NRC

Facility: RIVER BEND STATION	Date of Examination: 3/24/2014
Examination Level: RO ☑ SRO ☐	Operating Test Number: ________

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	(A1) Perform Jet Pump Operability (STP-053-3001) KA 2.1.20, 2.1.25
Conduct of Operations	R, N	(A2) Verify Thermal Power and Loop Flow for Single Loop Ops per GOP-0004 Steps 4.1-4.3 KA 2.1.7
Equipment Control	R, N	(A3) Perform Hand Written Tagout for HVT-UC12 Turbine Building Unit Cooler KA 2.2.13
Radiation Control	R, N	(A4) Determine Radiological Brief and Protective Clothing Requirements KA 2.3.7
Emergency Procedures/Plan		

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

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: RIVER BEND STATION
Date of Examination: 3/24/2014
Examination Level: RO ☐ SRO ☑
Operating Test Number: ___________

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, N	(A5) Determine the Heat Up Rate and the Time to Top of Active Fuel during a Loss of Shutdown Cooling KA 2.1.25
Conduct of Operations	R, M	(A6) Determine personnel callout availability KA 2.1.5
Equipment Control	R, N	(A7) Review manual Tagout of HVT-UC12. KA 2.2.13
Radiation Control	R, N	(A8) Determine if a worker is allowed to perform work without exceeding administrative dose limit KA 2.3.7
Emergency Procedures/Plan	R, N	(A9) Classify an Emergency KA 2.4.30

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

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☐ **RO** ☒

ALTERNATE PATH ☐

TITLE: **Perform Jet Pump Operability**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	30	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	September 30, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Jet Pump Operability Test completed; Steps 8.1.1 and 8.1.3 are found to be NOT Acceptable.

Synopsis: This task will have the applicant perform an operability using STP-053-3001. Jet Pump Data Sheet will be provided to the applicant. The applicant will arrive at the conclusion that several items do not meet acceptability requirements.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to complete step 8.1 of STP-053-3001, Jet Pump Operability Test, by using the data provided and determine if acceptance criteria are being met.

3) Initial Conditions:

The plant is operating at 100% power and STP-053-3001, Jet Pump Operability Test, is due to be performed.

Reactor Thermal Power	100%
Recirculation Pumps	Fast Speed
FCV-A Position	61%
FCV-B Position	60%

Recirculation Loop Flows are in compliance with TS 3.4.1

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Perform Jet Pump Operability	202012001001	G 2.1.20 G 2.1.25	4.6 3.9

REFERENCES:
STP-053-3001, Rev 21

APPLICABLE OBJECTIVES
RLP-STM-0053, Obj 3, 11

REQUIRED MATERIALS:
STP-053-3001, Rev 21
Jet Pump Data Sheet (attached)

SIMULATOR CONDITIONS &/or SETUP:

1. Need a marked up copy of the STP up to step 7 circled (not slashed)
2. This is a classroom/Admin JPM – There is no simulator setup
3. Develop the jet pump data sheet for the applicants to use to complete attachment 1.
4. Fill in data sheet and then the STP answer key.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Jet Pump Operability Test completed; Steps 8.1.1 and 8.1.3 are found to be NOT Acceptable.

This is a copy of the jet pump data sheet used by ops to complete STP-053-3001

Use this MASTER to fill in the handout on the Operator Cue Sheet

JET PUMPS

"A" FCV POSITION	61	"B" FCV POSITION	60
"A" LOOP FLOW (C51-R614A)	30.2	"B" LOOP FLOW (C51-R614B)	31.9
TOTAL FLOW (B33-R613)	78.7		

JET PUMP D/P

1. 52	11. 36
2. 45	12. 27
3. 38	13. 26
4. 32	14. 32
5. 29	15. 39
6. 34	16. 32
7. 37	17. 30
8. 39	18. 33
9. 34	19. 46
10. 25	20. 30

PERFORMANCE:

START TIME: ______________

STP-053-3001, Jet Pump Operability Test

1.	***Procedure Step:**	8.1.1 The indicated recirculation loop drive flow does not differ by more than 10% from the established flow control valve position-loop flow characteristics.
	Standard	Applicant determined this step is **NOT** ACCEPTABLE.
	Cue	
	Notes	Applicant will complete sections 7.3.1 and 7.3.2 of the STP to make this determination.
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	8.1.2 The indicated total core flow does not differ more than 10% from the established total core flow value derived from recirculation drive flow instruments.
	Standard	Applicant determined this step is ACCEPTABLE.
	Cue	
	Notes	Applicant will complete section 7.4 of the STP to make this determination.
	Results	SAT ☐ UNSAT ☐

3.	***Procedure Step:**	8.1.3 The indicated diffuser-to-lower plenum differential pressure of any individual pump does not differ from established patterns by more than 20%.
	Standard	Applicant determined this step is **NOT** ACCEPTABLE.
	Cue	
	Notes	Applicant will complete section 7.5 of the STP to make this determination.
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Jet Pump Operability Test completed; Steps 8.1.1 and 8.1.3 are found to be Not Acceptable.

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initiating Cues:

The CRS has directed you to complete step 8.1 of STP-053-3001, Jet Pump Operability Test, by using the data provided and determine if acceptance criteria are being met.

Initial Conditions:

The plant is operating at 100% power and STP-053-3001, Jet Pump Operability Test, is due to be performed.

Reactor Thermal Power	100%
Recirculation Pumps	Fast Speed
FCV-A Position	61%
FCV-B Position	60%

Recirculation Loop Flows are in compliance with TS 3.4.1

See attached Jet Pump Data Sheet

JET PUMPS

"A" FCV POSITION	________	"B" FCV POSITION	________
"A" LOOP FLOW (C51-R614A)	________	"B" LOOP FLOW (C51-R614B)	________
TOTAL FLOW (B33-R613)	________		

JET PUMP D/P

1. _____	11. _____
2. _____	12. _____
3. _____	13. _____
4. _____	14. _____
5. _____	15. _____
6. _____	16. _____
7. _____	17. _____
8. _____	18. _____
9. _____	19. _____
10. _____	20. _____

KEY

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
*SURVEILLANCE TEST PROCEDURE

*JET PUMP OPERABILITY TEST

PROCEDURE NUMBER: *STP-053-3001

REVISION NUMBER: *021

Effective Date: * 12/09/13

NOTE : SIGNATURES ARE ON FILE.

TemRev 2 AddCounter 18 Att Enc DS MSet REGULAR KWN OFF
REFERENCE USE
*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
STP-053-3001R021	Graphs used in STP evaluations updated from latest performance of REP-0033.

TABLE OF CONTENTS

1 PURPOSE/APPLICABILITY

1.1 Purpose

1.1.1. Demonstrate jet pump operability. This satisfies Technical Specification SR 3.4.3.1.

1.1.2. All jet pumps are determined to be operable by using data obtained from recirculation loop drive flow, total core flow, flow control valve position and diffuser-to-lower plenum differential pressure of each jet pump.

1.2 Applicability

1.2.1. Modes 1 and 2

2 REFERENCES

2.1 RBS Technical Specifications Section 3.4.1 and 3.4.3

2.2 STP-000-0001, Daily Operating Logs

3 DEFINITIONS

3.1 None

4 REQUIRED EQUIPMENT

4.1 None

5 PRECAUTIONS AND LIMITATIONS

5.1 The OSM/CRS should be immediately notified and Technical Specification LCO 3.4.3 referred to if any acceptance criteria can not be met.

5.2 Notify the OSM/CRS if during the performance of this STP, work must be stopped and can not be continued within a reasonable period of time.

5.3 The area between the lines on the attached graphs indicates the acceptable region for each monitored parameter.

5.4 While baselining new established patterns, engineering judgement of the daily surveillance results is used to detect significant abnormalities which could indicate a jet pump failure.

6 PREREQUISITES

6.1 Check Reactor Thermal Power is greater than 23.8%. DB *(Initials)*

6.2 Check that personnel performing this test meet the qualification of ADM-0007, Selection, Training, Qualification and Evaluation of Plant Staff Personnel DB *(Initials)*

6.3 Each performer indicates that he has read and understands this procedure by completing the following:

(Signature)	(Print Name)	(Initials)
Dave B	Dave Bergstrom	DB

6.4 Verify that the recirculation loop flows are in compliance with TS 3.4.1. Refer To STP-000-0001, Daily Operating Logs for calculational methodology. DB *(Initials)*

6.5 Verify this procedure is the latest revision. DB *(Initials)*

6.6 Obtain OSM/CRS permission to begin this test. DB *(Initials)*

6.7 Inform the NCO of test performance. DB *(Initials)*

7 **PROCEDURE**

7.1 Complete Attachment 1, Jet Pump Operability Test Data Sheet.

student
(Initials)

7.2 Indicate Recirc Pump speed below:

FAST SPEED ✓ SLOW SPEED

student
(Initials)

TS 7.3 Recirc loop drive flow vs FCV position.

7.3.1. Indicate that recirc Loop A drive flow vs FCV A position is within the +/- 10% tolerance as determined by Step 2 of Figure 1a in Attachment 1, Jet Pump Operability Test Data Sheet.

YES ✓ NO

student
(Initials)

7.3.2. Indicate that recirc Loop B drive flow vs FCV B position is within the +/- 10% tolerance as determined by Step 2 of Figure 1b in Attachment 1, Jet Pump Operability Test Data Sheet.

YES NO ✓

student
(Initials)

TS 7.4 Indicate that total core flow vs total recirc loop drive flow is within the +/- 10% tolerance determined by Step 2 of Figure 2 in Attachment 1, Jet Pump Operability Test Data Sheet.

YES ✓ NO

student
(Initials)

TS 7.5 Indicate that jet pump DPs vs recirc loop drive flows are within +/- 20% as determined by Step 2 of Figures 3 through 22 in Attachment 1, Jet Pump Operability Test Data Sheet.

YES NO ✓

student
(Initials)

8 ACCEPTANCE CRITERIA

TS 8.1 The requirements of SR 3.4.3.1 are satisfied by at least two of the following criteria being acceptable:

8.1.1. The indicated recirculation loop drive flow does not differ by more than 10% from the established flow control valve position-loop flow characteristics. IF Step 7.3.1 AND 7.3.2 are marked YES, THEN mark this ACCEPTABLE.

ACCEPTABLE ✓NOT ACCEPTABLE student
(Initials)

8.1.2. The indicated total core flow does not differ more than 10% from the established total core flow value derived from recirculation loop drive flow measurements. IF Step 7.4 is marked YES, THEN mark this ACCEPTABLE.

✓ACCEPTABLE NOT ACCEPTABLE student
(Initials)

8.1.3. The indicated diffuser-to-lower plenum differential pressure of any individual jet pump does not differ from established patterns by more than 20%. IF Step 7.5 is marked YES, THEN mark this ACCEPTABLE.

ACCEPTABLE ✓NOT ACCEPTABLE student
(Initials)

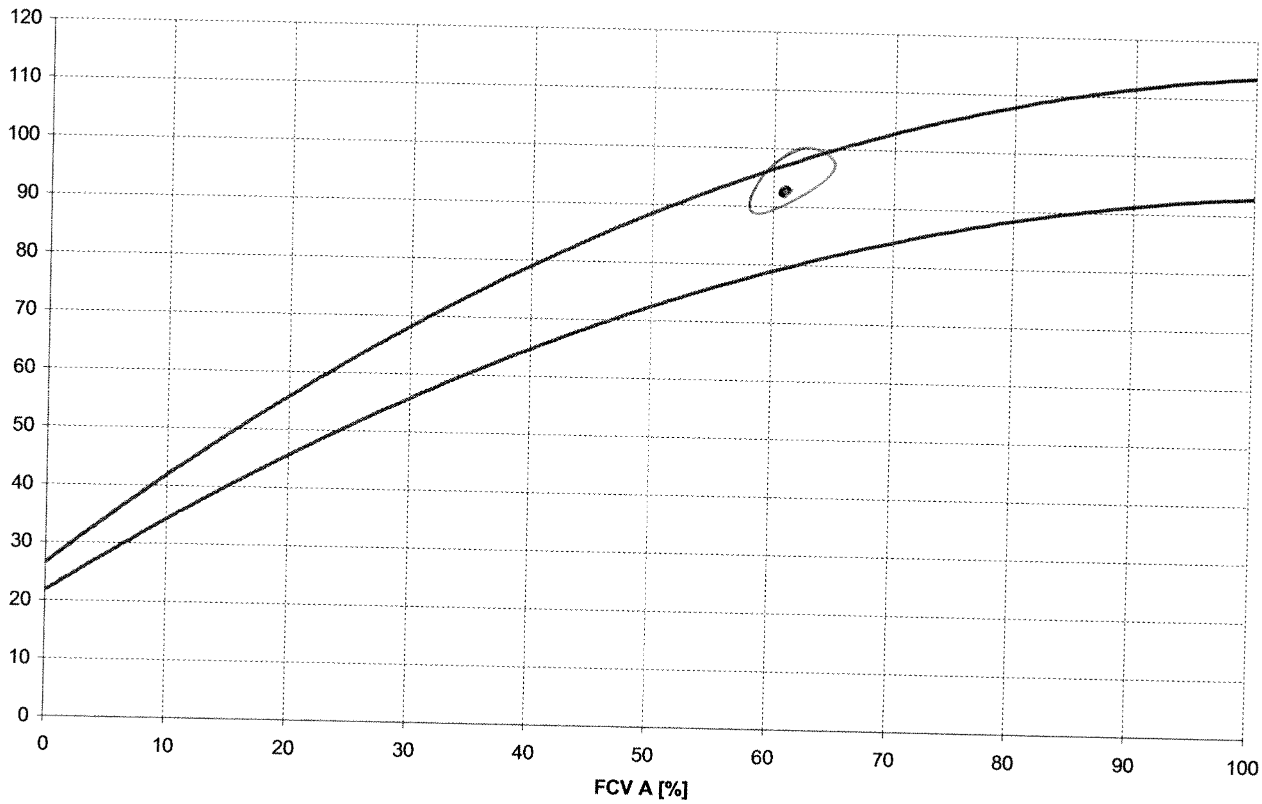
9 RECORDS

9.1 Upon completion of this test, forward the entire Data Package to the OSM/CRS for review and approval.

9.2 Upon completion of the entire review process, disposition records in accordance with ADM-0015, Station Surveillance Test Program.

JET PUMP OPERABILITY TEST DATA SHEET

Figure 1a: LOOP A DRIVE FLOW vs FCV A Position



1. Record the following from H13-P680:

   a. Flow Control Valve A Position ___61___ %

   b. Loop A Drive Flow as indicated on C51-R614
      or ERIS point B33EA028 ___30.2___ KGPM

$$\frac{(\ 30.2\ )\text{KGPM}}{32.5\ \text{KGPM}} \times 100 = \underline{\ 93\ }\ \%$$

____
(Initials)

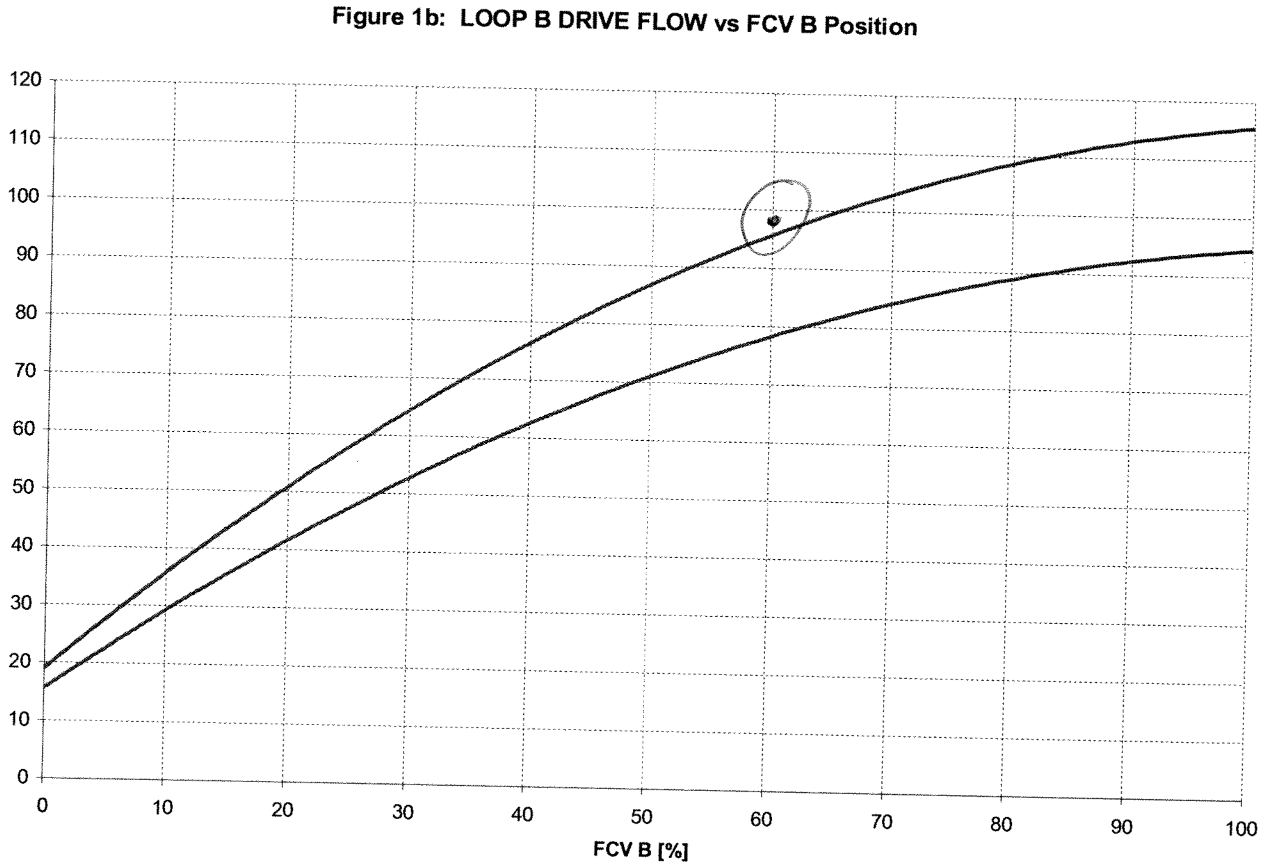
____
(IND VERIF)

2. IF Recirc Pumps in Fast Speed, THEN plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 10% tolerance span. IF Recirc Pumps in Slow Speed AND FCV position greater than or equal to 80%, THEN verify Drive Flow A is greater than 15% and less than 35%.

✓YES NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET



1. Record the following from H13-P680:
   a. Flow Control Valve B Position 60 %
   b. Loop B Drive Flow as indicated on C51-R614 or ERIS point B33EA030 31.9 KGPM

$$\frac{(\ 31.9\ )\text{KGPM}}{32.5\ \text{KGPM}} \times 100 = 98\ \%$$

_______ *(Initials)*

_______ ***(IND VERIF)***

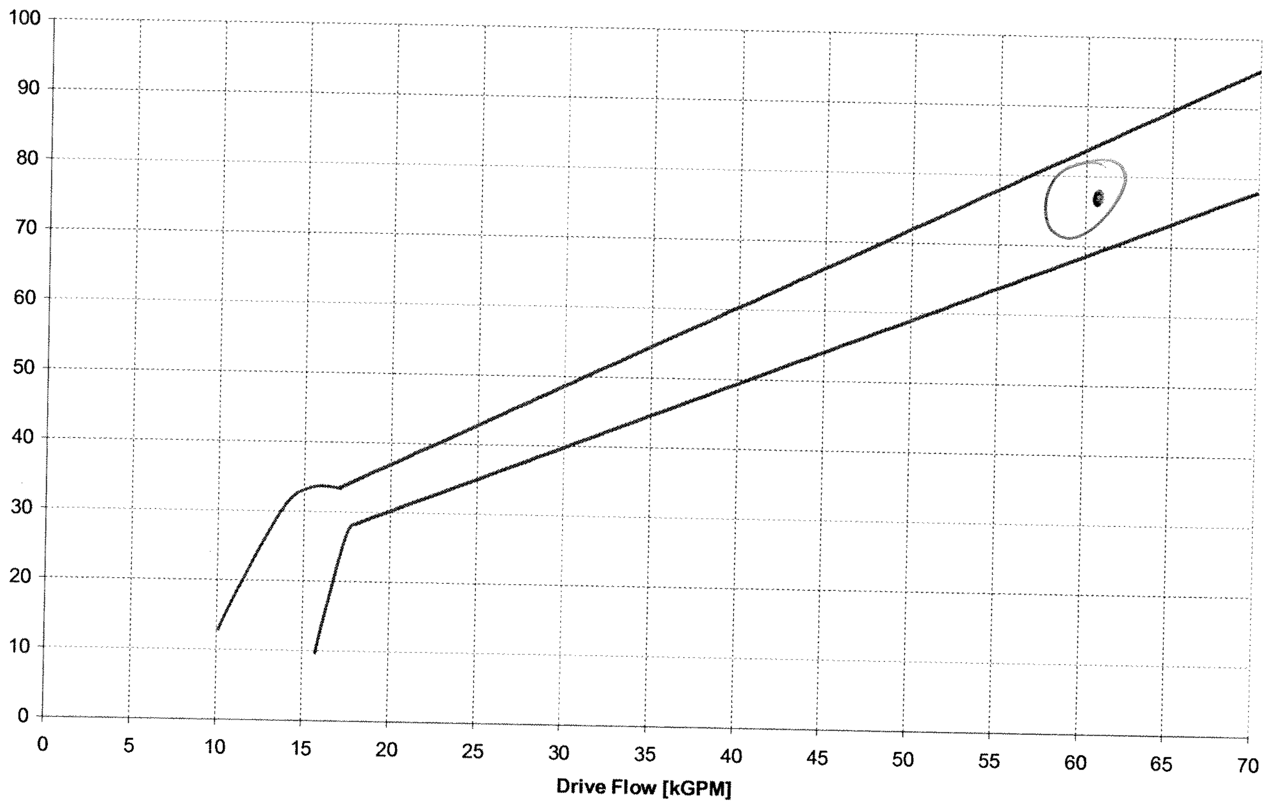
2. IF Recirc Pumps in Fast Speed, THEN plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 10% tolerance span. IF Recirc Pumps in Slow Speed AND FCV position greater than or equal to 80%, THEN verify Drive Flow B is greater than 15% and less than 35%.

YES NO ✓

_______ *(Initials)*

JET PUMP OPERABILITY TEST DATA SHEET

Figure 2: Total Core Flow vs. Total Recirc Loop Drive Flow



1. Record the following from H13-P680 or ERIS points:
   a. Total Core Flow as indicated on B33-R613 78.7 MLBM/hr
   b. Recirc Loop A Drive Flow as indicated on C51-R614 or ERIS B33EA028 30.2 KGPM
   c. Recirc Loop B Drive Flow as indicated on C51-R614 or ERIS B33EA030 31.9 KGPM
   d. Total Recirc Loop Drive Flow (1b + 1c) 62.1 KGPM

_______________ *(Initials)*

_______________ ***(IND VERIF)***

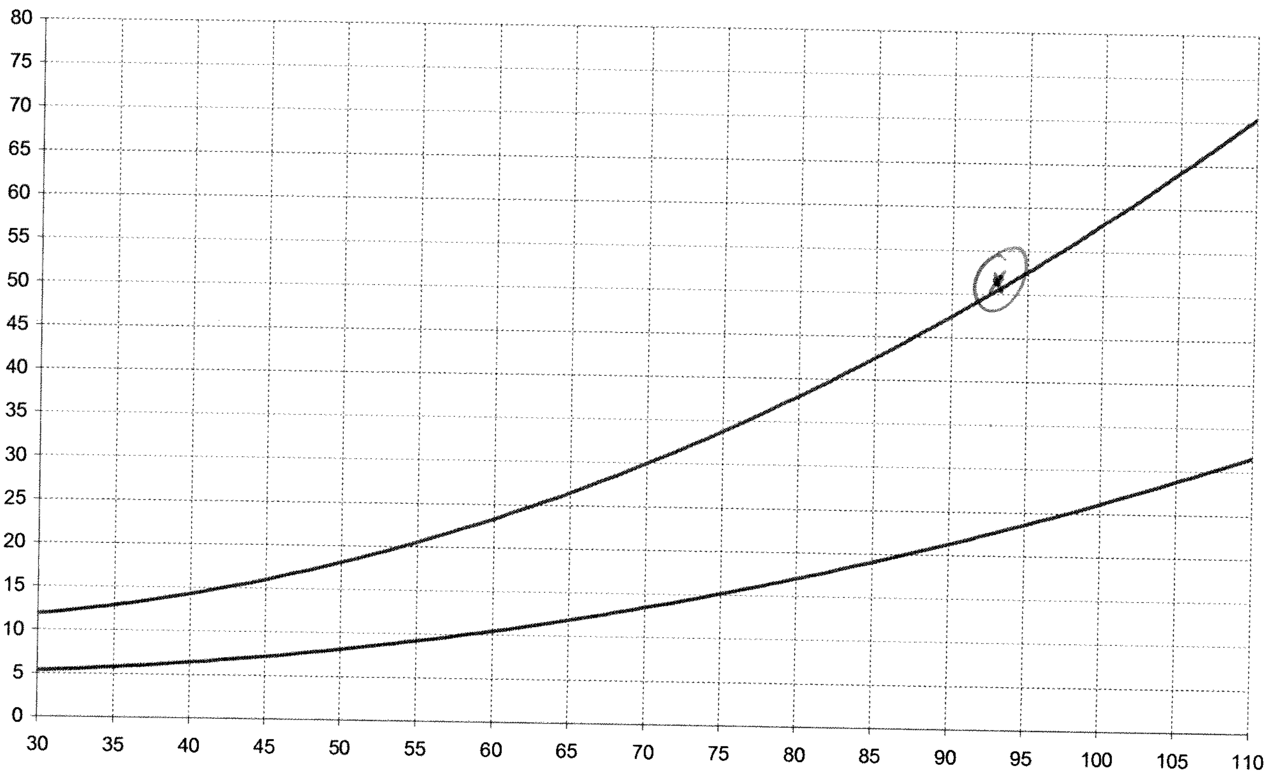
2. Plot the data point on the curve from Steps 1a and 1d and determine if the data falls within the +/- 10% tolerance span.

YES ✓ NO

_______________ *(Initials)*

JET PUMP OPERABILITY TEST DATA SHEET

Figure 3: Jet Pump #1 DP vs. Drive Flow



1. Perform the following:

    a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
    93 %

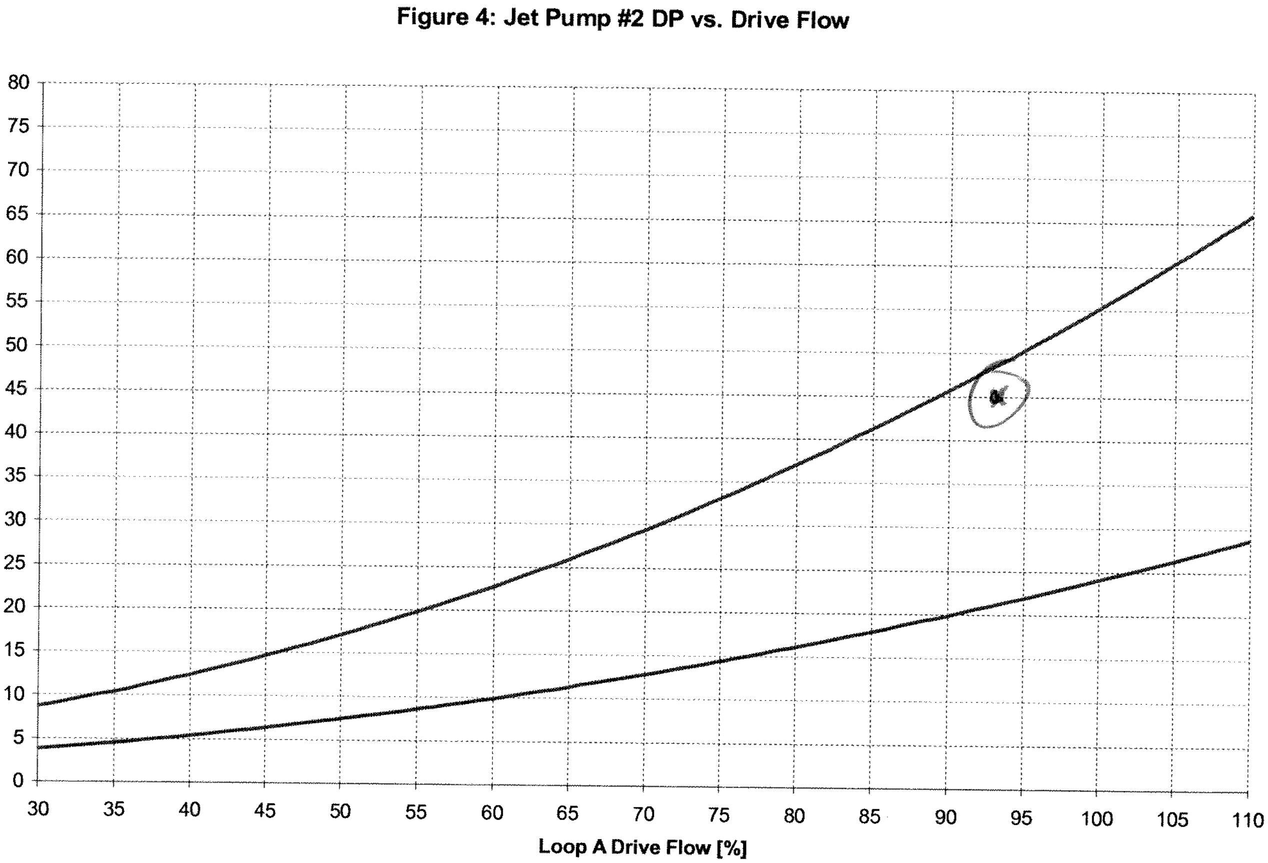
    b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
    52 %

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES NO ✓

______ (Initials)

JET PUMP OPERABILITY TEST DATA SHEET



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      93 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      45 %

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

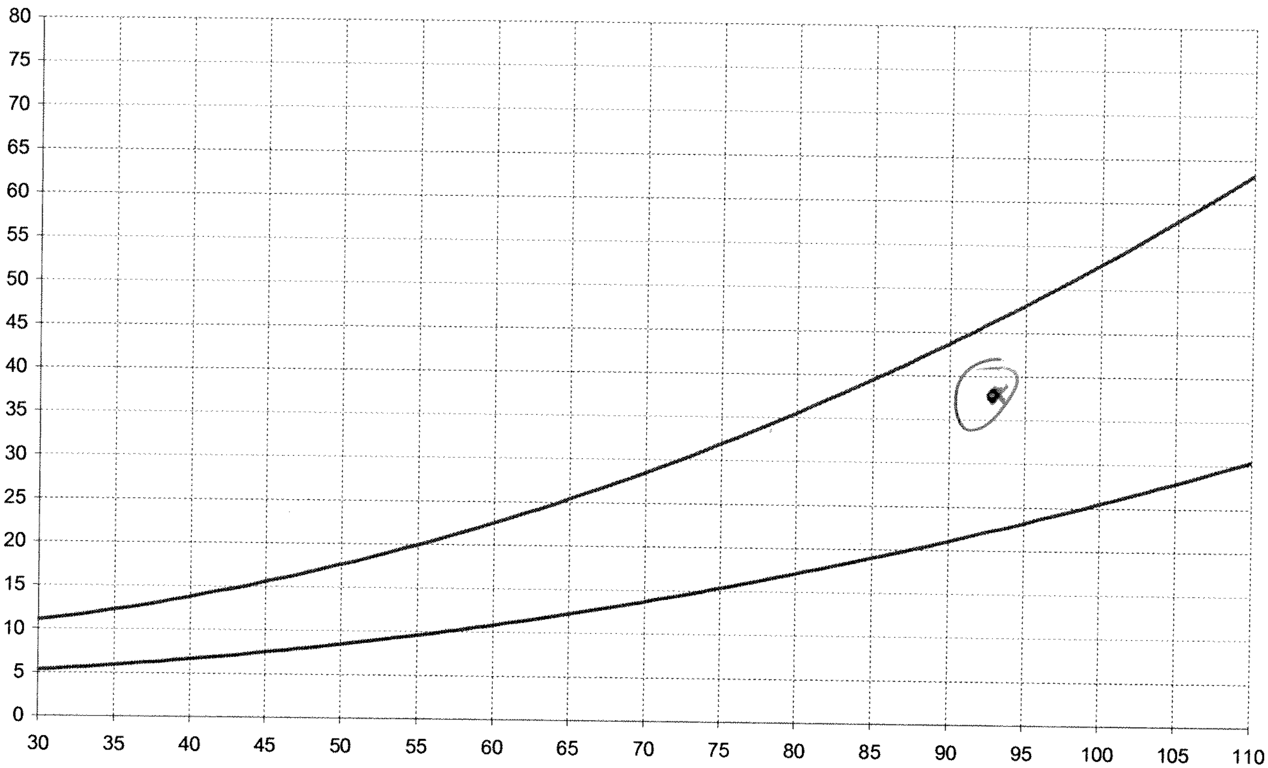


Figure 5: Jet Pump #3 DP vs. Drive Flow

1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
   93 %
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   38 %

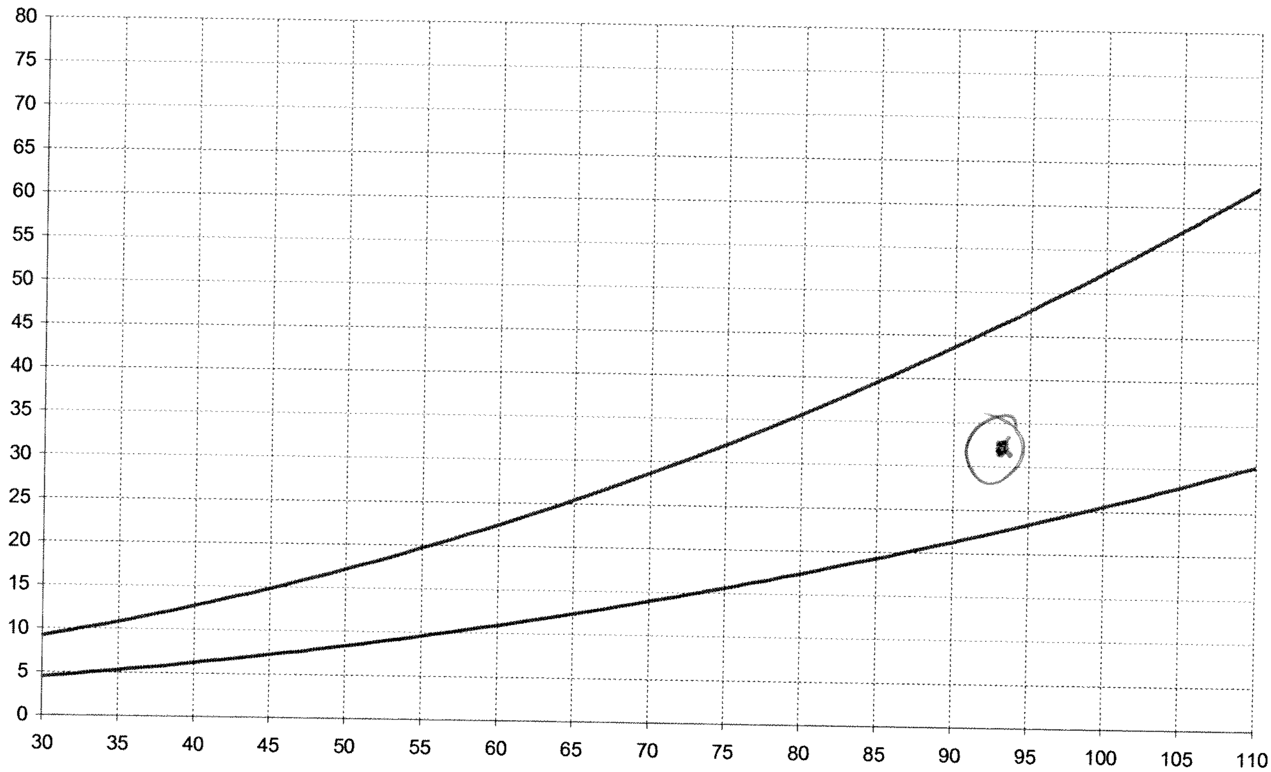
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 6: Jet Pump #4 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
   93 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   32 %

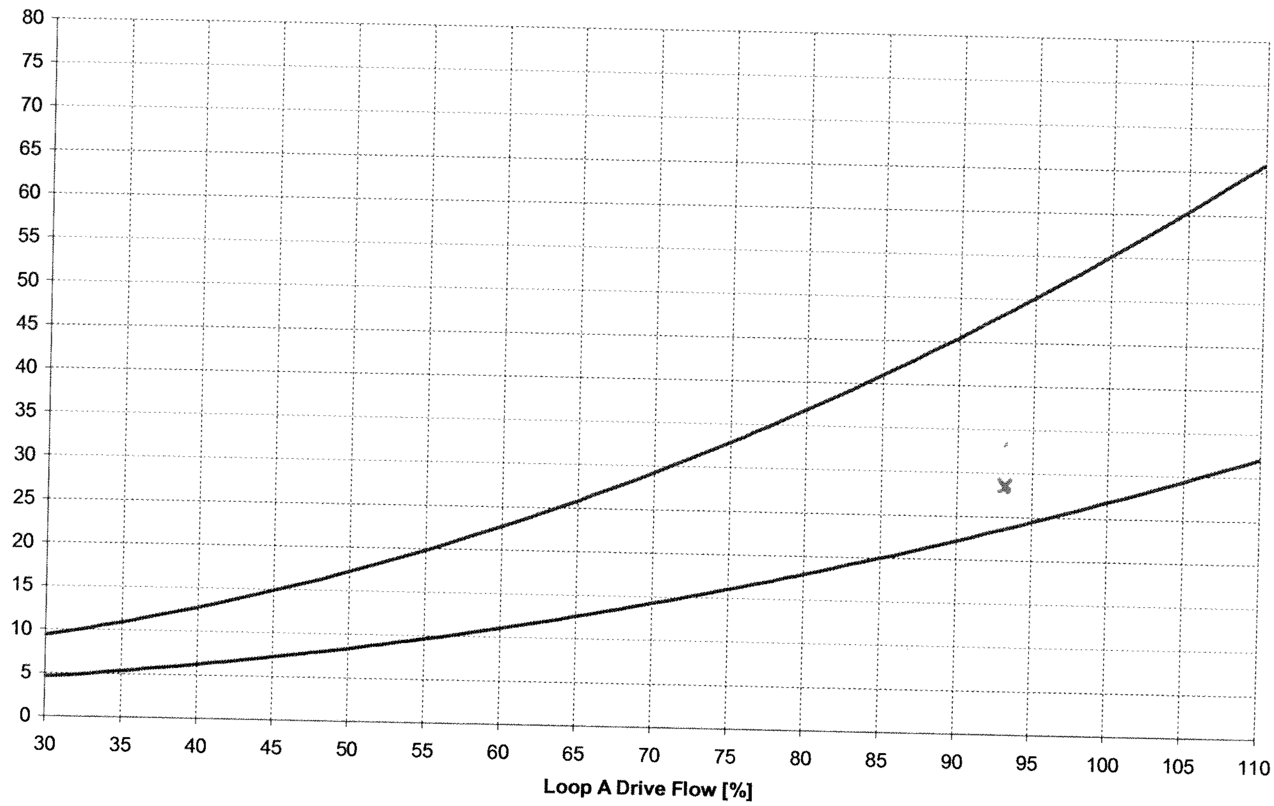
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 7: Jet Pump #5 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
   93 %

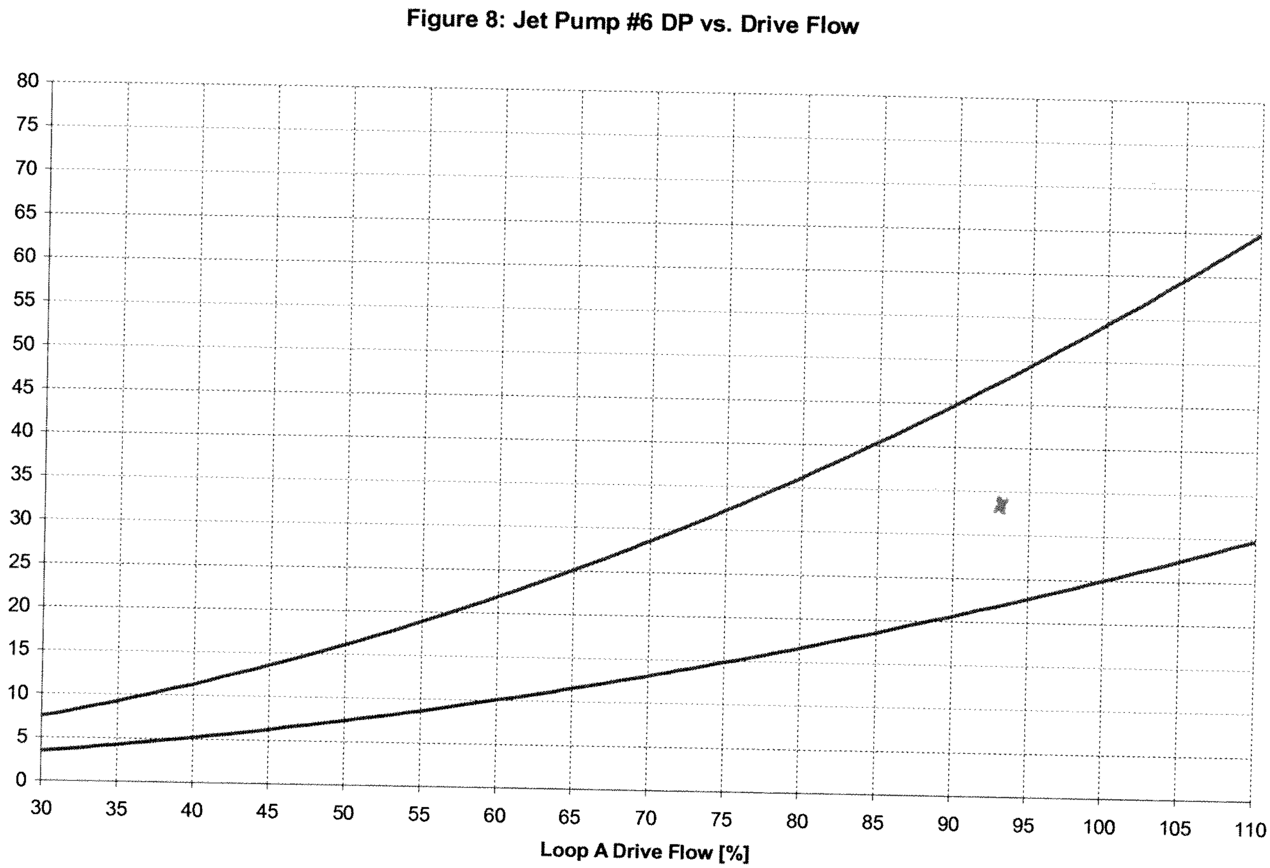
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   29 %

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
   93 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   34 %

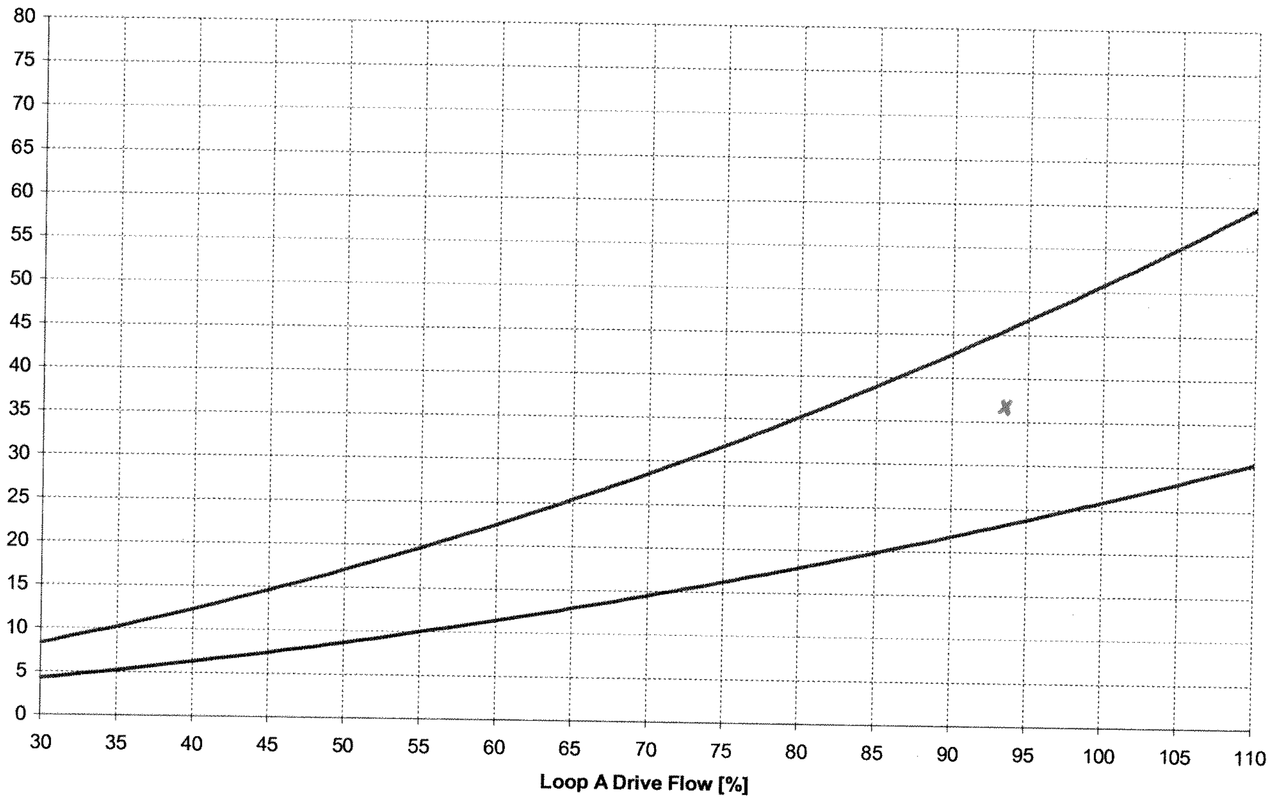
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 9: Jet Pump #7 DP vs. Drive Flow



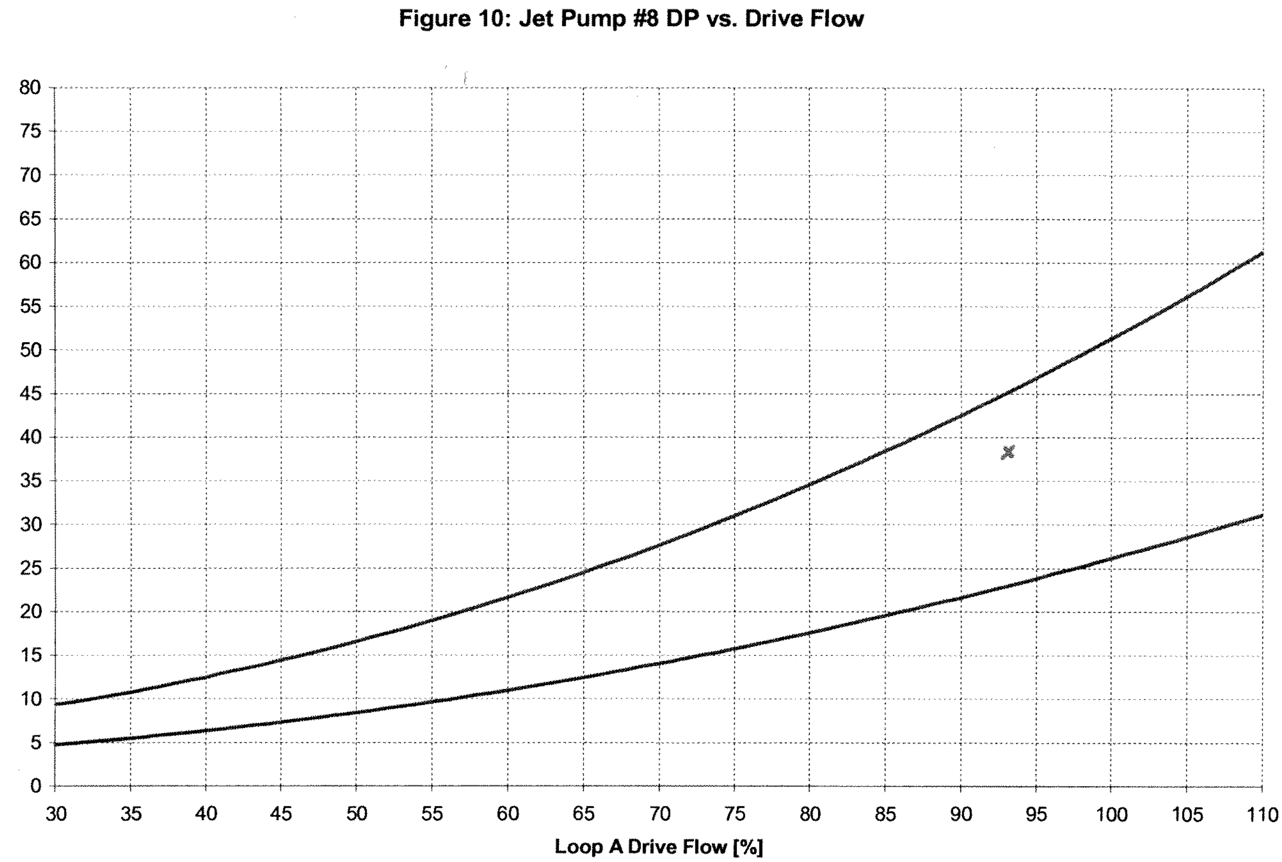
1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
   93 %
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   37 %

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
   93 %

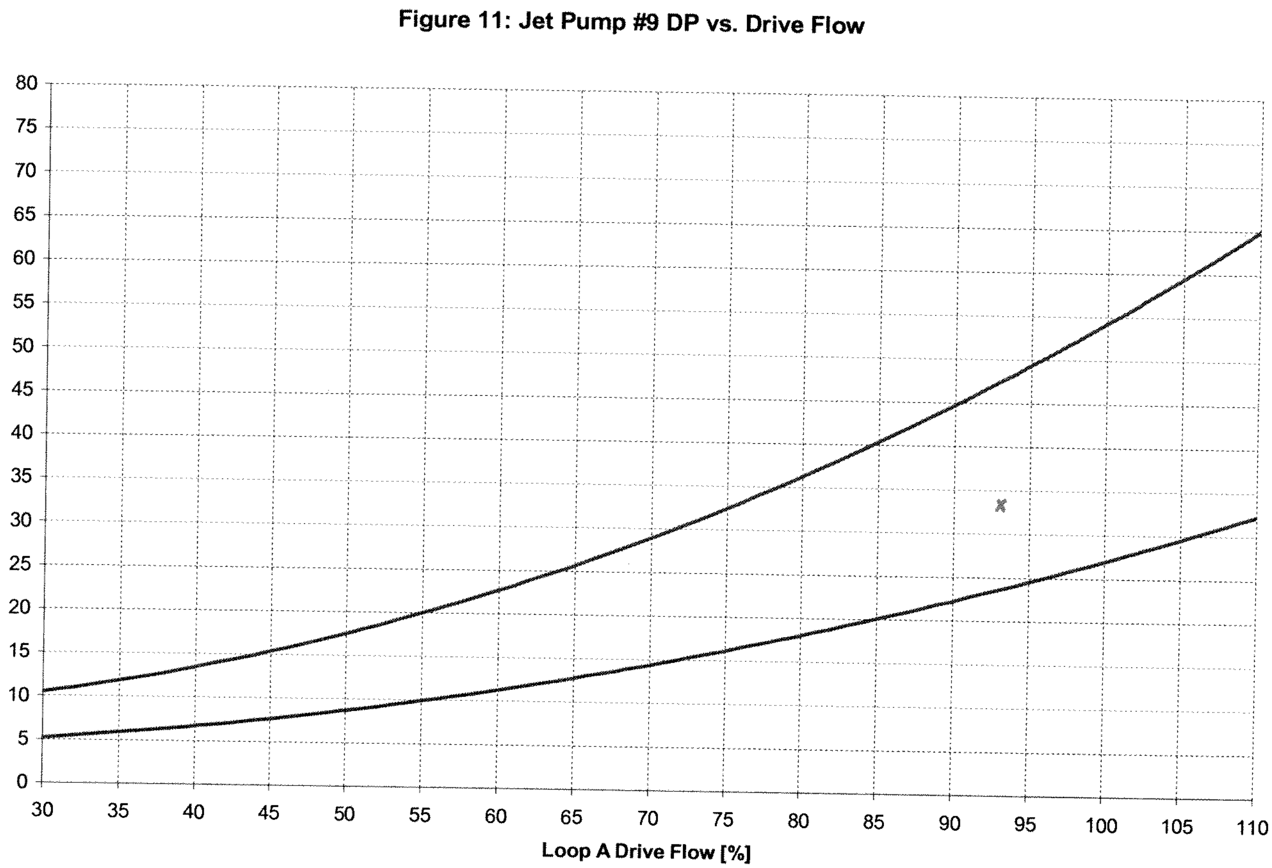
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   39 %

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET



1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
      93 %
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
      34 %

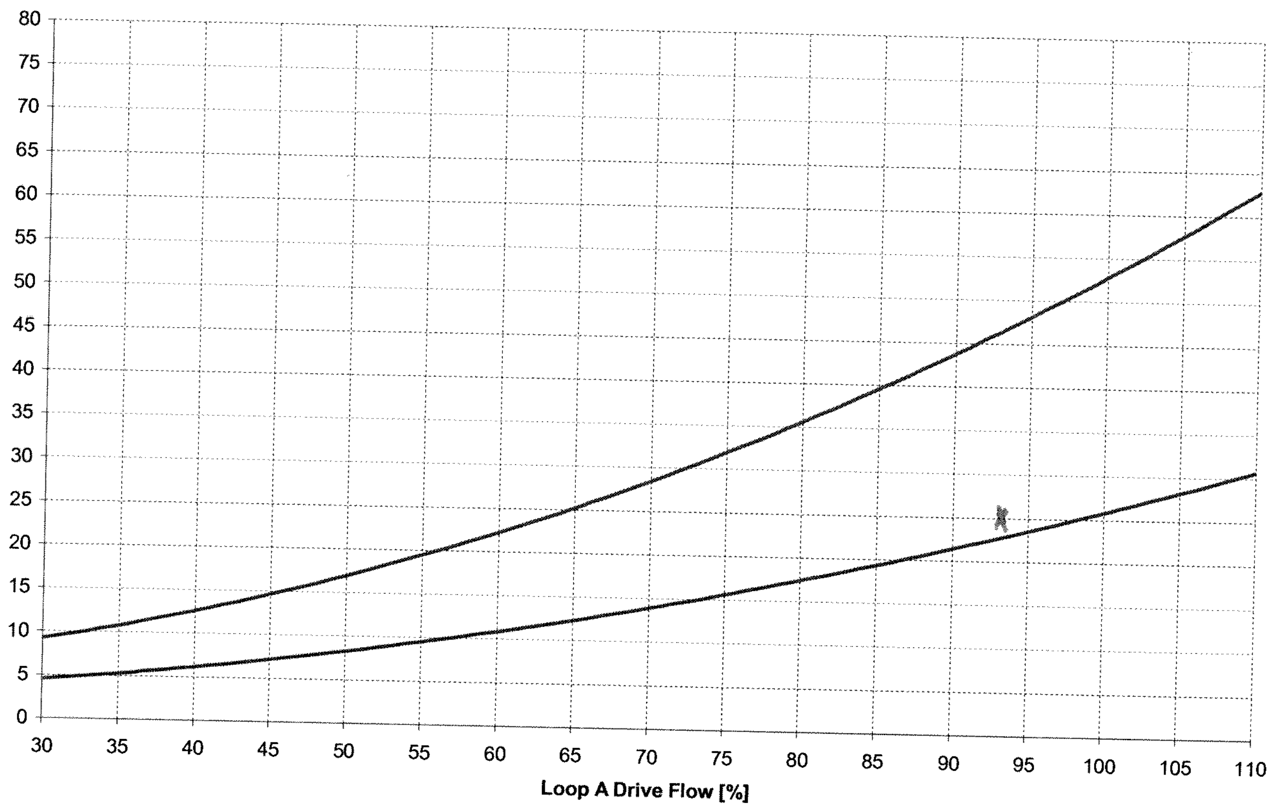
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 12: Jet Pump #10 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.
   93 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   25 %

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

______________ (Initials)

JET PUMP OPERABILITY TEST DATA SHEET

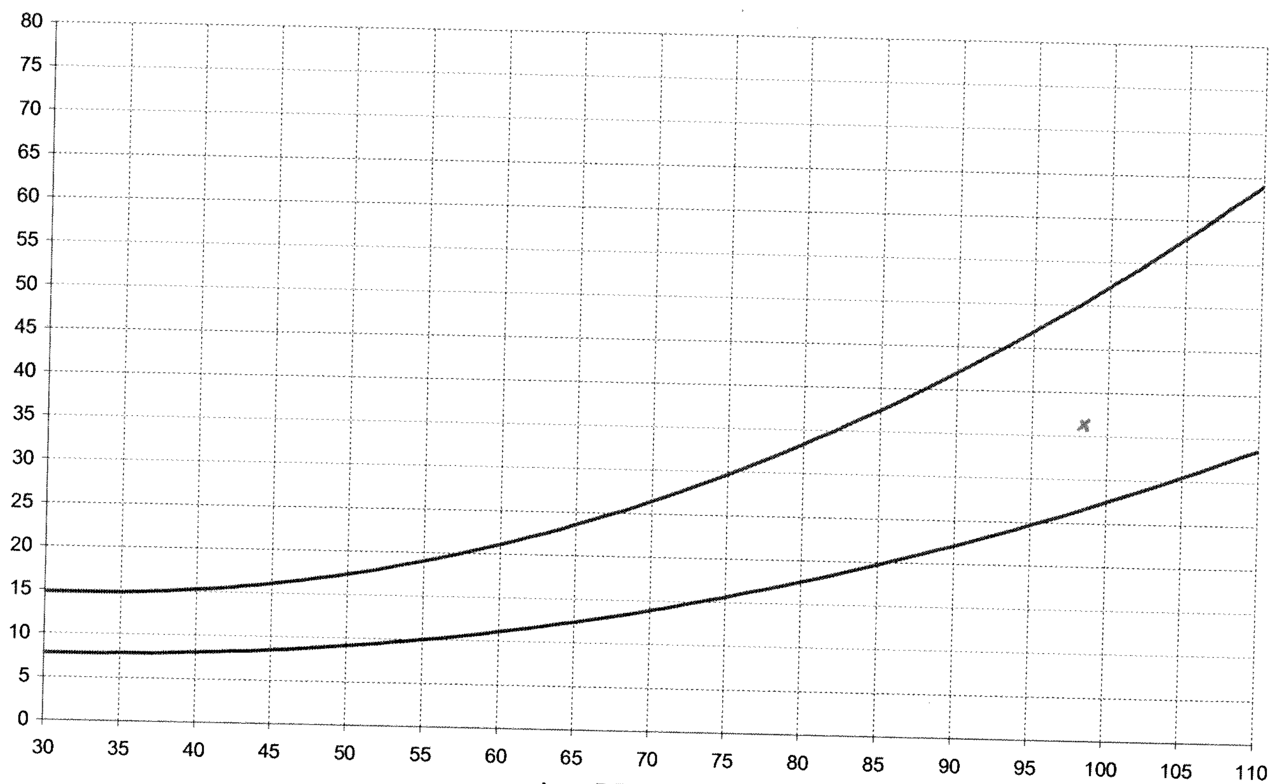


Figure 13: Jet Pump #11 DP vs. Drive Flow

1. Perform the following:
   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.
   98 %
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   36 %

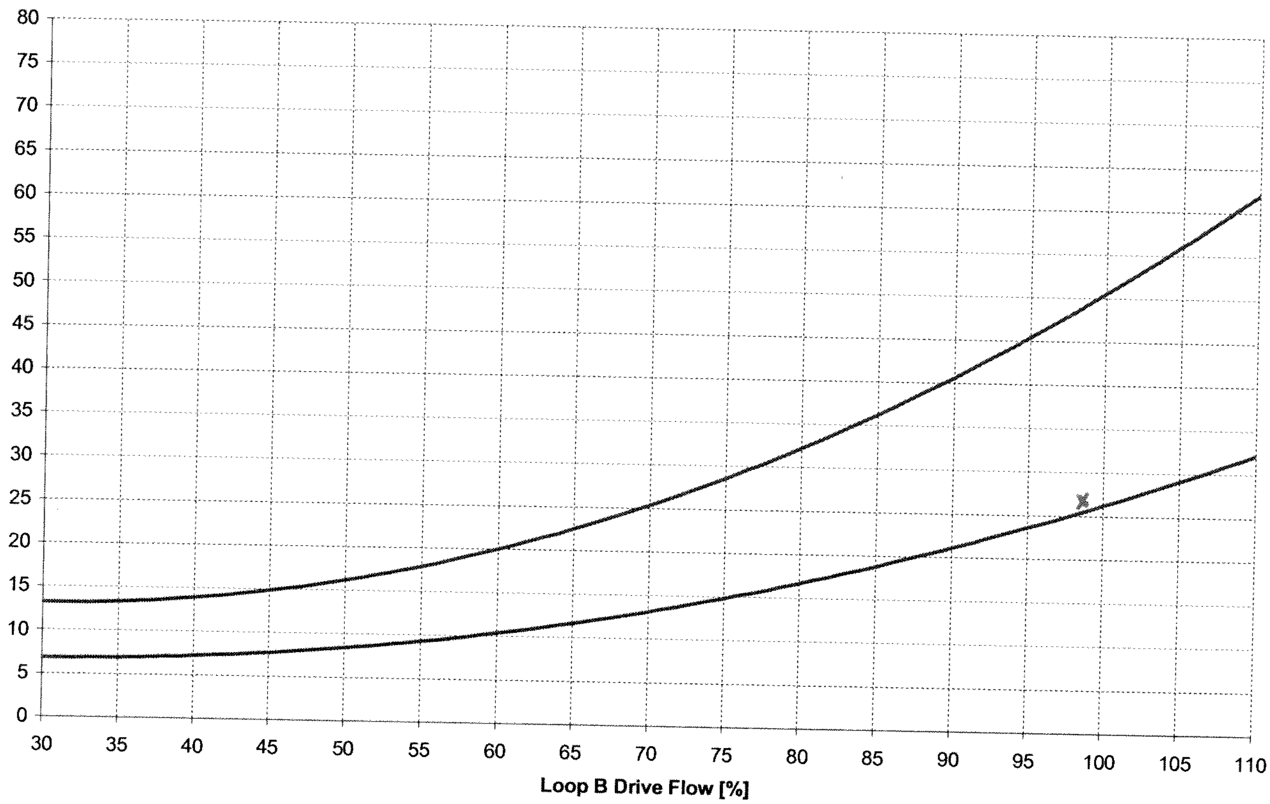
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 14: Jet Pump #12 DP vs. Drive Flow



