RO A1-1

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility:	HB ROBINSON	Task No.:	01002100402
Task Title:	Perform the RCS Leakage Surveillance Procedure	JPM No.:	2011-2 NRC JPM Admin RO A1-1
K/A Reference:	G2.1.7 (RO 4.4)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

Task Standard:	Candidate calculates the Unidentified and Identified Leakage.
Required Materials:	OST-051 Reactor Coolant System Leakage Evaluation Station Curve 8.10, RCDT Level Calculator
General References:	OST-051 Reactor Coolant System Leakage Evaluation Station Curve 8.10, RCDT Level
Handouts:	OST-051 Reactor Coolant System Leakage Evaluation, Revision 45 marked up to the step for verifying current RCS temperature is equal to initial RCS temperature (Step 8.1.7.1). Attachment 10.1 must be marked with the initial parameter values and Attachment 10.5 marked with collected data.
Time Critical Task:	NO
Validation Time:	15 minutes

Initial Conditions: Plant is at 50% RTP.
You are the Reactor Operator.

Initiating Cue: The previous shift started OST-051, Reactor Coolant System Leakage Evaluation. The plant has remained at steady state, with NO automatic make-ups for ONE (1) hour.

Complete the provided procedure.

These final parameter values were recorded 60 minutes after the procedure was started except as noted for PRT and RCDT levels:

- RCS Temperature: 560°F
- VCT Level: 20.8 inches
- PZR Level: 36%
- PZR RELIEF TANK: 70.9% (24 hour data)
- Accumulator A: 72%
- Accumulator B: 71%
- Accumulator C: 74%
- RCDT: 19% (12 hour data)
- Charging Pump Leakoff Collection Tank: 32%
- Attachment 10.5, Components with Known Measured Leakage, has leakage on valve LCV-115B outlet flange that has been measured during the performance of OST-051 at 1000 ml in a 5 minute period.

(Denote Critical Steps with an asterisk)

Performance Step: 1	Candidate obtains copy of the marked up OST-051.
Standard:	Candidate reviews the partially completed OST-051.
Examiner's NOTE:	**Provide candidate with a copy of the marked up Procedure and Attachment.**
Comment:	

Performance Step: 2	WHEN at least 1 hour has elapsed, OR IF required by plant conditions to end this test, THEN perform the following: (Step 8.1.7.1, 2, 3). 1. Verify RCS temperature is equal to initial RCS temperature recorded on Attachment 10.1. 2. Record the Final Values for the parameters listed on Attachment 10.1. 3. Verify LCV-115A, VCT HLDP TK DIV, in the AUTO position.
Standard:	RCS temperature is equal to the initial RCS temperature at the beginning of the OST. Final values have been recorded on Attachment 10.1. LCV-115A control switch has been placed in the AUTO position.
Examiner's NOTE:	
Examiner's CUE	**LCV-115A has been placed in AUTO.**
Comment:	

Procedure NOTE: **A decrease in VCT level represents plus (+) RCS leakage.**
A decrease in Pressurizer level represents plus (+) RCS leakage.

* **Performance Step: 3** Calculate the Difference and Change in Volume for the parameters listed on Attachment 10.1 (Step 8.1.8).

Standard: Operator completes the Difference and Change in Volume calculations as directed on Attachment 10.1 (See KEY).

Examiner's NOTE:

Comment:

Performance Step: 4 Perform a peer check of the calculated values listed in Attachment 10.1. (Step 8.1.9)

Standard: Candidate requests a peer check for the calculations performed.

Examiner's NOTE:

Examiner's CUE: **State that a peer check has been performed.**

Comment:

Procedure NOTE: **A plus (+) calculated Total RCS Leakage Rate represents plus (+) RCS leakage.**

Leak-rates (in gpm) on Attachment 10.2 should be rounded to two decimal places.

* **Performance Step: 5** On Attachment 10.2, Perform the following: (Step 8.1.10)

- Calculate the Total RCS Leakage Rate.
- Calculate the Identified RCS Leakage Rate.
- Calculate the Unidentified RCS Leakage Rate.
- Perform a peer check of the calculations performed on Attachment 10.2.

Standard: Candidate completes the Total, Identified and Unidentified leakage calculations as directed on Attachment 10.2 (See KEY).

Candidate requests a peer check of the calculations performed on Attachment 10.2.

Examiner's NOTE:

Examiner's CUE: **Once the RO candidate has performed the Total, Identified and Unidentified RCS Leakage Rate calculations, inform them that they have completed the JPM task.**

Comment:

END OF TASK

Termination Cue: When the RCS leakage rate calculation is completed, the evaluation for this JPM is complete.

STOP TIME:_____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC Admin JPM RO A1-1

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

Plant is at 50% RTP.

You are the Reactor Operator.

INITIATING CUE:

The previous shift started OST-051, Reactor Coolant System Leakage Evaluation. The plant has remained at steady state, with NO automatic make-ups for ONE (1) hour.

Complete the provided procedure.

These final parameter values were recorded 60 minutes after the procedure was started except as noted for PRT and RCDT levels:

- RCS Temperature: 560°F
- VCT Level: 20.8 inches
- PZR Level: 36%
- PZR RELIEF TANK: 70.9% (24 hour data)
- Accumulator A: 72%
- Accumulator B: 71%
- Accumulator C: 74%
- RCDT: 19% (12 hour data)
- Charging Pump Leakoff Collection Tank: 32%
- Attachment 10.5, Components with Known Measured Leakage, has leakage on valve LCV-115B outlet flange that has been measured during the performance of OST-051 at 1000 ml in a 5 minute period.

Progress Energy	C Continuous Use

ROBINSON NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 9

OST-051

REACTOR COOLANT SYSTEM LEAKAGE EVALUATION (EVERY 72 HOURS DURING STEADY STATE OPERATION AND WITHIN 12 HOURS AFTER REACHING STEADY STATE OPERATION)

REVISION 45

SUMMARY OF CHANGES
PRR #00448048
OST-051, Revision 45

STEP	REVISION COMMENTS
8.1.14.3	Added "**PERFORM** Peer Check of data entry fields prior to uploading any data." PRR 00448048
Note prior to 8.1.14	Deleted V:\Drive Link and added "N:\NGGWEB\RNP\Departments\Operations\RCS Leakage Program" PRR 00450337
Attachment 10.4 note prior to 3.a.2.b	Added "There is a single valve outside of containment to obtain this sample in pipe alley WD-1731A, RCDT Discharge Header to WHUT Drain." PRR 00453076
Attachment 10.4 3.a.2.b	Revised step to notify E&RC to obtain sample and analyze for activity and boron concentration IAW CP-003.

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

1.1 To evaluate RCS leakage and to satisfy Improved Technical Specification Surveillance Requirement (ITS SR) 3.4.13.1.

1.2 This test is required when in Modes 1, 2, 3 or 4. ITS SR 3.4.13.1 basis further defines the applicable conditions as "within 12 hours after reaching continuous steady state operation."

1.3 This test may be performed when in Mode 5 as long as the RCS is pressurized, there is a bubble in the Pressurizer and RCS/RHR temperature is constant. However, a test under these conditions will not satisfy ITS SR 3.4.13.1.

1.4 This procedure supports the License Renewal Aging Management Program Boric Acid Corrosion Program by providing RCS leakage monitoring criteria (Reference 2.11).

2.0 REFERENCES

2.1 Improved Technical Specifications LCO 3.4.13 and ITS 1.1 Definition of LEAKAGE

2.2 AP-030, NRC Reporting Requirements

2.3 EPCLA-01, Emergency Control

2.4 EGR-NGGC-0207, Boric Acid Corrosion Control (Generic Letter 88-05)

2.5 AOP-016, Excessive Primary Plant Leakage

2.6 OMM-015, Operations Surveillance Testing

2.7 ESR 94-471, Calculation for VCT Level vs. Volume

2.8 PLP-037, Conduct of Infrequently Performed Test or Evolutions and Pre-Job Briefs

2.9 CP-014, Primary-To-Secondary Leak Rate Calculation

2.10 SOER 97-1, Potential Loss of High Pressure Injection and Charging from Gas Intrusion (Credit taken for monitoring VCT level to address recommendation #1 of the SOER)

2.11 RNP-L/LR-0601, Aging Management Program, Boric Acid Corrosion Program

2.12 PWROG Letter, OG-07-286, Dated June 26, 2007 entitled "Recommendations for Implementation of Guidelines for PWROG RCS Leak Rate Programs"

2.13 PWROG Letter, OG-08-400 Dated November 19, 2008 entitled "Clarification of the Recommendation of Guidelines for PWROG RCS Leakage Rate Program with Respect to NEI-03-08 (PA-OSC-0189 and PA-OSC-0218)

2.14 WCAP-16423-NP, Pressurized Water Reactor Owners Group Standard Process and Methods for Calculating RCS Leak Rate for Pressurized Water Reactors

2.15 WCAP-16465-NP, Pressurized Water Reactor Owners Group Standard RCS Leakage Action Levels and Response Guidelines

3.0 RESPONSIBILITIES

3.1 Operations is responsible for:

3.1.1 Performance, review, and approval of this test.

3.1.2 Updating of the RCS Leakage Monitoring Spreadsheet after each performance of the surveillance.

3.2 Engineering is responsible for:

3.2.1 Development and maintenance of the RCS Leakage Monitoring Spreadsheet.

3.2.2 Establishment and updating of baseline mean (μ) and standard deviation (σ) values.

4.0 PREREQUISITES

INIT

4.1 This revision has been verified to be the latest revision available. Today JR
Date

4.2 The Shift Manager has given permission to conduct this test. Today JR
Date

4.3 RCS temperature is stable. JR

4.4 There is a bubble in the Pressurizer JR

NOTE: ITS SR 3.4.13.1 requires performance of this test within 12 hours after reaching steady state operating conditions in Modes 1, 2, 3, or 4. This test may be performed when stable in Mode 5 but only for tracking and trending purposes, not to satisfy the ITS SR requirements.

4.5 RCS pressure is stable. JR

4.6 Record RCS pressure. 2235 psig JR

4.7 Record Plant Mode. Mode 1 JR

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The accuracy of the RCS Leakage Rate Test is greatly improved when RCS temperature and Pressurizer level remain constant for the duration of the test.

5.2 This procedure should not be started unless the VCT level is high enough to avoid an automatic makeup during the performance of the RCS Leakage Rate Test.

5.3 Any steps not applicable shall be marked N/A and the reason(s) for any N/A noted in the Comments section of Attachment 10.6.

5.4 The principles of ALARA shall be used in planning and performing work and operations in the Radiation Control Area.

5.5 This procedure has been screened IAW PLP-037 criteria and determined to be outside the bounds of an Infrequently Performed Test or Evolution.

5.6 **IF** RCS pressure boundary **LEAKAGE** is verified, **THEN** the reactor shall be placed in Mode 3 within 6 hours and in Mode 5 within 36 hours of discovery of pressure boundary leakage. Pressure boundary **LEAKAGE** is leakage (except SG leakage) through a non-isolable fault in an RCS component body, pipe wall, or vessel wall. (ITS LCO 3.4.13)

5.7 For the purpose of this procedure, IDENTIFIED RCS Leakage is leakage collected in either the PRT, the RCDT, a Safety Injection Accumulator, or the Charging pump Seal Leak-off Collection Tank. This type of RCS leakage is through seat leakage, **NOT** through wall **OR** RCS Pressure Boundary (RCPB) leakage. This type leakage is **NOT** to be confused with Miscellaneous Identified RCS Leakage as it may be related to interconnected systems outside the RCS Pressure Boundary (See P&L 5.13).

5.8 Whenever possible, use the ERFIS Computer for data collection. This will improve accuracy and reduce the potential for human error.

5.9 The ERFIS on-screen historic information may be used to assist with data collection. This is especially helpful during xenon transients or when in AOP-016, Excessive Primary Plant Leakage.

5.10 To improve the accuracy of the Pressurizer Relief Tank (PRT) level changes calculated during this procedure, a long term trend should be used for data collected from ERFIS. Duration of the long term PRT trend should be any period of stable PRT operation up to 24 hours. Due to possible evolutions affecting the PRT, the duration of the trend will be decided by the operator performing this test.

5.11 **IF** R-11 is increasing and cannot be attributed to any specific leak location based on search results with the unit on line, **THEN** a task should be added to the forced outage schedule to inspect normally inaccessible areas for indication of leakage to the maximum extent practical.

5.12 To improve the accuracy of the Reactor Coolant Drain Tank (RCDT) level changes calculated during this procedure, a long term trend should be used for data collected from LI-1003. Duration of the long term RCDT trend should be any period of stable RCDT operation up to 12 hours. Due to possible evolutions affecting the RCDT, the duration of long term trend will be determined by the SM/CRS.

5.13 Component leakage (valve packing, pump seal, fitting leakage, etc.) from accessible sources may only be treated as Miscellaneous Identified leakage if the source has been identified **AND** the actual value of the leakage is obtained by a measurement taken at the start or during the data taking interval for the surveillance test. The leakage must be measured each time the OST is performed if it is to be credited towards Miscellaneous Identified RCS Leakage. Each component leak must have an active Work Order.

5.14 This procedure has been reviewed and found to be not applicable as per the requirements of OPS-NGGC-1306, Reactivity Management.

6.0 SPECIAL TOOLS AND EQUIPMENT

6.1 Calibrated Stop Watch (If needed to collect Miscellaneous RCS Identified Leakage)

6.2 Graduated Container (If needed to collect Miscellaneous RCS Identified Leakage)

7.0 ACCEPTANCE CRITERIA

7.1 This test is acceptable if:

- Unidentified RCS Leakage Rate does **NOT** exceed 1 gpm
- Identified RCS Leakage Rate does **NOT** exceed 10 gpm
- Primary-to-Secondary leakage does **NOT** exceed 75 gpd through any one steam generator as determined by CP-014.

7.2 The reviewing and approving authorities may accept this test in accordance with provisions set forth in OMM-015, Operations Surveillance Testing.

8.0 **PROCEDURE** INIT

8.1 RCS Leakage Rate Test

8.1.1 **VERIFY** RCS MAKEUP MODE in the AUTO position.

8.1.2 **VERIFY** RCS MAKEUP SYSTEM is ON.

8.1.3 **IF** desired, **THEN PLACE** LCV-115A, VCT/HLDP TK DIV, in the VCT position. N/A

NOTES: Whenever possible, use the ERFIS computer for data collection. This will improve accuracy and reduce the potential for human error.

The ERFIS on-screen historic information may be used to assist with data collection. This is especially helpful during a xenon transient or when in AOP-016, Excessive Primary Plant Leakage.

Measurement of leakage in Step 8.1.4.c, and the calculation of Total Measured Leakage in Step 8.1.4.d may be performed immediately prior to or at any time during the duration of this test.

The following step may be N/A if there is no active leakage issuing from components previously identified by work order.

8.1.4 **IF** there are any components that have known, active leakage, where the source is identified and can be treated as Miscellaneous Identified RCS Leakage or Known Non-RCPB Leakage per P&L 5.7 and P&L 5.13, **THEN PERFORM** the following on Attachment 10.5:

a. **LIST** the actively leaking component(s)

b. **RECORD** the Work Order number(s) for the component(s)

c. **RECORD** the measured leakage for the component(s)

d. **CALCULATE** the Total Measured Leakage ____

Peer Check ____

8.1.5 **RECORD** the Initial Values for the parameters listed on Attachment 10.1.

INIT

8.1.6 **IF** an automatic makeup occurs, **THEN PERFORM** the following:

1. **VERIFY** LCV-115A, VCT/HLDP TK DIV, in the AUTO position. N/A

2. **STOP** this procedure **AND NOTE** reason in Comments section. N/A

NOTES: When this procedure is being performed to satisfy ITS SR 3.4.13.1, the preferred duration is greater than or equal to 1 hour and the minimum duration 15 minutes.

When this procedure is being performed as directed by an AOP, there is not a minimum duration requirement.

8.1.7 **WHEN** at least 1 hour has elapsed, **OR**, **IF** required by Plant conditions to end this test, **THEN PERFORM** the following:

1. **VERIFY** RCS temperature is equal to initial RCS temperature recorded on Attachment 10.1. ____

2. **RECORD** the Final Values for the parameters listed on Attachment 10.1. ____

3. **VERIFY** LCV-115A, VCT/HLDP TK DIV, in the AUTO position. ____

NOTES: A decrease in VCT level represents plus (+) RCS leakage.

A decrease in Pressurizer level represents plus (+) RCS leakage.

8.1.8 **CALCULATE** the Difference and Change in Volume for the parameters listed on Attachment 10.1. ____

8.1.9 **PERFORM** a peer check of the calculated values listed in Attachment 10.1. ____

INIT

NOTES:	A plus (+) calculated Total RCS Leakage Rate represents plus (+) RCS leakage. Leak-rates (in gpm) on Attachment 10.2 should be rounded to two decimal places.

8.1.10 On Attachment 10.2, **PERFORM** the following:

1. **CALCULATE** the Total RCS Leakage Rate. ____
2. **CALCULATE** the Identified RCS Leakage Rate. ____
3. **CALCULATE** the Unidentified RCS Leakage Rate. ____
4. **PERFORM** a peer check of the calculations performed on Attachment 10.2 ____

8.1.11 **IF** unidentified RCS leakage is greater than 1.0 gpm **OR** the identified RCS leakage is greater than 10 gpm, **THEN PERFORM** the following:

1. **CONSULT** ITS LCO 3.4.13 for required actions. ____
2. **CONSULT** AP-030 for reporting requirements. ____
3. **CONSULT** EPCLA-01 for emergency action levels. ____
4. **CONSULT** AOP-016 for required actions. ____

8.1.12 **IF** RCS unidentified leakage is ≥ 0.05 gpm **AND** any valid R-24 monitor alarm **OR** any R-19 monitor indicates an increasing trend, **THEN** contact E&C Technician to perform Primary to Secondary Leakage Calculation for each steam generator in accordance with CP-014. (ITS LCO 3.4.13.d) ____

Primary to Secondary Leakage_____ gpd

INIT

8.1.13 **IF** unidentified RCS leakage is equal to or greater than 0.03 gpm for 3 consecutive leak rate calculations, **THEN** perform the following:

1. Start an investigation immediately and inform plant staff. ____
2. **IF** not currently in progress, **THEN** start daily leak rate calculations. ____

NOTE:	The RCS Leakage Monitoring Spreadsheet can be located at N:\NGGWEB\RNP\Departments\Operations\RCS Leakage Program or accessed from the OPS Tool Database

8.1.14 **Update** the RCS Leakage Monitoring Spreadsheet as follows:

1. **LOG** date and time. ____
2. **ENTER** RCS Identified and Unidentified RCS leakage. ____
3. **PERFORM** Peer Check of data entry fields prior to uploading any data. ____
4. **CLICK** UPLOAD DATA. ____

8.1.15 **RECORD** the following Unidentified Leak Rate data from the RCS Leakage Monitoring Spreadsheet:

1. Current Mean (μ) value _____gpm ____
2. Current Sigma (σ) value _____gpm ____
3. Current [μ + 2σ] value _____gpm ____
4. Current [μ + 3σ] value _____gpm ____
5. 7 Day Rolling Average _____gpm ____
6. Number of Consecutive Days greater than (μ) _____days ____
7. Last 3 Daily Unidentified Leak Rates

   _____gpm _____gpm _____gpm ____

INIT

8.1.16 Evaluate Unidentified Leakage against the Action Level Criteria Below:

Action Level	Action Level Limit Description	Action Level Exceeded (Circle One)
Tier One Action Level	7-day rolling average of **daily** Unidentified RCS leak rates is greater than 0.1 gpm	YES / NO
	Nine consecutive **daily** unidentified RCS leakage values > mean (μ)	YES / NO
Tier Two Action Level	Two consecutive **daily** Unidentified RCS leak rates are greater than 0.15 gpm	YES / NO
	Two of three consecutive **daily** Unidentified leak rates greater than [μ+2σ]	YES / NO
Tier Three Action Level	One **daily** Unidentified RCS leak rate is greater than 0.3 gpm	YES / NO
	One **daily** Unidentified RCS leak rate is greater than [μ+3σ]	YES / NO

8.1.17 **IF** any Unidentified RCS leakage Action Level (AL) is exceeded, **THEN PERFORM** the following:

1. **REVIEW** and implement the appropriate actions of Attachment 10.4, Action Level Response Guidelines while continuing with this procedure. ____

2. **INITIATE** an Action Plan IAW PLP-121 to document actions taken. ____

8.1.18 **UPDATE** leakage rate on Control Room status board. ____

8.1.19 **IF** Attachment 10.4, Action Level Response Guidelines was required, **THEN** ATTACH it to this OST when submitting to Records. ____

INIT

9.0 RECORDS

9.1 Completed procedure, included completed partials shall be retained as a non-permanent QA record

10.0 ATTACHMENTS

10.1 Leakage Evaluation Data Sheet

10.2 Leakage Evaluation Calculation Sheet

10.3 Level to Gallons Conversion Table

10.4 Action Level Response Guidelines

10.5 Components with Known Measured Leakage

10.6 Surveillance Test Procedure Certification and Review Form

LEAKAGE EVALUATION DATA SHEET

REF STEP	ITEM	VCT LVL (5) LI-115 or LI-112	PZR LVL (5) LI-459A or LI-460	RCS TEMP (5) T_{avg} ≥540°F TR-408 T_{avg} <540°F TR-413	PZR RELIEF TANK (1) (7) LI-470	ACCUM "A" (5) (6) LI-920 or LI-922	ACCUM "B" (5) (6) LI-924 or LI-926	ACCUM "C" (5) (6) LI-928 or LI-930	RCS DRAIN TANK LI-1003 (2)	CHARGING PUMP LEAK OFF COLL. TANK LIC-200 (3)	TIME
8.1.5	Initial Values	in 24.0	% 36	°F 560	Date/Time ____ 70.2 % 7094.5 gal(1)	% 72	% 71	% 74	Date/Time ____ 10 % 45 gal(2)	2.0 % 2.33 gal(3)	1815
8.1.7.2	Final Values	in	%	°F	Date/Time ____ % gal(1)	%	%	%	Date/Time ____ % gal(2)	% gal(3)	1915
8.1.8	Difference (+/-)	in	%		gal	%	%	%	gal	gal	min(4)
Multiplier		23.99 gal/in	50.56 gal/%			7 gal/%	7 gal/%	7 gal/%			
8.1.8	Change in Volume (gals)										

Comments _____

(1) Use Curve Book, Curve 8.23 or Attachment 10.3, to convert PRT level into gallons **OR** mark as N/A if level did not increase.

(2) Use Curve Book, Curve 8.10, to convert RCDT level into gallons OR mark as N/A if level did not increase. To improve the accuracy of the Reactor Coolant Drain Tank (RCDT) level changes calculated during this procedure, a long term trend should be used for data collected from LI-1003. A spreadsheet was developed to log RCDT levels that would provide a graph of the RCDT Trend. The file is located at V:\Operations\STA\RCDT Level. This graph or an ERFIS plot should be monitored for changes in inleakage rates into the RCDT. Duration of the long term RCDT trend should be any period of stable RCDT operation up to 12 hours. (Actual duration of long term trend will be determined by the SM/CRS).

(3) Use Curve Book, Curve 8.22 or Attachment 10.3, to convert Charging Pump Leak-off Collection Tank level into gallons or mark as N/A if level did not increase.

(4) Minimum test duration of 15 minutes is required when performing this procedure to satisfy ITS SR 3.4.13.1.

(5) Circle the respective indicator/indication used. **IF** ERFIS is in service, **THEN** use it to obtain values. **IF** ERFIS is not in service, **THEN** obtain the values from the respective RTGB indicators **AND** make a comment in the Comments section that RTGB indicators were used for the OST.

(6) An increase in SI Accumulator is (+) RCS Leakage. **IF** the increase is due to SI Accumulators sluicing from one accumulator to another, **THEN** do not include the change in the identified RCS leakage rate. A decrease in SI Accumulator is (-) RCS leakage **ONLY IF** RCS pressure is less than SI Accumulator pressure.

(7) PZR RELIEF TANK Level Initial & Final should be collected from ERFIS using long term trend up to 24 hours of Stable PRT Operation. An ERFIS plot should be monitored for changes in inleakage rates into the PRT. Duration of the long term PRT trend should be any period of stable PRT operation up to 24 hours. (Actual duration of long term trend will be determined by the SM/CRS)

LEAKAGE EVALUATION CALCULATION SHEET

Total RCS Leakage Rate		
VCT Volume Change Test Duration	_____ gal _____ min	_____ gpm
PZR Volume Change Test Duration	_____ gal _____ min	+ _____ gpm
Total RCS Leakage Rate		_____ gpm

Identified RCS Leakage Rate		
PRT Volume Change Test Duration	_____ gal _____ min	_____ gpm
SI ACC A/B/C Volume Change Test Duration	_____ gal _____ min	+ _____ gpm
RCDT Volume Change Test Duration	_____ gal _____ min	+ _____ gpm
Leak-Off Coll Tk Volume Change Test Duration	_____ gal _____ min	+ _____ gpm
Miscellaneous Identified RCS Leakage Rate from Att. 10.5		+ _____ gpm
Total Identified RCS Leakage Rate (MSPI)		_____ gpm

Unidentified RCS Leakage Rate	
Total RCS Leakage Rate	_____ gpm
Total Identified RCS Leakage Rate	- _____ gpm
Unidentified RCS Leakage Rate	_____ gpm

LEVEL TO GALLONS CONVERSION TABLE

Charging Pump Leakoff Collection Tank Curve 8.22			
Level Indicated %	Gallons	Level Indicated %	Gallons
1	0.17	51	22.00
2	0.33	52	22.66
3	0.50	53	23.17
4	0.66	54	23.66
5	1.00	55	24.17
6	1.17	56	24.66
7	1.33	57	25.33
8	1.66	58	25.84
9	2.00	59	26.33
10	2.33	60	26.84
11	2.66	61	27.51
12	3.00	62	28.00
13	3.33	63	28.50
14	3.66	64	29.00
15	4.00	65	29.33
16	4.33	66	30.17
17	4.66	67	30.66
18	5.33	68	31.17
19	5.66	69	31.66
20	6.00	70	32.17
21	6.50	71	32.66
22	7.00	72	33.33
23	7.33	73	33.66
24	7.84	74	34.33
25	8.33	75	34.66
26	8.83	76	35.17
27	9.33	77	35.66
28	9.84	78	36.00
29	10.33	79	36.50
30	10.83	80	36.84
31	11.33	81	37.33
32	11.84	82	37.66
33	12.33	83	38.00
34	13.00	84	38.50
35	13.49	85	38.83
36	14.00	86	39.17
37	14.66	87	39.66
38	15.18	88	40.00
39	15.66	89	40.33
40	16.17	90	40.50
41	16.66	91	40.84
42	17.00	92	41.00
43	17.66	93	41.33
44	18.33	94	41.66
45	18.83	95	41.83
46	19.33	96	41.84
47	20.00	97	42.33
48	20.50	98	42.66
49	21.00	99	42.83
50	21.50	100	43.00

Pressurizer Relief Tank Curve 8.23			
Level Indicated %	Gallons	Level Indicated %	Gallons
70.0	7075.00	75.1	7572.25
70.1	7084.75	75.2	7582.00
70.2	7094.50	75.3	7591.75
70.3	7104.25	75.4	7601.50
70.4	7114.00	75.5	7611.25
70.5	7123.75	75.6	7621.00
70.6	7133.50	75.7	7630.75
70.7	7143.25	75.8	7640.50
70.8	7153.00	75.9	7650.25
70.9	7162.75	76.0	7660.00
71.0	7172.50	76.1	7669.75
71.1	7182.25	76.2	7679.50
71.2	7192.00	76.3	7689.25
71.3	7201.75	76.4	7699.00
71.4	7211.50	76.5	7708.75
71.5	7221.25	76.6	7718.50
71.6	7231.00	76.7	7728.25
71.7	7240.75	76.8	7738.00
71.8	7250.50	76.9	7747.75
71.9	7260.25	77.0	7757.50
72.0	7270.00	77.1	7767.25
72.1	7279.75	77.2	7777.00
72.2	7289.50	77.3	7786.75
72.3	7299.25	77.4	7796.50
72.4	7309.00	77.5	7806.25
72.5	7318.75	77.6	7816.00
72.6	7328.50	77.7	7825.75
72.7	7338.25	77.8	7835.50
72.8	7348.00	77.9	7845.25
72.9	7357.75	78.0	7855.00
73.0	7367.50	78.1	7864.75
73.1	7377.25	78.2	7874.50
73.2	7387.00	78.3	7884.25
73.3	7396.75	78.4	7894.00
73.4	7406.50	78.5	7903.75
73.5	7416.25	78.6	7913.50
73.6	7426.00	78.7	7923.25
73.7	7435.75	78.8	7933.00
73.8	7445.50	78.9	7942.75
73.9	7455.25	79.0	7952.50
74.0	7465.00	79.1	7962.25
74.1	7474.75	79.2	7972.00
74.2	7484.50	79.3	7981.75
74.3	7494.25	79.4	7991.50
74.4	7504.00	79.5	8001.25
74.5	7513.75	79.6	8011.00
74.6	7523.50	79.7	8020.75
74.7	7533.25	79.8	8030.50
74.8	7543.00	79.9	8040.25
74.9	7552.75	80.0	8050.00
75.0	7562.50		

ACTION LEVEL RESPONSE GUIDELINES

DEFINITIONS: "**Daily**" means the "daily average value" which is "the average of all valid measurements performed on a given calendar day."

MEAN (μ) – Average of the valid leak rates for a given period of time.

STANDARD DEVIATION (σ) – A measure of the degree of dispersion of the data from the mean value.

NOTE: "**Daily** for below Action Levels should be interpreted as "periodic" if the ULR measurements are performed on less than a daily basis. That is, a "periodic" value is always a "daily average value" but is not evaluated every calendar day.

INIT

1. Response Guidelines for Exceeding **Tier One Action Levels**

   a. **IF** one 7-day rolling average of **daily** Unidentified RCS leak rates is greater than 0.1 gpm **OR** nine consecutive daily unidentified RCS leakage values > mean (μ), **THEN PERFORM** the following:

      1) **CONFIRM** indication. ____

      2) **PERFORM** a confirmatory leak rate calculation. ____

      3) **CHECK** for abnormal trends on other leakage indicators. ____

      4) **FORWARD** data to Engineering to evaluate trends. ____

      5) **INCREASE** monitoring as recommended by Engineering. ____

      6) **INITIATE** a condition report. NCR # _____ ____

      7) **NOTIFY** Operations Management ____

ACTION LEVEL RESPONSE GUIDELINES

INIT

2. Response Guidelines for Exceeding **Tier Two Action Levels**

a. **IF** two consecutive **daily** Unidentified RCS leak rates are greater than 0.15 gpm **OR** two of three consecutive daily Unidentified leak rates greater than [μ+2σ], **THEN PERFORM** the following:

1) **VERIFY** Tier One response guidelines have been performed. ____

2) **COMMENCE** a leak investigation as follows:

.a) **REVIEW** recent plant evolutions. ____

.b) **EVALUATE** changes in other leakage detection indications. ____

.c) **INITIATE** walkdowns of various portions of potentially affected systems outside containment. ____

3) **IDENTIFY** the source of the increase in leakage as follows:

.a) **CHECK** any components **OR** flow paths recently changed or placed in service, shutdown, vented, drained, or filled. ____

.b) **CHECK** any maintenance activity that may have resulted in increasing leakage. ____

.c) **CHECK** any filters recently alternated **OR** changed for leakage from their vents or drains. ____

– **INSPECT** filter housing for gaskets leakage. ____

– **CHECK** seal injection filters **AND** reactor coolant filter for signs of leakage. ____

4) **NOTIFY** Operations Management ____

ACTION LEVEL RESPONSE GUIDELINES

INIT

3. Response Guidelines for Exceeding **Tier Three Action Levels**

a. **IF** one **daily** Unidentified RCS leak rate is greater than 0.3 gpm **OR** [μ+3σ], **THEN PERFORM** the following:

1) **VERIFY** Tier One **AND** Tier Two response guidelines have been performed. ____

2) **IF** increased leak rate is indicated inside containment, **THEN PERFORM** the following:

.a) **BEGIN PLANNING** for a containment entry. ____

NOTE:	There is a single valve outside of containment to obtain this sample in pipe alley - WD-1731A.

.b) **NOTIFY** E&RC to **OBTAIN** a containment sump sample (during pump out) **AND** analyze for activity and boron concentration IAW CP-003, (looking for a larger than expected boric acid concentration **OR** other unexpected chemicals). ____

_____
E&RC NOTIFIED

.c) **EVALUATE** other systems for indications of leakage. ____

.d) **OBTAIN** a containment atmosphere sample for indications of RCS leakage. ____

ACTION LEVEL RESPONSE GUIDELINES

		INIT
3.0 (Continued)	Response Guidelines for Exceeding **Tier Three Action Levels**	
3)	**IDENTIFY** the source of the leak.	____
4)	**QUANTIFY** the leakage.	____
5)	**INITIATE** a plan to repair the leak.	____
6)	**MONITOR** containment airborne radiation levels **AND** area radiation monitors.	____
7)	**SAMPLE** containment atmosphere for indications of RCS leakage.	____
8)	**MONITOR** other containment parameters (temperature, pressure, humidity, etc.).	____
9)	**IF** the leak source is found **AND** isolated **OR** stopped, **THEN RE-PERFORM** RCS leak rate calculation.	____
10)	**NOTIFY** Operations Management	____

COMPONENTS WITH KNOWN MEASURED LEAKAGE

NOTE: If leakage can **NOT** be collected in a suitable container to accurately measure in milliliters per minute (such as when leakage is in a high dose area but can be viewed by camera), this "drops per minute conversion" may be used. To convert **drops per minute** to gallons per minute, multiply drops per minute by 1.32 x 10-5 (0.0000132). The drop counting method shall only be allowed if **NO** other means is available to measure leakage due to inaccessibility from a radiation dose or personnel safety standpoint based on CRS/SM guidance.

To convert **milliliters per minute** to gallons per minute, multiply milliliters per minute by 2.64×10^{-4} (0.000264). This is the preferred method for calculating leakage.

Individual component leakage should not be rounded. Rounding should be completed in the Total Measured Leakage calculation to 2 significant digits, as this is what will be used by the Leak Rate program.

