal problem is indicated, Go To 13003-1, "Reactor Coolant Pump Operation".

Standard: Candidate goes to 13003-1 and selects section 4.2.1.

Comment:

13003-1

Step 4.2.1.1 IF the Plant Computer is available, trend the computer data points listed in Table 2.

Standard: Candidate determines IPC is available and trends points.

CUE: When candidate checks IPC points, “Another operator will continue with trending points per table 2”.

Comment:

Step 4.2.1.2 IF the Plant Computer is NOT available, perform the following:

- a. Monitor the QMCB indication listed in Table 2 at least hourly for the next 8 hours.
- b. IF NO further seal degradation exists after 8 hours, consult with the Shift Supervisor (SS) for less frequent monitoring.

Standard: Candidate marks step N/A.

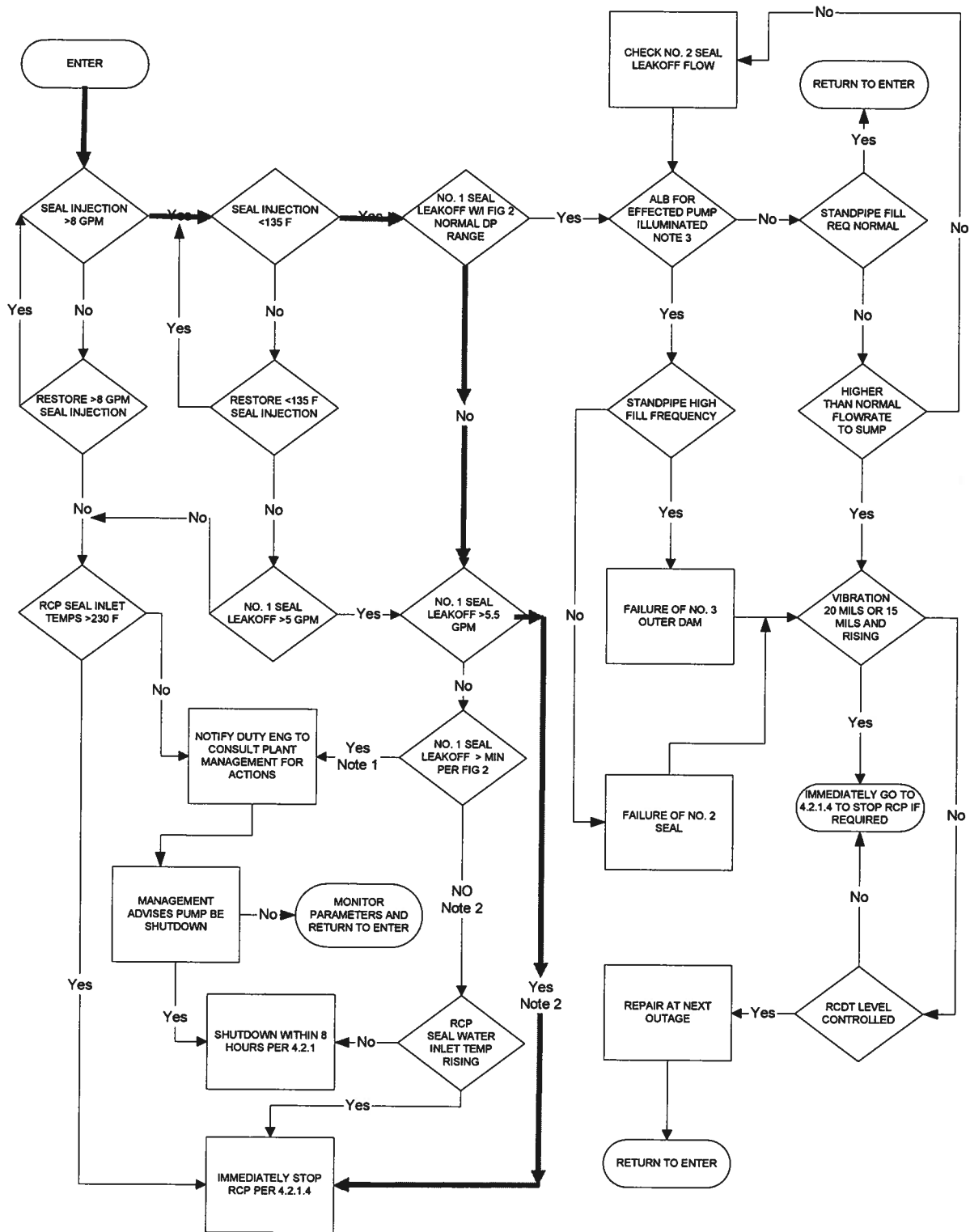
Comment:

Step 4.2.1.3 Monitor the No. 1 seal for further degradation using Figure 1 and RCP Trip Criteria as follows:

- a. Evaluate the monitored indications using Figure 1, "RCP Seal Abnormalities Tree."