1. Perform the following :

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      98 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      27 %

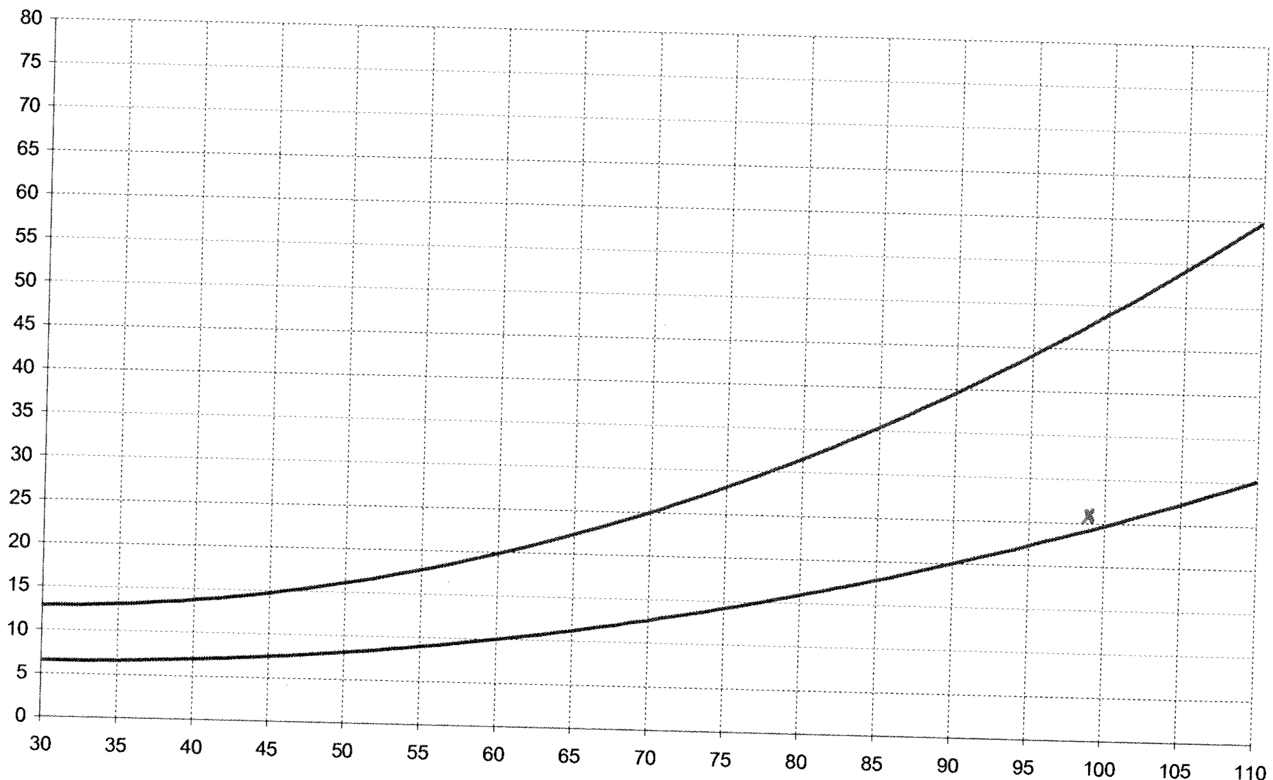
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES ✓ NO

   ____
   (Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 15: Jet Pump #13 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.
   98 %
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   26 %

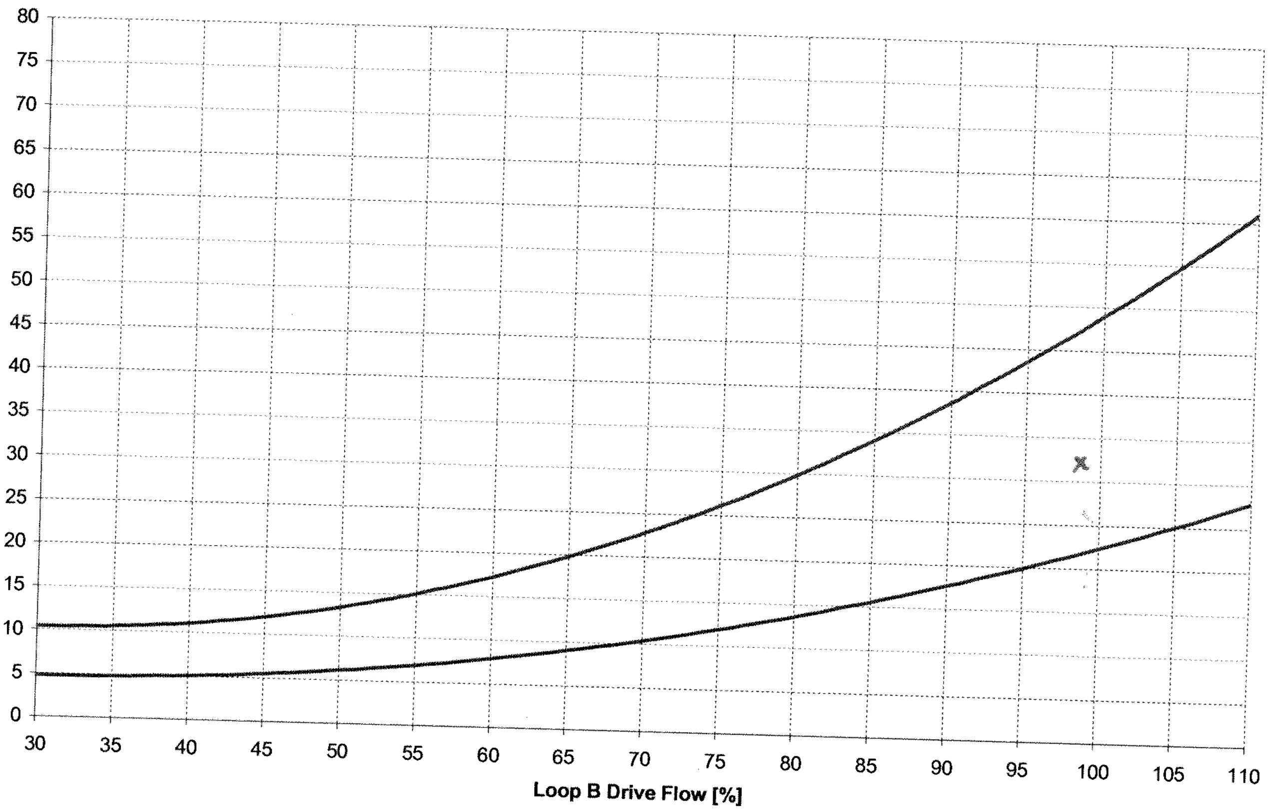
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 16: Jet Pump #14 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

   98 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

   32 %

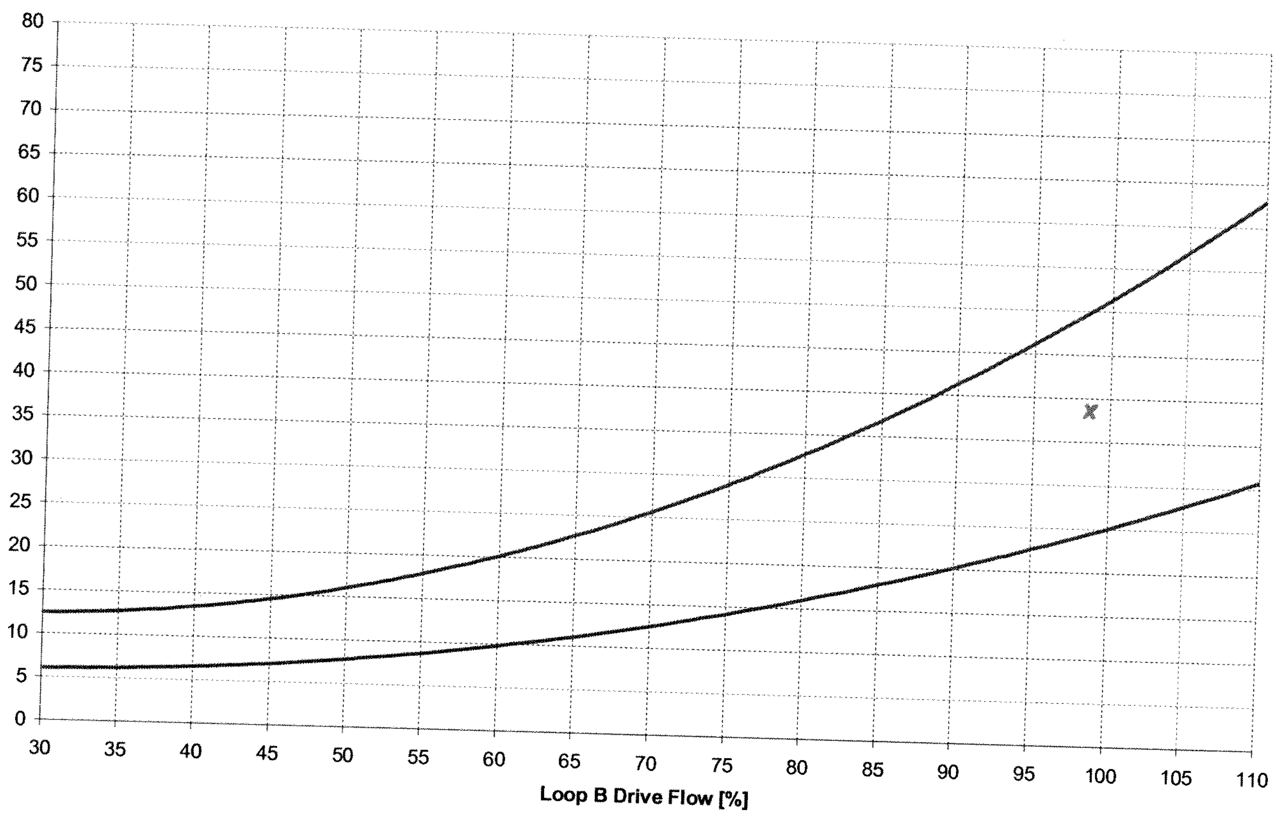
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 17: Jet Pump #15 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.
      98 %
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
      39 %

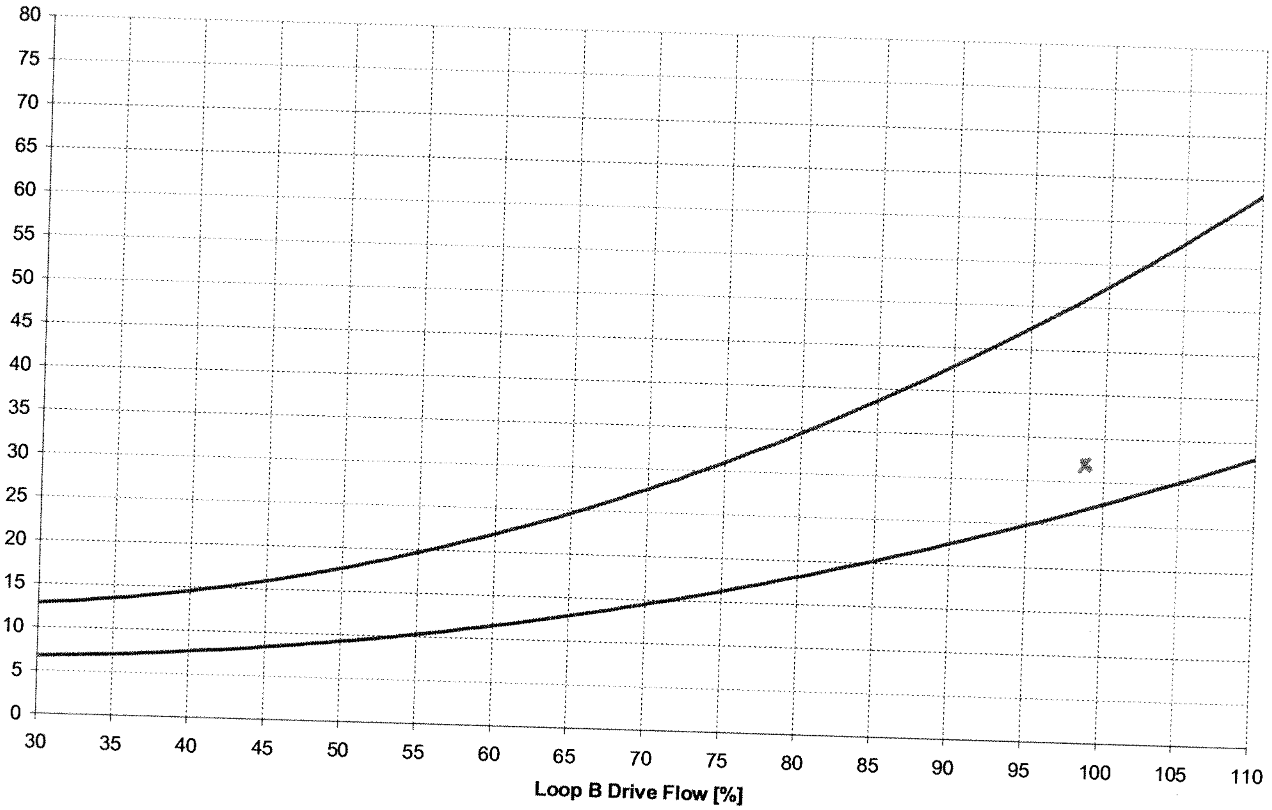
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 18: Jet Pump #16 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.
      98 %
   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
      32 %

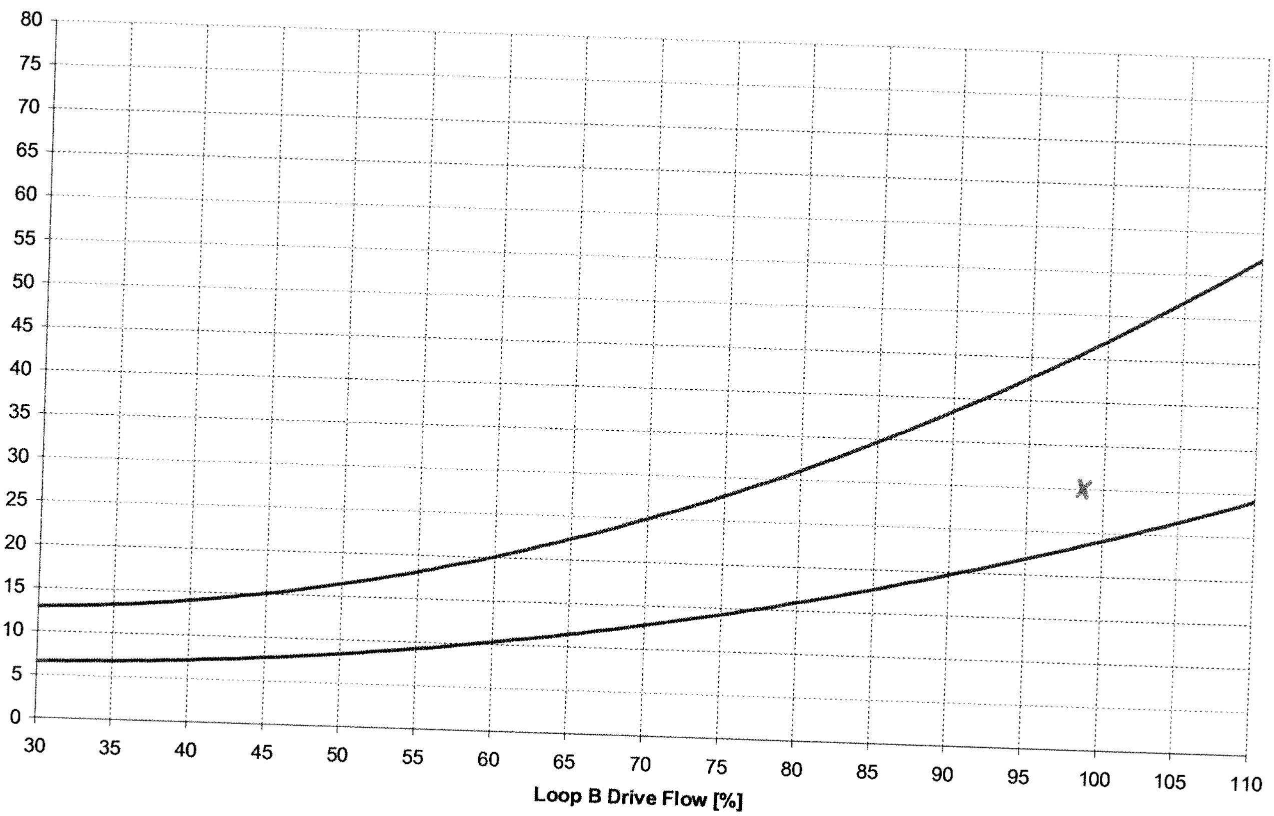
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 19: Jet Pump #17 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      98 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      30 %

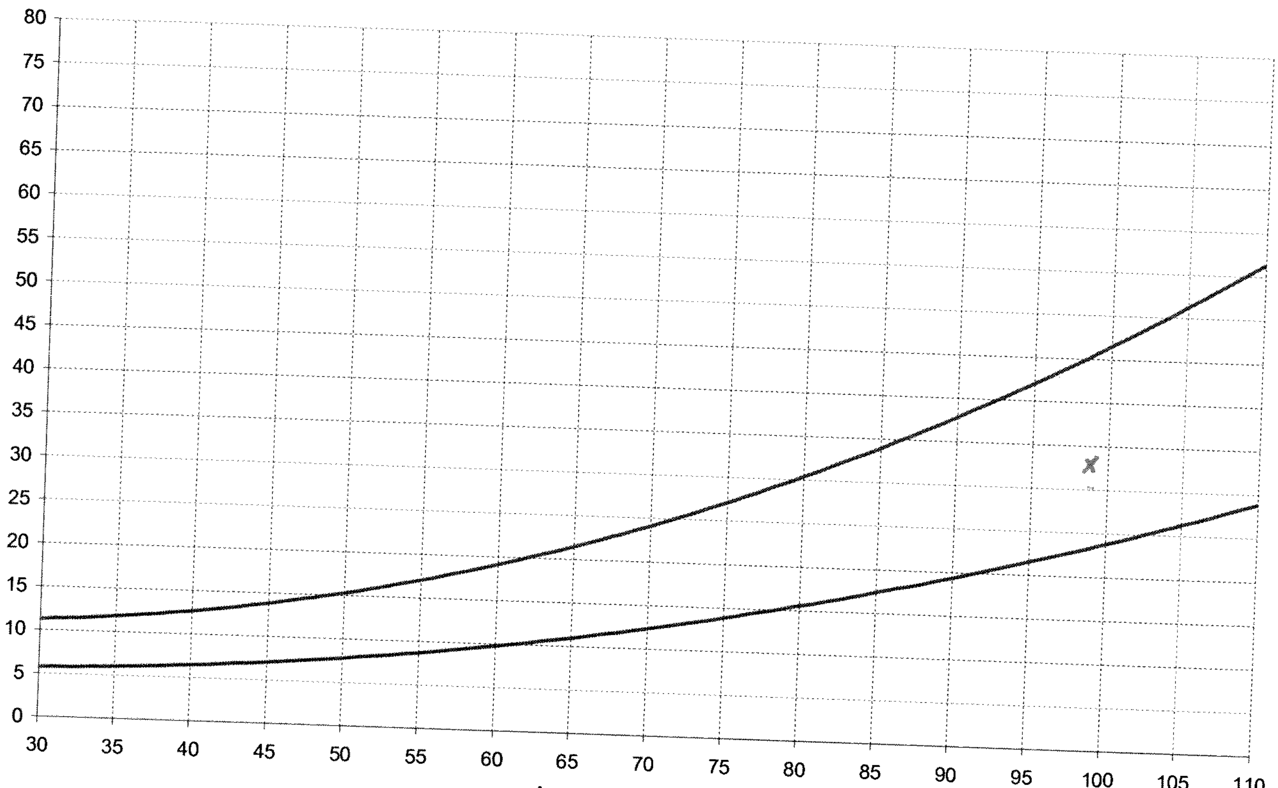
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES ✓ NO

   ____
   (Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 20: Jet Pump #18 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.
   98 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   33 %

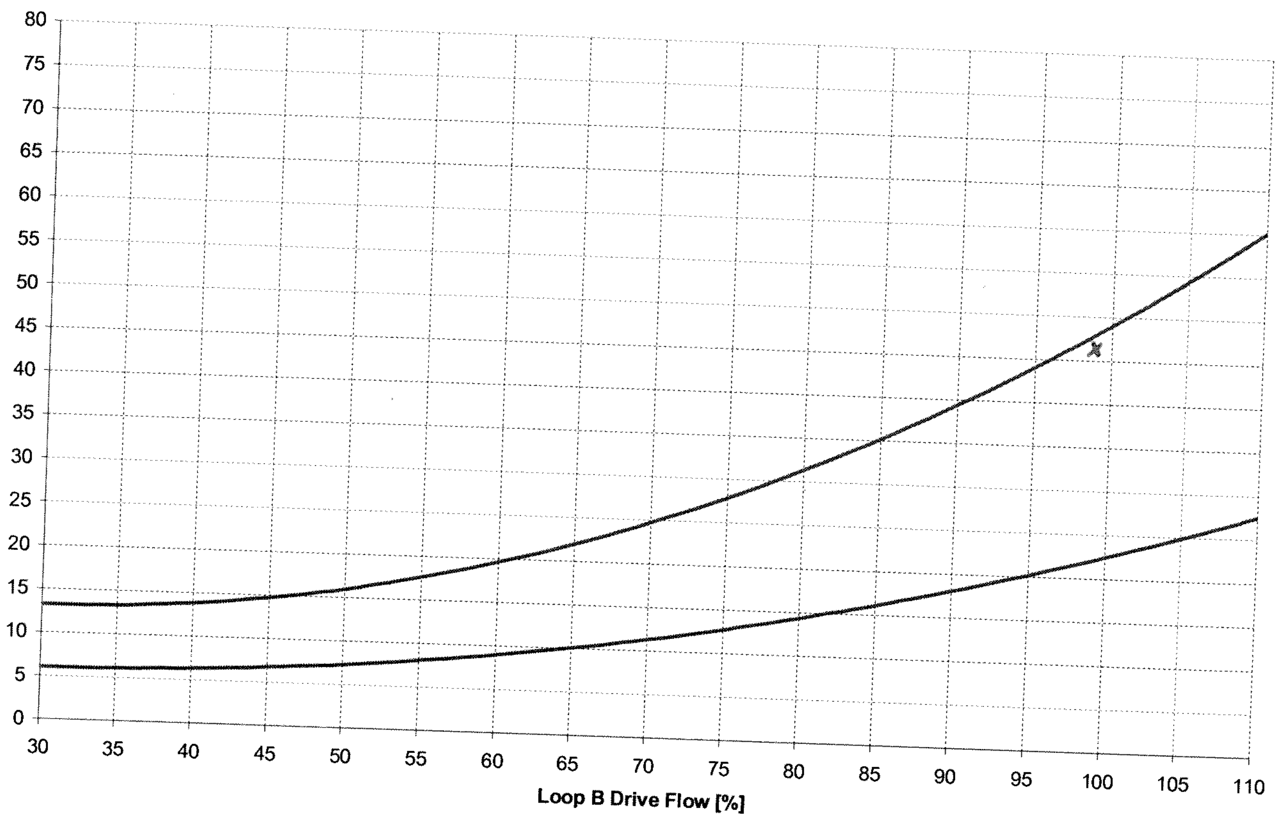
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 21: Jet Pump #19 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.
   98 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   46 %

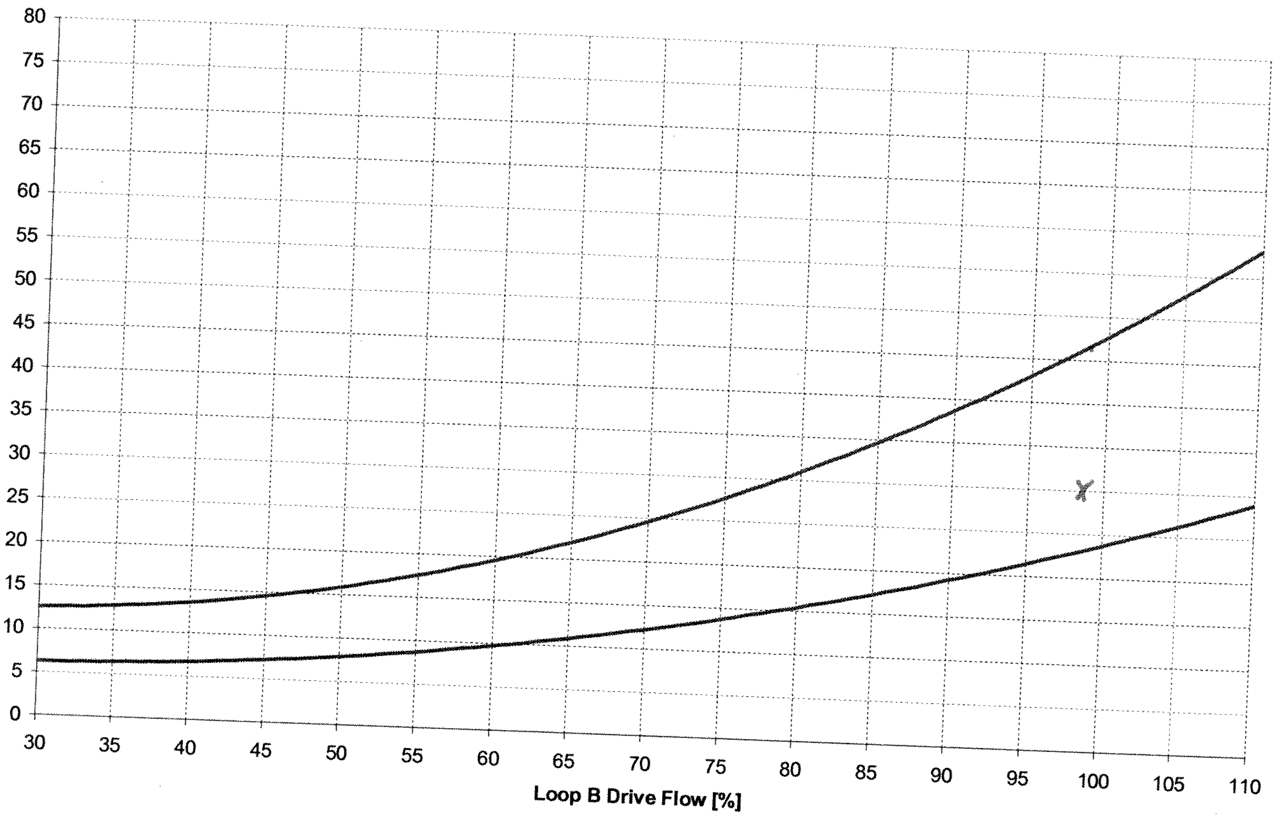
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ✓ NO

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 22: Jet Pump #20 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.
   98 %

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.
   30 %

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES✓ NO

____
(Initials)

JET PUMPS

"A" FCV POSITION	61	"B" FCV POSITION	60
"A" LOOP FLOW (C51-R614A)	30.2	"B" LOOP FLOW (C51-R614B)	31.9
TOTAL FLOW (B33-R613)	78.7		

JET PUMP D/P

1.	52	11.	36
2.	45	12.	27
3.	38	13.	26
4.	32	14.	32
5.	29	15.	39
6.	34	16.	32
7.	37	17.	30
8.	39	18.	33
9.	34	19.	46
10.	25	20.	30

G12.1.15

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
*SURVEILLANCE TEST PROCEDURE

*JET PUMP OPERABILITY TEST

PROCEDURE NUMBER:	***STP-053-3001**
REVISION NUMBER:	***021**
Effective Date:	*** 12/09/13**

NOTE : SIGNATURES ARE ON FILE.

TemRev 2 AddCounter 18 Att Enc DS MSet REGULAR KWN OFF
REFERENCE USE
*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
STP-053-3001R021	Graphs used in STP evaluations updated from latest performance of REP-0033.

TABLE OF CONTENTS

1 PURPOSE/APPLICABILITY

1.1 Purpose

1.1.1. Demonstrate jet pump operability. This satisfies Technical Specification SR 3.4.3.1.

1.1.2. All jet pumps are determined to be operable by using data obtained from recirculation loop drive flow, total core flow, flow control valve position and diffuser-to-lower plenum differential pressure of each jet pump.

1.2 Applicability

1.2.1. Modes 1 and 2

2 REFERENCES

2.1 RBS Technical Specifications Section 3.4.1 and 3.4.3

2.2 STP-000-0001, Daily Operating Logs

3 DEFINITIONS

3.1 None

4 REQUIRED EQUIPMENT

4.1 None

5 PRECAUTIONS AND LIMITATIONS

5.1 The OSM/CRS should be immediately notified and Technical Specification LCO 3.4.3 referred to if any acceptance criteria can not be met.

5.2 Notify the OSM/CRS if during the performance of this STP, work must be stopped and can not be continued within a reasonable period of time.

5.3 The area between the lines on the attached graphs indicates the acceptable region for each monitored parameter.

5.4 While baselining new established patterns, engineering judgement of the daily surveillance results is used to detect significant abnormalities which could indicate a jet pump failure.

6 PREREQUISITES

6.1 Check Reactor Thermal Power is greater than 23.8%.

_______________ *(Initials)*

6.2 Check that personnel performing this test meet the qualification of ADM-0007, Selection, Training, Qualification and Evaluation of Plant Staff Personnel

_______________ *(Initials)*

6.3 Each performer indicates that he has read and understands this procedure by completing the following:

(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)

6.4 Verify that the recirculation loop flows are in compliance with TS 3.4.1. Refer To STP-000-0001, Daily Operating Logs for calculational methodology.

_______________ *(Initials)*

6.5 Verify this procedure is the latest revision.

_______________ *(Initials)*

6.6 Obtain OSM/CRS permission to begin this test.

_______________ *(Initials)*

6.7 Inform the NCO of test performance.

_______________ *(Initials)*

7 PROCEDURE

7.1 Complete Attachment 1, Jet Pump Operability Test Data Sheet.

______ *(Initials)*

7.2 Indicate Recirc Pump speed below:

FAST SPEED ☐ SLOW SPEED ☐

______ *(Initials)*

TS 7.3 Recirc loop drive flow vs FCV position.

7.3.1. Indicate that recirc Loop A drive flow vs FCV A position is within the +/- 10% tolerance as determined by Step 2 of Figure 1a in Attachment 1, Jet Pump Operability Test Data Sheet.

YES ☐ NO ☐

______ *(Initials)*

7.3.2. Indicate that recirc Loop B drive flow vs FCV B position is within the +/- 10% tolerance as determined by Step 2 of Figure 1b in Attachment 1, Jet Pump Operability Test Data Sheet.

YES ☐ NO ☐

______ *(Initials)*

TS 7.4 Indicate that total core flow vs total recirc loop drive flow is within the +/- 10% tolerance determined by Step 2 of Figure 2 in Attachment 1, Jet Pump Operability Test Data Sheet.

YES ☐ NO ☐

______ *(Initials)*

TS 7.5 Indicate that jet pump DPs vs recirc loop drive flows are within +/- 20% as determined by Step 2 of Figures 3 through 22 in Attachment 1, Jet Pump Operability Test Data Sheet.

YES ☐ NO ☐

______ *(Initials)*

8 ACCEPTANCE CRITERIA

TS 8.1 The requirements of SR 3.4.3.1 are satisfied by at least two of the following criteria being acceptable:

8.1.1. The indicated recirculation loop drive flow does not differ by more than 10% from the established flow control valve position-loop flow characteristics. IF Step 7.3.1 AND 7.3.2 are marked YES, THEN mark this ACCEPTABLE.

❒ ACCEPTABLE ❒ NOT ACCEPTABLE

________ *(Initials)*

8.1.2. The indicated total core flow does not differ more than 10% from the established total core flow value derived from recirculation loop drive flow measurements. IF Step 7.4 is marked YES, THEN mark this ACCEPTABLE.

❒ ACCEPTABLE ❒ NOT ACCEPTABLE

________ *(Initials)*

8.1.3. The indicated diffuser-to-lower plenum differential pressure of any individual jet pump does not differ from established patterns by more than 20%. IF Step 7.5 is marked YES, THEN mark this ACCEPTABLE.

❒ ACCEPTABLE ❒ NOT ACCEPTABLE

________ *(Initials)*

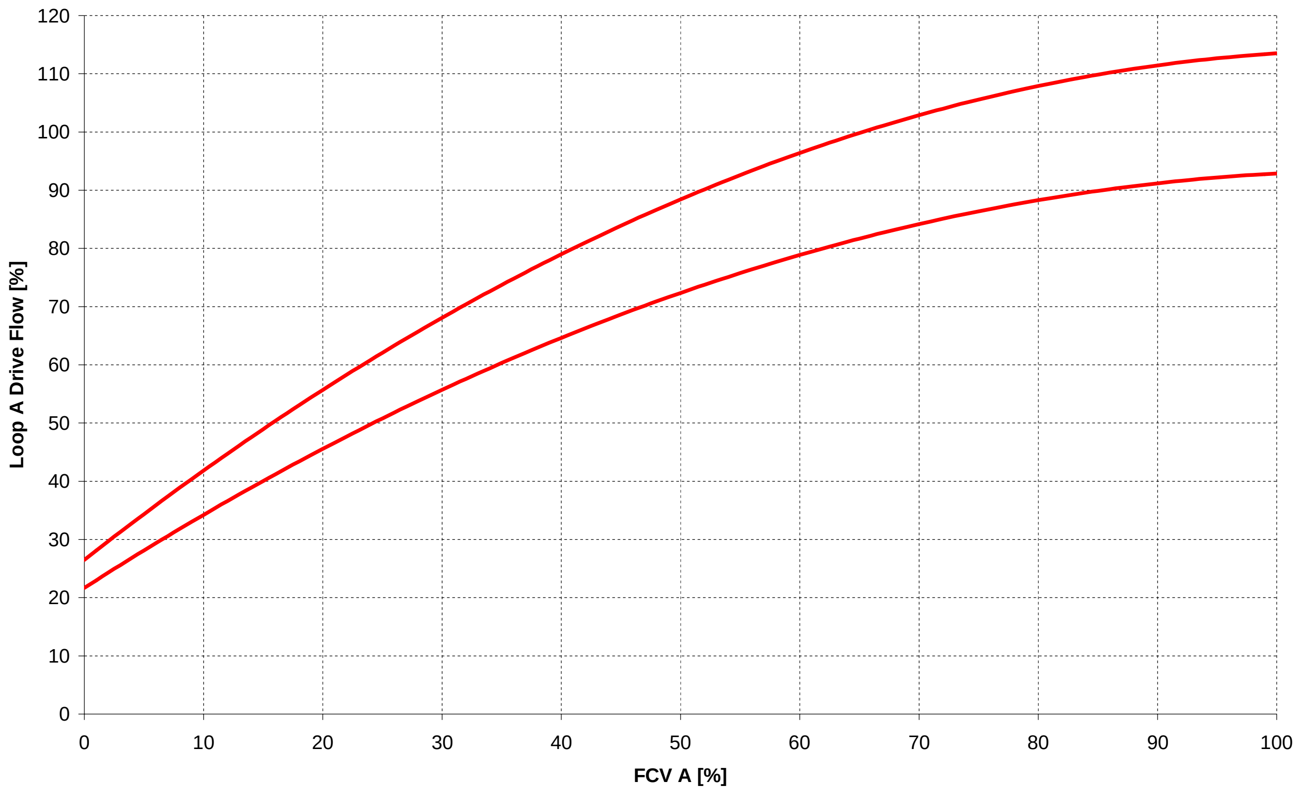
9 RECORDS

9.1 Upon completion of this test, forward the entire Data Package to the OSM/CRS for review and approval.

9.2 Upon completion of the entire review process, disposition records in accordance with ADM-0015, Station Surveillance Test Program.

JET PUMP OPERABILITY TEST DATA SHEET

Figure 1a: LOOP A DRIVE FLOW vs FCV A Position



1. Record the following from H13-P680:

   a. Flow Control Valve A Position ___________%

   b. Loop A Drive Flow as indicated on C51-R614

   or ERIS point B33EA028 ___________ KGPM

   (___________)KGPM X 100 =__________%
   32.5 KGPM

____
(Initials)

____
(IND VERIF)

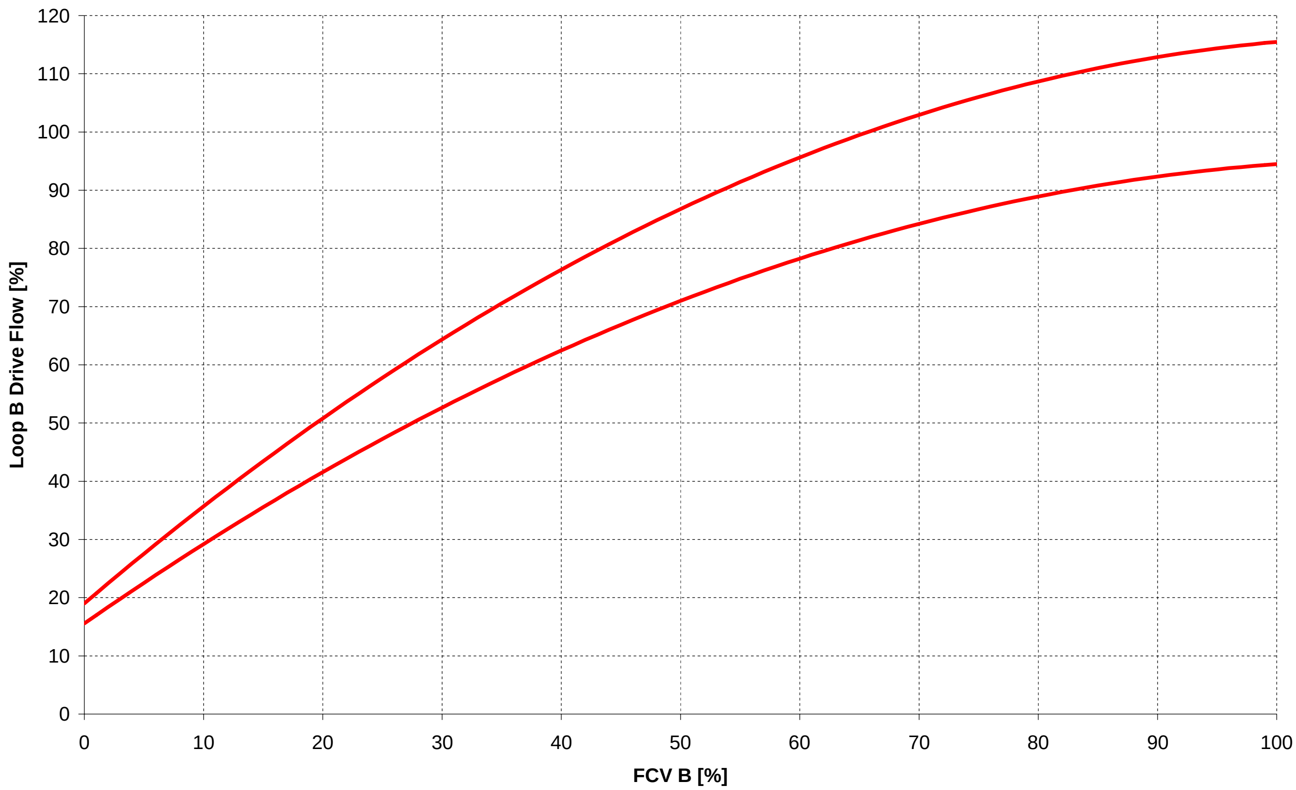
2. IF Recirc Pumps in Fast Speed, THEN plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 10% tolerance span. IF Recirc Pumps in Slow Speed AND FCV position greater than or equal to 80%, THEN verify Drive Flow A is greater than 15% and less than 35%.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 1b: LOOP B DRIVE FLOW vs FCV B Position



1. Record the following from H13-P680:

   a. Flow Control Valve B Position ___________%

   b. Loop B Drive Flow as indicated on C51-R614

      or ERIS point B33EA030 ___________ KGPM

      $\dfrac{(\_\_\_\_\_\_\_\_\_\_\_)\text{KGPM}}{32.5 \text{ KGPM}} \times 100 = \_\_\_\_\_\_\_\_\_\_\_\%$

____
(Initials)

____
(IND VERIF)

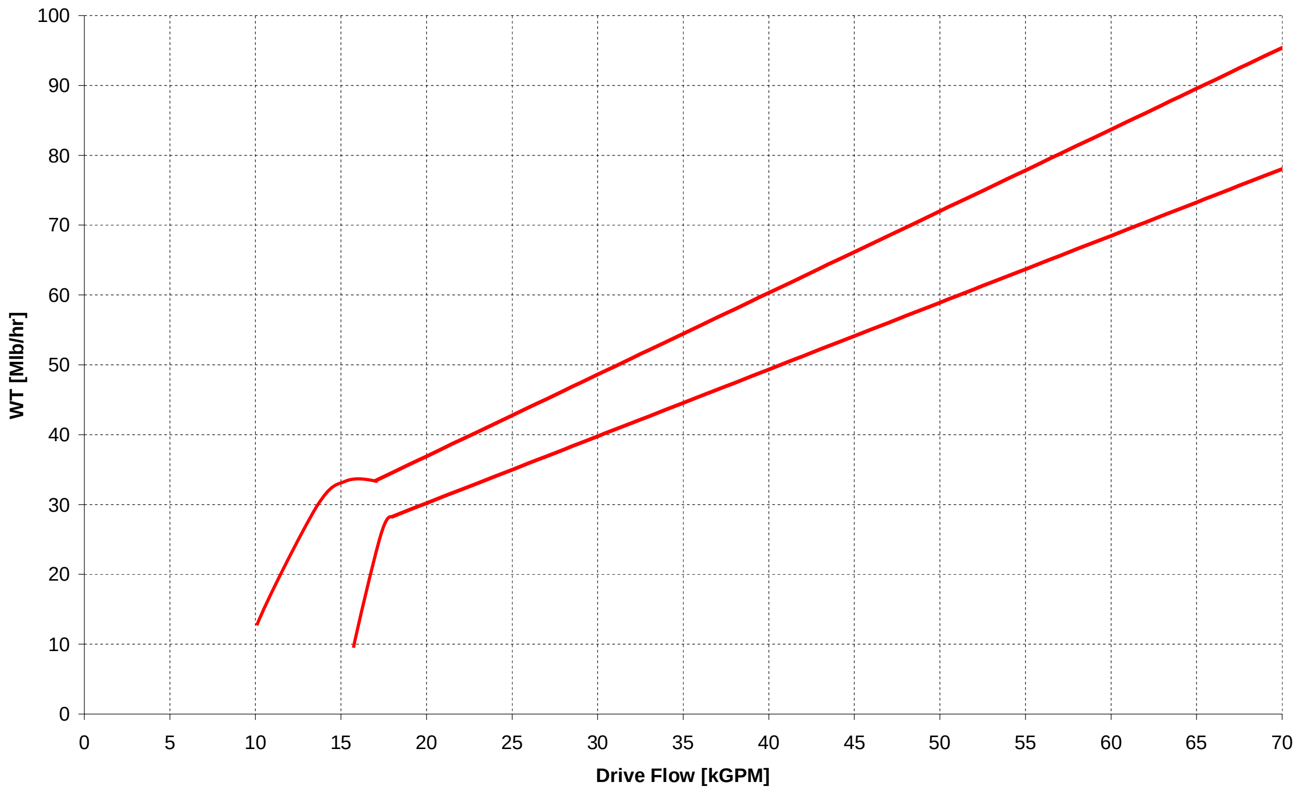
2. IF Recirc Pumps in Fast Speed, THEN plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 10% tolerance span. IF Recirc Pumps in Slow Speed AND FCV position greater than or equal to 80%, THEN verify Drive Flow B is greater than 15% and less than 35%.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 2: Total Core Flow vs. Total Recirc Loop Drive Flow



1. Record the following from H13-P680 or ERIS points:
   a. Total Core Flow as indicated on B33-R613________MLBM/hr
   b. Recirc Loop A Drive Flow as indicated on C51-R614 or ERIS B33EA028 _____________KGPM
   c. Recirc Loop B Drive Flow as indicated on C51-R614 or ERIS B33EA030 _____________KGPM
   d. Total Recirc Loop Drive Flow (1b + 1c) __________KGPM

____
(Initials)

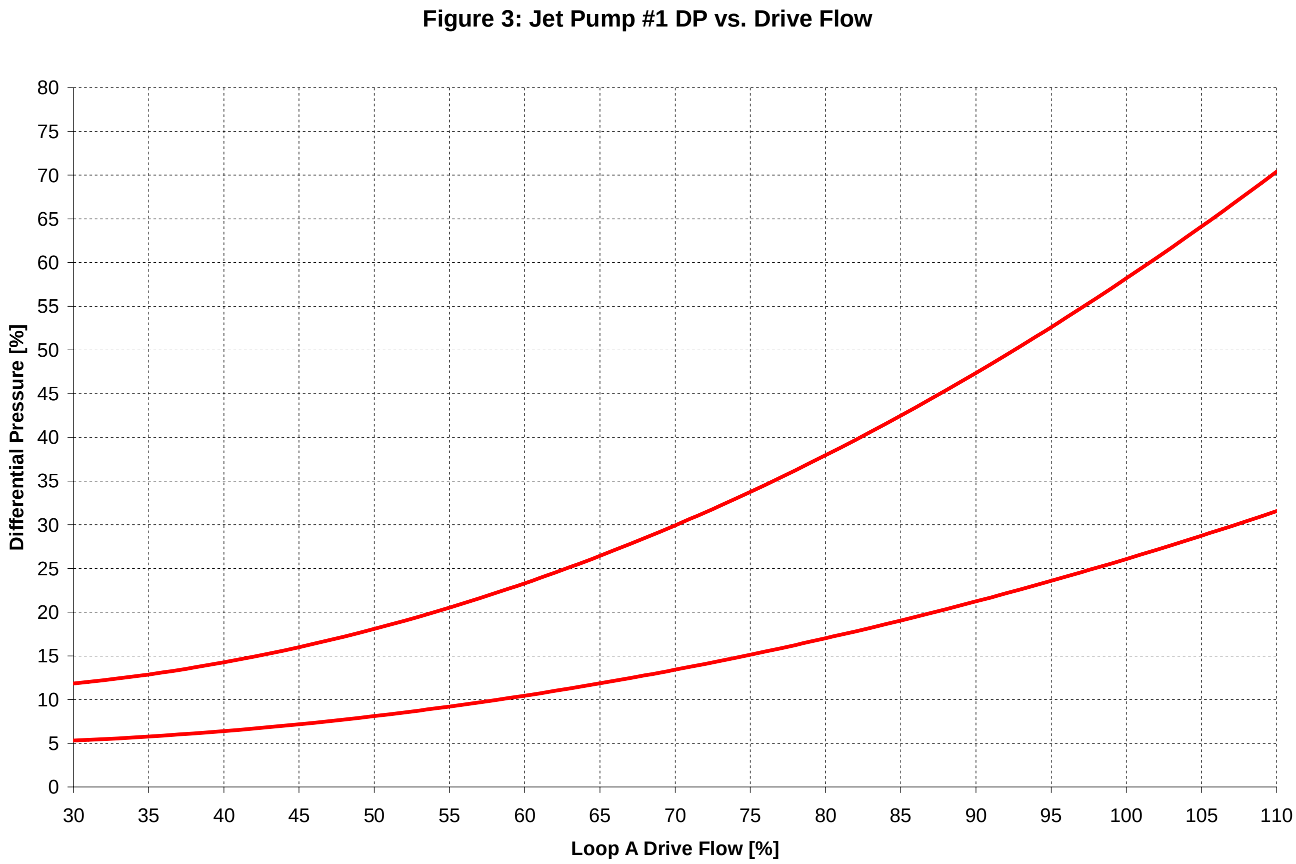
____
(IND VERIF)

2. Plot the data point on the curve from Steps 1a and 1d and determine if the data falls within the +/- 10% tolerance span.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

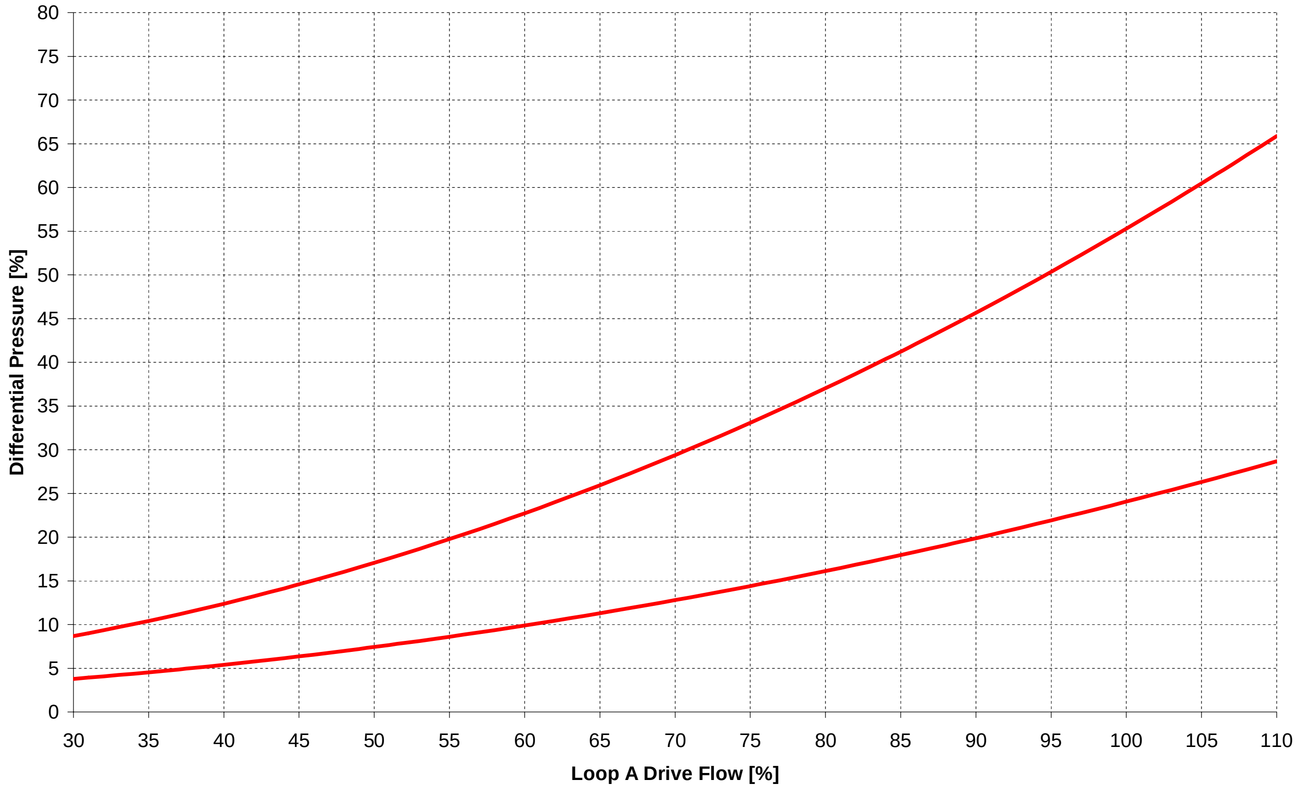
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES ❒ NO ❒

   ____
   (Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 4: Jet Pump #2 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

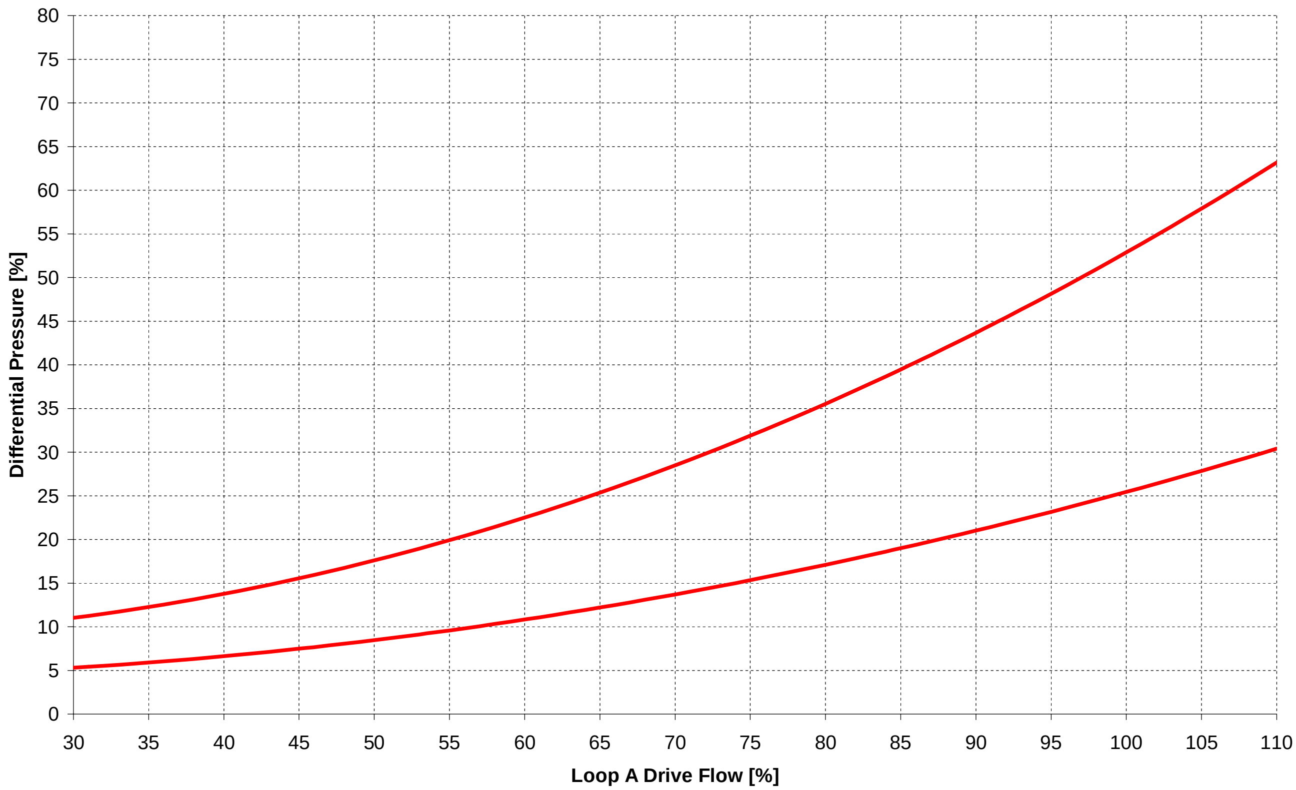
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 5: Jet Pump #3 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

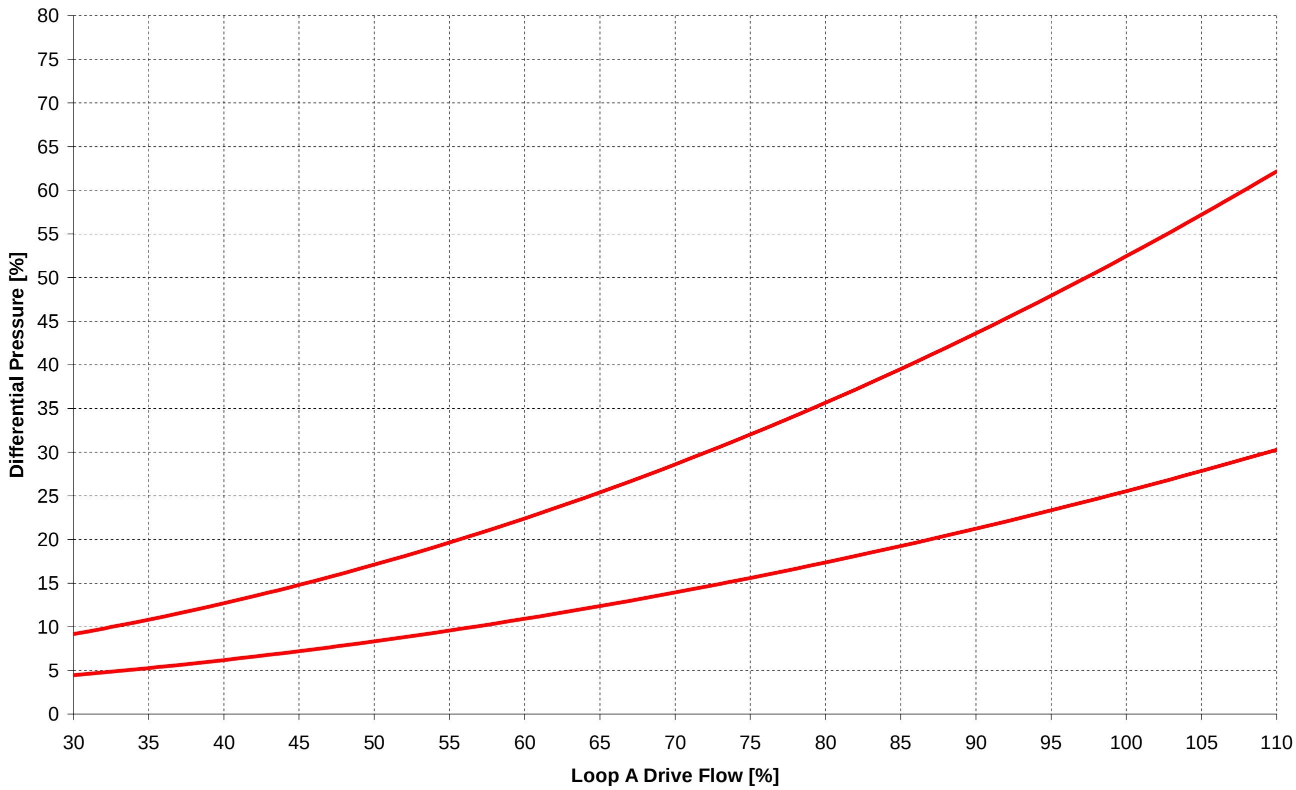
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 6: Jet Pump #4 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

   ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

   ______%

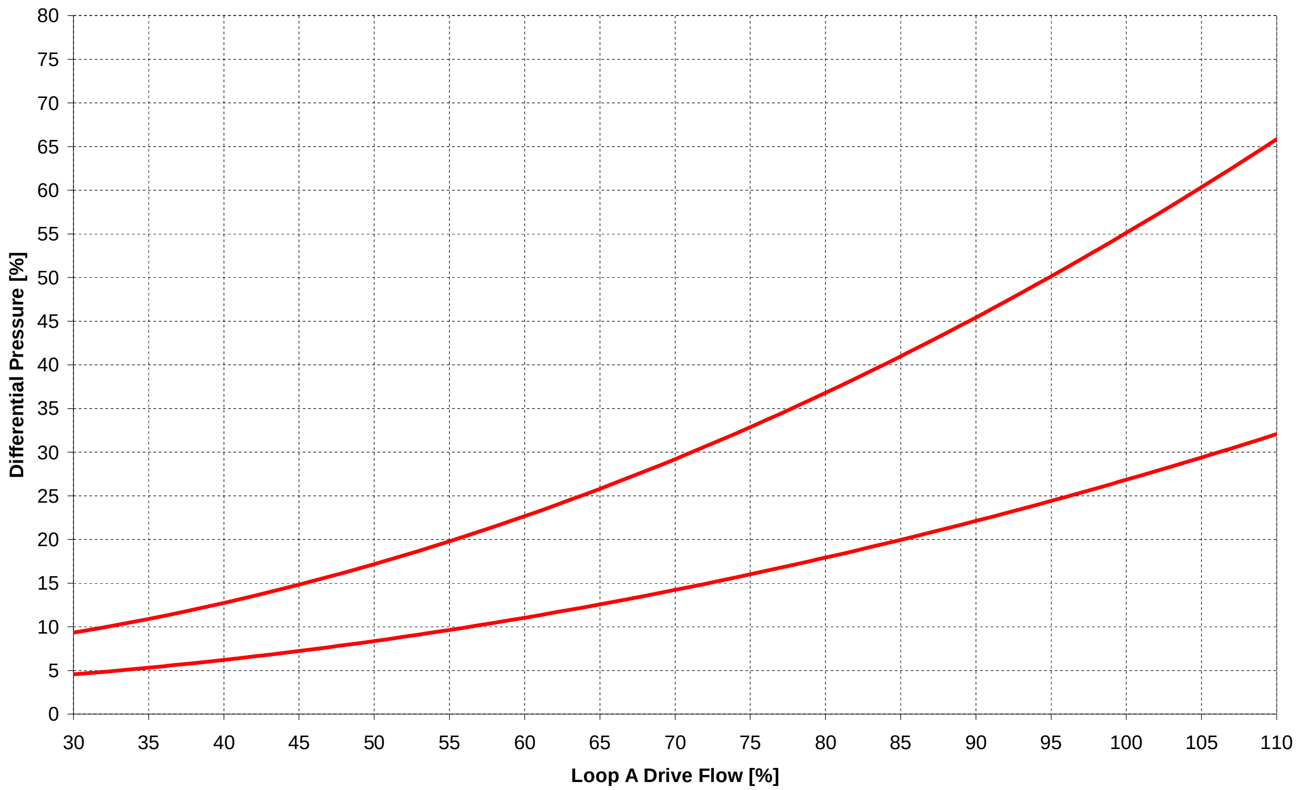
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 7: Jet Pump #5 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