Component	Measured Leakage (gpm)	Measured Leakage Volume	Duration Time	Active Work Order Number
CCV-115B Outlet Flange		1000 ml	5 min.	2011-XXXX

Total Measured Leakage	gpm

SURVEILLANCE TEST PROCEDURE
CERTIFICATION AND REVIEW FORM

Scheduled / Unscheduled (Circle one)

(If unscheduled, state reason for test and the page numbers included in partial test)

_____
_____
_____

Test Performed By:

Initials	Name (Print)	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Test Complete: Date:_____ Time:_____

Test Satisfactory: Yes / No (Circle one)

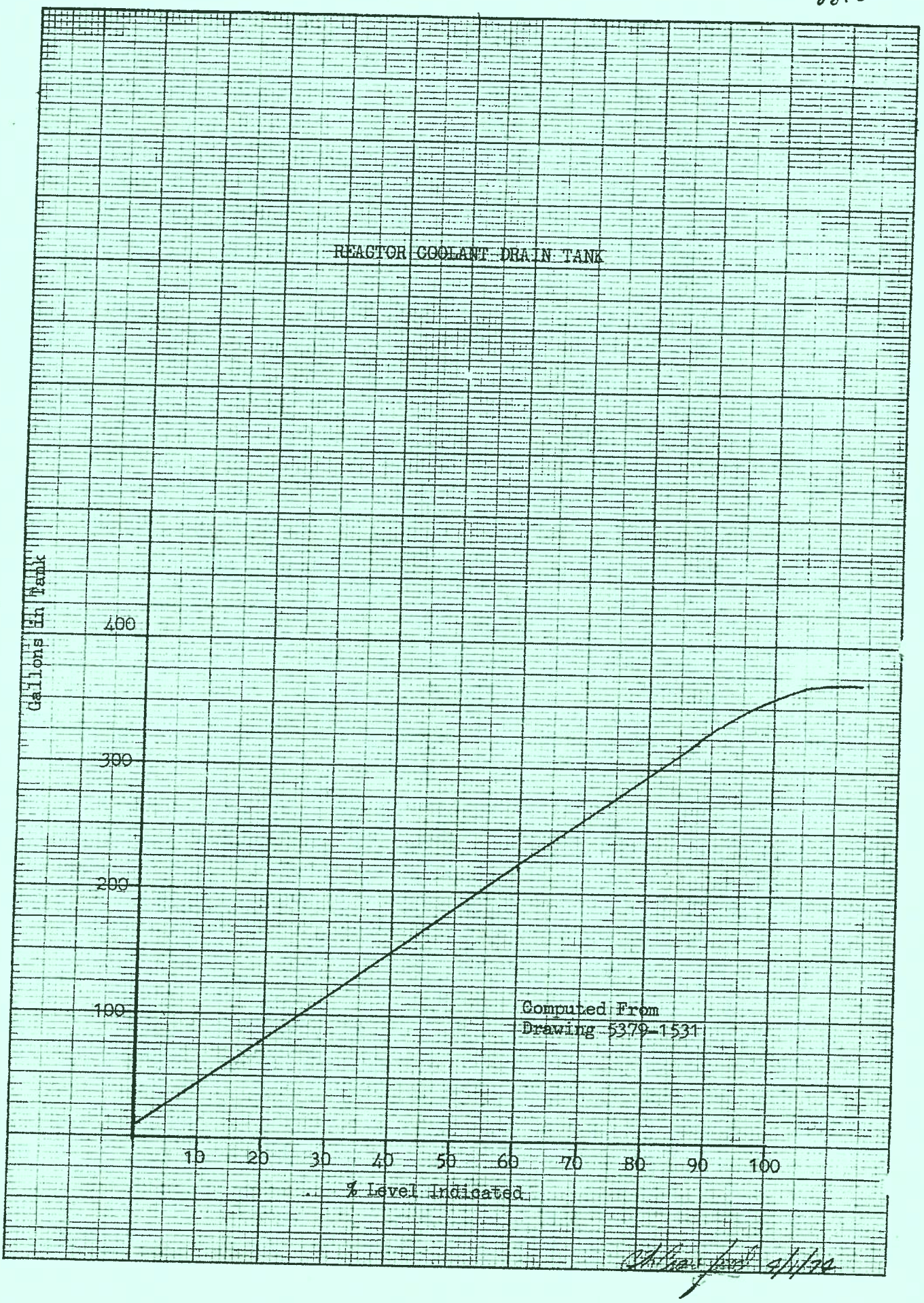
Reviewed by: _____ _____
Shift Technical Advisor Date

Comments: (Required if results were unsatisfactory)

_____
_____
_____
_____

Approved by: _____ _____
Shift Manager Date

8.10



Answer Key

Progress Energy

C
Continuous
Use

ROBINSON NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 9

OST-051

REACTOR COOLANT SYSTEM LEAKAGE EVALUATION (EVERY 72 HOURS DURING STEADY STATE OPERATION AND WITHIN 12 HOURS AFTER REACHING STEADY STATE OPERATION)

REVISION 45

SUMMARY OF CHANGES
PRR #00448048
OST-051, Revision 45

STEP	REVISION COMMENTS
8.1.14.3	Added "**PERFORM** Peer Check of data entry fields prior to uploading any data." PRR 00448048
Note prior to 8.1.14	Deleted V:\Drive Link and added "N:\NGGWEB\RNP\Departments\Operations\RCS Leakage Program" PRR 00450337
Attachment 10.4 note prior to 3.a.2.b	Added "There is a single valve outside of containment to obtain this sample in pipe alley WD-1731A, RCDT Discharge Header to WHUT Drain." PRR 00453076
Attachment 10.4 3.a.2.b	Revised step to notify E&RC to obtain sample and analyze for activity and boron concentration IAW CP-003.

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

1.1 To evaluate RCS leakage and to satisfy Improved Technical Specification Surveillance Requirement (ITS SR) 3.4.13.1.

1.2 This test is required when in Modes 1, 2, 3 or 4. ITS SR 3.4.13.1 basis further defines the applicable conditions as "within 12 hours after reaching continuous steady state operation."

1.3 This test may be performed when in Mode 5 as long as the RCS is pressurized, there is a bubble in the Pressurizer and RCS/RHR temperature is constant. However, a test under these conditions will not satisfy ITS SR 3.4.13.1.

1.4 This procedure supports the License Renewal Aging Management Program Boric Acid Corrosion Program by providing RCS leakage monitoring criteria (Reference 2.11).

2.0 REFERENCES

2.1 Improved Technical Specifications LCO 3.4.13 and ITS 1.1 Definition of LEAKAGE

2.2 AP-030, NRC Reporting Requirements

2.3 EPCLA-01, Emergency Control

2.4 EGR-NGGC-0207, Boric Acid Corrosion Control (Generic Letter 88-05)

2.5 AOP-016, Excessive Primary Plant Leakage

2.6 OMM-015, Operations Surveillance Testing

2.7 ESR 94-471, Calculation for VCT Level vs. Volume

2.8 PLP-037, Conduct of Infrequently Performed Test or Evolutions and Pre-Job Briefs

2.9 CP-014, Primary-To-Secondary Leak Rate Calculation

2.10 SOER 97-1, Potential Loss of High Pressure Injection and Charging from Gas Intrusion (Credit taken for monitoring VCT level to address recommendation #1 of the SOER)

2.11 RNP-L/LR-0601, Aging Management Program, Boric Acid Corrosion Program

2.12 PWROG Letter, OG-07-286, Dated June 26, 2007 entitled "Recommendations for Implementation of Guidelines for PWROG RCS Leak Rate Programs"

2.13 PWROG Letter, OG-08-400 Dated November 19, 2008 entitled "Clarification of the Recommendation of Guidelines for PWROG RCS Leakage Rate Program with Respect to NEI-03-08 (PA-OSC-0189 and PA-OSC-0218)

2.14 WCAP-16423-NP, Pressurized Water Reactor Owners Group Standard Process and Methods for Calculating RCS Leak Rate for Pressurized Water Reactors

2.15 WCAP-16465-NP, Pressurized Water Reactor Owners Group Standard RCS Leakage Action Levels and Response Guidelines

3.0 RESPONSIBILITIES

3.1 Operations is responsible for:

3.1.1 Performance, review, and approval of this test.

3.1.2 Updating of the RCS Leakage Monitoring Spreadsheet after each performance of the surveillance.

3.2 Engineering is responsible for:

3.2.1 Development and maintenance of the RCS Leakage Monitoring Spreadsheet.

3.2.2 Establishment and updating of baseline mean (μ) and standard deviation (σ) values.

4.0 PREREQUISITES

INIT

4.1 This revision has been verified to be the latest revision available. Today Date

4.2 The Shift Manager has given permission to conduct this test. Today Date

4.3 RCS temperature is stable.

4.4 There is a bubble in the Pressurizer

> **NOTE:** ITS SR 3.4.13.1 requires performance of this test within 12 hours after reaching steady state operating conditions in Modes 1, 2, 3, or 4. This test may be performed when stable in Mode 5 but only for tracking and trending purposes, not to satisfy the ITS SR requirements.

4.5 RCS pressure is stable.

4.6 Record RCS pressure. 2235 psig

4.7 Record Plant Mode. Mode 1

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The accuracy of the RCS Leakage Rate Test is greatly improved when RCS temperature and Pressurizer level remain constant for the duration of the test.

5.2 This procedure should not be started unless the VCT level is high enough to avoid an automatic makeup during the performance of the RCS Leakage Rate Test.

5.3 Any steps not applicable shall be marked N/A and the reason(s) for any N/A noted in the Comments section of Attachment 10.6.

5.4 The principles of ALARA shall be used in planning and performing work and operations in the Radiation Control Area.

5.5 This procedure has been screened IAW PLP-037 criteria and determined to be outside the bounds of an Infrequently Performed Test or Evolution.

5.6 **IF** RCS pressure boundary **LEAKAGE** is verified, **THEN** the reactor shall be placed in Mode 3 within 6 hours and in Mode 5 within 36 hours of discovery of pressure boundary leakage. Pressure boundary **LEAKAGE** is leakage (except SG leakage) through a non-isolable fault in an RCS component body, pipe wall, or vessel wall. (ITS LCO 3.4.13)

5.7 For the purpose of this procedure, IDENTIFIED RCS Leakage is leakage collected in either the PRT, the RCDT, a Safety Injection Accumulator, or the Charging pump Seal Leak-off Collection Tank. This type of RCS leakage is through seat leakage, **NOT** through wall **OR** RCS Pressure Boundary (RCPB) leakage. This type leakage is **NOT** to be confused with Miscellaneous Identified RCS Leakage as it may be related to interconnected systems outside the RCS Pressure Boundary (See P&L 5.13).

5.8 Whenever possible, use the ERFIS Computer for data collection. This will improve accuracy and reduce the potential for human error.

5.9 The ERFIS on-screen historic information may be used to assist with data collection. This is especially helpful during xenon transients or when in AOP-016, Excessive Primary Plant Leakage.

5.10 To improve the accuracy of the Pressurizer Relief Tank (PRT) level changes calculated during this procedure, a long term trend should be used for data collected from ERFIS. Duration of the long term PRT trend should be any period of stable PRT operation up to 24 hours. Due to possible evolutions affecting the PRT, the duration of the trend will be decided by the operator performing this test.

5.11 **IF** R-11 is increasing and cannot be attributed to any specific leak location based on search results with the unit on line, **THEN** a task should be added to the forced outage schedule to inspect normally inaccessible areas for indication of leakage to the maximum extent practical.

5.12 To improve the accuracy of the Reactor Coolant Drain Tank (RCDT) level changes calculated during this procedure, a long term trend should be used for data collected from LI-1003. Duration of the long term RCDT trend should be any period of stable RCDT operation up to 12 hours. Due to possible evolutions affecting the RCDT, the duration of long term trend will be determined by the SM/CRS.

5.13 Component leakage (valve packing, pump seal, fitting leakage, etc.) from accessible sources may only be treated as Miscellaneous Identified leakage if the source has been identified **AND** the actual value of the leakage is obtained by a measurement taken at the start or during the data taking interval for the surveillance test. The leakage must be measured each time the OST is performed if it is to be credited towards Miscellaneous Identified RCS Leakage. Each component leak must have an active Work Order.

5.14 This procedure has been reviewed and found to be not applicable as per the requirements of OPS-NGGC-1306, Reactivity Management.

6.0 SPECIAL TOOLS AND EQUIPMENT

6.1 Calibrated Stop Watch (If needed to collect Miscellaneous RCS Identified Leakage)

6.2 Graduated Container (If needed to collect Miscellaneous RCS Identified Leakage)

7.0 ACCEPTANCE CRITERIA

7.1 This test is acceptable if:

- Unidentified RCS Leakage Rate does **NOT** exceed 1 gpm
- Identified RCS Leakage Rate does **NOT** exceed 10 gpm
- Primary-to-Secondary leakage does **NOT** exceed 75 gpd through any one steam generator as determined by CP-014.

7.2 The reviewing and approving authorities may accept this test in accordance with provisions set forth in OMM-015, Operations Surveillance Testing.

8.0 **PROCEDURE** INIT

8.1 RCS Leakage Rate Test

8.1.1 **VERIFY** RCS MAKEUP MODE in the AUTO position.

8.1.2 **VERIFY** RCS MAKEUP SYSTEM is ON.

8.1.3 **IF** desired, **THEN PLACE** LCV-115A, VCT/HLDP TK DIV, in the VCT position. N/A

NOTES:

Whenever possible, use the ERFIS computer for data collection. This will improve accuracy and reduce the potential for human error.

The ERFIS on-screen historic information may be used to assist with data collection. This is especially helpful during a xenon transient or when in AOP-016, Excessive Primary Plant Leakage.

Measurement of leakage in Step 8.1.4.c, and the calculation of Total Measured Leakage in Step 8.1.4.d may be performed immediately prior to or at any time during the duration of this test.

The following step may be N/A if there is no active leakage issuing from components previously identified by work order.

8.1.4 **IF** there are any components that have known, active leakage, where the source is identified and can be treated as Miscellaneous Identified RCS Leakage or Known Non-RCPB Leakage per P&L 5.7 and P&L 5.13, **THEN PERFORM** the following on Attachment 10.5:

a. **LIST** the actively leaking component(s)

b. **RECORD** the Work Order number(s) for the component(s)

c. **RECORD** the measured leakage for the component(s)

d. **CALCULATE** the Total Measured Leakage ____

Peer Check

8.1.5 **RECORD** the Initial Values for the parameters listed on Attachment 10.1.

INIT

8.1.6 **IF** an automatic makeup occurs, **THEN PERFORM** the following:

1. **VERIFY** LCV-115A, VCT/HLDP TK DIV, in the AUTO position. N/A

2. **STOP** this procedure **AND NOTE** reason in Comments section. N/A

NOTES: When this procedure is being performed to satisfy ITS SR 3.4.13.1, the preferred duration is greater than or equal to 1 hour and the minimum duration 15 minutes.

When this procedure is being performed as directed by an AOP, there is not a minimum duration requirement.

8.1.7 **WHEN** at least 1 hour has elapsed, **OR, IF** required by Plant conditions to end this test, **THEN PERFORM** the following:

1. **VERIFY** RCS temperature is equal to initial RCS temperature recorded on Attachment 10.1. ____

2. **RECORD** the Final Values for the parameters listed on Attachment 10.1. ____

3. **VERIFY** LCV-115A, VCT/HLDP TK DIV, in the AUTO position. ____

NOTES: A decrease in VCT level represents plus (+) RCS leakage.

A decrease in Pressurizer level represents plus (+) RCS leakage.

8.1.8 **CALCULATE** the Difference and Change in Volume for the parameters listed on Attachment 10.1. ____

8.1.9 **PERFORM** a peer check of the calculated values listed in Attachment 10.1. ____

INIT

NOTES: A plus (+) calculated Total RCS Leakage Rate represents plus (+) RCS leakage.

Leak-rates (in gpm) on Attachment 10.2 should be rounded to two decimal places.

8.1.10 On Attachment 10.2, **PERFORM** the following:

1. **CALCULATE** the Total RCS Leakage Rate. ____
2. **CALCULATE** the Identified RCS Leakage Rate. ____
3. **CALCULATE** the Unidentified RCS Leakage Rate. ____
4. **PERFORM** a peer check of the calculations performed on Attachment 10.2 ____

8.1.11 **IF** unidentified RCS leakage is greater than 1.0 gpm **OR** the identified RCS leakage is greater than 10 gpm, **THEN PERFORM** the following:

1. **CONSULT** ITS LCO 3.4.13 for required actions. ____
2. **CONSULT** AP-030 for reporting requirements. ____
3. **CONSULT** EPCLA-01 for emergency action levels. ____
4. **CONSULT** AOP-016 for required actions. ____

8.1.12 **IF** RCS unidentified leakage is ≥ 0.05 gpm **AND** any valid R-24 monitor alarm **OR** any R-19 monitor indicates an increasing trend, **THEN** contact E&C Technician to perform Primary to Secondary Leakage Calculation for each steam generator in accordance with CP-014. (ITS LCO 3.4.13.d) ____

Primary to Secondary Leakage_____ gpd

INIT

8.1.13 **IF** unidentified RCS leakage is equal to or greater than 0.03 gpm for 3 consecutive leak rate calculations, **THEN** perform the following:

1. Start an investigation immediately and inform plant staff. ____
2. **IF** not currently in progress, **THEN** start daily leak rate calculations. ____

NOTE:	The RCS Leakage Monitoring Spreadsheet can be located at N:\NGGWEB\RNP\Departments\Operations\RCS Leakage Program or accessed from the OPS Tool Database

8.1.14 **Update** the RCS Leakage Monitoring Spreadsheet as follows:

1. **LOG** date and time. ____
2. **ENTER** RCS Identified and Unidentified RCS leakage. ____
3. **PERFORM** Peer Check of data entry fields prior to uploading any data. ____
4. **CLICK** UPLOAD DATA. ____

8.1.15 **RECORD** the following Unidentified Leak Rate data from the RCS Leakage Monitoring Spreadsheet:

1. Current Mean (μ) value _____gpm ____
2. Current Sigma (σ) value _____gpm ____
3. Current [μ + 2σ] value _____gpm ____
4. Current [μ + 3σ] value _____gpm ____
5. 7 Day Rolling Average _____gpm ____
6. Number of Consecutive Days greater than (μ) _____days ____
7. Last 3 Daily Unidentified Leak Rates

   _____gpm _____gpm _____gpm ____

INIT

8.1.16 Evaluate Unidentified Leakage against the Action Level Criteria Below:

Action Level	Action Level Limit Description	Action Level Exceeded (Circle One)
Tier One Action Level	7-day rolling average of **daily** Unidentified RCS leak rates is greater than 0.1 gpm	YES / NO
	Nine consecutive **daily** unidentified RCS leakage values > mean (μ)	YES / NO
Tier Two Action Level	Two consecutive **daily** Unidentified RCS leak rates are greater than 0.15 gpm	YES / NO
	Two of three consecutive **daily** Unidentified leak rates greater than [μ+2σ]	YES / NO
Tier Three Action Level	One **daily** Unidentified RCS leak rate is greater than 0.3 gpm	YES / NO
	One **daily** Unidentified RCS leak rate is greater than [μ+3σ]	YES / NO

8.1.17 **IF** any Unidentified RCS leakage Action Level (AL) is exceeded, **THEN PERFORM** the following:

1. **REVIEW** and implement the appropriate actions of Attachment 10.4, Action Level Response Guidelines while continuing with this procedure. ____

2. **INITIATE** an Action Plan IAW PLP-121 to document actions taken. ____

8.1.18 **UPDATE** leakage rate on Control Room status board. ____

8.1.19 **IF** Attachment 10.4, Action Level Response Guidelines was required, **THEN** ATTACH it to this OST when submitting to Records. ____

9.0 RECORDS

9.1 Completed procedure, included completed partials shall be retained as a non-permanent QA record

10.0 ATTACHMENTS

10.1 Leakage Evaluation Data Sheet

10.2 Leakage Evaluation Calculation Sheet

10.3 Level to Gallons Conversion Table

10.4 Action Level Response Guidelines

10.5 Components with Known Measured Leakage

10.6 Surveillance Test Procedure Certification and Review Form

ATTACHMENT 10.1
Page 1 of 2

LEAKAGE EVALUATION DATA SHEET

REF STEP	ITEM	VCT LVL (5) LI-115 or LI-112	PZR LVL (5) LI-459A or LI-460	RCS TEMP (5) T_{avg} ≥540°F TR-408 T_{avg} <540°F TR-413	PZR RELIEF TANK (1) (7) LI-470	ACCUM "A" (5) (6) LI-920 or LI-922	ACCUM "B" (5) (6) LI-924 or LI-926	ACCUM "C" (5) (6) LI-928 or LI-930	RCS DRAIN TANK LI-1003 (2)	CHARGING PUMP LEAK OFF COLL. TANK LIC-200 (3)	TIME
					1440 Minutes				720 minutes		
8.1.5	Initial Values	24.0 in	36 %	560 °F	Date/Time 70.2 % 7094.5 gal(1)	72 %	71 %	74 %	Date/Time 10 % 45 gal(2)	20 % 2.33 gal(3)	1815
8.1.7.2	Final Values	20.8 in	36 %	560 °F	Date/Time 70.9 % 7162.75 gal(1)	72 %	71 %	74 %	Date/Time 19 % 77 gal(2)	32 % 11.84 gal(3)	1915
8.1.8	Difference (+/-)	3.2 in	0 %		68.25 gal	0 %	0 %	0 %	32 gal	9.51 gal	60 min(4)
Multiplier		23.99 gal/in	50.56 gal/%			7 gal/%	7 gal/%	7 gal/%			
8.1.8	Change in Volume (gals)	76.768	0		68.25	0	0	0	32	9.51	

Comments _____

(1) Use Curve Book, Curve 8.23 or Attachment 10.3, to convert PRT level into gallons **OR** mark as N/A if level did not increase.

(2) Use Curve Book, Curve 8.10, to convert RCDT level into gallons OR mark as N/A if level did not increase. To improve the accuracy of the Reactor Coolant Drain Tank (RCDT) level changes calculated during this procedure, a long term trend should be used for data collected from LI-1003. A spreadsheet was developed to log RCDT levels that would provide a graph of the RCDT Trend. The file is located at V:\Operations\STA\RCDT Level. This graph or an ERFIS plot should be monitored for changes in inleakage rates into the RCDT. Duration of the long term RCDT trend should be any period of stable RCDT operation up to 12 hours. (Actual duration of long term trend will be determined by the SM/CRS).

(3) Use Curve Book, Curve 8.22 or Attachment 10.3, to convert Charging Pump Leak-off Collection Tank level into gallons or mark as N/A if level did not increase.

(4) Minimum test duration of 15 minutes is required when performing this procedure to satisfy ITS SR 3.4.13.1.

(5) Circle the respective indicator/indication used. **IF** ERFIS is in service, **THEN** use it to obtain values. **IF** ERFIS is not in service, **THEN** obtain the values from the respective RTGB indicators **AND** make a comment in the Comments section that RTGB indicators were used for the OST.

(6) An increase in SI Accumulator is (+) RCS Leakage. **IF** the increase is due to SI Accumulators sluicing from one accumulator to another, **THEN** do not include the change in the identified RCS leakage rate. A decrease in SI Accumulator is (-) RCS leakage **ONLY IF** RCS pressure is less than SI Accumulator pressure.

(7) PZR RELIEF TANK Level Initial & Final should be collected from ERFIS using long term trend up to 24 hours of Stable PRT Operation. An ERFIS plot should be monitored for changes in inleakage rates into the PRT. Duration of the long term PRT trend should be any period of stable PRT operation up to 24 hours. (Actual duration of long term trend will be determined by the SM/CRS)

ATTACHMENT 10.2
Page 1 of 1

LEAKAGE EVALUATION CALCULATION SHEET

Total RCS Leakage Rate		
VCT Volume Change	76.76 gal	1.28 gpm
Test Duration	60 min	
PZR Volume Change	0 gal	+ 0 gpm
Test Duration	60 min	
Total RCS Leakage Rate		1.28 gpm

Identified RCS Leakage Rate		
PRT Volume Change	68.25 gal	0.05 gpm
Test Duration	1440 min	
SI ACC A/B/C Volume Change	0 gal	+ 0 gpm
Test Duration	60 min	
RCDT Volume Change	32 gal	+ 0.04 gpm
Test Duration	720 min	
Leak-Off Coll Tk Volume Change	9.51 gal	+ 0.16 gpm
Test Duration	60 min	
Miscellaneous Identified RCS Leakage Rate from Att. 10.5		+ 0.05 gpm
Total Identified RCS Leakage Rate (MSPI)		0.3 gpm

Unidentified RCS Leakage Rate	
Total RCS Leakage Rate	1.28 gpm
Total Identified RCS Leakage Rate	- 0.3 gpm
Unidentified RCS Leakage Rate	0.98 gpm

LEVEL TO GALLONS CONVERSION TABLE

Charging Pump Leakoff Collection Tank Curve 8.22			
Level Indicated %	Gallons	Level Indicated %	Gallons
1	0.17	51	22.00
2	0.33	52	22.66
3	0.50	53	23.17
4	0.66	54	23.66
5	1.00	55	24.17
6	1.17	56	24.66
7	1.33	57	25.33
8	1.66	58	25.84
9	2.00	59	26.33
10	2.33	60	26.84
11	2.66	61	27.51
12	3.00	62	28.00
13	3.33	63	28.50
14	3.66	64	29.00
15	4.00	65	29.33
16	4.33	66	30.17
17	4.66	67	30.66
18	5.33	68	31.17
19	5.66	69	31.66
20	6.00	70	32.17
21	6.50	71	32.66
22	7.00	72	33.33
23	7.33	73	33.66
24	7.84	74	34.33
25	8.33	75	34.66
26	8.83	76	35.17
27	9.33	77	35.66
28	9.84	78	36.00
29	10.33	79	36.50
30	10.83	80	36.84
31	11.33	81	37.33
32	11.84	82	37.66
33	12.33	83	38.00
34	13.00	84	38.50
35	13.49	85	38.83
36	14.00	86	39.17
37	14.66	87	39.66
38	15.18	88	40.00
39	15.66	89	40.33
40	16.17	90	40.50
41	16.66	91	40.84
42	17.00	92	41.00
43	17.66	93	41.33
44	18.33	94	41.66
45	18.83	95	41.83
46	19.33	96	41.84
47	20.00	97	42.33
48	20.50	98	42.66
49	21.00	99	42.83
50	21.50	100	43.00

Pressurizer Relief Tank Curve 8.23			
Level Indicated %	Gallons	Level Indicated %	Gallons
70.0	7075.00	75.1	7572.25
70.1	7084.75	75.2	7582.00
70.2	7094.50	75.3	7591.75
70.3	7104.25	75.4	7601.50
70.4	7114.00	75.5	7611.25
70.5	7123.75	75.6	7621.00
70.6	7133.50	75.7	7630.75
70.7	7143.25	75.8	7640.50
70.8	7153.00	75.9	7650.25
70.9	7162.75	76.0	7660.00
71.0	7172.50	76.1	7669.75
71.1	7182.25	76.2	7679.50
71.2	7192.00	76.3	7689.25
71.3	7201.75	76.4	7699.00
71.4	7211.50	76.5	7708.75
71.5	7221.25	76.6	7718.50
71.6	7231.00	76.7	7728.25
71.7	7240.75	76.8	7738.00
71.8	7250.50	76.9	7747.75
71.9	7260.25	77.0	7757.50
72.0	7270.00	77.1	7767.25
72.1	7279.75	77.2	7777.00
72.2	7289.50	77.3	7786.75
72.3	7299.25	77.4	7796.50
72.4	7309.00	77.5	7806.25
72.5	7318.75	77.6	7816.00
72.6	7328.50	77.7	7825.75
72.7	7338.25	77.8	7835.50
72.8	7348.00	77.9	7845.25
72.9	7357.75	78.0	7855.00
73.0	7367.50	78.1	7864.75
73.1	7377.25	78.2	7874.50
73.2	7387.00	78.3	7884.25
73.3	7396.75	78.4	7894.00
73.4	7406.50	78.5	7903.75
73.5	7416.25	78.6	7913.50
73.6	7426.00	78.7	7923.25
73.7	7435.75	78.8	7933.00
73.8	7445.50	78.9	7942.75
73.9	7455.25	79.0	7952.50
74.0	7465.00	79.1	7962.25
74.1	7474.75	79.2	7972.00
74.2	7484.50	79.3	7981.75
74.3	7494.25	79.4	7991.50
74.4	7504.00	79.5	8001.25
74.5	7513.75	79.6	8011.00
74.6	7523.50	79.7	8020.75
74.7	7533.25	79.8	8030.50
74.8	7543.00	79.9	8040.25
74.9	7552.75	80.0	8050.00
75.0	7562.50		

ACTION LEVEL RESPONSE GUIDELINES

DEFINITIONS: "**Daily**" means the "daily average value" which is "the average of all valid measurements performed on a given calendar day."

MEAN (μ) – Average of the valid leak rates for a given period of time.

STANDARD DEVIATION (σ) – A measure of the degree of dispersion of the data from the mean value.

NOTE: "**Daily** for below Action Levels should be interpreted as "periodic" if the ULR measurements are performed on less than a daily basis. That is, a "periodic" value is always a "daily average value" but is not evaluated every calendar day.

INIT

1. Response Guidelines for Exceeding **Tier One Action Levels**

   a. **IF** one 7-day rolling average of **daily** Unidentified RCS leak rates is greater than 0.1 gpm **OR** nine consecutive daily unidentified RCS leakage values > mean (μ), **THEN PERFORM** the following:

      1) **CONFIRM** indication. ____

      2) **PERFORM** a confirmatory leak rate calculation. ____

      3) **CHECK** for abnormal trends on other leakage indicators. ____

      4) **FORWARD** data to Engineering to evaluate trends. ____

      5) **INCREASE** monitoring as recommended by Engineering. ____

      6) **INITIATE** a condition report. NCR # _____ ____

      7) **NOTIFY** Operations Management ____

ACTION LEVEL RESPONSE GUIDELINES

INIT

2. Response Guidelines for Exceeding **Tier Two Action Levels**

a. **IF** two consecutive **daily** Unidentified RCS leak rates are greater than 0.15 gpm **OR** two of three consecutive daily Unidentified leak rates greater than [μ+2σ], **THEN PERFORM** the following:

1) **VERIFY** Tier One response guidelines have been performed. ____

2) **COMMENCE** a leak investigation as follows:

.a) **REVIEW** recent plant evolutions. ____

.b) **EVALUATE** changes in other leakage detection indications. ____

.c) **INITIATE** walkdowns of various portions of potentially affected systems outside containment. ____

3) **IDENTIFY** the source of the increase in leakage as follows:

.a) **CHECK** any components **OR** flow paths recently changed or placed in service, shutdown, vented, drained, or filled. ____

.b) **CHECK** any maintenance activity that may have resulted in increasing leakage. ____

.c) **CHECK** any filters recently alternated **OR** changed for leakage from their vents or drains. ____

– **INSPECT** filter housing for gaskets leakage. ____

– **CHECK** seal injection filters **AND** reactor coolant filter for signs of leakage. ____

4) **NOTIFY** Operations Management ____

ACTION LEVEL RESPONSE GUIDELINES

INIT

3. Response Guidelines for Exceeding **Tier Three Action Levels**

   a. **IF** one **daily** Unidentified RCS leak rate is greater than 0.3 gpm **OR** [$\mu+3\sigma$], **THEN PERFORM** the following:

      1) **VERIFY** Tier One **AND** Tier Two response guidelines have been performed. ____

      2) **IF** increased leak rate is indicated inside containment, **THEN PERFORM** the following:

         .a) **BEGIN PLANNING** for a containment entry. ____

NOTE:	There is a single valve outside of containment to obtain this sample in pipe alley - WD-1731A.

         .b) **NOTIFY** E&RC to **OBTAIN** a containment sump sample (during pump out) **AND** analyze for activity and boron concentration IAW CP-003, (looking for a larger than expected boric acid concentration **OR** other unexpected chemicals). ____

         _____
         E&RC NOTIFIED

         .c) **EVALUATE** other systems for indications of leakage. ____

         .d) **OBTAIN** a containment atmosphere sample for indications of RCS leakage. ____

ACTION LEVEL RESPONSE GUIDELINES

		INIT
3.0 (Continued)	Response Guidelines for Exceeding **Tier Three Action Levels**	
3)	**IDENTIFY** the source of the leak.	____
4)	**QUANTIFY** the leakage.	____
5)	**INITIATE** a plan to repair the leak.	____
6)	**MONITOR** containment airborne radiation levels **AND** area radiation monitors.	____
7)	**SAMPLE** containment atmosphere for indications of RCS leakage.	____
8)	**MONITOR** other containment parameters (temperature, pressure, humidity, etc.).	____
9)	**IF** the leak source is found **AND** isolated **OR** stopped, **THEN RE-PERFORM** RCS leak rate calculation.	____
10)	**NOTIFY** Operations Management	____

COMPONENTS WITH KNOWN MEASURED LEAKAGE

NOTE: If leakage can **NOT** be collected in a suitable container to accurately measure in milliliters per minute (such as when leakage is in a high dose area but can be viewed by camera), this "drops per minute conversion" may be used. To convert **drops per minute** to gallons per minute, multiply drops per minute by 1.32 x 10-5 (0.0000132). The drop counting method shall only be allowed if **NO** other means is available to measure leakage due to inaccessibility from a radiation dose or personnel safety standpoint based on CRS/SM guidance.

To convert **milliliters per minute** to gallons per minute, multiply milliliters per minute by 2.64×10^{-4} (0.000264). This is the preferred method for calculating leakage.

Individual component leakage should not be rounded. Rounding should be completed in the Total Measured Leakage calculation to 2 significant digits, as this is what will be used by the Leak Rate program.

Component	Measured Leakage (gpm)	Measured Leakage Volume	Duration Time	Active Work Order Number
LCV-115B outlet Flange	0.05	1000 ml	5 min.	2011-XXXX

Total Measured Leakage	0.05 gpm

0.0528

SURVEILLANCE TEST PROCEDURE
CERTIFICATION AND REVIEW FORM

Scheduled / Unscheduled (Circle one)

(If unscheduled, state reason for test and the page numbers included in partial test)

Test Performed By:

Initials	Name (Print)	Date
	R.O. Moore	Today

Test Complete: Date:_____ Time:_____

Test Satisfactory: Yes / No (Circle one)

Reviewed by: _____ _____
Shift Technical Advisor Date

Comments: (Required if results were unsatisfactory)

Approved by: _____ _____
Shift Manager Date

RO A1-2

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility:	HB ROBINSON	Task No.:	01000100905
Task Title:	Calculate the Boron Addition Required Prior to Initiating a Natural Circulation Cooldown to CSD	JPM No.:	2011-2 NRC JPM RO A1-2
K/A Reference:	G2.1.25 3.9 / 4.2		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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:

- The plant tripped from 50% RTP when a loss of off-site power occurred.
- The crew is performing EPP-5, Natural Circulation Cooldown.
- The TSC is NOT staffed.
- Core Burnup is 11000 MWD/MTU
- Boron Concentration is 600 PPM
- Tavg is 547˚F
- Boric Acid Storage Tank "A" is in service, aligned to blend with level at 85%.
- POWERTRAX is NOT available.

Task Standard: Boron addition and BAST level change calculated within stated standards.