Standard: Candidate goes to Figure 1 and evaluates as highlighted. Figure 2 on the next page indicates the approximate point the candidate should determine as a decision on figure 1.

FIGURE 1 - RCP SEAL ABNORMALITIES DECISION TREE



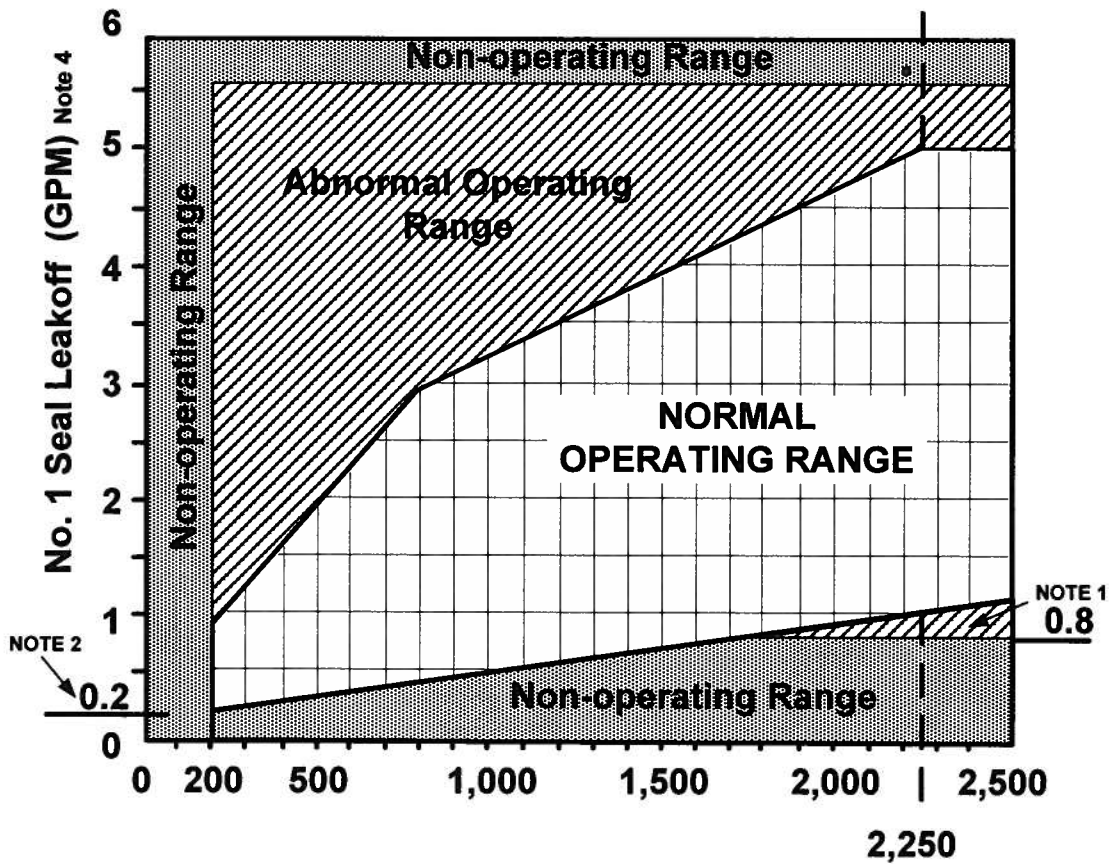
Note 1: Abnormal Operating Range of Figure 2