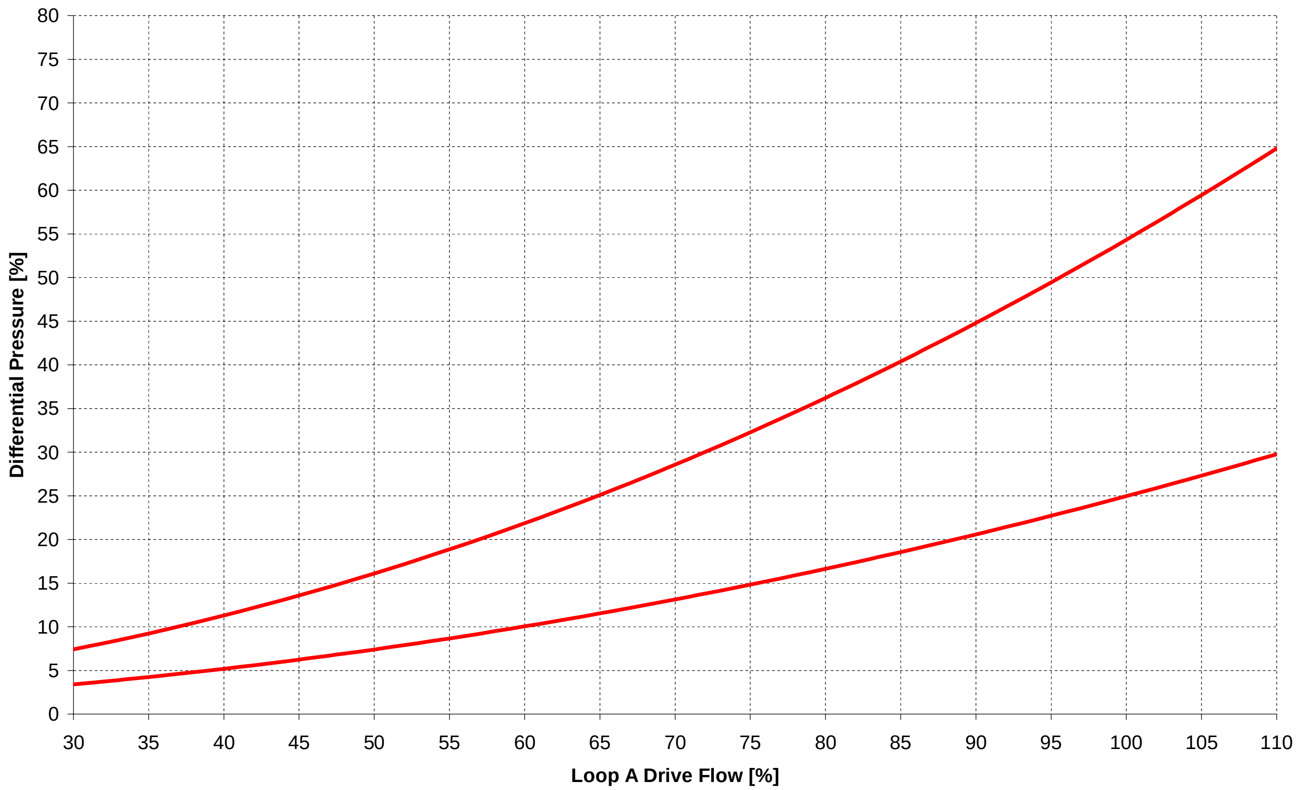
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 8: Jet Pump #6 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

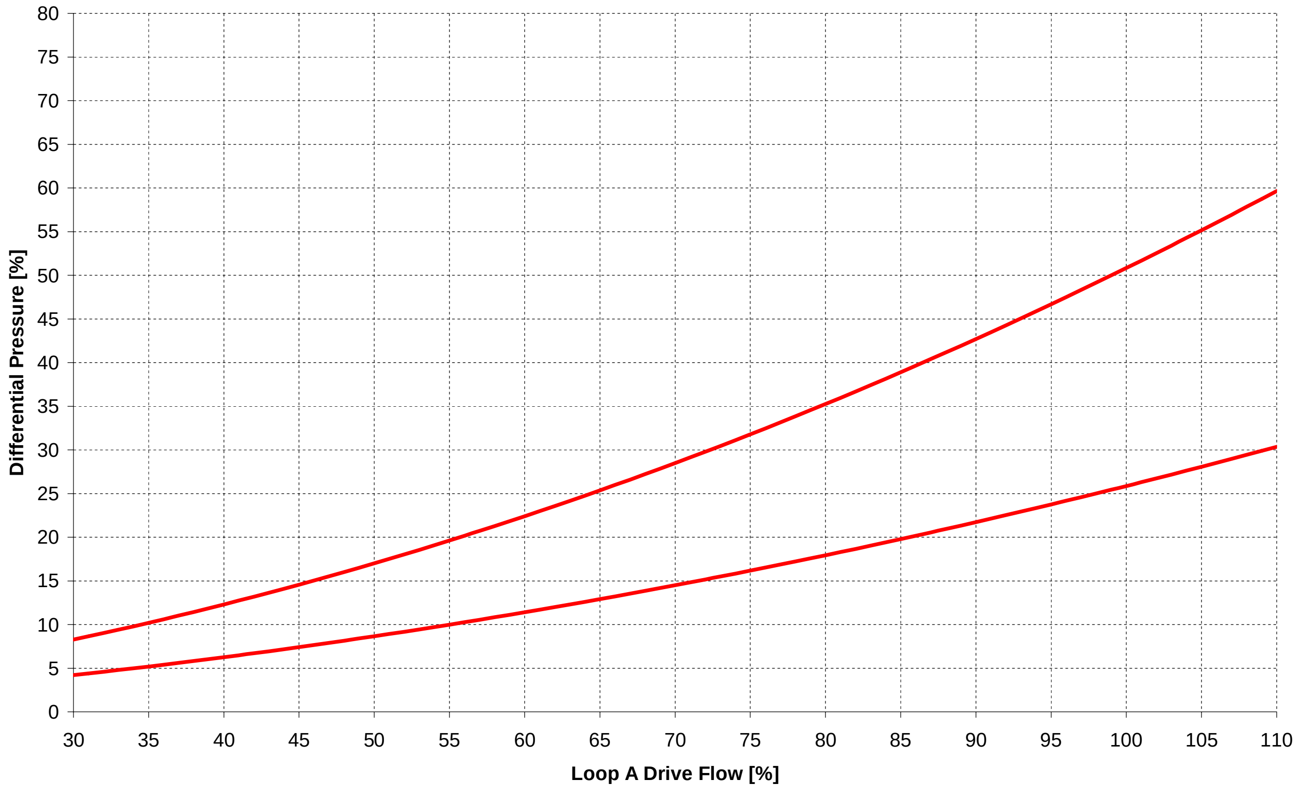
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES ❐ NO ❐

   ____
   (Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 9: Jet Pump #7 DP vs. Drive Flow



1. Perform the following:
   - a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

     ______%
   - b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

     ______%

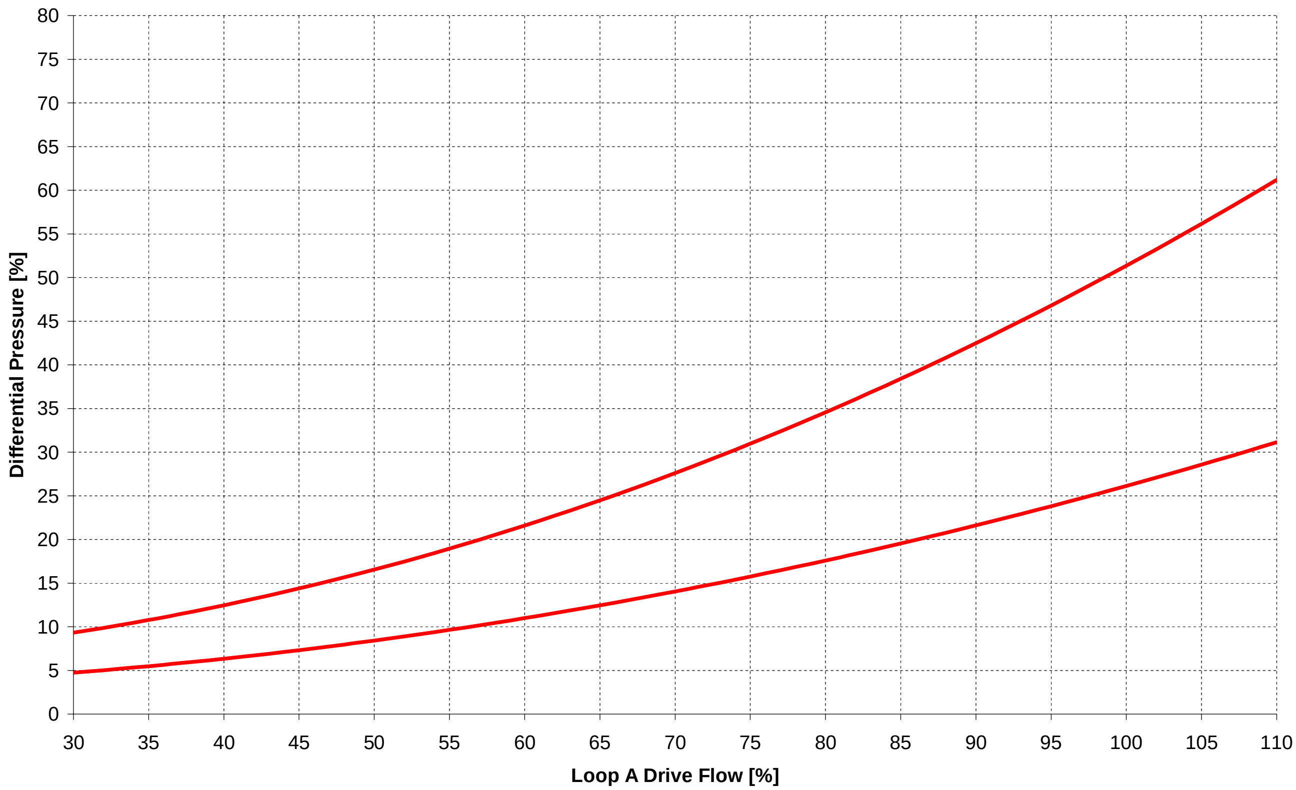
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 10: Jet Pump #8 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

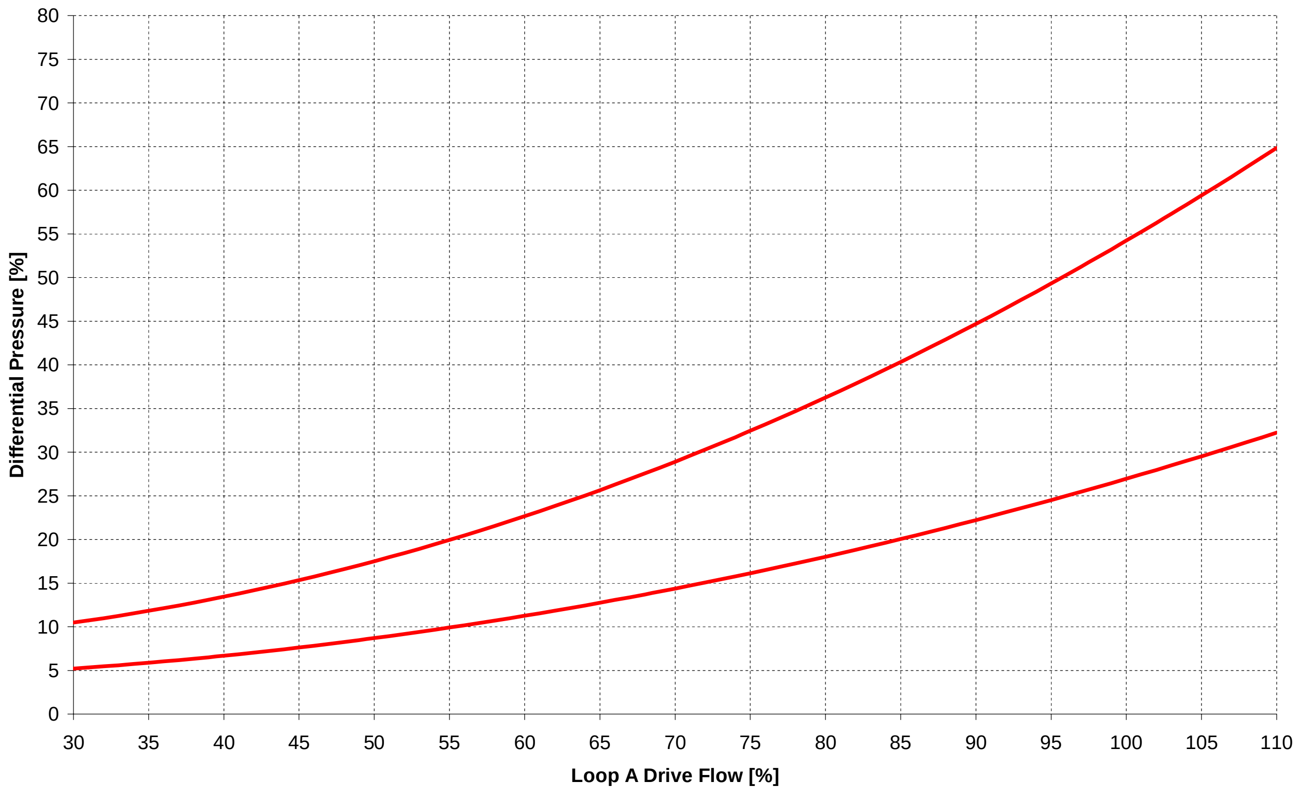
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

   YES ❒ NO ❒

   ____
   (Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 11: Jet Pump #9 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

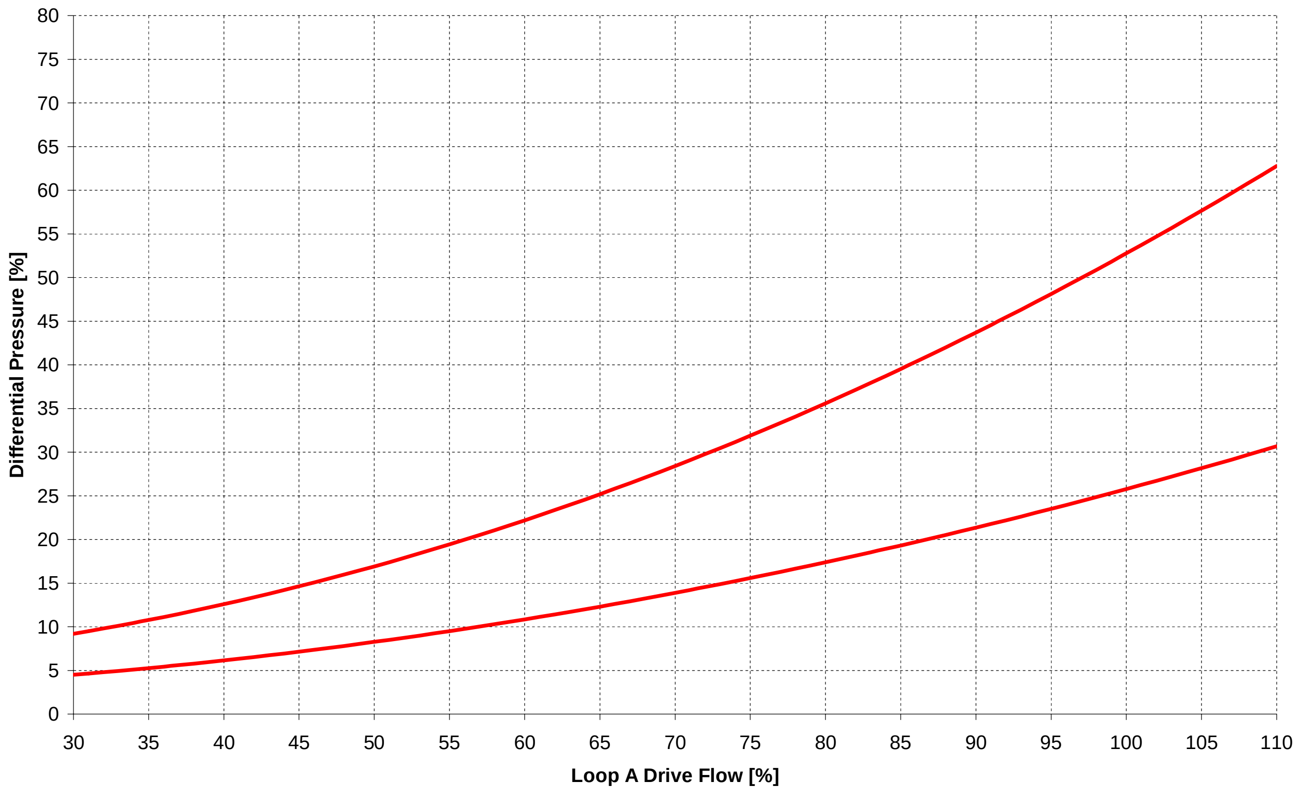
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 12: Jet Pump #10 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1a Step 1b of Attachment 1, record the Loop A Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

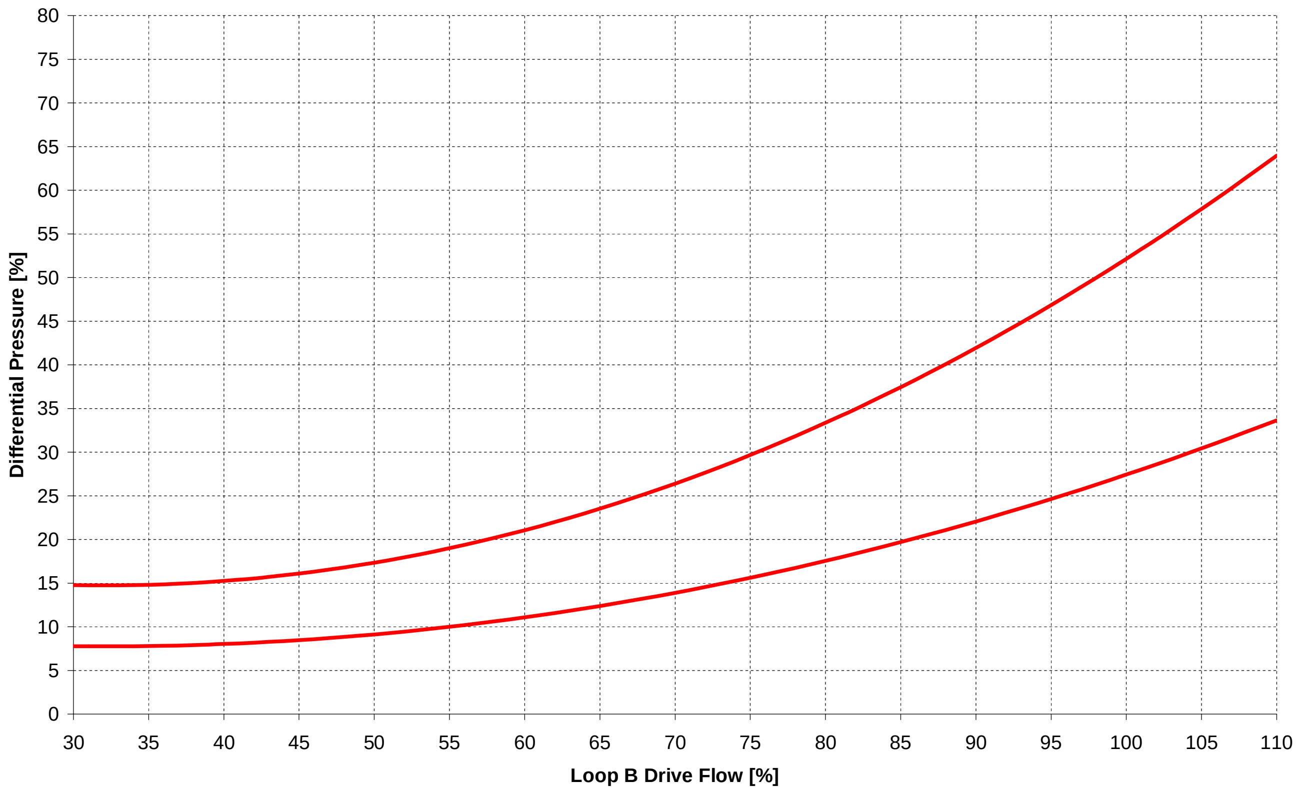
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 13: Jet Pump #11 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

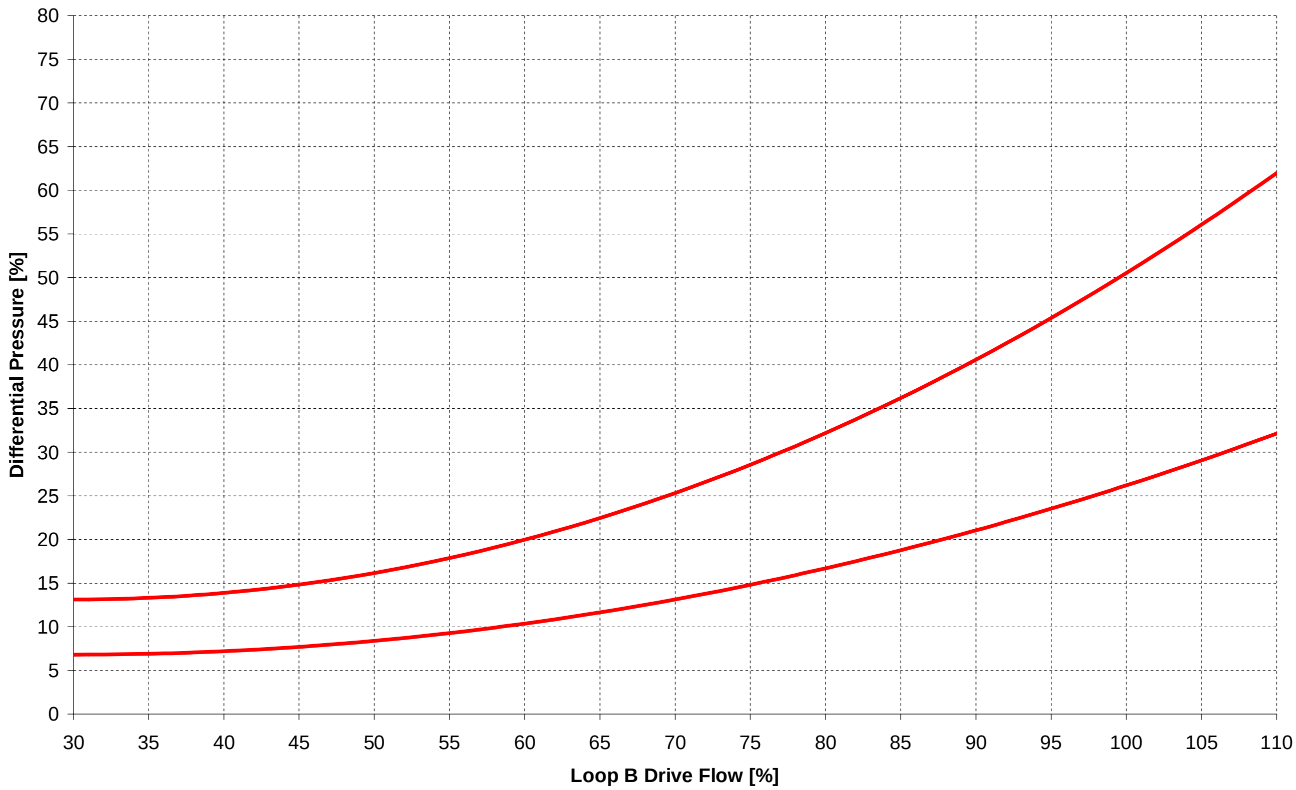
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 14: Jet Pump #12 DP vs. Drive Flow



1. Perform the following :

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

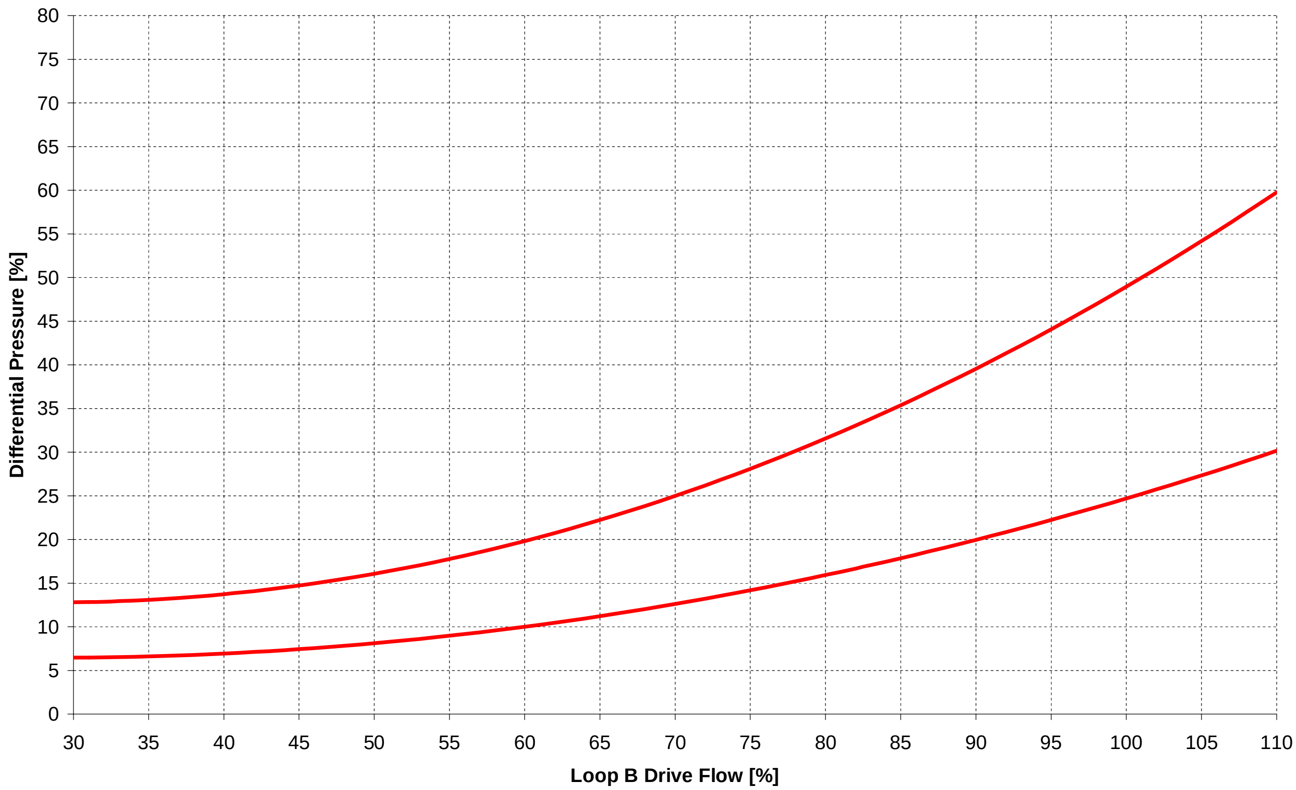
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 15: Jet Pump #13 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

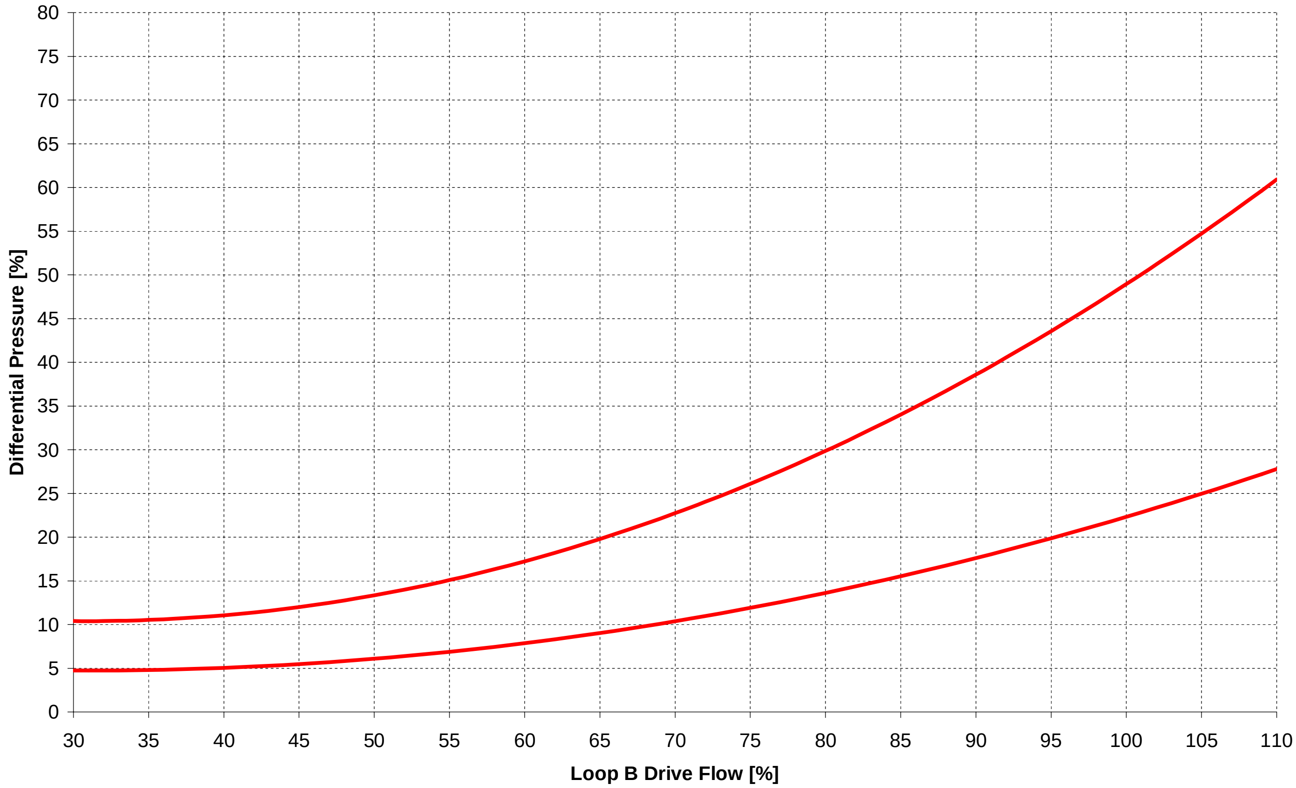
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 16: Jet Pump #14 DP vs. Drive Flow



1. Perform the following:
   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

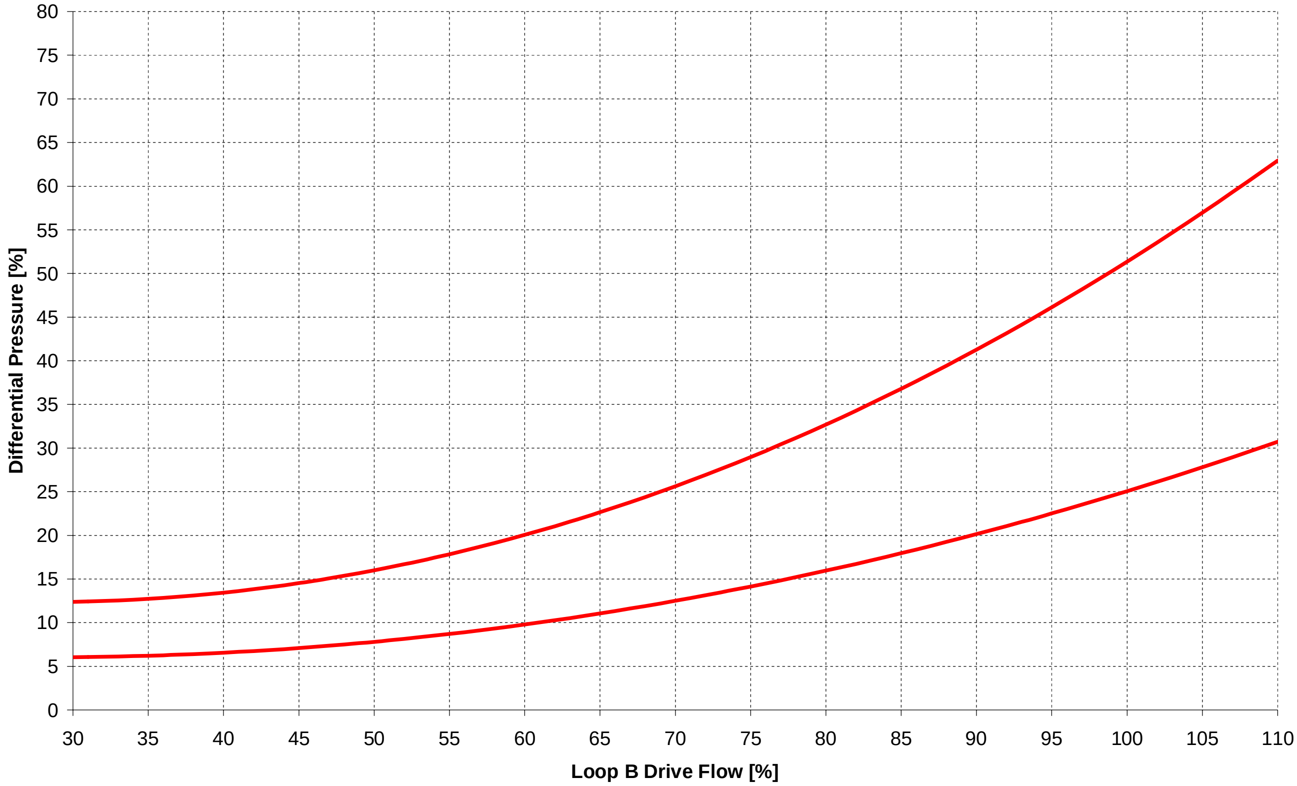
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 17: Jet Pump #15 DP vs. Drive Flow



1. Perform the following:
    a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

       ______%

    b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

       ______%

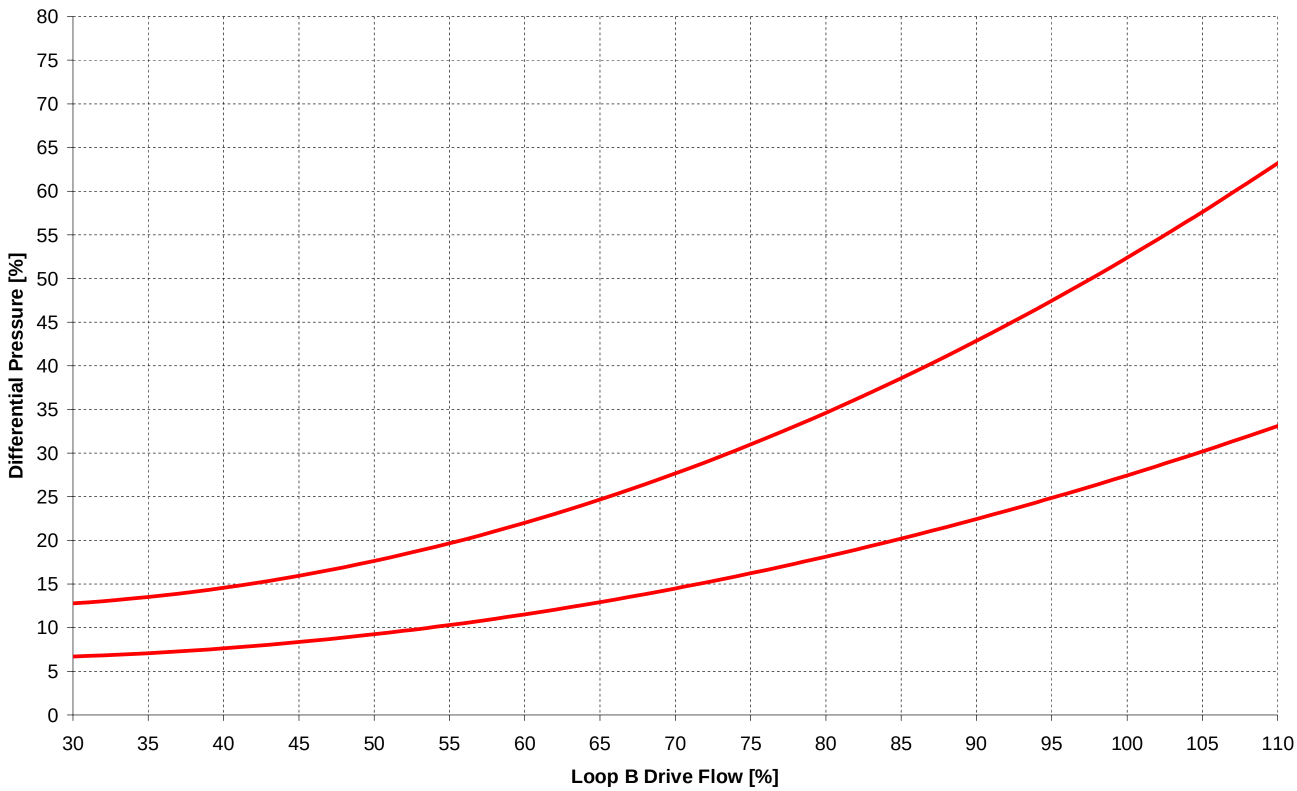
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ☐ NO ☐

______
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 18: Jet Pump #16 DP vs. Drive Flow



1. Perform the following:
    - a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

    - b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

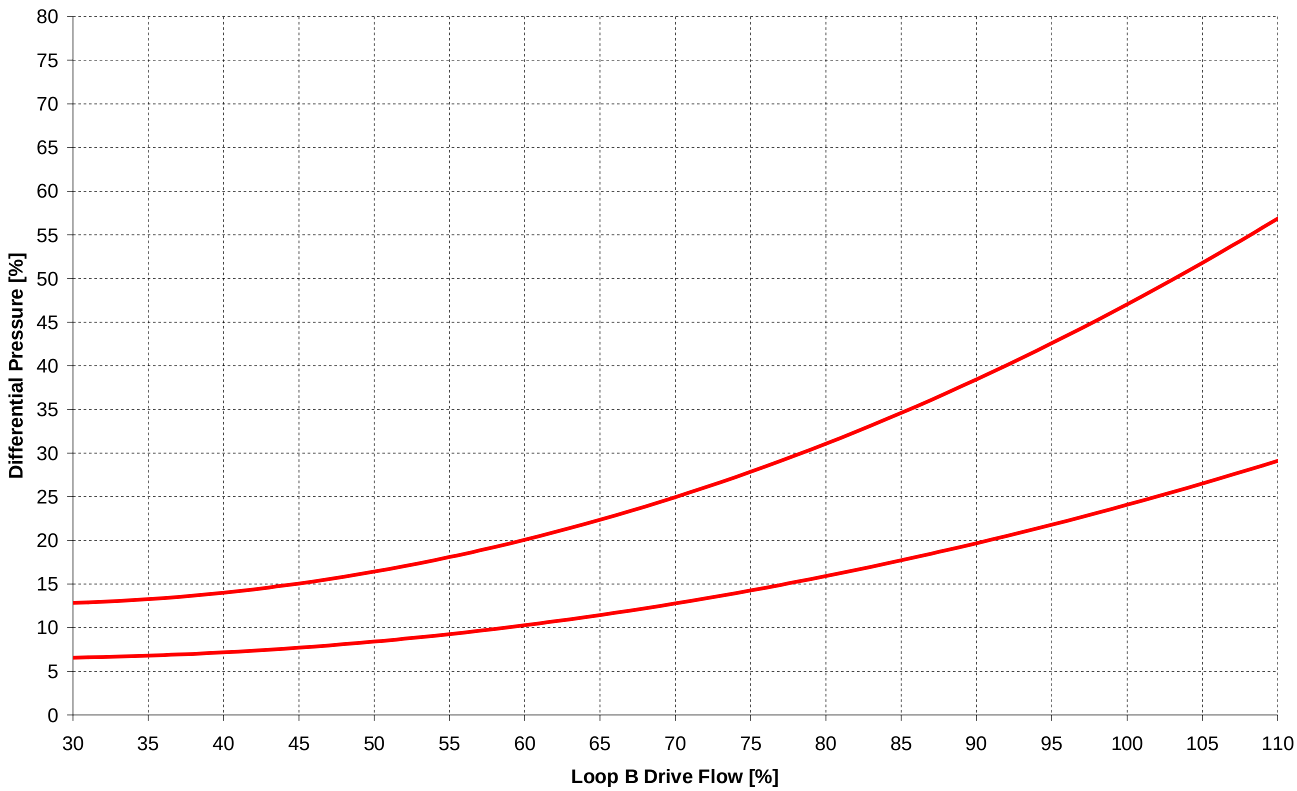
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

______
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 19: Jet Pump #17 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

   ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

   ______%

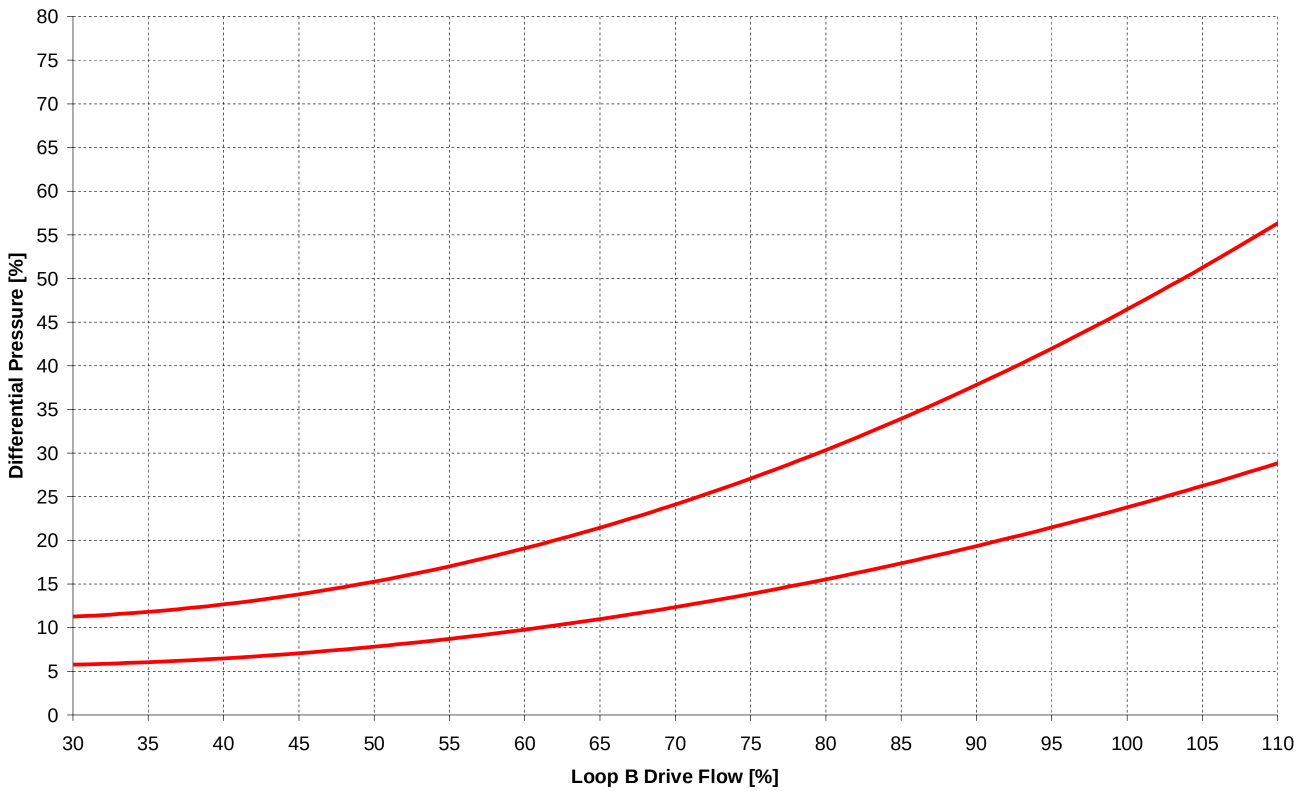
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❐ NO ❐

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 20: Jet Pump #18 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

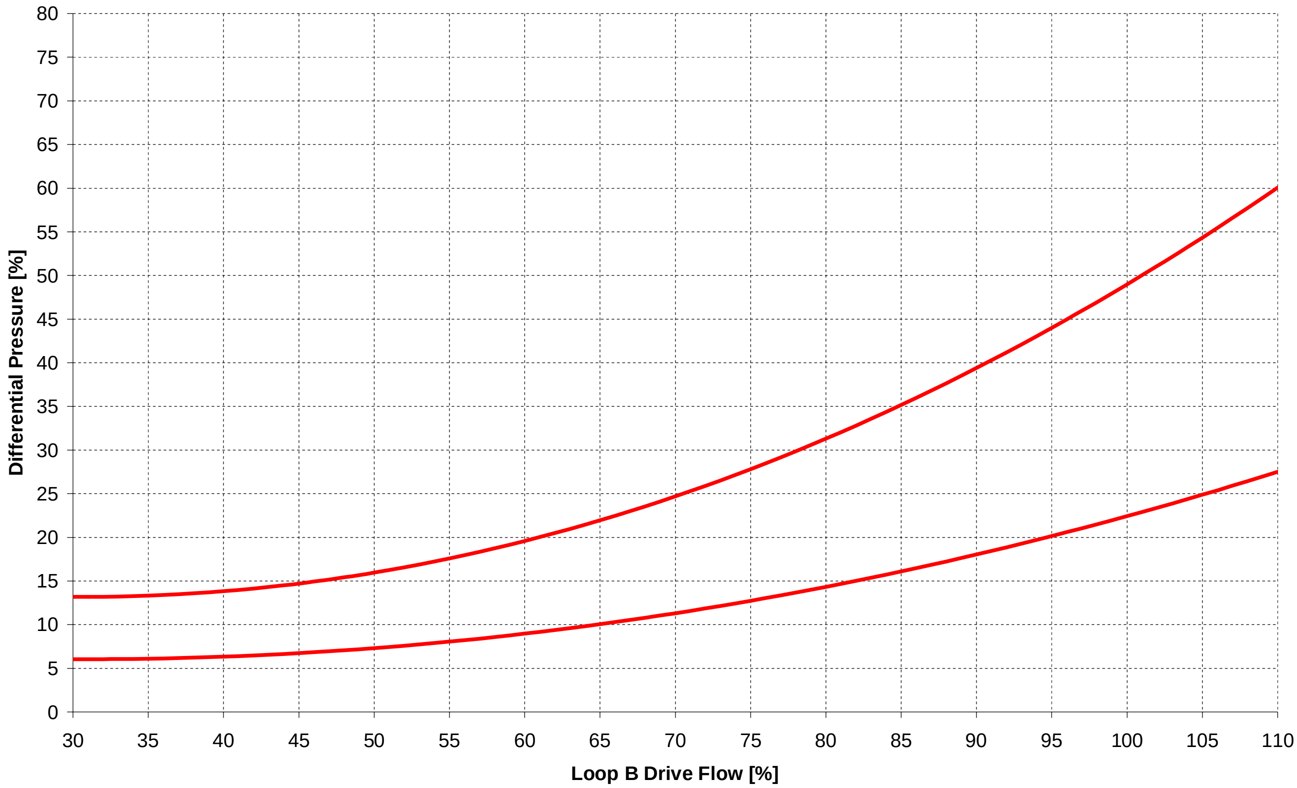
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❒ NO ❒

____
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 21: Jet Pump #19 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

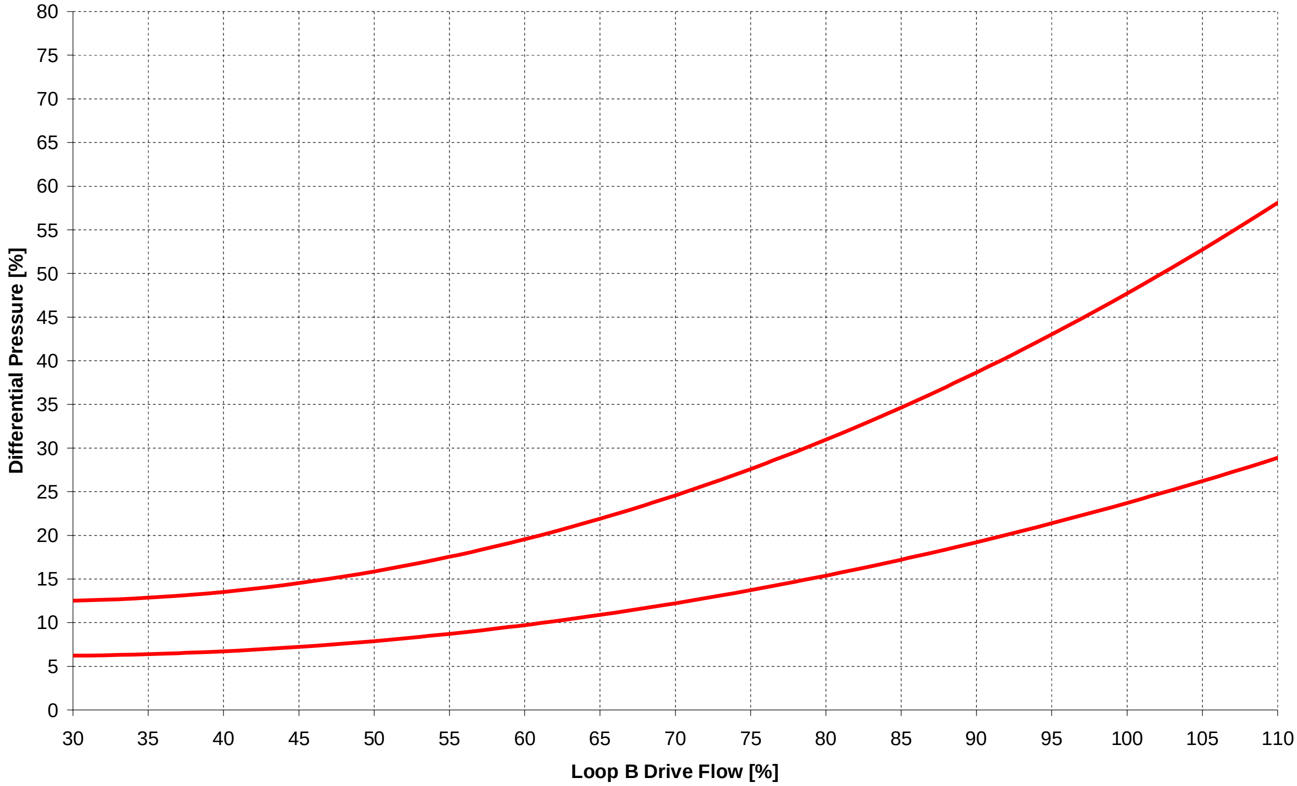
2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/- 20% tolerance span.

YES ❐ NO ❐

______
(Initials)

JET PUMP OPERABILITY TEST DATA SHEET

Figure 22: Jet Pump #20 DP vs. Drive Flow



1. Perform the following:

   a. From Figure 1b Step 1b of Attachment 1, record the Loop B Drive Flow.

      ______%

   b. At H13-P619 B33-R610, record Jet Pump Differential Pressure.

      ______%

2. Plot the data point on the curve from Steps 1a and 1b and determine if the data falls within the +/-20% tolerance span.

YES ❐ NO ❐

____
(Initials)

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☐ **RO** ☒

ALTERNATE PATH ☐

TITLE: **Perform Surveillances Required for Entry Into Single Loop Operation**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	10	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	October 1, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Step 4 of Attachment 1 from GOP-0004, Single Loop Operation, is complete in accordance with the answer key.

Synopsis: This task will have the applicant perform a one hour operability using GOP-0004, Attachment 1, Step 4.
The applicant will also be required to use steam tables to perform the final calculation of the operability.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:
"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:
The CRS has directed you to complete step 4 of Attachment 1 of GOP-0004, Single Loop Operation.

3) Initial Conditions:
The plant experienced a trip of the B Recirc Pump 30 minutes ago.
Steps 1 - 3 of Attach 1 of GOP-0004, Single Loop Operation, have been completed.
Core Thermal Power is 901 MW
A and B Recirc Flow Control Valves are in Loop Manual
Loop A Flow recorder on C51-R614 is failed downscale
Computer Point B33NA005 reads 2.7 mlbm/hr
Loop A temperature reads 515°F

4) Solicit and answer any questions the operator may have.

Step		Initials Date/Time
	NOTE *Steps 4, 5, and 6 should be performed concurrently but completed within their respective time limits.* *Record initial reading here, then every 12 hours on STP-000-0001, Daily Operating Logs.*	
4	Within one hour of entering Single Loop Operation, verify the following:	
	4.1. Thermal Power is less than or equal to 77.6% Rated Thermal Power (2400 MWTH) __901___CMWTH=__≈29.15___% ≤77.6% 3091 (TSR 3.4.1.1.2) AND	__INITIALs_
	4.2. At H13-P680, B33-HYVF060A and B33-HYVF060B, FLOW CONT VALVE, is in LOOP MANUAL. (TSR 3.4.1.1.3)	__INITIALs_
	4.3. Total loop flow in running loop is less than 33 kgpm using one of the following methods (N/A method not used): (TSR 3.4.1.1.1)	
	1. Obtain flow from C51-R614, LOOP A/B FLOW RECORDER, for the operating loop. ____________ kgpm	___N / A__
	2. Use computer point for the operating loop (LOOP A - B33NA005 or B33NA006; LOOP B - B33NA007 or B33NA008) and convert from mlbm/hr to kgpm using the following formula: __2.7__ x _0.0208__ x (124.68) = __≈7.00__ (flow) (sv) (kgpm)	__INITIALs_
	where flow = loop flow from computer point in mlbm/hr. sv = specific volume from steam tables (Vf) (dependent on loop temp) in ft^3/lbm.	

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Perform Surveillances Required for Entry Into Single Loop Operation	202012001001 300130003001	G 2.1.7	4.4

REFERENCES:
GOP-0004, Rev 21

APPLICABLE OBJECTIVES
RLP-HLO-0053, Obj 7
RLP-OPS-0503, Obj 2, 3

REQUIRED MATERIALS:
GOP-0004, Rev 21, Attachment 1, page 7 of 26
A copy of steam tables

SIMULATOR CONDITIONS &/or SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup
2.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Step 4 of Attachment 1 from GOP-0004, Single Loop Operation, is complete in accordance with the answer key.

PERFORMANCE:

START TIME: ______________

1.	**Procedure Step:**	4.1 Thermal Power is less than or equal to 77.6% Rated Thermal Power (2400 MWTH) _________ / 3091 CMWTH = _______% ≤77.6%
	Standard	Applicant used "901 MW" from initial conditions and calculated that thermal power was between 29 and 29.15% in accordance with the answer key.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	4.2 At H13-P680, B33-HYVF060A and B33-HYVF060B, FLOW CONT VALVE, is in LOOP MANUAL. (TSR 3.4.1.1.3)
	Standard	Applicant determined FCVs are in Loop Manual using initial conditions.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	***Procedure Step:**	4.3 Total loop flow in running loop is less than 33 kgpm using one of the following methods (N/A method not used): (TSR 3.4.1.1.1) 2. Use computer point for the operating loop (LOOP A – B33NA005 or B33NA006; LOOP B – B33NA007 or B33NA008) and convert from mlbm/hr to kgpm using the following formula: ____2.7____ x __________ x (124.68) = ________ (flow) (sv) (kgpm)
	Standard	Applicant performed calculation using flow from initial conditions (2.7) and then used steam tables to determine specific volume (between 0.02072 and 0.02081) and determined that loop flow was less than 33 kgpm in accordance with the answer key (6.975-7.005 kgpm).
	Cue	
	Notes	Candidate used the loop A temperature from the initial conditions (515˚F) and looked up specific volume (sv) using the steam tables.
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Step 4 of Attachment 1 from GOP-0004, Single Loop Operation, is complete in accordance with the answer key.

This completes this JPM.

STOP TIME: ____________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initial Conditions:

The plant experienced a trip of the B Recirc Pump 30 minutes ago.
Steps 1-3 of Attach 1 of GOP-0004, Single Loop Operation, have been completed.
Core Thermal Power is 901 MW
A and B Recirc Flow Control Valves are in Loop Manual
Loop A Flow recorder on C51-R614 is failed downscale
Computer Point B33NA005 reads 2.7 mlbm/hr
Loop A temperature reads 515°F

Initiating Cues:

The CRS has directed you to complete step 4 of Attachment 1 of GOP-0004, Single Loop Operation.

Step		Initials Date/Time
	NOTE *Steps 4, 5, and 6 should be performed concurrently but completed within their respective time limits.* *Record initial reading here, then every 12 hours on STP-000-0001, Daily Operating Logs.*	
4	Within one hour of entering Single Loop Operation, verify the following:	
	4.1. Thermal Power is less than or equal to 77.6% Rated Thermal Power (2400 MWTH) __________CMWTH=____________% ≤77.6% 3091 (TSR 3.4.1.1.2) <u>AND</u>	__________
	4.2. At H13-P680, B33-HYVF060A and B33-HYVF060B, FLOW CONT VALVE, is in LOOP MANUAL. (TSR 3.4.1.1.3)	__________
	4.3. Total loop flow in running loop is less than 33 kgpm using one of the following methods (N/A method <u>not</u> used): (TSR 3.4.1.1.1)	
	1. Obtain flow from C51-R614, LOOP A/B FLOW RECORDER, for the operating loop. __________ kgpm	__________
	2. Use computer point for the operating loop (LOOP A - B33NA005 or B33NA006; LOOP B - B33NA007 or B33NA008) and convert from mlbm/hr to kgpm using the following formula: __________ x __________ x (124.68) = __________ (flow) (sv) (kgpm)	__________
	where flow = loop flow from computer point in mlbm/hr. sv = specific volume from steam tables (Vf) (dependent on loop temp) in ft^3/lbm.	

SINGLE LOOP OPERATION

Step		Initials Date/Time
	NOTE *Steps 4, 5, and 6 should be performed concurrently but completed within their respective time limits.* *Record initial reading here, then every 12 hours on STP-000-0001, Daily Operating Logs.*	
4	Within one hour of entering Single Loop Operation, verify the following:	
	4.1. Thermal Power is less than or equal to 77.6% Rated Thermal Power (2400 MWTH) $\frac{\_\_\_\_\_\_\_\_\_\_ \text{CMWTH}}{3091}$ = ____________% ≤77.6% (TSR 3.4.1.1.2) AND	____________
	4.2. At H13-P680, B33-HYVF060A and B33-HYVF060B, FLOW CONT VALVE, is in LOOP MANUAL. (TSR 3.4.1.1.3)	____________
	4.3. Total loop flow in running loop is less than 33 kgpm using one of the following methods (N/A method not used): (TSR 3.4.1.1.1)	
	1. Obtain flow from C51-R614, LOOP A/B FLOW RECORDER, for the operating loop. ____________ kgpm	____________
	2. Use computer point for the operating loop (LOOP A - B33NA005 or B33NA006; LOOP B - B33NA007 or B33NA008) and convert from mlbm/hr to kgpm using the following formula: __________ (flow) x __________ (sv) x (124.68) = _________ (kgpm)	____________
	where flow = loop flow from computer point in mlbm/hr. sv = specific volume from steam tables (Vf) (dependent on loop temp) in ft^3/lbm.	

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☐ **RO** ☒

ALTERNATE PATH ☐

TITLE: **Perform Hand Written Tagout for HVT-Unit Cooler 12**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	20	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

	Perform
X	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	February 14, 2014
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	February 20, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	February 20, 2014

EXAMINER INFO SHEET

Task Standard: The applicant identified the components and sequence for a manual tagout on Turbine Building Unit Cooler, HVT-UC12 in accordance with the attached key.

Synopsis: eSOMS Clearance Module is unavailable due to a network failure. This task will have the applicant write a paper tagout using the form found in the attachments of EN-OP-102-01.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to identify the components and sequence for a manual tagout using Attachment 9.3 of EN-OP-102-01, Tagout Tags Sheet.

3) Initial Conditions:

The plant is mode 1, 100%.

Maintenance is scheduled to replace the cooler portion of HVT-UC12, Turbine Building Unit Cooler.

The eSOMS Clearance Module is unavailable due to problems with the network.

4) Solicit and answer any questions the operator may have.