Required Materials: Station Curve Book
Straight Edge
EPP-5, Step 11

General References: EPP-5, Natural Circulation Cooldown, Revision 15

Station Curve Book, Revision 197

Handouts: EPP-5, Step 11

Initiating Cue: The CRS wants to initiate boration while necessary support personnel are reporting. You have been directed to use Curve 1.14 to determine the minimum required boron concentration for CSD (200°F) and then calculate the boron addition necessary to achieve that boron concentration **(with no allowance for PZR outsurge).** In accordance with OP-301, "For large additions, **ESTIMATE** expected BAST level decrease for target boration".

Time Critical Task: NO

Validation Time: 12 minutes

VERIFICATION OF COMPLETION

(Denote Critical Steps with an asterisk)

Performance Step: 1 Determine minimum CSD Boron Concentration.

Standard: Determines Station Curve Book Curve 1.14 or Table 1.14 applies.

Examiner's Note:

Comment:

* **Performance Step: 2** Determine minimum CSD Boron Concentration.

1100

(1075 – 1090)

This makes no sense. How can they be above the line.

Standard: Reads no less than ~~1056~~ PPM and no more than 1106 PPM on Curve 1.14 or 1081 PPM from Table 1.14.

Examiner's Note: **The curve line falls between the 1050 PPM and the 1100 PPM line, allowing for a minor curve reading error since increments are 50 PPM.**

Obviously, so how do you justify above the 1100 line?

Comment:

* **Performance Step: 3** Determine the boron concentration change required.

Standard: ~~1090~~ 1100 - 600 = ~~490~~ 500

1081 PPM – 600 PPM = 481 PPM

1075 - 600 = 475

(475 - ~~490~~ 500)

Examiner's Note:

1056 PPM – 600 PPM = 456 PPM

1106 PPM - 600 PPM = 506 PPM

Comment:

* **Performance Step: 4** Determine boration required.

Standard: Using Boron / Dilution Table 5.11 of the Station Curve Book, System Temperature of 547°F, calculated boric acid addition is 1195.9 gallons (1081 PPM)

Using FIGURE S-3.1-3 (Curve Book 5.3), BORON ADDITION-COOLANT HOT, determines minimum addition of no less than 1150 gallons.

Examiner's Note: Based on ~~1056~~ PPM, boration volume will be 1132.6 gallons

Based on ~~1106~~ PPM, boration volume will be 1258.8 gallons

Comment: 1075 PPM → 1180.8 gallons

1100 ~~1090~~ PPM → 1243.7 gallons

600 - 700 : 246.3
700 - 800 : 247.5
800 - 900 : 248.7
900 - 1000 : 250.0
1000 - 1080 : 251.2

1243.7
high

1180.8 for 1075
low

* **Performance Step: 5** "For large additions, **ESTIMATE** expected BAST level decrease for target boration".

Standard: Utilizing Station Curve 8.18, determines final BAST level to be no greater than 62%. A range is needed.

Examiner's Note: **Calculation on Curve 8.18 as follows:**

GALLONS to % LEVEL = (GALLONS – 1024) / 52.36

% LEVEL to GALLONS = (% LEVEL)(52.36) + 1024 BAST level of 85% = 5474.6 gallons (using Curve 8.18 (5425 - 5475))

Volume of boric acid to be added to the RCS = >1132.6 gallons and <1258.8 gallons.

5474.6 – 1195.9 = 4278.7 gallons which equates to a BAST level of 62.16%.

5474.6 – 1132.6 = 4342 gallons which equates to a BAST level of 63.4%.

5474.6 – 1258.8 = 4215.8 gallons which equates to a BAST level of 60.96%.

Comment:

5475 − 1180.8 = 4294.3 → 63%

5425 − 1243.7 = 4181.3 → 61%

END OF TASK

Terminating Cue: **When the BAST Level estimate is complete, inform Candidate that the evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM RO A1-2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- The plant tripped from 50% RTP when a loss of off-site power occurred.
- The crew is performing EPP-5, Natural Circulation Cooldown.
- The TSC is NOT staffed.
- Core Burnup is 11000 MWD/MTU
- Boron Concentration is 600 PPM
- Tavg is 547°F
- Boric Acid Storage Tank "A" is in service, aligned to blend with level at 85%.
- POWERTRAX is NOT available.

INITIATING CUE:

The CRS wants to initiate boration while necessary support personnel are reporting. You have been directed to use Curve 1.14 to determine the required boron concentration for CSD (200°F) and then calculate the boron addition necessary to achieve that boron concentration **(with no allowance for PZR outsurge).** In accordance with OP-301, "For large additions, **ESTIMATE** expected BAST level decrease for target boration".

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

In the step below, the RCS must be over-borated to compensate for the effects of a PZR outsurge.

11. Ensure Adequate Shutdown Margin Exists As Follows:

a. Contact Plant Operations Staff to calculate the RCS Boron concentration required for Cold Shutdown allowing for a PZR outsurge

b. Check calculations - COMPLETED

b. WHEN the calculations are completed, THEN Go To Step 11.c.

c. Check RCS Boron concentration - GREATER THAN REQUIRED

c. Perform the following:

1) Borate RCS to cold shutdown boron concentration using OP-301, Chemical And Volume Control System (CVCS).

2) Steam all intact S/Gs for at least 30 minutes prior to sampling to ensure adequate chemical mixing.

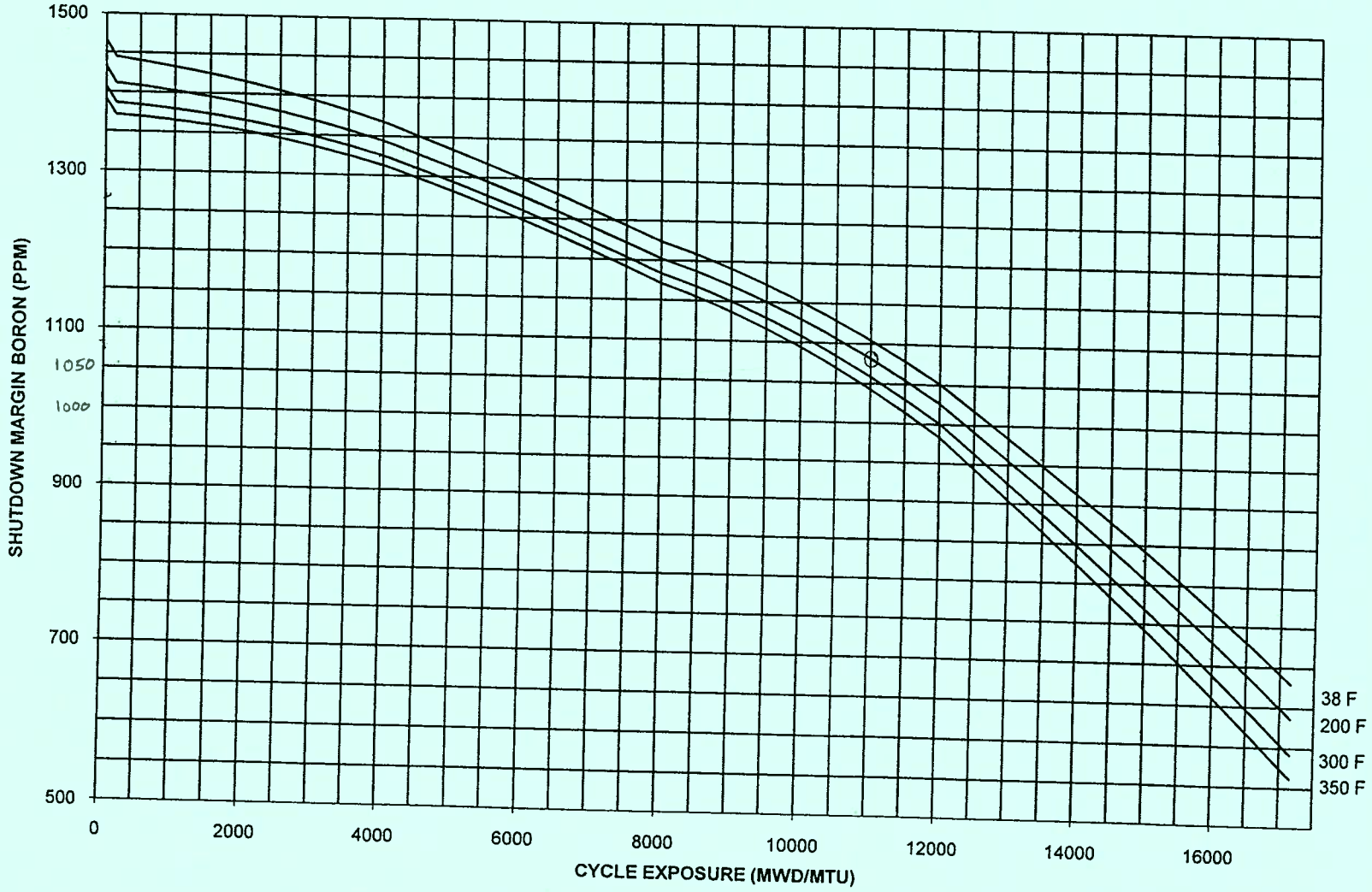
3) Contact Chemistry to obtain periodic boron samples of the following:

- Reactor Coolant System
- Pressurizer

4) WHEN the RCS is at cold shutdown boron concentration, THEN Go To Step 12.

REV. 197

CURVE 1.14
HBR2 CYCLE 27
BORON CONCENTRATION REQUIRED TO MAINTAIN
A MINIMUM OF 2.6% SHUTDOWN MARGIN (PPM) (ARI-MRR)



REVIEWS ARE DOCUMENTED ELECTRONICALLY IN THE PRR

TABLE 1.14
HBR2 CYCLE 27
BORON CONCENTRATION REQUIRED TO MAINTAIN
A MINIMUM OF 2.6% SHUTDOWN MARGIN (PPM) (ARI-MRR)

	Burnup (MWD/MTU)							
Temp (F)	**10300**	**10400**	**10500**	**10600**	**10700**	**10800**	**10900**	**11000**
38	1138	1133	1129	1124	1119	1114	1110	1105
40	1138	1133	1128	1124	1119	1114	1109	1104
50	1136	1132	1127	1122	1117	1113	1108	1103
60	1135	1130	1125	1121	1116	1111	1106	1101
70	1133	1129	1124	1119	1114	1110	1105	1100
80	1132	1127	1122	1118	1113	1108	1103	1098
100	1129	1124	1120	1115	1110	1105	1100	1095
120	1126	1121	1117	1112	1107	1102	1097	1092
140	1123	1119	1114	1109	1104	1099	1095	1089
160	1121	1117	1112	1107	1102	1097	1092	1087
180	1119	1114	1109	1104	1100	1095	1090	1085
200	1116	1111	1106	1101	1096	1092	1086	1081
220	1112	1107	1103	1098	1093	1088	1083	1078
240	1108	1104	1099	1094	1089	1084	1079	1074
260	1104	1099	1094	1089	1084	1079	1074	1069
280	1099	1095	1090	1085	1080	1074	1069	1064
300	1094	1089	1084	1079	1074	1069	1064	1058
320	1089	1084	1079	1074	1068	1063	1058	1052
340	1083	1078	1073	1067	1062	1057	1052	1046
350	1079	1074	1069	1064	1059	1054	1048	1043

Source: PDD Figure 6.4-1

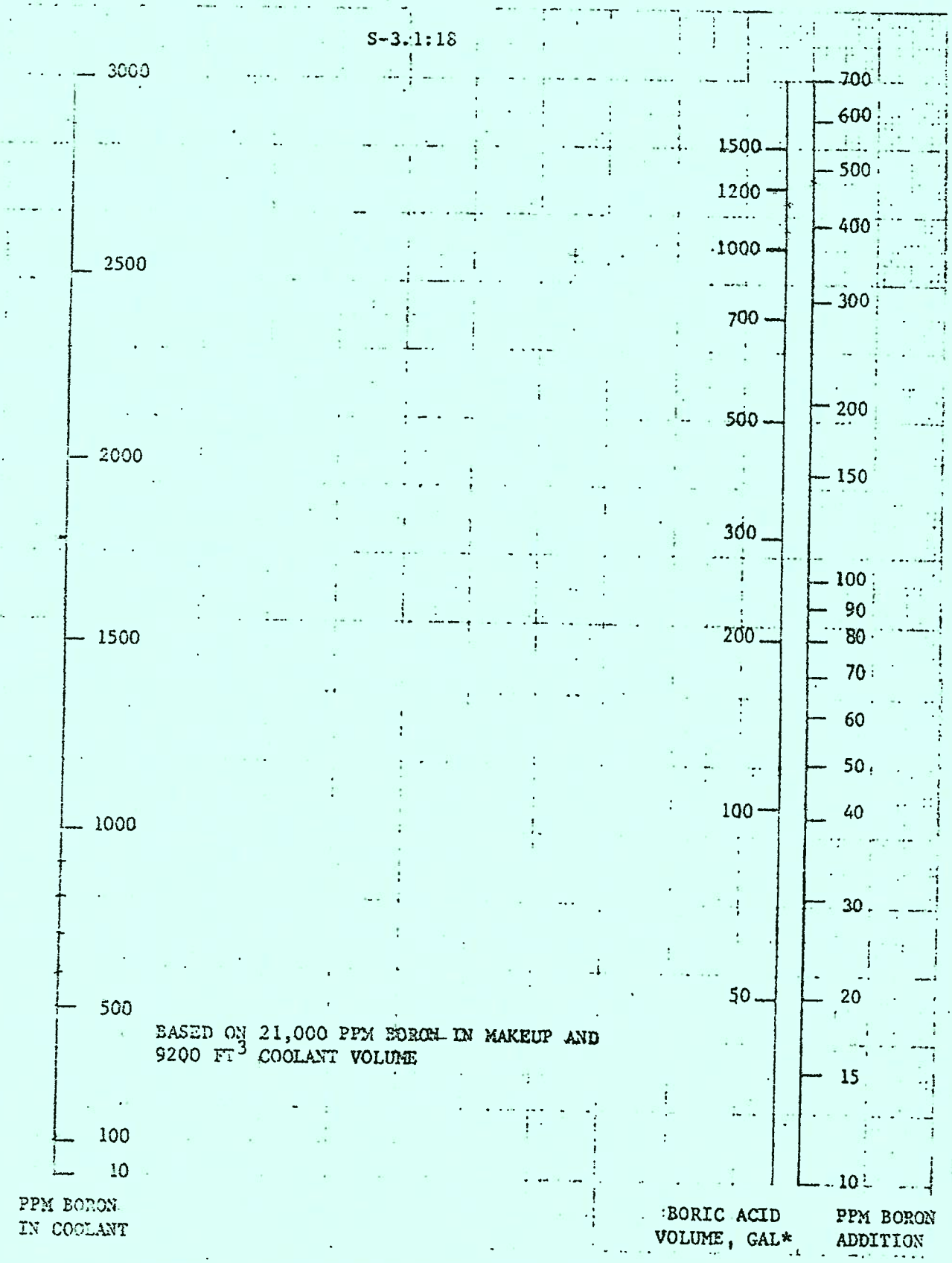


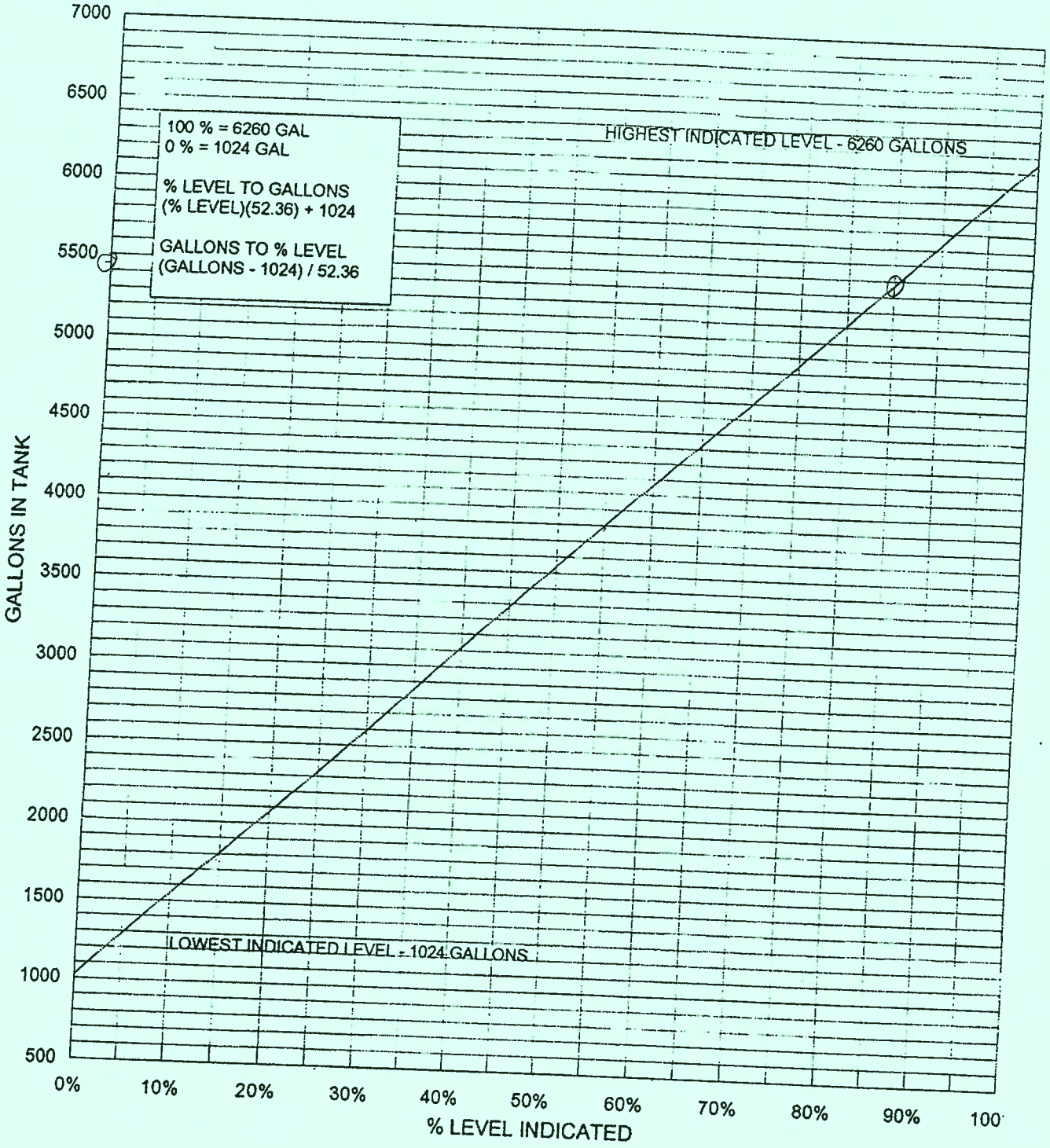
FIGURE S-3.1-3 BORON ADDITION - COOLANT HOT (~580°F)

Table 5.11

Boron Conc (ppm)	REQD GAL OF ACID TO BORATE 1 PPM	REQD GAL OF WATER TO DILUTE 1 PPM	REQD GAL OF ACID TO BORATE 5 PPM	REQD GAL OF WATER TO DILUTE 5 PPM	REQD GAL OF ACID TO BORATE 10 PPM	REQD GAL OF WATER TO DILUTE 10 PPM	REQD GAL OF ACID TO BORATE 20 PPM	REQD GAL OF WATER TO DILUTE 20 PPM	REQD GAL OF ACID TO BORATE 50 PPM	REQD GAL OF WATER TO DILUTE 50 PPM	REQD GAL OF ACID TO BORATE 100 PPM	REQD GAL OF WATER TO DILUTE 100 PPM
600	2.5	83.	12.3	416.	24.6	836.	49.2	1,686.	123.0	4,328.	246.3	9,068.
610	2.5	82.	12.3	409.	24.6	822.	49.2	1,658.	123.1	4,254.	246.5	8,905.
620	2.5	80.	12.3	403.	24.6	809.	49.2	1,631.	123.1	4,182.	246.6	8,748.
630	2.5	79.	12.3	396.	24.6	796.	49.2	1,605.	123.2	4,113.	246.7	8,597.
640	2.5	78.	12.3	390.	24.6	783.	49.3	1,579.	123.3	4,046.	246.8	8,450.
650	2.5	77.	12.3	384.	24.6	771.	49.3	1,554.	123.3	3,981.	246.9	8,309.
660	2.5	75.	12.3	378.	24.7	759.	49.3	1,531.	123.4	3,918.	247.1	8,172.
670	2.5	74.	12.3	373.	24.7	748.	49.3	1,507.	123.4	3,858.	247.2	8,040.
680	2.5	73.	12.3	367.	24.7	737.	49.4	1,485.	123.5	3,799.	247.3	7,912.
690	2.5	72.	12.3	362.	24.7	726.	49.4	1,463.	123.6	3,741.	247.4	7,787.
700	2.5	71.	12.3	357.	24.7	716.	49.4	1,442.	123.6	3,686.	247.5	7,667.
710	2.5	70.	12.4	352.	24.7	706.	49.4	1,421.	123.7	3,632.	247.7	7,550.
720	2.5	69.	12.4	347.	24.7	696.	49.5	1,401.	123.7	3,580.	247.8	7,437.
730	2.5	68.	12.4	342.	24.7	686.	49.5	1,382.	123.8	3,529.	247.9	7,328.
740	2.5	67.	12.4	337.	24.7	677.	49.5	1,363.	123.9	3,480.	248.0	7,221.
750	2.5	66.	12.4	333.	24.8	668.	49.5	1,344.	123.9	3,432.	248.1	7,118.
760	2.5	65.	12.4	328.	24.8	659.	49.6	1,326.	124.0	3,385.	248.3	7,017.
770	2.5	65.	12.4	324.	24.8	650.	49.6	1,309.	124.0	3,339.	248.4	6,919.
780	2.5	64.	12.4	320.	24.8	642.	49.6	1,292.	124.1	3,295.	248.5	6,824.
790	2.5	63.	12.4	316	24.8	634.	49.6	1,275.	124.2	3,252.	248.6	6,732.
800	2.5	62.	12.4	312.	24.8	626.	49.7	1,259.	124.2	3,210.	248.7	6,642.
810	2.5	61.	12.4	308.	24.8	618.	49.7	1,244.	124.3	3,169.	248.9	6,554.
820	2.5	61.	12.4	304.	24.8	610.	49.7	1,228.	124.3	3,129.	249.0	6,469.
830	2.5	60.	12.4	301.	24.9	603.	49.7	1,213.	124.4	3,090.	249.1	6,385.
840	2.5	59.	12.4	297.	24.9	596.	49.7	1,199.	124.5	3,052.	249.2	6,304.
850	2.5	59.	12.4	293.	24.9	589.	49.8	1,184.	124.5	3,015.	249.4	6,225.
860	2.5	58.	12.4	290.	24.9	582.	49.8	1,170.	124.6	2,979.	249.5	6,148.
870	2.5	57.	12.5	287.	24.9	575.	49.8	1,157.	124.6	2,944.	249.6	6,073.
880	2.5	57.	12.5	283.	24.9	568.	49.8	1,143.	124.7	2,909.	249.7	6,000.
890	2.5	56.	12.5	280.	24.9	562.	49.9	1,130.	124.8	2,876.	249.9	5,928.
900	2.5	55.	12.5	277.	24.9	556.	49.9	1,118.	124.8	2,843.	250.0	5,858.
910	2.5	55.	12.5	274.	25.0	550.	49.9	1,105.	124.9	2,811.	250.1	5,790.
920	2.5	54.	12.5	271.	25.0	544.	49.9	1,093.	125.0	2,779.	250.2	5,723.
930	2.5	54.	12.5	268.	25.0	538.	50.0	1,081.	125.0	2,749.	250.3	5,658.
940	2.5	53.	12.5	265.	25.0	532.	50.0	1,070.	125.1	2,719.	250.5	5,594.
950	2.5	52.	12.5	262.	25.0	526.	50.0	1,058.	125.1	2,689.	250.6	5,532.
960	2.5	52.	12.5	260.	25.0	521.	50.0	1,047.	125.2	2,660.	250.7	5,471.
970	2.5	51.	12.5	257.	25.0	515.	50.1	1,036.	125.3	2,632.	250.8	5,412.
980	2.5	51.	12.5	254.	25.0	510.	50.1	1,026.	125.3	2,605.	251.0	5,353.
990	2.5	50.	12.5	252.	25.1	505.	50.1	1,015.	125.4	2,578.	251.1	5,296.
1,000	2.5	50.	12.5	249.	25.1	500.	50.1	1,005.	125.4	2,551.	251.2	5,240.
1,010	2.5	49.	12.5	247.	25.1	495.	50.2	995.	125.5	2,525.	251.3	5,186.
1,020	2.5	49.	12.5	244.	25.1	490.	50.2	985.	125.6	2,500.	251.5	5,132.
1,030	2.5	48.	12.5	242.	25.1	485.	50.2	975.	125.6	2,475.	251.6	5,080.
1,040	2.5	48.	12.6	240.	25.1	481.	50.2	966.	125.7	2,451.	251.7	5,028.
1,050	2.5	47.	12.6	237.	25.1	476.	50.3	957.	125.8	2,427.	251.8	4,978.
1,060	2.5	47.	12.6	235.	25.1	471.	50.3	947.	125.8	2,403.	252.0	4,929.
1,070	2.5	47.	12.6	233.	25.2	467.	50.3	938.	125.9	2,380.	252.1	4,880.
1,080	2.5	46.	12.6	231.	25.2	463.	50.3	930.	125.9	2,358.	252.2	4,833.
1,090	2.5	46.	12.6	229.	25.2	458.	50.4	921.	126.0	2,336.	252.3	4,786.

System Temperature = 547°F

Station Curve 8.18 Boric Acid Storage Tanks



Curve Calculation: RNP-M/MECH-1570

Drawn by: Norman P. Lovett

Date: 6/9/94

Checked by: Mitchell R. Dingee

Date: 6/10/94

Rev. 148

RO A2

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: HB ROBINSON Task No.:

Task Title: Perform Section 8.2.3 of OST-020, Shiftly Surveillances JPM No.: 2011-2 NRC JPM RO A2

K/A Reference: G2.2.37 3.6 / 4.6

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

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: The unit is in Mode 3 at 547°F and 2235 psig.
All MSIVs are open.

Task Standard: Identify all out of specification readings.

Required Materials: OST-020

General References: OST-020 Shiftly Surveillances, Revision 41

Handouts: OST-020

Initiating Cue: You have relieved the OAC on the 07-1900 watch due to a sudden illness. He was performing but unable to complete OST-020, Shiftly Surveillances. Perform Section 8.2.3, evaluate the acceptability of the instrument readings and document any unsatisfactory conditions in the comments section of Attachment 10.1.

Time Critical Task: NO

Validation Time: 15 minutes

(Denote Critical Steps with an asterisk)

Examiner's Cue: Provide OST-020 Cover Page through Section 7.0 and Section 8.2.3.

Performance Step: 1 Review procedure OST-020.

Standard: Reviews Precautions and Limitations and remainder of handout.

Examiner's Note:

Comment:

Performance Step: 2 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.1)

1. PZR Level (Channels LI-459A, 460 and 461)

Standard: Candidate compares the channel readings and determines that all channels are within 5% for PZR level.

Examiner's Note:

Comment:

* **Performance Step: 3** IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.2)

2. PZR Pressure (Channels PI-455, 456 and 457)

Standard: Candidate compares the channel readings and determines that channel PI-455 is outside of the tolerance of 40 psig from the other 2 channels.

Examiner's Note:

Comment:

* **Performance Step: 4** IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.3)

S/G Pressure for A S/G (Channels PI-474, 475 and 476)

S/G Pressure for B S/G (Channels PI-484, 485 and 486)

S/G Pressure for C S/G (Channels PI-494, 495 and 496)

Standard: Candidate compares the channel readings and determines that channel PI-484 is outside of the tolerance of 70 psig from the other 2 channels for S/G B.

Examiner's Note:

Comment:

* **Performance Step: 5** IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.4)

S/G Level for A S/G (Channels LI-474, 475 and 476)

S/G Level for B S/G (Channels LI-484, 485 and 486)

S/G Level for C S/G (Channels LI-494, 495 and 496)

Standard: Candidate compares the channel readings and determines that channel LI-475 is outside of the tolerance of 5% from the other 2 channels for S/G A.

Examiner's Note:

Comment:

Performance Step: 6 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.5)

Steam Header Pressure (Channels PI-464A, 466 and 468)

Standard: Candidate compares the channel readings and determines all of the Steam Header pressure channels are within the tolerance of 70 psig.

Examiner's Note:

Comment:

Performance Step: 7 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.6)

S/G Steam Flows for S/G A (Channels FI-474 and 475)

S/G Steam Flows for S/G B (Channels FI-484 and 485)

S/G Steam Flows for S/G C (Channels FI-494 and 495)

Standard: Candidate compares the channel readings and determines all of the Steam Flow channels are within tolerance.

Examiner's Note:

Comment:

* **Performance Step: 8** IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.7)

Tavg (Channels TI-412D, 422D and 432D)

Standard: Candidate compares the channel readings and determines that channel TI-432D is outside of the tolerance of 4°F from the other channels for Tavg.

Examiner's Note:

Comment:

Performance Step: 9 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.8)

SI Accumulator A Level (LI-920 and 922)

SI Accumulator B Level (LI-924 and 926)

SI Accumulator C Level (LI-928 and 930)

Standard: Candidate compares the channel readings and determines all of the SI Accumulator level channels are within the tolerance of 5%.

Examiner's Note:

Comment:

Performance Step: 10 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.9)

SI Accumulator A Pressure (PI-921 and 923)

SI Accumulator B Pressure (PI-925 and 927)

SI Accumulator C Pressure (PI-929 and 931)

Standard: Candidate compares the channel readings and determines all of the SI Accumulator pressure channels are within the tolerance of 40 psig.

Examiner's Note:

Comment:

END OF TASK

Terminating Cue: **When the instrument readings have been evaluated and comments made for any out of spec readings, the evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM RO A2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

8.2.2.10 (Continued)

INIT 07-19 INIT 19-07

c. **CALCULATE** deviation: LOG (highest) minus LOG (lowest) equals: _____ ____

d. **PEER CHECK** calculation. ____

e. **DOCUMENT** results (≤ 1.48). SAT / UNSAT (Circle one) ____

8.2.3 **IF** MODE 1, 2, **OR** 3 shiftly checks are required, **THEN PERFORM** CHANNEL CHECK for the following:

NOTE: The following check is to determine the deviation between the highest and lowest channel of redundant indicators for the same parameter. The redundant indicators to be compared are grouped in blocks. If the actual deviation is greater than the maximum allowed deviation as shown (deviation of 5% of the full range of the indicator's movement, except for S/G Steam Flow when <20% rated thermal power), it is unacceptable. (ESR 97-00601)

1. PZR Level
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 8 and
ITS SR 3.3.3.1, Table 3.3.3-1 Item 12) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
LI-459A LI-460 LI-461	0-100%	5%	RNP-I/INST-1060

8.2.3 (Continued)

INIT INIT
07-19 19-07

2. PZR Pressure
IF Pressurizer Pressure is outside the indicating range due to normal plant conditions, **THEN** mark N/A.
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 7.a, 7.b and ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.d and 6.a) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-455 PI-456 PI-457	1700-2500 psig	40 psig	RNP-I/INST-1042

3. S/G Pressure
(ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.e, 1.g and 4.e, ITS SR 3.3.3.1, Table 3.3.3-1 Item 20) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-474 PI-475 PI-476	0-1400 psig	70 psig	RNP-I/INST-1072
PI-484 PI-485 PI-486	0-1400 psig	70 psig	RNP-I/INST-1072
PI-494 PI-495 PI-496	0-1400 psig	70 psig	RNP-I/INST-1072

8.2.3 (Continued)

INIT INIT
07-19 19-07

4. S/G Level
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 13 and 14,
ITS SR 3.3.3.1, Table 3.3.3-1 Item 13,
ITS SR 3.3.8.1, Table 3.3.8-1 Item 1) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
LI-474 LI-475 LI-476	0-100%	5%	RNP-I/INST-1070
LI-484 LI-485 LI-486	0-100%	5%	RNP-I/INST-1070
LI-494 LI-495 LI-496	0-100%	5%	RNP-I/INST-1070

5. Steam Header Pressure
(ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.e) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-464A PI-466 PI-468	0-1400 psig	70 psig	RNP-I/INST-1050

8.2.3 (Continued)

INIT INIT
07-19 19-07

6. S/G Steam Flow
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 14 and
ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.f, 1.g, 4.d
and 4.e) (ESR 97-00601)

– **IF** ≥20% rated thermal power, **THEN** check the following: ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
FI-474 FI-475	0-4x10^6 pph	0.2x10^{6}pph	RNP-I/INST-1040
FI-484 FI-485	0-4x10^6 pph	0.2x10^{6}pph	RNP-I/INST-1040
FI-494 FI-495	0-4x10^6 pph	0.2x10^{6}pph	RNP-I/INST-1040

– **IF** <20% rated thermal power, **THEN** check the following: ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION
FI-474 FI-475	0-4x10^6 pph	0.4x10^{6}pph between the following combinations: FI-474 AND FI-475 *FI-474 AND FI-477 *FI-475 AND FI-476
FI-484 FI-485	0-4x10^6 pph	0.4x10^{6}pph between the following combinations: FI-484 AND FI-485 *FI-484 AND FI-487 *FI-485 AND FI-486
FI-494 FI-495	0-4x10^6 pph	0.4x10^{6}pph between the following combinations: FI-494 AND FI-495 *FI-494 AND FI-497 *FI-495 AND FI-496

* The Steam Flow Channel is checked against the corresponding Feed Flow channel for acceptance.