Note 2: Non-operating Range of Figure 2

Note 3: ALB08 A-04, B-04, C-04 or D-04

FIGURE 2

NO. 1 SEAL NORMAL OPERATING RANGE



No. 1 Seal Differential Pressure (PSI) NOTE 3

1. If the No. 1 seal leak rates are outside the normal (1.0-5.0 gpm) but within the operating limits ((0.8-5.5 gpm), continue pump operation. VERIFY that seal injection flow exceeds No. 1 seal leak rate for the affected RCP. Closely monitor pump and seal parameters and contact Engineering for further instructions.
2. Minimum startup requirements are 0.2 gpm at 200 PSID differential across the No. 1 seal. For startups at differential pressures greater than 200 PSID, the minimum No. 1 seal leak rate requirements are defined in the NO. 1 SEAL NORMAL OPERATING RANGE (e.g., at 1000 psi differential pressure, do not start the RCP with less than 0.5 gpm).
3. No.1 Seal Differential Press = RCS WR Press – VCT Press.
4. Per Westinghouse Technical Bulletin ESBU-TB-93-01-R1, total #1 seal leakoff is the sum of #1 seal leakoff and #2 seal leakoff. #1 seal leakoff is read directly at the MCB and #2 seal leakoff can be obtained from instrumentation in Containment.

Comment:

***Step 4.2.1.3 b. IF evaluation of the monitored indications using Figure 1 requires immediate pump shutdown, Go to Step 4.2.1.4.**

Standard: Candidate goes to step 4.2.1.4.

Comment:

Step 4.2.1.4. WHEN directed by the SS, perform an RCP shutdown as follows:

- a. Start the RCP Oil Lift Pump for affected RCP, if available.
- b. IF Reactor Power is greater than 15% Rated Thermal Power:
 - (1) Trip the Reactor and initiate 19000-C, "E-0 Reactor Trip Or Safety Injection".
 - (2) WHEN the immediate operator actions of 19000-C are complete, Go to Step 4.2.1.4.d.
- c. IF Reactor Power is less than 15% Rated Thermal Power, initiate 18005-C, "Partial Loss Of Flow."

Standard: Candidate determines a. is done,
b. is Not applicable due to plant conditions
c. must be done

CUE: When SS direction requested, "The SS is not available."

CUE: When 18005-C initiation is determined, "An extra operator will initiate 18005-C".

Comment:

***Step 4.2.1.4.d Stop the RCP by placing the RCP Non-1E Control Switch in STOP and then placing the RCP 1E Control Switch in STOP:**

| <u>RCP</u> | <u>Non-1E Control Switch</u> | <u>1E Control Switch</u> |
|------------|------------------------------|--------------------------|
| Loop 2 | 1-HS-0496B | 1-HS-0496A |

Standard: 1) Candidate places 1-HS-0496B to STOP and releases and verifies:

Green light - OFF
Amber light - OFF
Red light - ON

2)Candidate places 1-HS-0496A to STOP and releases and verifies:

Green light - OFF
Amber light - OFF
Red light - ON

NOTE: Proper sequence and opening of both handswitches are critical.

Comment:

CAUTION

If RCP #1 or #4 is stopped, the associated Spray Valve is placed in manual and closed to prevent spray short cycling.

Step 4.2.1.4e IF RCP #1 OR #4 is stopped, verify its associated spray valve is placed in MANUAL and closed.

- RCP 1: 1-PIC-0455C
- RCP 4: 1-PIC-0455B

Standard: Candidate marks step N/A

Comment:

***Step 4.2.1.4.f** **WHEN the RCP comes to a complete stop (as indicated by reverse flow), close the RCP Seal Leakoff Isolation valve for the affected pump.**

RCP 2: 1-HV-8141B

Standard: Candidate determines reverse flow by observing loop 2 RCS flow meters indicate approximately 15%. Candidate then places 1HS-8141B to CLOSE and verifies the following on the handswitch:

Red light - OFF
Green Light - ON

Comment:

Step 4.2.1.4.g Secure the associated RCP Oil Lift Pump.

Standard: The candidate places 1HS-0556 to STOP and releases and verifies:

Red light - OFF
Green light - ON
Blue light - OFF

Comment:

Step 4.2.1.4 h **IF** RCP shutdown was due to loss of RCP seal cooling, review Limitation 2.2.11 for recovery action.

Standard: Candidate marks step N/A.

Comment:

Terminating Cue: Candidate returns initiating cue sheet

Verification of Completion

Job Performance Measure No. V-NRC-JP-13003-HL17

Examinee's Name:

Examiner's Name:

Date Performed:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____

Response: _____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____

Initial Conditions: Plant is in mode 3 at NOPT. RCP #2 was tagged out to perform a balance shot.

Maintenance is complete, the standby alignment has been verified.

RCP #2 has been hand-rotated, and visual inspection performed.

All personnel are out of Containment.

All remaining RCPs are in service.

Initiating Cue: The SS has directed you to “Start RCP # 2 using 13003-1, “Reactor Coolant Pump Operation”.