ANSWER KEY

Entergy	NUCLEAR MANAGEMENT MANUAL	NON-QUALITY RELATED	EN-OP-102-01	REV. 9
		INFORMATIONAL USE	PAGE 7 OF 30	
Protective and Caution Tagging Forms & Checklist				

ATTACHMENT 9.3 TAGOUT TAGS SHEET

CLEARANCE: MANUAL TAGOUT:

Tag Serial No.	Tag Type	Equipment Equipment Description Equipment Location	Place. Seq.	Placement Configuration	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time	Rest. Seq.	Restoration Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time	Placement/ Removal Tag Notes
	Danger	HVT-UC12 Unit Cooler Control Switch TB HVT-PNL161	1	STOP							
	Danger	NHS-MCC1J Breaker 2C HVT-UC12 Turbine Building Unit Cooler	2	OFF							
	Danger	HVN-V260 TURB BLDG COOLER HVT-UC12 OUTLET	3	CLOSED							
	Danger	HVN-V253 TURB BLDG COOLER HVT-UC12 INLET ISOLATION	4	CLOSED							
	Danger	HVN-V261 TURB BLDG COOLER HVT-UC12 INLET HEADER DRAIN	5	UN-CAP OPEN							
	Danger	HVN-V270 TURB BLDG COOLER HVT-UC12 VENT	6	UN-CAP OPEN							

Critical Items are:

*	Danger	NHS-MCC1J Breaker 2C	OFF
*	Danger	HVN-V253	CLOSED
*	Danger	HVN-V260	CLOSED

NOTE: Applicant may choose to dangert tag HVN-V256 in lieu of HVN-V260 – this would also be acceptable

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM**:	**K&A RATING**:
Perform Hand Written Tagout for HVT-UC12, Turbine Building Unit Cooler	300095003001	G 2.2.13	4.1

REFERENCES:
PID-22-14D, Rev 14
SOP-0064, Rev 27
SOP-0116, Rev 21
EE-001BK, Rev 11
OSP-0038, Rev 35
EN-OP-0102, Rev 16
EN-OP-0102-01, Rev 9

APPLICABLE OBJECTIVES

REQUIRED MATERIALS:
PID-22-14D, Rev 14
SOP-0064, Rev 27
SOP-0116, Rev 21
EE-001BK, Rev 11
Attachment 9.3 of EN-OP-0102-1 (attached)

SIMULATOR CONDITIONS & SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup but pictures/diagrams must be developed for the applicants use.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: The applicant identified the components and sequence for a manual tagout on Turbine Building Unit Cooler, HVT-UC12 in accordance with the attached key.

PERFORMANCE:

START TIME: _______________

1.	***Procedure Step:**	Identify the components to be tagged and the proper sequence for a manual tagout of HVT-UC12 Turbine Building Unit Cooler.
	Standard	Applicant identified the components and proper sequence for the tagout in accordance with the attached key.
	Cue	
	Notes	Provide applicant with attachments as necessary

Terminating Cue: The applicant identified the components and sequence for a manual tagout on Turbine Building Unit Cooler, HVT-UC12 in accordance with the attached key.

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initiating Cues:

The CRS has directed you to identify the components and sequence for a manual tagout using Attachment 9.3 of EN-OP-102-01, Tagout Tags Sheet.

Initial Conditions:

The plant is mode 1, 100%.

Maintenance is scheduled to replace the cooler portion of HVT-UC12, Turbine Building Unit Cooler.

The eSOMS Clearance Module is unavailable due to problems with the network.

Entergy	NUCLEAR MANAGEMENT MANUAL	NON-QUALITY RELATED	EN-OP-102-01	REV. 9
		INFORMATIONAL USE	PAGE 7 OF 30	
Protective and Caution Tagging Forms & Checklist				

ATTACHMENT 9.3 TAGOUT TAGS SHEET

CLEARANCE: ___MANUAL__________ TAGOUT: ______________

Tag Serial No.	Tag Type	Equipment Equipment Description Equipment Location	Place. Seq.	Placement Configuration	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time	Rest. Seq.	Restoration Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time	Placement/ Removal Tag Notes

Entergy	NUCLEAR MANAGEMENT MANUAL	NON-QUALITY RELATED	EN-OP-102-01	REV. 9
		INFORMATIONAL USE	PAGE 7 OF 30	
Protective and Caution Tagging Forms & Checklist				

ATTACHMENT 9.3 — TAGOUT TAGS SHEET

CLEARANCE: ___MANUAL__________ TAGOUT: ______________

Tag Serial No.	Tag Type	Equipment Equipment Description Equipment Location	Place. Seq.	Placement Configuration	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time	Rest. Seq.	Restoration Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time	Placement/ Removal Tag Notes

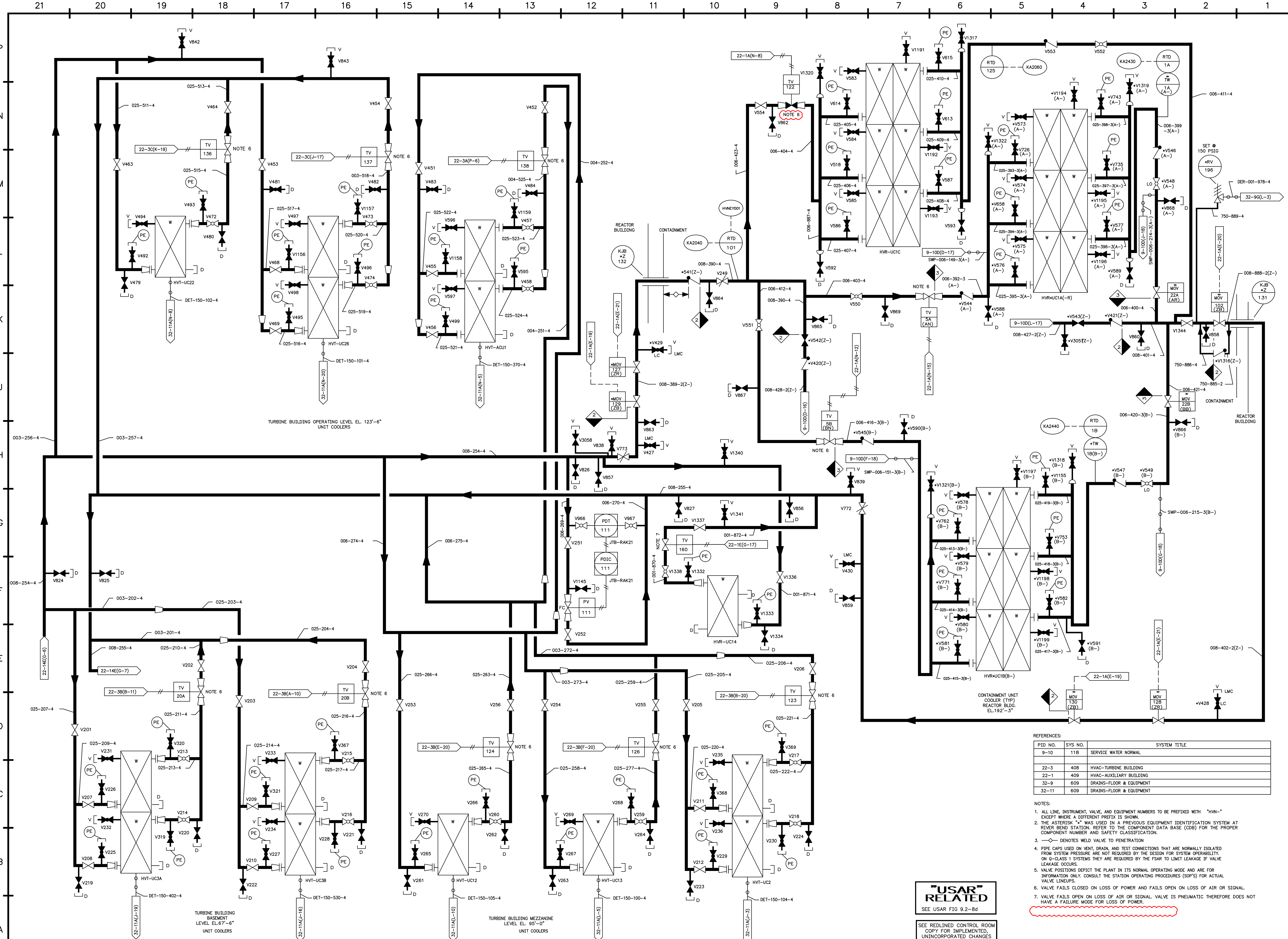
Entergy	NUCLEAR MANAGEMENT MANUAL	NON-QUALITY RELATED	EN-OP-102-01	REV. 9
		INFORMATIONAL USE	PAGE 7 OF 30	

Protective and Caution Tagging Forms & Checklist

ATTACHMENT 9.3 — **TAGOUT TAGS SHEET**

CLEARANCE: ___MANUAL__________ TAGOUT: ______________

Tag Serial No.	Tag Type	Equipment Equipment Description Equipment Location	Place. Seq.	Placement Configuration	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time	Rest. Seq.	Restoration Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time	Placement/ Removal Tag Notes



REFERENCES:

PID NO.	SYS NO.	SYSTEM TITLE
9–10	118	SERVICE WATER NORMAL
22–3	408	HVAC–TURBINE BUILDING
22–1	409	HVAC–AUXILIARY BUILDING
32–9	609	DRAINS–FLOOR & EQUIPMENT
32–11	609	DRAINS–FLOOR & EQUIPMENT

NOTES:

1. ALL LINE, INSTRUMENT, VALVE, AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "HVN–" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.
2. THE ASTERISK "*" WAS USED IN A PREVIOUS EQUIPMENT IDENTIFICATION SYSTEM AT RIVER BEND STATION. REFER TO THE COMPONENT DATA BASE (CDB) FOR THE PROPER COMPONENT NUMBER AND SAFETY CLASSIFICATION.
3. —◇— DENOTES WELD VALVE TO PENETRATION
4. PIPE CAPS USED ON VENT, DRAIN, AND TEST CONNECTIONS THAT ARE NORMALLY ISOLATED FROM SYSTEM PRESSURE ARE NOT REQUIRED BY THE DESIGN FOR SYSTEM OPERABILITY. ON Q–CLASS 1 SYSTEMS THEY ARE REQUIRED BY THE FSAR TO LIMIT LEAKAGE IF VALVE LEAKAGE OCCURS.
5. VALVE POSITIONS DEPICT THE PLANT IN ITS NORMAL OPERATING MODE AND ARE FOR INFORMATION ONLY. CONSULT THE STATION OPERATING PROCEDURES (SOP'S) FOR ACTUAL VALVE LINEUPS.
6. VALVE FAILS CLOSED ON LOSS OF POWER AND FAILS OPEN ON LOSS OF AIR OR SIGNAL.
7. VALVE FAILS OPEN ON LOSS OF AIR OR SIGNAL. VALVE IS PNEUMATIC THEREFORE DOES NOT HAVE A FAILURE MODE FOR LOSS OF POWER.

"USAR" RELATED

SEE USAR FIG 9.2–8d

SEE REDLINED CONTROL ROOM COPY FOR IMPLEMENTED, UNINCORPORATED CHANGES
SDC

MICROFILM	NO.	DATE	REASON	DFT	CHKD	RE	CGS
	14	10/14/10	INCORP EC 25163	TBS	N/A	N/A	SDJ
	13	11/13/01	INCORP ER00–0694–000; SUPERSEDE KC–PID–22–14D REV A	MJP	NWG	N/A	TBS
	12	11–17–97	INCORP ER96–0676; SUPERSEDE KB–PID–22–14D REV.A	MDM	TBS	N/A	MJP
	11	10–31–97	EDITORIAL CHANGE & INCORP MR96–0068; SUPERSEDE KA–PID–22–14D REV.A	MDM	MJP	N/A	CJ
	10	7–21–92	INCORP. DCN92–0251	CS	TH	OES	JMH
	9	3–21–88	INCORP. MR87–0515	CS	DWN	KAM	JRL
	8	8–16–87	INCORP. MR87–0337	ROY	JW BLT	KAM	JRL
	7	2–25–87	INCORP. MR86–1568	RLM	RJP	DNC	JRL
	6	1–30–87	INCORP. MR86–0748, MR86–1587, MR86–1588, AND MR86–1568	RLM	RJP	DNC	JRL
	5	11–14–86	INCORP. MR86–0795	RLM	RJP	WJ	JAW
	4	9–22–86	TRANSFER TO GSU MAINTENANCE, NO TECHNICAL CHANGES	RLM	RJP	WJ	KLG
	3	7–3–86	INCORP. M85–0929–00	BJD	WJ		JCB
	2	10–30–85	GENERAL REVISION	BJD	WJ		JCB
	1	5–29–85	FIRST SIGNIFICANT ISSUE	CAS LDM	RJM JCP		JCB
	0	4–16–84	ISSUED FOR INFORMATION ONLY	CAS LDM	HT JCP		WGC

Entergy Operations, Inc.

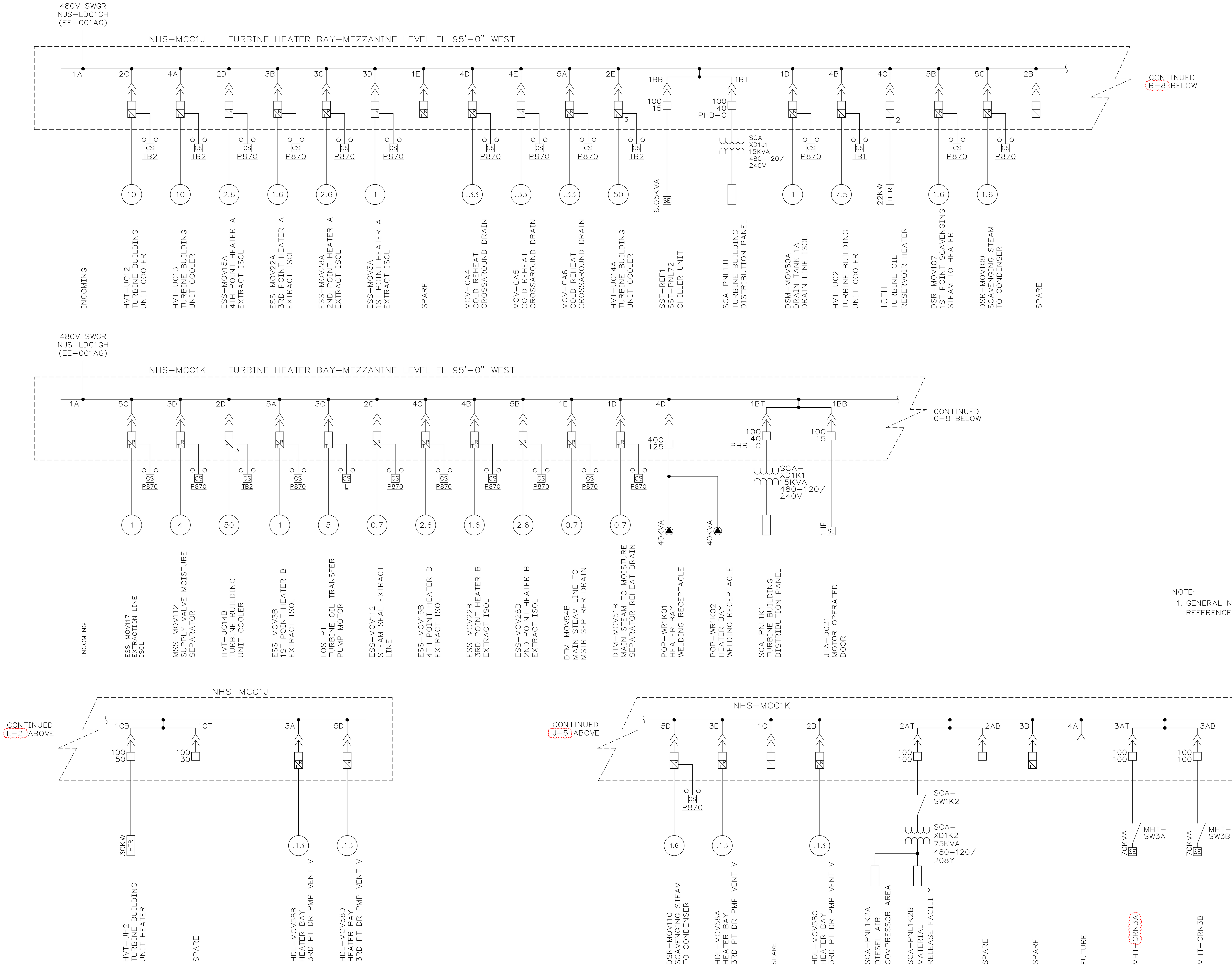
RIVER BEND UNIT 1

ENGINEERING P & I DIAGRAM
SYSTEM 410
HVAC–CHILLED WATER

SCALE: NONE

DRAWING NUMBER: PID–22–14D

REV.: 14



NOTE:
1. GENERAL NOTES, SYMBOLS, LOCATIONS AND REFERENCES EE-001AZ.

SEE REDLINED CONTROL ROOM COPY FOR IMPLEMENTED, UNINCORPORATED CHANGES
SDC

QA CAT. II

NOTE: THIS DRAWING PRODUCED BY CAD. DO NOT REVISE MANUALLY

MICROFILM	NO	DATE	REASON	DFT	CHKD	RE	CGS
	11	12/19/08	INCORP EC 12205	NWG	SA	N/A	N/A
	10	1/23/06	INCORP 05-44	TBS	NWG	N/A	N/A
	9	9/26/02	INCORP ER02-0212-000; SUPERSEDE KB-EE-001BK REV A	NWG	TBS	N/A	SA
	8	8-20-96	INCORP DCN96-0782 & SUPERCEDED KA-EE-1BK REV A	JAP	NWG	N/A	MJP
	7	4-11-96	INCORP MR93-0087, MR94-0136 AND DCN96-0255	NWG	JAP	NAR	RGF
	6	1-26-94	INCORP DCN94-0315	LLW	CJ	TT	CLD
	5	9-21-93	REDRAWN TO AUTOCAD	LLW	CJ	TT	CLD

Entergy Operations, Inc.
RIVER BEND STATION - UNIT 1
480V ONE LINE DIAGRAM NHS-MCC1J AND NHS-MCC1K TURBINE BUILDING
SCALE: NONE

JOB NUMBER	DRAWING NO.	SH	CONT	REV
	EE-001BK	-	X	11

*G12.1.6

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***SYSTEM OPERATING PROCEDURE**

**TURBINE BUILDING HVAC SYSTEM (SYS #408)*

PROCEDURE NUMBER:	***SOP-0064**
REVISION NUMBER:	***027**
Effective Date:	**09/11/2013**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
SOP-0064R026EC-A	Clarified the Note for Step 4.8.1 to provide an equipment location and added the same Note to the Shutdown Section, Step6.7.1. Also added existing switch in the procedure to the Control Board Lineup, Attachment 4.

TABLE OF CONTENTS

1 PURPOSE

1.1 To provide instructions for operation of the Turbine Building HVAC System, Offgas Building Ventilation Exhaust Fans and Offgas Vault Refrigeration Equipment.

2 PRECAUTIONS AND LIMITATIONS

2.1 Do not start fans and motors before checking freedom from obstructions.

2.2 Starting limitations for all fans and unit cooler motors are as follows:

- Motor cold, defined as at ambient temperature or having stood idle for 60 minutes, two (2) consecutive starting attempts are allowed. Additional attempts are allowed, provided the motor is at ambient temperature or has stood idle for 60 minutes between attempts.

- Motor hot, defined as having been running for greater than 30 minutes, one (1) attempted restart is allowed. Additional starts are allowed, provided the motor runs 30 minutes between starts.

2.3 Failure to start a Turbine Building Supply Fan within 15 seconds of starting its associated exhaust fan results in the exhaust fan tripping. The logic is reset by returning the supply fan switch to OFF AND the exhaust fan switch to STOP.

2.4 Continuous operation of the Offgas Vault refrigeration machines is essential for proper operation of the Offgas System and maintaining the gaseous radioactive effluents ALARA. Notify the Operations Shift Manager prior to performing any activity affecting the operation of the Offgas Vault refrigeration units when the Offgas System is in service.

2.5 Offgas refrigeration machine defrost cycle auto starts at greater than or equal to 2.5 in wc as sensed by HVT-PDS61A(B), OFFGAS VAULT REFRIG UNIT A(B) EVAP DIFF PRESS SWITCH.

2.6 HVT-CUR5, MAIN STEAM TUNNEL STANDBY COND UNIT is not to be used for unit rotation/equal run time purposes.

2.7 It is preferred to have the OFFGAS vault pressure control fan running when OFFGAS is in service; however, the pressure control fan can be secured for periods of time when required to support maintenance on the fan or the fan suction or discharge dampers provided the Turbine Building and Off Gas Building ventilation are in service.

2.8 The Turbine Building Unit Cooler temperature control valve controller settings can be adjusted for personnel comfort not to exceed the upper limit value (SET PT °F MAX) specified on drawing LSK-22-03Q. This is to maintain the controller setpoints at a value lower than that specified in the applicable LCRs and associated Setpoint Data Sheets (SPDS) in order to control the building temperatures below the upper limit of the Environmental Design Criteria (EDC). (Reference ER-RB-2005-0439)

2.9 The HVT-ACUFLT1 TURB BLDG SUPPLY ROLL FILTER auto mode input is from differential pressure only. Timer function has been removed from circuit, per ER-RB-2004-0274.

3 PREREQUISITES

3.1 480 VAC in operation per SOP-0047, 480 VAC System.

3.2 120 VAC in operation per SOP-0048, 120 VAC System.

3.3 Verify system is lined up for startup.

4 SYSTEM STARTUP

4.1 Placing System in Standby

4.1.1. Verify roll filter media on the turbine building supply air inlet filter unit.

4.1.2. Verify filters are in place on the unit coolers.

4.2 Turbine/Offgas Building Ventilation Startup

NOTE

The following indications and controls are located on HVT-PNL162 unless otherwise noted.

4.2.1. Select the pair of turbine building ventilation exhaust fans to be started by positioning the SUPPLY FANS AND EXHAUST FANS SELECTOR as follows:

SELECTOR POSITION	EXHAUST FANS SELECTED	ASSOCIATED SUPPLY FAN
Left	HVT-FN1A	HVT-ACU1F1
	HVT-FN1B	HVT-ACU1F2
Middle	HVT-FN1A	HVT-ACU1F1
	HVT-FN1C	HVT-ACU1F2
Right	HVT-FN1B	HVT-ACU1F1
	HVT-FN1C	HVT-ACU1F2

NOTE

A turbine building exhaust fan must be started first followed by starting the associated supply fan in less than 15 seconds.

CRITICAL STEP

4.2.2. Start the selected combination of:

1. HVT-FN1A(B)(C), EXHAUST FAN
2. HVT-ACU1F1(1F2), SUPPLY FAN

4.2.3. Verify HVT-AOD4A(4B)(4C), EXHAUST FAN DISCH DAMPER opens and is regulating.

4.2.4. Repeat steps 4.2.2 through 4.2.3 for the second selected exhaust and supply fans.

4.2.5. Check the following annunciators are reset:

- SUPPLY INLET FILTER DIFF PRESSURE HIGH
- EXHAUST AIR FLOW LOW
- SUPPLY AIR FLOW LOW
- H13-P863-75A-D07, TB SPLY & EXH FAN LOCAL CONTROL PNL TROUBLE

4.2.6. Depress START pushbutton for the HVT-ACU1H, SUPPLY AIR HEATER.

4.2.7. Check annunciator HVT-ACU1 HEATER TRIP reset.

4.2.8. Start the individual unit coolers as follows:

CAUTIONS

If both HVT-UC11 fans are started, one fan operates in stall/surge and may result in equipment damage. Do not run both HVT-UC11 fans.

Operating only one HVT-UC20 fan may cause the Leak Detection System temperature detectors to sense a high temperature in the turbine area resulting in a high temperature alarm. Do not operate only one HVT-UC20 fan.

NOTE

Area Unit Cooler HVT-UC11 has two 100% capacity fans with separate control switches.

Unit Cooler HVT-UC20 has two 50% capacity fans with separate control switches.

CRITICAL STEP

1. At HVT-PNL161, start either of the following:
   - HVT-UC11F1, UNIT COOLER
   - HVT-UC11F2, UNIT COOLER

CRITICAL STEP

2. At HVT-PNL162, start both of the following:

    - HVT-UC20F1, UNIT COOLER
    - HVT-UC20F2, UNIT COOLER

4.2.9. At HVT-PNL162, start the following turbine building unit coolers:

- HVT-UC19A, UNIT COOLER
- HVT-UC21A, UNIT COOLER
- HVT-UC23A, UNIT COOLER
- HVT-UC24A, UNIT COOLER
- HVT-UC25A, UNIT COOLER
- HVT-UC19B, UNIT COOLER
- HVT-UC21B, UNIT COOLER
- HVT-UC23B, UNIT COOLER
- HVT-UC24B, UNIT COOLER
- HVT-UC25B, UNIT COOLER
- HVT-UC24C, UNIT COOLER
- HVT-UC22, UNIT COOLER
- HVT-UC24D, UNIT COOLER
- HVT-UC26, UNIT COOLER
- HVT-UC30, UNIT COOLER
- HVT-UC31A, UNIT COOLER
- HVT-UC31B, UNIT COOLER
- HVT-UC32, UNIT COOLER

4.2.10. At TB, 95 ft el, HVT-PNL161, start the following turbine building unit coolers:

- HVT-UC14A, UNIT COOLER
- HVT-UC16A, UNIT COOLER
- HVT-UC18A, UNIT COOLER
- HVT-UC29, UNIT COOLER
- HVT-UC14B, UNIT COOLER
- HVT-UC16B, UNIT COOLER
- HVT-UC18B, UNIT COOLER
- HVT-UC12, UNIT COOLER
- HVT-UC16C, UNIT COOLER
- HVT-UC18C, UNIT COOLER
- HVT-UC13, UNIT COOLER
- HVT-UC15, UNIT COOLER
- HVT-UC17, UNIT COOLER

4.2.11. At TB, 67 ft el, HVT-PNL160, start the following turbine building unit coolers:

- HVT-UC1A, UNIT COOLER
- HVT-UC3A, UNIT COOLER
- HVT-UC4A, UNIT COOLER
- HVT-UC5A, UNIT COOLER
- HVT-UC7, UNIT COOLER
- HVT-UC1B, UNIT COOLER
- HVT-UC3B, UNIT COOLER
- HVT-UC4B, UNIT COOLER
- HVT-UC5B, UNIT COOLER
- HVT-UC8, UNIT COOLER
- HVT-UC3C, UNIT COOLER
- HVT-UC9, UNIT COOLER
- HVT-UC2, UNIT COOLER
- HVT-UC3D, UNIT COOLER
- HVT-UC6, UNIT COOLER
- HVT-UC10, UNIT COOLER
- HVT-UC27, UNIT COOLER
- HVT-UC28, UNIT COOLER

NOTE

The Turbine Building Unit Cooler temperature control valve controller settings can be adjusted for personnel comfort not to exceed the upper limit value (SET PT °F MAX) specified on drawing LSK-22-03Q. This is to maintain the controller setpoints at a value lower than that specified in the applicable LCRs and associated Setpoint Data Sheets (SPDS) in order to control the building temperatures below the upper limit of the Environmental Design Criteria (EDC). (Reference ER-RB-2005-0439)

4.2.12. Adjust the Turbine Building Unit Cooler temperature controllers setpoint for personnel comfort, not to exceed the value specified on drawing LSK-22-03Q.

4.3 Iodine Filtration Unit HVT-FLT1 Startup

NOTES

The following indications and controls are located on HVT-PNL162 unless otherwise noted.

This unit is placed in service when the condenser air removal pumps are to be started.

4.3.1. IF water is not visible in any drain trap, THEN fill the drain trap using MWS-V362, V322 or V323, IODINE FILTRATION UNIT TRAP PRIMER ISOLATION VALVE.

4.3.2. Notify Chemistry when altering ventilation system lineups involving filter trains.

CRITICAL STEP

4.3.3. Start HVT-FN3, IODINE FILTER EXHAUST FAN and verify the following:

- HVT-AOD114, IODINE FILTER INLET DAMPER open.
- HVT-AOD118, IODINE FILTER OUTDOOR AIR regulates to maintain greater than or equal to 4500 scfm and less than or equal to 5500 scfm as indicated on HVT-FIC118, TURBINE BLDG IODINE FILTRATION UNIT EXHAUST FLOW INDICATING CONTROLLER on HVT-FLT1 in the Iodine Filtration Room.

4.3.4. Place HVT-FN4, IODINE FLTR DECAY HEAT REMOVAL FAN Control Switch to AUTO.

4.3.5. Check the following annunciators are reset:

- CHARCOAL FILTER BED OUTLET AIR TEMP HIGH
- H13-P863-75A-D06, AIR REMOVAL PUMPS EXHAUST FILTER TROUBLE

4.3.6. Verify HVT-FLT1H, HOGGING PUMP FILTER HEATER BKR is energized, at NHS-MCC1M, BKR 1BB.

4.3.7. Have Turbine Building Operator monitor the filter train for water especially the Demister Section per OSP-0030, Log Report-Turbine Building.

4.3.8. IF water is found in the demister portion of the filter train, THEN drain the section per Section 5.7 of this procedure.

4.4 Offgas Vault Refrigeration Startup

4.4.1. IF the Offgas Vault has been entered, THEN verify the vault is vacated and sealed, and no further entries required prior to placing Offgas Vault Refrigeration Machines in service.

NOTES

Depressing the MANUAL DEFROST Pushbutton starts a 1.5-hour defrost cycle, closes HVT-AOD44A(B), OFFGAS UNIT COOLER A(B)DISCHARGE DAMPER and turns off HVT-FN10A(B,) FAN.

The following step drives the refrigerant from the ventilation coils back into HVT-C1A(B), COMPRESSOR to help eliminate low suction pressure trips on startup.

4.4.2. IF the OFFGAS VAULT temperature is at or below freezing, THEN at HVT-PNL10A and HVT-PNL10B depress MANUAL DEFROST.

4.4.3. WHEN the defrost cycles are complete, THEN continue in this procedure.

4.4.4. At HVT-PNL163, verify the following:

- HVT-FN6, OFFGAS REFRIGERATION DEFROST FAN off
- HVT-AOD187, OFFGAS REFRIGERATION OUTSIDE AIR DAMPER closed
- HVT-AOD188, OFFGAS REFRIGERATION EXHAUST AIR DAMPER closed
- HVT-AOD186, OFFGAS REFRIGERATION RETURN AIR DAMPER open

4.4.5. At HVT-PNL162, perform the following:

1. Start HVT-FN5, OFFGAS VAULT PRESS CONTROL FAN.
2. Check HVT-AOD189, OFFGAS VAULT PRESS CONTROL DAMPER regulates.

4.4.6. Check oil temperature is at least 100°F

4.4.7. At HVT-PNL163, open HVT-AOD44A(B), OFFGAS UNIT COOLER DISCHARGE DAMPER, for the fan to be started.

NOTE

Compressor starts after a time delay when the START Pushbutton is depressed.

4.4.8. Start the following:

1. HVT-FN10A(B), FAN

CRITICAL STEP

2. HVT-C1A(B), COMPRESSOR

4.4.9. Check refrigeration unit operating parameters per OSP-0030, Log Report - Turbine Building.

4.4.10. IF both refrigeration units are to be operated, THEN repeat Steps 4.4.6 through 4.4.9.

NOTE

The compressor runs for greater than or equal to 2 minutes and less than or equal to 8 minutes after the STOP button is depressed.

4.4.11. <u>IF</u> both Offgas Vault Refrigeration Units were started <u>AND</u> Offgas Vault temperature is less than or equal to 0°F, <u>THEN</u> stop one of the Refrigeration Units as follows:

1. Stop HVT-C1A(B), COMPRESSOR.
2. Stop HVT-FN10A(B), FAN.
3. Close associated HVT-AOD44A(B), OFFGAS UNIT COOLER DISCHARGE DAMPER.

4.4.12. Check that vault temperature is maintained less than or equal to 0°F with one vault refrigeration unit in service.

4.5 Offgas Vault Defrost Cycle Startup

4.5.1. Check the Offgas System is no longer required for plant operation.

NOTE

The operating HVT-FN10A(B), FAN remains running after the associated compressor is stopped.

4.5.2. At HVT-SKD3A(B), OFFGAS VAULT REFRIGERATION UNIT SKID stop HVT-C1A(B), COMPRESSOR.

4.5.3. At panel HVT-PNL162, perform the following:

1. Stop HVT-FN5, OFFGAS VAULT PRESS CONTROL FAN.
2. Verify HVT-AOD189, OFFGAS VAULT PRESS CONTROL DAMPER closed.

4.5.4. Remove blank upstream of HVT-AOD187, OFFGAS REFRIGERATION OUTSIDE AIR DAMPER.

4.5.5. At panel HVT-PNL163, start HVT-FN6, OFFGAS REFRIGERATION DEFROST FAN and verify the following:

- HVT-AOD186, OFFGAS REFRIGERATION RETURN AIR DAMPER closed
- HVT-AOD187, OFFGAS REFRIGERATION OUTLET AIR DAMPER open
- HVT-AOD188, OFFGAS REFRIGERATION EXHAUST AIR DAMPER open

4.6 HVT-CUR4, Main Steam Tunnel Normal Air Conditioning Unit Startup

4.6.1. Verify NJS-LDC1CD, BKR 063, HVT-CUR4, HVT-ACU4A, HVT-ACU4B, HVT-ACU4C, STM TNL HVAC NORMAL FEED on.

4.6.2. Place disconnect HVT-ACU4A, HVT-ACU4B, HVT-ACU4C, STM TNL AIR CONDITIONING UNITS MAIN DISCONNECT AND FEED SELECTOR in the NORMAL FEED position.

4.6.3. IF normal power is unavailable, THEN place disconnect in the ALTERNATE FEED position as follows:

1. Verify the following:
   - NJS-LDC1C ACB-043, NJS-PNL1 T-TUNNEL is CLOSED
   - NJS-PNL1, Breaker 13, STEAM TUNNEL (BACKUP) HVT-ACU4A, B, & C is ON.
2. Place disconnect to the ALTERNATE FEED position.

4.6.4. At T-Tunnel, 95 ft el, verify the following disconnect switches closed:

- HVT-ACU4A, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4B, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4C, STEAM TUNNEL AIR CONDITIONING UNIT

4.6.5. Outside T-Tunnel, 98 ft el, north wall, close HVT-CUR4, STM TNL NORM CONDENSING UNIT Disconnect Switch.

4.6.6. Verify the following:

- Main Steam Tunnel Condensing Unit heaters have been energized for at least 8 hours
- Main Steam Tunnel air handler units running

4.6.7. Verify the following valves open:

- HVT-V3000, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 SUCT ISOL
- HVT-V3001, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 DISCH ISOL
- HVT-V3002, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 SUCT ISOL
- HVT-V3003, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 DISCH ISOL
- HVT-V3100, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3101, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3102, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3103, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE

4.6.8. Verify the following valves are closed:

- HVT-V3104, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3105, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3106, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3107, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE
- HVT-V3004, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 SUCT ISOL.
- HVT-V3005, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 DISCH ISOL.
- HVT-V3006, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 SUCT ISOL.
- HVT-V3007, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 DISCH ISOL.

NOTE

The following switch is located inside HVT-CUR4, STEAM TUNNEL NORMAL CONDENSING UNIT control panel.

CRITICAL STEP

4.6.9. Place S1 Switch to ON.

4.6.10. Verify the following:

- HVT-CUR4, STEAM TUNNEL NORMAL CONDENSING UNIT compressor 1 starts
- HVT-CUR4, STEAM TUNNEL NORMAL CONDENSING UNIT compressor 2 starts after a time delay

4.7 HVT-CUR5, Main Steam Tunnel Standby Air Conditioning Unit Startup

4.7.1. Verify NJS-LDC1CD, BKR 063, HVT-CUR4, HVT-ACU4A, HVT-ACU4B, HVT-ACU4C, STM TNL HVAC NORMAL FEED on.

4.7.2. Place disconnect HVT-ACU4A, HVT-ACU4B, HVT-ACU4C, STM TNL AIR CONDITIONING UNITS MAIN DISCONNECT AND FEED SELECTOR in the NORMAL FEED position.

4.7.3. <u>IF</u> normal power is unavailable, <u>THEN</u> place disconnect in the ALTERNATE FEED position as follows:

1. Verify the following:
    - NJS-LDC1C/ACB043, NJS-PNL1 T-TUNNEL is CLOSED.
    - NJS-PNL1, Breaker 13, STEAM TUNNEL (BACKUP) HVT-ACU4A, B, & C is ON.
2. Place disconnect to the ALTERNATE FEED position.

4.7.4. At T-Tunnel, 95 ft el, verify the following disconnect switches closed:

- HVT-ACU4A, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4B, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4C, STEAM TUNNEL AIR CONDITIONING UNIT

4.7.5. At HVT-CUR5, verify HVT-SW6 480V, FUSED DISCONN SW HVT-CUR5 disconnect is ON.

4.7.6. Verify the following:

- Main Steam Tunnel Condensing Unit heaters have been energized for at least 8 hours.
- Main Steam Tunnel air handler units running.

4.7.7. Open the following valves:

- HVT-V3004, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 SUCT ISOL.
- HVT-V3005, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 DISCH ISOL.
- HVT-V3006, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 SUCT ISOL.
- HVT-V3007, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 DISCH ISOL.
- HVT-V3104, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3105, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3106, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3107, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE

4.7.8. Verify the following valves are closed:

- HVT-V3100, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3101, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3102, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3103, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE
- HVT-V3000, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 SUCT ISOL
- HVT-V3001, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 DISCH ISOL

- HVT-V3002, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 SUCT ISOL
- HVT-V3003, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 DISCH ISOL

NOTE

The following controls are located in HVT-CUR5, STEAM TUNNEL STBY CONDENSING UNIT control panel.

4.7.9. Depress the red HVT-CUR5 COMP 1 OIL PRESS CONTROL RESET and HVT-CUR5 COMP 2 OIL PRESS CONTROL RESET pushbuttons.

4.7.10. Place the COMPRESSOR SEQUENCE switch in the 1-2 position.

4.7.11. Place the RESET SWITCH to RESET.

CAUTION

Starting a compressor with its skid discharge valve closed causes damage to the compressor. Do not start the compressor until the respective compressor skid discharge valve is open.

CRITICAL STEP

4.7.12. Place the COMPRESSOR 1 ON/OFF switch to ON.

CRITICAL STEP

4.7.13. Place the COMPRESSOR 2 ON/OFF switch to ON.

4.7.14. Check the following:

1. HVT-CUR5 COMPRESSOR 1 starts
2. HVT-CUR5 COMPRESSOR 2 starts after a time delay

4.7.15. IF either compressor failed to start, THEN perform the following for the applicable compressor:

1. Place the COMPRESSOR 1(2) ON/OFF switch to OFF.

2. Depress the red HVT-CUR5 COMP 1(2) OIL PRESS CONTROL RESET pushbutton.

3. Place the COMPRESSOR 1(2) ON/OFF switch to ON.

NOTE

Since there is no start limitation for the compressors, Step 4.7.15.4 may be performed up to three successive times with no damage expected to the compressor.

4. Repeat Steps 4.7.15.1 through 4.7.15.3 until the compressor remains running.

4.8 HVT-CUR1, Turbine Building Sample Room Air Conditioning Unit Startup

NOTE

The following switches are located inside the condensing unit control panel, elevation TB 82', located above the Chemistry Sample Room.

4.8.1. Check condensing unit heaters have been energized for at least 24 hours.

4.8.2. Verify compressor ON-OFF switch in OFF.

4.8.3. Depress the red OIL PRESSURE CONTROL RESET pushbutton.

4.8.4. Place the compressor ON-OFF switch to ON.

4.8.5. Check the following operating parameters:

- Oil level visible in sightglass
- Oil pressure greater than or equal to 20 psig and less than or equal to 35 psig
- No bubbles visible in refrigerant flow through sightglasses
- Discharge pressure greater than or equal to 170 psig and less than or equal to 245 psig

- Suction pressure greater than or equal to 55 psig and less than or equal to 85 psig

4.9 OFFGAS Vault Pressure Control Fan Start up following Maintenance

4.9.1. At panel HVT-PNL162, perform the following:

1. Start HVT-FN5, OFFGAS VAULT PRESS CONTROL FAN.
2. Check HVT-AOD189, OFFGAS VAULT PRESS CONTROL DAMPER regulates.

4.10 OFFGAS Building Ventilation Startup

4.10.1. Start HVT-ACU2, SAMPLING ROOM AIR HDLG UNIT FAN.

4.10.2. Start one of the HVT-FN2A(2B), EXHAUST FAN.

4.10.3. Check HVT-AOD1A(B), EXHAUST FAN DISCH DAMPER open and regulating.

4.10.4. Start one of the HVT-FN7A(7B), H2 ANALYZER AND PRETREAT SAMPLE PNL EXH FAN.

4.10.5. Verify HVT-AOD45A(45B), H2 ANALYZER & PRETREAT FLOW CONTROL DAMPER opens and is regulating.

5 SYSTEM OPERATION

NOTE

The following indications and controls are located on HVT-PNL162 unless otherwise noted.

5.1 Equipment Rotation

CRITICAL STEP

5.1.1. Turbine Building Supply/Exhaust Fans

SELECTOR POSITION	EXHAUST FANS SELECTED	ASSOCIATED SUPPLY FAN
Left	HVT-FN1A	HVT-ACU1F1
	HVT-FN1B	HVT-ACU1F2
Middle	HVT-FN1A	HVT-ACU1F1
	HVT-FN1C	HVT-ACU1F2
Right	HVT-FN1B	HVT-ACU1F1
	HVT-FN1C	HVT-ACU1F2

1. Stop all running supply fans HVT-ACU1F1(2), SUPPLY FAN.
2. Stop all running exhaust fans HVT-FN1A(B)(C), EXHAUST FAN.
3. Start the desired fans per steps 4.2.1 through 4.2.5 of this procedure.

CRITICAL STEP

5.1.2. Offgas Building Vent Exhaust Fans

1. Start the idle HVT-FN2A(B), EXHAUST FAN.
2. Verify HVT-AOD1A(B), EXHAUST FAN DISCH DAMPER open.
3. Stop the previously running HVT-FN2A(B), EXHAUST FAN.
4. Verify associated HVT-AOD1A(B), EXHAUST FAN DISCH DAMPER closed.

5.1.3. H2 Analyzer and Pretreatment Sample Panel Exhaust Fans

1. Start the idle HVT-FN7A(B), H2 ANALYZER AND PRETREAT SAMPLE PNL EXH FAN.

2. Verify HVT-AOD45A(B), H2 ANALYZER & PRETREAT FLOW CONTROL DAMPER open.

3. Stop the previously running HVT-FN7B(A), H2 ANALYZER AND PRETREAT SAMPLE PNL EXH FAN.

4. Verify associated HVT-AOD45B(A), H2 ANALYZER & PRETREAT FLOW CONTROL DAMPER closed.

5.1.4. Offgas Vault Refrigeration Units

NOTES

Depressing the MANUAL DEFROST Pushbutton starts a 1.5-hour defrost cycle, closes HVT-AOD44A(B), OFFGAS UNIT COOLER A(B)DISCHARGE DAMPER and turns off HVT-FN10A(B), FAN.

The following step drives the refrigerant from the ventilation coils back into HVT-C1A(B), COMPRESSOR to help eliminate low suction pressure trips on startup.

1. At HVT-PNL10A(B), depress MANUAL DEFROST for the idle unit.

2. <u>WHEN</u> defrost cycle is complete, <u>THEN</u> continue in this procedure.

3. At HVT-SKD3A(B), OFFGAS VAULT REFRIGERATION UNIT SKID check the following:

   - Vault Refrigeration Unit supply breaker closed for at least 24 hours.

   - Oil temperature greater than or equal to 120°F.

4. At HVT-PNL163, open the associated HVT-AOD44A(B), OFFGAS UNIT COOLER DISCHARGE DAMPER.

CAUTION

Starting a compressor with cold oil causes damage to crankshaft and connecting rod bearings. Do not start an Offgas Refrigeration Machine unless oil temperature is greater than or equal to 120°F.

NOTE

Compressor starts after a time delay when the START button is depressed.

5. Start the following:

   1) HVT-FN10A(B), FAN

   CRITICAL STEP

   2) HVT-C1A(B), COMPRESSOR

6. Check refrigeration unit operating parameters per OSP-0030, Log Report - Turbine Building.

NOTE

Compressor runs for greater than or equal to 2 minutes and less than or equal to 8 minutes after STOP button is depressed.

7. Perform the following for the unit to be shut down:

   1) Stop the HVT-C1A(B), COMPRESSOR.

   2) Stop the associated HVT-FN10A(B), FAN.

   3) At panel HVT-PNL163, close the associated HVT-AOD44A(B), OFFGAS UNIT COOLER DISCHARGE DAMPER.

5.2 Vault Ventilation Coil HVT-CH1A(B) Manual Defrost

NOTE

Step 5.2.1 is not required unless the coil differential pressure monitoring system is out-of-service.

5.2.1. Start manual defrost when any of the following occur:

- Offgas Vault temperature starts to rise while the refrigeration machine controller demands cooling
- The refrigeration machine hot-gas bypass valve is cycling intermittently as indicated by discharge/intercooler pressures HVT-PI63A/B and HVT-PI46A/B
- Temperature differential of 0°F between points 7 and 8 as indicated by HVT-TI50A/B and external icing observed on the operating refrigeration machine.

NOTE

Depressing MANUAL DEFROST Pushbutton starts a 1.5 hour defrost cycle, closes HVT-AOD44A(B) and turns off HVT-FN10A(B).

5.2.2. Depress MANUAL DEFROST Pushbutton on panel HVT-PNL10A(B).

5.3 Swapping from HVT-CUR4, Steam Tunnel Normal Condensing Unit to HVT-CUR5, Steam Tunnel Standby Condensing Unit

5.3.1. Verify HVT-SW6, 480V FUSED DISCONN SW HVT-CUR5 disconnect is ON.

5.3.2. Check HVT-CUR5, STEAM TUNNEL STANDBY CONDENSING UNIT compressor has been energized for at least 8 hours prior to compressor start.

5.3.3. Contact Mechanical Maintenance to perform the monthly PM on HVT-CUR5, STEAM TUNNEL STANDBY CONDENSING UNIT.

NOTE

The following switch is located inside HVT-CUR4 control panel.

5.3.4. Stop HVT-CUR4, MAIN STEAM TUNNEL NORMAL CONDENSING UNIT, by placing S1 to OFF.

5.3.5. Close the following valves:

- HVT-V3000, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 SUCT ISOL.
- HVT-V3001, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 DISCH ISOL.
- HVT-V3002, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 SUCT ISOL.
- HVT-V3003, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 DISCH ISOL.
- HVT-V3100, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3101, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3102, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3103, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE

5.3.6. Open the following valves:

- HVT-V3004, HVT-CUR5 STM TNL STDBY COND UNIT COMPRESSOR 1 SUCT ISOL.
- HVT-V3005, HVT-CUR5 STM TNL STDBY COND UNIT COMPRESSOR 1 DISCH ISOL.
- HVT-V3006, HVT-CUR5 STM TNL STDBY COND UNIT COMPRESSOR 2 SUCT ISOL.
- HVT-V3007, HVT-CUR5 STM TNL STDBY COND UNIT COMPRESSOR 2 DISCH ISOL.
- HVT-V3104, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3105, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3106, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3107, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE

NOTE

The following controls are located in HVT-CUR5, STEAM TUNNEL STBY CONDENSING UNIT control panel.

5.3.7. Depress the red HVT-CUR5 COMP 1 OIL PRESS CONTROL RESET and HVT-CUR5 COMP 2 OIL PRESS CONTROL RESET pushbuttons.

5.3.8. Place the COMPRESSOR SEQUENCE switch in the 1-2 position.

5.3.9. Place the RESET SWITCH to RESET.

CAUTION

Starting a compressor with its skid discharge valve closed causes damage to the compressor. Do not start the compressor until the respective compressor skid discharge valve is open.

CRITICAL STEP

5.3.10. Place the COMPRESSOR 1 ON/OFF switch to ON.

CRITICAL STEP

5.3.11. Place the COMPRESSOR 2 ON/OFF switch to ON.

5.3.12. Check the following:

- HVT-CUR5 COMPRESSOR 1 starts
- HVT-CUR5 COMPRESSOR 2 starts after a time delay

5.3.13. IF either compressor failed to start, THEN perform the following for the applicable compressor:

1. Place the COMPRESSOR 1(2) ON/OFF switch to OFF.
2. Depress the red HVT-CUR5 COMP 1(2) OIL PRESS CONTROL RESET pushbutton.
3. Place the COMPRESSOR 1(2) ON/OFF switch to ON.

NOTE

Since there is no start limitation for the compressors, Step 5.3.13.4 may be performed up to three successive times with no damage expected to the compressor.

4. Repeat Steps 5.3.13.1 through 5.3.13.3 until the compressor remains running.

5.4 Swapping from HVT-CUR5, Steam Tunnel Standby Condensing Unit to HVT-CUR4, Steam Tunnel Normal Condensing Unit

5.4.1. At T-Tunnel, 95 ft el, north wall, verify HVT-CUR4, STM TNL NORM CONDENSER UNIT Disconnect Switch closed.

5.4.2. Check HVT-CUR4, STEAM TUNNEL NORMAL CONDENSING UNIT compressor has been energized for at least 8 hours prior to compressor start.

NOTE

The following controls are located in HVT-CUR5, STEAM TUNNEL STBY CONDENSING UNIT control panel.

5.4.3. Stop HVT-CUR5, STEAM TUNNEL STANDBY CONDENSING UNIT by performing the following:

1. Place the COMPRESSOR 1 ON/OFF switch to OFF.
2. Place the COMPRESSOR 2 ON/OFF switch to OFF.
3. Place the RESET SWITCH to OFF.

5.4.4. Close the following valves:

- HVT-V3104, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3105, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3106, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3107, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE
- HVT-V3004, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 SUCT ISOL.
- HVT-V3005, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 DISCH ISOL.
- HVT-V3006, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 SUCT ISOL.
- HVT-V3007, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 DISCH ISOL.

5.4.5. Open the following valves:

- HVT-V3000, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 SUCT ISOL.
- HVT-V3001, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 DISCH ISOL.
- HVT-V3002, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 SUCT ISOL.
- HVT-V3003, HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 DISCH ISOL.
- HVT-V3100, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3101, HVT-CUR4 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3102, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3103, HVT-CUR4 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE

NOTE

The following switch is located inside HVT-CUR4, STEAM TUNNEL NORMAL CONDENSING UNIT control panel.

CRITICAL STEP

5.4.6. Place S1 switch to ON.

5.4.7. Verify the following:

- HVT-CUR4, STEAM TUNNEL NORMAL CONDENSING UNIT compressor 1 starts
- HVT-CUR4, STEAM TUNNEL NORMAL CONDENSING UNIT compressor 2 starts after a time delay

5.5 Operation of Steam Tunnel Air Conditioning System Cross-Connected

NOTE

This is an abnormal mode of operation and is only used if one compressor on HVT-CUR4, MAIN STEAM TUNNEL NORMAL CONDENSING UNIT is out of service for extended maintenance and a compressor on HVT-CUR5, STEAM TUNNEL STANDBY CONDENSING UNIT is also not available for an extended period of time.

Control switches in Steps 5.5.1 and 5.5.2 are for HVT-CUR5, STEAM TUNNEL STANDBY CONDENSING UNIT unless otherwise noted.

5.5.1. Cross-connect compressors as follows:

1. De-energize HVT-CUR4, COMPRESSOR 1(2) as follows:

   1) Place HVT-CUR4 switch S1 to OFF.

   2) Remove compressor fuse F44(F45) that is NOT to be operated.

CRITICAL STEP

2. Place HVT-CUR4, COMPRESSOR switch S1 to ON.

3. Verify compressor 1(2) starts after a time delay.

4. Close the following:

   1) HVT-V3000(V3002), HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1(2) SUCT ISOL.

   2) HVT-V3001(V3003), HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1(2) DISCH ISOL.

   3) HVT-V3100(V3102), HVT-CUR4 STM TNL NORM COND UNIT COMP 1(2) SUCT SERVICE VALVE

   4) HVT-V3101 (V3103), HVT-CUR4 STM TNL NORM COND UNIT COMP 1(2) DISCH SERVICE VALVE

5. Open the following:

   - HVT-V3104(3106), HVT-CUR5 STM TNL NORM COND UNIT COMP 1(2) SUCT SERVICE VALVE

   - HVT-V3105(3107), HVT-CUR5 STM TNL NORM COND UNIT COMP 1(2) DISCH SERVICE VALVE

   - HVT-V3004(V3006), HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1(2) SUCT ISOL.

   - HVT-V3005(V3007), HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1(2) DISCH ISOL.

6. Place COMPRESSOR SEQUENCE switch to the 1-2(2-1) position.

7. Place the RESET SWITCH to ON.

CAUTION

Starting a compressor with its skid discharge valve closed causes damage to the compressor. Do not start the compressor until the respective compressor skid discharge valve is open.

CRITICAL STEP

8. Place the COMPRESSOR 1(2) ON/OFF switch to ON.

9. IF HVT-CUR5 COMPRESSOR 1(2) failed to start, THEN perform the following:

   1) Place the COMPRESSOR 1(2) ON/OFF switch to OFF.

   2) Depress the red HVT-CUR5 COMP 1(2) OIL PRESS CONTROL RESET pushbutton.

   3) Place the COMPRESSOR 1(2) ON/OFF switch to ON.

NOTE

Since there is no start limitation for the compressors, Step 5.5.1.9.4) may be performed up to three successive times with no damage expected to the compressor.

4) Repeat Steps 5.5.1.9.1) through 5.5.1.9.3) until the compressor remains running.

5.5.2. Restore from cross-connected compressors as follows:

1. Place RESET SWITCH to OFF.

2. Place COMPRESSOR 1(2) ON/OFF switch to OFF.

3. Place COMPRESSOR SEQUENCE switch to the 2-1(1-2) position.

4. Close the following:

   - HVT-V3104(V3106), HVT-CUR5 STM TNL NORM COND UNIT COMP 1(2) SUCT SERVICE VALVE
   - HVT-V3105(V3107), HVT-CUR5 STM TNL NORM COND UNIT COMP 1(2) DISCH SERVICE VALVE
   - HVT-V3005(V3007), HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1(2) DISCH ISOL.
   - HVT-V3004(V3006), HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1(2) SUCT ISOL.

5. Open the following:

   - HVT-V3000(V3002), HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1(2) SUCT ISOL.
   - HVT-V3001(V3003), HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1(2) DISCH ISOL.
   - HVT-V3100(V3102), HVT-CUR4 STM TNL NORM COND UNIT COMP 1(2) SUCT SERVICE VALVE
   - HVT-V3101(V3103), HVT-CUR4 STM TNL NORM COND UNIT COMP 1(2) DISCH SERVICE VALVE

6. Place HVT-CUR4 S1 switch to OFF.

7. Install fuse F44(F45).

CRITICAL STEP

8. Place HVT-CUR4 S1 switch to ON and verify the following:

   1) Compressor 1 starts after a time delay.

   2) Compressor 2 starts after compressor 1 starts.

CAUTION

Do <u>not</u> have the Offgas Refrigeration Machines shutdown for more than 30 days with the offgas system in service. Offgas Post Treatment Radiation alarm and isolation setpoints are available to monitor offgas radiological conditions with the refrigeration machines shutdown.

5.6 Shutdown the Offgas Vault Refrigeration Machines for Up to 30 Days for Maintenance Activities

NOTE

Compressor runs for greater than or equal to 2 minutes and less than or equal to 8 minutes after STOP button is depressed.

5.6.1 At the skid for the running refrigeration unit(s), perform the following:

1. Stop HVT-C1A(B), COMPRESSOR.

2. Stop HVT-FN10A(B), FAN.

3. At panel HVT-PNL163, close HVT-AOD44A(B), OFFGAS UNIT COOLER DISCHARGE DAMPER.

5.7 Draining water from the Iodine Filter Train

5.7.1. <u>IF</u> water is found in any section of the Iodine Filtration Unit, <u>THEN</u> open the appropriate drain valve for that section as listed below:

- DFT-V5, HVT-FLY1 DRAIN VALVE
- DFT-V6, HVT-FLY1 DRAIN VALVE
- DFT-V7, HVT-FLY1 DRAIN VALVE
- DFT-V8, HVT-FLY1 DRAIN VALVE

5.7.2. <u>WHEN</u> is water is drained, <u>THEN</u> close the valve opened in Step 5.7.1.

6 SYSTEM SHUTDOWN

6.1 Offgas Vault Refrigeration

6.1.1. Check the Offgas System is no longer in service.

NOTE

Compressor runs for greater than or equal to 2 minutes and less than or equal to 8 minutes after STOP button is depressed.

6.1.2. At the skid for the running refrigeration unit(s), perform the following:

1. Stop HVT-C1A(B), COMPRESSOR.
2. Stop HVT-FN10A(B), FAN.
3. At panel HVT-PNL163, close HVT-AOD44A(B), OFFGAS UNIT COOLER DISCHARGE DAMPER.

6.1.3. At panel HVT-PNL162, perform the following:

1. Stop HVT-FN5, OFFGAS VAULT PRESS CONTROL FAN.
2. Verify HVT-AOD189, OFFGAS VAULT PRESS CONTROL DAMPER closed.

6.2 Offgas Vault Defrost Cycle

6.2.1. At panel HVT-PNL163 perform the following:

1. Stop HVT-FN6, OFFGAS REFRIGERATION DEFROST FAN.
2. Verify the following:
   - HVT-AOD188, OFFGAS REFRIGERATION EXHAUST AIR DAMPER closed
   - HVT-AOD187, OFFGAS REFRIGERATION OUTSIDE AIR DAMPER closed
   - HVT-AOD186, OFFGAS REFRIGERATION RETURN AIR DAMPER open

6.2.2. Install blank upstream of HVT-AOD187, OFFGAS REFRIGERATION OUTSIDE AIR DAMPER.

6.3 Iodine Filtration Unit

NOTE

The following controls are located on HVT-PNL162 unless otherwise noted.

6.3.1. Check the following pumps are secured:

- ARC-P1A, CONDENSER AIR REMOVAL PUMP
- ARC-P1B, CONDENSER AIR REMOVAL PUMP

NOTE

The 2 hour run of HVT-FN3 through HVT-AOD118 will remove moisture from the filter that may have accumulated during the ARC-P1A(B) operation.

6.3.2. WHEN ARC-P1A(B) have been shut down for at least 2 hours, THEN shutdown the Iodine Filtration Unit as follows:

1. Stop HVT-FN3, IODINE FILTER EXHAUST FAN.
2. Verify closed, HVT-AOD118, IODINE FILTER OUTDOOR AIR.
3. Verify HVT-FN4, IODINE FLTR DECAY HEAT REMOVAL FAN starts.
4. Verify the following dampers open:
   - HVT-AOD104, IODINE FLTR DECAY HEAT DISCH DAMPER
   - HVT-AOD113, IODINE FLTR DECAY HEAT INLET DAMPER

6.3.3. WHEN at least 30 minutes has elapsed, OR at the OSM/CRS direction, THEN perform the following:

1. Stop HVT-FN4, IODINE FLTR DECAY HEAT REMOVAL FAN.
2. Verify the following dampers closed:
   - HVT-AOD104, IODINE FLTR DECAY HEAT DISCH DAMPER
   - HVT-AOD113, IODINE FLTR DECAY HEAT INLET DAMPER
3. Place HVT-FN4, IODINE FLTR DECAY HEAT REMOVAL FAN in AUTO.

6.4 Turbine/Offgas Building Ventilation Shutdown

NOTE

The following controls are located on HVT-PNL162 unless otherwise noted.

6.4.1. Stop the running HVT-FN7A(B), H2 ANALYZER & PRETREAT SAMPLE PNL EXH FAN.

6.4.2. Verify HVT-AOD45A(B), H2 ANALYZER & PRETREAT FLOW CONTROL DAMPER closed.

6.4.3. Stop HVT-FN2A(B), EXHAUST FAN.

6.4.4. Verify HVT-AOD1A(B), EXHAUST FAN DISCH DAMPER closed.

6.4.5. Stop HVT-ACU2, SAMPLING ROOM AIR HDLG UNIT FAN.

CAUTION

Operating only one HVT-UC20 fan may cause the Leak Detection System temperature detectors to sense a high temperature in the turbine area resulting in a high temperature alarm. Do not operate only one HVT-UC20 fan.

6.4.6. Shutdown the desired unit coolers.

6.4.7. Stop HVT-ACU1H, SUPPLY AIR HEATER.

6.4.8. Stop the operating HVT-ACU1F1(2), SUPPLY FAN.

6.4.9. Stop the operating HVT-FN1A(B)(C), EXHAUST FAN.

6.4.10. Verify HVT-AOD4A(B)(C), EXHAUST FAN DISCH DAMPER closed.

6.5 HVT-CUR4, Main Steam Tunnel Normal Air Conditioning System Shutdown

6.5.1. Place control switch S1 to OFF.

6.5.2. At T-Tunnel, outside, north wall, open HVT-CUR4, STM TNL NORM CONDENSING UNIT Disconnect Switch.

6.5.3. At T-Tunnel, 98 ft el, open the following disconnect switches:

- HVT-ACU4A, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4B, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4C, STEAM TUNNEL AIR CONDITIONING UNIT

6.5.4. At NJS-LDC1CD, open BKR 063, HVT-CUR4, ACU4A, 4B, 4C STM TNL HVAC NORMAL FEED.

6.6 HVT-CUR5, Main Steam Tunnel Standby Air Conditioning System Shutdown

NOTE

The following are located at HVT-CUR5, STM TNL STBY COND UNIT, unless otherwise noted.

6.6.1. Place the following switches to OFF:

1. COMPRESSOR 1 ON/OFF switch
2. COMPRESSOR 2 ON/OFF switch
3. RESET SWITCH

6.6.2. Close the following:

- HVT-V3104, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE
- HVT-V3105, HVT-CUR5 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE
- HVT-V3106, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE
- HVT-V3107, HVT-CUR5 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE
- HVT-V3004, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 SUCT ISOL.

- HVT-V3005, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 DISCH ISOL.
- HVT-V3006, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 SUCT ISOL.
- HVT-V3007, HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 DISCH ISOL.

6.6.3. Open HVT-SW6, 480V FUSED DISCONN SW HVT-CUR5.

6.6.4. At T-Tunnel, 98 ft el, open the following disconnect switches:

- HVT-ACU4A, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4B, STEAM TUNNEL AIR CONDITIONING UNIT
- HVT-ACU4C, STEAM TUNNEL AIR CONDITIONING UNIT

6.7 HVT-CUR1, Turbine Building Sample Room Air Conditioning Unit Shutdown

NOTE

The following switch is located inside the condensing unit control panel, elevation TB 82', located above the Chemistry Sample Room.