8.2.3 (Continued)

INIT INIT
07-19 19-07

7. Tavg
IF Tavg is outside the indicating range due to normal plant conditions, **THEN** mark N/A.
(ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.f, 4.d and 6.b) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
TI-412D TI-422D TI-432D	540-615°F	4°F	WCAP 11889

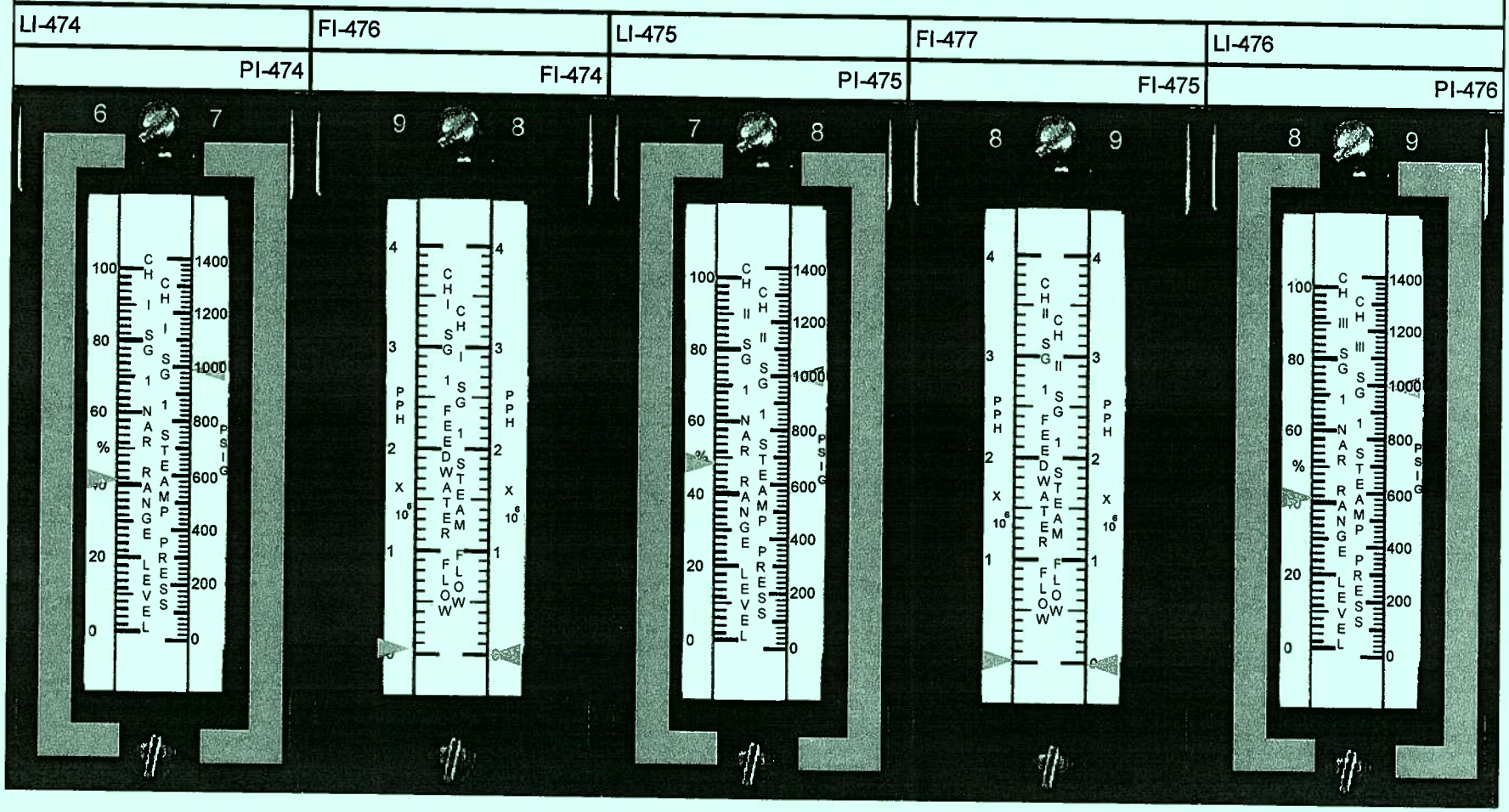
8. SI Accumulator Level
(TRMS TR 4.2.1) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
LI-920 LI-922	0-100%	5%	RNP-I/INST-1052
LI-924 LI-926	0-100%	5%	RNP-I/INST-1052
LI-928 LI-930	0-100%	5%	RNP-I/INST-1052

9. SI Accumulator Pressure
(TRMS TR 4.2.1) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-921 PI-923	0-800 psig	40 psig	RNP-I/INST-1036
PI-925 PI-927	0-800 psig	40 psig	RNP-I/INST-1036
PI-929 PI-931	0-800 psig	40 psig	RNP-I/INST-1036

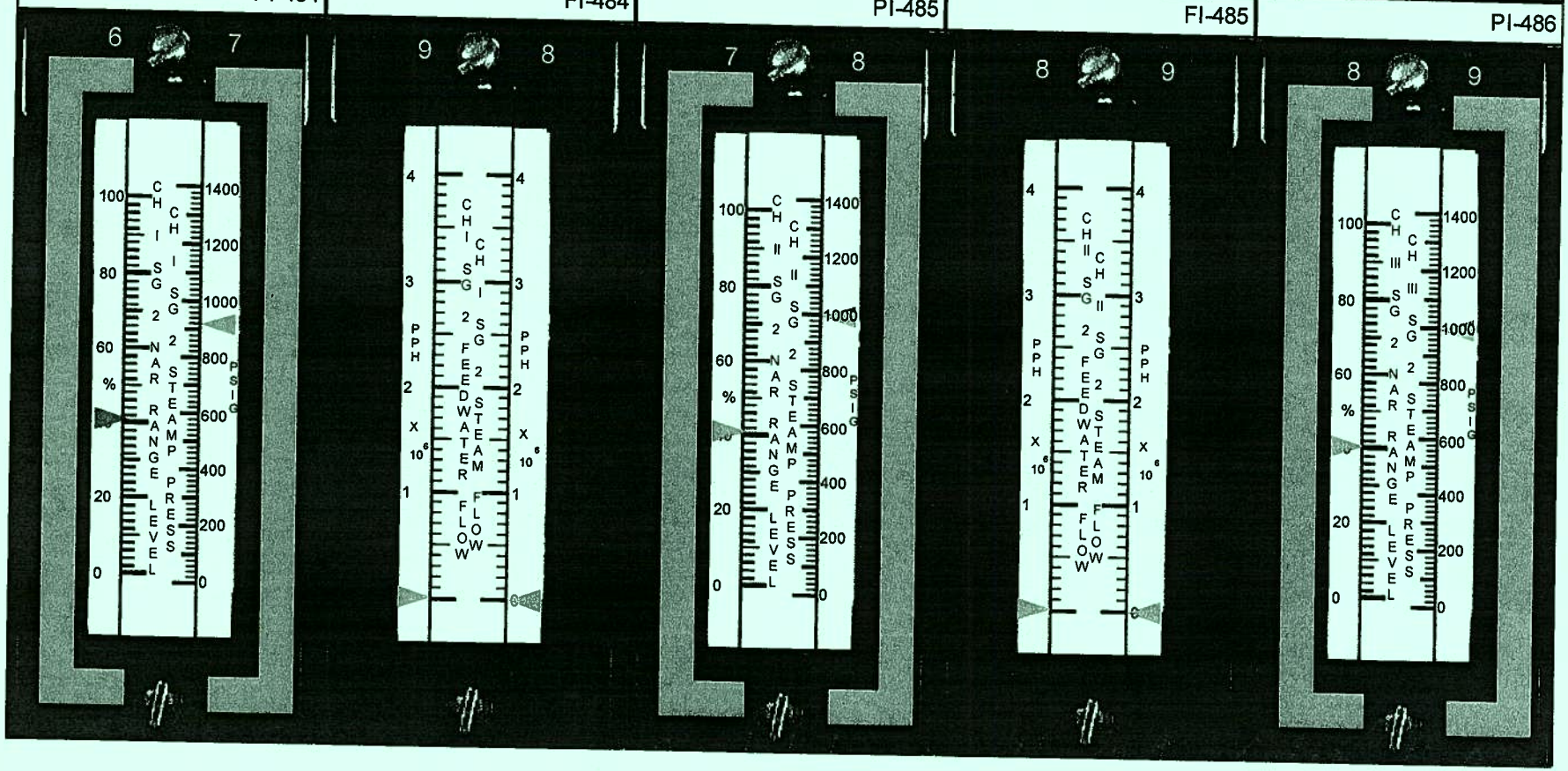
A STEAM GENERATOR



Candidates will get color copies on white paper for clarity

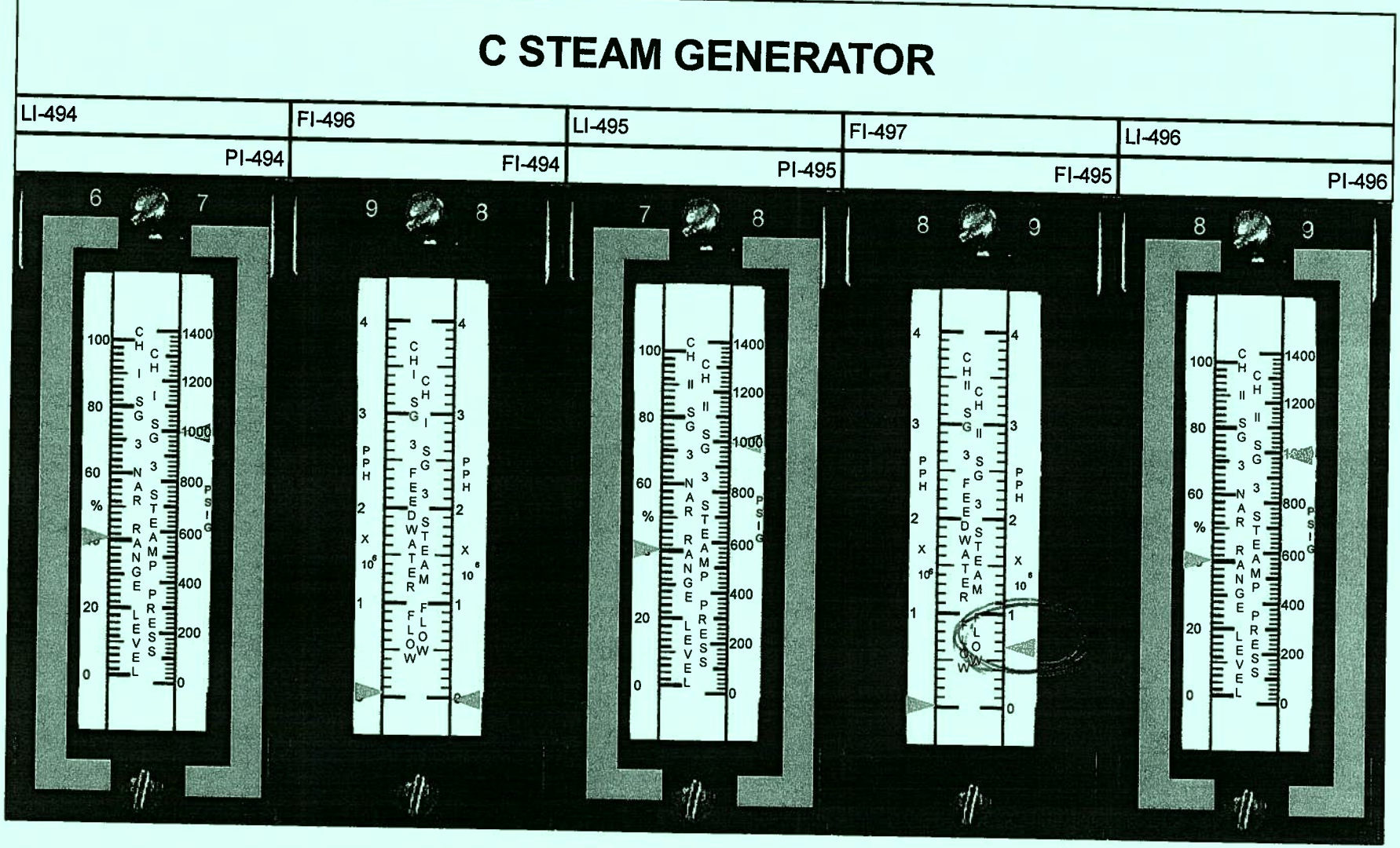
B STEAM GENERATOR

LI-484	FI-486	LI-485	FI-487	LI-486
PI-484	FI-484	PI-485	FI-485	PI-486



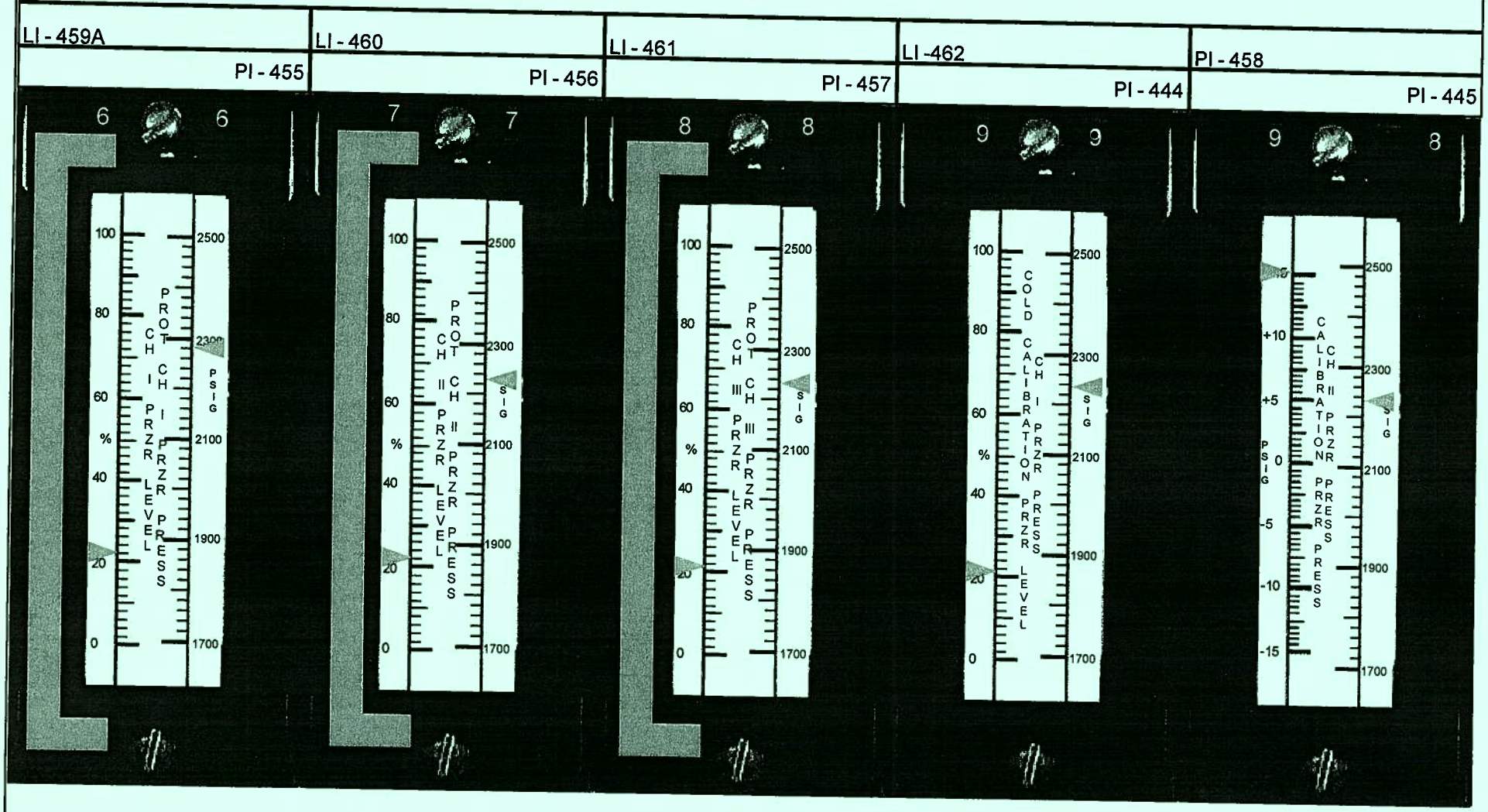
Project: Training Drawing: Books\SoftPanels\Panel3_part

C STEAM GENERATOR

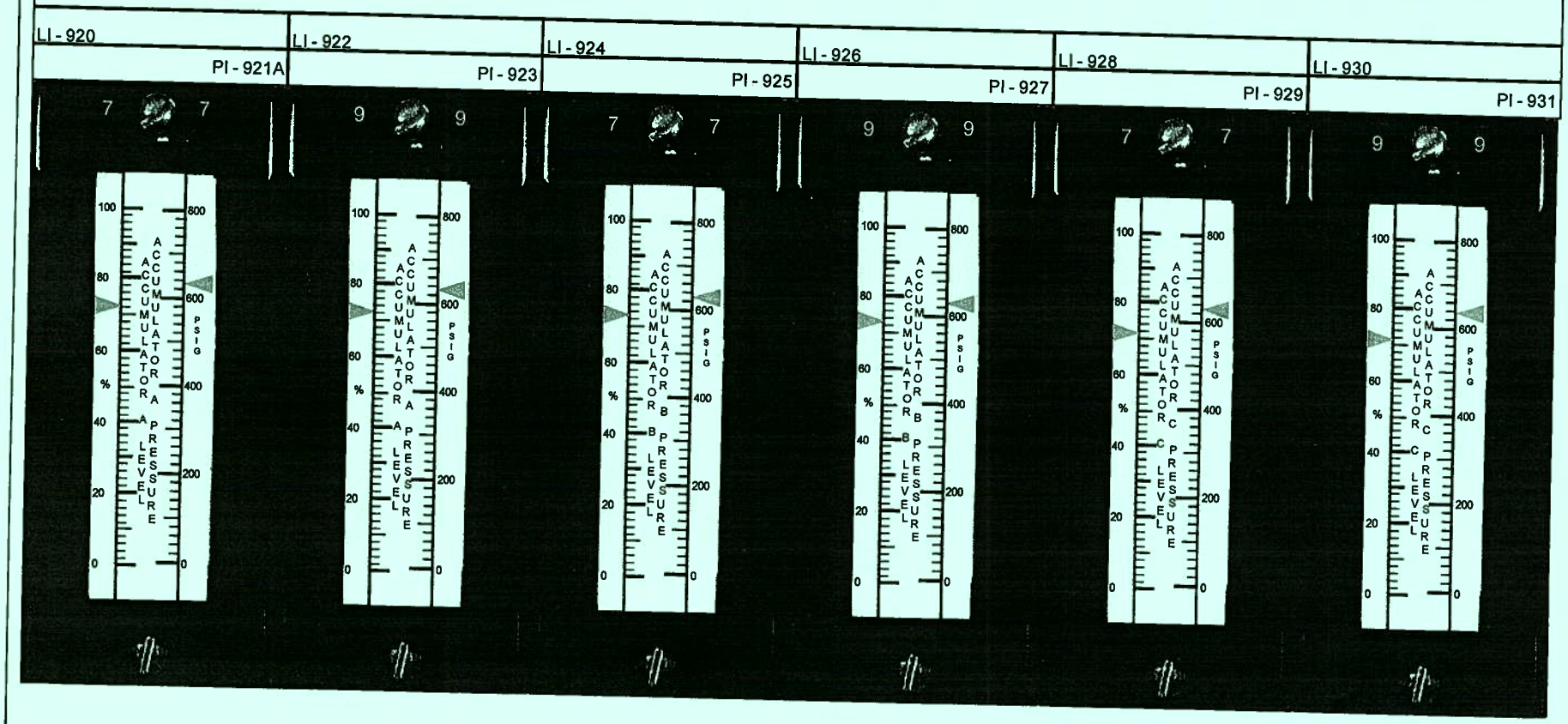


Project: Training Drawing: Books\SoftPanels\Panel2.pcd

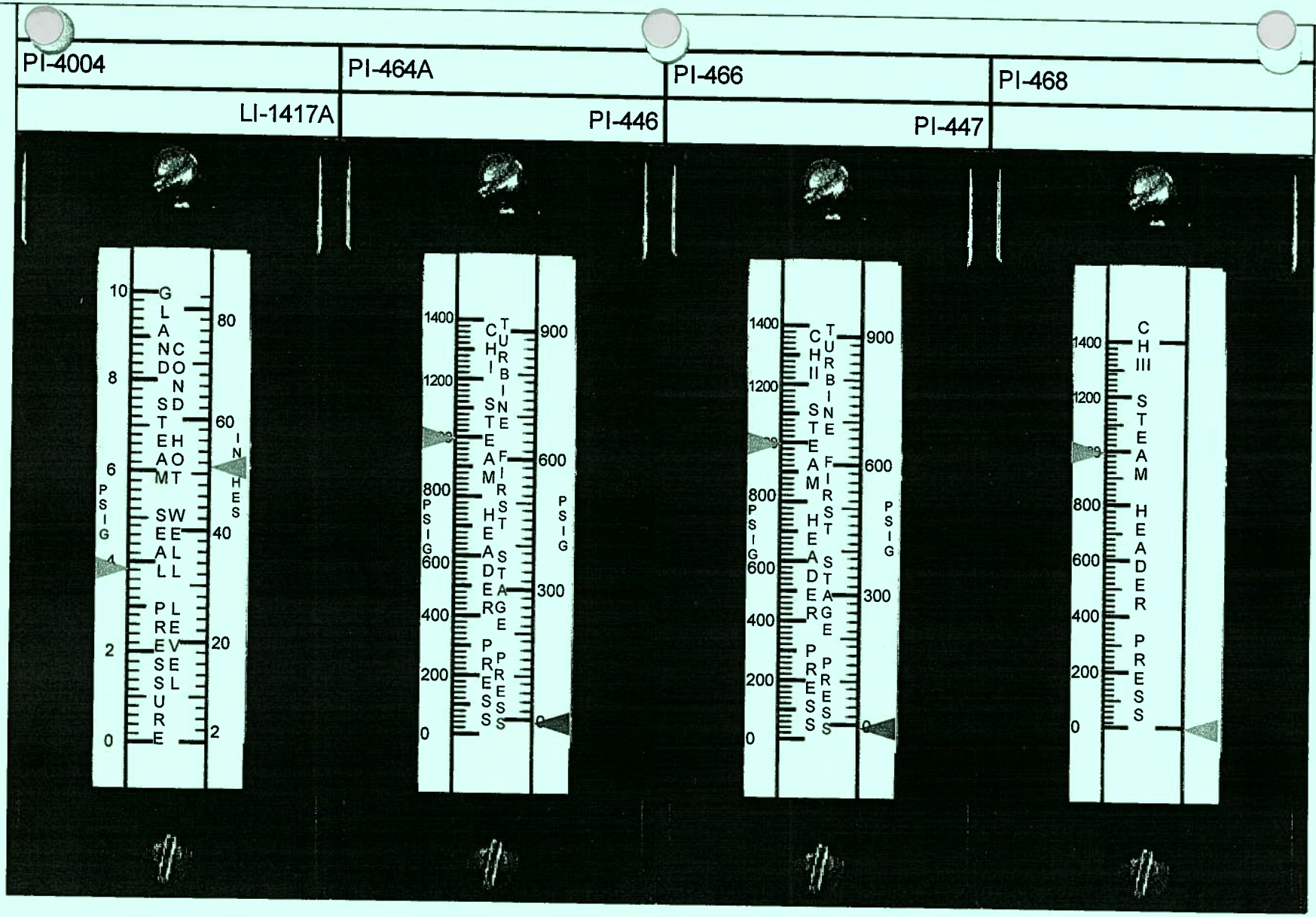
PZR PRESSURES AND LEVELS



ACCUMULATORS

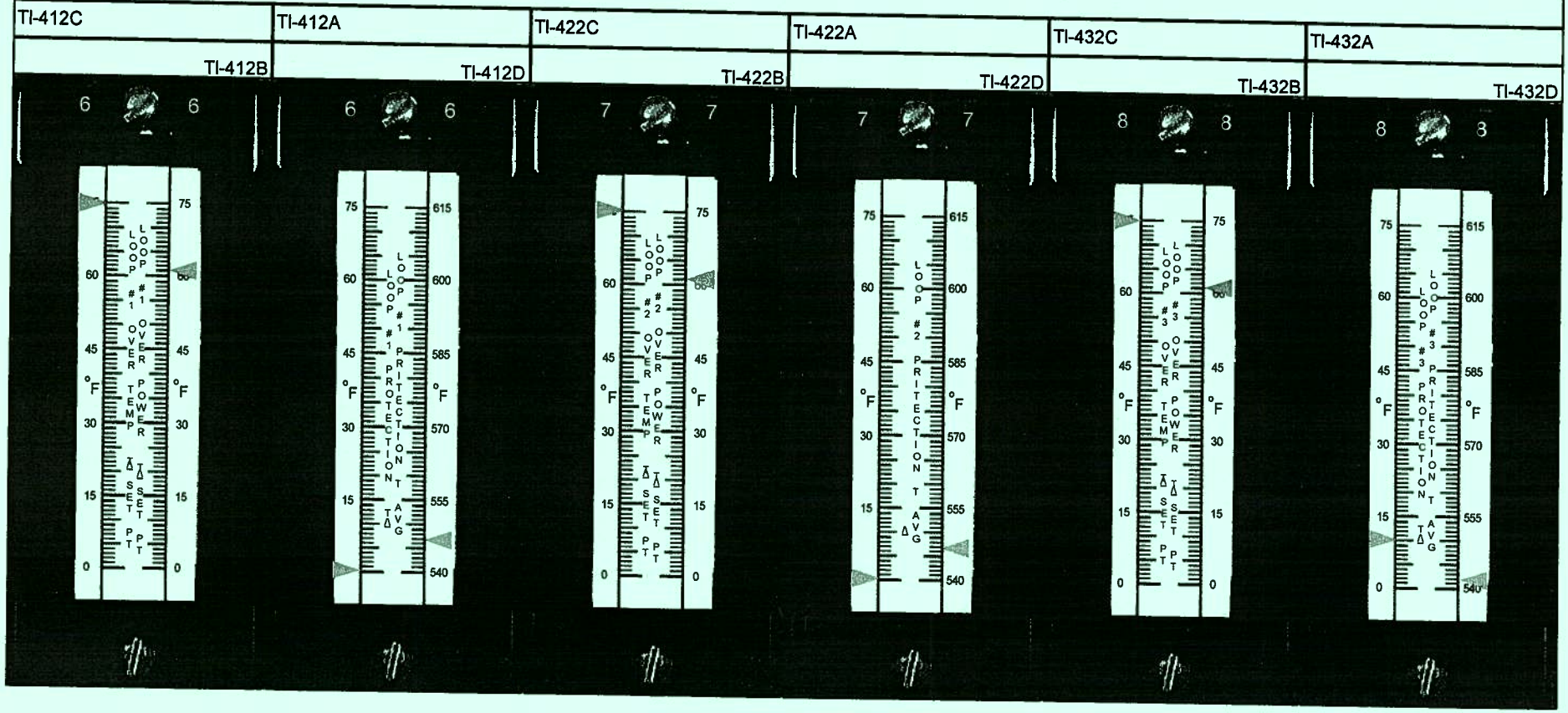


Project: Training Drawing: Books\SoftPanels\Panel1_top_part



Project: Training Drawing: Books\SoftPanels\P

PROTECTION TAVG AND ΔT



Project: Training Drawing: Books\SoftPanels\Panel1_top_part

INITIAL CONDITIONS: The unit is in Mode 3 at 547°F and 2235 psig.

All MSIVs are open.

INITIATING CUE: You have relieved the OAC on the 07-1900 watch due to a sudden illness. He was performing but unable to complete OST-020, Shiftly Surveillances. Perform Section 8.2.3, evaluate the acceptability of the instrument readings and document any unsatisfactory conditions in the comments section of Attachment 10.1.

RO A3

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: HB ROBINSON Task No.:

Task Title: Calculate the Maximum Permissible Stay Time with Emergency Dose Limits JPM No.: 2011-2 NRC JPM Admin RO A3

K/A Reference: G2.3.4 (3.2/3.7)

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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:

- An emergency event has been declared.
- A Containment entry would enhance the pressure control of the plant but is NOT required to protect valuable plant equipment.
- The tasks to be performed are:

Task Number	Task	Time Required (minutes)	Dose Rate (R/hr)
1	Fail closed PCV-455A	8	21.42
2	Manually open RC-536	6	3.65
3	Manually close CVC-312		9.51

NOTE: Assume that NO dose is received while traveling between the tasks.

Task Standard: Calculate the dose received and the maximum time allowed to perform the final task (+1, -3 minutes)

Required Materials: Calculator
NGGM-PM-0002

General References: NGGM-PM-0002, EPCLA-01

Handouts:	NGGM-PM-0002, EPCLA-01
Initiating Cue:	The Inside Auxiliary Operator has completed Tasks #1 and 2 in the time required. How long does he have to complete Task #3 without exceeding the applicable Emergency Dose Limit?
Time Critical Task:	NO
Validation Time:	10 minutes

SIMULATOR SETUP

N/A

(Denote Critical Steps with an asterisk)

START TIME: _____

Performance Step: 1 Determine the dose received while performing Task #1.

Standard: Candidate determines the dose received while performing Task #1:

21.42 R/hr X 8 minutes X 1 hour/60 minutes = 2.856 R.

Examiner's Note: **Provide the candidate a copy of EPCLA-01.**

Comment:

Performance Step: 2 Determine the dose received while performing Task #2.

Standard: Candidate determines the dose received while performing Task #2:

3.65 R/hr X 6 minutes X 1 hour/60 minutes =0.365 R.

Examiner's Note:

Comment:

* **Performance Step: 3** Determine the remaining dose to reach the Emergency Dose Limit.

Standard: Candidate calculates the dose remaining for the Emergency Dose Limit:

5.00 R – 2.856 R – 0.365 R = 1.779 R

Examiner's Note:

Comment:

* **Performance Step: 4** Determine the time available for the Inside Auxiliary Operator to complete Task #3 with exceeding the Emergency Dose Limit.

Standard: Candidate determines within +1, - 3 minutes the time available for the Inside Auxiliary Operator to complete Task #3 without exceeding the Emergency Dose Limit:

Available Dose/ Dose Rate = 1.779 R/ 9.51 R/hr = 0.187 hrs

0.187 hrs X 60 minutes/1 hour = 11.22 minutes (+1, - 3 minutes)

NO

LP Basis?

Examiner's Note:

Comment:

11.22 minutes

⇓

11 min, 13.2 seconds

END OF TASK

Termination Cue: When the candidate has calculated the allowable dose for Task #3, the evaluation of this JPM is complete.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM Admin RO A3

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- An emergency event has been declared.
- A Containment entry would enhance the pressure control of the plant but is NOT required to protect valuable plant equipment.
- The tasks to be performed are:

Task Number	Task	Time Required (minutes)	Dose Rate (R/hr)
1	Fail closed PCV-455A	8	21.42
2	Manually open RC-536	6	3.65
3	Manually close CVC-312		9.51

NOTE: Assume that NO dose is received while traveling between the tasks.

INITIATING CUE:

The Inside Auxiliary Operator has completed Tasks #1 and 2 in the time required.

How long does he have to complete Task #3 without exceeding the applicable Emergency Dose Limit?

SRO A1-1

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: HB ROBINSON Task No.: 02341101103

Task Title: Heat Stress Work Limits JPM No.: 2011-2 NRC JPM SRO A1-1

K/A Reference: G2.1.26 3.4/3.6

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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 with RCS cooldown in progress.
- RHR System needs to be aligned for core cooling IAW GP-007 and OP-201
- 2 AOs have been briefed on performing the valve alignments.
- Work time is 30 minutes per AO (1 hour total)
- RC has determined that OREX coveralls will be used.

Task Standard: Candidate is to determine the following:

- Metabolic heat load
- Action time in minutes
- Recovery period in minutes

Required Materials: AP-020, Heat Stress Program, Revision 16

General References: AP-020, Heat Stress Program

Handouts: AP-020, Heat Stress Program

Initiating Cue: Using AP-020, Complete Attachment 10.3 to determine the metabolic heat load, allowable working time and recovery period for work in the specified plant area. Additional information on CUE sheet.

Time Critical Task: NO

Validation Time: 12 minutes

(Denote Critical Steps with an asterisk*)

Start Time: _____

Performance Step: 1	Candidate reviews AP-020 Attachment 10.3, Heat Stress Evaluation Form
Standard:	Candidate reviews AP-020 Attachment 10.3, Heat Stress Evaluation Form

Examiner's Note:

Comment:

Performance Step: 2	Determine the correct clothing for the type of job. (Step 8.1.4)
Standard:	Candidate determines that Attachment 10.2, Page 4 of 11, OREX over Scrub Suit (CS) or SMS polypropylene coveralls (PP) over Scrub Suit (CS) is the proper attachment to be used in the heat stress determination.

Examiner's Note:

Comment:

* **Performance Step: 3** Determines the Metabolic Heat Load to be Moderate Work. (Step uses Attachment 10.1)

Standard: Candidate determines performing valve alignments to be Moderate Work

Examiner's Note: .

Comment:

Performance Step: 4 Determines the temperature in the Auxiliary Building Pipe Alley

Standard: Candidate circles "Estimate" for WBGT on Attachment 10.3

Examiner's Note: **Candidate uses Attachment 10.4, Estimating WBGT to estimate WBGT from dry temperature.**

Comment:

* **Performance Step: 5** Determines WBGT to be 101°F

Standard: Candidate determines WBGT to be Dry bulb plus 4°F from Attachment 10.4 (97°F +4°F =101°F)

Examiner's Note:

Comment:

Performance Step: 6 Determines Action Time to be 35 minutes

Standard: Candidate uses Attachment 10.2 to determine Action Time to be 35 minutes. Page 4 of 11, Recommended Heat Stress Control Action Times OREX Over Scrub Suit (CS) for Moderate Work at 101°F WBGT

Examiner's Note:

Comment:

* **Performance Step: 7** Determines the Recovery time to be 51 minutes (Step 8.3.1)

Standard: Candidate uses 30 minutes as time in hot environment (2 men working for 1.0 person hour)

(30*60)/35 = (1800/35) = 51.4 Minutes **(Range of 51 to 52 minutes)** OK

Examiner's Note:

Comment:

Performance Step: 8 Circles "YES" for the workers have received a pre-job brief including Heat Stress Concerns

Standard: Candidate circles "YES", this information was in the initial conditions.

Examiner's Note:

Comment:

Performance Step: 9 Sign and Date Attachment 10.3

Standard: Candidate reviews and then signs and dates Attachment 10.3

Examiner's Note:

Comment:

END OF TASK

Terminating Cue: **Candidate completes Heat Stress Evaluation Form**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC Admin JPM SRO A1-1

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- Plant is in Mode 3 with RCS cooldown in progress.
- RHR System needs to be aligned for core cooling IAW GP-007 and OP-201
- 2 AOs have been briefed on performing the valve alignments.
- Work time is 30 minutes per AO (1 hour total)
- RC has determined that OREX overalls will be used.

INITIATING CUE:

Using AP-020, Complete Attachment 10.3 to determine the metabolic heat load, allowable working time and recovery period for work in the specified plant area.

Work to be performed	Valve alignments in overhead
Pipe Alley Thermometer:	97°F
Relative Humidity:	Not Available

Pipe Alley is a Contaminated Area

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 1

PART 1

AP-020

HEAT STRESS PROGRAM

REVISION 16

SUMMARY OF CHANGES

PRR 00476573

AP-020 REVISION 16

STEP/SECTION	REVISION COMMENTS
Attachment 10.2	Updated NOTE to include (refer to 8.4.2) for PCR references - Editorial

TABLE OF CONTENTS

1.0 PURPOSE

1.1 The purpose of this procedure is to provide guidance to management and all employees for preventing heat-induced illnesses while performing work activities on the plant site.

2.0 REFERENCES

2.1 EPRI NP-4453-L, "Heat Stress Management Program for Nuclear Power Plants" Revision 1, Aug. 1991.

2.2 Clothing Update of EPRI NP-4453-L, 1991 Report, TR-109445, Final Report, July 1998.

2.3 CP&L Corporate Guidance Document SAF-CPL-032 Heat Stress.

2.4 NCR 49246, Use Of Tube Suits

3.0 RESPONSIBILITIES

3.1 Section Managers - Robinson Plant are responsible for:

3.1.1 Ensuring that personnel who perform work in moderate/high heat stress work environment(s) follow the guidelines in this procedure.

3.1.2 Ensuring that supervisors follow this the guidelines in this procedure when planning work in moderate/high heat stress work environments.

3.2 Supervisors are responsible for:

3.2.1 Ensuring that heat stress mitigation has been considered during job planning. The work crew supervisor or designee shall determine the Wet Bulb Globe Temperature and metabolic heat load using the guidance available in Attachments 10.1, 10.2 and 10.6.

3.2.2 Ensuring that either Attachment 10.3, "Heat Stress Evaluation Form" is completed, OR that proper means of determining action times and control measures have taken place and have been included as part of pre-job planning when Heat Stress has been determined to be an issue.

3.2.3 Ensuring that a pre-job briefing is conducted prior to workers entering the high temperature environment to perform work. The Precautions and Limitations found in section 5.1 of this procedure should be covered in the briefing.

3.2.4 Ensuring that proper control methods are used to protect against heat stress.

3.2.5 Ensuring that all heat-stress caused incidents which require medical attention are recorded on FRM-SUBS-00979, Injury and Illness Incident Report Form. These forms can be obtained on the Progress Energy Intranet.

3.3 Individuals are responsible for:

3.3.1 Following instructions for the handling of body cooling devices and using them as needed to prevent heat stress.

3.3.2 Being attentive to symptoms of heat stress while working in moderate/high heat stress work environments, stopping work, leaving it in a safe condition, and exiting the hot environment, if they feel ill due to heat stress.

3.3.3 Reporting to their supervisor any occurrence of heat stress or heat related illness.

3.3.4 Reporting to their supervisor any condition that might adversely impact their ability to perform their duties as a Fire Brigade Member. These conditions include but are not limited to general health, illness, medications, etc.

3.4 RC Unit is responsible for:

3.4.1 Providing Ice vests for work activities inside the RCA.

3.5 Unit 2 Control Room personnel are responsible for ensuring actions are taken to provide first aid or medical attention when notified of conditions involving heat stress victims.

3.6 Site Industrial Hygiene and Safety Representative is responsible for:

3.6.1 Providing technical assistance on heat stress issues, including the development of plant heat stress training programs and maintenance of this procedure.

3.6.2 Ensuring that instruction on heat stress mitigation is arranged and conducted for employees prior to initial work in high temperature environments.

3.6.3 Assisting supervisors in the implementation of this procedure, when requested.

3.7 Maintenance is responsible for:

3.7.1 Maintaining and issuing Tube Suits.

40 PREREQUISITES

N/A

5.0 PRECAUTIONS AND LIMITATIONS

NOTE: These precautions should be covered in employee training as well as in the pre-job briefings prior to performing moderate or high heat stress work.

During time-critical evolutions involving emergency response where the safety of personnel and the public is a critical issue, personnel may not be able to comply with all of the requirements of this procedure. All reasonable attempts should be made to ensure the safety of personnel involved in the emergency response without compromising the timely completion of the response.

5.1 If an individual begins to feel symptoms of heat illness, the person should put their work in a safe condition, exit the area, notify their supervisor, rest in a cool area, and drink fluids. The Control Room should be called at ext. 5555 if symptoms persist in order to dispatch appropriate site first aid providers.

5.2 All jobs in high temperature environments should address heat stress controls in the planning stages. Planned action times and the use of body cooling devices should be considered.

5.3 Individuals who work in high temperature environments for the first time are more susceptible to heat illness than those accustomed to hot environments. After working in hot environments for several days, their bodies tend to acclimatize to heat exposure and they may tolerate longer heat exposures at higher work rates.

5.4 Work shall be planned so that an adequate number of workers are prepared to work in a high temperature environment. Workers should never work alone in high heat stress areas.

5.5 Individuals vary greatly in their tolerance to heat exposure. Factors which may affect heat tolerances may include:

- Age
- Weight
- Sex
- physical fitness
- general health
- colds, viruses, and infections
- some medications
- consumption of alcoholic beverages

5.6 In situations where individuals know that their work schedule for the following day involves entering a heat stress area, they should drink plenty of liquids in the 24 hours prior to reporting to work.

5.7 Whenever feasible, engineering controls should be used to eliminate/reduce the heat exposure (i.e., isolation of the heat source, introduction of cooled air, circulation of present air, reduced humidity, etc.). The impact of these engineering controls should be reviewed with the Radiation Control (RC) unit for jobs in radiologically controlled areas.

5.8 Individuals who work in high temperature environments may become dehydrated due to sweating. Lost body water and electrolytes should be replaced at rest breaks to prevent heat-related illness. Liquids designed to replace these electrolytes (gatorade) may be obtained from the bulk warehouse prior to or after entry, and should be consumed in frequent, small amounts. (Salt tablets are not recommended.)

5.9 Individuals who work in high temperature environments must periodically rest in a cooler area to shed body heat. Duration of breaks, extent of clothing removal, and rest area should be determined by the job supervisor, using the guidance in Step 8.3.1. Certain employees may require longer rest periods than others.

5.10 Workers should be encouraged to drink one pint of water/fluid per hour of scheduled work prior to entering high heat stress areas.

5.11 Workers should also be encouraged to drink water/fluids after high temperature work to maintain fluid balance.

5.12 Where feasible, high heat stress work should be scheduled to minimize thermal stress in the work area. This includes scheduling work at times where the WBGT and/or the metabolic heat load are lower and/or protective clothing requirements are less restrictive.

5.13 For pre-job briefings in heat stress related work areas, utilize Attachment 10.6 during the briefing.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 INSTRUCTIONS

8.1 Heat Stress Evaluation

8.1.1 The heat stress evaluation process involves assessing the variables that effect heat stress, including WBGT measurements, metabolic work load, clothing type and recovery periods. These factors are converted to recommended action times without regard to personal cooling devices for job planning purposes. A "Heat Stress Evaluation Form", Attachment 10.3, may be used for heat stress job planning.

NOTE: The Temperature/Relative Humidity meters should be placed in the shade, where possible. These meters may display inaccurate readings if in direct sunlight (higher than actual temperature and lower than actual relative humidity). The crew supervisor/designee should contact the Site Industrial Hygiene and Safety Representative for assistance in conducting Heat Stress Evaluations.

8.1.2 The work crew supervisor/designee should measure the WBGT of the work area when he/she feels that heat stress conditions may exist. WBGT is calculated using the following WBGT formulas:

Indoor WBGT = (0.7 x wet bulb) + (0.3 x globe)

Outdoor WBGT = (0.7 x wet bulb) + (0.2 x globe) + (0.1 x dry bulb)

Initial WBGT readings should be made with a Wet Bulb Globe Thermometer, available from the calibration lab. Instructions for the use of the Wet Bulb Globe Thermometer are found on Attachment 10.5, Using the Wet Bulb Globe Thermometer. Measurements should be representative of the work area thermal load. Succeeding evaluations may be based solely on dry bulb temperature and relative humidity by using Attachment 10.4, "Estimating WBGT". Temperature/Relative Humidity meters are posted at various locations around site to assist with conducting these estimates. Charts on these meters have been developed in accordance with Attachment 10.4, and should be consulted to assist in the estimation of WBGT.

8.1.3 The work crew supervisor/designee should determine the metabolic heat load using the guide available in Attachment 10.1.

8.1.4 The work crew supervisor/designee should determine the type of work clothing required or being used for the job. The categories include; work clothes (WC), cloth coveralls (CC), cloth coveralls over scrub suit (CS), double cloth coveralls (DC), OREX coveralls, SMS polypropylene coveralls (PP), MB polyethylene coveralls (PE), polyester coveralls (P2), polyester coveralls with scrubs (PS), water-barrier vapor-permeable coveralls (WB-1), water barrier vapor-permeable coveralls (WB-2), vapor-barrier coveralls (VB), encapsulating suit or turn-out gear (ES), flame retardant shirt and pants (FR).

8.2 Use of Recommended Action Times

8.2.1 Knowing the WBGT measurements, metabolic heat load, and protective clothing used, the work crew supervisor or designee should determine the planned action time from Attachment 10.2 and identify the desired methods to mitigate heat stress if longer work times are necessary.

8.2.2 Action times are used for job planning. Action times are <u>not</u> absolute because of the great variability in worker response to heat-stress. Some workers could experience heat stress symptoms prior to reaching the maximum action time.

8.2.3 By using the planned action time limits and assessing the physical condition of the workers, the work crew supervisor or designee can determine how long his workers can be expected to work before rest breaks should be given. Workers have the right to and should immediately exit the hot environment prior to the time limit if they begin to experience heat stress symptoms.

8.2.4 If there are changes in the WBGT, the metabolic work load category, or the required clothing type during the course of the job, then a re-evaluation of the job action time is necessary.

8.2.5 Absolute Stay Time will be two times the Recommended Action Time IAW Attachment 10.2 and EPRI guidelines.

8.3 Determination of Recovery Period Times

8.3.1 When work cannot be completed in the estimated action time, the supervisor must calculate an appropriate recovery period for workers to dissipate excess heat and replace water. Recovery should take place in a cool location (less than 80 degrees F.) where drinking water or gatorade is available. The length of recovery period depends on the length of exposure and the action time of the job. Recovery periods of up to one hour may be necessary for jobs which approach or exceed the planned action times. The following formula should be used as a guide for determining the minimum length of recovery period. All times are in minutes.

$$REC = \frac{AET \times 60}{MST}$$

REC-------Recovery Time

AET-------Actual Exposure Time to the Hot Environment

MST------Appropriate Action Time determined from Attachment 10.2

8.4 Use of Personal Cooling Devices

CAUTION

The personal cooling device should not be donned until just prior to entering the hot environment. The ice vest or Tube Suit will provide body cooling only while the ice is melting. Once the ice has melted, body temperature will increase quickly. Workers should monitor their condition and exit the work area as soon as the ice vest has lost its cooling effectiveness.

8.4.1 By using Attachment 10.2, "Recommended Heat Stress Control Action Times", the work crew leader's supervisor can determine if personal cooling devices would be beneficial for the job.

8.4.2 Individual workers should have the option of wearing a personal cooling device for any job when they feel there is a need. If a personal cooling device is worn, then the recommended action time is 60 minutes or until the ice melts.

8.4 (Continued)

8.4.3 Ice vests are available in dressout areas in the Radiation Control Area.

8.4.4 The ice vest should be worn so that the vest fits snugly. A t-shirt should be worn under the vest.

8.4.5 Tube Suits are available in the Maintenance Shop.

CAUTION

Use of supplied air hoods results in forced air cooling of the head, but not the body. This can lead to a false sense of body cooling, and delayed awareness of heat stress by the hood user.

8.5 Use of Supplied Air Hoods

8.5.1 Supplied air hoods are used mainly as respirators and their uses are authorized only by the Radiation Control Unit.

8.5.2 When authorized for use, supplied air hoods will supply respirable air and cooling air to the head. Normal action times per Attachment 10.2 are applicable.

8.6 First Aid For Heat Illness

8.6.1 If any individual begins to feel symptoms of heat illness, then the person should immediately exit the area, notify the supervisor, rest in a cool area, and drink fluids. The Control Room (ext. 5555) should be called if symptoms persist.

8.6.2 Examples of symptoms that should necessitate calling the Control Room are as follows:

- Pulse rate does not decrease in 30-45 minutes
- Unconsciousness
- Cannot drink fluids without vomiting
- Heat stroke
- Any other symptom deemed to be of concern.

8.6.3 The individual in the Control Room who receives the call shall take appropriate actions to ensure further first aid and/or medical attention is provided.

8.6.4 The following first aid actions should be taken at the first sign of heat stress symptoms.

1. Heat Illness - occurs due to an increased body temperature and/or a loss of body fluids and salts.

   First Aid - Rest in cool area, drink water or other liquids to replace body fluids, and eat food high in salt content.

2. Heat Cramps - are muscle spasms due to a loss of salt through sweating. Leg, stomach, and back muscles are most often affected and are often a sign of approaching heat exhaustion. Cramps can also result from drinking large amounts of water without electrolytes (salt, sugar).

   First Aid: Rest in cool area, drink water or other liquids, and eat food high in salt content.

3. Heat Exhaustion - Condition caused by an insufficient flow of blood to the brain (blood is shunted to the skin to lose heat). Symptoms can include cool, pale clammy skin, weakness, dizziness, headache, nausea, and fainting.

   First Aid: Rest in cool area, lie down, elevate feet, apply cool wet cloths, fan with air, and drink liquids.

4. Heat Stroke - a serious medical emergency caused by a failure of the body's cooling mechanisms. Symptoms include hot, dry skin (sweating stops), extremely high body temperatures, strong, rapid pulse, and unconsciousness.

   First Aid: Immediate, rapid cooling of the body is necessary. Use safety showers, move air over the body with a fan or by fanning, or cover the body with a wet sheet. **Seek immediate medical attention.**

9.0 **RECORDS**

N/A

10.0 **ATTACHMENTS**

10.1 Metabolic Heat Load Guidelines

10.2 Recommended Heat Stress Control Action Times

10.3 Heat Stress Evaluation Form

10.4 Estimating WBGT

10.5 Using the Wet Bulb Globe Thermometer

10.6 Heat Stress Pre-Job Briefing

ATTACHMENT 10.1

Page 1 of 1

METABOLIC HEAT LOAD GUIDELINES

LIGHT WORK

Light work are those average demands that are typical of job supervision, inspections, instrument repair and calibration, surveying. Light work can be performed indefinitely by everyone.

MODERATE WORK

Moderate work are those average demands that are typical of a system walk-down, valve alignments, valve and motor repairs, and light materials handling. Under cool conditions, moderate work can be easily performed by most people if there is a 10-minute break every hour. Most physically demanding work falls into this category.

HEAVY WORK

Heavy work are those average demands that are typical of gross decontamination, heavy materials handling, and extensive ladder and stair climbing. Even in comfortable conditions, heavy work can be sustained by most people for no more than 60 minutes. It is not often that heavy work is the appropriate classification because rest breaks will reduce the overall demand to the moderate category.

ATTACHMENT 10.2
Page 1 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
WORK CLOTHES (WC) – (Cotton)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
81	NL	NL	NL
82	NL	NL	240
83	NL	NL	150
84	NL	240	120
85	NL	210	100
86	NL	165	90
87	NL	135	80
88	NL	110	70
89	240	95	65
90	230	85	55
91	215	80	50
92	200	70	45
93	180	65	40
94	165	55	40
95	150	50	35
96	130	50	35
97	115	45	30
98	110	40	25
99	100	40	25
100	90	35	20
101	85	35	20
102	75	35	20
103	65	30	20
104	60	30	15
105	55	25	PCR
106	50	25	PCR
107	50	25	PCR
108	45	25	PCR
109	40	20	PCR
110	35	20	PCR
111	30	20	PCR
112	30	20	PCR
113	25	20	PCR
114	25	15	PCR
115	25	15	PCR
116	25	PCR	PCR
117	20	PCR	PCR
118	20	PCR	PCR
119	20	PCR	PCR
120	20	PCR	PCR
121	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
CLOTH COVERALLS OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
73	NL	NL	NL
74	NL	NL	240
75	NL	NL	150
76	NL	240	120
77	NL	210	100
78	NL	165	90
79	NL	135	80
80	NL	110	70
81	240	95	65
82	230	85	55
83	215	80	50
84	200	70	45
85	180	65	40
86	165	55	40
87	150	50	35
88	130	50	35
89	115	45	30
90	110	40	25
91	100	40	25
92	90	35	20
93	85	35	20
94	75	35	20
95	65	30	20
96	60	30	15
97	55	25	PCR
98	50	25	PCR
99	50	25	PCR
100	45	25	PCR
101	40	20	PCR
102	35	20	PCR
103	30	20	PCR
104	30	20	PCR
105	25	20	PCR
106	25	15	PCR
107	25	15	PCR
108	25	PCR	PCR
109	20	PCR	PCR
110	20	PCR	PCR
111	20	PCR	PCR
112	20	PCR	PCR
113	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.2
Page 3 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
DOUBLE CLOTH COVERALLS (DC) OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
69	NL	NL	NL
70	NL	NL	240
71	NL	NL	150
72	NL	240	120
73	NL	210	100
74	NL	165	90
75	NL	135	80
76	NL	110	70
77	240	95	65
78	230	85	55
79	215	80	50
80	200	70	45
81	180	65	40
82	165	55	40
83	150	50	35
84	130	50	35
85	115	45	30
86	110	40	25
87	100	40	25
88	90	35	20
89	85	35	20
90	75	35	20
91	65	30	20
92	60	30	15
93	55	25	PCR
94	50	25	PCR
95	50	25	PCR
96	45	25	PCR
97	40	20	PCR
98	35	20	PCR
99	30	20	PCR
100	30	20	PCR
101	25	20	PCR
102	25	15	PCR
103	25	15	PCR
104	25	PCR	PCR
105	20	PCR	PCR
106	20	PCR	PCR
107	20	PCR	PCR
108	20	PCR	PCR
109	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
OREX OVER SCRUB SUIT (CS) or SMS POLYPROPYLENE COVERALLS (PP) OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
81	NL	NL	NL
82	NL	NL	240
83	NL	NL	150
84	NL	240	120
85	NL	210	100
86	NL	165	90
87	NL	135	80
88	NL	110	70
89	240	95	65
90	230	85	55
91	215	80	50
92	200	70	45
93	180	65	40
94	165	55	40
95	150	50	35
96	130	50	35
97	115	45	30
98	110	40	25
99	100	40	25
100	90	35	20
101	85	35	20
102	75	35	20
103	65	30	20
104	60	30	15
105	55	25	PCR
106	50	25	PCR
107	50	25	PCR
108	45	25	PCR
109	40	20	PCR
110	35	20	PCR
111	30	20	PCR
112	30	20	PCR
113	25	20	PCR
114	25	15	PCR
115	25	15	PCR
116	25	PCR	PCR
117	20	PCR	PCR
118	20	PCR	PCR
119	20	PCR	PCR
120	20	PCR	PCR
121	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
MB POLYETHYLENE COVERALLS (PE) (Tyvek 1422A) OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
76	NL	NL	NL
77	NL	NL	240
78	NL	NL	150
79	NL	240	120
80	NL	210	100
81	NL	165	90
82	NL	135	80
83	NL	110	70
84	240	95	65
85	230	85	55
86	215	80	50
87	200	70	45
88	180	65	40
89	165	55	40
90	150	50	35
91	130	50	35
92	115	45	30
93	110	40	25
94	100	40	25
95	90	35	20
96	85	35	20
97	75	35	20
98	65	30	20
99	60	30	15
100	55	25	PCR
101	50	25	PCR
102	50	25	PCR
103	45	25	PCR
104	40	20	PCR
105	35	20	PCR
106	30	20	PCR
107	30	20	PCR
108	25	20	PCR
109	25	15	PCR
110	25	15	PCR
111	25	PCR	PCR
112	20	PCR	PCR
113	20	PCR	PCR
114	20	PCR	PCR
115	20	PCR	PCR
116	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.2
Page 6 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
POLYESTER COVERALLS (P2) (ProTech 2000) OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
76	NL	NL	NL
77	NL	NL	240
78	NL	NL	150
79	NL	240	120
80	NL	210	100
81	NL	165	90
82	NL	135	80
83	NL	110	70
84	240	95	65
85	230	85	55
86	215	80	50
87	200	70	45
88	180	65	40
89	165	55	40
90	150	50	35
91	130	50	35
92	115	45	30
93	110	40	25
94	100	40	25
95	90	35	20
96	85	35	20
97	75	35	20
98	65	30	20
99	60	30	15
100	55	25	PCR
101	50	25	PCR
102	50	25	PCR
103	45	25	PCR
104	40	20	PCR
105	35	20	PCR
106	30	20	PCR
107	30	20	PCR
108	25	20	PCR
109	25	15	PCR
110	25	15	PCR
111	25	PCR	PCR
112	20	PCR	PCR
113	20	PCR	PCR
114	20	PCR	PCR
115	20	PCR	PCR
116	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.2
Page 7 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
WATER-BARRIER, VAPOR-PERMEABLE COVERALLS (WB-1) OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
68	NL	NL	NL
69	NL	NL	240
70	NL	NL	150
71	NL	240	120
72	NL	210	100
73	NL	165	90
74	NL	135	80
75	NL	110	70
76	240	95	65
77	230	85	55
78	215	80	50
79	200	70	45
80	180	65	40
81	165	55	40
82	150	50	35
83	130	50	35
84	115	45	30
85	110	40	25
86	100	40	25
87	90	35	20
88	85	35	20
89	75	35	20
90	65	30	20
91	60	30	15
92	55	25	PCR
93	50	25	PCR
94	50	25	PCR
95	45	25	PCR
96	40	20	PCR
97	35	20	PCR
98	30	20	PCR
99	30	20	PCR
100	25	20	PCR
101	25	15	PCR
102	25	15	PCR
103	25	PCR	PCR
104	20	PCR	PCR
105	20	PCR	PCR
106	20	PCR	PCR
107	20	PCR	PCR
108	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.2
Page 8 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
WATER-BARRIER VAPOR-PERMEABLE COVERALLS (WB-2) OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
74	NL	NL	NL
75	NL	NL	240
76	NL	NL	150
77	NL	240	120
78	NL	210	100
79	NL	165	90
80	NL	135	80
81	NL	110	70
82	240	95	65
83	230	85	55
84	215	80	50
85	200	70	45
86	180	65	40
87	165	55	40
88	150	50	35
89	130	50	35
90	115	45	30
91	110	40	25
92	100	40	25
93	90	35	20
94	85	35	20
95	75	35	20
96	65	30	20
97	60	30	15
98	55	25	PCR
99	50	25	PCR
100	50	25	PCR
101	45	25	PCR
102	40	20	PCR
103	35	20	PCR
104	30	20	PCR
105	30	20	PCR
106	25	20	PCR
107	25	15	PCR
108	25	15	PCR
109	25	PCR	PCR
110	20	PCR	PCR
111	20	PCR	PCR
112	20	PCR	PCR
113	20	PCR	PCR
114	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.2
Page 9 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
VAPOR-BARRIER COVERALLS (VB) OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
64	NL	NL	NL
65	NL	NL	240
66	NL	NL	150
67	NL	240	120
68	NL	210	100
69	NL	165	90
70	NL	135	80
71	NL	110	70
72	240	95	65
73	230	85	55
74	215	80	50
75	200	70	45
76	180	65	40
77	165	55	40
78	150	50	35
79	130	50	35
80	115	45	30
81	110	40	25
82	100	40	25
83	90	35	20
84	85	35	20
85	75	35	20
86	65	30	20
87	60	30	15
88	55	25	PCR
89	50	25	PCR
90	50	25	PCR
91	45	25	PCR
92	40	20	PCR
93	35	20	PCR
94	30	20	PCR
95	30	20	PCR
96	25	20	PCR
97	25	15	PCR
98	25	15	PCR
99	25	PCR	PCR
100	20	PCR	PCR
101	20	PCR	PCR
102	20	PCR	PCR
103	20	PCR	PCR
104	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.2
Page 10 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
ENCAPSULATING SUIT OR TURN-OUT GEAR (ES) - OVER SCRUB SUIT (CS)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
62	NL	NL	NL
63	NL	NL	240
64	NL	NL	150
65	NL	240	120
66	NL	210	100
67	NL	165	90
68	NL	135	80
69	NL	110	70
70	240	95	65
71	230	85	55
72	215	80	50
73	200	70	45
74	180	65	40
75	165	55	40
76	150	50	35
77	130	50	35
78	115	45	30
79	110	40	25
80	100	40	25
81	90	35	20
82	85	35	20
83	75	35	20
84	65	30	20
85	60	30	15
86	55	25	PCR
87	50	25	PCR
88	50	25	PCR
89	45	25	PCR
90	40	20	PCR
91	35	20	PCR
92	30	20	PCR
93	30	20	PCR
94	25	20	PCR
95	25	15	PCR
96	25	15	PCR
97	25	PCR	PCR
98	20	PCR	PCR
99	20	PCR	PCR
100	20	PCR	PCR
101	20	PCR	PCR
102	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.2
Page 11 of 11
RECOMMENDED HEAT STRESS CONTROL ACTION TIMES
FLAME RETARDANT SHIRT AND PANTS (FR)

WBGT	METABOLIC HEAT LOAD and ACTION TIMES IN MINUTES		
degrees F	Light	Moderate	Heavy
79	NL	NL	NL
80	NL	NL	240
81	NL	NL	150
82	NL	240	120
83	NL	210	100
84	NL	165	90
85	NL	135	80
86	NL	110	70
87	240	95	65
88	230	85	55
89	215	80	50
90	200	70	45
91	180	65	40
92	165	55	40
93	150	50	35
94	130	50	35
95	115	45	30
96	110	40	25
97	100	40	25
98	90	35	20
99	85	35	20
100	75	35	20
101	65	30	20
102	60	30	15
103	55	25	PCR
104	50	25	PCR
105	50	25	PCR
106	45	25	PCR
107	40	20	PCR
108	35	20	PCR
109	30	20	PCR
110	30	20	PCR
111	25	20	PCR
112	25	15	PCR
113	25	15	PCR
114	25	PCR	PCR
115	20	PCR	PCR
116	20	PCR	PCR
117	20	PCR	PCR
118	20	PCR	PCR
119	PCR	PCR	PCR

NOTES: NL = No Limit, PCR = Personal Cooling Required (refer to 8.4.2)

ATTACHMENT 10.3
Page 1 of 1

HEAT STRESS EVALUATION FORM

JOB DATE: _____

JOB LOCATION: _____

TASK(S):

_____

_____

_____

SUPERVISOR: _____

EST. PERSON-HOURS: _____

NUMBER OF WORKERS: _____

PLANT STATUS (for job planning use): _____

CLOTHING TYPE: _____

METABOLIC HEAT LOAD (CIRCLE ONE):

LIGHT **MODERATE** **HEAVY**

TEMPERATURE (CIRCLE ONE):

MEASUREMENT **ESTIMATE**

WBGT = _____F

DB = _____F **WB** = _____F **GT** = _____F

ACTION TIME = _____ minutes (from Attachment 10.2)

RECOVERY PERIOD = _____ minutes = $\frac{\text{(Time in minutes in Hot Environment) x (60)}}{\text{(Action Time in minutes)}}$

HAVE WORKERS RECEIVED A PRE-JOB BRIEFING INCLUDING HEAT STRESS CONCERNS? (CIRCLE ONE)

YES **NO**

ADDITIONAL INFORMATION:

_____

_____

Signature (Job Supervisor): _____ Date: _____

ATTACHMENT 10.4
Page 1 of 1
ESTIMATING WBGT

Measuring WBGT may require entering the work area prior to the start of the job. However, this action could also create an ALARA concern.

There are two methods which can be used to estimate the WBGT without entering the work area.

- The first method is to estimate the WBGT based on previously recorded measurements, such as those obtained from the Heat Stress Evaluation Form (Attachment 10.3). The plant condition and work location must be essentially identical to use this method.

NOTE:	The following method may underestimate the actual WBGT for work performed directly adjacent to hot steam pipes or other radiant heat sources.

- The second method is based on a remote reading of the dry bulb temperature (DB) and an estimation of the relative humidity as follows: (When the relative humidity is not known, use 100% value for estimation)

RELATIVE HUMIDITY	ESTIMATED WBGT
100%	DB + 4°F
90%	DB + 2°F
80%	DB
70%	DB - 3°F
60%	DB - 5°F
50%	DB - 7°F
40%	DB – 9°F

USING THE WET BULB GLOBE THERMOMETER

Measuring WBGT by using the Wet Bulb Globe thermometer will require entering the work area prior to the start of the job. Be sure to prepare the meter for use, prior to bringing it into the hot environment, in order to save time.

To prepare the meter:

1. Connect each of the wet bulb, dry bulb, and globe sensors to the unit. Look at the symbols located on the top of the unit to determine the appropriate connector for each sensor. Use caution to insure that the connector prongs are aligned properly in order to avoid damaging the sensors.
2. Use distilled water to saturate the sponge and wick on the wet bulb sensor.

To operate the meter:

1. Turn the meter on to the desired function; WBGT in for indoor measurements, or WBGT out for outdoor measurements.
2. Allow the sensors to stabilize in the environment where reading is being taken. Typical response times may be as long as 15 minutes.
3. Take reading once display has stabilized.

Changing Batteries/Meter Calibration:

1. Consult owners manual.

HEAT STRESS PRE-JOB BRIEFING

Advise persons entering a heat stress area of the recommended action time and the absolute stay time.

Advise persons entering a heat stress area of any required engineering controls or of any personal cooling device requirements, such as ice vests or Tube Suits.

Advise persons entering a heat stress area:

- They may become dehydrated due to sweating.
- Lost body water and electrolytes should be replaced by drinking during rest breaks to prevent heat-related illness.
- Where they may obtain drinking water and/or Gatorade.
- Where cooler rest areas are located and the duration of minimum recovery times.

First Aid for Heat Stress:

Heat Cramps - are muscle spasms due to a loss of salt through sweating. Leg, stomach, and back muscles are most often affected and are often a sign of approaching heat exhaustion. Cramps can also result from drinking large amounts of water without electrolytes (salt, sugar).

First Aid: Rest in cool area, drink water or Gatorade, and eat food high in salt content.

Heat Exhaustion - Condition caused by an insufficient flow of blood to the brain (blood is shunted to the skin to lose heat). Symptoms can include cool, pale clammy skin, weakness, dizziness, headache, nausea, and fainting.

First Aid: Rest in cool area, lie down, elevate feet, apply cool wet cloths, fan with air, and drink liquids.

Heat Stroke - a serious medical emergency caused by a failure of the body's cooling mechanisms. Symptoms include hot, dry skin (sweating stops), extremely high body temperatures, strong, rapid pulse, and unconsciousness.

First Aid: Immediate, rapid cooling of the body is necessary. Use safety showers, move air over the body with a fan or by fanning, or cover the body with a wet sheet. **Seek immediate medical attention.**

DEFINITIONS

- Absolute Stay Time – Two times the Recommended Action Time (IAW Attachment 10.2 and EPRI guidelines)
- Acclimation - The gradual process of improved heat tolerance after continuous exposure to heat. Acclimation consists of reduced heart rate, increased sweat production, production of less salty sweat, and lower body temperature.
- Action Time - An estimate of the length of time workers may be exposed in hot environments without personal cooling devices and not suffer heat stress disorders (used for planning purposes). The length of action times is not absolute because of worker variability in response to heat.
- ALARA (As Low As Reasonably Achievable) - Making every reasonable effort to maintain exposure to radiation as far below the dose limits as is practical, taking into account the state of technology, and the economics of improvements in relation to the benefits.
- Cloth Coveralls (CC) - A standard configuration of anticontamination coveralls with a hood and hand and foot coverings. The fabric is either a cotton or cotton/polyester blend with weights of about 8 to 9 oz/sqyd.
- Cloth Coveralls over Scrub Suit (CS) - The configuration described as CC plus a set of 2 oz/sqyd cloth underalls (a.k.a. surgical scrub suit).
- Double Cloth Coveralls (DC) - The configuration described as CC plus a second set of cloth coveralls only.
- Dry Bulb Temperature (DB) - The temperature as measured by a standard thermometer, without respect to humidity or radiant heat.
- Encapsulating Suit or Turn-out Gear (ES) - Total encapsulating suits (eg, Level A); re-usable, whole body chemical protective suits; firefighter turn-out gear.
- Flame-Retardant Shirt and Pants (FR) - Long-sleeve shirt and pants made from a treated cotton fabric.
- Globe Temperature (GT) - Temperature resulting from radiant heat sources, measured with a globe thermometer.
- Globe Thermometer - A thermometer with a black globe at its end, used for measuring radiant heat.

DEFINITIONS (Continued)

- Heat Stress - The physiological stress which occurs when the body temperature rises above normal. This occurs when the body produces or gains more heat than it is capable of losing. It is caused by any combination of air temperature, thermal radiation, humidity, air flow, restrictive clothing, and physical work load which may result in elevated core body temperature and subsequent illness.
- High Heat Stress Job/Work - Any job or work in which the calculated action time, without regard to personal cooling equipment, is less than 30 minutes.
- MB Polyethylene Coveralls (PE) - Limited use coveralls with hood (particle barrier only) made from a meltblown polyethylene (Tyvek 1422A).
- Metabolic Heat Load - Heat generated by the body, which increases with physical work. Examples may be found on Attachment 10.1.
- Moderate Heat Stress Job/Work - Any job/work in which the calculated action time, without regard to personal cooling equipment, is greater than 30 minutes but less than 240 minutes.
- OREX – Disposable coveralls made of poly vinyl alcohol (PVA).
- Personal Cooling Device - Equipment such as ice vests or Tube Suits, used to minimize heat gain and/or increase heat loss.
- Polyester Coveralls (P2) - Light-weight polyester (98% nylon)(3 oz/sqyd) coveralls worn with a hood of the same material (ProTech 2000).
- Polyester Coveralls with Scrubs (PS) - Light-weight polyester coveralls and hood (P2) worn over a typical surgical scrub suit (cotton or cotton/polyester blend).
- Protective Clothing - Items worn to prevent radioactive contamination.
- Recovery Period - Time allowed to be spent outside of a hot area allocated to workers who have performed work in hot environments. Water or gatorade should be available for consumption in the recovery area.
- Relative Humidity - The amount of moisture in the air compared to the amount of moisture the air can hold for a given temperature.
- Self Determination - Allowing for worker discretion to exit Heat Stress Work Areas.

DEFINITIONS (Continued)

- SMS Polypropylene Coveralls (PP) - Limited-use coveralls with hood (particle barrier only) made from a spunbonded, meltblown polypropylene.
- Supplied Air Hood - Air-supplied hood respirator which will deliver respirable air over the head and upper body.
- Vapor-Barrier Coveralls (VB) - Coveralls and hood made of light weight fabrics designed for limited use. Typical fabrics might be a polyethylene coated spunbonded polyethylene or a polyvinylchloride.
- Water-Barrier, Vapor Permeable Coveralls (WB-1) - Limited-use coverall with hood made from tri-laminate fabric with a tetrafluoroethylene microporous film.
- Water-Barrier, Vapor Permeable Coveralls (WB-2) - Coverall with hood made from tri-laminate fabric with a microporous film.
- Wet-Bulb Temperature (WB) - The temperature as determined by a wet bulb thermometer. This temperature is influenced by the evaporation rate of water, which is dependent upon the relative humidity in air.
- Wet-Bulb Globe Temperature (WBGT) - An index of heat-stress based on globe, dry and wet bulb temperatures.
- Wet-Bulb Globe Thermometer - A thermometer with sensors to measure wet bulb, dry bulb, and globe temperatures.
- Work Clothes (WC) - A standard ensemble that includes a 4 oz/sqyd cotton shirt with long sleeves and 8 oz/sqyd cotton pants.