6.7.1. IF HVT-CUR1, TURBINE BUILDING SAMPLE ROOM AIR CONDITIONING UNIT is to be shut down, THEN place the Compressor ON-OFF switch to OFF.

6.8 OFFGAS Vault Pressure Control Fan Shutdown for Maintenance

NOTE

It is preferred to have the OFFGAS vault pressure control fan running when OFFGAS is in service; however, the pressure control fan can be secured for periods of time when required to support maintenance on the fan or the fan suction or discharge dampers provided the Turbine Building and Off Gas Building ventilation are in service.

6.8.1. At panel HVT-PNL162, perform the following:

1. Stop HVT-FN5, OFFGAS VAULT PRESS CONTROL FAN.
2. Verify HVT-AOD189, OFFGAS VAULT PRESS CONTROL DAMPER closed.

7 REFERENCES

7.1 PID-22-3

7.2 ESK 6HVT01 through 06, 09 through 40 and 42 through 46

7.3 ESK 7HVT01 through 09

7.4 VTD-T265-0165

7.5 ER 96-0625

8 RECORDS

8.1 Record disposition shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVT-V1210	IODINE FLTR UNIT PREFILTER OUTLET SAMPLE POINT VALVE	CLOSED/ CAPPED		
HVT-V1211	IODINE FLTR UNIT HEPA FLTR OUTLET SAMPLE POINT VALVE	CLOSED/ CAPPED		
HVT-V1212	IODINE FLTR UNIT CHARCOAL FLTR OUTLET SAMPLE POINT VALVE	CLOSED/ CAPPED		
HVT-V1213	IODINE FLTR UNIT AFTERFLTR OUTLET SAMPLE POINT VALVE	CLOSED/ CAPPED		
HVT-AOD187	OFFGAS REFRIG OUTSIDE AIR DAMPER	BLANKED UPSTREAM		
HVT-V289A	VAULT REFRIG MACHINE N64-B012A EXPANSION TANK INLET VLV	OPEN		
HVT-HCV94A	OIL SKIMMER LINE FROM EXPANSION TANK ISOL VLV	OPEN		
HVT-V3011A	OIL SKIMMER LINE FROM EXPANSION TANK SKID ISOL VLV	OPEN		
HVT-V292A	HVT-PDS61A HIGH SIDE ROOT VLV	OPEN		
HVT-V293A	HVT-PDS61A LOW SIDE ROOT VLV	OPEN		
HVT-V297A	HVT-PI71A ROOT VALVE	OPEN		
HVT-HCV73A	HVT-C1A SUCTION TRAP DRAIN VLV TO OIL RECEIVER	OPEN		
HVT-V299A	HVT-C1A RECIRC LINE MANUAL SHUTOFF VLV	OPEN		
HVT-V295A	HVT-C1A HOT GAS BYPASS LINE MANUAL SHUTOFF VLV	OPEN		
HVT-V270A	HVT-C1A COMPRESSOR SUCTION VLV	OPEN		
HVT-V274A	HVT-C1A COMPRESSOR DISCH VLV	OPEN		
HVT-V271A	HVT-PI46A ROOT VLV	OPEN		
HVT-V272A	HVT-PI58A ROOT VLV	OPEN		

VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVT-V273A	HVT-PI63A ROOT VLV	OPEN		
HVT-V287A	HVT-C1A OIL CHARGING VLV	CLOSED/ CAPPED		
HVT-V298A	HVT-C1A COMPRESSOR DISCHARGE VLV	OPEN		
HVT-V277A	HVT-C1A COMPRESSOR DISCH DRAIN TO OIL RECEIVER	1/8 TURN OPEN		
HVT-V275A	OIL SEPARATOR FLOAT VALVE ISOL VLV	OPEN		
HVT-V276A	OIL SEPARATOR FLOAT VALVE ISOL VLV	OPEN		
HVT-V269A	OIL SEPARATOR DRAIN VLV TO OIL RECEIVER	OPEN		
HVT-V280A	CONDENSER VENT VLV	CLOSED/ CAPPED		
HVT-V281A	HVT-PCV84A CONTROL MEDIA SUPPLY VLV	OPEN		
HVT-V282A	RECEIVER TEST CONN	CLOSED/ CAPPED		
HVT-V283A	REFRIG UNIT A FLT 2A DRAIN ISOLATION VLV	CLOSED/ CAPPED		
HVT-V267A	REFRIG UNIT A SP1A OUTLET VENT VLV	CLOSED/ CAPPED		
HVT-V268A	REFRIG UNIT A EXPANSION TANK 3A OUTLET VENT VLV	CLOSED/ CAPPED		
HVT-V286A	CONDENSER DISCH VLV	OPEN		
HVT-V285A	RECEIVER DISCH FILTER/DRYER BYPASS VLV	CLOSED		
HVT-V284A	FILTER/DRYER INLET VLV	OPEN		
HVT-V279A	FILTER/DRYER OUTLET VLV	OPEN		
HVT-V294A	REFRIG UNIT A EXPANSION TANK OUTLET PI62A ROOT VLV	OPEN		
HVT-V3010A	REFRIG UNIT A INTERSTAGE COOLING BLOCK VLV	OPEN		

VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVT-V3009A	REFRIG UNIT A INTERSTAGE COOLING BLOCK VLV	OPEN		
HVT-V3008A	REFRIG UNIT A OIL COOLER E1A BLOCK VALVE	OPEN		
HVT-V3015A	REFRIG UNIT A COMPRESSOR CIA OIL HEATER DRAIN VLV	CLOSED		
HVT-HCV91A	REFRIG UNIT A OIL RECEIVER INLET ISOLATION VALVE	OPEN		
HVT-V3012A	REFRIG UNIT A PI404A ISOLATION VLV	OPEN		
HVT-V3013A	REFRIG UNIT A PI403A ISOLATION VLV	OPEN		
HVT-V3014A	REFRIG UNIT A OIL RECEIVER DRAIN VLV	CLOSED		
HVT-HCV90A	OIL RECEIVER TK2A VENT VLV	OPEN		
HVT-V289B	VAULT REFRIG MACHINE N64-B012B EXPANSION TANK INLET VLV	OPEN		
HVT-V294B	HVT-PI62B ROOT VLV	OPEN		
HVT-HCV94B	OIL SKIMMER LINE FROM EXPANSION TANK ISOL VLV	OPEN		
HVT-V3011B	OIL SKIMMER LINE FROM EXPANSION TANK SIDE ISOL VLV	OPEN		
HVT-V292B	HVT-PDS61B HIGH SIDE ROOT VLV	OPEN		
HVT-V293B	HVT-PDS61B LOW SIDE ROOT VLV	OPEN		
HVT-V297B	HVT-PI71B ROOT VLV	OPEN		
HVT-HCV73B	HVT-C1B SUCTION TRAP DRAIN VLV TO OIL RECEIVER	OPEN		
HVT-V299B	HVT-C1B RECIRC LINE MANUAL SHUTOFF VLV	OPEN		
HVT-V295B	HVT-C1B HOT GAS BYPASS LINE MANUAL SHUTOFF VLV	OPEN		

VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVT-V270B	HVT-C1B COMPRESSOR SUCTION VLV	OPEN		
HVT-V274B	HVT-C1B COMPRESSOR DISCHARGE VLV	OPEN		
HVT-V271B	HVT-PI46B ROOT VLV	OPEN		
HVT-V272B	HVT-PI58B ROOT VLV	OPEN		
HVT-V273B	HVT-PI63B ROOT VLV	OPEN		
HVT-V287B	HVT-C1B OIL CHARGING VLV	CLOSED/ CAPPED		
HVT-V298B	HVT-C1B COMPRESSOR DISCHARGE VLV	OPEN		
HVT-V277B	HVT-C1B COMPRESSOR DISCH DRAIN TO OIL RECEIVER	1/8 TURN OPEN		
HVT-V275B	OIL SEPARATOR FLOAT VALVE ISOL VLV	OPEN		
HVT-V276B	OIL SEPARATOR FLOAT VALVE ISOL VLV	OPEN		
HVT-V269B	OIL SEPARATOR DRAIN VLV TO OIL RECEIVER	OPEN		
HVT-V280B	CONDENSER VENT VLV	CLOSED/ CAPPED		
HVT-V281B	HVT-PCV84B CONTROL MEDIA SUPPLY VLV	OPEN		
HVT-V282B	RECEIVER TEST CONN	CLOSED/ CAPPED		
HVT-V283B	REFRIG UNIT B FLT 2B DRAIN ISOLATION VLV	CLOSED/ CAPPED		
HVT-V267B	REFRIG UNIT B SP1B OUTLET VENT VLV	CLOSED/ CAPPED		
HVT-V268B	REFRIG UNIT B EXPANSION TANK 3B OUTLET VENT VLV	CLOSED/ CAPPED		
HVT-V286B	CONDENSER DISCHARGE VLV	OPEN		
HVT-V285B	RECEIVER DISCH FILTER/DRYER BYPASS VLV	CLOSED		

VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVT-V284B	FILTER/DRYER INLET VLV	OPEN		
HVT-V279B	FILTER/DRYER OUTLET VLV	OPEN		
HVT-V3010B	REFRIG UNIT B INTERSTAGE COOLING BLOCK VLV	OPEN		
HVT-V3009B	REFRIG UNIT B INTERSTAGE COOLING BLOCK VLV	OPEN		
HVT-V3008B	REFRIG UNIT B OIL COOLER E1B BLOCK VALVE	OPEN		
HVT-V3015B	REFRIG UNIT B COMPRESSOR C1B OIL HEATER DRAIN VLV	CLOSED		
HVT-V3012B	REFRIG UNIT B PI404B ISOLATION VLV	OPEN		
HVT-HCV91B	REFRIG UNIT B OIL RECEIVER INLET ISOLATION VALVE	OPEN		
HVT-V3013B	REFRIG UNIT B PI403B ISOLATION VLV	OPEN		
HVT-V3014B	REFRIG UNIT B OIL RECEIVER DRAIN VLV	CLOSED		
HVT-HCV90B	OIL RECEIVER TK2B VENT VLV	OPEN		
HVT-V300	CONDENSING UNIT CUR 1 OUTLET VALVE	OPEN		
HVT-V301	AIR COND UNIT ACU2 REFRIG INLET FILTER INLET ISOL VLV	OPEN		
HVT-V303	AIR COND UNIT ACU2 REFRIG INLET FILTER OUTLET ISOL VLV	OPEN		
HVT-V302	AIR COND UNIT ACU2 REFRIG INLET FILTER BYPASS VLV	CLOSED		
HVT-V309	AIR COND UNIT ACU2 REFRIG CHARGING UNIT	CLOSED		
HVT-V304	COND UNIT CUR1 COMPRESSOR SUCTION FILTER INLET	OPEN		
HVT-V305	COND UNIT CUR1 COMPRESSOR SUCTION FILTER BYPASS	CLOSED		

VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVT-V306	COND UNIT CUR1 COMPRESSOR SUCTION FILTER OUTLET	OPEN		
THE FOLLOWING VALVES ARE LOCATED OUTSIDE T-TUNNEL, 95 FT EL				
HVT-V3000	HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 SUCT ISOL	OPEN		
HVT-V3100	HVT-CUR4 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE	OPEN		
HVT-V3001	HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 1 DISCH ISOL	OPEN		
HVT-V3101	HVT-CUR4 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE	OPEN		
HVT-V3002	HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 SUCT ISOL	OPEN		
HVT-V3102	HVT-CUR4 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE	OPEN		
HVT-V3003	HVT-CUR4 STM TNL NORM COND UNIT COMPRESSOR 2 DISCH ISOL	OPEN		
HVT-V3103	HVT-CUR4 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE	OPEN		
HVT-V3004	HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 SUCT ISOL	CLOSED		
HVT-V3104	HVT-CUR5 STM TNL NORM COND UNIT COMP 1 SUCT SERVICE VALVE	CLOSED		
HVT-V3005	HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 1 DISCH ISOL	CLOSED		

VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVT-V3105	HVT-CUR5 STM TNL NORM COND UNIT COMP 1 DISCH SERVICE VALVE	CLOSED		
HVT-V3006	HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 SUCT ISOL	CLOSED		
HVT-V3106	HVT-CUR5 STM TNL NORM COND UNIT COMP 2 SUCT SERVICE VALVE	CLOSED		
HVT-V3007	HVT-CUR5 STM TNL STBY COND UNIT COMPRESSOR 2 DISCH ISOL	CLOSED		
HVT-V3107	HVT-CUR5 STM TNL NORM COND UNIT COMP 2 DISCH SERVICE VALVE	CLOSED		

Remarks: ____

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Performed By: ____________________ __________ __________ _______/_______
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________________ __________ ______________
OSM/CRS KCN Date/Time

INSTRUMENT AND VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-AOD1A	OFFGAS BLDG EXH FAN FN2A OUT TD-15-154 FT EL		
	HVT-AOD1A-V1	OPEN	
HVT-AOD1B	OFFGAS BLDG EXH FAN FN2B OUT TD-15-151 FT EL		
	HVT-AOD1B-V1	OPEN	
HVT-AOD4A	TURB BLDG EXH FAN FN1A OUT TE-4-146 FT EL		
	HVT-AOD4A-V1	OPEN	
HVT-AOD4B	TURB BLDG EXH FAN FN1B OUT TF-4-146 FT EL		
	HVT-AOD4B-V1	OPEN	
HVT-AOD4C	TURB BLDG EXH FAN FN1C OUT TF-4-146 FT EL		
	HVT-AOD4C-V1	OPEN	
HVT-AOD44A	FN10A AIR SUPPLY TE-12-132 FT EL		
	HVT-AOD44A-V1	OPEN	
HVT-AOD44B	FAN 10B AIR SUPPLY TF-12-132 FT EL		
	HVT-AOD44B-V1	OPEN	
HVT-AOD45A	FAN-7A DISCHARGE TD-12-156 FT EL		
	HVT-AOD45A-V1	OPEN	
HVT-AOD45B	FAN FN7B DISCHARGE TD-13-156 FT EL		
	HVT-AOD45B-V1	OPEN	

INSTRUMENT AND VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-AOD104	FLTR DECAY HT FAN FN-4 OUT TE-10-128 FT EL		
	HVT-AOD104-V1	OPEN	
HVT-AOD113	FLTR FLT1 FRESH AIR INLET TC-10-126 FT EL		
	HVT-AOD113-V1 TE-10-131 FT	OPEN	
HVT-AOD114	IODINE FILTER FLT1 INLET TC-10-134 FT EL		
	HVT-AOD114-V1	OPEN	
HVT-AOD118	FLTR FLT1 OUT AIR F1 CONT TD-11-141 FT EL		
	HVT-AOD118-V1	OPEN	
HVT-AOD186	OFFGAS UC AIR RETURN TE-12-142 FT EL		
	HVT-AOD186-V1	OPEN	
HVT-AOD187	OFFGAS UC OUTLET AIR TE-12-142 FT EL		
	HVT-AOD187-V1	OPEN	
HVT-AOD188	OFFGAS UC OUTLET AIR TE-13-150 FT EL		
	HVT-AOD188-V1	OPEN	
HVT-AOD189	PRESS CONTROL FAN FN5 INLET TE-13-150 FT EL		
	HVT-AOD189-V1	OPEN	
HVT-FIC118	FILTER FLT1 OUT AIR FI CONT TD-10-128 FT EL		
	HVT-FIC118-V1	OPEN	

INSTRUMENT AND VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-FIC182	TURB BLDG DISCH DAMPERS TF-3-124 FT EL		
	HVT-FIC182-V1	OPEN	
HVT-FIC183	OFFGAS BLDG DISCH DAMPER TC-15-148 FT EL		
	HVT-FIC183-V1	OPEN	
HVT-FIC184	FANS FN7A&B COMMON DISCH TC-13-148 FT EL		
	HVT-FIC184-V1	OPEN	
HVT-FIC189	PRESS CONTROL FAN FN5 INLET TE-13-148 FT EL		
	HVT-FIC189-V1	OPEN	
HVT-FS102	FLTR FL1 EXHAUST FAN FN1 TE-10-130 FT EL		
	HVT-FS102-V1	CLOSED	
HVT-PDI105	FLT1 FINAL HEPA FILTER TE-10-124 FT EL		
	HVT-PDI105-V1H	OPEN	
	HVT-PDI105-V2L	OPEN	
	HVT-PDI105-V3B	CLOSED	
HVT-PDI107	FLT1 CHARCOAL FILTER TE-10-124 FT EL		
	HVT-PDI107-V1H	OPEN	
	HVT-PDI107-V2L	OPEN	
	HVT-PDI107-V3B	CLOSED	

INSTRUMENT AND VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-PDI109	FLT1 HEPA FILTER TD-10-124 FT EL		
	HVT-PDI109-V1H	OPEN	
	HVT-PDI109-V2L	OPEN	
	HVT-PDI109-V3B	CLOSED	
HVT-PDI110	FLT1 PREFILTER TD-10-124 FT EL		
	HVT-PDI110-V1H	OPEN	
	HVT-PDI110-V2L	OPEN	
	HVT-PDI110-V3B	CLOSED	
HVT-PDI112	FLT1 DEMISTER TC-10-124 FT EL		
	HVT-PDI112-V1H	OPEN	
	HVT-PDI112-V2L	OPEN	
	HVT-PDI112-V3B	CLOSED	
HVT-PDI159	TURB BLDG AIR HLDG UNIT ACU1 TF-2-134 FT EL		
	HVT-PDI159-V1H	OPEN	
	HVT-PDI159-V2L	OPEN	
	HVT-PDI159-V3B	CLOSED	
	HVT-PDI159-V4	CLOSED	
	HVT-PDI159-V5	CLOSED	
	HVT-PDI159-V6	CLOSED	
	HVT-PDI159-V7	CLOSED	
	HVT-PDI159-V8	OPEN	
	HVT-PDI159-V9	OPEN	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-PDI190	ACU2 AIR FLTR TB-4-81 FT EL		
	HVT-PDI190-V1H	OPEN	
	HVT-PDI190-V2L	OPEN	
	HVT-PDI190-V3B	CLOSED	
	HVT-PDI190-V4	CLOSED	
	HVT-PDI190-V5	CLOSED	
HVT-PDS105	FLT1 FINAL HEPA FILTER TE-10-124 FT EL		
	HVT-PDS105-V1H	OPEN	
	HVT-PDS105-V2L	OPEN	
	HVT-PDS105-V3B	CLOSED	
HVT-PDS107	FLT1 CHARCOAL FILTER TE-10-124 FT EL		
	HVT-PDS107-V1H	OPEN	
	HVT-PDS107-V2L	OPEN	
	HVT-PDS107-V3B	CLOSED	
HVT-PDS109	FLT1 HEPA FILTER TD-10-124 FT EL		
	HVT-PDS109-V1H	OPEN	
	HVT-PDS109-V2L	OPEN	
	HVT-PDS109-V3B	CLOSED	
HVT-PDS110	FLT1 PREFILTER TD-10-124 FT EL		
	HVT-PDS110-V1H	OPEN	
	HVT-PDS110-V2L	OPEN	
	HVT-PDS110-V3B	CLOSED	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-PDS112	FLT1 DEMISTER TD-10-124 FT EL		
	HVT-PDS112-V1H	OPEN	
	HVT-PDS112-V2L	OPEN	
	HVT-PDS112-V3B	CLOSED	
HVT-PDS159	TURB BLDG AIR BLDG UNIT ACU1 TF-2-134 FT EL		
	HVT-PDS159-V1H	OPEN	
	HVT-PDS159-V2L	OPEN	
	HVT-PDS159-V3B	CLOSED	
	HVT-PDS159-V4	CLOSED	
	HVT-PDS159-V5	CLOSED	
	HVT-PDS159-V6	CLOSED	
	HVT-PDS159-V7	CLOSED	
HVT-PDS190	ACU2 AIR FLTR TB-4-81 FT EL		
	HVT-PDS190-V1H	OPEN	
	HVT-PDS190-V2L	OPEN	
	HVT-PDS190-V3B	CLOSED	
	HVT-PDS190-V4	CLOSED	
	HVT-PDS190-V5	CLOSED	
HVT-PS185	IODINE FLTR FLT1 OUTLET TC-11-132 FT EL		
	HVT-PS185-V1	CLOSED	
HVT-TIC16A	AIR INLET UC1A TB-3-68 FT EL		
	HVT-TIC16A-V1	OPEN	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-TIC16B	AIR INLET UC1B TY-2-68 FT EL		
	HVT-TIC16B-V1	OPEN	
HVT-TIC17A	AIR INLET UC3A TZ-4-68 FT EL		
	HVT-TIC17A-V1	OPEN	
HVT-TIC17B	AIR INLET UC3B TZ-4-68 FT EL		
	HVT-TIC17B-V1	OPEN	
HVT-TIC17C	AIR OUTLET UC3C TZ-12-68 FT EL		
	HVT-TIC17C-V1	OPEN	
HVT-TIC17D	AIR OUTLET UC3D TZ-11-68 FT EL		
	HVT-TIC17D-V1	OPEN	
HVT-TIC19A	AIR INLET UC4A TC-8-68 FT EL		
	HVT-TIC19A-V1	OPEN	
HVT-TIC19B	AIR INLET UC4B TC-8-68 FT EL		
	HVT-TIC19B-V1	OPEN	
HVT-TIC21A	AIR INLET UC5A TZ-14-68 FT EL		
	HVT-TIC21A-V1	OPEN	
HVT-TIC21B	AIR INLET UC5B TZ-15-72 FT EL		
	HVT-TIC21B-V1	OPEN	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-TIC24A	AIR INLET UC14A TF-5-95 FT EL		
	HVT-TIC24A-V1	OPEN	
HVT-TIC24B	AIR INLET UC14B TF-5-95 FT EL		
	HVT-TIC24B-V1	OPEN	
HVT-TIC26A	AIR INLET UC16A TX-10-95 FT EL		
	HVT-TIC26A-V1	OPEN	
HVT-TIC26B	AIR INLET UC16B TX-16-95 FT EL		
	HVT-TIC26B-V1	OPEN	
HVT-TIC26C	AIR INLET UC16C TC-14-95 FT EL		
	HVT-TIC26C-V1	OPEN	
HVT-TIC28A	AIR INLET UC18A TZ-10-112 FT EL		
	HVT-TIC28A-V1	OPEN	
HVT-TIC28B	AIR INLET UC18B TZ-12-112 FT EL		
	HVT-TIC28B-V1	OPEN	
HVT-TIC28C	AIR INLET UC18C TZ-12-112 FT EL		
	HVT-TIC28C-V1	OPEN	
HVT-TIC30A	AIR INLET UC19A TX-4-154 FT EL		
	HVT-TIC30A-V1	OPEN	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-TIC30B	AIR INLET UC19B TX-7-154 FT EL		
	HVT-TIC30B-V1	OPEN	
HVT-TIC32A	AIR INLET UC21A TC-5-154 FT EL		
	HVT-TIC32A-V1	OPEN	
HVT-TIC32B	AIR INLET UC21B TC-7-154 FT EL		
	HVT-TIC32B-V1	OPEN	
HVT-TIC34A	AIR INLET UC23A TC-7-124 FT EL		
	HVT-TIC34A-V1	OPEN	
HVT-TIC34B	AIR INLET UC23B I/O MANUAL TE-7-124 FT EL		
	HVT-TIC34B-V1	OPEN	
HVT-TIC36A	AIR INLET UC25A TF-7-124 FT EL		
	HVT-TIC36A-V1	OPEN	
HVT-TIC36B	AIR INLET UC25B TF-10-124 FT EL		
	HVT-TIC36B-V1	OPEN	
HVT-TIC38A	AIR INLET UC24A TB-12-127 FT EL		
	HVT-TIC38A-V1	OPEN	
HVT-TIC38B	AIR INLET UC24B TX-16-124 FT EL		
	HVT-TIC38B-V1	OPEN	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-TIC38C	AIR INLET UC24C TY-16-124 FT EL		
	HVT-TIC38C-V1	OPEN	
HVT-TIC38D	AIR INLET UC24D TC-12-124 FT EL		
	HVT-TIC38D-V1	OPEN	
HVT-TIC40A	AIR INLET UC31A TE-15-138 FT EL		
	HVT-TIC40A-V1	OPEN	
HVT-TIC40B	AIR INLET UC31B TE-16-138 FT EL		
	HVT-TIC40B-V1	OPEN	
HVT-TIC116	AIR OUTLET ACU1 TE-2-139 FT EL		
	HVT-TIC116-V1	OPEN	
HVT-TIC121	AIR INLET UC2 TF-2-68 FT EL		
	HVT-TIC121-V1	OPEN	
HVT-TIC122	AIR INLET UC6 TB-11-68 FT EL		
	HVT-TIC122-V1	OPEN	
HVT-TIC123	AIR INLET UC7 TB-15-68 FT EL		
	HVT-TIC123-V1	OPEN	
HVT-TIC124	AIR INLET UC8 TX-16-68 FT EL		
	HVT-TIC124-V1	OPEN	

INSTRUMENT AND VALVE LINEUP - TURBINE BUILDING VENTILATION SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-TIC128	AIR INLET UC9 TB-6-81 FT EL		
	HVT-TIC128-V1	OPEN	
HVT-TIC130	AIR INLET UC10 TB-5-81 FT EL		
	HVT-TIC130-V1	OPEN	
HVT-TIC132	AIR INLET UC11 TB-2-95 FT EL		
	HVT-TIC132-V1	OPEN	
HVT-TIC134	AIR INLET UC12 TD-2-95 FT EL		
	HVT-TIC134-V1	OPEN	
HVT-TIC136	AIR INLET UC13 TF-2-95 FT EL		
	HVT-TIC136-V1	OPEN	
HVT-TIC138	AIR INLET UC15 TB-12-110 FT EL		
	HVT-TIC138-V1	OPEN	
HVT-TIC140	AIR INLET UC17 TY-12-95 FT EL		
	HVT-TIC140-V1	OPEN	
HVT-TIC142	AIR INLET UC20 TZ-8-154 FT EL		
	HVT-TIC142-V1	OPEN	
HVT-TIC144	AIR INLET UC22 TC-2-124 FT EL		
	HVT-TIC144-V1	OPEN	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVT-TIC146	AIR INLET UC26 TY-1-134 FT EL		
	HVT-TIC146-V1	OPEN	
HVT-TIC148	AIR INLET UC27 TE-13-79 FT EL		
	HVT-TIC148-V1	OPEN	
HVT-TIC150	AIR INLET UC28 TC-14-72 FT EL		
	HVT-TIC150-V1	OPEN	
HVT-TIC152	AIR INLET UC29 TF-13-110 FT EL		
	HVT-TIC152-V1	OPEN	
HVT-TIC154	AIR INLET UC30 TF-11-124 FT EL		
	HVT-TIC154-V1	OPEN	
HVT-TIC156	AIR INLET UC32 TC-13-149 FT EL		
	HVT-TIC156-V1	OPEN	
HVT-PS216	TURBINE BLDG TE-10-127 FT EL		
	HVT-PS216-V1	OPEN	
	HVT-PS216-V2	CLOSED	
	HVT-PS216-V3	CLOSED	
HVT-PS217	TURBINE BLDG TE-10-127 FT EL		
	HVT-PS217-V1	OPEN	
	HVT-PS217-V2	CLOSED	
	HVT-PS217-V3	CLOSED	

Remarks: ____

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OSM/CRS KCN Date/Time

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-C1A	OFFGAS VAULT REFRIG UNIT COMPRESSOR	NJS-LDC1E ACB079	RACKED IN CLOSED	
HVT-C1B	OFFGAS VAULT REFRIG UNIT COMPRESSOR	NJS-LDC1F ACB087	RACKED IN CLOSED	
HVT-FN1A	TURB BLDG VENT EXH FAN MOTOR	NJS-LDC1G ACB123	RACKED IN	
HVT-FN1C	TURB BLDG VENT EXH FAN MOTOR	NJS-LDC1G ACB124	RACKED IN	
HVT-ACU1H1	TURB BLDG VENT SUPPLY A/C UNIT HEATER	NJS-LDC1G ACB102	RACKED IN	
HVT-FN1B	TURB BLDG VENT EXH FAN MOTOR	NJS-LDC1H ACB127	RACKED IN	
HVT-CH1	TURBINE BLDG COIL HTR	NJS-LDC1H ACB128	RACKED IN CLOSED	
HVT-UC17	UNIT COOLER 17 FAN MOTOR	NHS-MCC1A BKR 3C	ON	
HVT-UC18A	UNIT COOLER 18A FAN MOTOR	NHS-MCC1A BKR 3D	ON	
HVT-UC24C	UNIT COOLER 24C FAN MOTOR	NHS-MCC1A BKR 4C	ON	
HVT-UC17H	UNIT COOLER 17 FAN MOTOR SPACE HEATER	SCA-PNL1A1 BKR 10	ON	
HVT-UC18AH	UNIT COOLER 18A FAN MOTOR SPACE HEATER			
HVT-UC24CH	UNIT COOLER 24C FAN MOTOR SPACE HEATER			
HVT-UC18B	UNIT COOLER 18B FAN MOTOR	NHS-MCC1B BKR 2C	ON	
HVT-UC18C	UNIT COOLER 18C FAN MOTOR	NHS-MCC1B BKR 2D	ON	
HVT-UC16C	UNIT COOLER 16C FAN MOTOR	NHS-MCC1B BKR 2B	ON	
HVT-UC16B	UNIT COOLER 16B FAN MOTOR	NHS-MCC1B BKR 1D	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-UC24B	UNIT COOLER 24B FAN MOTOR	NHS-MCC1B BKR 4D	ON	
HVT-UH1	TURB BLDG 95 FT EL HEATER	NHS-MCC1B BKR 2FT	ON	
HVT-UH3	FIRE PROTECTION ROOM HEATER	NHS-MCC1B BKR 2ET	ON	
HVT-UH4	FIRE PROTECTION ROOM HEATER	NHSMCC1B BKR 2EB	ON	
HVT-UC18BH	UNIT COOLER 18B FAN MOTOR SPACE HEATER	SCA-PNL1B1 BKR 5	ON	
HVT-UC18CH	UNIT COOLER 18C FAN MOTOR SPACE HEATER			
HVT-UC16BH	UNIT COOLER 16B FAN MOTOR SPACE HEATER			
HVT-UC16CH	UNIT COOLER 16C FAN MOTOR SPACE HEATER			
HVT-UC24BH	UNIT COOLER 24B FAN MOTOR SPACE HEATER			
HVT-UC3C	UNIT COOLER 3C FAN MOTOR	NHS-MCC1C1 BKR 4D	ON	
HVT-UC4A	UNIT COOLER 4A FAN MOTOR	NHS-MCC1C1 BKR 4E	ON	
HVT-UC5A	UNIT COOLER 5A FAN MOTOR	NHS-MCC1C1 BKR 4F	ON	
HVT-UC28	UNIT COOLER 28 FAN MOTOR	NHS-MCC1C1 BKR 4C	ON	
HVT-UC3CH	UNIT COOLER 3C FAN MOTOR SPACE HEATER	SCA-PNL1C1 BKR 19	ON	
HVT-UC4AH	UNIT COOLER 4A FAN MOTOR SPACE HEATER			
HVT-UC5AH	UNIT COOLER 5A FAN MOTOR SPACE HEATER			
HVT-UC28H	UNIT COOLER 28 FAN MOTOR SPACE HEATER			
HVT-UC3D	UNIT COOLER 3D FAN MOTOR	NHS-MCC1D2 BKR 3B	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-UC4B	UNIT COOLER 4B FAN MOTOR	NHS-MCC1D2 BKR 4A	ON	
HVT-UC5B	UNIT COOLER 5B FAN MOTOR	NHS-MCC1D2 BKR 4B	ON	
HVT-UC27	UNIT COOLER 27 FAN MOTOR	NHS-MCC1D2 BKR 3A	ON	
HVT-UC3DH	UNIT COOLER 3D FAN MOTOR SPACE HEATER	SCA-PNL1D1 BKR 5	ON	
HVT-UC4BH	UNIT COOLER 4B FAN MOTOR SPACE HEATER			
HVT-UC5BH	UNIT COOLER 5B FAN MOTOR SPACE HEATER			
HVT-UC27H	UNIT COOLER 27 FAN MOTOR SPACE HEATER			
HVT-UC16A	UNIT COOLER 16A FAN MOTOR	NHS-MCC1E BKR 4B	ON	
HVT-UC6	UNIT COOLER 6 FAN MOTOR	NHS-MCC1E BKR 4D	ON	
HVT-UC7	UNIT COOLER 7 FAN MOTOR	NHS-MCC1E BKR 4E	ON	
HVT-UC24A	UNIT COOLER 24A FAN MOTOR	NHS-MCC1E BKR 4C	ON	
HVT-UC16AH	UNIT COOLER 16A FAN MOTOR SPACE HEATER	SCA-PNL1E1 BKR 6	ON	
HVT-UC7H	UNIT COOLER 7 FAN MOTOR SPACE HEATER			
HVT-UC6H	UNIT COOLER 6 FAN MOTOR SPACE HEATER			
HVT-UC24AH	UNIT COOLER 24A FAN MOTOR SPACE HEATER			
HVT-UC15	UNIT COOLER 15 FAN MOTOR	NHS-MCC1F BKR 5C	ON	
HVT-UC8	UNIT COOLER 8 FAN MOTOR	NHS-MCC1F BKR 4A	ON	
HVT-UC19B	UNIT COOLER 19B FAN MOTOR	NHS-MCC1F BKR 5D	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-UC15H	UNIT COOLER 15 FAN MOTOR SPACE HEATER	SCA-PNL1F1 BKR 9	ON	
HVT-UC8H	UNIT COOLER 8 FAN MOTOR SPACE HEATER			
HVT-UC19BH	UNIT COOLER 19B FAN MOTOR SPACE HEATER			
HVT-TIS192	TURB BLDG SAMPLE ROOM TEMP INDICATING SW	SCA-PNL1F1 BKR 14	ON	
HVT-UC3A	UNIT COOLER 3A FAN MOTOR	NHS-MCC1G BKR 5B	ON	
HVT-UC3AH	UNIT COOLER 3A FAN MOTOR SPACE HEATER	SCA-PNL1G1 BKR 16	ON	
HVT-UC3B	UNIT COOLER 3B FAN MOTOR	NHS-MCC1H BKR 2C	ON	
HVT-UC3BH	UNIT COOLER 3B FAN MOTOR SPACE HEATER	SCA-PNL1H1 BKR 4	ON	
HVT-UC2	UNIT COOLER 2 FAN MOTOR	NHS-MCC1J BKR 4B	ON	
HVT-UC12	UNIT COOLER 12 FAN MOTOR	NHS-MCC1J BKR 2C	ON	
HVT-UC13	UNIT COOLER 13 FAN MOTOR	NHS-MCC1J BKR 4A	ON	
HVT-UC14A	UNIT COOLER 14A FAN MOTOR	NHS-MCC1J BKR 2E	ON	
HVT-UH2	TURB BLDG EL 95 HEATER	NHS-MCC1J BKR 1CB	ON	
HVT-ACUFLT1	TURB BLDG ACU UNIT COOL FILTER	SCA-PNL1J1 BKR 8	ON	
HVT-UC12H	UNIT COOLER 12 FAN MOTOR SPACE HEATER	SCA-PNL1J1 BKR 11	ON	
HVT-UC2H	UNIT COOLER 2 FAN MOTOR SPACE HEATER			
HVT-UC13H	UNIT COOLER 13 FAN MOTOR SPACE HEATER			
HVT-UC14AH	UNIT COOLER 14A FAN MOTOR SPACE HEATER			

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-UC14B	UNIT COOLER 14B FAN MOTOR	NHS-MCC1K BKR 2D	ON	
HVT-UC14BH	UNIT COOLER 14B FAN MOTOR SPACE HEATER	SCA-PNL1K1 BKR 7	ON	
HVT-ACU1F1	TURB BLDG VENT SUPPLY FAN MOTOR	NHS-MCC1L BKR 2E	ON	
HVT-FN3	IODINE FLTR UNIT EXH FAN MOTOR	NHS-MCC1L BKR 2C	ON	
HVT-FN4	DECAY HEAT REMOVAL FAN MOTOR	NHS-MCC1L BKR 2A	ON	
HVT-UC26	UNIT COOLER 26 FAN MOTOR	NHS-MCC1L BKR 4C	ON	
HVT-UC22	UNIT COOLER 22 FAN MOTOR	NHS-MCC1L BKR 4A	ON	
HVT-UC21A	UNIT COOLER 21A FAN MOTOR	NHS-MCC1L BKR 5E	ON	
HVT-UC20F1	UNIT COOLER 20 FAN F1 MOTOR	NHS-MCC1L BKR 5D	ON	
HVT-UC23A	UNIT COOLER 23A FAN MOTOR	NHS-MCC1L BKR 4B	ON	
HVT-UC25A	UNIT COOLER 25A FAN MOTOR	NHS-MCC1L BKR 5A	ON	
HVT-FN1AH	TURB BLDG VENT EXH FAN MOTOR SPACE HEATER	SCA-PNL1L1 BKR 4	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-UC26H	UNIT COOLER 26 FAN MOTOR SPACE HEATER	SCA-PNL1L1 BKR 5	ON	
HVT-UC22H	UNIT COOLER 22 FAN MOTOR SPACE HEATER			
HVT-UC21AH	UNIT COOLER 21A FAN MOTOR SPACE HEATER			
HVT-UC20F1H	UNIT COOLER 20 FAN F1 MOTOR SPACE HEATER			
HVT-UC23AH	UNIT COOLER 23A FAN MOTOR SPACE HEATER			
HVT-UC25AH	UNIT COOLER 25A FAN MOTOR SPACE HEATER			
HVT-FN4H	DECAY HEAT REMOVAL FAN MOTOR SPACE HEATER			
HVT-FN3H	IODINE FILTER UNIT EXH FAN MOTOR SPACE HEATER			
HVT-ACU1F1H	TURB BLDG VENT SUPPLY FAN MOTOR SPACE HEATER			
HVT-FLT1	IODINE FILTRATION UNIT	SCA-PNL1L1 BKR 16	ON	
	IODINE FILTRATION UNIT	SCA-PNL1L1 BKR 17	ON	
	IODINE FILTRATION UNIT	SCA-PNL1L1 BKR 18	ON	
HVT-TV138	HVT-CHL1 SVCE WTR OUT	SCA-PNL1L1 BKR 14	ON	
HVT-TT115	TEMP TRANSMITTER	SCA-PNL1L1 BKR 8	ON	
HVT-TT108	TEMP TRANSMITTER	SCA-PNL1L1 BKR 9	ON	
HVT-TIS106	IODINE FILTRATION UNIT TEMP INDICATING SW	SCA-PNL1L1 BKR 10	ON	
HVT-ACU1F2	TURB BLDG VENT SUPPLY FAN MOTOR	NHS-MCC1M BKR 6E	ON	
HVT-UC21B	UNIT COOLER 21B FAN MOTOR	NHS-MCC1M BKR 4D	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-UC20F2	UNIT COOLER 20 FAN F2 MOTOR	NHS-MCC1M BKR 2A	ON	
HVT-UC23B	UNIT COOLER 23B FAN MOTOR	NHS-MCC1M BKR 6D	ON	
HVT-UC24D	UNIT COOLER 24D FAN MOTOR	NHS-MCC1M BKR 5C	ON	
HVT-UC25B	UNIT COOLER 25B FAN MOTOR	NHS-MCC1M BKR 4C	ON	
HVT-FLT1H	HOGGING PUMP FILTER HEATER	NHS-MCC1M BKR 1BB	ON	
HVT-FIC118	IODINE FILTER TRAIN SUCTION DAMPER	SCA-PNL1M1 BKR 3	ON	
HVT-FN1BH	TURB BLDG VENT EXH FAN MOTOR SPACE HEATER	SCA-PNL1M1 BKR 11	ON	
HVT-FN1CH	TURB BLDG VENT EXH FAN MOTOR SPACE HEATER	SCA-PNL1M1 BKR 14	ON	
HVT-PNL162	HVT CONTROL PANEL	SCA-PNL1M1 BKR 21	ON	
HVT-PNL162	HVT CONTROL PANEL	SCA-PNL1M1 BKR 19	ON	
HVT-PNL162	HVT CONTROL PANEL	SCA-PNL1M1 BKR 10	ON	
FPW-ZS285	IODINE FLTR UNIT FIRE PROT VALVE SOL (FPW-V725)			
FPW-ZS286	IODINE FLTR UNIT FIRE PROT VALVE SOL (FPW-V711)			
HVT-SOV4A	TURB BLDG EXH FAN 1A DISCH DAMPER SOL			
HVT-SOV4B	TURB BLDG EXH FAN 1B DISCH DAMPER SOL			
HVT-SOV4C	TURB BLDG EXH FAN 1C DISCH DAMPER SOL			

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-PNL163	HVT CONTROL PANEL	SCA-PNL1M1 BKR 9	ON	
HVT-SOV44A	OFFGAS VAULT COOLING FAN FN10A DISCH DAMPER SOL	SCA-PNL1M1 BKR 9	ON	
HVT-SOV44B	OFFGAS VAULT COOLING FAN FN10B DISCH DAMPER SOL	SCA-PNL1M1 BKR 9	ON	
HVT-UC21BH	UNIT COOLER 21B FAN MOTOR SPACE HEATER	SCA-PNL1M1 BKR 12	ON	
HVT-ACU1F2H	TURB BLDG VENT SUPPLY FAN MOTOR SPACE HEATER	SCA-PNL1M1 BKR 12	ON	
HVT-UC20F2H	UNIT COOLER 20 FAN F2 MOTOR SPACE HEATER	SCA-PNL1M1 BKR 12	ON	
HVT-UC23BH	UNIT COOLER 23B FAN MOTOR SPACE HEATER	SCA-PNL1M1 BKR 12	ON	
HVT-UC24DH	UNIT COOLER 24D FAN MOTOR SPACE HEATER	SCA-PNL1M1 BKR 12	ON	
HVT-UC25BH	UNIT COOLER 25B FAN MOTOR SPACE HEATER	SCA-PNL1M1 BKR 12	ON	
HVT-UC1A	UNIT COOLER 1A FAN MOTOR	NHS-MCC1N BKR 1E	ON	
HVT-UC11F1	UNIT COOLER 11 FAN 1 MOTOR	NHS-MCC1N BKR 2D	ON	
HVT-UC19A	UNIT COOLER 19A FAN MOTOR	NHS-MCC1N BKR 1F	ON	
HVT-UC1AH	UNIT COOLER 1A FAN MOTOR SPACE HEATER	SCA-PNL1N1 BKR 13	ON	
HVT-UC11F1H	UNIT COOLER 11 FAN F1 MOTOR SPACE HEATER	SCA-PNL1N1 BKR 13	ON	
HVT-UC19AH	UNIT COOLER 19A FAN MOTOR SPACE HEATER	SCA-PNL1N1 BKR 13	ON	
HVT-UC1B	UNIT COOLER 1B FAN MOTOR	NHS-MCC1P BKR 3B	ON	
HVT-UC9	UNIT COOLER 9 FAN MOTOR	NHS-MCC1P BKR 4C	ON	
HVT-UC10	UNIT COOLER 10 FAN MOTOR	NHS-MCC1P BKR 3C	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

<table>
<tr><th>EQUIPMENT NUMBER</th><th>EQUIPMENT DESCRIPTION</th><th>POWER SUPPLY</th><th>REQ'D POSITION</th><th>INITIALS</th></tr>
<tr><td>HVT-UC11F2</td><td>UNIT COOLER 11 FAN 2 MOTOR</td><td>NHS-MCC1P BKR 5D</td><td>ON</td><td></td></tr>
<tr><td>HVT-CUR1</td><td>SAMPLING ROOM CONDENSER UNIT</td><td>NHS-MCC1P BKR 1CT</td><td>ON</td><td></td></tr>
<tr><td colspan="5"><u>NOTE</u>
At NHS-MCC1P, when tagging out HVT-ACU2, SAMPLING ROOM AIR HANDLING UNIT FAN tag both breaker 4B, SAMPLING ROOM AIR HANDLING UNIT FAN and breaker 1BB, SAMPLING ROOM AIR HDLG UNIT PREHEAT to de-energize the fan motor and the ventilation duct heater.</td></tr>
<tr><td>HVT-ACU2</td><td>SAMPLING ROOM AIR HANDLING UNIT FAN</td><td>NHS-MCC1P BKR 4B</td><td>ON</td><td></td></tr>
<tr><td>HVT-ACU2</td><td>SAMPLING ROOM AIR HDLG UNIT PREHEAT</td><td>NHS-MCC1P BKR 1BB</td><td>ON</td><td></td></tr>
<tr><td>HVT-UC1BH</td><td>UNIT COOLER 1B FAN MOTOR SPACE HEATER</td><td rowspan="4">SCA-PNL1P1 BKR 4</td><td rowspan="4">ON</td><td rowspan="4"></td></tr>
<tr><td>HVT-UC9H</td><td>UNIT COOLER 9 FAN MOTOR SPACE HEATER</td></tr>
<tr><td>HVT-UC10H</td><td>UNIT COOLER 10 FAN MOTOR SPACE HEATER</td></tr>
<tr><td>HVT-UC11F2H</td><td>UNIT COOLER 11 FAN 2 MOTOR SPACE HEATER</td></tr>
<tr><td>HVT-UC29</td><td>DEMINERALIZER BLDG UNIT COOLER</td><td>NHS-MCC4A BKR 1D</td><td>ON</td><td></td></tr>
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ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-FN2AH	OFFGAS BLDG VENT EXH FAN MOTOR SPACE HEATER	SCA-PNL4A1 BKR 9	ON	
HVT-FN7AH	H2 ANAL & PRETRT SAMPLE PNL EXH FAN MOTOR SPACE HEATER			
HVT-UC30H	UNIT COOLER 30 FAN MOTOR SPACE HEATER			
HVT-UC31AH	UNIT COOLER 31A FAN MOTOR SPACE HEATER			
HVT-FN5H	OFFGAS VAULT PRESS MAINT FAN MOTOR SPACE HEATER			
HVT-FN6H	OFFGAS VAULT DEFROST FAN MOTOR SPACE HEATER			
HVT-UC29H	UNIT COOLER 29 FAN MOTOR SPACE HEATER	SCA-PNL4A1 BKR 10	ON	
HVT-FN2BH	OFFGAS BLDG VENT EXH FAN MOTOR SPACE HEATER	SCA-PNL4B1 BKR 12	ON	
HVT-FN7BH	H2 ANAL & PRETRT SAMPLE PNL EXH FAN MOTOR SPACE HEATER			
HVT-UC31BH	UNIT COOLER 31B FAN MOTOR SPACE HEATER			
HVT-UC32H	UNIT COOLER 32 FAN MOTOR SPACE HEATER			
HVT-FN2A	OFFGAS BLDG VENT EXH FAN MOTOR	NHS-MCC4C BKR 3D	ON	
HVT-FN7A	H2 ANAL & PRETRT SAMPLE PNL EXH FAN MOTOR	NHS-MCC4C BKR 1F	ON	
HVT-UC30	UNIT COOLER 30 FAN MOTOR	NHS-MCC4C BKR 1D	ON	
HVT-UC31A	UNIT COOLER 31A FAN MOTOR	NHS-MCC4C BKR 1E	ON	
HVT-FN5	OFFGAS VAULT PRESS MAINT FAN MOTOR	NHS-MCC4C BKR 3B	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVT-FN6	OFFGAS VAULT DEFROST FAN MOTOR	NHS-MCC4C BKR 2D	ON	
HVT-CH1A	OFFGAS VAULT DEFROST HEATER 1A	NHS-MCC4C BKR 1CT	ON	
HVT-FN10A	OFFGAS VAULT REFRIG UNIT FAN MOTOR	NHS-MCC4C BKR 3C	ON	
HVT-FN2B	OFFGAS BLDG VENT EXH FAN MOTOR	NHS-MCC4D BKR 3D	ON	
HVT-FN7B	H2 ANAL & PRETRT SAMPLE PNL EXH FAN MOTOR	NHS-MCC4D BKR 2A	ON	
HVT-UC31B	UNIT COOLER 31B FAN MOTOR	NHS-MCC4D BKR 1D	ON	
HVT-UC32	UNIT COOLER 32 FAN MOTOR	NHS-MCC4D BKR 2B	ON	
HVT-CH1B	OFFGAS VAULT DEFROST HEATER 1B	NHS-MCC4D BKR 1CT	ON	
HVT-FN10B	OFFGAS VAULT REFRIG UNIT FAN MOTOR	NHS-MCC4D BKR 3C	ON	
HVT-CH2 HVT-TIS207	TURB BLDG DUCT COIL HEATER	NHS-MCC4D BKR 1CB	ON	
HVT-CH2	TURB BLDG DUCT COIL HEATER FAN RELAY COIL	SCA-PNL1L1 BKR 07		
HVT-CUR4; HVT-ACU4A,4B,4C	STM TNL HVAC NORMAL FEED	NJS-LDC1D ACB 063	OPEN	
HVT-CUR5	HVT-CUR5	NJS-PNL1 BKR 14	ON	
HVT-ACU4A, 4B, & 4C	STEAM TUNNEL (BACKUP) HVT-ACU4A, B, & C	NJS-PNL1 BKR 13	ON	

ELECTRICAL LINEUP - TURBINE BUILDING VENTILATION SYSTEM

Remarks: ____

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CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
THE FOLLOWING CONTROLS AND INDICATIONS ARE LOCATED ON HVT-PNL161 95 FT EL			
HVN-TV132 TEMP VALVE	N/A	GREEN	
HVT-UC11F1 UNIT COOLER	OFF	GREEN	
HVT-UC14A UNIT COOLER	OFF	GREEN	
HVN-TV25A TEMP VALVE	N/A	GREEN	
HVN-TV26A TEMP VALVE	N/A	GREEN	
HVT-UC16A UNIT COOLER	OFF	GREEN	
HVN-TV23A TEMP VALVE	N/A	GREEN	
HVT-UC18A UNIT COOLER	OFF	GREEN	
HVN-TV153 TEMP VALVE	N/A	GREEN	
HVT-UC29 UNIT COOLER	OFF	GREEN	
HVT-UC11F2 UNIT COOLER	OFF	GREEN	
HVN-TV25B TEMP VALVE	N/A	GREEN	
HVT-UC14B UNIT COOLER	OFF	GREEN	
HVN-TV26B TEMP VALVE	N/A	GREEN	
HVT-UC16B UNIT COOLER	OFF	GREEN	
HVN-TV23B TEMP VALVE	N/A	GREEN	
HVT-UC18B UNIT COOLER	OFF	GREEN	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVN-TV124 TEMP VALVE	N/A	GREEN	
HVT-UC12 UNIT COOLER	OFF	GREEN	
HVN-TV26C TEMP VALVE	N/A	GREEN	
HVT-UC16C UNIT COOLER	OFF	GREEN	
HVN-TV23C TEMP VALVE	N/A	GREEN	
HVT-UC18C UNIT COOLER	OFF	GREEN	
HVN-TV126 TEMP VALVE	N/A	GREEN	
HVT-UC13 UNIT COOLER	OFF	GREEN	
HVN-TV131 TEMP VALVE	N/A	GREEN	
HVT-UC15 UNIT COOLER	OFF	GREEN	
HVN-TV133 TEMP VALVE	N/A	GREEN	
HVT-UC17 UNIT COOLER	OFF	GREEN	
THE FOLLOWING CONTROLS AND INDICATIONS ARE LOCATED ON HVT-PNL160 67 FT EL			
HVN-TV18A TEMP VALVE	N/A	GREEN	
HVT-UC1A UNIT COOLER	OFF	GREEN	
HVN-TV20A TEMP VALVE	N/A	GREEN	
HVT-UC3A UNIT COOLER	OFF	GREEN	
HVN-TV21A TEMP VALVE	N/A	GREEN	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVT-UC4A UNIT COOLER	OFF	GREEN	
HVN-TV19A TEMP VALVE	N/A	GREEN	
HVT-UC5A UNIT COOLER	OFF	GREEN	
HVN-TV120 TEMP VALVE	N/A	GREEN	
HVT-UC7 UNIT COOLER	OFF	GREEN	
HVN-TV18B TEMP VALVE	N/A	GREEN	
HVT-UC1B UNIT COOLER	OFF	GREEN	
HVN-TV20B TEMP VALVE	N/A	GREEN	
HVT-UC3B UNIT COOLER	OFF	GREEN	
HVN-TV21B TEMP VALVE	N/A	GREEN	
HVT-UC4B UNIT COOLER	OFF	GREEN	
HVN-TV19B TEMP VALVE	N/A	GREEN	
HVT-UC5B UNIT COOLER	OFF	GREEN	
HVN-TV121 TEMP VALVE	N/A	GREEN	
HVT-UC8 UNIT COOLER	OFF	GREEN	
HVN-TV20C TEMP VALVE	N/A	GREEN	
HVT-UC3C UNIT COOLER	OFF	GREEN	
HVN-TV118 TEMP VALVE	N/A	GREEN	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVT-UC9 UNIT COOLER	OFF	GREEN	
HVN-TV123 TEMP VALVE	N/A	GREEN	
HVT-UC2 UNIT COOLER	OFF	GREEN	
HVN-TV20D TEMP VALVE	N/A	GREEN	
HVT-UC3D UNIT COOLER	OFF	GREEN	
HVN-TV119 TEMP VALVE	N/A	GREEN	
HVT-UC6 UNIT COOLER	OFF	GREEN	
HVN-TV117 TEMP VALVE	N/A	GREEN	
HVT-UC10 UNIT COOLER	OFF	GREEN	
HVN-TV151 TEMP VALVE	N/A	GREEN	
HVT-UC27 UNIT COOLER	OFF	GREEN	
HVN-TV152 TEMP VALVE	N/A	GREEN	
HVT-UC28 UNIT COOLER	OFF	GREEN	
THE FOLLOWING CONTROL AND INDICATIONS ARE LOCATED ON HVT-PNL163 123 FT EL			
HVT-AOD188 OFFGAS REFRIGERATION EXHAUST AIR DAMPER	N/A	GREEN	
HVT-AOD187 OFFGAS REFRIGERATION OUTLET AIR DAMPER	N/A	GREEN	
HVT-AOD186 OFFGAS REFRIGERATION RETURN AIR DAMPER	N/A	RED	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVT-FN6 OFFGAS REFRIGERATION DEFROST FAN	OFF	GREEN	
HVT-AOD44B OFFGAS UNIT COOLER DISCH DAMPER	OFF	GREEN	
HVT-AOD44A OFFGAS UNIT COOLER DISCH DAMPER	OFF	GREEN	
THE FOLLOWING CONTROLS AND INDICATIONS ARE LOCATED ON HVT-PNL162 123 FT EL			
HVN-TV38A TEMP VALVE	N/A	GREEN	
HVT-UC19A UNIT COOLER	OFF	GREEN	
HVN-TV31A TEMP VALVE	N/A	GREEN	
HVT-UC21A UNIT COOLER	OFF	GREEN	
HVN-TV32A TEMP VALVE	N/A	GREEN	
HVT-UC23A UNIT COOLER	OFF	GREEN	
HVN-TV34A TEMP VALVE	N/A	GREEN	
HVT-UC24A UNIT COOLER	OFF	GREEN	
HVN-TV30A TEMP VALVE	N/A	GREEN	
HVT-UC25A UNIT COOLER	OFF	GREEN	
HVN-TV38B TEMP VALVE	N/A	GREEN	
HVT-UC19B UNIT COOLER	OFF	GREEN	
HVN-TV31B TEMP VALVE	N/A	GREEN	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVT-UC21B UNIT COOLER	OFF	GREEN	
HVN-TV32B TEMP VALVE	N/A	GREEN	
HVT-UC23B UNIT COOLER	OFF	GREEN	
HVN-TV34B TEMP VALVE	N/A	GREEN	
HVT-UC24B UNIT COOLER	OFF	GREEN	
HVN-TV30B TEMP VALVE	N/A	GREEN	
HVT-UC25B UNIT COOLER	OFF	GREEN	
HVN-TV139 TEMP VALVE	N/A	GREEN	
HVT-UC20F1 UNIT COOLER	OFF	GREEN	
HVT-UC20F2 UNIT COOLER	OFF	GREEN	
HVN-TV34C TEMP VALVE	N/A	GREEN	
HVT-UC24C UNIT COOLER	OFF	GREEN	
HVN-TV136 TEMP VALVE	N/A	GREEN	
HVT-UC22 UNIT COOLER	OFF	GREEN	
HVN-TV34D TEMP VALVE	N/A	GREEN	
HVT-UC24D UNIT COOLER	OFF	GREEN	
HVN-TV137 TEMP VALVE	N/A	GREEN	
HVT-UC26 UNIT COOLER	OFF	GREEN	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVN-TV154 TEMP VALVE	N/A	GREEN	
HVT-UC30 UNIT COOLER	OFF	GREEN	
HVN-TV43A TEMP VALVE	N/A	GREEN	
HVT-UC31A UNIT COOLER	OFF	GREEN	
HVN-TV43B TEMP VALVE	N/A	GREEN	
HVT-UC31B UNIT COOLER	OFF	GREEN	
HVN-TV155 TEMP VALVE	N/A	GREEN	
HVT-UC32 UNIT COOLER	OFF	GREEN	
HVT-ACU1H SUPPLY AIR HTR	NOT DEPRESSED AFTER STOP	GREEN/WHITE	
HVN-TV138 TEMP VALVE	N/A	GREEN	
HVT-ACU1F1 SUPPLY FAN	OFF	GREEN	
HVT-ACU1F2 SUPPLY FAN	OFF	GREEN	
HVT-AOD4A EXHAUST FAN DISCH DAMPER	N/A	GREEN	
HVT-FN1A EXHAUST FAN	NOT DEPRESSED AFTER STOP	GREEN/WHITE	
HVT-AOD4B EXHAUST FAN DISCH DAMPER	N/A	GREEN	
HVT-FN1B EXHAUST FAN	NOT DEPRESSED AFTER STOP	GREEN/WHITE	
HVT-AOD4C EXHAUST FAN DISCH DAMPER	N/A	GREEN	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVT-FN1C EXHAUST FAN	NOT DEPRESSED AFTER STOP	GREEN/WHITE	
HVT-AOD114 IODINE FILTER INLET DAMPER	N/A	RED	
HVT-AOD118 IODINE FILTER OUTDOOR AIR	N/A	GREEN	
HVT-FN3 IODINE FILTER EXHAUST FAN	OFF	GREEN	
FPW-V711 HVT-FLT1 WS-15 INLET ISOLATION VALVE	N/A	GREEN	
FPW-V725 HVT-FLT1 WS-15 INLET ISOLATION VALVE	N/A	GREEN	
HVT-AOD104 IODINE FLTR DECAY HEAT DISCH DAMPER	N/A	GREEN	
HVT-AOD113 IODINE FLTR DECAY HEAT INLET DAMPER	N/A	GREEN	
HVT-FN4 IODINE FLTR DECAY HEAT REMOVAL FAN	AUTO	GREEN	
HVT-AOD1A EXHAUST FAN DISCH DAMPER	N/A	GREEN	
HVT-FN2A EXHAUST FAN	OFF	GREEN	
HVT-AOD1B EXHAUST FAN DISCH DAMPER	N/A	GREEN	
HVT-FN2B EXHAUST FAN	OFF	GREEN	
HVT-AOD189 OFFGAS VAULT PRESS CONTROL DAMPER	N/A	GREEN	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVT-FN5 OFFGAS VAULT PRESS CONTROL FAN	OFF	GREEN	
HVT-AOD45A H2 ANALYZER & PRETREAT FLOW CONTROL DAMPER	N/A	GREEN	
HVT-FN7A H2 ANALYZER & PRETREAT SAMPLE PNL EXH FAN	OFF	GREEN	
HVT-AOD45B H2 ANALYZER & PRETREAT FLOW CONTROL DAMPER	N/A	GREEN	
HVT-FN7B H2 ANALYZER & PRETREAT SAMPLE PNL EXH FAN	OFF	GREEN	
HVT-ACU2 SAMPLING ROOM AIR HANDLING UNIT FAN	OFF	GREEN	
THE FOLLOWING CONTROLS ARE LOCATED AT HVT-ACU1 123 FT EL MEZZANINE			
HVT-ACUFLT1 TURB BLDG SUPPLY ROLL FILTER	AUTO (NOTE 1)	N/A	
THE FOLLOWING CONTROLS ARE LOCATED ON THE VAULT REFRIG UNIT CONTROL PANEL HVT-SKD3A 123 FT EL			
VAULT REFRIG MACHINE A PANEL DISCONNECT	ON	N/A	
SYSTEM ENERGIZED	N/A	RED	
HVT-FN10A FAN ON	N/A	NONE	
HVT-FN10A FAN START	NOT DEPRESSED	N/A	
HVT-FN10A FAN STOP	NOT DEPRESSED	N/A	
HVT-FN10A FAN OFF	N/A	GREEN	
HVT-C1A COMPRESSOR ON	N/A	NONE	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVT-C1A COMPRESSOR START	NOT DEPRESSED	N/A	
HVT-C1A COMPRESSOR STOP	NOT DEPRESSED	N/A	
HVT-C1A COMPRESSOR OFF	N/A	GREEN	
DEFROST ON	N/A	NONE	
THE FOLLOWING CONTROLS ARE LOCATED ON THE VAULT REFRIG UNIT CONTROL PANEL HVT-SKD3B 123 FT EL			
VAULT REFRIG MACHINE B PANEL DISCONNECT	ON	N/A	
SYSTEM ENERGIZED	N/A	RED	
HVT-FN10B FAN ON	N/A	NONE	
HVT-FN10B FAN START	NOT DEPRESSED	N/A	
HVT-FN10B FAN STOP	NOT DEPRESSED	N/A	
HVT-FN10B FAN OFF	N/A	GREEN	
HVT-C1B COMPRESSOR ON	N/A	NONE	
HVT-C1B COMPRESSOR START	NOT DEPRESSED	N/A	
HVT-C1B COMPRESSOR STOP	NOT DEPRESSED	N/A	
HVT-C1B COMPRESSOR OFF	N/A	GREEN	
DEFROST ON	N/A	NONE	

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
T-TUNNEL, 98 FT EL			
HVT-ACU4A, 4B, 4C STM TNL AIR COND UNITS MAIN DISCONNECT AND FEED SELECTOR	NORMAL SUPPLY	N/A	
HVT-ACU4A STEAM TUNNEL AIR COND UNIT	OPEN	N/A	
HVT-ACU4B STEAM TUNNEL AIR COND UNIT	OPEN	N/A	
HVT-ACU4C STEAM TUNNEL AIR COND UNIT	OPEN	N/A	
OUTSIDE T-TUNNEL, NORTH WALL, 98 FT EL, COL NJ			
HVT-CUR4 STM TNL NORM CONDENSING UNIT DISCONNECT	OPEN	N/A	
OUTSIDE T-TUNNEL AT HVT-CUR 5, 98 FT EL			
HVT-SW6, 480V FUSED DISCONN SW HVT-CUR5	OPEN	N/A	
OFFGAS AREA			
HVT-CH2, TURBINE BUILDING DUCT COIL HEATER DISCONNECT	ON	N/A	
THE FOLLOWING CONTROLS ARE ABOVE THE CHEMISTRY SAMPLE ROOM 82 FT EL			
HVT-CUR1 ON-OFF TURBINE BUILDING SAMPLE ROOM AIR CONDITIONING UNIT	ON	N/A	

(NOTE 1) – The HVT-ACUFLT1 TURB BLDG SUPPLY ROLL FILTER auto mode input is from differential pressure only. Timer function has been removed from circuit, per ER-RB-2004-0274.