ANSWER KEY

ATTACHMENT 10.3
Page 1 of 1

HEAT STRESS EVALUATION FORM

JOB DATE: Today
JOB LOCATION: Aux. Building Pipe Alley
TASK(S): OP-201 Valve Alignments

SUPERVISOR: R.O. Moore

EST. PERSON-HOURS: 1.0

NUMBER OF WORKERS: 2

PLANT STATUS (for job planning use): Mode 3

CLOTHING TYPE: OREX Coveralls

METABOLIC HEAT LOAD (CIRCLE ONE):
LIGHT **MODERATE** **HEAVY**

TEMPERATURE (CIRCLE ONE):
MEASUREMENT **ESTIMATE**

WBGT = 101 F

DB = _____F **WB** = _____F **GT** = _____F

ACTION TIME = 35 minutes (from Attachment 10.2)

RECOVERY PERIOD = 51.4 minutes = (Time in minutes in Hot Environment) x (60) / (Action Time in minutes)

HAVE WORKERS RECEIVED A PRE-JOB BRIEFING INCLUDING HEAT STRESS CONCERNS? (CIRCLE ONE)

YES **NO**

ADDITIONAL INFORMATION:

Signature (Job Supervisor): R.O. Moore Date: Today

SRO A1-2

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility:	HB ROBINSON	Task No.:	02344101203
Task Title:	Complete Equipment Inoperable Record	JPM No.:	2011-2 NRC JPM Admin SRO A1-2
K/A Reference:	G2.1 18 (3.6 / 3.8)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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:

- Unit operating at 100% RTP steady state
- CCW Pump B removed from service at 1245 hours on 12/1/11 due to failed inboard motor bearing
- No additional equipment is inoperable
- Current plans will return to service in 44 hours
- Work order # 47548629 has been initiated
- NCR # 407627 has been initiated

Task Standard: Complete OMM-007, Attachment 10.1 and 10.11

Required Materials: OMM-007, Equipment Inoperable Record, Rev. 84
PLP-100, Technical Requirements Manual, Rev. 36

General References: OMM-007, Equipment Inoperable Record, Rev. 84

Handouts: OMM-007, Equipment Inoperable Record, Rev. 84
PLP-100, Technical Requirements Manual, Rev. 36

Initiating Cue:	The CRS has directed you to complete the necessary OMM-007 attachment(s) for the inoperability of CCW Pump B Another SRO will perform the checklist of OMM-001-8, Control of Equipment and System Status and OPS-NGGC-1000, Fleet Conduct of Operations. All necessary outside notifications will be made by the Shift Manager.
Time Critical Task:	NO
Validation Time:	30 minutes

(Denote Critical Steps with an asterisk *)

Start Time: _____

NOTE: Completion of EIR – Ultimate Heat Sink (UHS) for Service Water Temperature Exceeding 97°F will be used versus this section if entering ITS LCO 3.7.8 (UHS) REQUIRED ACTIONS due to Service Water temperature exceeding 97°F.

Performance Step: 1 Perform the Revision Verification (Step 8.2.1)

Standard: Candidate performs the revision verification or states that he uses the Control Room copy, enters today's date and initials on Attachment 10.1, EIR – ITS/TRM/ODCM/RG 1.97.

Examiner's Note:

Examiner's Cue: **Revision verification is the correct revision.**

Comment:

Performance Step: 2 Enter the name of the equipment which is inoperable in Section "A" (Step 8.2.2)

Standard: Candidate enters **CCW Pump B** in Section A.

Examiner's Note:

Comment:

Performance Step: 3 Record the reason for the equipment inoperability. This may include MOD number, problems with the equipment, and/or work to be performed (Step 8.2.3)

Standard: Candidate documents that motor bearing failure is the reason for the inoperability.

Examiner's Note:

Comment:

Performance Step: 4 Verify a Work Request has been initiated (if applicable) AND record the WR number (ACR 94-00281) (Step 8.2.4)

Standard: Candidate documents a work request number and fills in the WR # blank.

Examiner's Note:

Comment:

* **Performance Step: 5**	IF the unavailability is unplanned, AND the component is part of a system listed on Attachment 10.10, THEN review OMM-048 AND the Maintenance Rule Scoping and Performance Criteria basis section of the Maintenance Rule Database to determine if the listed function(s) of the system is/are affected. IF a system function is affected, THEN initiate a CR stating a potential Safety Significant Functional Failure has occurred IAW OMM-048, and record the CR# in Section "D" (Step 8.2.5)
Standard:	Candidate determines that the unavailability is unplanned and the component is listed in Attachment 10.10. A CR number is recorded in the blank under Section D.
Examiner's Note:	**Attachment 10.10, Maintenance Rule Systems, lists System # 4080, Component/Cooling Water System to be considered a High Safety Significant System under the Maintenance Rule.**
Comment:	
Performance Step: 6	Complete Section "E" as follows: Item 1 – Enter the TIME AND DATE that the equipment was declared inoperable (Step 8.2.6)
Standard:	Candidate enters the TIME as **1245** and DATE as **12/1/11.**
Examiner's Note:	
Comment:	

* **Performance Step: 7** Complete Section "E" as follows:
Item 2 – Circle the applicable document abbreviation and enter applicable LCO, TRMS or Specification number. Be specific. For example, provide table number and item number where applicable.(Step 8.2.6)

Standard: Candidate circles **ITS** and enters **LCO 3.7.6, Condition A.**

Examiner's Note:

Comment:

* **Performance Step: 8** Complete Section "E" as follows:
Item 3 – Enter any applicable actions required to satisfy the document identified in Item 2 and any required completion time. (Step 8.2.6)

Standard: Candidate enters as follows: **Restore required CCW Train to operable status within 72 hours. THEN apply Condition B – Be in Mode 3 in 6 hours and Mode 5 in 36 hours.**

Examiner's Note:

Comment:

* **Performance Step: 9** Complete Section "E" as follows:

Item 4 – Enter the maximum time the equipment is allowed to be inoperable in the applicable blank. Circle hrs/days as they apply to the Special Report. (Step 8.2.6)

Standard: Candidate enters **78** hours in the MODE 3 blank and **108** hours in the MODE 5 blank.

Examiner's Note:

Comment:

* **Performance Step: 10** Complete Section "E" as follows:

Item 5 – Enter the Time and Date that Item4 is required in the applicable blank. (Step 8.2.6)

Standard: Candidate enters **1845** in the Time blank and **12/4/11** in the Date blank for MODE 3.

Candidate enters **0045** in the Time blank and **12/6/11** in the Date blank for MODE 5.

Examiner's Note:

Comment:

NOTE: ODCM required initial compensatory samples lack a "grace period."

Performance Step: 11 Complete Section "E" as follows:
Item 6 – Enter any applicable surveillances or activities and required frequencies which are required as a result of the component inoperability. (Step 8.2.6)

Standard: Candidate enters **NONE**.

Examiner's Note:

Comment:

Performance Step: 12

IF the component is an ITS Support System component, THEN perform Attachment 10.11, which is provided to ensure Safety Function Determinations are performed consistently. The TRM contains in-depth guidance for performing Safety Function Determinations. [CAPR 193057] (Step 8.2.7) (Attachment 10.1, Section F)

Standard:

Candidate determines the following from Attachment 10.11, Loss of Safety Function Worksheet, Page 1 of 4:

1. TS Support Feature is Inoperable –

   Yes, CCW Pump B.

2. Determine the impact the inoperability has on applicable supported systems.
3. Does the TS support feature result in a supported feature LCO not met –

   NO

4. Exit the SFDP.

Attachment 10.11, Page 2 of 4 completed as follows:

Revision status checked with **Date** and **INIT** filled in.

Date of **12/1/11** and Time of **1245** completed

MODE **1**, Power – **100%**, RCS Temperature - **575.9°F**, RCS Pressure – **2235 psig.**

1) List inoperable ITS Support Feature: **CCW Pump B listed and step initialed.**

2) IF inoperable ITS Support Feature does NOT result in ITS Supported Feature inoperability, THEN perform the following:

   a) N/A Steps 3 through 8 and **step initialed.**

   b) Sign and Date and **step initialed.**

Examiner's Note:

Comment:

Performance Step: 13 IF the component is an ITS Supported System Component, THEN review open Loss of Safety Function Worksheets (Attachment 10.11) for impact AND log in AUTO log to document review. [CAPR 193057] (Step 8.2.8) (Attachment 10.1, Section G)

Standard: Candidate determines that there are no open Loss of Safety Function worksheets.

Examiner's Note:

Comment:

Performance Step: 14 Initial the blank in Section "H" when the Load Dispatcher has been notified when the component inoperability could force plant shutdown or load reduction. [SOER 99-1. Rec. 1C] (Step 8.2.9)

Standard: Candidate initials blank for Load Dispatcher notification.

Examiner's Cue: **If requested, respond as the Load Dispatcher that notification has been received.**

Comment:

Performance Step: 15 Initial the blank in Section "I" when Planning and Scheduling has been notified when ITS/TRM/ODCM/RG 1.97 actions have been entered and plant shutdown is anticipated. (Step 8.2.10)

Standard: Candidate initials the blank that Planning and Scheduling has been notified of anticipated plant shutdown.

Examiner's Cue: **If requested, respond as Planning and Scheduling that notification has been received.**

Comment:

Performance Step: 16 IF the EIR is completed due to a Radiation Monitor, Flowrate Monitor or Tank Level Monitor inoperability, THEN enter the E&C Technician's name, time and date of notification in the blanks in Section "J." (Step 8.2.11)

Standard: Candidate determines that the component inoperability does not involve any radiation monitor, flowrate monitor or tank level monitor and N/As the blanks in Section J of Attachment 10.1.

Examiner's Note:

Comment:

NOTE: Maintenance Rule data can be found by clicking on Start, Programs, Engineering, RNP, and RNP System Notebook. When the database opens move the desired system(s) from the list of available systems to the list of selected systems. From the list of Systems Notebook links click on M.R. System Specific Reports, then click on Performance Summary.

* **Performance Step: 17** IF a Maintenance Rule System monitored for unavailability (Attachment 10.10, page 2) is affected, THEN record the Allowed Unavailability hours, subtract the actual unavailability hours, and record the remaining unavailability hours in Section "K." (NCR 102997) (Step 8.2.12)

Standard: Candidate determines that System 4080-CCW, CCW Pump Trains is listed in Attachment 10.10, Page 2.

(37.75 - 38)

Candidate determines that the Allowed Unavailability hours is **132** hours, the actual unavailability hours is **94.25** hours and the remaining unavailability hours is **38** hours.

Values do not match answer key.

132 Hours Allowed – **94.25** Hours Actual = **38** Hours Remaining will be entered in Section K of Attachment 10.1.

Examiner's Note: **Data will be provided to the candidate from the Maintenance Rule Database.**

Comment:

Performance Step: 18 IF the unavailability is unplanned and remaining unavailability hours are less the 72, THEN notify the RES Duty Manager and record the name, date, and time in Section "K." (NCR 102997) (Step 8.2.13)

Standard: Candidate determines that the remaining hours is less than 72 hours and notifies the RES Duty Manager. He documents the name, date and time that the notification was made.

Examiner's Note:

Comment:

Performance Step: 19 The SM OR the CRS shall review the EIR AND sign AND date following completion in Section "L." (Step 8.2.14)

Standard: Candidate will sign and date the Completed By portion of Attachment 10.1, Section L.

Examiner's Note:

Comment:

Performance Step: 20 The comments section is used for documenting failed testing or changed equipment status. (Step 8.2.15)

Standard: Candidate can place any comments needed or mark the comments as N/A or NONE.

Examiner's Note:

Comment:

END OF TASK

Termination Cue: **EIR completion for the CCW Pump B inoperability completes the JPM.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM Admin SRO A1-2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

ANSWER Key

ATTACHMENT 10.1
Page 1 of 2
EIR – ITS/TRM/ODCM/RG 1.97

CONTINUOUS USE

This revision has been verified to be the latest revision available. Today (Date) JA (INIT)

A. Equipment Inoperable: CCW Pump B

B. Reason for Equipment Inoperability: Failure of inboard motor bearing

C. WR initiated: (ACR 94-00281) WR # 47548629

D. **IF** an unplanned unavailability **AND** a High Safety Significant Maintenance Rule System FUNCTION is affected by the equipment, **THEN** initiate CR stating a potential safety significant functional failure has occurred. CR # 407627

E. Operating Limitations:

1. Equipment declared inoperable: Time 1245 Date 12/1/11
2. (ITS)/TRM/ODCM/RG 1.97 Other reference number LCO 3.7.6, Condition A
   (Circle one)
3. Other actions and associated completion time: Restore required CCW Train to Operable Status within 72 hours. Then Apply Condition B – Be in Mode 3 in 6 hours and Mode 5 in 36 hours
4. Maximum time equipment allowed inoperable before:
   MODE 2 ___ Hrs MODE 3 78 Hrs MODE 4 ___ Hrs MODE 5 108 Hrs
   Special Report _____ hrs/days
5. Time **AND** Date Action Required:

MODE 2	Time:	Date:
MODE 3	Time: 1845	Date: 12/4/11
MODE 4	Time:	Date:
MODE 5	Time: 0045	Date: 12/6/11
Special Report	Time:	Date:

6. Record any surveillance required to be performed as a result of the inoperability of this component. (ODCM initial compensatory samples lack a "grace period".)
   NONE

EIR – ITS/TRM/ODCM/RG 1.97

F. **IF** this is an ITS Support System Component, **THEN** perform Attachment 10.11. [CAPR 193057]

G. **IF** this is an ITS Supported System Component, **THEN** review open Loss of Safety Function Worksheets (Attachment 10.11) for impact.

H. Load Dispatcher notified of REQUIRED ACTION which could force plant shutdown/load reduction. _____(SM/CRS Initials) [SOER 99-1, Rec. 1C]

I. Planning and Scheduling notified to develop Forced Outage Schedule if ITS/TRM/ODCM/RG 1.97 actions are entered **AND** plant shutdown anticipated.
_____(SM/CRS Initials)

J. **IF** this EIR is for a Radiation Monitor, Flowrate Monitor or Tank Level Monitor, **THEN** notify E&C of equipment inoperability:
Time N/A Date N/A N/A
E&C Shift Technician (Print name)

K. **IF** a Maintenance Rule System Function is affected, **THEN** record Allowed Unavailability Hours, Actual Unavailability Hours, and Unavailability Hours Remaining.
132 Hours Allowed - 91.14 Hours Actual = 40.86 Hours Remaining
IF unplanned and less than 72 Hours remaining, **THEN** notify the RES Duty Manager.
Ken Jones (Name) 12/1/11 (Date) 1310 (Time)

L. Completed By: _____ (SM/CRS) 12/1/11 (Date)

M. Comments: NONE

N. Restoration

1. Equipment operable: Time _____ Date _____
2. **IF** this EIR is for a Radiation Monitor, Flowrate Monitor or Tank Level Monitor, **THEN** notify E&C of equipment return to service:
   Time _____ Date _____ _____
   E&C Shift Technician (Print Name)
3. Equipment no longer required due to plant conditions:
   Time _____ Date _____
   Reason: _____
4. Completed By: _____ (SM/CRS) _____ (Date)

MAINTENANCE RULE SYSTEMS

INFORMATION USE

The following systems are considered to be High Safety Significant Systems under the Maintenance rule.

1000	Containment Isol Valve – Pseudo System	5098	Dedicated Shutdown Diesel Generator
1005	Reactor Vessel and Internals System	5100	Fuel Oil System
1045	Excore Nuclear Instrument System	5114	Dedicated Shutdown System
1065	Rod Control System	5120	Switchyard and Transformer System
1080	Reactor Protection and Safeguards System	5170	4 KV AC Distribution System
2005	Reactor Coolant System	5175	480V AC Distribution System
2045	Residual Heat Removal System	5185	208-120 VAC Distribution System
2060	Chemical and Volume Control System	5235	125V DC Battery/Charger/Distribution System
2080	Safety Injection System	6135	Instrument Air System
3005	Steam Generator	6150	Nitrogen Supply/Blanketing System
3020	Main Steam	6175	Site Fire Protection System
3050	Feedwater System	6270	Primary and Demineralized Water Makeup System
3065	Auxiliary Feedwater	8010	Containment System
3070	Condensate System	8150	HVAC Containment Building System
4060	Service Water System	8210	HVAC Auxiliary Building
4080	Component/Cooling Water System	8220	HVAC Control Room Area
5095	Emergency Diesel Generator System		

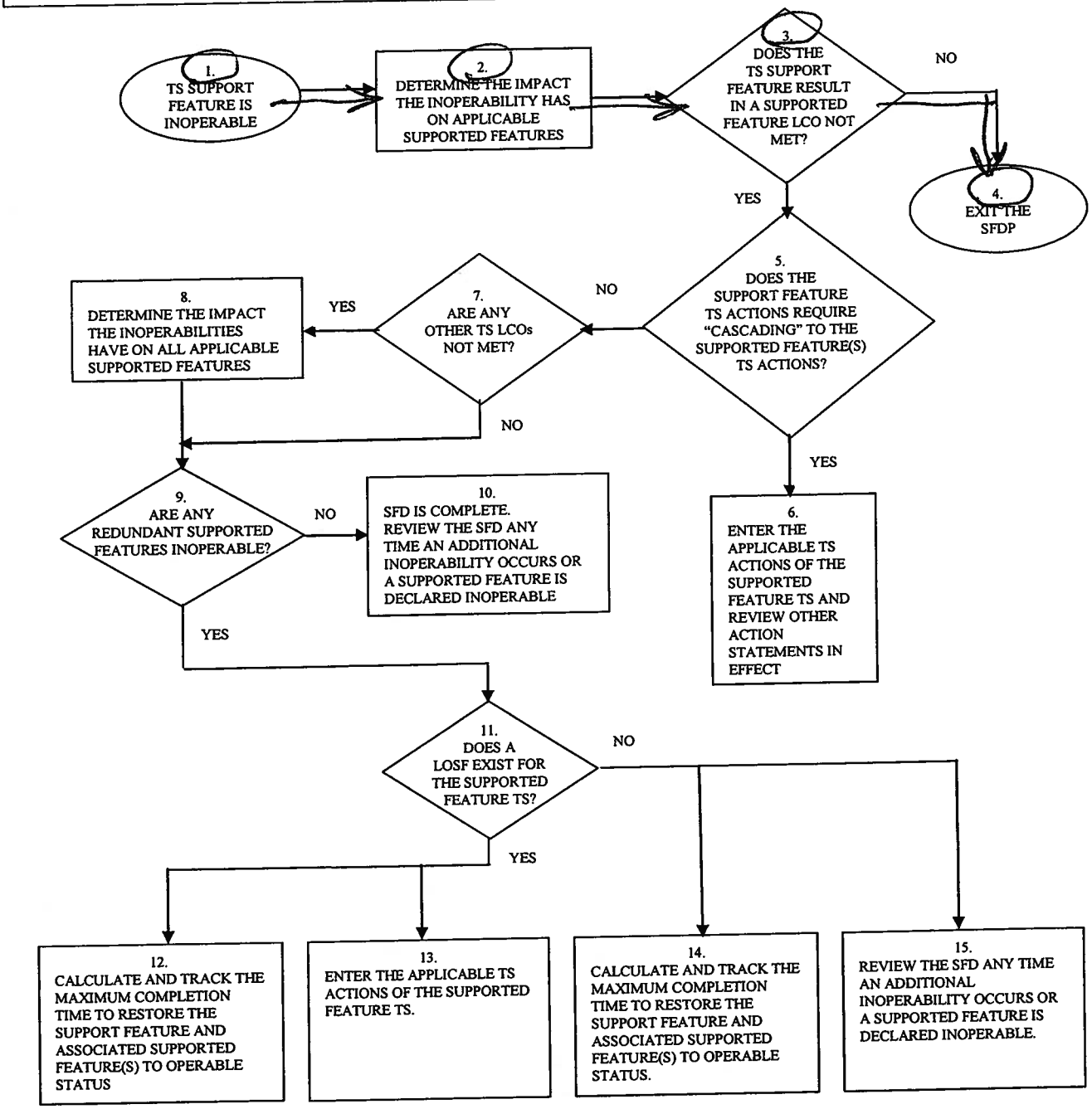
MAINTENANCE RULE SYSTEMS

The following systems require unavailability monitoring for the maintenance rule:

System	What's Monitored
1065 – Rod Drive	Reactor trip breakers
2005 – RCS	RCS PORVs and block valves
2045 – RHR	RHR trains
2060 – CVCS	Charging pump trains, boric acid pumps, emergency boration flowpath
2080 – SI	SI Pump trains, CV Spray trains, Accumulators
3020 – MS	S/G PORVs, Steam Supplies to SDAFW
3065 – AFW	AFW Pump trains, injection lines
4060 – SW	SW pumps, SW booster pumps, north and south headers, Turbine Building Isolation
4080 – CCW	CCW pump trains, heat exchangers
5095 – EDG	EDG trains
5098 – DSDG	Dedicated Shutdown Diesel
5114 – DS	DS bus, DS-UPS-Inverter
5170 – 4 KV	Auto Bus Transfer breakers
5175 – 480 V	Bus E-1, Bus E-2
5185 – 120 / 208 VAC	Constant voltage transformers
5235 – 125 VDC	Battery Chargers, Inverters, DC Buses
6004 – ERFIS	ERFIS Computer
6135 – IA	Compressors, Backup Air Supply For Charging Pumps
6175 – FP	Pumps, Flowpath to SI, AFW, CVCS Pump cooling / suction
6270 – Primary Water	Deep Well Pump "D", Primary Water Pumps and Header
8150 – CV HVAC	HVH units
8220 – MCR HVAC	Ventilation fans, Emergency Filtration Unit, Control Room Envelope Integrity

LOSS OF SAFETY FUNCTION WORKSHEET
[CAPR 193057]
CONTINUOUS USE

NOTE: The numbers in the flow chart correspond to the description of SFD steps in Appendix C of the TRM.



LOSS OF SAFETY FUNCTION WORKSHEET

This revision has been verified to be the latest revision available. 12/1/11 Date INIT

Date: 12/1/11	Plant Conditions		Time: 1245
MODE	Power	RCS Temperature	RCS Pressure
1	100 %	575.9 °F	2235 psig

NOTE: This Safety Function Determination should be performed by a licensed Senior Reactor Operator and should be reviewed any time additional inoperabilities occur or an ITS Supported Feature is declared inoperable.

INIT

1) List inoperable ITS Support Feature.
CCW Pump B

2) **IF** inoperable ITS Support Feature does **NOT** result in ITS Supported Feature inoperability, **THEN** perform the following:
   a) N/A steps 3 through 8.
   b) Sign and date.
   c) Forward worksheet to SM for review. ___
   d) **IF** the Support Feature will **NOT** be returned to service prior to end of shift, **THEN** attach completed worksheet to the EIR for the Support Feature. ___
   e) **IF** the Support Feature will be returned to service prior to end of shift, **THEN** file LOSF Worksheet in EIR notebook. N/A

3) **IF** inoperable ITS Support Feature results in ITS Supported Feature inoperability, **THEN** list inoperable ITS Supported Feature(s). N/A
N/A

LOSS OF SAFETY FUNCTION WORKSHEET

INIT

4) **IF** support feature ITS Actions require cascading to Supported Feature(s) ITS Actions, **THEN** perform the following:
   a) Enter applicable ITS Actions of Supported Feature(s) ITS. N/A
   b) N/A steps 5 through 8. N/A
   c) Sign and date. N/A
   d) Forward worksheet to SM for review. N/A
   e) Attach completed worksheet to the EIR for the Support Feature. N/A

5) **IF** any other ITS LCOs are **NOT** met, **THEN** determine the impact the inoperabilities have on all applicable Supported Features **AND** list. N/A
   N/A
   _____
   _____
   _____

6) **IF** there are NO redundant Supported Features inoperable, **THEN** perform the following:
   a) N/A steps 7 and 8. N/A
   b) Sign and date. N/A
   c) Forward worksheet to SM for review. N/A
   d) Attach completed worksheet to the EIR for the Supported Feature. N/A

7) **IF** a LOSF does **NOT** exist for the Supported Feature ITS, **THEN** perform the following:
   a) Calculate and record the maximum completion time to restore the ITS Support Feature and associated ITS Supported Feature(s) to operable status. N/A
      N/A hrs + N/A hrs = N/A hrs
      1st Support Feature | Supported Feature | Max Completion
   b) N/A step 8. N/A
   c) Sign and date. N/A
   d) Forward worksheet to SM for review. N/A
   e) Attach completed worksheet to the EIR for the Supported Feature. N/A

LOSS OF SAFETY FUNCTION WORKSHEET

INIT

8) **IF** a LOSF exists for the Supported Feature ITS, **THEN** perform the following:

a) Calculate and record the maximum completion time to restore the ITS Support Feature and associated ITS Supported Feature(s) to operable status. N/A

N/A hrs (1st Support Feature) + N/A hrs (Supported Feature) = N/A hrs (Max Completion)

b) Enter the applicable ITS LCO for the ITS Supported Feature or ITS LCO 3.0.3 as applicable. N/A

c) Attach completed worksheet to the EIR for the Supported Feature. N/A

Remarks: N/A

Completed By: _____ (SRO) Date: 12/1/11

Reviewed By: _____ (SM) Date: _____

Maintenance Rule Event List

RNP

System 4080

Event Date	End Date	Event Title	PMG	Monitoring	Value
Event Type	**EVENT**				
7/29/2010	7/29/2010	CCW-PMP-A-MTR TAKEN OOS TO LUBRICATE MOTOR BEARI	CCW Pump Train A	UNAVAILABLE HOURS	5.53
8/25/2010	8/25/2010	CCW-PMP-A Taken OOS for oil sample	CCW Pump Train A	UNAVAILABLE HOURS	7.10
1/14/2011	1/14/2011	CCW-PMP-A taken OOS for oil sample	CCW Pump Train A	UNAVAILABLE HOURS	4.01
5/31/2011	5/31/2011	CCW-PMP-A taken OOS for oil and oiler change	CCW Pump Train A	UNAVAILABLE HOURS	7.81
8/25/2011	8/25/2011	CCW-PMP-A OOS for planned maintenance	CCW Pump Train A	UNAVAILABLE HOURS	4.11
9/12/2011	9/14/2011	CCW-PMP-A unavailable due to DS bus outage	CCW Pump Train A	UNAVAILABLE HOURS	53.06
					81.62
7/27/2010	7/27/2010	CCW-PMP-B TAKEN OOS TO LUBRICATE MOTOR BEARINGS	CCW Pump Train B	UNAVAILABLE HOURS	7.75
8/24/2010	8/24/2010	CCW-PMP-B Taken OOS for oil sample	CCW Pump Train B	UNAVAILABLE HOURS	2.73
9/29/2010	10/1/2010	CCW-PMP-B Taken OOS to remove foreign material	CCW Pump Train B	UNAVAILABLE HOURS	45.68
1/14/2011	1/14/2011	CCW-PMP-B taken OOS for oil sample	CCW Pump Train B	UNAVAILABLE HOURS	3.88
1/22/2011	1/22/2011	CCW-PMP-B taken OOS for oil sample	CCW Pump Train B	UNAVAILABLE HOURS	5.66
1/23/2011	1/23/2011	CCW-PMP-B taken OOS for oil sample, follow-up	CCW Pump Train B	UNAVAILABLE HOURS	3.20
2/12/2011	2/12/2011	CCW-PMP-B OOS for Oil Sample	CCW Pump Train B	UNAVAILABLE HOURS	3.10
3/8/2011	3/8/2011	CCW-PMP-B OOS for OB bearing replacement	CCW Pump Train B	UNAVAILABLE HOURS	10.50
3/9/2011	3/9/2011	CCW-PMP-B OOS for oil sample	CCW Pump Train B	UNAVAILABLE HOURS	2.63
5/13/2011	5/13/2011	CCW-PMP-B taken OOS for oil flush and sample	CCW Pump Train B	UNAVAILABLE HOURS	2.53
6/3/2011	6/3/2011	CCW-PMP-B taken OOS for oil change and sample	CCW Pump Train B	UNAVAILABLE HOURS	3.48
8/25/2011	8/25/2011	CCW-PMP-B OOS for planned maintenance	CCW Pump Train B	UNAVAILABLE HOURS	3.11
					94.25
8/11/2010	8/11/2010	CCW-PMP-C taken OOS for oil sample and breaker inspections	CCW Pump Train C	UNAVAILABLE HOURS	6.41
9/12/2010	9/13/2010	CCW-PMP-C taken OOS to replace pump seals	CCW Pump Train C	UNAVAILABLE HOURS	33.41
4/5/2011	4/7/2011	CCW-PMP-C taken OOS for seal leak, sleeve nut repair	CCW Pump Train C	UNAVAILABLE HOURS	38.66
4/29/2011	4/29/2011	CCW-PMP-C taken OOS for oil sample	CCW Pump Train C	UNAVAILABLE HOURS	3.73
6/14/2011	6/15/2011	CCW-PMP-C taken OOS, measurements for seal leakage	CCW Pump Train C	UNAVAILABLE HOURS	19.13
8/15/2011	8/15/2011	CCW-PMP-C OOS for planned maintenance	CCW Pump Train C	UNAVAILABLE HOURS	2.96

Event Date	End Date	Event Title	PMG	Monitoring	Value
					104.30
Event Type	**MISCELLANEOUS**				
5/7/2010		ONLINE GEMCO SWITCH REFURBISHMENT - 1/CCW-C-MTR	CCW Pump Train C		
10/29/2010		CCW-PMP-C OOS to repair seal leak	CCW Pump Train C		
5/22/2010		CC-862F MAYBE CLOGGED	System Integrity and Cooling Flowpath		
5/29/2010		IMPLEMENT EC 63452 FOR CC-749A (CHILD EC 69284)	System Integrity and Cooling Flowpath		
6/30/2010		FIC-629 ON ERFIS INDICATES ``FLOW LO``	System Integrity and Cooling Flowpath		
4/14/2011		MCC-5(3M)-42/C; ESTABLISH PICKUP/DROPOUT VOLTAGES	System Integrity and Cooling Flowpath		

Maintenance Rule Monitoring Status

RNP

4080 Component/Cooling Water System

Type	Title	Since	Criteria	Actual	Remain'g	Status
PMG	***CCW Heat Exchangers***			**Status: A2**		
UNAVAILABILITY	UNAVAILABLE HOURS	4/11/2010	132	0	132	√
RELIABILITY	FUNCTIONAL FAILURES	10/13/2008	1	0	1	√
PMG	***CCW Pump Train A***			**Status: A2**		
UNAVAILABILITY	UNAVAILABLE HOURS	4/11/2010	188	81.62	106	√
RELIABILITY	FUNCTIONAL FAILURES	10/13/2008	1	0	1	√
PMG	***CCW Pump Train B***			**Status: A2**		
UNAVAILABILITY	UNAVAILABLE HOURS	4/11/2010	132	94.25	38	√
RELIABILITY	FUNCTIONAL FAILURES	10/13/2008	1	0	1	√
PMG	***CCW Pump Train C***			**Status: A2**		
UNAVAILABILITY	UNAVAILABLE HOURS	4/11/2010	132	104.3	28	√
RELIABILITY	FUNCTIONAL FAILURES	10/13/2008	1	0	1	√
PMG	***CCW Temperature and Level Instruments***			**Status: A2**		
RELIABILITY	FUNCTIONAL FAILURES	10/13/2008	2	0	2	√
PMG	***CCW Valve Isolation Monitoring***			**Status: A2**		
RELIABILITY	FUNCTIONAL FAILURES	10/13/2008	0	0	0	√
PMG	***System Integrity and Cooling Flowpaths***			**Status: A2**		
RELIABILITY	FUNCTIONAL FAILURES	10/13/2008	1	0	1	√

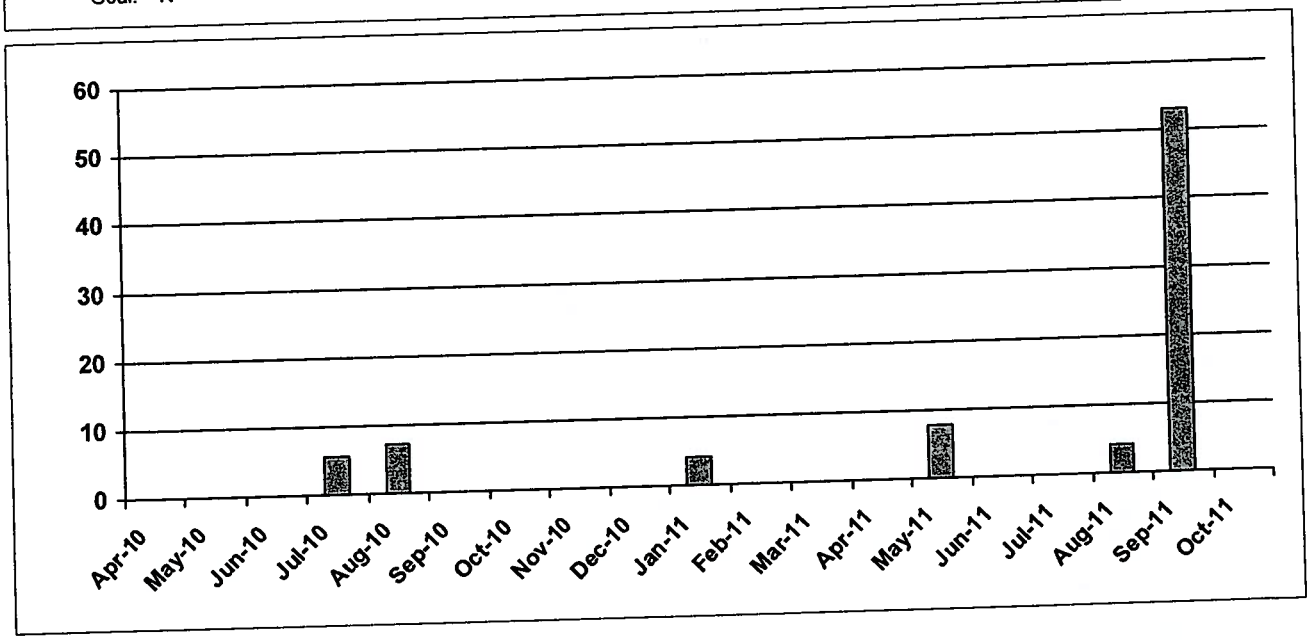
MR PMG Monitoring Trend

RNP

4080 Component/Cooling Water System

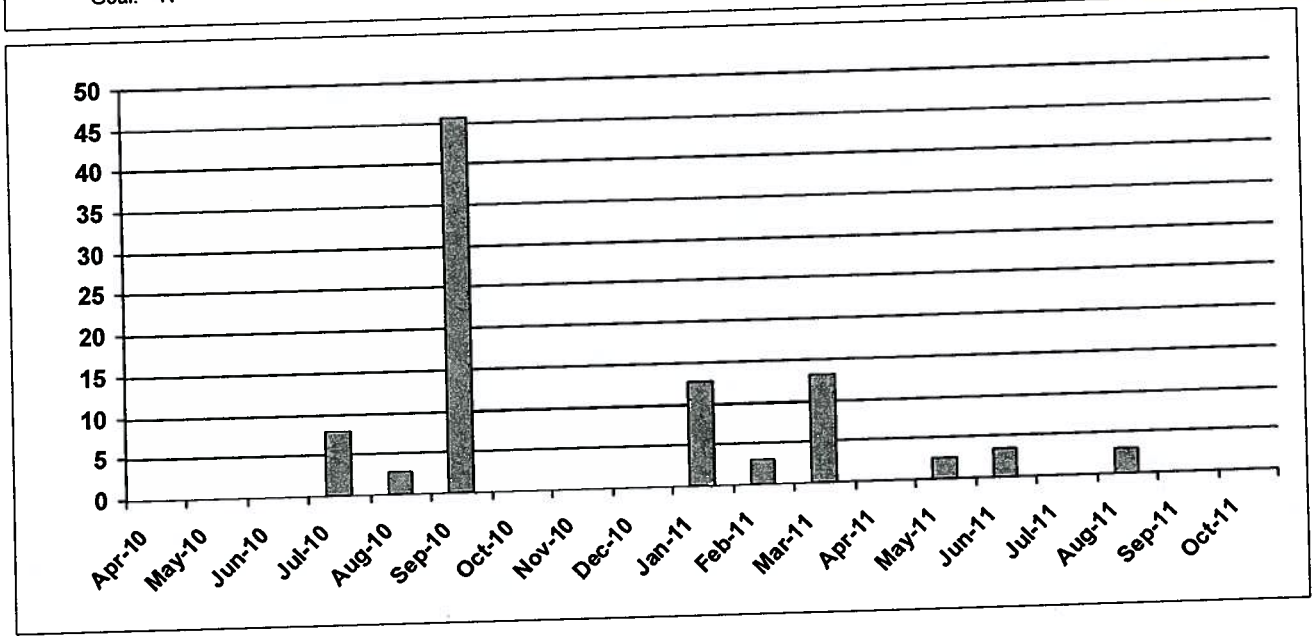
PMG: CCW Pump Train A
Monitoring: UNAVAILABLE HOURS
Goal: N

Monitoring period (days): 550
Allowable: 188
Actual: 81.62



PMG: CCW Pump Train B
Monitoring: UNAVAILABLE HOURS
Goal: N

Monitoring period (days): 550
Allowable: 132
Actual: 94.25



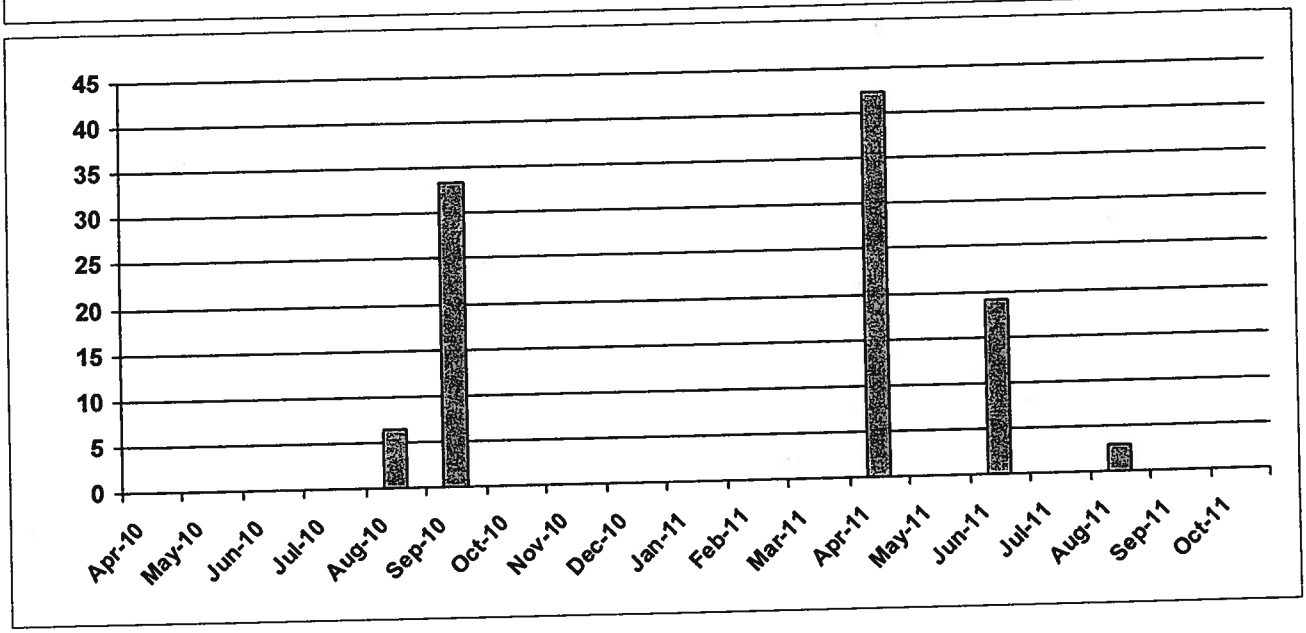
MR PMG Monitoring Trend

RNP

4080 Component/Cooling Water System

PMG: CCW Pump Train C
Monitoring: UNAVAILABLE HOURS
Goal: N

Monitoring period (days): 550
Allowable: 132
Actual: 104.3



INITIAL CONDITIONS:

- Unit operating at 100% RTP
- CCW Pump B removed from service at 1245 hours on 12/1/11 due to failed inboard motor bearing
- No additional equipment is inoperable
- Current plans will return to service in 44 hours
- Work order # 47548629 has been initiated
- NCR # 407627 has been initiated

INITIATING CUE:

The CRS has directed you to complete the necessary OMM-007 attachment(s) for the inoperability of CCW Pump B

Another SRO will perform the checklist of OMM-001-8, Control of Equipment and System Status and OPS-NGGC-1000, Fleet Conduct of Operations.

All necessary outside notifications will be made by the Shift Manager.

INITIAL CONDITIONS:

- Unit operating at 100% RTP
- CCW Pump B removed from service at 1245 hours on 12/1/11 due to failed inboard motor bearing
- No additional equipment is inoperable
- Current plans will return to service in 44 hours
- Work order # 47548629 has been initiated

INITIATING CUE:

The CRS has directed you to complete the necessary OMM-007 attachment(s) for the inoperability of CCW Pump B

Another SRO will perform the checklist of OMM-001-8, Control of Equipment and System Status and OPS-NGGC-1000, Fleet Conduct of Operations.

All necessary outside notifications will be made by the Shift Manager.

SRO A2

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: HB ROBINSON Task No.:

Task Title: Perform Section 8.2.3 of OST-020, Shiftly Surveillances JPM No.: 2011-2 NRC JPM SRO A2

K/A Reference: G2.2.37 3.6 / 4.6

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

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: The unit is in Mode 3 at 547°F and 2235 psig.
All MSIVs are open.

Task Standard: Identify all out of specification readings and apply all applicable Technical Specification requirements.

Required Materials: OST-020
ITS

General References: OST-020 Shiftly Surveillances, Revision 41

Handouts: OST-020

Initiating Cue: You have relieved the OAC on the 07-1900 watch due to a sudden illness. He was performing but unable to complete OST-020, Shiftly Surveillances. Perform Section 8.2.3, evaluate the acceptability of the instrument readings, document any unsatisfactory conditions in the comments section of Attachment 10.1 and identify any applicable Technical Specifications requirements.

Time Critical Task: NO

Validation Time: 25 minutes

(Denote Critical Steps with an asterisk)

Examiner's Cue: Provide OST-020.

Performance Step: 1 Review procedure OST-020.

Standard: Reviews Precautions and Limitations and remainder of handout.

Examiner's Note:

Comment:

Performance Step: 2 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.1)

1. PZR Level (Channels LI-459A, 460 and 461)

Standard: Candidate compares the channel readings and determines that all channels are within 5% for PZR level.

Examiner's Note:

Comment:

* **Performance Step: 3** IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.2)

2. PZR Pressure (Channels PI-455, 456 and 457)

Standard: Candidate compares the channel readings and determines that channel PI-455 is outside of the tolerance of 40 psig from the other 2 channels. ITS Table 3.3.2-1 Items 1.d and 6.a apply for Mode 3. Condition D applies for Item 1.d to Place the channel in trip within 6 hours or Be in Mode 4 within 18 hours. Condition H applies for Item 6.a to Verify the interlock is in the required state for existing unit condition within 1 hour or be in Mode 4 within 13 hours.

Examiner's Note: **ITS Table 3.3.1-1, Items 7.a and 7.b do not apply. Item 7 is applicable in Modes 1 and 2. The unit is in Mode 3.**

The interlock verification for PZR Pressure being greater than 2000 psig is the LO PRESS SI BLOCK PERMIT 2 X 2 status light is extinguished.

Comment:

* **Performance Step: 4**

IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.3)

S/G Pressure for S/G A (Channels PI-474, 475 and 476)

S/G Pressure for S/G B (Channels PI-484, 485 and 486)

S/G Pressure for S/G C (Channels PI-494, 495 and 496)

Standard:

Candidate compares the channel readings and determines that channel PI-484 is outside of the tolerance of 70 psig from the other 2 channels for S/G B. ITS Table 3.3.2-1 Items 1.e, 1.g and 4.e apply for Mode 3. Condition D applies for Items 1.e, 1.g and 4.e to Place the channel in trip within 6 hours or Be in Mode 4 within 18 hours.

Examiner's Note:

ITS Table 3.3.3-1, Item 20 does not apply due to the required channels for steam generator pressure is 2 per S/G. The remaining channels for S/G B are operable and satisfy the specification.

Comment:

* **Performance Step: 5** IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.4)

S/G Level for S/G A (Channels LI-474, 475 and 476)

S/G Level for S/G B (Channels LI-484, 485 and 486)

S/G Level for S/G C (Channels LI-494, 495 and 496)

Standard: Candidate compares the channel readings and determines that channel LI-475 is outside of the tolerance of 5% from the other 2 channels for S/G A. ITS Table 3.3.8-1 Item 1 applies for Mode 3. Condition C applies for Item 1 to Place the channel in trip within 6 hours or Be in Mode 4 within 18 hours.

Examiner's Note: **ITS Table 3.3.1-1 Items 13 and 14 are applicable in Modes 1 and 2. The unit is in Mode 3.**

ITS Table 3.3.3-1 Item 13 for Steam Generator Water Level (Narrow Range) does not apply due to the other 2 remaining S/G level channels are operable. The specification requires 2 per S/G.

Comment:

Performance Step: 6 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.5)

Steam Header Pressure (Channels PI-464A, 466 and 468)

Standard: Candidate compares the channel readings and determines all of the Steam Header pressure channels are within the tolerance of 70 psig.

Examiner's Note:

Comment:

Performance Step: 7 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.6)

S/G Steam Flows for S/G A (Channels FI-474 and 475)

S/G Steam Flows for S/G A (Channels FI-484 and 485)

S/G Steam Flows for S/G A (Channels FI-494 and 495)

Standard: Candidate compares the channel readings and determines that all of the steam flow channels are within the specified tolerance.

Examiner's Note:

Comment:

* **Performance Step: 8** IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.7)

Tavg (Channels TI-412D, 422D and 432D)

Standard: Candidate compares the channel readings and determines that channel TI-432D is outside of the tolerance of 4°F from the other channels for Tavg. ITS Table 3.3.2-1 Items 1.f, 4.d and 6.b apply for Mode 3. Condition D applies for Items 1.f, 4.d and 6.b to Place the channel in trip within 6 hours or Be in Mode 4 within 18 hours. Condition H applies for Item 6.b to Verify the interlock is in the required state for existing unit condition within 1 hour or be in Mode 4 within 13 hours.

Examiner's Note: **The interlock verification for Tavg being greater than 543°F is the STEAM DUMP T-AVG CONTROL BLOCKED 2 X 2 status light is extinguished.**

Comment:

Performance Step: 9 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.8)

SI Accumulator A Level (LI-920 and 922)

SI Accumulator B Level (LI-924 and 926)

SI Accumulator C Level (LI-928 and 930)

Standard: Candidate compares the channel readings and determines all of the SI Accumulator level channels are within the tolerance of 5%.

Examiner's Note:

Comment:

Performance Step: 10 IF MODE 1, 2 OR 3 shiftly checks are required, THEN PERFORM CHANNEL CHECK for the following: (Step 8.2.3.9)

SI Accumulator A Pressure (PI-921 and 923)

SI Accumulator B Pressure (PI-925 and 927)

SI Accumulator C Pressure (PI-929 and 931)

Standard: Candidate compares the channel readings and determines all of the SI Accumulator pressure channels are within the tolerance of 40 psig.

Examiner's Note:

Comment:

END OF TASK

Terminating Cue: **When the instrument readings have been evaluated, comments made for any out of spec readings and the applicable Technical Specification requirements have been identified, the evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM SRO A2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS: The unit is in Mode 3 at 547°F and 2235 psig.

All MSIVs are open.

INITIATING CUE: You have relieved the OAC on the 07-1900 watch due to a sudden illness. He was performing but unable to complete OST-020, Shiftly Surveillances. Perform Section 8.2.3, evaluate the acceptability of the instrument readings, document any unsatisfactory conditions in the comments section of Attachment 10.1 and identify any applicable Technical Specifications requirements.

8.2.2.10 (Continued)

INIT INIT
07-19 19-07

c. **CALCULATE** deviation: LOG (highest) minus LOG (lowest) equals: _____ ____

d. **PEER CHECK** calculation. ____

e. **DOCUMENT** results (≤ 1.48). SAT / UNSAT (Circle one ____

8.2.3 **IF** MODE 1, 2, **OR** 3 shiftly checks are required, **THEN PERFORM** CHANNEL CHECK for the following:

NOTE: The following check is to determine the deviation between the highest and lowest channel of redundant indicators for the same parameter. The redundant indicators to be compared are grouped in blocks. If the actual deviation is greater than the maximum allowed deviation as shown (deviation of 5% of the full range of the indicator's movement, except for S/G Steam Flow when <20% rated thermal power), it is unacceptable. (ESR 97-00601)

1. PZR Level
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 8 and
ITS SR 3.3.3.1, Table 3.3.3-1 Item 12) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
LI-459A LI-460 LI-461	0-100%	5%	RNP-I/INST-1060

8.2.3 (Continued)

INIT INIT
07-19 19-07

2. PZR Pressure
IF Pressurizer Pressure is outside the indicating range due to normal plant conditions, **THEN** mark N/A.
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 7.a, 7.b and ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.d and 6.a) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-455 PI-456 PI-457	1700-2500 psig	40 psig	RNP-I/INST-1042

3. S/G Pressure
(ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.e, 1.g and 4.e, ITS SR 3.3.3.1, Table 3.3.3-1 Item 20) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-474 PI-475 PI-476	0-1400 psig	70 psig	RNP-I/INST-1072
PI-484 PI-485 PI-486	0-1400 psig	70 psig	RNP-I/INST-1072
PI-494 PI-495 PI-496	0-1400 psig	70 psig	RNP-I/INST-1072

8.2.3 (Continued)

INIT INIT
07-19 19-07

4. S/G Level
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 13 and 14,
ITS SR 3.3.3.1, Table 3.3.3-1 Item 13,
ITS SR 3.3.8.1, Table 3.3.8-1 Item 1) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
LI-474 LI-475 LI-476	0-100%	5%	RNP-I/INST-1070
LI-484 LI-485 LI-486	0-100%	5%	RNP-I/INST-1070
LI-494 LI-495 LI-496	0-100%	5%	RNP-I/INST-1070

5. Steam Header Pressure
(ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.e) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-464A PI-466 PI-468	0-1400 psig	70 psig	RNP-I/INST-1050

8.2.3 (Continued)

INIT INIT
07-19 19-07

6. S/G Steam Flow
(ITS SR 3.3.1.1, Table 3.3.1-1 Item 14 and
ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.f, 1.g, 4.d
and 4.e) (ESR 97-00601)

– **IF** ≥20% rated thermal power, **THEN** check the following: ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
FI-474 FI-475	0-4x10^6 pph	0.2x10^{6}pph	RNP-I/INST-1040
FI-484 FI-485	0-4x10^6 pph	0.2x10^{6}pph	RNP-I/INST-1040
FI-494 FI-495	0-4x10^6 pph	0.2x10^{6}pph	RNP-I/INST-1040

– **IF** <20% rated thermal power, **THEN** check the following: ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION
FI-474 FI-475	0-4x10^6 pph	0.4x10^{6}pph between the following combinations: FI-474 AND FI-475 *FI-474 AND FI-477 *FI-475 AND FI-476
FI-484 FI-485	0-4x10^6 pph	0.4x10^{6}pph between the following combinations: FI-484 AND FI-485 *FI-484 AND FI-487 *FI-485 AND FI-486
FI-494 FI-495	0-4x10^6 pph	0.4x10^{6}pph between the following combinations: FI-494 AND FI-495 *FI-494 AND FI-497 *FI-495 AND FI-496

* The Steam Flow Channel is checked against the corresponding Feed Flow channel for acceptance.

8.2.3 (Continued)

INIT INIT
07-19 19-07

7. Tavg
IF Tavg is outside the indicating range due to normal plant conditions, **THEN** mark N/A.
(ITS SR 3.3.2.1, Table 3.3.2-1 Item 1.f, 4.d and 6.b) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
TI-412D TI-422D TI-432D	540-615°F	4°F	WCAP 11889

8. SI Accumulator Level
(TRMS TR 4.2.1) ____ ____

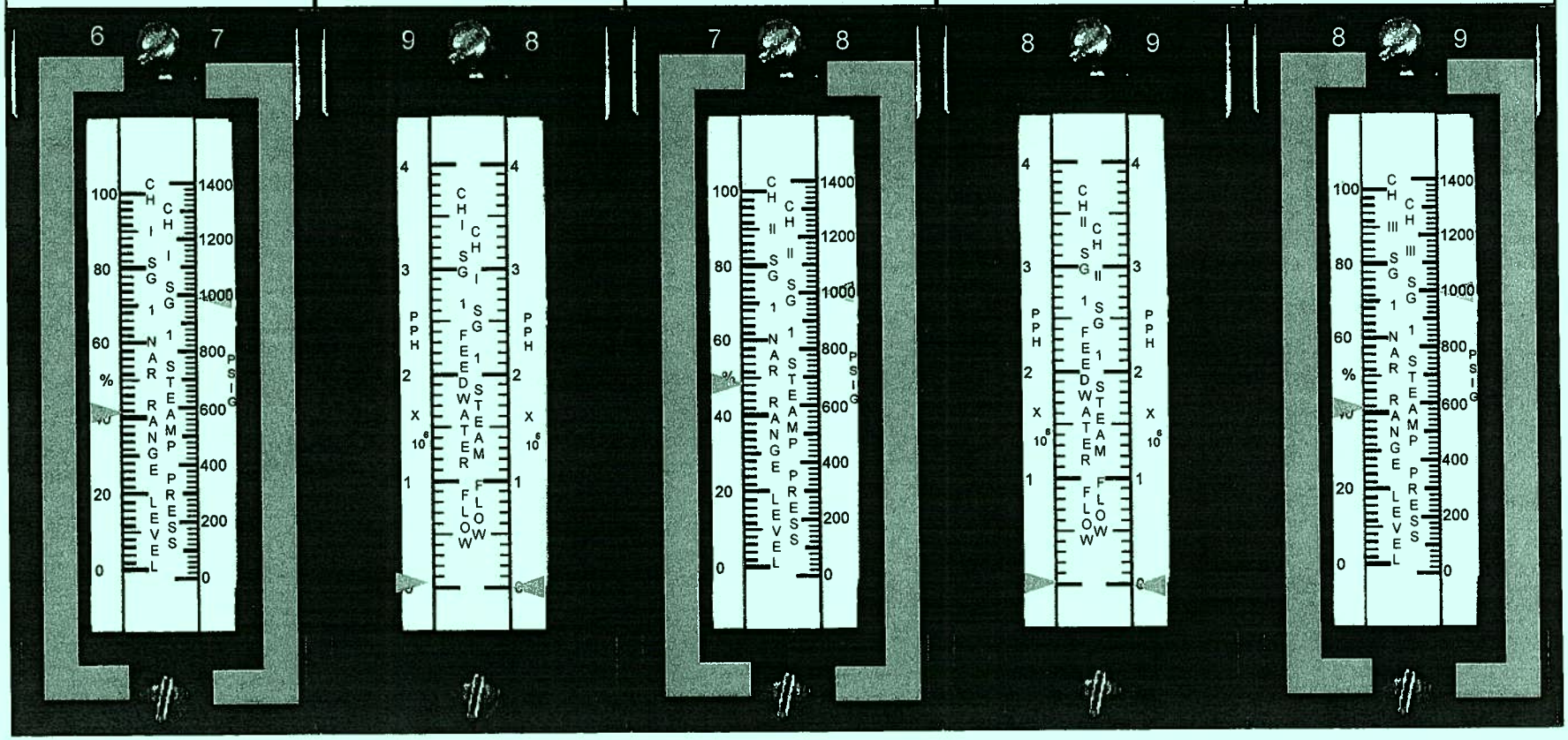
INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
LI-920 LI-922	0-100%	5%	RNP-I/INST-1052
LI-924 LI-926	0-100%	5%	RNP-I/INST-1052
LI-928 LI-930	0-100%	5%	RNP-I/INST-1052

9. SI Accumulator Pressure
(TRMS TR 4.2.1) ____ ____

INSTRUMENT	INSTRUMENT RANGE	MAXIMUM DEVIATION	CALCULATION NUMBER
PI-921 PI-923	0-800 psig	40 psig	RNP-I/INST-1036
PI-925 PI-927	0-800 psig	40 psig	RNP-I/INST-1036
PI-929 PI-931	0-800 psig	40 psig	RNP-I/INST-1036

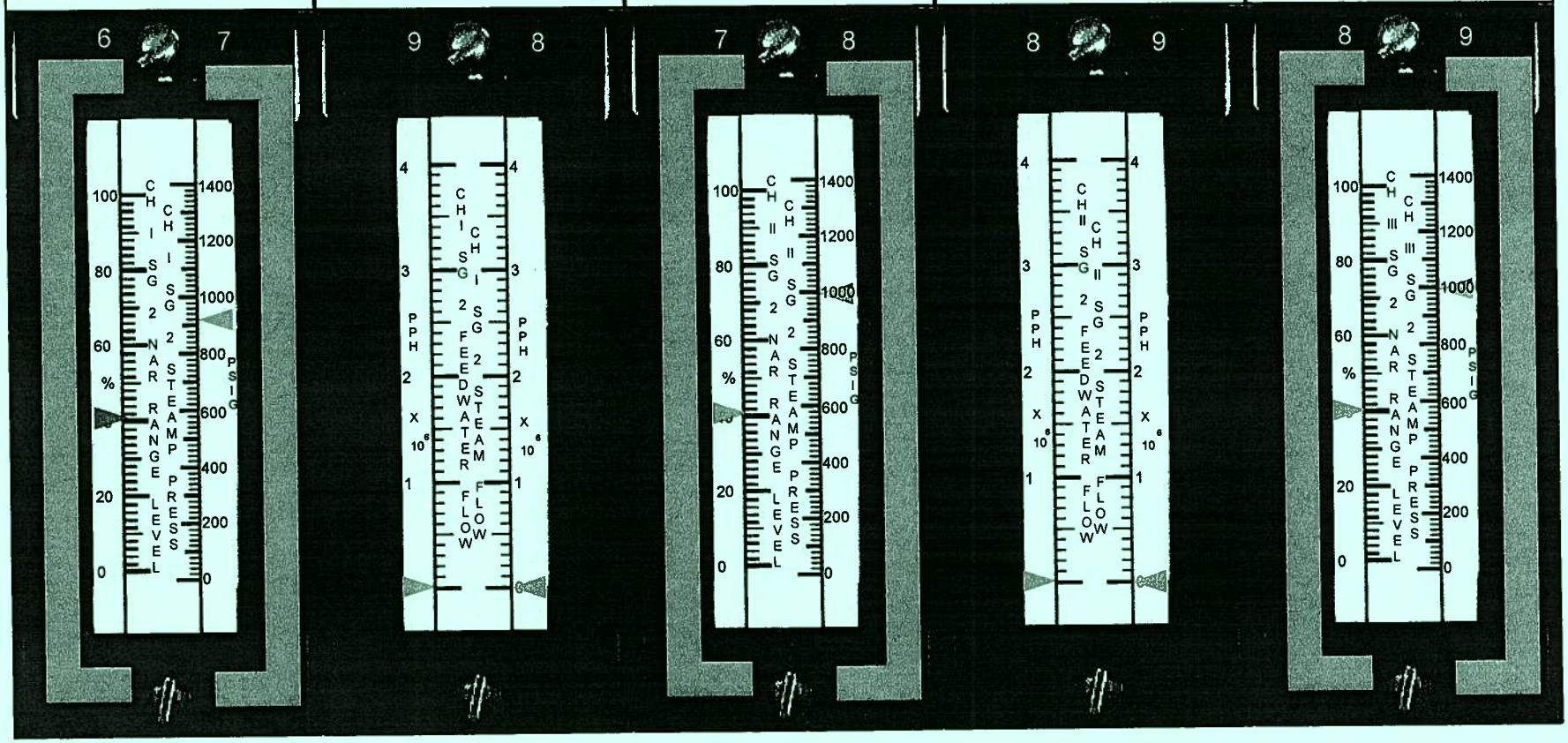
A STEAM GENERATOR

LI-474	FI-476	LI-475	FI-477	LI-476
PI-474	FI-474	PI-475	FI-475	PI-476



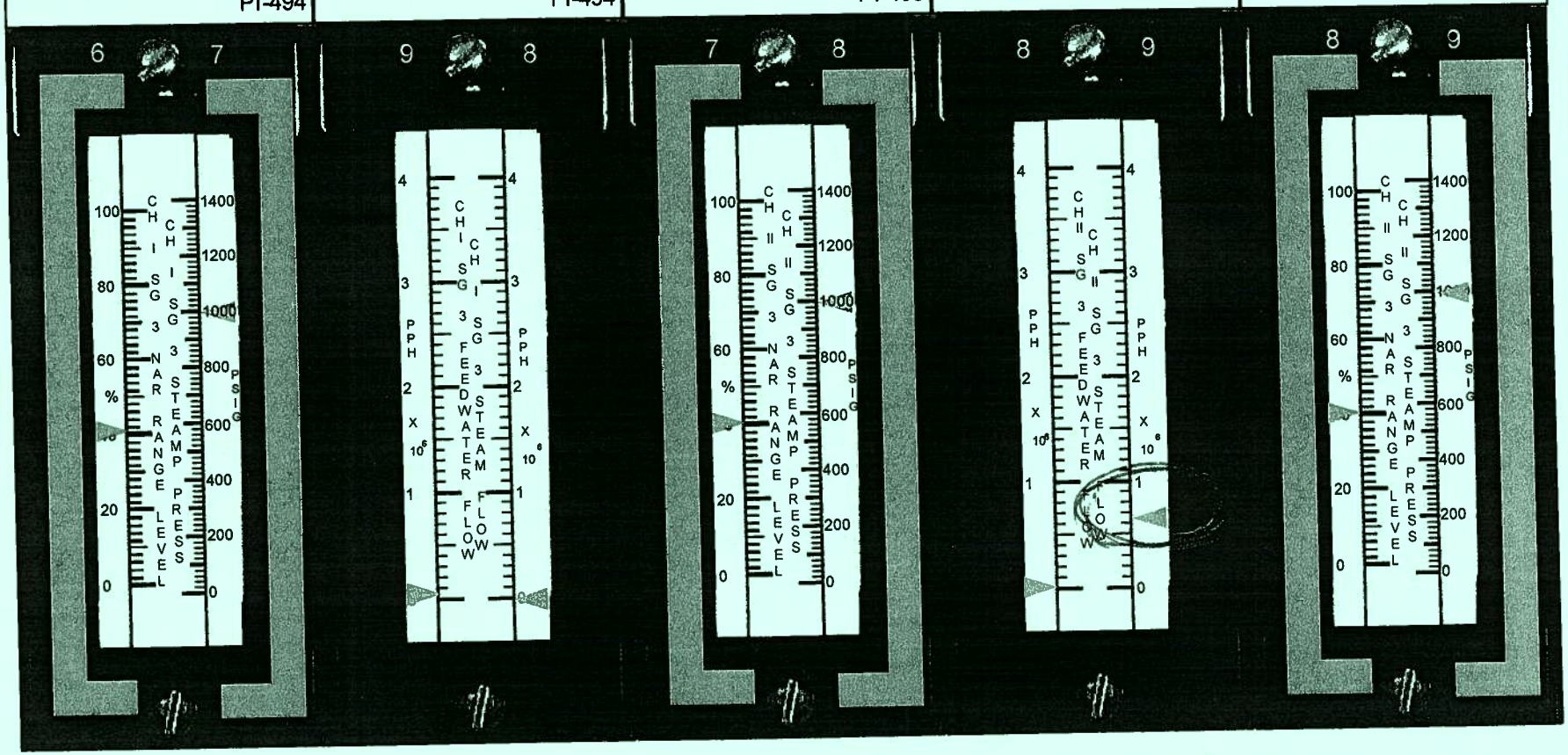
B STEAM GENERATOR

LI-484	FI-486	LI-485	FI-487	LI-486
PI-484	FI-484	PI-485	FI-485	PI-486

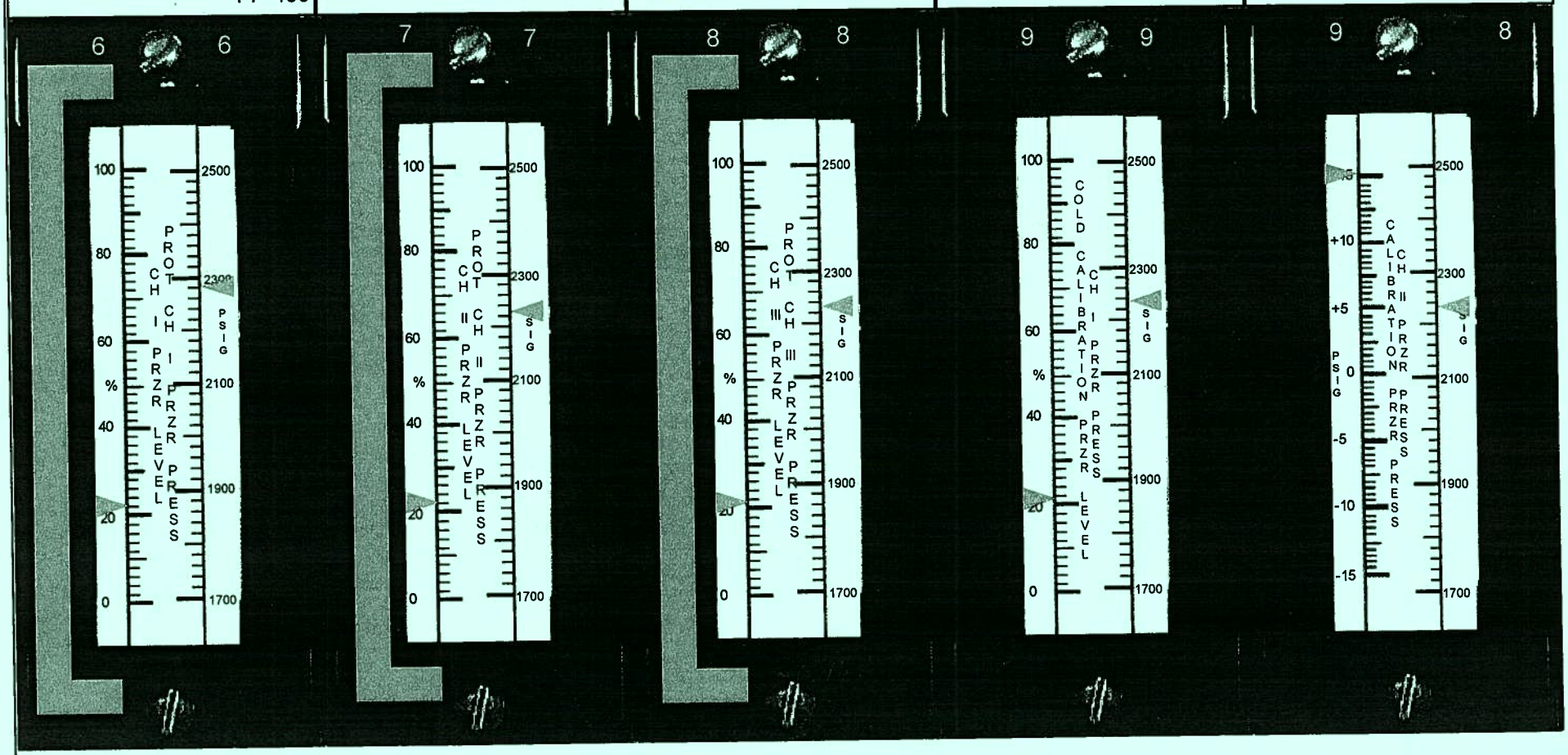


C STEAM GENERATOR

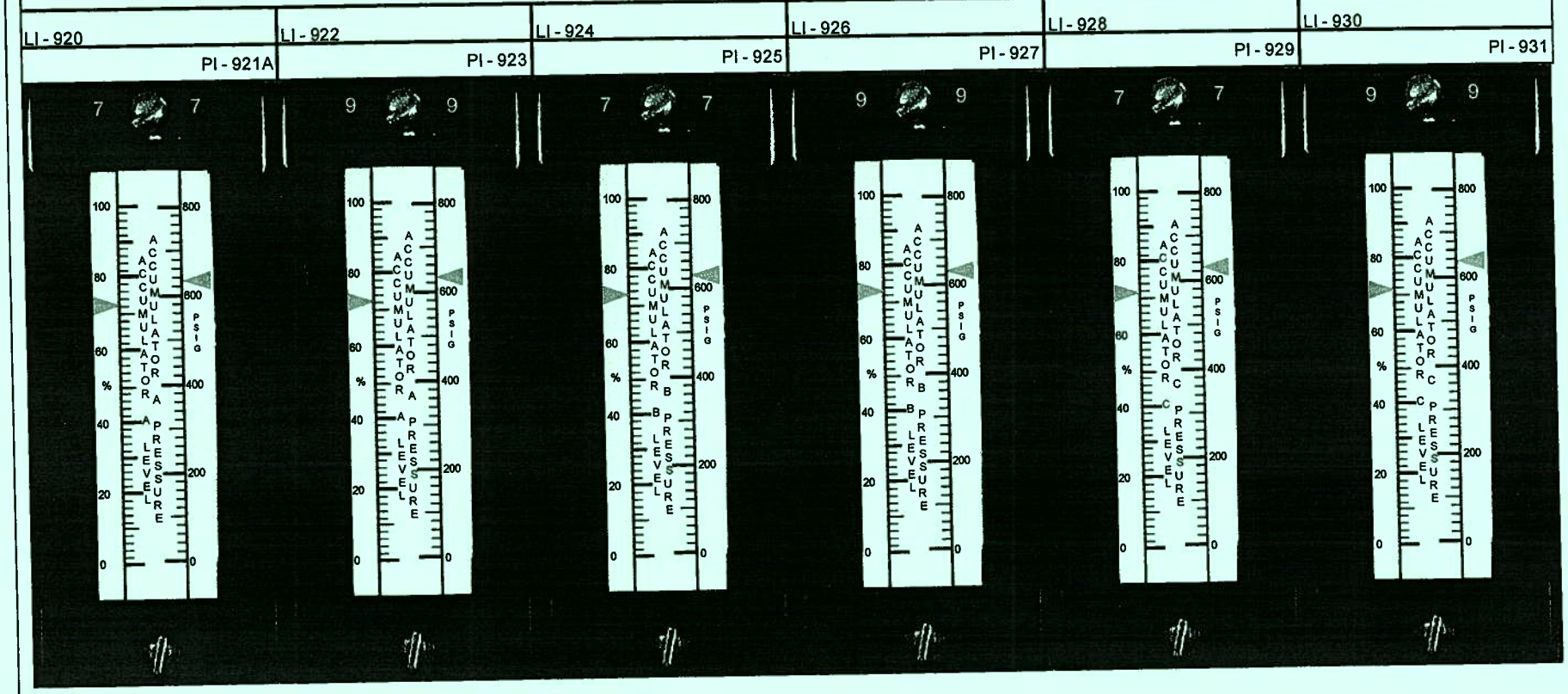
LI-494	FI-496	LI-495	FI-497	LI-496
PI-494	FI-494	PI-495	FI-495	PI-496