CONTROL BOARD LINEUP - TURBINE BUILDING VENTILATION SYSTEM

Remarks: ____

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Performed By: ____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

Reviewed By: ____________________ __________ __________
OSM/CRS KCN Date/Time

CONTINUOUS USE

*G12.1.6

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
*SYSTEM OPERATING PROCEDURE

*TURBINE AND RADWASTE BUILDING HVAC CHILLED WATER SYSTEM (SYS #410)

PROCEDURE NUMBER:	***SOP-0116**
REVISION NUMBER:	***021**
Effective Date:	***08/08/2012**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
SOP-0116R020EC-A	Added Precaution & Limitation 2.12 and Cautions to Steps 5.12.2 & 5.12.9.2 to describe the proper tightening technique for compression fittings per CR-RBS-2012-04312 CA 06.

TABLE OF CONTENTS

1 PURPOSE

1.1 The purpose of this procedure is to provide the specific steps necessary to startup, operate, and shutdown the Turbine and Radwaste Building HVAC Chilled Water Systems.

2 PRECAUTIONS AND LIMITATIONS

2.1 Turbine and Radwaste Building Ventilation Chilled Water equipment capacities are as follows:

- Turbine Building Chillers - 50% each.
- Turbine Building Chilled Water Pumps - 100% each.
- Radwaste/Fuel Building Chillers - 50% each.
- Radwaste Building Chilled Water Pumps - 100% each.
- Fuel Building Chilled Water Pumps - 100% each.

2.2 The HVN-CHL1A(B)(C), VENT CHLR CPRSR and HVN-CHL2A(B)(C), RDWST & FUEL BLDG VENT CHILLER CPRSR starting is inhibited as follows:

- A chiller is prevented from restarting, by an anti-cycle time delay, until 30 minutes have elapsed from the previous start. This time delay allows for cool down of the chiller motor prior to restart.
- A chiller is prevented from starting until oil temperature is greater than 120°F.

C 2.3 During chiller startup, the START Pushbutton should be held for greater than 30 seconds to allow lube oil pressure to rise to a normal operating level above the compressor trip setpoint.

2.4 Even though the refrigerant is not toxic at normal temperatures, in heavy concentrations it will displace the air and can cause suffocation.

2.5 When exposed to heater elements or flame, Freon refrigerant becomes highly toxic, and even in low concentrations may cause fatal or serious injury. If a flame or heating element exists in a room when Freon is present, the room or space must be evacuated. IF personnel are required to enter the space, THEN use of breathing apparatus is required until the space is ventilated and the air sampled.

2.6 Potential exists for water hammer when testing or performing system lineups. Individual components requiring venting are vented locally prior to placing the system in service to prevent water hammer.

2.7 The following flow orifices and flow transmitters require venting during SWP Loop Fill or if the chiller condenser has been isolated and drained:

- SWP-FE14A, B, C, D
- SWP-FTX518A, B, C, D

2.8 During periods of cool weather (low load conditions of approximately 60 degrees Fahrenheit or less) the Radwaste/Fuel Building Chillers may surge from the lack of heat load. Should the chiller start to surge, it is permissible to operate the chiller in “HOLD” after setting the controls to eliminate the surging. A good indication of surging is condenser pressure and amperage oscillating. At no time should the chiller be allowed to surge for an extended period of time. If the surging can <u>not</u> be eliminated by adjusting the controls while operating the chiller in “HOLD”, the chiller should be shutdown until adequate load is available. Adequate load is available when the chiller runs without surging. If cooling is needed in the Radwaste or Fuel Building during periods of low load additional administrative measures may be needed to maintain the chillers operating such as failing open the unit cooler temperature control valves.

2.9 When tagging out HVN-DEMN1, HVAC CHILLED WTR DEMIN 1, for resin replacement, do <u>NOT</u> drain the demineralizer of water as this water is used for sluicing the vessel’s exhausted resin out (Ref: CR-RBS-2005-2999 and CR-RBS-2005-3016).

2.10 Draining of HVN Water or any closed loop cooling system into plant radioactive drain systems will impact the liquid radioactive waste system in a negative manner. Thus, introduction of HVN Water into plant radioactive drains should be minimized to the maximum extent practicable.

2.11 If draining HVN Water into plant radioactive drain systems is necessary, the Operations Shift Manager, Control Room Supervisor, or Work Control / Outage Management SRO should contact Radwaste Management to evaluate the potential impact upon radioactive waste water processing. Initiate appropriate documentation (e.g., plant condition report, control room log entry) documenting the event, approximately how much water is drained, and the evaluated impact of the drain.

2.12 Over tightening compression type fittings will damage the threads and sealing surfaces of the fittings. This type of fitting should only require a maximum of ¼ turn more than hand tight. Over tightening and damage has occurred on more than one occasion while making the connection on HVN-V982, HVN COMPRESSION TK HVN-TK2 PI169 ROOT, during HVN-TK2, Chilled Water Compression Tank, repressurization.

2.13 HVN-CAB1, HVAC CHILLED WTR CHILLERS (TURB BLDG) REFRIGERANT MONITOR and HVN-CAB2, HVAC CHILLED WTR CHILLERS (RW BLDG) REFRIGERANT MONITOR have been installed to detect refrigerant (R-123) concentrations in the immediate area of the HVN chillers (MR95-0064). The monitor main display indicates refrigerant concentration levels in parts per million (ppm) from each sample port for two ports at a time. For each port, the display shows the port number followed by a colon and the concentration level. An arrow to the right of the concentration level reading indicates the port currently being analyzed. (VTM 3216.130-995-084A)

2.14 HVN-CAB1, HVAC CHILLED WTR CHILLERS (TURB BLDG) REFRIGERANT MONITOR and HVN-CAB2, HVAC CHILLED WTR CHILLERS (RW BLDG) REFRIGERANT MONITORS are equipped with continuous indication and one local annunciating alarm as follows:

REFRIGERANT CONCENTRATION	**SAFETY SIGNIFICANCE**	**RECOMMENDED ACTION**
10 ppm	Early warning of refrigerant leak from HVN chillers. No immediate safety concern.	Notify WMC/HVN chiller System Engineer.
20 ppm	Refrigerant concentration is approaching alarm level. No immediate safety concern.	Notify WMC/HVN chiller System Engineer.
27 ppm (Alarm Level)	Refrigerant concentration is approaching alarm level. No immediate safety concern.	Notify MCR. Restrict personnel access to the area around the HVN chillers until the alarm is cleared.

3 PREREQUISITES

3.1 Check Makeup Water System in operation and aligned to the Chilled Water System per SOP-0099, Makeup Water System.

3.2 Check Normal Service Water System in operation and aligned to the Chilled Water System per SOP-0018, Normal Service Water.

3.3 Check the following electrical systems are in operation and aligned to the Chilled Water System:

3.3.1. 4.160KV per SOP-0046, 4.16KV System.

3.3.2. 480VAC per SOP-0047, 480VAC System.

3.3.3. 120VAC per SOP-0048, 120VAC System.

3.4 Check Instrument Air System in operation and aligned to the Chilled Water System per SOP-0022, Instrument Air System.

3.5 Verify the system is lined up for startup.

4 SYSTEM STARTUP

4.1 Filling and Venting Turbine/Offgas/Containment Building Chilled Water

NOTE

This section of the procedure only addresses filling and venting of Chilled Water Headers not specific components.

CAUTION

Possible damage to Chilled Water Pumps can occur if NPSH is lost to the pumps. Do not allow HVN-TK1, SURGE TANK level to be lost during fill/vent process.

4.1.1. At Turbine Building 67 ft el, vent Turbine Building Chiller Inlet and Outlet Headers using the following:

- HVN-V815, TURBINE BUILDING CHILLER INLET HEADER VENT
- HVN-V812, HVN SUPPLY HEADER VENT TB
- HVN-V813, HVN SUPPLY HEADER VENT TB

4.1.2. At Turbine Building, 67 ft el, TZ-14, near HVT-UC5A, vent HVT-UC3C/D, UC5A/B, UC7, and UC8 header using the following:

- HVN-V822, HVN RETURN HEADER VENT TB
- HVN-V823, HVN SUPPLY HEADER VENT TB

4.1.3. At Turbine Building, 95 ft el, TX-12, near HVT-UC17, vent HVT-UC15, UC16A, UC17, and UC24A header using the following:

- HVN-V836, HVN SUPPLY HDR VENT FOR HVT-UC17, UC16A
- HVN-V837, HVN RETURN HDR VENT FOR HVT-UC17, UC16A

4.1.4. At Turbine Building, 95 ft el, west condenser bay, TC-8, vent HVT-UC4A/B header using the following:

- HVN-V832, HVN SUPPLY HEADER VENT TB EL 95'
- HVN-V833, HVN RETURN HEADER VENT TB EL 95'

4.1.5. At Turbine Building, 123 ft el, near HVT-UC24C, TY-16, vent HVT-UC16B/C and UC24B/C header using the following:

- HVN-V846, HVN UNIT COOLER HVT-UC24B, UC24C SUPPLY HDR VENT
- HVN-V847, HVN UNIT COOLER HVT-UC24B, UC24C RETURN HDR VENT

4.1.6. At Turbine Building, 123 ft el, near HVT-UC24D, TC-12, vent HVT-UC24D header using the following:

- HVN-V848, HVN TURB BLDG COOLER HVT-UC24D RETURN HDR VENT
- HVN-V849, HVN TURB BLDG COOLER HVT-UC24D SUPPLY HDR VENT

4.1.7. At Turbine Building, 123 ft el, near HVT-UC25B, TF-10, vent HVT-UC25B header using the following:

- HVN-V840, HVN SUPPLY HEADER VENT TB
- HVN-V841, HVN RETURN HEADER VENT TB

4.1.8. At Turbine Building, 134 ft el, above personnel passageway, TZ-1, vent HVT-UC22 and UC26 header using the following:

- HVN-V842, HVN SUPPLY HEADER VENT TB
- HVN-V843, HVN RETURN HEADER VENT TB

4.1.9. At Turbine Building, 154 ft el, east side Turbine Deck Mezzanine, TB-3, vent HVT- UC1A/B, UC9, UC10, UC11, and UC19A/B header using the following:

- HVN-V850, HVN UNIT COOLER SUPPLY HEADER VENT TB
- HVN-V851, HVN UNIT COOLER RETURN HEADER VENT TB

4.1.10. At Turbine Building, 148 ft el, near HVT-UC32A above Offgas H_2 Samplers, TC-12, vent HVT-UC32 header using the following:

- HVN-V872, OFFGAS BLDG COOLER HVT-UC32 SUPPLY HEADER VENT
- HVN-V873, OFFGAS BLDG COOLER HVT-UC32 RETURN HEADER VENT

4.1.11. At Turbine Building, 137 ft el, near HVT-UC31B in southwest corner of Offgas area, TF-16, vent HVT-UC31B header using the following:

- HVN-V874, OFFGAS BLDG COOLER HVT-UC31B SUPPLY HEADER VENT
- HVN-V875, OFFGAS BLDG COOLER HVT-UC31B SUPPLY HEADER VENT

4.1.12. At Auxiliary Building, 141 ft el, behind EJS-LDC2A, vent HVR-UC14 header using the following:

- HVN-V1340, SUPPLY HEADER TO HVR-UC14 VENT
- HVN-V1341, RETURN HEADER FROM HVR-UC14 VENT

4.1.13. At Auxiliary Building, 141 ft el extreme southwest corner, vent Containment Supply Header using HVN-V3058, HVN CONTMT SUPPLY HEADER VENT.

4.1.14. At Auxiliary Building, 141 ft el, near Containment penetration for HVN, vent Containment Supply and Return Headers using the following:

- HVN-V838, HVN CONTMT SUPPLY HDR VENT TB
- HVN-V839, HVN CONTMT RETURN HDR VENT TB

4.1.15. Vent HVR-UC1A, CONTAINMENT UNIT COOLER using the following:

- HVN-V1322, CONTMT COOLER HVR-UC1A INLET VENT
- HVN-V575, CONTMT COOLER HVR-UC1A LOWER COIL VENT
- HVN-V574, CONTMT COOLER HVR-UC1A MID COIL VENT
- HVN-V573, CONTMT COOLER HVR-UC1A UPPER COIL VENT
- HVN-V1194, CONTMT COOLER HVR-UC1A UPPER COIL VENT
- HVN-V1319, CONTMT COOLER HVR-UC1A OUTLET VENT

4.1.16. Vent HVR-UC1B, CONTAINMENT UNIT COOLER using the following:

- HVN-V1321, CONTMT COOLER HVR-UC1B INLET VENT
- HVN-V580, CONTMT COOLER HVR-UC1B LOWER COIL VENT
- HVN-V579, CONTMT COOLER HVR-UC1B MID COIL VENT
- HVN-V578, CONTMT COOLER HVR-UC1B UPPER COIL VENT
- HVN-V1197, CONTMT COOLER HVR-UC1B UPPER COIL VENT
- HVN-V1318, CONTMT COOLER HVR-UC1B OUTLET VENT

4.1.17. Vent HVR-UC1C, CONTAINMENT UNIT COOLER using the following:

- HVN-V1320, CONTMT COOLER HVR-UC1C INLET VENT
- HVN-V585, CONTMT COOLER HVR-UC1C LOWER COIL VENT
- HVN-V584, CONTMT COOLER HVR-UC1C MID COIL VENT
- HVN-V583, CONTMT COOLER HVR-UC1C UPPER COIL VENT
- HVN-V1191, CONTMT COOLER HVR-UC1C UPPER COIL VENT
- HVN-V1317, CONTMT COOLER HVR-UC1C OUTLET VENT

4.2 Filling and Venting Radwaste/Fuel Building Chilled Water

NOTE

This section of the procedure only addresses filling and venting of Chilled Water Headers not specific components.

CAUTION

Possible damage to Chilled Water Pumps can occur if NPSH is lost to the pumps. Do not allow HVN-TK2, SURGE TANK level to be lost during fill/vent process.

4.2.1. At Fuel Building, 148 ft el, vent Fuel Building Header using HVN-V1092, FUEL BUILDING HVN RETURN HDR VENT.

4.2.2. At Radwaste Building, 166 ft el, perform the following:

1. Vent Fuel and Radwaste Building Supply Header using HVN-V1030, CHILLER HVN-CHL2A, B, C COMBINED DISCH HDR VENT.

2. Vent HVN-CHL2A using HVN-V1027, CHILLER 2A HVN-CHL2A EVAPORATOR VENT.

3. Vent HVN-CHL2B using HVN-V1028, CHILLER 2B HVN-CHL2B EVAPORATOR VENT.

4. Vent HVN-CHL2C using HVN-V1029, CHILLER 2C HVN-CHL2C EVAPORATOR VENT.

4.2.3. Vent Fuel Building Unit Coolers locally at each coil.

1. IF Fuel Building Unit Cooler HVF-ACU1, FUEL BLDG VENT SUPPLY A/C UNIT was isolated and drained per OSP-0043, Freeze Protection, THEN perform the following:

   1) For HVF-ACU1, FUEL BLDG VENT SUPPLY A/C UNIT:

      a) Close HVN-V1090, FUEL BLDG COOLER HVF-ACU1 INLET HEADER DRAIN.

      b) Crack open HVN-V1080, FUEL BLDG COOLER HVF-ACU1 INLET ISOLATION.

      c) WHEN air free water issues from the vent, THEN close HVN-V1087, FUEL BLDG COOLER HVF-ACU1 OUTLET PE CONN.

d) Fully open HVN-V1080, FUEL BLDG COOLER HVF-ACU1 INLET ISOLATION.

e) Open HVN-V1081, FUEL BLDG COOLER HVF-ACU1 OUTLET ISOLATION.

4.2.4. Vent Radwaste Building Unit Coolers locally at each coil.

1. IF the Radwaste Building Unit Coolers were isolated and drained per OSP-0043, Freeze Protection, THEN perform the following:

1) For HVW-UC1, UNIT COOLER:

a) Close HVN-V954, RADWASTE BLDG COOLER HVW-UC1 INLET HEADER DRAIN.

b) Crack open HVN-V915, RADWASTE BLDG COOLER HVW-UC1 INLET ISOLATION.

c) WHEN air free water issues from the vent, THEN close HVN-V1179, RADWASTE BLDG COOLER HVW-UC1 UPPER OUTLET PE CONN.

d) Fully open HVN-V915, RADWASTE BLDG COOLER HVW-UC1 INLET ISOLATION.

e) Open HVN-V914, RADWASTE BLDG COOLER HVW-UC1 OUTLET ISOLATION.

2) For HVW-UC2, UNIT COOLER:

a) Close HVN-V956, RADWASTE BLDG COOLER HVW-UC2 INLET HEADER DRAIN.

b) Crack open HVN-V903, RADWASTE BLDG COOLER HVW-UC2 INLET ISOLATION.

c) WHEN air free water issues from the vent, THEN close HVN-V1177, RADWASTE BLDG COOLER HVW-UC2 UPPER OUTLET PE CONN.

d) Fully open HVN-V903, RADWASTE BLDG COOLER HVW-UC2 INLET ISOLATION.

e) Open HVN-V904, RADWASTE BLDG COOLER HVW-UC2 OUTLET ISOLATION.

3) For HVW-UC3, UNIT COOLER:

a) Close HVN-V958, RADWASTE BLDG COOLER HVW-UC3 INLET HEADER DRAIN.

b) Crack open HVN-V908, RADWASTE BLDG COOLER HVW-UC3 INLET ISOLATION.

c) <u>WHEN</u> air free water issues from the vent, <u>THEN</u> close HVN-V1173, RADWASTE BLDG COOLER HVW-UC3 UPPER COIL PE CONN.

d) Fully open HVN-V908, RADWASTE BLDG COOLER HVW-UC3 INLET ISOLATION.

e) Open HVN-V909, RADWASTE BLDG COOLER HVW-UC3 OUTLET ISOLATION.

4) For HVW-UC4, UNIT COOLER:

a) Close HVN-V961, RADWASTE BLDG COOLER HVW-UC4 INLET HEADER DRAIN.

b) Crack open HVN-V906, RADWASTE BLDG COOLER HVW-UC4 INLET ISOLATION.

c) <u>WHEN</u> air free water issues from the vent, <u>THEN</u> close HVN-V921, RADWASTE BLDG COOLER HVW-UC4 UPPER OUTLET PE CONN.

d) Fully open HVN-V906, RADWASTE BLDG COOLER HVW-UC4 INLET ISOLATION.

e) Open HVN-V907, RADWASTE BLDG COOLER HVW-UC4 OUTLET ISOLATION.

5) For HVW-UC5A, UNIT COOLER:

a) Close HVN-V963, RADWASTE BLDG COOLER HVW-UC5A INLET HEADER DRAIN.

b) Crack open HVN-V911, RADWASTE BLDG COOLER HVW-UC5A INLET ISOLATION.

c) <u>WHEN</u> air free water issues from the vent, <u>THEN</u> close HVN-V1022, RADWASTE BLDG COOLER HVW-UC5A UPPER OUTLET PE CONN.

d) Fully open HVN-V911, RADWASTE BLDG COOLER HVW-UC5A INLET ISOLATION.

e) Open HVN-V910, RADWASTE BLDG COOLER HVW-UC5A OUTLET ISOLATION.

6) For HVW-UC5B, UNIT COOLER:

a) Close HVN-V965, RADWASTE BLDG COOLER HVW-UC5B INLET HEADER DRAIN.

b) Crack open HVN-V913, RADWASTE BLDG COOLER HVW-UC5B INLET ISOLATION.

c) WHEN air free water issues from the vent, THEN close HVN-V1026, RADWASTE BLDG COOLER HVW-UC5B UPPER OUTLET PE CONN.

d) Fully open HVN-V913, RADWASTE BLDG COOLER HVW-UC5B INLET ISOLATION.

e) Open HVN-V912, RADWASTE BLDG COOLER HVW-UC5B OUTLET ISOLATION.

4.3 Turbine/Offgas/Containment Building Chilled Water Loop Startup

NOTE

Controls and indications are located on HVN-PNL158, unless otherwise noted.

4.3.1. Verify the following:

- HVN-CHL1A, VENT CHLR CPRSR in STOP
- HVN-CHL1B, VENT CHLR CPRSR in STOP
- HVN-CHL1C, VENT CHLR CPRSR in STOP
- HVN-P1A, VENT CHILL WTR in STOP
- HVN-P1B, VENT CHILL WTR in STOP

4.3.2. Perform the following for the chiller to be started:

1. Open SWP-MOV22A(B)(C), VENT CHLR HVN-CHL1A(B)(C) INLET.
2. Start SWP-P4A(B)(C), VENT CHILLER RECIRC PUMP.

3. Open HVN-MOV24A(B)(C), VENT CHLR DISCHARGE.

NOTE

A minimum of two HVN-MOV24A(B)(C) are required to be open for adequate flow for HVN-P1A(B).

4. Open an additional HVN-MOV24A(B)(C).

NOTE

TURB BLDG VENT CHILLER 1A(B)(C) PRE-TRIP alarms for the chiller(s) being started and clears when the low oil pressure condition clears.

4.3.3. Start HVN-P1A(B) and check HVN-MOV4A(B), VENT CHILL WTR PUMP HVN-P1A(B) DISCHARGE opens.

4.3.4. Locally at the chiller, check the following:

- Oil level visible in oil sump sight glass
- Motor oil levels visible in sight glasses
- Oil temperature is greater than or equal to 120°F and less than or equal to 150°F

4.3.5. Place chiller FAULT/RESET to RESET and check it spring returns to FAULT.

4.3.6. Locally at the chiller control panel, verify the following:

- Chiller Compressor Lube Oil Pump in AUTO
- For HVN-CHL1A(C), Chiller Purge System in AUTO
- For HVN-CHL1A(C), PURGE COMPRESSOR in AUTO
- For HVN-CHL1B, locally at the purge control panel, PURGE OPERATING MODE in ADAPTIVE
- LOAD-HOLD UNLOAD-AUTO Switch in HOLD
- POWER Light is on
- COMPRESSOR STOP REQ'D Light is on

CRITICAL STEP

4.3.7. Depress and hold the HVN-CHL1A(B), VENT CHLR CPRSR START Pushbutton for greater than 30 seconds.

4.3.8. Locally at the chiller control panel, check the following:

1. Oil pump starts

2. OIL PUMP RUN REQ'D Light comes on

NOTE

15 second time delay precedes compressor start.

3. Chiller compressor starts

4. COMPRESSOR STOP REQ'D Light goes off

5. COMPRESSOR RUN REQ'D Light comes on

4.3.9. Check refrigerant visible in evaporator sight glass.

4.3.10. WHEN compressor is vented AND is stabilized, THEN place LOAD-HOLD UNLOAD-AUTO Switch in AUTO.

4.3.11. IF compressor surging occurs, THEN perform the following:

1. Place LOAD-HOLD UNLOAD-AUTO Switch in HOLD.

2. WHEN compressor surging stops, THEN place LOAD-HOLD UNLOAD-AUTO Switch to AUTO.

3. Repeat Step 4.3.11 until no further surging occurs with the LOAD-HOLD UNLOAD-AUTO Switch in AUTO.

4.4 Radwaste/Fuel Building Chilled Water Loop Startup

NOTE

Controls and indications are located on CES-PNL4, unless otherwise noted.

4.4.1. Verify the following:

- HVN-CHL2A, RDWST & FUEL BLDG VENT CHILLER CPRSR in STOP
- HVN-CHL2B, RDWST & FUEL BLDG VENT CHILLER CPRSR in STOP
- HVN-CHL2C, RDWST & FUEL BLDG VENT CHILLER CPRSR in STOP
- HVN-P4A, CHILL WATER PUMP in STOP
- HVN-P4B, CHILL WATER PUMP in STOP
- HVN-P2A, UNIT 1 FUEL BLDG CHILL WTR PUMP in OFF
- HVN-P2B, UNIT 1 FUEL BLDG CHILL WTR PUMP in OFF

NOTE

RW BLDG CHILLERS 2A(B)(C) PRE-TRIP alarm is locked-in until the associated chiller is started and the low oil pressure condition clears.

4.4.2. Perform the following for the chiller to be started:

1. Open SWP-MOV514A(B)(C), INLET VALVE FOR CHILLER 2A(B)(C).
2. Start SWP-P5A(B)(C), VENT CHLR 2A(B)(C) CND RECIRC PUMP.
3. Open HVN-MOV45A(B)(C), VENT CHLR DISCHARGE VALVE.

4.4.3. Start HVN-P4A(B), CHILL WATER PUMP and check HVN-MOV55A(B), V CHILL WTR PMP P4A(B) DISCHARGE VALVE opens.

NOTE

The Fuel Building Chilled Water Pumps do not start unless a Radwaste Building Chilled Water Pump is running.

4.4.4. Start HVN-P2A(B), UNIT 1 FUEL BLDG CHILL WTR PUMP and check HVN-MOV63A(B), CHILL WATER PUMP P2A(B) DISCHARGE VALVE opens.

4.5 Radwaste Chiller Startup

4.5.1. Verify Section 4.4 has been completed.

4.5.2. Locally at the chiller, check the following:

- Oil level visible in oil sump sight glass
- Motor oil levels visible in sight glasses
- Oil temperature is greater than or equal to 120°F and less than or equal to 150°F

4.5.3. Place chiller FAULT/RESET to RESET and check it spring returns to FAULT.

4.5.4. Locally at the chiller control panel, verify the following:

- Chiller Compressor Lube Oil Pump in AUTO
- Chiller Purge System in AUTO
- PURGE COMPRESSOR in AUTO
- LOAD-HOLD UNLOAD-AUTO Switch in HOLD
- POWER ON Light is on
- COMPRESSOR STOP REQ'D Light is on

CRITICAL STEP

4.5.5. Depress and hold the HVN-CHL2A(B)(C), RDWST & FUEL BLDG VENT CHILLER CPRSR START Pushbutton for greater than 30 seconds.

4.5.6. Locally at the chiller control panel, check the following:

1. Oil pump starts

2. OIL PUMP RUN REQ'D Light comes on

NOTE

15 second time delay precedes compressor start.

3. Chiller compressor starts

4. COMPRESSOR STOP REQ'D Light goes off

5. COMPRESSOR RUN REQ'D Light comes on

4.5.7. Check refrigerant visible in evaporator sight glass.

4.5.8. WHEN compressor is vented AND is stabilized, THEN place LOAD-HOLD UNLOAD-AUTO Switch in AUTO.

4.5.9. IF compressor surging occurs, THEN perform the following:

1. Place LOAD-HOLD UNLOAD-AUTO Switch in HOLD.

2. WHEN compressor surging stops, THEN place LOAD-HOLD UNLOAD-AUTO Switch to AUTO.

3. Repeat Step 4.5.9 until no further surging occurs with the LOAD-HOLD UNLOAD-AUTO Switch in AUTO.

NOTE

Chiller compressors may operate at full capacity for a short time after start or when load fluctuates causing excessive motor current.

4.5.10. IF during start, the chiller compressor reaches full capacity, THEN perform the following:

1. Inside the chiller control panel, lower the ELECTRICAL DEMAND CONTROL to prevent full capacity operation.

2. WHEN start is complete, THEN place ELECTRICAL DEMAND CONTROL to 100%.

5 SYSTEM OPERATION

5.1 Placing HVN Demin in Service

5.1.1. Open HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE.

5.1.2. Throttle open one turn HVN-V3141, HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY TANK SHUTOFF VALVE.

5.1.3. WHEN HVN-DEMIN 1 is vented, THEN close HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE.

5.1.4. Open fully HVN-V3141, HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY TANK SHUTOFF VALVE.

5.1.5. Check HVN-DEMN1, HVAC CHILLED WTR DEMIN 1 access cover for leaks.

5.1.6. IF leakage is observed, THEN tighten hold down bolts wrench tight.

5.1.7. IF leakage is still present, THEN perform the following:

1. Close HVN-V3141, HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY TANK SHUTOFF VALVE.
2. Initiate a Work Request.
3. WHEN work is complete, THEN Return To Step 5.1.1.

NOTE

A 73% reading on HVN-FI300 equals 50 gpm.

5.1.8. Adjust HVN-V3140, HVN DEMINERALIZER 1 LOW PRESSURE RETURN TANK SHUTOFF VALVE, to establish 50 gpm on HVN-FI300, HVN DEMIN 1 TK FLOW INDICATOR.

5.1.9. IF flow can not be maintained at 50 gpm, THEN contact Chemistry/Radwaste Management.

5.2 Removing the HVN Demin from Service or for Resin Replacement

5.2.1. Close HVN-V3140, HVN DEMINERALIZER 1 LOW PRESSURE RETRUN TANK SHUTOFF VALVE.

5.2.2. Close HVN-V3141, HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY TANK SHUTOFF VALVE.

5.3 Turbine Building Chilled Water Pump Rotation

NOTE

Controls and indications located on HVN-PNL158, unless otherwise noted.

Annunciator, P870-53-G07, ANALOG SYSTEM TROUBLE may come in during this evolution.

5.3.1. Verify HVN-V1(2), TURB BLDG PUMP HVN-P1A(B) SUCTION is open.

5.3.2. Start HVN-P1A(B), VENT CHILL WTR.

5.3.3. Check HVN-MOV4A(B), VENT CHILL WTR PUMP HVN-P1A(B) DISCHARGE, opens.

5.3.4. Stop HVN-P1B(A), VENT CHILL WTR.

5.3.5. Check HVN-MOV4B(A), VENT CHILL WTR PUMP HVN-P1B(A) DISCHARGE, closes.

5.4 Radwaste Building Chilled Water Pump Rotation

NOTE

Controls and indications are located on CES-PNL4, unless otherwise noted.

5.4.1. Verify HVN-V880(V881), HVN RAD CHILLED WTR PUMP HVN-P4A(B) SUCTION is open.

5.4.2. Start HVN-P4A(B), CHILL WTR PUMP and check HVN-MOV55A(B), V CHILL WTR PUMP P4A(B) DISCHARGE VALVE opens.

5.4.3. Stop HVN-P4B(A), CHILL WTR PUMP and check HVN-MOV55B(A), V CHILL WTR PUMP P4B(A) DISCHARGE VALVE closes.

5.5 Fuel Building Chilled Water Pump Rotation

NOTE

Controls and indications located on CES-PNL4, unless otherwise noted.

5.5.1. Verify HVN-V897(V898), HVN FUEL BLDG PUMP HVN-P2A(B) SUCTION is open.

5.5.2. Start HVN-P2A(B), UNIT 1 FUEL BLDG CHILL WTR PUMP and check HVN-MOV63A(B), CHILL WATER PUMP P2A(B) DISCHARGE VALVE opens.

5.5.3. Stop HVN-P2B(A), UNIT 1 FUEL BLDG CHILL WTR PUMP and check HVN-MOV63B(A), CHILL WATER PUMP P2B(A) DISCHARGE VALVE closes.

5.6 Turbine Building Chiller Rotation

NOTES

Controls and indications located on HVN-PNL158, unless otherwise noted.

Turbine Building Chiller rotation will cause the "Pre-Trip" annunciator in the Main Control Room to alarm for the chiller to be started and the chiller to be secured.

- *For HVN-CHL1A: Annunciator, P863-75A-C06, TURB BLDG VENT CHILLER 1A PRE-TRIP*
- *For HVN-CHL1B: Annunciator, P863-75A-C07, TURB BLDG VENT CHILLER 1B PRE-TRIP*
- *For HVN-CHL1C: Annunciator, P863-75A-C08, TURB BLDG VENT CHILLER 1C PRE-TRIP*

5.6.1. Verify the chiller to be started is lined up for startup.

5.6.2. IF Temporary Cooling Water is in service per TSP-0060 to the chiller condenser, THEN perform the following:

1. Verify the Temporary Cooling Water lineup.

2. Go To Step 5.6.4.

5.6.3. Perform the following for the chiller to be started:

1. Open SWP-MOV22A(B)(C), VENT CHLR HVN-CHL1A(B)(C) INLET.
2. Start SWP-P4A(B)(C), VENT CHILLER RECIRC.

NOTE

Opening the low and high side test taps drains/flushes the sensing lines and minimizes sporadic trips due to low service water flow to the condenser.

5.6.4. IF this is the scheduled rotation, THEN have I&C blowdown the sensing lines to SWP-FT14A(B)(C), SERVICE WTR SPLY TO HVN-CHL1A(B)(C).

5.6.5. Open HVN-MOV24A(B)(C), VENT CHLR DISCHARGE for the chiller to be started.

5.6.6. Locally at the chiller, check the following:

- Oil level visible in oil sump sight glass
- Motor oil levels visible in sight glasses
- Oil temperature is greater than or equal to 120°F and less than or equal to 150°F

5.6.7. On the Chiller Control Panel, place chiller FAULT/RESET to RESET and check it spring returns to FAULT.

5.6.8. Locally at the chiller control panel, verify the following:

- Chiller Compressor Lube Oil Pump in AUTO
- For HVN-CHL1A(C), Chiller Purge System in AUTO
- For HVN-CHL1A(C), PURGE COMPRESSOR in AUTO
- For HVN-CHL1B, locally at the purge control panel, PURGE OPERATING MODE in ADAPTIVE
- LOAD-HOLD UNLOAD-AUTO Switch in HOLD
- POWER ON Light is on
- COMPRESSOR STOP REQ'D Light is on

CRITICAL STEP

5.6.9. Depress and hold the HVN-CHL1A(B)(C), VENT CHLR CPRSR START Pushbutton for greater than 30 seconds.

5.6.10. Locally at the chiller control panel, check the following:

1. Oil pump starts
2. OIL PUMP RUN REQ'D Light comes on

NOTE

15 second time delay precedes compressor start.

3. Chiller compressor starts
4. COMPRESSOR STOP REQ'D Light goes off
5. COMPRESSOR RUN REQ'D Light comes on

5.6.11. Check refrigerant visible in evaporator sight glass.

5.6.12. WHEN compressor is vented AND is stabilized, THEN place LOAD-HOLD-UNLOAD-AUTO Switch in AUTO.

5.6.13. IF compressor surging occurs, THEN perform the following:

1. Place LOAD-HOLD UNLOAD-AUTO Switch in HOLD.
2. WHEN compressor surging stops, THEN place LOAD-HOLD UNLOAD-AUTO Switch to AUTO.
3. Repeat Step 5.6.13 until no further surging occurs with the LOAD-HOLD UNLOAD-AUTO Switch in AUTO.

NOTE

The chiller oil pump automatically operates for seven minutes after the chiller is stopped.

TURB BLDG VENT CHILLER 1A(B)(C) PRE-TRIP alarm is locked-in until the associated chilled water discharge MOV is closed.

5.6.14. Stop the applicable HVN-CHL1A(B)(C), VENT CHLR CPRSR.

5.6.15. Perform the following for the previously running chiller:

NOTE

Maintain chilled water flowpath through two chillers.

1. Close HVN-MOV24A(B)(C), VENT CHLR DISCHARGE.
2. Stop SWP-P4A(B)(C), VENT CHILLER RECIRC.
3. Close SWP-MOV22A(B)(C), VENT CHLR HVN-CHL1A(B)(C) INLET.
4. For HVN-CHL1A(C), at the Chiller Control Panel, place Purge System Switch to OFF.

5.7 Radwaste/Fuel Building Chiller Rotation

NOTE

Controls and indications located on CES-PNL4, unless otherwise noted.

RW BLDG CHILLERS 2A(B)(C) PRE-TRIP alarm is locked-in until the associated chiller is started and the low oil pressure condition clears.

5.7.1. Perform the following for the chiller to be started:

1. Open SWP-MOV514A(B)(C), INLET VALVE FOR CHILLER 2A(B)(C).
2. Start SWP-P5A(B)(C), VENT CHLR 2A(B)(C) CND RECIRC PUMP.
3. Open HVN-MOV45A(B)(C), VENT CHLR DISCHARGE VALVE.

5.7.2. Locally at the chiller, check the following:

- Oil level visible in oil sump sight glass
- Motor oil levels visible in sight glasses
- Oil temperature is greater than or equal to 120°F and less than or equal to 150°F

5.7.3. Place chiller FAULT/RESET to RESET and check it spring returns to FAULT.

5.7.4. Locally at the chiller control panel, verify the following:

- Chiller Compressor Lube Oil Pump in AUTO
- Chiller Purge System in AUTO
- PURGE COMPRESSOR in AUTO
- LOAD-HOLD-UNLOAD-AUTO Switch in HOLD
- POWER ON Light is on
- COMPRESSOR STOP REQ'D Light is on

CRITICAL STEP

5.7.5. Depress and hold the HVN-CHL2A(B)(C), RDWST & FUEL BLDG VENT CHILLER CPRSR, START Pushbutton for greater than 30 seconds.

5.7.6. Locally at the chiller control panel, check the following:

1. Oil pump starts
2. OIL PUMP RUN REQ'D Light comes on

NOTE

15 second time delay precedes compressor start.

3. Chiller compressor starts
4. COMPRESSOR STOP REQ'D Light goes off
5. COMPRESSOR RUN REQ'D Light comes on

5.7.7. Check refrigerant visible in evaporator sight glass.

5.7.8. WHEN compressor is vented AND is stabilized, THEN place LOAD-HOLD-UNLOAD-AUTO Switch in AUTO.

5.7.9. IF compressor surging occurs, THEN perform the following:

1. Place LOAD-HOLD UNLOAD-AUTO Switch in HOLD.
2. WHEN compressor surging stops, THEN place LOAD-HOLD UNLOAD-AUTO Switch to AUTO.

3. Repeat Step 5.7.9 until no further surging occurs with the LOAD-HOLD UNLOAD-AUTO Switch in AUTO.

5.7.10. Stop the desired HVN-CHL2A(B)(C), RDWST & FUEL BLDG VENT CHILLER CPRSR.

5.7.11. Close HVN-MOV45A(B)(C), VENT CHLR DISCHARGE VALVE.

NOTE

RW BLDG CHILLERS 2A(B)(C) PRE-TRIP alarm is locked-in until the associated chiller service water inlet MOV is closed.

5.7.12. Stop the associated SWP-P5A(B)(C), VENT CHLR 2A(B)(C) RECIRC PUMP.

5.7.13. Close SWP-MOV514A(B)(C), INLET VALVE FOR CHILLER 2A(B)(C).

5.7.14. At the Chiller Control Panel, place Purge System Switch for the previously running chiller to OFF.

5.8 Supplying Drywell Coolers with Chilled Water

5.8.1. On Panel H13-P870, close the following valves:

1. SWP-MOV4A, DRYWELL UC SUPPLY
2. SWP-MOV5A, DRYWELL UC RETURN
3. SWP-MOV4B, DRYWELL UC SUPPLY
4. SWP-MOV5B, DRYWELL UC RETURN

NOTE

At the direction of the OSM, draining/flushing of the unit coolers prior to supplying them with chilled water may be waived.

5.8.2. IF OSM has waived draining/flushing, THEN Go To Step 5.8.8.

NOTE

Unit Coolers can be drained in any order.

5.8.3. Perform the following to drain Drywell Unit Coolers:

1. At Drywell, 141 ft el, Az 50°, open the following DRS-UC1A Drywell Cooler Vent and Drain Valves:

   1) SWP-V704, DRS-UC1A SVCE WTR LOWER COIL VENT

   2) SWP-V705, DRS-UC1A SVCE WTR MIDDLE COIL VENT

   3) SWP-V706, DRS-UC1A SVCE WTR UPPER COIL VENT

   4) SWP-V256, DRS-UC1A SVCE WTR OUTLET DRAIN VLV

2. At Drywell, 141 ft el, Az 50°, open the following DRS-UC1C Drywell Cooler Vent and Drain Valves:

   1) SWP-V710, DRS-UC1C SVCE WTR LOWER COIL VENT

   2) SWP-V711, DRS-UC1C SVCE WTR MIDDLE COIL VENT

   3) SWP-V712, DRS-UC1C SVCE WTR UPPER COIL VENT

   4) SWP-V258, DRS-UC1C SVCE WTR OUTLET DRAIN VLV

3. At Drywell, 141 ft el, Az 140°, open the following DRS-UC1E Drywell Cooler Vent and Drain Valves:

   1) SWP-V716, DRS-UC1E SVCE WTR LOWER COIL VENT

   2) SWP-V717, DRS-UC1E SVCE WTR MIDDLE COIL VENT

   3) SWP-V718, DRS-UC1E SVCE WTR UPPER COIL VENT

   4) SWP-V260, DRS-UC1E SVCE WTR OUTLET DRAIN VLV

4. At Drywell, 141 ft el, Az 200°, open the following DRS-UC1B Drywell Cooler Vent and Drain Valves:

   1) SWP-V722, DRS-UC1B SVCE WTR LOWER COIL VENT

   2) SWP-V723, DRS-UC1B SVCE WTR MIDDLE COIL VENT

   3) SWP-V724, DRS-UC1B SVCE WTR UPPER COIL VENT

   4) SWP-V262, DRS-UC1B SVCE WTR OUTLET DRAIN VLV

5. At Drywell, 141 ft el, Az 270°, open the following DRS-UC1D Drywell Cooler Vent and Drain Valves:

   1) SWP-V728, DRS-UC1D SVCE WTR LOWER COIL VENT

   2) SWP-V729, DRS-UC1D SVCE WTR MIDDLE COIL VENT

   3) SWP-V730, DRS-UC1D SVCE WTR UPPER COIL VENT

   4) SWP-V264, DRS-UC1D SVCE WTR OUTLET DRAIN VLV

6. At Drywell, 141 ft el, Az 305°, open the following DRS-UC1F Drywell Cooler Vent and Drain Valves:

   1) SWP-V734, DRS-UC1F SVCE WTR LOWER COIL VENT

   2) SWP-V735, DRS-UC1F SVCE WTR MIDDLE COIL VENT

   3) SWP-V736, DRS-UC1F SVCE WTR UPPER COIL VENT

   4) SWP-V266, DRS-UC1F SVCE WTR OUTLET DRAIN VLV

5.8.4. WHEN coolers are drained, THEN close vent and drain valves opened in 5.8.3.1 through 5.8.3.6.

5.8.5. At Reactor Building, 141 ft el, throttle HVN-V542, HVN TO SWP DRYWELL UNIT COOLER ISOLATION open to establish fill flow.

5.8.6. Maintain Chilled Water Compression Tank HVN-TK1, SURGE TANK level by monitoring level on HVN-LI107.

5.8.7. Perform the following to flush Drywell Unit Coolers:

- DRS-UC1A:

  1) Flush water through DRS-UC1A using drain and vent valves in 5.8.3.1.

  2) WHEN flush water is clear, THEN close drain and vent valves opened in 5.8.3.1.

- DRS-UC1C:

  1) Flush water through DRS-UC1C using drain and vent valves in 5.8.3.2.

  2) WHEN flush water is clear, THEN close drain and vent valves opened in 5.8.3.2.

- DRS-UC1E:

  1) Flush water through DRS-UC1E using drain and vent valves in 5.8.3.3.

  2) WHEN flush water is clear, THEN close drain and vent valves opened in 5.8.3.3.

- DRS-UC1B:

  1) Flush water through DRS-UC1B using drain and vent valves in 5.8.3.4.

  2) WHEN flush water is clear, THEN close drain and vent valves opened in 5.8.3.4.

- DRS-UC1D:

  1) Flush water through DRS-UC1D using drain and vent valves in 5.8.3.5.

  2) WHEN flush water is clear, THEN close drain and vent valves opened in 5.8.3.5.

- DRS-UC1F:

  1) Flush water through DRS-UC1F using drain and vent valves in 5.8.3.6.

  2) WHEN flush water is clear, THEN close drain and vent valves opened in 5.8.3.6.

5.8.8. At Reactor Building, 143 ft el, Az 125°, open HVN-V542, HVN TO SWP DRYWELL UNIT COOLER ISOLATION.

5.8.9. At Reactor Building, 153 ft el, Az 135°, open HVN-V543, HVN FROM SWP DRYWELL UNIT COOLER ISOLATION.

5.9 Removing Chilled Water from Drywell Coolers

5.9.1. Request Chemistry to sample and analyze Drywell Cooling Water.

1. IF no activity is detected, THEN Go To Step 5.9.2.
2. C Contact Radiological Engineering to check that activity levels are within analysis and any other regulatory requirements.
3. Log Radiological Engineering authorization to continue this evolution in the Main Control Room Log Book. Entry to include:
   - Person contacted
   - Justification for continued operation

5.9.2. Close the following:

1. HVN-V543, HVN FROM SWP DRYWELL UNIT COOLER ISOLATION
2. HVN-V542, HVN TO SWP DRYWELL UNIT COOLER ISOLATION

5.9.3. Monitor Chilled Water Compression Tank HVN-TK1, SURGE TANK level on HVN-LI107.

NOTE

At the direction of the OSM/CRS, filling/venting of the unit coolers prior to supplying them with service water may be waived.

5.9.4. Unlock and close the following:

1. SWP-V205, DRYWELL SVCE WTR INLET HDR MAN ISOL VLV.
2. SWP-V206, DRYWELL SVCE WTR OUTLET HDR MAN ISOL VLV.

5.9.5. On Panel H13-P870, open the following valves:

1. SWP-MOV4A, DRYWELL UC SUPPLY
2. SWP-MOV5A, DRYWELL UC RETURN
3. SWP-MOV4B, DRYWELL UC SUPPLY
4. SWP-MOV5B, DRYWELL UC RETURN

CAUTION

Normal Service Water Pumps can trip on low suction pressure if SWP-TK3, SWP SURGE TANK level is lost. Do not fill Drywell Unit Coolers without closely monitoring SWP-TK3, SWP SURGE TANK level.

5.9.6. Throttle SWP-V205, DRYWELL SVCE WTR INLET HDR MAN ISOL VLV open to fill header while monitoring Normal Service Water SWP-TK3 Level.

5.9.7. Vent DRS-UC1A, at Drywell, 141 ft el, Az 50°, using the following:

- SWP-V704, DRS-UC1A SVCE WTR LOWER COIL VENT
- SWP-V705, DRS-UC1A SVCE WTR MIDDLE COIL VENT
- SWP-V706, DRS-UC1A SVCE WTR UPPER COIL VENT

5.9.8. Vent DRS-UC1C, at Drywell, 141 ft el, Az 50°, using the following:

- SWP-V710, DRS-UC1C SVCE WTR LOWER COIL VENT
- SWP-V711, DRS-UC1C SVCE WTR MIDDLE COIL VENT
- SWP-V712, DRS-UC1C SVCE WTR UPPER COIL VENT

5.9.9. Vent DRS-UC1E, at Drywell, 141 ft el, Az 140°, using the following:

- SWP-V716, DRS-UC1E SVCE WTR LOWER COIL VENT
- SWP-V717, DRS-UC1E SVCE WTR MIDDLE COIL VENT
- SWP-V718, DRS-UC1E SVCE WTR UPPER COIL VENT

5.9.10. Vent DRS-UC1B, at Drywell, 141 ft el, Az 200°, using the following:

- SWP-V722, DRS-UC1B SVCE WTR LOWER COIL VENT
- SWP-V723, DRS-UC1B SVCE WTR MIDDLE COIL VENT
- SWP-V724, DRS-UC1B SVCE WTR UPPER COIL VENT

5.9.11. Vent DRS-UC1D, at Drywell, 141 ft el, Az 270°, using the following:

- SWP-V728, DRS-UC1D SVCE WTR LOWER COIL VENT
- SWP-V729, DRS-UC1D SVCE WTR MIDDLE COIL VENT
- SWP-V730, DRS-UC1D SVCE WTR UPPER COIL VENT

5.9.12. Vent DRS-UC1F, at Drywell, 141 ft el, Az 305°, using the following:

- SWP-V734, DRS-UC1F SVCE WTR LOWER COIL VENT
- SWP-V735, DRS-UC1F SVCE WTR MIDDLE COIL VENT
- SWP-V736, DRS-UC1F SVCE WTR UPPER COIL VENT

5.9.13. Open and lock the following:

1. SWP-V205, DRYWELL SVCE WTR INLET HDR MAN ISOL VLV.
2. SWP-V206, DRYWELL SVCE WTR OUTLET HDR MAN ISOL VLV.

5.10 Supplying HVR-UC1A(B) with Service Water During Maintenance Outage

CAUTION

Supplying both Service Water loads and additional Chilled Water loads from Standby Service Water can result in Standby Service Water Pump runout and/or Low Service Water Pressure initiations. Do not operate with Standby Service Water supplying Chilled Water loads without first ensuring sufficient capacity is available.

5.10.1. Verify SWP is available to Containment for Division(s) being used.

1. Request Chemistry to sample and analyze HVN Cooling Water prior to switching to SWP for piping drain flush consideration.

1) IF no activity is detected, THEN Go To Step 5.10.2.

C *2)* Contact Radiological Engineering to check that activity levels are within analysis and any other regulatory requirements.

3) Log Radiological Engineering authorization to continue this evolution in the Main Control Room Log Book. Entry to include:

- Person contacted
- Justification for continued operation

NOTE

There is a potential for leakage past HVN-V550(V551) and/or HVN-MOV22A(B).

2. Monitor level in the following until terminated by the OSM/CRS:

- HVN-TK1, SURGE TANK
- SWP-TK3, SWP SURGE TANK (If Normal Service Water is supplying the Standby Service Water piping.)

NOTE

C61-PNLP001, Division I REMOTE SHUTDOWN PANEL Transfer Switch 43-HVCN30 has capability of transferring control of HVN-MOV22A to its remote switch located on EHS-MCC2C. This control switch is normally in CLOSE.

5.10.2. At H13-P863, close HVN-MOV22A(B), CONTMNT UC1A(B) DISCH.

5.10.3. Close HVN-V550(V551), CONTMNT COOLER HVR-UC1A(1B) INLET ISOLATION.

NOTE

At the direction of the OSM, draining/flushing of the unit cooler prior to supplying with Service Water may be waived.

5.10.4. IF OSM has waived draining/flushing, THEN Go To Step 5.10.13.

5.10.5. Verify the following:

- SWP-MOV502A(B), CONTAINMENT UC SUPPLY is closed.
- SWP-MOV503A(B), CONTAINMENT UC RETURN is closed.

5.10.6. Open the following to drain the unit cooler:

- HVN-V588(V590), CONTMT COOLER HVR-UC1A(B) INLET HEADER DRAIN
- HVN-V868(V866), CONTMT COOLER HVR-UC1A(B) OUTLET HEADER DRAIN
- HVN-V1319(V1318), CONTMT COOLER HVR-UC1A(B) OUTLET VENT
- HVN-V1322(V1321), CONTMT COOLER HVR-UC1A(B) INLET VENT

5.10.7. WHEN HVR-UC1A(B) is drained, THEN close the following:

- HVN-V1319(V1318), CONTMT COOLER HVR-UC1A(B) OUTLET VENT
- HVN-V1322(V1321), CONTMT COOLER HVR-UC1A(B) INLET VENT
- HVN-V588(V590), CONTMT COOLER HVR-UC1A(B) INLET HEADER DRAIN

5.10.8. At EHS-MCC2A(B), open BKR 5B(C), SWP-MOV502A(B) CONTMT UNIT COOLER A(B) LOOP SUPPLY.

CAUTION

Normal Service Water Pumps can trip on low suction pressure if SWP-TK3, SWP SURGE TANK level is lost. Do not fill Drywell Unit Coolers without closely monitoring SWP-TK3 level.

5.10.9. Throttle SWP-MOV502A(B), CONTAINMENT UC SUPPLY open manually to flush the unit cooler with service water.

5.10.10. Close HVN-V868(V866), CONTMT COOLER HVR-UC1A(B) OUTLET HEADER DRAIN when unit cooler flushing is complete.

5.10.11. Vent HVR-UC1A(B) using the following:

- HVN-V1319(V1318), CONTMT COOLER HVR-UC1A(B) OUTLET VENT
- HVN-V1322(V1321), CONTMT COOLER HVR-UC1A(B) INLET VENT

5.10.12. WHEN HVR-UC1A(B) is flushed, filled and vented, THEN at EHS-MCC2A(B), close BKR 5B(C).

5.10.13. Open SWP-MOV502A(B), CONTAINMENT UC SUPPLY.

5.10.14. Open SWP-MOV503A(B), CONTAINMENT UC RETURN.

5.11 Returning HVR-UC1A(B) to Chilled Water, HVN, During Maintenance Outage

5.11.1. Verify Chilled Water is available to Containment.

5.11.2. At H13-P870, verify the following closed:

1. SWP-MOV502A(B), CONTAINMENT UC SUPPLY
2. SWP-MOV503A(B), CONTAINMENT UC RETURN

NOTE

At the direction of the OSM, draining/flushing of the unit cooler prior to supplying with Chilled Water may be waived.

5.11.3. IF OSM has waived draining/flushing, THEN Go To Step 5.11.9.

5.11.4. Open the following to drain unit cooler:

- HVN-V588(V590), CONTMT COOLER HVR-UC1A(B) INLET HEADER DRAIN
- HVN-V868(V866), CONTMT COOLER HVR-UC1A(B) OUTLET HEADER DRAIN
- HVN-V1319(V1318), CONTMT COOLER HVR-UC1A(B) OUTLET VENT
- HVN-V1322(V1321), CONTMT COOLER HVR-UC1A(B) INLET VENT

5.11.5. WHEN unit cooler is drained, THEN close the following:

- HVN-V1319(V1318), CONTMT COOLER HVR-UC1A(B) OUTLET VENT
- HVN-V1322(V1321), CONTMT COOLER HVR-UC1A(B) INLET VENT
- HVN-V588(V590), CONTMT COOLER HVR-UC1A(B) INLET HEADER DRAIN

5.11.6. Throttle HVN-V550(V551), CONTMT COOLER HVR-UC1A(B) INLET ISOLATION open to flush/fill the unit cooler.

5.11.7. Close HVN-V868(V866), CONTMT COOLER HVR-UC1A(B) OUTLET HEADER DRAIN when unit cooler flushing is complete.

5.11.8. Vent HVR-UC1A(B) using the following:

- HVN-V1319(V1318), CONTMT COOLER HVR-UC1A(B) OUTLET VENT
- HVN-V1322(V1321), CONTMT COOLER HVR-UC1A(B) INLET VENT

5.11.9. Open HVN-V550(V551), CONTMT COOLER HVR-UC1A(B) INLET ISOLATION.

5.11.10. At H13-P863, open HVN-MOV22A(B), CONTMT UC1A(B) DISCH.

5.12 Pressurizing HVN-TK2, Chilled Water Compression Tank

NOTE

Tubing and fittings are normally stored in the Operations storage cabinet on RW, 166 ft el.

5.12.1. Obtain tubing and fittings for pressurization of HVN-TK2, CHILLED WATER COMPRESSION TANK.

CAUTION

Do not over tighten compression (tubing) fitting when connecting tubing to HVN-V982, HVN COMPRESSION TK HVN-TK2 PI169 ROOT, to prevent damage to fitting threads or sealing surfaces. Tightening the compression fitting should require no more than ¼ turn past hand tight.

5.12.2. Connect tubing to HVN-V982, HVN COMPRESSION TK HVN-TK2 PI169 ROOT, per the following:

1. Close HVN-V982.
2. Remove HVN-V982 test connection cap.

NOTE

For ease of HVN-TK2 pressure monitoring and control, the tubing throttle valve should be near the HVN-V982 test connection.

3. Connect tubing to HVN-V982, HVN COMPRESSION TK HVN-TK2 PI169 ROOT, test connection.
4. Verify closed tubing throttle valve.

5.12.3. Connect tubing to MWS-AOV148-V2, RWB VENTILATION TK2 MAKEUP VALVE, connection per the following:

1. Verify closed MWS-AOV148-V2.

2. Remove MWS-AOV148-V2 connection cap.

3. Connect free end of tubing to the connection.

5.12.4. Open MWS-AOV148-V2 to pressurize tubing.

5.12.5. Open HVN-V982.

5.12.6. Open tubing throttle valve to begin pressurizing HVN-TK2, CHILLED WATER COMPRESSION TANK.

NOTE

HVN-TK2 relief valve lifts at 75 psig.

5.12.7. WHEN HVN-TK2 is pressurized, THEN close the tubing throttle valve.

5.12.8. Close HVN-V982.

5.12.9. Restore HVN-V982 connection per the following:

1. Disconnect slowly the tubing from HVN-V982 test connection.

CAUTION

Do not over tighten compression (tubing) fitting when re-installing the cap on HVN-V982, HVN COMPRESSION TK HVN-TK2 PI169 ROOT, to prevent damage to fitting threads or sealing surfaces. Tightening the compression fitting should require no more than ¼ turn past hand tight.

2. Re-install cap on test connection.

3. Open HVN-V982.

5.12.10. Close MWS-AOV148-V2.

5.12.11. Restore MWS-AOV148-V2, RWB VENTILATION TK2 MAKEUP VALVE, connection per the following:

1. Disconnect slowly the tubing from MWS-AOV148-V2 connection.

2. Re-install cap on connection.

5.12.12. Return tubing and fittings to its storage location.

5.13 Pressurizing HVN-TK1, TURB BLDG Chilled Water Compression Tank TK1

5.13.1. Verify closed HVN-PI104-V2.

5.13.2. Remove plug downstream of HVN-PI104-V2.

NOTE

One source of instrument air (IAS) is located just east of TB-11 and can be accessed using a ladder.

5.13.3. Install hose/tubing between an IAS source and HVN-PI104-V2.

5.13.4. Open the IAS source isolation valve.

5.13.5. Throttle open HVN-PI104-V2.

5.13.6. Monitor pressure on HVN-PI104.

5.13.7. WHEN pressure on HVN-PI104 is greater than or equal to 15 psig and less than or equal to 30 psig, THEN close HVN-PI104-V2.

5.13.8. Close the IAS source isolation valve.

WARNING

Use caution when performing the following step as the hose/tubing will be pressurized to IAS system pressure.

5.13.9. Loosen the tubing connection at HVN-PI104-V2 to depressurize the hose/tubing.

5.13.10. Remove hose/tubing from HVN-PI104-V2 and the IAS source.

5.13.11. Install plug downstream of HVN-PI104-V2.

5.14 Operation of the Radwaste/Fuel Building Chillers Under Low Load Conditions

NOTE

During periods of cool weather with the outside ambient temperature of approximately 60°F or less the Radwaste/Fuel Building Chillers may surge from the lack of heat load. It is permissible to operate the chiller in "HOLD" after setting the controls to eliminate the surging. The chiller should not be allowed to surge for an extended period of time.

5.14.1. IF HVN-CHL2A(B)(C), RDWST & FUEL BLDG VENT CHILLER CPRSR is surging as indicated by condenser pressure and compressor amperage oscillating, THEN perform the following to manually load the chiller:

1. Place the LOAD-HOLD UNLOAD-AUTO Switch in HOLD.

NOTE

Placing LOAD-HOLD UNLOAD-AUTO Switch in LOAD raises chiller load and placing it in UNLOAD lowers chiller load.

2. Cycle the LOAD-HOLD UNLOAD-AUTO Switch from HOLD to LOAD or UNLOAD and back to HOLD to stabilize chiller condenser pressure and chiller operation to prevent surge of compressor.
3. Maintain condenser pressure steady at greater than or equal to 5 psig and less than or equal to 18 psig.
4. IF condenser pressure can not be maintained steady AND the compressor continues to surge, THEN shutdown the chiller per Section 6.2.
5. WHEN low load conditions no longer exist AND the chiller can be operated without surging, THEN place the LOAD-HOLD UNLOAD-AUTO Switch to AUTO.

5.15 HVN-DEMN1, HVAC CHILLED WTR DEMIN 1 Resin Change Out

NOTES

Model work order for HVN demin change is 50344750.

Typically 10 cubic feet (2 drums) of mixed bed resin (NR6-LC) are loaded into the demin.

Spent resin will be transferred into two 55 gallon drums. New drums should be used for collection of spent HVN resin.

5.15.1. Verify HVN-DEMN1, HVAC CHILLED WTR DEMIN 1 is removed from service per Section 5.2.

5.15.2. Notify RP of impending HVN DEMIN resin change out.

5.15.3. Tag out HVN-DEMN1, HVAC CHILLED WTR DEMIN 1 per EN-OP-102, Protective and Caution Tagging.

NOTE

A 1" red rubber hose equipped with a cam-lock fitting a ball valve is typically stored on RW 136' el northwest area.

5.15.4. Connect resin transfer hose equipped with a valve on the end to HVN-V3135, HVN DEMINERALIZER 1 RESIN OUTLET VLV and route to a 55 gallon drum.

5.15.5. Connect an air hose between a service air supply and HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE.

5.15.6. Open service air supply valve.

5.15.7. Verify valve on resin transfer hose is closed.

5.15.8. Open HVN-V3135, HVN DEMINERALIZER 1 RESIN OUTLET VLV.

NOTE

The following 2 steps may be performed concurrently to accomplish resin transfer.

Use as little air pressure as possible to preclude the resin transfer hose from jumping and/or jerking near the end of the resin transfer.

5.15.9. Intermittently throttle HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE, to maintain a slight pressure in the demin while transferring resin to the waste drums.

5.15.10. Open and close ball valve on resin transfer hose as necessary to fill drums.

5.15.11. <u>WHEN</u> resin transfer is complete, <u>THEN</u> close HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE.

5.15.12. Close service air supply valve.

5.15.13. Open HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE.

5.15.14. Slowly open HVN-V3135, HVN DEMINERALIZER 1 RESIN OUTLET VLV to depressurize the demin and air hose.

5.15.15. Close HVN-V3135, HVN DEMINERALIZER 1 RESIN OUTLET VLV.

5.15.16. Close HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE.

5.15.17. Remove air supply hose and resin transfer hose.

5.15.18. Install cap on HVN-V3135, HVN DEMINERALIZER 1 RESIN OUTLET VLV.

5.15.19. Install cap on HVN-V3142, HVN DEMINERALIZER 1 TANK VENT VALVE.

NOTE

Due to the size of the access cover and internal demin interference, the access cover may not come out of the demin. It can be moved to the side to allow resin to be added if removal can <u>not</u> be performed.

5.15.20. Remove the hold down bolts from HVN-DEMN1, HVAC CHILLED WTR DEMIN 1 access cover.

5.15.21. Remove, inspect, and clean the access cover gasket. Replace if necessary.

5.15.22. Don proper safety equipment for handling dry resin per EN-IS-121, Personal Protective Equipment.

5.15.23. Add 10 cubic feet of mixed be resin to HVN-DEMN1, HVAC CHILLED WTR DEMIN 1.

5.15.24. Remove any residual resin from the seating surface of the access cover.

5.15.25. Install the access cover with gasket.

5.15.26. Tighten hold down bolts wrench tight.

5.15.27. Notify RP to survey waste resin drums prior to transport to RW 106' el.

5.15.28. Release tagout on HVN-DEMN1, HVAC CHILLED WTR DEMIN 1 installed in Step 5.15.3.

5.15.29. Return HVN-DEMN1, HVAC CHILLED WTR DEMIN 1 to service as directed by the OSM/CRS per Section 5.1.

5.16 HVN Strainer Blowdown

5.16.1. Blowdown HVN-STR2A(B)(C), HVAC CHILLED WTR HVN-CHL1A(B)(C) OIL CLR STRAINER as follows:

1. Verify closed HVN-V1353(V1354)(V1355), HVN-CHL1A(B)(C) PURGE UNIT/OIL COOLER INLET STRAINER DRAIN VALVE.
2. Remove cap from HVN-V1353(V1354)(V1355).
3. Attach hose to HVN-V1353(V1354)(V1355).
4. Open HVN-V1353(V1354)(V1355) and flush strainer for 15 to 20 seconds.
5. Close HVN-V1353(V1354)(V1355).
6. Remove hose from HVN-V1353(V1354)(V1355).
7. Install cap on HVN-V1353(V1354)(V1355).

5.16.2. Blowdown HVN-STR3A(B)(C), HVAC CHILLED WTR HVN-CHL2A(B)(C) OIL CLR STRAINER as follows:

1. Verify closed HVN-V1362(V1363)(V1364), HVN-CHL2A(B)(C) OIL COOLER STRNR 3A(3B)(3C) BLOWDOWN VLV.
2. Remove cap from HVN-V1362(V1363)(V1364).
3. Attach hose to HVN-V1362(V1363)(V1364).
4. Open HVN- HVN-V1362(V1363)(V1364) and flush strainer for 15 to 20 seconds.
5. Close HVN- HVN-V1362(V1363)(V1364).
6. Remove hose from HVN-V1362(V1363)(V1364).
7. Install cap on HVN-V1362(V1363)(V1364).

6 SYSTEM SHUTDOWN

6.1 Turbine/Offgas/Containment Building Chilled Water Shutdown

NOTE

Controls and indications located on HVT-PNL158, unless otherwise noted.

TURB BLDG VENT CHILLER 1A(B)(C) PRE-TRIP alarm is locked-in until the associated chilled water discharge MOV is closed.

6.1.1. Stop HVN-CHL1A(B)(C), VENT CHLR CPRSR.

NOTE

With oil pump in AUTO, the pump auto starts and runs for seven minutes when chiller is stopped.

6.1.2. At chiller control panel, verify oil pump starts.

6.1.3. Stop chiller purge system as follows:

- IF stopping HVN-CHL1A(C), THEN place HVN-CHL1A(C) Purge System Switch to OFF.
- IF stopping HVN-CHL1B AND the purge system is to be shutdown, THEN set PURGE OPERATING MODE to OFF.

6.1.4. IF stopping all chillers, THEN perform the following:

1. Repeat Steps 6.1.1 through 6.1.3 for each chiller.
2. Stop HVN-P1A(B), VENT CHILL WTR and check HVN-MOV4A(B), VENT CHILL WTR PUMP HVN-P1A(B) DISCHARGE closes.

NOTE

HVN-P1A or 1B requires two HVN-MOV24 valves open for adequate flow path.

6.1.5. Close HVN-MOV24A(B)(C), VENT CHLR DISCHARGE.

6.1.6. Stop associated SWP-P4A(B)(C), VENT CHILLER DISCHARGE RECIRC.

6.1.7. Close associated SWP-MOV22A(B)(C), VENT CHLR HVN-CHL1A(B)(C) INLET.

6.2 Radwaste/Fuel Building Chilled Water Shutdown

NOTE

Controls and indications located on CES-PNL4, unless otherwise noted.

RW BLDG CHILLERS 2A(B)(C) PRE-TRIP alarm is locked-in until the associated chiller service water inlet MOV is closed.

6.2.1. Stop HVN-CHL2A(B)(C), RDWST & FUEL BLDG VENT CHILLER CPRSR.

6.2.2. IF desired to maintain chilled water circulation, THEN Go To Step 6.2.7

6.2.3. Verify SFC-P2A, and SFC-P2B, FUEL POOL PURIFICATION PUMPs are shut down.

6.2.4. Stop HVN-P2A(B), UNIT 1 FUEL BLDG CHILL WTR PUMP and check HVN-MOV63A(B), CHILL WATER PUMP P2A(B) DISCHARGE VALVE closes.

6.2.5. Stop HVN-P4A(B), CHILL WATER PUMP and check HVN-MOV55A(B), V CHILL WTR PMP P4A(B) DISCHARGE VALVE closes.

6.2.6. Close associated HVN-MOV45A(B)(C), VENT CHLR DISCHARGE VALVE.

6.2.7. Stop associated SWP-P5A(B)(C), VENT CHLR 2A(B)(C) CND RECIRC PUMP.

6.2.8. Close associated SWP-MOV514A(B)(C), INLET VALVE FOR CHILLER 2A(B)(C).

6.2.9. At Chiller Control Panel, place Purge System control switch(s) in OFF.

7 REFERENCES

7.1 Control System Descriptions

- 22-12
- 22-14
- 22-14.3

7.2 Control Loop Diagrams

- 1HVN-1
- 1HVN-13
- 1HVN-46
- 1HVN-107
- 1HVN-111
- 1HVN-125
- 1HVN-160
- 1HVN-170
- 1HVN-172
- 1HVN-PI
- 1HVN-PSE
- 1HVN-TE
- 1HVN-TI

7.3 Vendor Manuals

- Trane Co., Model NOX-TJ2-WV2, S&W #3215.300-031-003B
- Trane Co., Model HOX-MV2-HF2, S&W #3215.300-031-004A
- Carrier Air Condition, Model 17FA443-B-114-14-10-S, S&W #3216.210-085-001C
- VTD-T265-0195, O&M Manual for Earthwise Purge with CH350

7.4 Elementary Diagrams, ESKs

- 5HVN01 through 5HVN08
- 6HVN05 through 6HVN19
- 6HVN22 through 6HVN26
- 7HVN01 through 7HVN07
- 11HVN01 through 11HVN04

7.5 Logic System Diagrams, LSKs

- 22-14A through 22-14H
- 22-14J through 22-14N
- 22-14P through 22-14R
- 3A through 3D

7.6 PMR-91-003

7.7 QAFR P-91-07-005

7.8 Commitment No. 13233

7.9 Commitment No. 03224

7.10 Commitment No. 00694

7.11 CR 88-0641

7.12 CR 93-0161

7.13 CR 95-0284

7.14 MR 94-0023

7.15 ER-RB-2004-0204

8 **RECORDS**

8.1 Record disposition shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
THE FOLLOWING ITEMS ARE LOCATED ON RADWASTE BUILDING 65 FT EL				
HVN-V979	HVN FUEL BLDG PUMP COMMON DISCHARGE HDR DRAIN	CLOSED/ CAPPED		
HVN-V978	UNIT 2 CONNECTION DRAIN	CLOSED/ CAPPED		
HVN-V976	FUEL BUILDING HVN RETURN HDR DRAIN	CLOSED/ CAPPED		
HVN-V977	UNIT 2 HVN RETURN HDR DRAIN	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON RADWASTE BUILDING 166 FT EL				
HVN-V1259	FUEL BUILDING HVN RETURN HDR DRAIN	CLOSED/ CAPPED		
HVN-V1260	UNIT 2 HVN RETURN HDR DRAIN	CLOSED/ CAPPED		
HVN-V901	FUEL BUILDING HVN RETURN HDR ISOL	OPEN		
HVN-V1035	FUEL BUILDING HVN RETURN HDR VENT	CLOSED/ CAPPED		
HVN-V1034	UNIT 2 HVN RETURN HDR VENT	CLOSED/ CAPPED		
HVN-V1031	RADWASTE HVN CHILLER INLET HEADER VENT	CLOSED/ CAPPED		
HVN-V884	CHILLER 2A HVN-CHL2A INLET	OPEN		
HVN-V939	CHILLER 2A HVN-CHL2A INLET BYPASS	CLOSED		
HVN-V987	2A FLOW XMTR HVN-FE46A HIGH SIDE ISOL	OPEN		
HVN-V988	2A FLOW XMTR HVN-FE46A LOW SIDE ISOL	OPEN		
HVN-V943	CHILLER 2A HVN-CHL2A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V942	CHILLER 2A HVN-CHL2A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V973	CHILLER 2A HVN-CHL2A EVAPORATOR DRAIN	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1027	CHILLER 2A HVN-CHL2A EVAPORATOR VENT	CLOSED/ CAPPED		
HVN-V1186	CHILLER 2A HVN-CHL2A EVAP PURGE UNIT INLET	CLOSED		
HVN-V1187	CHILLER 2A HVN-CHL2A EVAP PURGE UNIT OUTLET	CLOSED		
HVN-V1185	CHILLER 2A HVN-CHL2A OIL COOLER INLET	OPEN		
HVN-V1184	CHILLER 2A HVN-CHL2A OIL COOLER OUTLET	OPEN		
HVN-V885	CHILLER 2B HVN-CHL2B INLET	OPEN		
HVN-V1356	HVN-CHL2A OIL COOLER STRNR 3A INLET	OPEN		
HVN-V1357	HVN-CHL2A OIL COOLER STRNR 3A OUTLET	OPEN		
HVN-V1362	HVN-CHL2A OIL COOLER STRNR 3A BLOWDOWN VLV	CLOSED		
HVN-V940	CHILLER 2B HVN-CHL2B INLET BYPASS	CLOSED		
HVN-V985	2B FLOW XMTR HVN-FE46B HIGH SIDE ISOL	OPEN		
HVN-V986	2B FLOW XMTR HVN-FE46B LOW SIDE ISOL	OPEN		
HVN-V944	CHILLER 2B HVN-CHL2B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V945	CHILLER 2B HVN-CHL2B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V974	CHILLER 2B HVN-CHL2B EVAPORATOR DRAIN	CLOSED/ CAPPED		
HVN-V1028	CHILLER 2B HVN-CHL2B EVAPORATOR VENT	CLOSED/ CAPPED		
HVN-V1182	CHILLER 2B HVN-CHL2B EVAP PURGE UNIT INLET	CLOSED		
HVN-V1183	CHILLER 2B HVN-CHL2B EVAP PURGE UNIT OUTLET	CLOSED		
HVN-V1181	CHILLER 2B HVN-CHL2B OIL COOLER INLET	OPEN		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1180	CHILLER 2B HVN-CHL2B OIL COOLER OUTLET	OPEN		
HVN-V1358	HVN-CHL2B OIL COOLER STRNR 3B INLET	OPEN		
HVN-V1359	HVN-CHL2B OIL COOLER STRNR 3B OUTLET	OPEN		
HVN-V1363	HVN-CHL2B OIL COOLER STRNR 3B BLOWDOWN VLV	CLOSED		
HVN-V886	CHILLER 2C HVN-CHL2C INLET	OPEN		
HVN-V941	CHILLER 2C HVN-CHL2C INLET BYPASS	CLOSED		
HVN-V983	2C FLOW XMTR HVN-FE46C HIGH SIDE ISOL	OPEN		
HVN-V984	2C FLOW XMTR HVN-FE46C LOW SIDE ISOL	OPEN		
HVN-V946	CHILLER 2C HVN-CHL2C INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V947	CHILLER 2C HVN-CHL2C OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V975	CHILLER 2C HVN-CHL2C EVAPORATOR DRAIN	CLOSED/ CAPPED		
HVN-V1029	CHILLER 2C HVN-CHL2C EVAPORATOR VENT	CLOSED/ CAPPED		
HVN-V948	CHILLER 2C HVN-CHL2C EVAP PURGE UNIT INLET	OPEN		
HVN-V949	CHILLER 2C HVN-CHL2C EVAP PURGE UNIT OUTLET	OPEN		
HVN-V19	CHILLER 2C HVN-CHL2C OIL COOLER OUTLET	OPEN		
HVN-V20	CHILLER 2C HVN-CHL2C OIL COOLER OUTLET	OPEN		
HVN-V1360	HVN-CHL2C OIL COOLER STRNR 3C INLET	OPEN		
HVN-V1361	HVN-CHL2C OIL COOLER STRNR 3C OUTLET	OPEN		
HVN-V1364	HVN-CHL2C OIL COOLER STRNR 3C BLOWDOWN VLV	CLOSED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1030	CHILLER HVN-CHL2A, B, C COMBINED DISCH HDR VENT	CLOSED/ CAPPED		
HVN-V1188	HVN AIR SEPARATOR HVN-ASP2 INLET	OPEN		
HVN-V1038	HVN AIR SEPARATOR HVN-ASP2 PE CONN	CLOSED/ CAPPED		
HVN-V938	AIR SEPARATOR HVN-ASP2 TO/FROM COMPRESSION TANK	OPEN		
HVN-V1189	HVN AIR SEPARATOR HVN-ASP2 OUTLET	OPEN		
HVN-V1003	HVN RAD CHILLED WTR PP P4A SUCT PI HVN-PI52A ROOT	OPEN		
HVN-V880	HVN RAD CHILLED WTR PUMP HVN-P4A SUCTION	OPEN		
HVN-V3082	STR-197A STRAINER VENT VALVE	CLOSED/ CAPPED		
HVN-V3083	STR-197A STRAINER DRAIN VALVE	CLOSED/ CAPPED		
HVN-V1243	HVN RAD CHILLED WTR PUMP HVN-P4A CASING DRAIN	CLOSED/ CAPPED		
HVN-V1000	HVN RAD CHILLED WTR PP P4A DISCH PI HVN-PI54A ROOT	OPEN		
HVN-V1002	HVN RAD CHILLED WTR PP P4B SUCT PI HVN-PI52B ROOT	OPEN		
HVN-V881	HVN RAD CHILLED WTR PUMP HVN-P4B SUCTION	OPEN		
HVN-V3084	STR-197B STRAINER VENT VALVE	CLOSED/ CAPPED		
HVN-V3085	STR-197B STRAINER DRAIN VALVE	CLOSED/ CAPPED		
HVN-V1190	HVN AIR SEPARATOR HVN-ASP2 DRAIN	CLOSED		
HVN-V1245	HVN RAD CHILLED WTR PUMP HVN-P4B CASING DRAIN	CLOSED/ CAPPED		
HVN-V1001	HVN RAD CHILLED WTR PP P4B DISCH PI HVN-PI54B ROOT	OPEN		
HVN-V989	HVN FUEL BLDG PUMP P2A SUCTION PI HVN-PI60A ROOT	OPEN		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V897	HVN FUEL BLDG PUMP HVN-P2A SUCTION	OPEN		
HVN-V1252	HVN FUEL BLDG PUMP HVN-P2A CASING DRAIN	CLOSED/ CAPPED		
HVN-V994	HVN FUEL BLDG PP P2A DISCH PI HVN-PI62A ROOT	OPEN		
HVN-V990	HVN FUEL BLDG PP P2B SUCT PI HVN-PI60B ROOT	OPEN		
HVN-V898	HVN FUEL BLDG PUMP HVN-P2B SUCTION	OPEN		
HVN-V1250	HVN FUEL BLDG PUMP HVN-P2B CASING DRAIN	CLOSED/ CAPPED		
HVN-V995	HVN FUEL BLDG PUMP P2B DISCH PI HVN-PI62B ROOT	OPEN		
HVN-V1036	HVN FUEL BLDG PUMP COMMON DISCHARGE HDR VENT	CLOSED/ CAPPED		
HVN-V1138	UNIT 2 CONNECTION AT FUEL BLDG PPS RETURN	LOCKED CLOSED		
HVN-V1139	UNIT 2 CONNECTION AT FUEL BLDG PPS RETURN	LOCKED CLOSED		
HVN-V1140	UNIT 2 CONNECTION	LOCKED CLOSED		
HVN-V1037	UNIT 2 CONNECTION VENT	CLOSED/ CAPPED		
HVN-V905	RADWASTE BLDG EL 166' HVN SUPPLY HEADER ISOL	OPEN		
HVN-V908	RADWASTE BLDG COOLER HVW-UC3 INLET ISOLATION	OPEN		
HVN-V958	RADWASTE BLDG COOLER HVW-UC3 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V918	RADWASTE BLDG COOLER HWV-UC3 UPPER COIL INLET	OPEN		
HVN-V1172	RADWASTE BLDG COOLER HVW-UC3 UPPER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1004	RADWASTE BLDG COOLER HVW-UC3 UPPER COIL VENT	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1173	RADWASTE BLDG COOLER HVW-UC3 UPPER COIL PE CONN	CLOSED/ CAPPED		
HVN-V929	RADWASTE BLDG COOLER HVW-UC3 UPPER COIL OUTLET	THROTTLED		
HVN-V919	RADWASTE BLDG COOLER HVW-UC3 LOWER COIL INLET	OPEN		
HVN-V1006	RADWASTE BLDG COOLER HVW-UC3 LOWER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1005	RADWASTE BLDG COOLER HVW-UC3 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V1007	RADWASTE BLDG COOLER HVW-UC3 LOWER OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V930	RADWASTE BLDG COOLER HVW-UC3 LOWER COIL OUTLET	THROTTLED		
HVN-V959	RADWASTE BLDG COOLER HVW-UC3 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V909	RADWASTE BLDG COOLER HVW-UC3 OUTLET ISOLATION	OPEN		
HVN-V906	RADWASTE BLDG COOLER HVW-UC4 INLET ISOLATION	OPEN		
HVN-V961	RADWASTE BLDG COOLER HVW-UC4 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V916	RADWASTE BLDG COOLER HVW-UC4 UPPER COIL INLET	OPEN		
HVN-V920	RADWASTE BLDG COOLER HVW-UC4 UPPER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1008	RADWASTE BLDG COOLER HVW-UC4 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V921	RADWASTE BLDG COOLER HVW-UC4 UPPER OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V927	RADWASTE BLDG COOLER HVW-UC4 UPPER COIL OUTLET	OPEN		
HVN-V917	RADWASTE BLDG COOLER HVW-UC4 LOWER COIL INLET	OPEN		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1010	RADWASTE BLDG COOLER HVW-UC4 LOWER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1009	RADWASTE BLDG COOLER HVW-UC4 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V1011	RADWASTE BLDG COOLER HVW-UC4 LOWER OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V928	RADWASTE BLDG COOLER HVW-UC4 LOWER COIL OUTLET	OPEN		
HVN-V960	RADWASTE BLDG COOLER HVW-UC4 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V907	RADWASTE BLDG COOLER HVW-UC4 OUTER ISOLATION	OPEN		
HVN-V911	RADWASTE BLDG COOLER HVW-UC5A INLET ISOLATION	OPEN		
HVN-V963	RADWASTE BLDG COOLER HVW-UC5A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1021	RADWASTE BLDG COOLER HVW-UC5A INLET PE CONN	CLOSED/ CAPPED		
HVN-V1023	RADWASTE BLDG COOLER HVW-UC5A VENT	CLOSED/ CAPPED		
HVN-V1022	RADWASTE BLDG COOLER HVW-UC5A OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V931	RADWASTE BLDG COOLER HVW-UC5A OUTLET	OPEN		
HVN-V962	RADWASTE BLDG COOLER HVW-UC5A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V910	RADWASTE BLDG COOLER HVW-UC5A OUTLET ISOLATION	OPEN		
HVN-V913	RADWASTE BLDG COOLER HVW-UC5B INLET ISOLATION	OPEN		
HVN-V965	RADWASTE BLDG COOLER HVW-UC5B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1025	RADWASTE BLDG COOLER HVW-UC5B INLET PE CONN	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1024	RADWASTE BLDG COOLER HVW-UC5B VENT	CLOSED/ CAPPED		
HVN-V1026	RADWASTE BLDG COOLER HVW-UC5B OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V932	RADWASTE BLDG COOLER HVW-UC5B OUTLET	OPEN		
HVN-V964	RADWASTE BLDG COOLER HVW-UC5B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V912	RADWASTE BLDG COOLER HVW-UC5B OUTLET ISOLATION	OPEN		
HVN-V1220	CHILLED WATER RETURN FROM LIQUID WASTE DRY CLEANING	LOCKED CLOSED		
HVN-V1219	HVN SUPPLY HDR ISOL TO LIQUID WASTE DRY CLEANING	LOCKED CLOSED		
HVN-V982	HVN COMPRESSION TANK HVN-TK2 PI169 ROOT	OPEN		
HVN-V980	COMPRESSION TANK TK2 LEVEL IND UPPER ISOL	OPEN		
HVN-V981	COMPRESSION TANK TK2 LEVEL IND LOWER ISOL	OPEN		
HVN-V969	HVN COMPRESSION TANK TK2 LG 171 VENT	CLOSED/ CAPPED		
HVN-V1258	HVN COMPRESSION TANK TK2 LG 171 DRAIN	CLOSED/ CAPPED		
HVN-V971	COMPRESSION TANK TK2 LT170 UPPER ISOL	OPEN		
HVN-V1256	COMPRESSION TANK TK2 LT170 LOWER ISOL	OPEN		
HVN-V970	HVN COMPRESSION TANK TK2 LT170 VENT	CLOSED/ CAPPED		
HVN-V1257	HVN COMPRESSION TANK TK2 LT170 DRAIN	CLOSED/ CAPPED		
HVN-V972	HVN COMPRESSION TANK HVN-TK2 DRAIN	CLOSED		
HVN-V915	RADWASTE BLDG COOLER HVW-UC1 INLET ISOLATION	OPEN		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V954	RADWASTE BLDG COOLER HVW-UC1 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V925	RADWASTE BLDG COOLER HVW-UC1 UPPER COIL INLET	OPEN		
HVN-V1178	RADWASTE BLDG COOLER HVW-UC1 UPPER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1013	RADWASTE BLDG COOLER HVW-UC1 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1179	RADWASTE BLDG COOLER HVW-UC1 UPPER OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V936	RADWASTE BLDG COOLER HVW-UC1 UPPER COIL OUTLET	OPEN		
HVN-V926	RADWASTE BLDG COOLER HVW-UC1 LOWER COIL INLET	OPEN		
HVN-V1014	RADWASTE BLDG COOLER HVW-UC1 LOWER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1012	RADWASTE BLDG COOLER HVN-UC1 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V1015	RADWASTE BLDG COOLER HVW-UC1 LOWER OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V937	RADWASTE BLDG COOLER HVW-UC1 LOWER COIL OUTLET	OPEN		
HVN-V955	RADWASTE BLDG COOLER HVW-UC1 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V914	RADWASTE BLDG COOLER HVW-UC1 OUTLET ISOLATION	OPEN		
HVN-V903	RADWASTE BLDG COOLER HVW-UC2 INLET ISOLATION	OPEN		
HVN-V956	RADWASTE BLDG COOLER HVW-UC2 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V923	RADWASTE BLDG COOLER HVW-UC2 UPPER COIL INLET	OPEN		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1176	RADWASTE BLDG COOLER HVW-UC2 UPPER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1016	RADWASTE BLDG COOLER HVW-UC2 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1177	RADWASTE BLDG COOLER HVW-UC2 UPPER OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V933	RADWASTE BLDG COOLER HVW-UC2 UPPER COIL OUTLET	OPEN		
HVN-V922	RADWASTE BLDG COOLER HVW-UC2 MID COIL INLET	OPEN		
HVN-V1174	RADWASTE BLDG COOLER HVW-UC2 MID INLET PE CONN	CLOSED/ CAPPED		
HVN-V1017	RADWASTE BLDG COOLER HVW-UC2 MID COIL VENT	CLOSED/ CAPPED		
HVN-V1175	RADWASTE BLDG COOLER HVW-UC2 MID OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V934	RADWASTE BLDG COOLER HVW-UC2 MID COIL OUTLET	OPEN		
HVN-V924	RADWASTE BLDG COOLER HVW-UC2 LOWER COIL INLET	OPEN		
HVN-V1019	RADWASTE BLDG COOLER HVW-UC2 LOWER INLET PE CONN	CLOSED/ CAPPED		
HVN-V1018	RADWASTE BLDG COOLER HVW-UC2 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V1020	RADWASTE BLDG COOLER HVW-UC2 LOWER OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V935	RADWASTE BLDG COOLER HVW-UC2 LOWER COIL OUTLET	OPEN		
HVN-V957	UNIT COOLER HVW-UC2 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V904	UNIT COOLER HVW-UC2 OUTLET ISOLATION	OPEN		
HVN-V1032	HVN SUPPLY HEADER VENT	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1033	HVN RETURN HEADER VENT	CLOSED/ CAPPED		
HVN-V1254	HVN-PDT172 LOW SIDE ISOLATION	OPEN		
HVN-V1255	HVN-PDT172 HI SIDE ISOLATION	OPEN		
HVN-V888	HVN-PCV172 UPSTREAM ISOL	OPEN		
HVN-V889	HVN-PCV172 DOWNSTREAM ISOL	OPEN		
HVN-V1261	HVN DRAIN AT HVN-PCV172	CLOSED/ CAPPED		
HVN-V890	HVN RWB UNIT COOLER RETURN HDR ISOLATION	OPEN		
HVN-V1262	HVN RETURN HEADER DRAIN RWB	CLOSED/ CAPPED		
HVN-V902	UNIT 2 RETURN HDR ISOL	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON FUEL BUILDING 78 FT EL				
HVN-V1124	FUEL BLDG COOLER HVF-UC1 INLET ISOLATION	OPEN		
HVN-V1045	FUEL BLDG COOLER HVF-UC1 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1042	FUEL BLDG COOLER HVF-UC1 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1044	FUEL BLDG COOLER HVF-UC1 VENT	CLOSED/ CAPPED		
HVN-V1043	FUEL BLDG COOLER HVF-UC1 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1040	FUEL BLDG COOLER HVF-UC1 OUTLET	OPEN		
HVN-V1046	FUEL BLDG COOLER HVF-UC1 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1125	FUEL BLDG COOLER HVF-UC1 OUTLET ISOLATION	OPEN		
HVN-V1059	FUEL BLDG COOLER HVF-UC2 INLET VENT	CLOSED/ CAPPED		
HVN-V1058	FUEL BLDG COOLER HVF-UC2 OUTLET VENT	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1057	CHILL WATER SUPPLY TO SFC-E2A/E2B	OPEN		
HVN-V1056	CHILL WATER RETURN FROM SFC-E2A/E2B	OPEN		
HVN-V1047	FUEL BLDG COOLER HVF-UC2 INLET ISOLATION	OPEN		
HVN-V1054	FUEL BLDG COOLER HVF-UC2 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1051	FUEL BLDG COOLER HVF-UC2 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1053	FUEL BLDG COOLER HVF-UC2 VENT	CLOSED/ CAPPED		
HVN-V1052	FUEL BLDG COOLER HVF-UC2 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1049	FUEL BLDG COOLER HVF-UC2 OUTLET	OPEN		
HVN-V1055	FUEL BLDG COOLER HVF-UC2 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1048	FUEL BLDG COOLER HVF-UC2 OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED IN E TUNNEL				
HVN-V799	FUEL BLDG HVN SUPPLY HDR DRAIN IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V778	FUEL BLDG HVN SUPPLY HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V798	FUEL BLDG HVN SUPPLY HDR DRAIN IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V787	FUEL BLDG HVN SUPPLY HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V800	UNIT 2 HVN SUPPLY HDR DRAIN IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V774	UNIT 2 HVN SUPPLY HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V777	UNIT 2 HVN RETURN HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V785	FUEL BLDG HVN SUPPLY HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V786	FUEL BLDG HVN RETURN HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V776	UNIT 2 HVN SUPPLY HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V775	UNIT 2 HVN RETURN HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V801	UNIT 2 HVN RETURN HDR DRAIN IN PIPING TUNNEL	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED IN F TUNNEL				
HVN-V792	UNIT 2 HVN RETURN HDR DRAIN IN PIPING TUNNEL	CLOSED CAPPED		
HVN-V790	FUEL BLDG HVN SUPPLY HDR DRAIN IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V789	FUEL BLDG HVN RETURN HDR DRAIN IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V779	UNIT 2 HVN SUPPLY HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V791	UNIT 2 HVN SUPPLY HDR DRAIN IN PIPING TUNNEL	CLOSED/ CAPPED		
HVN-V780	UNIT 2 HVN RETURN HDR VENT IN PIPING TUNNEL	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON FUEL BUILDING 95 FT EL				
HVN-V1060	FUEL BLDG COOLER HVF-UC3 INLET ISOLATION	OPEN		
HVN-V1067	FUEL BLDG COOLER HVF-UC3 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1064	FUEL BLDG COOLER HVF-UC3 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1066	FUEL BLDG COOLER HVF-UC3 VENT	CLOSED/ CAPPED		
HVN-V1065	FUEL BLDG COOLER HVF-UC3 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1062	FUEL BLDG COOLER HVF-UC3 OUTLET	OPEN		
HVN-V1068	FUEL BLDG COOLER HVF-UC3 OUTLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1061	FUEL BLDG COOLER HVF-UC3 OUTLET ISOLATION	OPEN		
HVN-V1324	RMS-RE120 COOLING WATER INLET	CLOSED		
HVN-V1323	RMS-RE120 COOLING WATER OUTLET	CLOSED		
HVN-V1331	RMS-RE120 COOLING WATER OUTLET DRAIN	CLOSED/ CAPPED		
HVN-V3054	RMS-RE120 COOLING WATER INLET DRAIN	CLOSED/ CAPPED		
HVN-V3053	RMS-RE120 COOLING WATER OUTLET DRAIN	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON FUEL BUILDING 123 FT EL				
HVN-V1069	FUEL BUILDING HVN SUPPLY HDR DRAIN	CLOSED/ CAPPED		
HVN-V1070	FUEL BUILDING HVN RETURN HDR DRAIN	CLOSED/ CAPPED		
HVN-V1071	FUEL BLDG COOLER HVF-UC4 INLET ISOLATION	OPEN		
HVN-V1078	FUEL BLDG COOLER HVF-UC4 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1075	FUEL BLDG COOLER HVF-UC4 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1077	FUEL BLDG COOLER HVF-UC4 VENT	CLOSED/ CAPPED		
HVN-V1076	FUEL BLDG COOLER HVF-UC4 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1073	FUEL BLDG COOLER HVF-UC4 OUTLET	OPEN		
HVN-V1079	FUEL BLDG COOLER HVF-UC4 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1072	FUEL BUILDING COOLER HVF-UC4 OUTLET ISOLATION	OPEN		
HVN-V1098	FUEL BLDG COOLER HVF-UC8 INLET ISOLATION	OPEN		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
THE FOLLOWING ITEMS ARE LOCATED ON FUEL BUILDING 148 FT EL				
HVN-V1088	FUEL BLDG COOLER HVF-UC8 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1041	FUEL BLDG COOLER HVF-UC8 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1102	FUEL BLDG COOLER HVF-UC8 VENT	CLOSED/ CAPPED		
HVN-V1050	FUEL BLDG COOLER HVF-UC8 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1096	FUEL BLDG COOLER HVF-UC8 OUTLET	OPEN		
HVN-V1063	FUEL BLDG COOLER HVF-UC8 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1084	FUEL BLDG COOLER HVF-UC8 OUTLET ISOLATION	OPEN		
HVN-V1080	FUEL BLDG COOLER HVF-ACU1 INLET ISOLATION	OPEN		
HVN-V1090	FUEL BLDG COOLER HVF-ACU1 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V817	FUEL BLDG COOLER HVF-ACU1 INLET VENT	CLOSED/ CAPPED		
HVN-V1086	FUEL BLDG COOLER HVF-ACU1 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1089	FUEL BLDG COOLER HVF-ACU1 VENT	CLOSED/ CAPPED		
HVN-V1087	FUEL BLDG COOLER HVF-ACU1 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1083	FUEL BLDG COOLER HVF-ACU1 OUTLET	OPEN		
HVN-V1091	FUEL BLDG COOLER HVF-ACU1 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1081	FUEL BLDG COOLER HVF-ACU1 OUTLET ISOLATION	OPEN		
HVN-V816	FUEL BLDG COOLER HVF-ACU1 OUTLET VENT	CLOSED/ CAPPED		
HVN-V1103	FUEL BLDG COOLER HVF-UC7 VENT	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1101	FUEL BLDG COOLER HVF-UC7 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1097	FUEL BLDG COOLER HVF-UC7 OUTLET	OPEN		
HVN-V1105	FUEL BLDG COOLER HVF-UC7 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1095	FUEL BLDG COOLER HVF-UC7 OUTLET ISOLATION	OPEN		
HVN-V1094	FUEL BLDG COOLER HVF-UC7 INLET ISOLATION	OPEN		
HVN-V1104	FUEL BLDG COOLER HVF-UC7 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1100	FUEL BLDG COOLER HVF-UC7 HVN INLET PE CONN	CLOSED/ CAPPED		
HVN-V1093	FUEL BUILDING HVN SUPPLY HDR VENT	CLOSED/ CAPPED		
HVN-V1092	FUEL BUILDING HVN RETURN HDR VENT	CLOSED/ CAPPED		
HVN-V1115	FUEL BLDG COOLER HVF-UC5 INLET ISOLATION	OPEN		
HVN-V1122	FUEL BLDG COOLER HVF-UC5 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1119	FUEL BLDG COOLER HVF-UC5 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1121	FUEL BLDG COOLER HVF-UC5 VENT	CLOSED/ CAPPED		
HVN-V1120	FUEL BLDG COOLER HVF-UC5 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1117	FUEL BLDG COOLER HVF-UC5 OUTLET	OPEN		
HVN-V1123	FUEL BLDG COOLER HVF-UC5 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1116	FUEL BLDG COOLER HVF-UC5 OUTLET ISOLATION	OPEN		
HVN-V1106	FUEL BLDG COOLER HVF-UC6 HVN-P2A SUCTION	OPEN		
HVN-V1113	FUEL BLDG COOLER HVF-UC6 INLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1110	FUEL BLDG COOLER HVF-UC6 INLET PE CONN	CLOSED/ CAPPED		
HVN-V1112	FUEL BLDG COOLER HVF-UC6 VENT	CLOSED/ CAPPED		
HVN-V1111	FUEL BLDG COOLER HVF-UC6 OUTLET PE CONN	CLOSED/ CAPPED		
HVN-V1108	FUEL BLDG COOLER HVF-UC6 OUTLET	OPEN		
HVN-V1114	FUEL BLDG COOLER HVF-UC6 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V1107	FUEL BLDG COOLER HVF-UC6 OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED AT FUEL BUILDING 78 FT EL SFC-P2A/B AREA				
HVN-V3239	CHILL WATER RETURN VENT VALVE	CLOSED/ CAPPED		
HVN-V3235A	CHILL WATER SUPPLY VALVE TO SFC-E2A	OPEN		
HVN-V3235B	CHILL WATER SUPPLY VALVE TO SFC-E2B	OPEN		
HVN-V3236A	CHILL WATER THROTTLE VALVE FROM SFC-E2A	THROTTLED		
HVN-V3236B	CHILL WATER THROTTLE VALVE FROM SFC-E2B	THROTTLED		
HVN-V3237A	CHILL WATER SUPPLY SFC-E2A DRAIN VALVE	CLOSED/ CAPPED		
HVN-V3237B	CHILL WATER SUPPLY SFC-E2B DRAIN VALVE	CLOSED/ CAPPED		
HVN-V3238A	CHILL WATER RETURN SFC-E2A VENT VALVE	CLOSED/ CAPPED		
HVN-V3238B	CHILL WATER RETURN SFC-E2B VENT VALVE	CLOSED/ CAPPED		

VALVE LINEUP VENTILATION CHILLED WATER - RADWASTE BUILDING

Remarks: ____

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Performed By: ____________ ____________ ____________ ______/______
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________ ____________ ____________
OSM/CRS KCN Date/Time