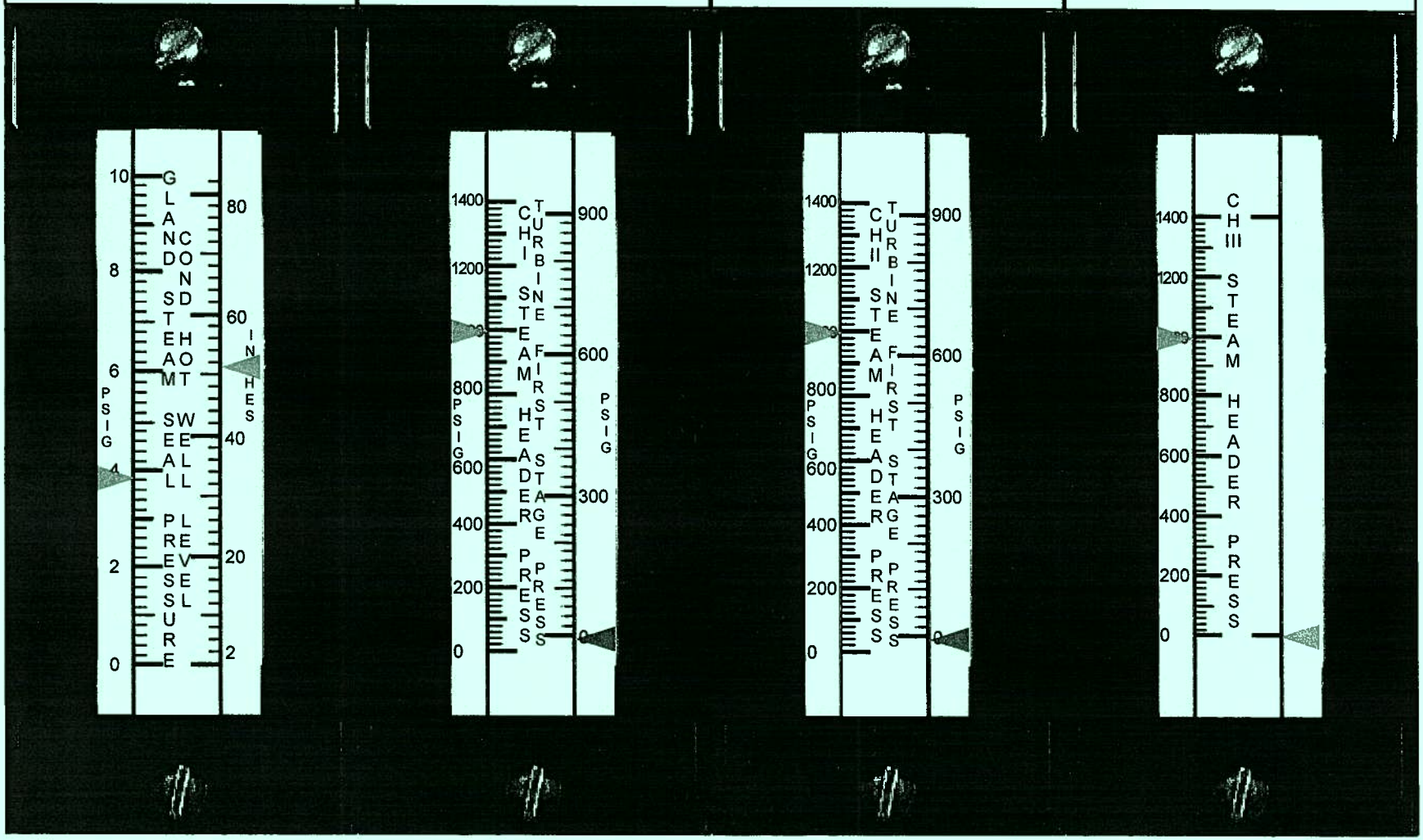
PZR PRESSURES AND LEVELS



ACCUMULATORS



PI-4004	PI-464A	PI-466	PI-468
LI-1417A	PI-446	PI-447	



PROTECTION TAVG AND ΔT

TI-412C	TI-412A	TI-422C	TI-422A	TI-432C	TI-432A
TI-412B	TI-412D	TI-422B	TI-422D	TI-432B	TI-432D

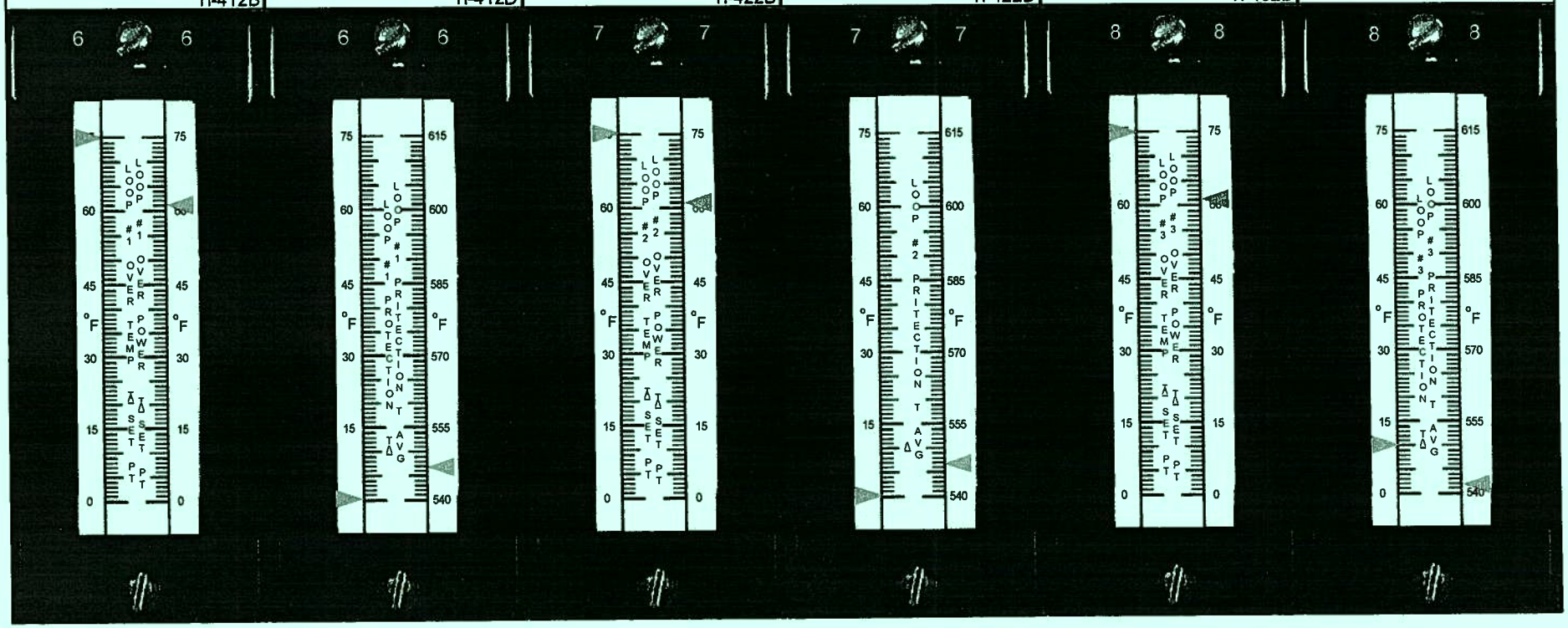


Table 3.3.1-1 (page 2 of 7)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
5. Overtemperature ΔT	1,2	3	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.12	Refer to Note 1 (Page 3.3-18)	Refer to Note 1 (Page 3.3-18) (3)
6. Overpower ΔT	1,2	3	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.12	Refer to Note 2 (Page 3.3-19)	Refer to Note 2 (Page 3.3-19) (3)
7. Pressurizer Pressure						
a. Low	1(f)	3	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 1832.02 psig	1844 psig
b. High	1,2	3	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 2381.11 psig	2376 psig
8. Pressurizer Water Level – High	1(f)	3	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 91.64%	91%

(continued)

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.
(3) The Nominal Trip Setpoint is as stated unless reduced as required by LCO 3.2.1 Required Action A.2.3.
(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

Table 3.3.1-1 (page 3 of 7)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
9. Reactor Coolant Flow – Low						
a. Single Loop	1(g)	3 per loop	N	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 93.47%	94.26%
b. Two Loops	1(h)	3 per loop	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 93.47%	94.26%
10. Reactor Coolant Pump (RCP) Breaker Position						
a. Single Loop	1(g)	1 per RCP	O	SR 3.3.1.14	NA	NA
b. Two Loops	1(h)	1 per RCP	M	SR 3.3.1.14	NA	NA
11. Undervoltage RCPs	1(f)	1 per bus	M	SR 3.3.1.9 SR 3.3.1.10	≥ 2959 V	3120 V
12. Underfrequency RCPs	1(f)	1 per bus	M	SR 3.3.1.10 SR 3.3.1.14	≥ 57.84 Hz	58.2 Hz
13. Steam Generator (SG) Water Level – Low Low	1,2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 15.36%	16%

(continued)

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.
(f) Above the P-7 (Low Power Reactor Trips Block) interlock.
(g) Above the P-8 (Power Range Neutron Flux) interlock.
(h) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 4 of 7)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
14. SG Water Level - Low	1,2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 29.36%	30%
Coincident with Steam Flow/Feedwater Flow Mismatch	1,2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 7.01 E5 lbm/hr	6.4 E5 lbm/hr
15. Turbine Trip						
a. Low Auto Stop Oil Pressure	1(f)	3	P	SR 3.3.1.10 SR 3.3.1.15	≥ 40.87 psig	45 psig
b. Turbine Stop Valve Closure	1(f)	2	P	SR 3.3.1.15	NA	NA
16. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.14	NA	NA

(continued)

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.
(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

Table 3.3.2-1 (page 1 of 4)

Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
1. Safety Injection						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
c. Containment Pressure - High	1,2,3,4	3	E	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 4.45 psig	4 psig
d. Pressurizer Pressure - Low	1,2,3[(a)]	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 1709.89 psig	1715 psig
e. Steam Line High Differential Pressure Between Steam Header and Steam Lines	1,2,3[(a)]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 83.76 psig ≤ 116.24 psig	100 psig
f. High Steam Flow in Two Steam Lines	1,2[(b)],3[(b)]	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	(d)
Coincident with T_{avg} - Low	1,2[(b)],3[(b)]	1 per loop	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 541.50 °F	543°F
g. High Steam Flow in Two Steam Lines	1,2[(b)],3[(b)]	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	(d)
Coincident with Steam Line Pressure - Low	1,2[(b)],3[(b)]	1 per loop	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 605.05 psig	614 psig

(continued)

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.

(a) Above the Pressurizer Pressure interlock.

(b) Above the T_{avg}-Low interlock.

(c) Less than or equal to a function defined as ΔP corresponding to 41.58% full steam flow below 20% load, and ΔP increasing linearly from 41.58% full steam flow at 20% load to 110.5% full steam flow at 100% load, and ΔP corresponding to 110.5% full steam flow above 100% load.

(d) A function defined as ΔP corresponding to 37.25% full steam flow between 0% and 20% load and then a ΔP increasing linearly from 37.25% steam flow at 20% load to 109% full steam flow at 100% load.

Table 3.3.2-1 (page 3 of 4)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
4. Steam Line Isolation						
a. Manual Initiation	1,2(e),3(e)	1 per steam line	F	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2(e),3(e)	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
c. Containment Pressure - High High	1,2(e),3(e)	6 (2 sets of 3)	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 10.45 psig	10 psig
d. High Steam Flow in Two Steam Lines	1,2(e),3(e)	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	(d)
Coincident with T_{avg} - Low	1,2(e),3(e)(b)	1 per loop	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 541.50 °F	543°F
e. High Steam Flow in Two Steam Lines	1,2(e),3(e)	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	(d)
Coincident with Steam Line Pressure - Low	1,2(e),3(e)	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 605.05 psig	614 psig

(continued)

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.
(b) Above the T_{avg} - Low interlock.
(c) Less than or equal to a function defined as ΔP corresponding to 41.58% full steam flow below 20% load, and ΔP increasing linearly from 41.58% full steam flow at 20% load to 110.5% full steam flow at 100% load, and ΔP corresponding to 110.5% full steam flow above 100% load.
(d) Less than or equal to a function defined as ΔP corresponding to 37.25% full steam flow between 0% and 20% load and then a ΔP increasing linearly from 37.25% steam flow at 20% load to 109% full steam flow at 100% load.
(e) Except when all MSIVs are closed.

Table 3.3.2-1 (page 4 of 4)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
5. Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2[(f)],3[(f)]	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
b. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6. ESFAS Interlocks						
a. Pressurizer Pressure Low	1,2,3	3	H	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 2005.11 psig	2000 psig
b. T_{avg} – Low	1,2,3	1 per loop	H	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 544.50 °F	543°F

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.
(f) Except when all MFIVs, MFRVs, and bypass valves are closed or isolated by a closed manual valve.

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Not applicable to Functions 3, 4, 19, 22, 23, and 24. ---------- One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.6	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days
D. ---------NOTE--------- Only applicable to Functions 3, 4, 19, 22, 23, and 24. ---------- One or more Functions with one required channel inoperable.	D.1 Restore required channel to OPERABLE status.	7 days
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
F. As required by Required Action E.1 and referenced in Table 3.3.3-1.	F.1 Be in MODE 3. AND F.2 Be in MODE 4.	6 hours 12 hours

(continued)

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION E.1
1.	Power Range Neutron Flux	2	F
2.	Source Range Neutron Flux	2	F
3.	Reactor Coolant System (RCS) Hot Leg Temperature	1 per loop	F
4.	RCS Cold Leg Temperature	1 per loop	F
5.	RCS Pressure (Wide Range)	2	F
6.	Refueling Water Storage Tank Level	2	F
7.	Containment Sump Water Level (Wide Range)	2	G
8.	Containment Pressure (Wide Range)	2	G
9.	Containment Isolation Valve Position	2 per penetration flow path [(a)(b)]	F
10.	Containment Area Radiation (High Range)	2	G
11.	Not used		
12.	Pressurizer Level	2	F
13.	Steam Generator Water Level (Narrow Range)	2 per SG	F
14.	Condensate Storage Tank Level	2	F
15.	Core Exit Temperature—Quadrant 1	2[(c)]	F
16.	Core Exit Temperature—Quadrant 2	2[(c)]	F
17.	Core Exit Temperature—Quadrant 3	2[(c)]	F
18.	Core Exit Temperature—Quadrant 4	2[(c)]	F
19.	Auxiliary Feedwater Flow		
	SD AFW Pump	1 per SG	G
	MD AFW Pump	1 per SG	G
20.	Steam Generator Pressure	2 per SG	F
21.	Containment Spray Additive Tank Level	2	F
22.	PORV Position (Primary)	1	G
23.	PORV Block Valve Position (Primary)	1	G
24.	Safety Valve Position (Primary)	1	G

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed automatic containment isolation valve.

(c) A channel consists of one core exit thermocouple (CET).

Table 3.3.8-1 (page 1 of 1)
Auxiliary Feedwater System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
1.	SG Water Level–Low Low	1,2,3	3 per SG	C	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.4	≥ 15.36%	16%
2.	Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.					
3.	Loss of Offsite Power	1,2,3	2 per bus	D	SR 3.3.8.3 SR 3.3.8.4	NA	328 V ± 10% with ≤ 1 sec time delay
4.	Undervoltage Reactor Coolant Pump	1,2,3	2 per bus	B	SR 3.3.8.3 SR 3.3.8.4	≥ 2959 V	3120 V
5.	Trip of all Main Feedwater Pumps	1,2	1 per pump	E	SR 3.3.8.3	NA	NA

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.

4.0 MISCELLANEOUS TEST REQUIREMENTS

TEST		FREQUENCY
TR 4.1.1 (CTS 3.8.1.c)	Radiation levels in the containment and spent fuel storage areas shall be monitored during refueling operations.	Continuously
TR 4.2.1 (CTS Table 4.1-1 item 23)	Perform CHANNEL CHECK of Accumulator Level and Pressure.	12 hours
TR 4.2.2 (CTS Table 4.1-1 item 14)	Perform CHANNEL CHECK of Boric Acid Tank Level.	24 hours
TR 4.2.3 (CTS Table 4.1-1 item 14)	Rod Boric Acid Tank Level Bubblers Tubes.	7 days
TR 4.2.4 (CTS Table 4.1-1 item 12)	Perform CHANNEL CALIBRATION of Charging Flow.	18 months
TR 4.2.5 (CTS Table 4.1-1 item 13)	Perform CHANNEL CALIBRATION of Residual Heat Removal Pump Flow.	18 months
TR 4.2.6 (CTS Table 4.1-1 item 14)	Perform CHANNEL CALIBRATION of Boric Acid Tank Level.	18 months

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One channel inoperable.	H.1 Verify interlock is in required state for existing unit condition.	1 hour
	OR	
	H.2.1 Be in MODE 3.	7 hours
	AND	
	H.2.2 Be in MODE 4.	13 hours
I. One train inoperable	I.1 Restore train to OPERABLE status.	1 hour
	OR	
	I.2.1 Be in MODE 3	7 hours
	AND	
	I.2.2 Be in MODE 4	13 hours
	AND	
	I.2.3 Be in MODE 5	37 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One train inoperable.	C.1 Restore train to OPERABLE status.	12 hours
	OR	
	C.2.1 Be in MODE 3.	18 hours
	AND	
	C.2.2 Be in MODE 5.	48 hours
D. One channel inoperable.	D.1 Place channel in trip.	6 hours
	OR	
	D.2.1 Be in MODE 3.	12 hours
	AND	
	D.2.2 Be in MODE 4.	18 hours
E. One Containment Pressure channel inoperable.	E.1 Place channel in trip.	6 hours
	OR	
	E.2.1 Be in MODE 3.	12 hours
	AND	
	E.2.2 Be in MODE 4.	18 hours
	AND	
	E.2.3 Be in MODE 5.	42 hours

(continued)

SRO A3

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: HB ROBINSON Task No.: 02344100403

Task Title: Calculate Emergency Dose Exposure Time Limits JPM No.: 2011-2 NRC Admin JPM SRO A3

K/A Reference: G2.3.4 3.2/3.7

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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:

- An Emergency Event has been declared.
- Re-entry individual has received 1240 mR TEDE dose this year at RNP.
- There are 2 jobs that must be performed to stabilize the plant and protect the equipment:
  - Valve LCV-115B, RWST to Charging Pump Suction, air line needs to be re-attached to the valve operator.
  - Seal Injection Filter B must be placed in service due to Filter A clogged.
- All valves are located in a 48 R/hr field.

Task Standard: Determines Stay Time

Required Materials: Calculator
EPOSC-04, EMERGENCY WORK CONTROL

General References: EPOSC-04, EMERGENCY WORK CONTROL

Handouts: EPOSC-04, EMERGENCY WORK CONTROL

Initiating Cue:	Calculate how long the individual can remain in the radiation area without exceeding the applicable emergency exposure limits.
Time Critical Task:	NO
Validation Time:	8 minutes

(Denote Critical Steps with an asterisk*)

Start Time: _____

EPOSC-04, EMERGENCY WORK CONTROL

* **Performance Step: 1**

The table shown below identifies the emergency worker dose limits. In addition to the categories listed in the table, doses should be limited as follows:

1. The lens of the eye should be limited to three (3) times the stated TEDE value.
2. Any other organ (including skin and body extremities) should be limited to ten (10) times the stated TEDE value. (Step 8.7.2)

Dose Limit	Activity	Condition
5 REM	All	
10 REM	Repair and reentry efforts	Lower dose not practical
25 REM	Lifesaving or protection of large populations	Lower dose not practical
>25 REM	Lifesaving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved

Standard: Candidate selects 10 REM Dose Limit for Repair efforts

Examiner's Cue:

Examiner's Note:

Comment:

* **Performance Step: 2**

10R	HR	60 Min		
	48 R	HR	=	12.5 Minutes
Dose Limit	Dose Rate	Conversion		Time Limit

Standard: Candidate calculates 12.5 minutes total stay time.

Examiner's Cue:

Comment:

END OF TASK

Terminating Cue: **Candidate calculates Stay Time**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC Admin JPM SRO A3

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- An Emergency Event has been declared.
- Re-entry individual has received 1240 mR TEDE dose this year at RNP.
- There are 2 jobs that must be performed to stabilize the plant and protect the equipment:
  - Valve LCV-115B, RWST to Charging Pump Suction, air line needs to be re-attached to the valve operator.
  - Seal Injection Filter B must be placed in service due to Filter A clogged.
- All valves are located in a 48 R/hr field.

Initiating Cue: Calculate how long the individual can remain in the radiation area without exceeding the applicable emergency exposure limits.

ANSWER KEY SRO A4

ATTACHMENT 10.5
Page 1 of 11

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [X] DRILL [ ] ACTUAL EVENT MESSAGE # 1
2. [X] INITIAL [ ] FOLLOW-UP NOTIFICATION: TIME _____ DATE ___/___/___ AUTHENTICATION # _____
3. SITE: HB Robinson Confirmation Phone # 843 383-368.

4. EMERGENCY CLASSIFICATION: [ ] UNUSUAL EVENT [ ] ALERT [X] SITE AREA EMERGENCY [ ] GENERAL EMERGENCY
BASED ON EAL # FS 1.1 EAL DESCRIPTION: Loss of Potential Loss of ANY Two Barriers (Table F-1)

5. PROTECTIVE ACTION RECOMMENDATIONS: [X] NONE
[ ] EVACUATE _____
[ ] SHELTER _____
[ ] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.
[ ] OTHER _____

6. EMERGENCY RELEASE: [X] None [ ] Is Occurring [ ] Has Occurred

7. RELEASE SIGNIFICANCE: [X] Not applicable [ ] Within normal operating limits [ ] Above normal operating limits [ ] Under evaluation

8. EVENT PROGNOSIS: [ ] Improving [ ] Stable [X] Degrading

9. METEOROLOGICAL DATA: (*May not be available for Initial Notifications)
Wind Direction* from 145 degrees Wind Speed* 4 mph
Precipitation* 0 Stability Class* [ ] A [ ] B [ ] C [X] D [ ] E [ ] F [ ] G

10. [X] DECLARATION [ ] TERMINATION Time Now Date Today

11. AFFECTED UNIT(S): [ ] 1 [X] 2 [ ] 3 [ ] All

12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)
U1 ____% Power Shutdown at Time _____ Date ___/___/___
U2 0 % Power Shutdown at Time 1021 Date 11/28/11
U3 ____% Power Shutdown at Time _____ Date ___/___/___

13. REMARKS: _____

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)

EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [ ] Elevated [ ] Mixed [ ] Ground UNITS: [ ] Ci [ ] Ci/sec [ ] µCi/sec
MAGNITUDE: Noble Gases:_____ Iodines:_____ Particulates:_____ Other: _____
FORM: [ ] Airborne Start Time _____ Date ___/___/___ Stop Time _____ Date ___/___/___
[ ] Liquid Start Time _____ Date ___/___/___ Stop Time _____ Date ___/___/___

15. PROJECTION PARAMETERS: Projection period: _____Hours Estimated Release Duration _____Hours
Projection performed: Time _____ Date ___/___/___

16. PROJECTED DOSE:

DISTANCE	TEDE (mRem)	Adult Thyroid CDE (mRem)
Site boundary		
2 Miles		
5 Miles		
10 Miles		

17. APPROVED BY: [signature] Title CR-SEC Time Now Date Today
NOTIFIED BY: _____ RECEIVED BY: _____ Time _____ Date ___/___/___

(Denote Critical Steps with an asterisk*)

Start Time: _____ **Time Critical Start Time:**_____

Performance Step: 1 Obtain the EAL ALL Conditions and COLD Conditions Matrix

Standard: Candidate states where to obtain the EALs.

Examiner's NOTE: **Provide copies of the EAL Matrix to the candidate.**

Comment:

Performance Step: 2 EVALUATE ALL Conditions EAL Matrix under all conditions. (Step 8.3.1)

Standard: Candidate reviews EAL ALL Conditions Matrix and does not identify any classification.

Examiner's NOTE:

Comment:

* **Performance Step: 3** IF Reactor Coolant temperature is > 200°F, THEN EVALUATE HOT Conditions EAL Matrix (Step 8.3.2)

Standard: Candidate reviews EAL HOT Conditions Matrix and identifies the following classification: **Site Area Emergency**

FS1.1 – Loss or potential loss of any two barriers (Table F-1)

Reactor Coolant System Barrier –

- **Loss 1 – Containment High Range Monitor R-32A or R-32B > 5 Rem/hr.**

OR

- **Loss 2 - RCS leak rate > available makeup capacity as indicated by a loss of RCS subcooling less than 35°F [55°F]**

OR

- **Potential Loss 2 - Unisolable RCS leak exceeding the capacity of one charging pump (77 gpm)**

Containment Barrier –

- **Potential Loss 7 – Containment pressure > 10 psig with < one full train of depressurization equipment operating. (Note: One Containment Spray System train and one Containment Cooling System train comprise one full train of depressurization equipment.)**

Examiner's NOTE: **Candidate will declare a Site Area Emergency and present his classification to you. This will stop the 15 minute clock for the declaration portion of the JPM.**

Comment:

Time Critical Stop Time for EAL Classification: _____ (15 Minutes)

Examiner's CUE: **Present the candidate with the second cue sheet for the JPM task of completing the Emergency Notification Form and a copy of procedure EPNOT-01.**

Time Critical Start Time for EAL Notification: _____

Performance Step: 4 Candidate will proceed to Attachment 10.7 for a Site Area Emergency and direct the Emergency Communicator to report to the Control Room to assume the duties of the Emergency Communicator.

Standard: Candidate informs the Emergency Communicator to prepare for communication activities.

Examiner's NOTE:

Examiner's CUE: **When the candidate has completed the EAL classification, CUE the candidate that he will manually complete an Emergency Notification Form and submit it to the SEC.**

Comment:

Performance Step: 5 Obtain EPNOT-01, Attachment 10.5, Nuclear Power Plant Emergency Notification Form.

Standard: Copies Attachment from procedure or pulls it from a file.

Examiner's NOTE:

Examiner's CUE: **The Examiner will provide a copy of EPNOT-01 to the candidate.**

Comment:

* **Performance Step: 6** Enter Line 1 information.

Standard: Marks **DRILL** and Message **# 1.**

Examiner's NOTE: **Ensure that DRILL is marked. ACTUAL EVENT is only used during a real emergency.**

Comment:

* **Performance Step: 7** Enter Line 2 information.

Standard: Marks **INITIAL.**

Examiner's NOTE:

Comment:

* **Performance Step: 8** Enter Line 3 information.

Standard: Enters **H.B. Robinson** as the Site and enters CONFIRMATION PHONE NUMBER.

Examiner's NOTE: **Identifying the site as H.B. Robinson is critical. Listing the proper confirmation telephone number is NOT critical.**

Examiner's CUE: **When candidate requests the ERO phone list, tell him the Confirmation Phone Number is 843-383-3685.**

Comment:

* **Performance Step: 9** Enter Line 4 information.

Standard: Marks **SITE AREA EMERGENCY** as the Emergency Classification.

Based on EAL # **FS1.1**

EAL Description - **Loss or potential loss of any two barriers (Table F-1)**

Examiner's NOTE:

Comment:

* **Performance Step: 10** Enter Line 5, Protective Action Recommendation information.

Standard: Marks **NONE.**

Examiner's NOTE:

Comment:

* **Performance Step: 11** Enter Line 6, EMERGENCY RELEASE, information.

Standard: Marks **NONE.**

Examiner's NOTE:

Comment:

Performance Step: 12 Enter Line 7, RELEASE SIGNIFICANCE, information.

Standard: Marks **NOT APPLICABLE.**

Examiner's NOTE:

Examiner's CUE:

Comment:

Performance Step: 13 Enter Line 8, EVENT PROGNOSIS, information.

Standard: Marks **Degrading.**

Examiner's NOTE:

Comment:

* **Performance Step: 14** Enter Line 9, METEROLOGICAL DATA, information.

Standard: Enters data that was given in the initial conditions:
Wind Direction **145** degrees,
Wind Speed (4) mph,
Precipitation **0**,
Stability Class "D".

Examiner's NOTE:

Comment:

* **Performance Step: 15** Enter Line 10 INFORMATION.

Standard: Marks Block A, DECLARATION: Enters applicable **Date** and **Time.**

Examiner's NOTE:

Examiner's CUE: **Date and time should reflect present date and time.**

Comment:

Performance Step: 16 Enter Line 11 information, AFFECTED UNITS.

Standard: Marks **Unit 2.**

Examiner's NOTE:

Comment:

Performance Step: 17 Enter Line 12 information UNIT STATUS.

Standard: Enters Shutdown Time: **1021 hours on 11/28/2011**

Examiner's NOTE: **Reactor shutdown DATE and TIME was given in the initial conditions on the cue sheet.**

Examiner's CUE:

Comment:

Performance Step: 18 Enter Line 13 Remarks information.

Standard: Enters information describing accident from EAL matrix.

Examiner's NOTE: **May leave LINE 13, Remarks blank or enter EAL information.**

Comment:

* **Performance Step: 19** Line 17 APPROVAL by SEC.

Standard: Completes Line 17 with **Signature, Title, Time, and Date.**

Examiner's NOTE:

Comment:

Time Critical Stop Time for EAL Notification: _____ (15 Minutes)

END OF TASK

Termination Cue: **EAL classification has been determined and notification has been made.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM Admin SRO A4

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility:	HB ROBINSON	Task No.:	02344101203
Task Title:	Classify an Emergency Event	JPM No.:	2011-2 NRC JPM Admin SRO A4
K/A Reference:	G2.4.41 (2.9/4.6)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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:

- This is a DRILL.
- Unit at 30% RTP with a shutdown in progress IAW GP-006.
- CV Purge is in progress to support upcoming maintenance activities inside the CV.
- CV Spray Pump A is inoperable due to a grounded motor.
- Subsequently, a LOCA and loss of offsite power occurred at 1021 hours on 11/28/2011.
- Emergency Diesel Generator B trips while starting.
- CV pressure peaked at 37 psig.
- Core exit thermocouples are currently reading 304°F.
- R-32A is reading 8 Rem/hr.
- RVLIS indication reads 45%.
- S/G NR levels are currently at A-12%, B-15%, C-32%.
- Weather conditions: Wind direction is from 145 degrees, Wind speed is 4 mph, Stability Class is D, Precipitation is Zero.
- You are the Shift Manager.

Task Standard: Identifies event as an SITE AREA EMERGENCY per FS1.1

Required Materials: EPCLA-01, EPCLA-04, EAL Matrixes, EPNOT-01.

General References: EPCLA-01, EPCLA-04, EAL Matrixes, EPNOT-01.

Handouts:	EPCLA-01, EPCLA-04, EAL Matrixes, EPNOT-01.
Initiating Cue:	Classify the event IAW the EAL matrixes. Upon completion of the event classification, inform the examiner. **This Task is TIME CRITICAL**
Time Critical Task:	YES (15 minutes for classification AND 15 minutes for notification)
Validation Time:	24 minutes

INITIAL CONDITIONS:

- This is a DRILL.
- Unit at 30% RTP with a shutdown in progress IAW GP-006.
- CV Purge is in progress to support upcoming maintenance activities inside the CV.
- CV Spray Pump A is inoperable due to a grounded motor.
- Subsequently, a LOCA and loss of offsite power occurred at 1021 hours on 11/28/2011.
- Emergency Diesel Generator B trips while starting.
- CV pressure peaked at 37 psig.
- Core exit thermocouples are currently reading 304°F.
- R-32A is reading 8 Rem/hr.
- RVLIS indication reads 45%.
- S/G NR levels are currently at A-12%, B-15%, C-32%.
- Weather conditions: Wind direction is from 145 degrees, Wind speed is 4 mph, Stability Class is D, Precipitation is Zero.
- You are the Shift Manager.

INITIATING CUE:

Classify the event IAW the EAL matrixes. Upon completion of the event classification, inform the examiner.

This Task is TIME CRITICAL

JPM CUE SHEET

INITIAL CONDITIONS: Emergency event has just been declared by the Control Room Site Emergency Coordinator (SEC).

INITIATING CUE: The Emergency Communicator is NOT available. You, as the Control Room Site Emergency Coordinator (SEC), must manually complete the Emergency Notification Form (ENF) from procedure EPNOT-01, CR/EOF Emergency Communicator.

This task is TIME CRITICAL.