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 154 FT EL EAST				
HVN-V651	TURB BLDG COOLER HVT-UC19A INLET ISOLATION	OPEN		
HVN-V670	TURB BLDG COOLER HVT-UC19A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V659	TURB BLDG COOLER HVT-UC19A UPPER COIL INLET	OPEN		
HVN-V1166	TURB BLDG COOLER HVT-UC19A UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V679	TURB BLDG COOLER HVT-UC19A UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1167	TURB BLDG COOLER HVT-UC19A UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V664	TURB BLDG COOLER HVT-UC19A UPPER COIL OUTLET	THROTTLED		
HVN-V660	TURB BLDG COOLER HVT-UC19A LOWER COIL INLET	OPEN		
HVN-V677	TURB BLDG COOLER HVT-UC19A LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V680	TURB BLDG COOLER HVT-UC19A LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V678	TURB BLDG COOLER HVT-UC19A LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V665	TURB BLDG COOLER HVT-UC19A LOWER COIL OUTLET	THROTTLED		
HVN-V671	TURB BLDG COOLER HVT-UC19A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V652	TURB BLDG COOLER HVT-UC19A OUTLET ISOLATION	OPEN		
HVN-V653	TURB BLDG COOLER HVT-UC19B INLET ISOLATION	OPEN		
HVN-V672	TURB BLDG COOLER HVT-UC19B INLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V661	TURB BLDG COOLER HVT-UC19B UPPER COIL INLET	OPEN		
HVN-V1168	TURB BLDG COOLER HVT-UC19B UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V683	TURB BLDG COOLER HVT-UC19B UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1169	TURB BLDG COOLER HVT-UC19B UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V666	TURB BLDG COOLER HVT-UC19B UPPER COIL OUTLET	THROTTLED		
HVN-V662	TURB BLDG COOLER HVT-UC19B LOWER COIL INLET	OPEN		
HVN-V681	TURB BLDG COOLER HVT-UC19B LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V684	TURB BLDG COOLER HVT-UC19B LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V682	TURB BLDG COOLER HVT-UC19B LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V667	TURB BLDG COOLER HVT-UC19B LOWER COIL OUTLET	THROTTLED		
HVN-V673	TURB BLDG COOLER HVT-UC19B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V654	TURB BLDG COOLER HVT-UC19B OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 154 FT EL WEST				
HVN-V601	TURB BLDG COOLER HVT-UC20 INLET ISOLATION	OPEN		
HVN-V625	TURB BLDG COOLER HVT-UC20 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V603	TURB BLDG COOLER HVT-UC20 UPPER COIL INLET	OPEN		
HVN-V1164	TURB BLDG COOLER HVT-UC20 UPPER INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V638	TURB BLDG COOLER HVT-UC20 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1165	TURB BLDG COOLER HVT-UC20 UPPER COIL OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V605	TURB BLDG COOLER HVT-UC20 UPPER COIL OUTLET	THROTTLED		
HVN-V604	TURB BLDG COOLER HVT-UC20 LOWER COIL INLET	OPEN		
HVN-V636	TURB BLDG COOLER HVT-UC20 LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V639	TURB BLDG COOLER HVT-UC20 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V637	TURB BLDG COOLER HVT-UC20 LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V606	TURB BLDG COOLER HVT-UC20 LOWER COIL OUTLET	THROTTLED		
HVN-V626	TURB BLDG COOLER HVT-UC20 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V602	TURB BLDG COOLER HVT-UC20 OUTLET ISOLATION	OPEN		
HVN-V503	TURB BLDG COOLER HVT-UC21A INLET ISOLATION	OPEN		
HVN-V523	TURB BLDG COOLER HVT-UC21A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V507	TURB BLDG COOLER HVT-UC21A UPPER COIL INLET	OPEN		
HVN-V1162	TURB BLDG COOLER HVT-UC21A UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V539	TURB BLDG COOLER HVT-UC21A UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1163	TURB BLDG COOLER HVT-UC21A UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V511	TURB BLDG COOLER HVT-UC21A UPPER COIL OUTLET	THROTTLED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V508	TURB BLDG COOLER HVT-UC21A LOWER COIL INLET	OPEN		
HVN-V531	TURB BLDG COOLER HVT-UC21A LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V540	TURB BLDG COOLER HVT-UC21A LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V532	TURB BLDG COOLER HVT-UC21A LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V512	TURB BLDG COOLER HVT-UC21A LOWER COIL OUTLET	THROTTLED		
HVN-V524	TURB BLDG COOLER HVT-UC21A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V504	TURB BLDG COOLER HVT-UC21A OUTLET ISOLATION	OPEN		
HVN-V501	TURB BLDG COOLER HVT-UC21B INLET ISOLATION	OPEN		
HVN-V521	TURB BLDG COOLER HVT-UC21B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V505	TURB BLDG COOLER HVT-UC21B UPPER COIL INLET	OPEN		
HVN-V1160	TURB BLDG COOLER HVT-UC21B UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V537	TURB BLDG COOLER HVT-UC21B UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1161	TURB BLDG COOLER HVT-UC21B UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V509	TURB BLDG COOLER HVT-UC21B UPPER COIL OUTLET	THROTTLED		
HVN-V506	TURB BLDG COOLER HVT-UC21B LOWER COIL INLET	OPEN		
HVN-V529	TURB BLDG COOLER HVT-UC21B LOWER INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V538	TURB BLDG COOLER HVT-UC21B LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V530	TURB BLDG COOLER HVT-UC21B LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V510	TURB BLDG COOLER HVT-UC21B LOWER COIL OUTLET	THROTTLED		
HVN-V522	TURB BLDG COOLER HVT-UC21B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V502	TURB BLDG COOLER HVT-UC21B OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 137 FT EL				
HVN-V842	HVN SUPPLY HEADER VENT TB	CLOSED/ CAPPED		
HVN-V843	HVN RETURN HEADER VENT TB	CLOSED/ CAPPED		
HVN-V451	TURB BLDG COOLER HVT-ACU1 INLET ISOLATION	OPEN		
HVN-V483	TURB BLDG COOLER HVT-ACU1 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V455	TURB BLDG COOLER HVT-ACU1 UPPER COIL INLET	OPEN		
HVN-V1158	TURB BLDG COOLER HVT-ACU1 UPPER COIL INLET PE CONN	CLOSED/ CAPPED*		
HVN-V596	TURB BLDG COOLER HVT-ACU1 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1159	TURB BLDG COOLER HVT-ACU1 UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V457	TURB BLDG COOLER HVT-ACU1 UPPER COIL OUTLET	THROTTLED		
HVN-V456	TURB BLDG COOLER HVT-ACU1 LOWER COIL INLET	OPEN		
HVN-V499	TURB BLDG COOLER HVT-ACU1 LOWER INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V597	TURB BLDG COOLER HVT-ACU1 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V595	TURB BLDG COOLER HVT-ACU1 LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V458	TURB BLDG COOLER HVT-ACU1 LOWER COIL OUTLET	THROTTLED		
HVN-V484	TURB BLDG COOLER HVT-ACU1 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V452	TURB BLDG COOLER HVT-ACU1 OUTLET ISOLATION	OPEN		
HVN-V453	TURB BLDG COOLER HVT-UC26 INLET ISOLATION	OPEN		
HVN-V481	TURB BLDG COOLER HVT-UC26 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V468	TURB BLDG COOLER HVT-UC26 UPPER COIL INLET	OPEN		
HVN-V1156	TURB BLDG COOLER HVT-UC26 UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V497	TURB BLDG COOLER HVT-UC26 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1157	TURB BLDG COOLER HVT-UC26 UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V473	TURB BLDG COOLER HVT-UC26 UPPER COIL OUTLET	THROTTLED		
HVN-V469	TURB BLDG COOLER HVT-UC26 LOWER COIL INLET	OPEN		
HVN-V495	TURB BLDG COOLER HVT-UC26 LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V498	TURB BLDG COOLER HVT-UC26 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V496	TURB BLDG COOLER HVT-UC26 LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V474	TURB BLDG COOLER HVT-UC26 LOWER COIL OUTLET	THROTTLED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V482	TURB BLDG COOLER HVT-UC26 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V454	TURB BLDG COOLER HVT-UC26 OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 123 FT EL				
HVN-V463	TURB BLDG COOLER HVT-UC22 INLET ISOLATION	OPEN		
HVN-V479	TURB BLDG COOLER HVT-UC22 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V492	TURB BLDG COOLER HVT-UC22 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V494	TURB BLDG COOLER HVT-UC22 VENT	CLOSED/ CAPPED		
HVN-V493	TURB BLDG COOLER HVT-UC22 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V472	TURB BLDG COOLER HVT-UC22 OUTLET	THROTTLED		
HVN-V480	TURB BLDG COOLER HVT-UC22 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V464	TURB BLDG COOLER HVT-UC22 OUTLET ISOLATION	OPEN		
HVN-V514	TURB BLDG COOLER HVT-UC23A INLET ISOLATION	OPEN		
HVN-V525	TURB BLDG COOLER HVT-UC23A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V533	TURB BLDG COOLER HVT-UC23A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V598	TURB BLDG COOLER HVT-UC23A VENT	CLOSED/ CAPPED		
HVN-V534	TURB BLDG COOLER HVT-UC23A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V519	TURB BLDG COOLER HVT-UC23A OUTLET	THROTTLED		
HVN-V526	TURB BLDG COOLER HVT-UC23A OUTLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V513	TURB BLDG COOLER HVT-UC23A OUTLET ISOLATION	OPEN		
HVN-V515	TURB BLDG COOLER HVT-UC23B INLET ISOLATION	OPEN		
HVN-V527	TURB BLDG COOLER HVT-UC23B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V535	TURB BLDG COOLER HVT-UC23B INLET PE CONN	CLOSED/ CAPPED*		
HVN-V599	TURB BLDG COOLER HVT-UC23B VENT	CLOSED/ CAPPED		
HVN-V536	TURB BLDG COOLER HVT-UC23B OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V520	TURB BLDG COOLER HVT-UC23B OUTLET	THROTTLED		
HVN-V528	TURB BLDG COOLER HVT-UC23B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V516	TURB BLDG COOLER HVT-UC23B OUTLET ISOLATION	OPEN		
HVN-V845	TURB BLDG COOLER HVT-UC24A SUPPLY HDR VENT	CLOSED/ CAPPED		
HVN-V844	TURB BLDG COOLER HVT-UC24A RETURN HDR VENT	CLOSED/ CAPPED		
HVN-V656	TURB BLDG COOLER HVT-UC24A INLET ISOLATION	OPEN		
HVN-V668	TURB BLDG COOLER HVT-UC24A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V674	TURB BLDG COOLER HVT-UC24A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V676	TURB BLDG COOLER HVT-UC24A VENT	CLOSED/ CAPPED		
HVN-V675	TURB BLDG COOLER HVT-UC24A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V663	TURB BLDG COOLER HVT-UC24A OUTLET	THROTTLED		
HVN-V669	TURB BLDG COOLER HVT-UC24A OUTLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V657	TURB BLDG COOLER HVT-UC24A OUTLET ISOLATION	OPEN		
HVN-V607	TURB BLDG COOLER HVT-UC24B INLET ISOLATION	OPEN		
HVN-V619	TURB BLDG COOLER HVT-UC24B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V627	TURB BLDG COOLER HVT-UC24B INLET PE CONN	CLOSED/ CAPPED*		
HVN-V629	TURB BLDG COOLER HVT-UC24B VENT	CLOSED/ CAPPED		
HVN-V628	TURB BLDG COOLER HVT-UC24B OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V616	TURB BLDG COOLER HVT-UC24B OUTLET	THROTTLED		
HVN-V620	TURB BLDG COOLER HVT-UC24B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V608	TURB BLDG COOLER HVT-UC24B OUTLET ISOLATION	OPEN		
HVN-V609	TURB BLDG COOLER HVT-UC24C INLET ISOLATION	OPEN		
HVN-V621	TURB BLDG COOLER HVT-UC24C INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V630	TURB BLDG COOLER HVT-UC24C INLET PE CONN	CLOSED/ CAPPED*		
HVN-V632	TURB BLDG COOLER HVT-UC24C VENT	CLOSED/ CAPPED		
HVN-V631	TURB BLDG COOLER HVT-UC24C OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V617	TURB BLDG COOLER HVT-UC24C OUTLET	THROTTLED		
HVN-V622	TURB BLDG COOLER HVT-UC24C OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V610	TURB BLDG COOLER HVT-UC24C OUTLET ISOLATION	OPEN		
HVN-V611	TURB BLDG COOLER HVT-UC24C INLET ISOLATION	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V623	TURB BLDG COOLER HVT-UC24D INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V633	TURB BLDG COOLER HVT-UC24D INLET PE CONN	CLOSED/ CAPPED*		
HVN-V635	TURB BLDG COOLER HVT-UC24D VENT	CLOSED/ CAPPED		
HVN-V634	TURB BLDG COOLER HVT-UC24D OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V618	TURB BLDG COOLER HVT-UC24D OUTLET	THROTTLED		
HVN-V624	TURB BLDG COOLER HVT-UC24D OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V612	TURB BLDG COOLER HVT-UC24D OUTLET ISOLATION	OPEN		
HVN-V846	HVN UNIT COOLER HVT-UC24B, UC24C SUPPLY HDR VENT	CLOSED/ CAPPED		
HVN-V847	HVN UNIT COOLER HVT-UC24B, UC24C RETURN HDR VENT	CLOSED/ CAPPED		
HVN-V849	HVN TURB BLDG COOLER HVT-UC24D SUPPLY HDR VENT	CLOSED/ CAPPED		
HVN-V848	HVN TURB BLDG COOLER HVT-UC24D RETURN HDR VENT	CLOSED/ CAPPED		
HVN-V694	HVN COMPRESSION TANK TK1 PI-104 ROOT	OPEN		
HVN-V696	HVN COMPRESSION TANK TK1 DRAIN	CLOSED		
HVN-V686	COMPRESSION TANK TK1 LEVEL IND LOWER ISOL	OPEN		
HVN-V687	COMPRESSION TANK TK1 LEVEL IND UPPER ISOL	OPEN		
HVN-V3124	HVN COMP TK1 UPPER SIGHT GLASS UPPER ISOL	OPEN		
HVN-V3125	HVN COMP TK1 UPPER SIGHT GLASS LOWER ISOL	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V3126	HVN COMP TK1 LOWER SIGHT GLASS UPPER ISOL	OPEN		
HVN-V3127	HVN COMP TK1 LOWER SIGHT GLASS LOWER ISOL	OPEN		
HVN-V1118	HVN COMPRESSION TANK TK1 LG108 DRAIN	CLOSED/ CAPPED		
HVN-V685	HVN COMPRESSION TANK TK1 LG108 VENT	CLOSED/ CAPPED		
HVN-V689	HVN COMPRESSION TANK TK1 LT107 LOWER ISOL	OPEN		
HVN-V688	HVN COMPRESSION TANK TK1 LT107 UPPER	OPEN		
HVN-V699	HVN COMPRESSION TANK TK1 LT107 DRAIN	CLOSED/ CAPPED		
HVN-V698	HVN COMPRESSION TANK TK1 LT107 VENT	CLOSED/ CAPPED		
HVN-V850	HVN UNIT COOLER SUPPLY HEADER VENT TB	CLOSED/ CAPPED		
HVN-V851	HVN UNIT COOLER RETURN HEADER VENT TB	CLOSED/ CAPPED		
HVN-V840	HVN SUPPLY HEADER VENT TB	CLOSED/ CAPPED		
HVN-V841	HVN RETURN HEADER VENT TB	CLOSED/ CAPPED		
HVN-V459	TURB BLDG COOLER HVT-UC25A INLET ISOLATION	OPEN		
HVN-V475	TURB BLDG COOLER HVT-UC25A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V485	TURB BLDG COOLER HVT-UC25A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V487	TURB BLDG COOLER HVT-UC25A VENT	CLOSED/ CAPPED		
HVN-V486	TURB BLDG COOLER HVT-UC25A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V470	TURB BLDG COOLER HVT-UC25A OUTLET	THROTTLED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V476	TURB BLDG COOLER HVT-UC25A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V460	TURB BLDG COOLER HVT-UC25A OUTLET ISOLATION	OPEN		
HVN-V461	TURB BLDG COOLER HVT-UC25B INLET ISOLATION	OPEN		
HVN-V477	TURB BLDG COOLER HVT-UC25B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V490	TURB BLDG COOLER HVT-UC25B INLET PE CONN	CLOSED/ CAPPED*		
HVN-V489	TURB BLDG COOLER HVT-UC25B VENT	CLOSED/ CAPPED		
HVN-V491	TURB BLDG COOLER HVT-UC25B OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V471	TURB BLDG COOLER HVT-UC25B OUTLET	THROTTLED		
HVN-V478	TURB BLDG COOLER HVT-UC25B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V462	TURB BLDG COOLER HVT-UC25B OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 109 FT EL, ABOVE RELAY ROOM				
HVN-V361	TURB BLDG COOLER HVT-UC15 INLET ISOLATION	OPEN		
HVN-V373	TURB BLDG HVT-UC15 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V379	TURB BLDG COOLER HVT-UC15 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V385	TURB BLDG COOLER HVT-UC15 VENT	CLOSED/ CAPPED		
HVN-V380	TURB BLDG COOLER HVT-UC15 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V370	TURB BLDG COOLER HVT-UC15 OUTLET	THROTTLED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V374	TURB BLDG COOLER HVT-UC15 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V362	TURB BLDG COOLER HVT-UC15 OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 107 FT EL, ABOVE ARC PUMPS				
HVN-V317	TURB BLDG COOLER HVT-UC18A INLET ISOLATION	OPEN		
HVN-V329	TURB BLDG COOLER HVT-UC18A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V346	TURB BLDG COOLER HVT-UC18A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V337	TURB BLDG COOLER HVT-UC18A VENT	CLOSED/ CAPPED		
HVN-V347	TURB BLDG COOLER HVT-UC18A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V324	TURB BLDG COOLER HVT-UC18A OUTLET	THROTTLED		
HVN-V330	TURB BLDG COOLER HVT-UC18A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V318	TURB BLDG COOLER HVT-U18A OUTLET ISOLATION	OPEN		
HVN-V315	TURB BLDG COOLER HVT-UC18B INLET ISOLATION	OPEN		
HVN-V327	TURB BLDG COOLER HVT-UC18B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V344	TURB BLDG COOLER HVT-UC18B INLET PE CONN	CLOSED/ CAPPED*		
HVN-V336	TURB BLDG COOLER HVT-UC18B VENT	CLOSED/ CAPPED		
HVN-V345	TURB BLDG COOLER HVT-UC18B OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V323	TURB BLDG COOLER HVT-UC18B OUTLET	THROTTLED		
HVN-V328	TURB BLDG COOLER HVT-UC18B OUTLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V316	TURB BLDG COOLER HVT-UC18B OUTLET ISOLATION	OPEN		
HVN-V313	TURB BLDG COOLER HVT-UC18C INLET ISOLATION	OPEN		
HVN-V325	TURB BLDG COOLER HVT-UC18C INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V342	TURB BLDG COOLER HVT-UC18C INLET PE CONN	CLOSED/ CAPPED*		
HVN-V335	TURB BLDG COOLER HVT-UC18C VENT	CLOSED/ CAPPED		
HVN-V343	TURB BLDG COOLER HVT-UC18C OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V322	TURB BLDG COOLER HVT-UC18C OUTLET	THROTTLED		
HVN-V326	TURB BLDG COOLER HVT-UC18C OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V314	TURB BLDG COOLER HVT-UC18C OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 95 FT EL				
HVN-V401	TURB BLDG COOLER HVT-UC11 INLET ISOLATION	OPEN		
HVN-V415	TURB BLDG COOLER HVT-UC11 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V403	TURB BLDG COOLER HVT-UC11 UPPER COIL INLET	OPEN		
HVN-V467	TURB BLDG COOLER HVT-UC11 UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V423	TURB BLDG COOLER HVT-UC11 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V517	TURB BLDG COOLER HVT-UC11 UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V405	TURB BLDG COOLER HVT-UC11 UPPER COIL OUTLET	THROTTLED		
HVN-V404	TURB BLDG COOLER HVT-UC11 LOWER COIL INLET	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V422	TURB BLDG COOLER HVT-UC11 LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V424	TURB BLDG COOLER HVT-UC11 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V431	TURB BLDG COOLER HVT-UC11 LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V406	TURB BLDG COOLER HVT-UC11 LOWER COIL OUTLET	THROTTLED		
HVN-V416	TURB BLDG COOLER HVT-UC11 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V402	TURB BLDG COOLER HVT-UC11 OUTLET ISOLATION	OPEN		
HVN-V253	TURB BLDG COOLER HVT-UC12 INLET ISOLATION	OPEN		
HVN-V261	TURB BLDG COOLER HVT-UC12 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V265	TURB BLDG COOLER HVT-UC12 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V270	TURB BLDG COOLER HVT-UC12 VENT	CLOSED/ CAPPED		
HVN-V266	TURB BLDG COOLER HVT-UC12 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V260	TURB BLDG COOLER HVT-UC12 OUTLET	THROTTLED		
HVN-V262	TURB BLDG COOLER HVT-UC12 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V256	TURB BLDG COOLER HVT-UC12 OUTLET ISOLATION	OPEN		
HVN-V254	TURB BLDG COOLER HVT-UC13 INLET ISOLATION	OPEN		
HVN-V263	TURB BLDG COOLER HVT-UC13 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V267	TURB BLDG COOLER HVT-UC13 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V269	TURB BLDG COOLER HVT-UC13 VENT	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V268	TURB BLDG COOLER HVT-UC13 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V259	TURB BLDG COOLER HVT-UC13 OUTLET	THROTTLED		
HVN-V264	TURB BLDG COOLER HVT-UC13 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V255	TURB BLDG COOLER HVT-UC13 OUTLET ISOLATION	OPEN		
HVN-V824	HVN SUPPLY HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V826	HVN CONTMT SUPPLY HDR DR TB	CLOSED/ CAPPED		
HVN-V825	HVN RETURN HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V827	HVN CONTMT RETURN HDR DR TB	CLOSED/ CAPPED		
HVN-V966	CONTMT HVN PDT111 HIGH SIDE ISOLATION	OPEN		
HVN-V967	CONTMT HVN PDT111 LOW SIDE ISOLATION	OPEN		
HVN-V251	CONTMT HVN PCV HVN-PCV111 DOWNSTREAM ISOL	OPEN		
HVN-V252	CNTMT HVN PCV HVN-PCV111 DOWNSTREAM ISOL	OPEN		
HVN-V1145	DRAIN AT HVN-PCV111 CONTAINMENT PCV	CLOSED/ CAPPED		
HVN-V830	HVN SUPPLY HEADER DRAIN TB EL 95'	CLOSED/ CAPPED		
HVN-V832	HVN SUPPLY HEADER VENT TB EL 95'	CLOSED/ CAPPED		
HVN-V833	HVN RETURN HEADER VENT TB EL 95'	CLOSED/ CAPPED		
HVN-V831	HVN RETURN HEADER DRAIN TB EL 95'	CLOSED/ CAPPED		
HVN-V301	TURB BLDG COOLER HVT-UC14A INLET ISOLATION	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V331	TURB BLDG COOLER HVT-UC14A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V305	TURB BLDG COOLER HVT-UC14A UPPER COIL INLET	OPEN		
HVN-V412	TURB BLDG COOLER HVT-UC14A UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V338	TURB BLDG COOLER HVT-UC14A UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V411	TURB BLDG COOLER HVT-UC14A UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V309	TURB BLDG COOLER HVT-UC14A UPPER COIL OUTLET	THROTTLED		
HVN-V306	TURB BLDG COOLER HVT-UC14A LOWER COIL INLET	OPEN		
HVN-V348	TURB BLDG COOLER HVT-UC14A LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V340	TURB BLDG COOLER HVT-UC14A LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V349	TURB BLDG COOLER HVT-UC14A LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V310	TURB BLDG COOLER HVT-UC14A LOWER COIL OUTLET	THROTTLED		
HVN-V332	TURB BLDG COOLER HVT-UC14A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V302	TURB BLDG COOLER HVT-UC14A OUTLET ISOLATION	OPEN		
HVN-V303	UNIT COOLER HVT-UC14B INLET ISOLATION	OPEN		
HVN-V333	UNIT COOLER HVT-UC14B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V307	UNIT COOLER HVT-UC14B UPPER COIL INLET	OPEN		
HVN-V465	UNIT COOLER HVT-UC14B UPPER INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V339	UNIT COOLER HVT-UC14B UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V466	UNIT COOLER HVT-UC14B UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V311	UNIT COOLER HVT-UC14B UPPER COIL OUTLET	THROTTLED		
HVN-V308	UNIT COOLER HVT-UC14B LOWER COIL INLET	OPEN		
HVN-V350	UNIT COOLER HVT-UC14B LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V341	UNIT COOLER HVT-UC14B LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V351	UNIT COOLER HVT-UC14B LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V312	UNIT COOLER HVT-UC14B LOWER COIL OUTLET	THROTTLED		
HVN-V334	UNIT COOLER HVT-UC14B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V304	UNIT COOLER HVT-UC14B OUTLET ISOLATION	OPEN		
HVN-V353	HVN SUPPLY HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V352	HVN RETURN HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V409	TURB BLDG COOLER HVT-UC16A INLET ISOLATION	OPEN		
HVN-V419	TURB BLDG COOLER HVT-UC16A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V434	TURB BLDG COOLER HVT-UC16A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V436	TURB BLDG COOLER HVT-UC16A VENT	CLOSED/ CAPPED		
HVN-V435	TURB BLDG COOLER HVT-UC16A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V414	TURB BLDG COOLER HVT-UC16A OUTLET	THROTTLED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V432	TURB BLDG COOLER HVT-UC16A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V410	TURB BLDG COOLER HVT-UC16A OUTLET ISOLATION	OPEN		
HVN-V363	TURB BLDG COOLER HVT-UC16B INLET ISOLATION	OPEN		
HVN-V375	TURB BLDG COOLER HVT-UC16B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V381	TURB BLDG COOLER HVT-UC16B INLET PE CONN	CLOSED/ CAPPED*		
HVN-V386	TURB BLDG COOLER HVT-UC16B VENT	CLOSED/ CAPPED		
HVN-V382	TURB BLDG COOLER HVT-UC16B OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V371	TURB BLDG COOLER HVT-UC16B OUTLET	THROTTLED		
HVN-V376	TURB BLDG COOLER HVT-UC16B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V364	TURB BLDG COOLER HVT-UC16B OUTLET ISOLATION	OPEN		
HVN-V365	TURB BLDG COOLER HVT-UC16C INLET ISOLATION	OPEN		
HVN-V3205	HVN SUPPLY TO SST-PNL206	OPEN		
HVN-V3206	TURB BLDG COOLER HVT-UC16C INLET ISOLATION	OPEN		
HVN-V377	TURB BLDG COOLER HVT-UC16C INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V383	TURB BLDG COOLER HVT-UC16C INLET PE CONN	CLOSED/ CAPPED*		
HVN-V387	TURB BLDG COOLER HVT-UC16C VENT	CLOSED/ CAPPED		
HVN-V384	TURB BLDG COOLER HVT-UC16C OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V372	TURB BLDG COOLER HVT-UC16C OUTLET	THROTTLED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V378	TURB BLDG COOLER HVT-UC16C OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V3207	HVN RETURN FROM SST-PNL206	OPEN		
HVN-V3213	HVN FROM SST-PNL206 THROTTLE VALVE	THROTTLED		
HVN-V366	TURB BLDG COOLER HVT-UC16C OUTLET ISOLATION	OPEN		
HVN-V408	UNIT COOLER HVT-UC17 INLET ISOLATION	OPEN		
HVN-V418	UNIT COOLER HVT-UC17 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V425	UNIT COOLER HVT-UC17 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V433	UNIT COOLER HVT-UC17 VENT	CLOSED/ CAPPED		
HVN-V426	UNIT COOLER HVT-UC17 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V413	UNIT COOLER HVT-UC17 OUTLET	THROTTLED		
HVN-V417	UNIT COOLER HVT-UC17 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V407	UNIT COOLER HVT-UC17 OUTLET ISOLATION	OPEN		
HVN-V836	HVN SUPPLY HDR VENT FOR HVT-UC17, UC16A	CLOSED/ CAPPED		
HVN-V837	HVN RETURN HDR VENT FOR HVT-UC17, UC16A	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED IN TURBINE BUILDING ABOVE CHEM SAMPLE ROOM				
HVN-V52	TURB BLDG COOLER HVT-UC9 INLET HEADER	OPEN		
HVN-V76	TURB BLDG COOLER HVT-UC9 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V91	TURB BLDG COOLER HVT-UC9 INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V85	TURB BLDG COOLER HVT-UC9 VENT	CLOSED/ CAPPED		
HVN-V92	TURB BLDG COOLER HVT-UC9 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V69	TURB BLDG COOLER HVT-UC9 OUTLET	THROTTLED		
HVN-V75	TURB BLDG COOLER HVT-UC9 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V57	TURB BLDG COOLER HVT-UC9 OUTLET ISOLATION	OPEN		
HVN-V55	TURB BLDG COOLER HVT-UC10 INLET ISOLATION	OPEN		
HVN-V78	TURB BLDG COOLER HVT-UC10 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V93	TURB BLDG COOLER HVT-UC10 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V86	TURB BLDG COOLER HVT-UC10 VENT	CLOSED/ CAPPED		
HVN-V94	TURB BLDG COOLER HVT-UC10 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V72	TURB BLDG COOLER HVT-UC10 OUTLET	THROTTLED		
HVN-V77	TURB BLDG COOLER HVT-UC10 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V60	TURB BLDG COOLER HVT-UC10 OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 67 FT EL				
HVN-V870	HVN UNIT COOLER SUPPLY HEADER DRAIN	CLOSED/ CAPPED		
HVN-V871	HVN UNIT COOLER RETURN HEADER DRAIN	CLOSED/ CAPPED		
HVN-V815	TURBINE BUILDING CHILLER INLET HEADER VENT	CLOSED/ CAPPED		
HVN-V7	CHILLER 1A HVN-CHL1A INLET	OPEN		
HVN-V10	CHILLER 1A HVN-CHL1A INLET BYPASS	CLOSED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V35	1A FLOW XMTR HVN-FE13A HIGH SIDE ISOL	OPEN		
HVN-V34	1A FLOW XMTR HVN-FE13A LOW SIDE ISOL	OPEN		
HVN-V803	CHILLER 1A HVN-CHL1A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V29	CHILLER 1A HVN-CHL1A EVAPORATOR DRAIN	CLOSED/ CAPPED		
HVN-V26	CHILLER 1A HVN-CHL1A EVAPORATOR VENT	CLOSED/ CAPPED		
HVN-V1126	CHILLER 1A HVN-CHL1A EVAP PURGE UNIT OUTLET	CLOSED/ CAPPED		
HVN-V1127	CHILLER 1A HVN-CHL1A EVAP PURGE UNIT INLET	CLOSED/ CAPPED		
HVN-V1350	PURGE UNIT/OIL COOLER INLET ISOLATION HVN-CHL1A	OPEN		
HVN-V1353	PURGE UNIT/OIL COOLER INLET STRAINER (HVN-STR2A) DRAIN VALVE HVN-CHL1A	CLOSED/ CAPPED		
HVN-V1128	CHILLER 1A HVN-CHL1A OIL COOLER INLET	OPEN		
HVN-V1129	CHILLER 1A HVN-CHL1A OIL COOLER OUTLET	OPEN		
HVN-V802	CHILLER 1A HVN-CHL1A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V6	CHILLER 1B HVN-CHL1B	OPEN		
HVN-V9	CHILLER 1B HVN-CHL1B INLET BYPASS	CLOSED		
HVN-V33	1B FLOW XMTR HVN-FE13B HIGH SIDE ISOL	OPEN		
HVN-V32	1B FLOW XMTR HVN-FE13B LOW SIDE ISOL	OPEN		
HVN-V805	CHILLER 1B HVN-CHL1B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V28	CHILLER 1B HVN-CHL1B EVAPORATOR DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V25	CHILLER 1B HVN-CHL1B EVAPORATOR VENT	CLOSED/ CAPPED		
HVN-V1351	HVN-CHL1B PURGE UNIT/OIL COOLER INLET ISOLATION	OPEN		
HVN-V1354	HVN-CHL1B PURGE UNIT/OIL COOLER INLET STRAINER (HVN-STR2B) DRAIN VALVE	CLOSED/ CAPPED		
HVN-V1131	CHILLER 1B HVN-CHL1B EVAP PURGE UNIT INLET	CLOSED/ CAPPED		
HVN-V1130	CHILLER 1B HVN-CHL1B EVAP PURGE UNIT OUTLET	CLOSED/ CAPPED		
HVN-V1133	CHILLER 1B HVN-CHL1B OIL COOLER INLET	OPEN		
HVN-V1132	CHILLER 1B HVN-CHL1B OIL COOLER OUTLET	OPEN		
HVN-V804	CHILLER 1B HVN-CHL1B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V5	CHILLER 1C HVN-CHL1C INLET	OPEN		
HVN-V8	CHILLER 1C HVN-CHL1C INLET BYPASS	CLOSED		
HVN-V31	1C FLOW TRANSMITTER HVN-FE13C HI SIDE ISOL	OPEN		
HVN-V30	1C FLOW TRANSMITTER HVN-FE13C LOW SIDE ISOL	OPEN		
HVN-V807	CHILLER 1C HVN-CHL1C INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V27	CHILLER 1C HVN-CHL1C EVAPORATOR DRAIN	CLOSED/ CAPPED		
HVN-V24	CHILLER 1C HVN-CHL1C EVAPORATOR VENT	CLOSED/ CAPPED		
HVN-V1352	HVN-CHL1C PURGE UNIT/OIL COOLER INLET ISOLATION	OPEN		
HVN-V1355	HVN-CHL1C PURGE UNIT/OIL COOLER INLET STRAINER (HVN-STR2C) DRAIN VALVE	CLOSED/ CAPPED		
HVN-V1135	CHILLER 1C HVN-CHL1C EVAP PURGE UNIT INLET	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1134	CHILLER 1C HVN-CHL1C EVAP PURGE UNIT OUTLET	CLOSED/ CAPPED		
HVN-V1137	CHILLER 1C HVN-CHL1C OIL COOLER INLET	OPEN		
HVN-V1136	CHILLER 1C HVN-CHL1C OIL COOLER OUTLET	OPEN		
HVN-V806	CHILLER 1C HVN-CHL1C OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V811	HVN SUPPLY HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V812	HVN SUPPLY HEADER VENT TB	CLOSED/ CAPPED		
HVN-V813	HVN SUPPLY HEADER VENT TB	CLOSED/ CAPPED		
HVN-V54	TURB BLDG COOLER HVT-UC1A INLET ISOLATION	OPEN		
HVN-V82	TURB BLDG COOLER HVT-UC1A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V97	TURB BLDG COOLER HVT-UC1A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V88	TURB BLDG COOLER HVT-UC1A VENT	CLOSED/ CAPPED		
HVN-V98	TURB BLDG COOLER HVT-UC1A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V71	TURB BLDG COOLER HVT-UC1A OUTLET	THROTTLED		
HVN-V81	TURB BLDG COOLER HVT-UC1A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V59	TURB BLDG COOLER HVT-UC1A OUTLET ISOLATION	OPEN		
HVN-V53	TURB BLDG COOLER HVT-UC1B INLET ISOLATION	OPEN		
HVN-V80	TURB BLDG COOLER HVT-UC1B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V95	TURB BLDG COOLER HVT-UC1B INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V87	TURB BLDG COOLER HVT-UC1B VENT	CLOSED/ CAPPED		
HVN-V96	TURB BLDG COOLER HVT-UC1B OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V70	TURB BLDG COOLER HVT-UC1B OUTLET	THROTTLED		
HVN-V79	TURB BLDG COOLER HVT-UC1B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V58	TURB BLDG COOLER HVT-UC1B OUTLET ISOLATION	OPEN		
HVN-V205	TURB BLDG COOLER HVT-UC2 INLET ISOLATION	OPEN		
HVN-V223	TURB BLDG COOLER HVT-UC2 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V211	TURB BLDG COOLER HVT-UC2 UPPER COIL INLET	OPEN		
HVN-V368	TURB BLDG COOLER HVT-UC2 UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V235	TURB BLDG COOLER HVT-UC2 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V369	TURB BLDG COOLER HVT-UC2 UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V217	TURB BLDG COOLER HVT-UC2 UPPER COIL OUTLET	THROTTLED		
HVN-V212	TURB BLDG COOLER HVT-UC2 LOWER COIL INLET	OPEN		
HVN-V229	TURB BLDG COOLER HVT-UC2 LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V236	TURB BLDG COOLER HVT-UC2 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V230	TURB BLDG COOLER HVT-UC2 LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V218	TURB BLDG COOLER HVT-UC2 LOWER COIL OUTLET	THROTTLED		
HVN-V224	TURB BLDG COOLER HVT-UC2 OUTLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V206	TURB BLDG COOLER HVT-UC2 OUTLET ISOLATION	OPEN		
HVN-V201	TURB BLDG COOLER HVT-UC3A INLET ISOLATION	OPEN		
HVN-V219	TURB BLDG COOLER HVT-UC3A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V207	TURB BLDG COOLER HVT-UC3A UPPER COIL INLET	OPEN		
HVN-V226	TURB BLDG COOLER HVT-UC3A UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V231	TURB BLDG COOLER HVT-UC3A UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V320	TURB BLDG COOLER HVT-UC3A UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V213	TURB BLDG COOLER HVT-UC3A UPPER COIL OUTLET	THROTTLED		
HVN-V208	TURB BLDG COOLER HVT-UC3A LOWER COIL INLET	OPEN		
HVN-V225	TURB BLDG COOLER HVT-UC3A LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V232	TURB BLDG COOLER HVT-UC3A LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V319	TURB BLDG COOLER HVT-UC3A LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V214	TURB BLDG COOLER HVT-UC3A LOWER COIL OUTLET	THROTTLED		
HVN-V220	TURB BLDG COOLER HVT-UC3A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V202	TURB BLDG COOLER HVT-UC3A OUTLET ISOLATION	OPEN		
HVN-V203	TURB BLDG COOLER HVT-UC3B INLET ISOLATION	OPEN		
HVN-V222	TURB BLDG COOLER HVT-UC3B INLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V209	TURB BLDG COOLER HVT-UC3B UPPER COIL INLET	OPEN		
HVN-V321	TURB BLDG COOLER HVT-UC3B UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V233	TURB BLDG COOLER HVT-UC3B UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V367	TURB BLDG COOLER HVT-UC3B UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V215	TURB BLDG COOLER HVT-UC3B UPPER COIL OUTLET	THROTTLED		
HVN-V210	TURB BLDG COOLER HVT-UC3B LOWER COIL INLET	OPEN		
HVN-V227	TURB BLDG COOLER HVT-UC3B LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V234	TURB BLDG COOLER HVT-UC3B LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V228	TURB BLDG COOLER HVT-UC3B LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V216	TURB BLDG COOLER HVT-UC3B LOWER COIL OUTLET	THROTTLED		
HVN-V221	TURB BLDG COOLER HVT-UC3B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V204	TURB BLDG COOLER HVT-UC3B OUTLET ISOLATION	OPEN		
HVN-V151	TURB BLDG COOLER HVT-UC3C INLET ISOLATION	OPEN		
HVN-V178	TURB BLDG COOLER HVT-UC3C INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V163	TURB BLDG COOLER HVT-UC3C UPPER COIL INLET	OPEN		
HVN-V159	TURB BLDG COOLER HVT-UC3C UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V191	TURB BLDG COOLER HVT-UC3C UPPER COIL VENT	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V160	TURB BLDG COOLER HVT-UC3C UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V169	TURB BLDG COOLER HVT-UC3C UPPER COIL OUTLET	THROTTLED		
HVN-V164	TURB BLDG COOLER HVT-UC3C LOWER COIL INLET	OPEN		
HVN-V185	TURB BLDG COOLER HVT-UC3C LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V192	TURB BLDG COOLER HVT-UC3C LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V186	TURB BLDG COOLER HVT-UC3C LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V170	TURB BLDG COOLER HVT-UC3C LOWER COIL OUTLET	THROTTLED		
HVN-V177	TURB BLDG COOLER HVT-UC3C OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V152	TURB BLDG COOLER HVT-UC3C OUTLET ISOLATION	OPEN		
HVN-V153	TURB BLDG COOLER HVT-UC3D INLET ISOLATION	OPEN		
HVN-V176	TURB BLDG COOLER HVT-UC3D INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V161	TURB BLDG COOLER HVT-UC3D UPPER COIL INLET	OPEN		
HVN-V258	TURB BLDG COOLER HVT-UC3D UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V189	TURB BLDG COOLER HVT-UC3D UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V257	TURB BLDG COOLER HVT-UC3D UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V167	TURB BLDG COOLER HVT-UC3D UPPER COIL OUTLET	THROTTLED		
HVN-V162	TURB BLDG COOLER HVT-UC3D LOWER COIL INLET	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V183	TURB BLDG COOLER HVT-UC3D LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V190	TURB BLDG COOLER HVT-UC3D LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V184	TURB BLDG COOLER HVT-UC3D LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V168	TURB BLDG COOLER HVT-UC3D LOWER COIL OUTLET	THROTTLED		
HVN-V175	TURB BLDG COOLER HVT-UC3D OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V154	TURB BLDG COOLER HVT-UC3D OUTLET ISOLATION	OPEN		
HVN-V157	TURB BLDG COOLER HVT-UC4A INLET ISOLATION	OPEN		
HVN-V3201	HVN SUPPLY TO SST-PNL207	OPEN		
HVN-V3202	TURB BLDG COOLER HVT-UC4A INLET ISOLATION	OPEN		
HVN-V172	TURB BLDG COOLER HVT-UC4A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V179	TURB BLDG COOLER HVT-UC4A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V187	TURB BLDG COOLER HVT-UC4A VENT	CLOSED/ CAPPED		
HVN-V180	TURB BLDG COOLER HVT-UC4A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V165	TURB BLDG COOLER HVT-UC4A OUTLET	THROTTLED		
HVN-V171	TURB BLDG COOLER HVT-UC4A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V3203	HVN RETURN FROM SST-PNL 207	OPEN		
HVN-V3214	HVN FROM SST-PNL207 THROTTLE VALVE	THROTTLED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V3204	TURB BLDG COOLER HVT-UC4A OUTLET ISOLATION	OPEN		
HVN-V158	TURB BLDG COOLER HVT-UC4A OUTLET ISOLATION	OPEN		
HVN-V155	TURB BLDG COOLER HVT-UC4B INLET ISOLATION	OPEN		
HVN-V173	TURB BLDG COOLER HVT-UC4B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V174	TURB BLDG COOLER HVT-UC4B INLET PE CONN	CLOSED/ CAPPED*		
HVN-V188	TURB BLDG COOLER HVT-UC4B VENT	CLOSED/ CAPPED		
HVN-V182	TURB BLDG COOLER HVT-UC4B OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V166	TURB BLDG COOLER HVT-UC4B OUTLET	THROTTLED		
HVN-V181	TURB BLDG COOLER HVT-UC4B OUTLET DRAIN	CLOSED/ CAPPED		
HVN-V156	TURB BLDG COOLER HVT-UC4B OUTLET ISOLATION	OPEN		
HVN-V3209	TURB BLDG COOLER HVT-UC5A INLET ISOLATION	OPEN		
HVN-V3208	HVN SUPPLY TO SST-PNL205	OPEN		
HVN-V123	TURB BLDG COOLER HVT-UC5A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V109	TURB BLDG COOLER HVT-UC5A UPPER COIL INLET	OPEN		
HVN-V113	TURB BLDG COOLER HVT-UC5A UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V130	TURB BLDG COOLER HVT-UC5A UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V114	TURB BLDG COOLER HVT-UC5A UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V116	TURB BLDG COOLER HVT-UC5A UPPER COIL OUTLET	THROTTLED		
HVN-V110	TURB BLDG COOLER HVT-UC5A LOWER COIL INLET	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V136	TURB BLDG COOLER HVT-UC5A LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V131	TURB BLDG COOLER HVT-UC5A LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V137	TURB BLDG COOLER HVT-UC5A LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V117	TURB BLDG COOLER HVT-UC5A LOWER COIL OUTLET	THROTTLED		
HVN-V122	TURB BLDG COOLER HVT-UC5A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V3086	SWP-E163 INLET ISOLATION VALVE	OPEN		
HVN-V3087	SWP-E163 OUTLET ISOLATION VALVE	OPEN		
HVN-V3088	SWP-E163 INLET DRAIN VALVE	CLOSED		
HVN-V101	TURB BLDG COOLER HVT-UC5A OUTLET AND CORR MON SAMPLE ISOLATION	OPEN		
HVN-V3210	HVN RETURN FROM SST-PNL205	OPEN		
HVN-V3212	HVN FROM SST-PNL205 THROTTLE VALVE	THROTTLED		
HVN-V3211	TURB BLDG COOLER HVT-UC5A OUTLET ISOLATION	OPEN		
HVN-V104	TURB BLDG COOLER HVT-UC5B INLET ISOLATION	OPEN		
HVN-V125	TURB BLDG COOLER HVT-UC5B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V111	TURB BLDG COOLER HVT-UC5B UPPER COIL INLET	OPEN		
HVN-V65	TURB BLDG COOLER HVT-UC5B UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V132	TURB BLDG COOLER HVT-UC5B UPPER COIL VENT	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V66	TURB BLDG COOLER HVT-UC5B UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V118	TURB BLDG COOLER HVT-UC5B UPPER COIL OUTLET	THROTTLED		
HVN-V112	TURB BLDG COOLER HVT-UC5B LOWER COIL INLET	OPEN		
HVN-V138	TURB BLDG COOLER HVT-UC5B LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V133	TURB BLDG COOLER HVT-UC5B LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V139	TURB BLDG COOLER HVT-UC5B LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V119	TURB BLDG COOLER HVT-UC5B LOWER COIL OUTLET	THROTTLED		
HVN-V124	TURB BLDG COOLER HVT-UC5B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V103	TURB BLDG COOLER HVT-UC5B OUTLET ISOLATION	OPEN		
HVN-V51	TURB BLDG COOLER HVT-UC6 INLET ISOLATION	OPEN		
HVN-V74	TURB BLDG COOLER HVT-UC6 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V61	TURB BLDG COOLER HVT-UC6 UPPER COIL INLET	OPEN		
HVN-V63	TURB BLDG COOLER HVT-UC6 UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V83	TURB BLDG COOLER HVT-UC6 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V64	TURB BLDG COOLER HVT-UC6 UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V67	TURB BLDG COOLER HVT-UC6 UPPER COIL OUTLET	THROTTLED		
HVN-V62	TURB BLDG COOLER HVT-UC6 LOWER COIL INLET	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V89	TURB BLDG COOLER HVT-UC6 LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V84	TURB BLDG COOLER HVT-UC6 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V90	TURB BLDG COOLER HVT-UC6 LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V68	TURB BLDG COOLER HVT-UC6 LOWER COIL OUTLET	THROTTLED		
HVN-V73	TURB BLDG COOLER HVT-UC6 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V102	TURB BLDG COOLER HVT-UC5A INLET ISOLATION	OPEN		
HVN-V56	TURB BLDG COOLER HVT-UC6 OUTLET ISOLATION	OPEN		
HVN-V108	TURB BLDG COOLER HVT-UC7 INLET ISOLATION	OPEN		
HVN-V129	TURB BLDG COOLER HVT-UC7 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V142	TURB BLDG COOLER HVT-UC7 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V135	TURB BLDG COOLER HVT-UC7 VENT	CLOSED/ CAPPED		
HVN-V143	TURB BLDG COOLER HVT-UC7 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V121	TURB BLDG COOLER HVT-UC7 OUTLET	THROTTLED		
HVN-V128	TURB BLDG COOLER HVT-UC7 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V107	TURB BLDG COOLER HVT-UC7 OUTLET ISOLATION	OPEN		
HVN-V106	TURB BLDG COOLER HVT-UC8 INLET ISOLATION	OPEN		
HVN-V127	TURB BLDG COOLER HVT-UC8 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V140	TURB BLDG COOLER HVT-UC8 INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V134	TURB BLDG COOLER HVT-UC8 VENT	CLOSED/ CAPPED		
HVN-V141	TURB BLDG COOLER HVT-UC8 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V120	TURB BLDG COOLER HVT-UC8 OUTLET	THROTTLED		
HVN-V126	TURB BLDG COOLER HVT-UC8 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V105	TURB BLDG COOLER HVT-UC8 OUTLET ISOLATION	OPEN		
HVN-V818	HVN RETURN HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V819	HVN SUPPLY HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V820	HVN SUPPLY HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V821	HVN RETURN HEADER DRAIN TB	CLOSED/ CAPPED		
HVN-V822	HVN RETURN HEADER VENT TB	CLOSED/ CAPPED		
HVN-V823	HVN SUPPLY HEADER VENT TB	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON OFFGAS BUILDING 146 FT EL				
HVN-V769	OFFGAS BLDG COOLER HVT-UC32 INLET ISOLATION	OPEN		
HVN-V766	OFFGAS BLDG COOLER HVT-UC32 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V763	OFFGAS BLDG COOLER HVT-UC32 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V765	OFFGAS BLDG COOLER HVT-UC32 VENT	CLOSED/ CAPPED		
HVN-V764	OFFGAS BLDG COOLER HVT-UC32 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V770	OFFGAS BLDG COOLER HVT-UC32 OUTLET	THROTTLED		
HVN-V767	OFFGAS BLDG COOLER HVT-UC32 OUTLET HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V768	OFFGAS BLDG COOLER HVT-UC32 OUTLET ISOLATION	OPEN		
HVN-V872	OFFGAS BLDG COOLER HVT-UC32 SUPPLY HEADER VENT	CLOSED/ CAPPED		
HVN-V873	OFFGAS BLDG COOLER HVT-UC32 RETURN HEADER VENT	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON OFFGAS BUILDING 137 FT EL				
HVN-V751	OFFGAS BLDG COOLER HVT-UC31A INLET ISOLATION	OPEN		
HVN-V748	OFFGAS BLDG COOLER HVT-UC31A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V745	OFFGAS BLDG COOLER HVT-UC31A INLET PE CONN	CLOSED/ CAPPED*		
HVN-V747	OFFGAS BLDG COOLER HVT-UC31A VENT	CLOSED/ CAPPED		
HVN-V746	OFFGAS BLDG COOLER HVT-UC31A OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V752	OFFGAS BLDG COOLER HVT-UC31A OUTLET	THROTTLED		
HVN-V749	OFFGAS BLDG COOLER HVT-UC31A OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V750	OFFGAS BLDG COOLER HVT-UC31A OUTLET ISOLATION	OPEN		
HVN-V3056	OFFGAS BLDG COOLER HVT-UC31A SUPPLY HEADER DRAIN	CLOSED/ CAPPED		
HVN-V760	OFFGAS BLDG COOLER HVT-UC31B INLET ISOLATION	OPEN		
HVN-V757	OFFGAS BLDG COOLER HVT-UC31B UNLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V754	OFFGAS BLDG COOLER HVT-UC31B INLET PE CONN	CLOSED/ CAPPED*		
HVN-V756	OFFGAS BLDG COOLER HVT-UC31B VENT	CLOSED/ CAPPED		
HVN-V755	OFFGAS BLDG COOLER HVT-UC31B OUTLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V761	OFFGAS BLDG COOLER HVT-UC31B OUTLET	THROTTLED		
HVN-V758	OFFGAS BLDG COOLER HVT-UC31B OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V759	OFFGAS BLDG COOLER HVT-UC31B OUTLET ISOLATION	OPEN		
HVN-V874	OFFGAS BLDG COOLER HVT-UC31B SUPPLY HEADER VENT	CLOSED/ CAPPED		
HVN-V875	OFFGAS BLDG COOLER HVT-UC31B SUPPLY HEADER VENT	CLOSED/ CAPPED		
HVN-V3055	OFFGAS BLDG COOLER HVT-UC31B SUPPLY HEADER DRAIN	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON OFFGAS BUILDING 123 FT EL				
HVN-V712	OFFGAS BLDG COOLER HVT-UC30 INLET ISOLATION	OPEN		
HVN-V710	OFFGAS BLDG COOLER HVT-UC30 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V713	OFFGAS BLDG COOLER HVT-UC30 OUTLET ISOLATION	OPEN		
HVN-V714	OFFGAS BLDG COOLER HVT-UC30 UPPER COIL INLET	OPEN		
HVN-V1170	OFFGAS BLDG COOLER HVT-UC30 UPPER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V708	OFFGAS BLDG COOLER HVT-UC30 UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1171	OFFGAS BLDG COOLER HVT-UC30 UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V715	OFFGAS BLDG COOLER HVT-UC30 UPPER COIL OUTLET	THROTTLED		
HVN-V716	OFFGAS BLDG COOLER HVT-UC30 LOWER COIL INLET	OPEN		
HVN-V706	OFFGAS BLDG COOLER HVT-UC30 LOWER INLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V709	OFFGAS BLDG COOLER HVT-UC30 LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V707	OFFGAS BLDG COOLER HVT-UC30 LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V717	OFFGAS BLDG COOLER HVT-UC30 LOWER COIL OUTLET	THROTTLED		
HVN-V711	OFFGAS BLDG COOLER HVT-UC30 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON OFFGAS BUILDING 105 FT EL STAIRWELL				
HVN-V741	OFFGAS BLDG COOLER HVT-UC29 INLET ISOLATION	OPEN		
HVN-V739	OFFGAS BLDG COOLER HVT-UC29 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V736	OFFGAS BLDG COOLER HVT-UC29 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V738	OFFGAS BLDG COOLER HVT-UC29 VENT	CLOSED/ CAPPED		
HVN-V737	OFFGAS BLDG COOLER HVT-UC29 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V744	OFFGAS BLDG COOLER HVT-UC29 OUTLET	THROTTLED		
HVN-V740	OFFGAS BLDG COOLER HVT-UC29 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V742	OFFGAS BLDG COOLER HVT-UC29 OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON TURBINE BUILDING 67 FT EL				
HVN-V724	OFFGAS BLDG COOLER HVT-UC27 INLET ISOLATION	OPEN		
HVN-V721	OFFGAS BLDG COOLER HVT-UC27 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V718	OFFGAS BLDG COOLER HVT-UC27 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V720	OFFGAS BLDG COOLER HVT-UC27 VENT	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V719	OFFGAS BLDG COOLER HVT-UC27 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V725	OFFGAS BLDG COOLER HVT-UC27 OUTLET	THROTTLED		
HVN-V722	OFFGAS BLDG COOLER HVT-UC27 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V723	OFFGAS BLDG COOLER HVT-UC27 OUTLET ISOLATION	OPEN		
HVN-V733	OFFGAS BLDG COOLER HVT-UC28 INLET ISOLATION	OPEN		
HVN-V730	OFFGAS BLDG COOLER HVT-UC28 INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V727	OFFGAS BLDG COOLER HVT-UC28 INLET PE CONN	CLOSED/ CAPPED*		
HVN-V729	OFFGAS BLDG COOLER HVT-UC28 VENT	CLOSED/ CAPPED		
HVN-V728	OFFGAS BLDG COOLER HVT-UC28 OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V734	OFFGAS BLDG COOLER HVT-U28 OUTLET	THROTTLED		
HVN-V731	OFFGAS BLDG COOLER HVT-UC28 OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V732	OFFGAS BLDG COOLER HVT-UC28 OUTLET ISOLATION	OPEN		
HVN-V810	TURB BLDG PUMPS HVN-P1A, P1B, RETURN HEADER DRAIN	CLOSED/ CAPPED		
HVN-V814	TURB BLDG PUMPS HVN-P1A, P1B RETURN HEADER VENT	CLOSED/ CAPPED		
HVN-V690	HVN AIR SEPARATOR HVN-ASP1 INLET	OPEN		
HVN-V655	AIR SEPARATOR HVN-ASP1 TO/FROM COMPRESSION TK	OPEN		
HVN-V691	HVN AIR SEPARATOR HVN-ASP1 OUTLET	OPEN		
HVN-V697	HVN AIR SEPARATOR HVN-ASP1 DRAIN	CLOSED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V13	TURB BLDG PUMP 1A SUCTION PI HVN-PI16A ROOT	OPEN		
HVN-V1	TURB BLDG PUMP 1A HVN-P1A SUCTION	OPEN		
HVN-V17	TURB BLDG PUMP 1A SUCTION STRAINER HVN-STR1A DRAIN	CLOSED/ CAPPED		
HVN-V15	TURB BLDG PUMP 1A HVN-P1A SUCTION PE CONN	CLOSED/ CAPPED*		
HVN-V1214	TURB BLDG PUMP 1A HVN-P1A CASING VENT	CLOSED/ CAPPED		
HVN-V1215	TURB BLDG PUMP 1A HVN-P1A CASING DRAIN	CLOSED/ CAPPED		
HVN-V809	TURB BLDG PUMP 1A HVN-P1A CASING DRAIN	CLOSED/ CAPPED		
HVN-V11	TURB BLDG PUMP 1A DISCH PI HVN-PI13A ROOT	OPEN		
HVN-MOV4A	TURB BLDG PUMP 1A HVN-P1A DISCHARGE	OPEN/ CLOSED		
HVN-V14	TURB BLDG PUMP 1B SUCTION PI HVN-PI16B ROOT	OPEN		
HVN-V2	TURB BLDG PUMP 1B HVN-P1B SUCTION	OPEN		
HVN-V18	TURB BLDG PUMP 1B SUCTION STRAINER HVN-STR1B DRAIN	CLOSED/ CAPPED		
HVN-V16	TURB BLDG PUMP 1B HVN-P1B SUCTION PE CONN	CLOSED/ CAPPED*		
HVN-V1216	TURB BLDG PUMP 1B HVN-P1B CASING VENT	CLOSED/ CAPPED		
HVN-V1217	TURB BLDG PUMP 1B HVN-P1B CASING DRAIN	CLOSED/ CAPPED		
HVN-V808	TURB BLDG PUMP 1B HVN-P1B CASING DRAIN	CLOSED/ CAPPED		
HVN-V12	TURB BLDG PUMP 1B DISCH PI HVN-PI3B ROOT	OPEN		
HVN-MOV4B	TURB BLDG PUMP 1B HVN-P1B DISCHARGE	OPEN/ CLOSED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V3134	HVN DEMINERALIZER 1 TANK PRESSURE TEST CONNECTION ROOT VALVE	CLOSED/ CAPPED*		
HVN-V3142	HVN DEMINERALIZER 1 TANK VENT VALVE	CLOSED/ CAPPED		
HVN-V3135	HVN DEMINERALIZER 1 RESIN OUTLET VLV	CLOSED/ CAPPED		
HVN-V3139	HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY PI233B ROOT VALVE	OPEN		
HVN-V3137	HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY SHUTOFF VALVE	OPEN		
HVN-V3141	HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY TANK SHUTOFF VALVE	OPEN/ CLOSED		
HVN-V3140	HVN DEMINERALIZER 1 LOW PRESSURE RETURN TANK SHUTOFF VALVE	OPEN/ CLOSED		
HVN-V3138	HVN DEMINERALIZER 1 LOW PRESSURE RETURN PI233A ROOT VALVE	OPEN		
HVN-V3143	HVN DEMINERALIZER 1 DISCHARGE LINE DRAIN VALVE	CLOSED/ CAPPED		
HVN-V3136	HVN DEMINERALIZER 1 HIGH PRESSURE SUPPLY SHUTOFF VALVE	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON CONTAINMENT BUILDING 141 FT EL				
HVN-V249	CONTMT UNIT COOLERS HVN SUPPLY HDR MANUAL ISOL	OPEN		
HVN-V864	CONTMT UNIT COOLERS HVN SUPPLY HDR DRAIN	CLOSED/ CAPPED		
HVN-V865	HVN TO SWP DRYWELL UNIT COOLER HEADER DRAIN	CLOSED/ CAPPED		
HVN-V858	CONTMT UNIT COOLERS HVN RETURN HEADER DRAIN	CLOSED/ CAPPED		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V1344	CONTAINMENT UNIT COOLER RETURN HEADER MANUAL ISOLATION	OPEN		
THE FOLLOWING ITEMS ARE LOCATED ON CONTAINMENT BUILDING 162 FT EL				
HVN-V550	CONTMT COOLER HVR-UC1A INLET ISOLATION	OPEN		
HVN-V869	CONTMT COOLER HVR-UC1A INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V551	CONTMT COOLER HVR-UC1B INLET ISOLATION	OPEN		
HVN-V867	CONTMT COOLER HVR-UC1B INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V554	CONTMT COOLER HVR-UC1C INLET ISOLATION	OPEN		
HVN-V862	CONTMT COOLER HVR-UC1C INLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V592	CONTMT COOLER HVR-UC1C INLET DRAIN	CLOSED/ CAPPED		
HVN-V1320	CONTMT COOLER HVR-UC1C INLET VENT	CLOSED/ CAPPED		
HVN-V614	CONTMT COOLER HVR-UC1C UPPER INLET PE CONN	CLOSED/ CAPPED		
HVN-V583	CONTMT COOLER HVR-UC1C UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V1191	CONTMT COOLER HVR-UC1C UPPER COIL VENT	CLOSED/ CAPPED		
HVN-V615	CONTMT COOLER HVR-UC1C UPPER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V1317	CONTMT COOLER HVR-UC1C OUTLET VENT	CLOSED/ CAPPED		
HVN-V518	CONTMT COOLER HVR-UC1C MID INLET PE CONN	CLOSED/ CAPPED*		
HVN-V584	CONTMT COOLER HVR-UC1C MID COIL VENT	CLOSED/ CAPPED		
HVN-V1192	CONTMT COOLER HVR-UC1C MID COIL VENT	CLOSED/ CAPPED		
HVN-V613	CONTMT COOLER HVR-UC1C MID OUTLET PE CONN	CLOSED/ CAPPED*		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
HVN-V586	CONTMT COOLER HVR-UC1C LOWER INLET PE CONN	CLOSED/ CAPPED*		
HVN-V585	CONTMT COOLER HVR-UC1C LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V1193	CONTMT COOLER HVR-UC1C LOWER COIL VENT	CLOSED/ CAPPED		
HVN-V587	CONTMT COOLER HVR-UC1C LOWER OUTLET PE CONN	CLOSED/ CAPPED*		
HVN-V593	CONTMT COOLER HVR-UC1C OUTLET HEADER DRAIN	CLOSED/ CAPPED		
HVN-V552	CONTMT COOLER HVR-UC1C OUTLET ISOLATION	OPEN		
THE FOLLOWING ITEM IS LOCATED ON CONTAINMENT BUILDING 141 FT EL				
HVN-V860	HVN TO SWP DRYWELL HEADER DRAIN	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON AUXILIARY BUILDING 146 FT EL				
HVN-V857	HVN CONTMT SUPPLY HDR DR TB	CLOSED/ CAPPED		
HVN-V838	HVN CONTMT SUPPLY HDR VENT TB	CLOSED/ CAPPED		
HVN-V856	HVN CONTMT RETURN HDR DR TB	CLOSED/ CAPPED		
HVN-V839	HVN CONTMT RETURN HDR VENT TB	CLOSED/ CAPPED		
HVN-V859	HVN CONTMT RETURN HDR DR TB	CLOSED/ CAPPED		
HVN-V863	HVN CONTMT RETURN HDR DR TB	CLOSED/ CAPPED		
HVN-V427	HVN CONTMT SUPPLY HEADER LMC VENT	CLOSED/ CAPPED		
HVN-V430	HVN CONTMT RETURN HEADER LMC VENT	CLOSED/ CAPPED		
HVN-V773	CONTMT HVN SUPPLY HEADER MANUAL ISOL	OPEN		
HVN-V772	CONTMT HVN RETURN HEADER MANUAL ISOL	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
THE FOLLOWING ITEMS ARE LOCATED IN AUX BLDG ABOVE CRD REBUILD ROOM				
HVN-V1340	SUPPLY HEADER TO HVR-UC14 VENT	CLOSED/ CAPPED		
HVN-V1341	RETURN HEADER FROM HVR-UC14 VENT	CLOSED/ CAPPED		
HVN-V3058	HVN CONTMT SUPPLY HEADER VENT	CLOSED/ CAPPED		
THE FOLLOWING ITEMS ARE LOCATED ON AUXILIARY BUILDING 95 FT EL				
HVN-V1330	RMS-RE19A COOLING WATER INLET DRAIN	CLOSED/ CAPPED		
HVN-V1328	RMS-FE19B COOLING WATER INLET	CLOSED		
HVN-V1327	RMS-FE19B COOLING WATER OUTLET	CLOSED		
HVN-V1329	RMS-RE19B COOLING WATER INLET DRAIN	CLOSED/ CAPPED		
HVN-V1343	RMS-RE19B COOLING WATER OUTLET DRAIN	CLOSED/ CAPPED		
HVN-V1326	RMS-FE19A COOLING WATER INLET	CLOSED		
HVN-V1325	RMS-FE19A COOLING WATER OUTLET	CLOSED		
HVN-V1342	RMS-RE19A COOLING WATER OUTLET DRAIN	CLOSED/ CAPPED		
HVN-V1336	SUPPLY HEADER TO HVR-UC14 ISOLATION	OPEN		
HVN-V1333	SUPPLY HEADER TO HVR-UC14 PE CONNECTION	CLOSED/ CAPPED		
HVN-V1334	SUPPLY HEADER TO HVR-UC14 DRAIN	CLOSED/ CAPPED		
HVN-V1332	RETURN HEADER FROM HVR-UC14 PE CONNECTION	CLOSED/ CAPPED		
HVN-V1338	RETURN HEADER FROM HVR-UC14 ISOLATION	OPEN		
HVN-V1337	RETURN HEADER FROM HVR-UC14 ISOLATION	OPEN		

VALVE LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS/CONTAINMENT BUILDINGS

* Pipe caps are <u>not</u> required by the design to be used on vent, drain and test connections that are normally isolated from system pressure for system operability. On Q-Class 1 systems they are required by the USAR to limit leakage if valve leakage occurs.

Remarks: ____

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Performed By: ______________________ __________ __________ ________/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ______________________ ______ __________
OSM/CRS KCN Date/Time

VALVE LINEUP - TURBINE BUILDING CHILLERS (NON-SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS	VALVE LABELED
LOCATION: HVN-CHL1A TURB BLDG 67 FT EL				
HVN-V3089A	HVN-CHL1A OIL COOLER LEFT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3090A	HVN-CHL1A OIL COOLER LEFT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3091A	HVN-CHL1A OIL COOLER RIGHT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3092A	HVN-CHL1A OIL COOLER RIGHT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3093A	HVN-CHL1A OIL COOLER SAMPLE VALVE	CLOSED/ CAPPED		
HVN-V3095A	HVN-CHL1A SEAL LEAK-OFF SUMP TO OIL SUMP ISOLATION	CLOSED		
HVN-V3096A	HVN-CHL1A OIL SUMP CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3097A	HVN-CHL1A COMPRESSOR SUCTION RETURN TO SUMP ISOLATION VALVE	OPEN		
HVN-V3098A	HVN-CHL1A EVAPORATOR INLET CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3099A	HVN-CHL1A PURGE UNIT ISOLATION	CLOSED/ CAPPED		
HVN-V3100A	HVN-CHL1A EVAPORATOR PRESS INDICATOR (PI209A) ISOL	OPEN		
HVN-V3102A	HVN-CHL1A OIL PRESS INDICATOR (P121A) ISOL	OPEN		
HVN-V3118A	HVN-CHL1A PURGE UNIT COMPRESSOR ISOLATION	OPEN		
HVN-V3120A	HVN-PRG1A INLET ISOL VLV	OPEN		
HVN-V3122A	HVN-PRG1A OUTLET ISOL VLV	OPEN		

VALVE LINEUP - TURBINE BUILDING CHILLERS (NON-SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS	VALVE LABELED
LOCATION: HVN-CHL1B TURB BLDG 67 FT EL				
HVN-V3089B	HVN-CHL1B OIL COOLER LEFT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3090B	HVN-CHL1B OIL COOLER LEFT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3091B	HVN-CHL1B OIL COOLER RIGHT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3092B	HVN-CHL1B OIL COOLER RIGHT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3093B	HVN-CHL1B OIL COOLER SAMPLE VALVE	CLOSED/ CAPPED		
HVN-V3095B	HVN-CHL1B SEAL LEAK-OFF SUMP TO OIL SUMP ISOLATION	CLOSED		
HVN-V3096B	HVN-CHL1B OIL SUMP CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3097B	HVN-CHL1B COMPRESSOR SUCTION RETURN TO SUMP ISOLATION VALVE	OPEN		
HVN-V3098B	HVN-CHL1B EVAPORATOR INLET CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3099B	HVN-CHL1B EVAP INLET FROM PURGE UNIT	OPEN		
HVN-V3100B	HVN-CHL1B EVAPORATOR PRESS INDICATOR (PI209B) ISOLATION	OPEN		
HVN-V3102B	HVN-CHL1B OIL PRESS INDICATOR (P121B) ISOLATION	OPEN		
HVN-V3220B	CLEANUP HOT GAS SUPPLY	CLOSED/ CAPPED		
HVN-V3221B	CLEANUP REFRIGERANT RETURN	CLOSED/ CAPPED		
HVN-V3222B	CLEANUP HIGH POINT REFRIGERANT SUPPLY	CLOSED/ CAPPED		
HVN-V3223B	CLEANUP LOW POINT REFRIGERANT SUPPLY	CLOSED/ CAPPED		

VALVE LINEUP - TURBINE BUILDING CHILLERS (NON-SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS	VALVE LABELED
HVN-V3224B	LUBE OIL RETURN	CLOSED/ CAPPED		
HVN-V3120B	HVN-PRG1B INLET ISOL VLV	OPEN		
HVN-V3122B	HVN-PRG1B OUTLET ISOL VLV	OPEN		
LOCATION: HVN-CHL1C TURB BLDG 67 FT EL				
HVN-V3089C	HVN-CHL1C OIL COOLER LEFT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3090C	HVN-CHL1C OIL COOLER LEFT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3091C	HVN-CHL1C OIL COOLER RIGHT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3092C	HVN-CHL1C OIL COOLER RIGHT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3093C	HVN-CHL1C OIL COOLER SAMPLE VALVE	CLOSED/ CAPPED		
HVN-V3095C	HVN-CHL1C SEAL LEAK-OFF SUMP TO OIL SUMP ISOLATION	CLOSED		
HVN-V3096C	HVN-CHL1C OIL SUMP CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3097C	HVN-CHL1C COMPRESSOR SUCTION RETURN TO SUMP ISOLATION VALVE	OPEN		
HVN-V3098C	HVN-CHL1C EVAPORATOR INLET CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3099C	HVN-CHL1C PURGE UNIT ISOLATION	CLOSED/ CAPPED		
HVN-V3100C	HVN-CHL1C EVAPORATOR PRESS INDICATOR (PI209C) ISOLATION	OPEN		
HVN-V3102C	HVN-CHL1C OIL PRESS INDICATOR (P121C) ISOLATION	OPEN		
HVN-V3220C	CLEANUP HOT GAS SUPPLY	CLOSED/ CAPPED		
HVN-V3221C	CLEANUP REFRIGERANT RETURN	CLOSED/ CAPPED		

VALVE LINEUP - TURBINE BUILDING CHILLERS (NON-SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS	VALVE LABELED
HVN-V3222C	CLEANUP HIGH POINT REFRIGERANT SUPPLY	CLOSED/ CAPPED		
HVN-V3223C	CLEANUP LOW POINT REFRIGERANT SUPPLY	CLOSED/ CAPPED		
HVN-V3224C	LUBE OIL RETURN	CLOSED/ CAPPED		
HVN-V3120C	HVN-PRG1C INLET ISOL VLV	OPEN		
HVN-V3122C	HVN-PRG1C OUTLET ISOL VLV	OPEN		
LOCATION: HVN-CHL2A RADWASTE BLDG 166 FT EL				
HVN-V3103A	HVN-CHL2A OIL COOLER LEFT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3104A	HVN-CHL2A OIL COOLER LEFT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3105A	HVN-CHL2A OIL COOLER RIGHT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3106A	HVN-CHL2A OIL COOLER RIGHT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3107A	HVN-CHL2A OIL COOLER SAMPLE VALVE	CLOSED/ CAPPED		
HVN-V3109A	HVN-CHL2A SEAL LEAK-OFF SUMP TO OIL SUMP ISOLATION	CLOSED		
HVN-V3110A	HVN-CHL2A OIL SUMP CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3111A	HVN-CHL2A COMPRESSOR SUCTION RETURN TO SUMP ISOLATION VALVE	OPEN		
HVN-V3112A	HVN-CHL2A EVAPORATOR INLET CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3113A	HVN-CHL2A PURGE UNIT ISOLATION	CLOSED/ CAPPED		
HVN-V3114A	HVN-CHL2A EVAPORATOR PRESS INDICATOR (PI224A) ISOLATION	OPEN		
HVN-V3116A	HVN-CHL2A OIL PRESS INDICATOR (P232A) ISOLATION	OPEN		

VALVE LINEUP - TURBINE BUILDING CHILLERS (NON-SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS	VALVE LABELED
HVN-V3117A	HVN-CHL2A CONDENSER DRAIN VALVE	CLOSED		
HVN-V3121A	HVN-PRG2A INLET ISOL VLV	OPEN		
HVN-V3123A	HVN-PRG2A OUTLET ISOL VLV	OPEN		
LOCATION: HVN-CHL2B RADWASTE BLDG 166 FT EL				
HVN-V3103B	HVN-CHL2B OIL COOLER LEFT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3104B	HVN-CHL2B OIL COOLER LEFT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3105B	HVN-CHL2B OIL COOLER RIGHT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3106B	HVN-CHL2B OIL COOLER RIGHT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3107B	HVN-CHL2B OIL COOLER SAMPLE VALVE	CLOSED/ CAPPED		
HVN-V3109B	HVN-CHL2B SEAL LEAK-OFF SUMP TO OIL SUMP ISOLATION	CLOSED		
HVN-V3110B	HVN-CHL2B OIL SUMP CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3111B	HVN-CHL2B COMPRESSOR SUCTION RETURN TO SUMP ISOLATION VALVE	OPEN		
HVN-V3112B	HVN-CHL2B EVAPORATOR INLET CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3113B	HVN-CHL2B PURGE UNIT ISOLATION	CLOSED/ CAPPED		
HVN-V3114B	HVN-CHL2B EVAPORATOR PRESS INDICATOR (PI224B) ISOLATION	OPEN		
HVN-V3116B	HVN-CHL2B OIL PRESS INDICATOR (P323B) ISOLATION	OPEN		
HVN-V3117B	HVN-CHL2B CONDENSER DRAIN VALVE	CLOSED		
HVN-V3121B	HVN-PRG2B INLET ISOL VLV	OPEN		

VALVE LINEUP - TURBINE BUILDING CHILLERS (NON-SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS	VALVE LABELED
HVN-V3123B	HVN-PRG2B OUTLET ISOL VLV	OPEN		
LOCATION: HVN-CHL2C RADWASTE BLDG 166 FT EL				
HVN-V3103C	HVN-CHL2C OIL COOLER LEFT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3104C	HVN-CHL2C OIL COOLER LEFT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3105C	HVN-CHL2C OIL COOLER RIGHT SIDE FILTER INLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3106C	HVN-CHL2C OIL COOLER RIGHT SIDE FILTER OUTLET ISOLATION VALVE	OPEN/CLOSED (NOTE 1)		
HVN-V3107C	HVN-CHL2C OIL COOLER SAMPLE VALVE	CLOSED/ CAPPED		
HVN-V3109C	HVN-CHL2C SEAL LEAK-OFF SUMP TO OIL SUMP ISOLATION	CLOSED		
HVN-V3110C	HVN-CHL2C OIL SUMP CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3111C	HVN-CHL2C COMPRESSOR SUCTION RETURN TO SUMP ISOLATION VALVE	OPEN		
HVN-V3112C	HVN-CHL2C EVAPORATOR INLET CHARGING VALVE	CLOSED/ CAPPED		
HVN-V3113C	HVN-CHL2C PURGE UNIT ISOLATION	CLOSED/ CAPPED		
HVN-V3114C	HVN-CHL2C EVAPORATOR PRESS INDICATOR (PI224C) ISOLATION	OPEN		
HVN-V3116C	HVN-CHL2C OIL PRESS INDICATOR (P323C) ISOLATION	OPEN		
HVN-V3117C	HVN-CHL2C CONDENSER DRAIN VALVE	CLOSED		
HVN-V3225C	CLEANUP HOT GAS SUPPLY	CLOSED/ CAPPED		
HVN-V3226C	CLEANUP REFRIGERANT SUPPLY	CLOSED/ CAPPED		

VALVE LINEUP - TURBINE BUILDING CHILLERS (NON-SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS	VALVE LABELED
HVN-V3227C	CLEANUP REFRIGERANT RETURN	CLOSED/ CAPPED		
HVN-V3228C	LUBE OIL RETURN	CLOSED/ CAPPED		
HVN-V3121C	HVN-PRG2C INLET ISOL VLV	OPEN		
HVN-V3123C	HVN-PRG2C OUTLET ISOL VLV	OPEN		
HVN-V3225C	CLEANUP HOT GAS SUPPLY	CLOSED/ CAPPED		
HVN-V3226C	CLEANUP REFRIGERANT SUPPLY	CLOSED/ CAPPED		
HVN-V3227C	CLEANUP REFRIGERANT RETURN	CLOSED/ CAPPED		
HVN-V3228C	LUBE OIL RETURN	CLOSED/ CAPPED		

NOTE 1: Only one of the oil filters on the dual oil filter system is in service with the other in standby.

Remarks: ____

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Performed By: ______________ ______ ______ ____/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ______________ ______ ______
OSM/CRS KCN Date/Time

VALVE LINEUP - VENTILATION CHILLED WATER - CONTAINMENT BUILDING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
THE FOLLOWING ITEMS ARE LOCATED ON REACTOR BUILDING 141 FT EL					
HVN-V542	HVN TO SWP DRYWELL UNIT COOLER ISOLATION	CLOSED			
HVN-V543	HVN FROM SWP DRYWELL UNIT COOLER ISOLATION	CLOSED			
HVN-V3057	HVN FROM SWP DRYWELL UNIT COOLER HEADER VENT	CLOSED/ CAPPED			
HVN-MOV102	HVN CONTMT RETURN HDR ISOLATION	OPEN			
THE FOLLOWING ITEM IS LOCATED ON AUXILIARY BUIDING 141 FT EL					
HVN-V429	HVN CONTMT SUPPLY HDR LMC CONNECTION	LOCKED CLOSED/ CAPPED			
HVN-MOV127	HVN CONTMT SUPPLY HDR ISOLATION	OPEN			
HVN-MOV129	HVN CONTMT SUPPLY HDR ISOLATION	OPEN			
HVN-V428	HVN CONTMT RETURN HDR LMC CONNECTION	LOCKED CLOSED/ CAPPED			
HVN-MOV128	HVN CONTMT RETURN HDR ISOLATION	OPEN			
HVN-MOV130	HVN CONTMT RETURN HDR ISOLATION	OPEN			
THE FOLLOWING ITEMS ARE LOCATED ON REACTOR BUILDING 162 FT EL					
HVN-V1322	CONTMT COOLER HVR-UC1A INLET VENT	CLOSED/ CAPPED			
HVN-V588	CONTMT COOLER HVN-UC1A INLET HEADER DRAIN	CLOSED/ CAPPED			
HVN-V726	CONTMT COOLER HVR-UC1A UPPER INLET PE CONNECTION	CLOSED/ CAPPED			
HVN-V573	CONTMT COOLER HVR-UC1A UPPER COIL VENT	CLOSED/ CAPPED			
HVN-V1194	CONTMT COOLER HVR-UC1A UPPER COIL VENT	CLOSED/ CAPPED			
HVN-V658	CONTMT COOLER HVR-UC1A MID INLET PE CONN	CLOSED/ CAPPED			

VALVE LINEUP - VENTILATION CHILLED WATER - CONTAINMENT BUILDING
(SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVN-V574	CONTMT COOLER HVR-UC1A MID COIL VENT	CLOSED/ CAPPED			
HVN-V1195	CONTMT COOLER HVR-UC1A MID COIL VENT	CLOSED/ CAPPED			
HVN-V735	CONTMT COOLER HVR-UC1A MID OUTLET PE CONN	CLOSED/ CAPPED			
HVN-V576	CONTMT COOLER HVR-UC1A LOWER INLET PE CONN	CLOSED/ CAPPED			
HVN-MOV22B	CONTMT COOLER UC1B DISCHARGE	OPEN			
HVN-V575	CONTMT COOLER HVR-UC1A LOWER COIL VENT	CLOSED/ CAPPED			
HVN-V1196	CONTMT COOLER HVR-UC1A LOWER COIL VENT	CLOSED/ CAPPED			
HVN-V577	CONTMT COOLER HVR-UC1A LOWER OUTLET PE CONN	CLOSED/ CAPPED			
HVN-V589	CONTMT COOLER HVR-UC1A OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVN-V548	CONTMT COOLER HVR-UC1A OUTLET ISOLATION	LOCKED OPEN			
HVN-V868	CONTMT COOLER HVR-UC1A OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVN-V590	CONTMT COOLER HVR-UC1B INLET HEADER DRAIN	CLOSED/ CAPPED			
HVN-MOV22A	CONTMT COOLER HVR-UC1A DISCHARGE	OPEN			
HVN-V1318	CONTMT COOLER HVR-UC1B OUTLET VENT	CLOSED/ CAPPED			
HVN-V578	CONTMT COOLER HVR-UC1B UPPER COIL VENT	CLOSED/ CAPPED			
HVN-V1197	CONTMT COOLER HVR-UC1B UPPER COIL VENT	CLOSED/ CAPPED			
HVN-V1155	CONTMT COOLER HVR-UC1B UPPER OUTLET PE CONN	CLOSED/ CAPPED			
HVN-V771	CONTMT COOLER HVR-UC1B MID INLET PE CONN	CLOSED/ CAPPED			
HVN-V579	CONTMT COOLER HVR-UC1B MID COIL VENT	CLOSED/ CAPPED			

VALVE LINEUP - VENTILATION CHILLED WATER - CONTAINMENT BUILDING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVN-V1198	CONTMT COOLER HVR-UC1B MID COIL VENT	CLOSED/ CAPPED			
HVN-V753	CONTMT COOLER HVR-UC1B MID OUTLET PE CONN	CLOSED/ CAPPED			
HVN-V581	CONTMT COOLER HVR-UC1B LOWER INLET PE CONN	CLOSED/ CAPPED			
HVN-V580	CONTMT COOLER HVR-UC1B LOWER COIL VENT	CLOSED/ CAPPED			
HVN-V1199	CONTMT COOLER HVR-UC1B LOWER COIL VENT	CLOSED/ CAPPED			
HVN-V582	CONTMT COOLER HVR-UC1B LOWER OUTLET PE CONN	CLOSED/ CAPPED			
HVN-V591	CONTMT COOLER HVR-UC1B OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVN-V549	CONTMT COOLER HVR-UC1B OUTLET ISOLATION	LOCKED OPEN			
HVN-V866	CONTMT COOLER HVR-UC1B OUTLET HEADER DRAIN	CLOSED/ CAPPED			
THE FOLLOWING ITEMS ARE LOCATED ON REACTOR BUILDING 174 FT EL					
HVN-V743	CONTMT COOLER HVR-UC1A UPPER OUTLET PE CONN	CLOSED/ CAPPED			
HVN-V1319	CONTMT COOLER HVR-UC1A OUTLET VENT	CLOSED/ CAPPED			
HVN-V1321	CONTMT COOLER HVR-UC1B INLET VENT	CLOSED/ CAPPED			
HVN-V762	CONTMT COOLER HVR-UC1B UPPER INLET PE CONN	CLOSED/ CAPPED			

VALVE LINEUP - VENTILATION CHILLED WATER - CONTAINMENT BUILDING (SAFETY RELATED)

Remarks: ____

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Signature KCN Initials Date/Time

Reviewed By: ______________________ ________ ________
OSM/CRS KCN Date/Time

Second Review: ______________________ ________ ________
Operations Management KCN Date/Time

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-FT13B	CHILL WTR INLET CHL1B, TX-13-68 FT		
	HVN-FT13B-V1H	OPEN	
	HVN-FT13B-V2L	OPEN	
	HVN-FT13B-V3B	CLOSED	
	HVN-FT13B-V4	CLOSED	
	HVN-FT13B-V5	CLOSED	
	HVN-FT13B-V6	CLOSED	
	HVN-FT13B-V7	CLOSED	
	HVN-FT13B-V8	CLOSED	
	HVN-FT13B	LIVE ZERO	
HVN-FT13C	CHILL WTR INLET CHL1C, TX-14-68 FT		
	HVN-FT13C-V1H	OPEN	
	HVN-FT13C-V2L	OPEN	
	HVN-FT13C-V3B	CLOSED	
	HVN-FT13C-V4	CLOSED	
	HVN-FT13C-V5	CLOSED	
	HVN-FT13C-V6	CLOSED	
	HVN-FT13C-V7	CLOSED	
	HVN-FT13C-V8	CLOSED	
	HVN-FT13C	LIVE ZERO	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-FT46A	CHILL WTR INLET CHL2A, RA-2-182 FT		
	HVN-FT46A-V1H	OPEN	
	HVN-FT46A-V2L	OPEN	
	HVN-FT46A-V3B	CLOSED	
	HVN-FT46A-V4	CLOSED	
	HVN-FT46A-V5	CLOSED	
	HVN-FT46A-V6	CLOSED	
	HVN-FT46A-V7	CLOSED	
	HVN-FT46A	LIVE ZERO	
HVN-FT46B	CHILL WTR INLET CHL2B, RA-2-182 FT		
	HVN-FT46B-V1H	OPEN	
	HVN-FT46B-V2L	OPEN	
	HVN-FT46B-V3B	CLOSED	
	HVN-FT46B-V4	CLOSED	
	HVN-FT46B-V5	CLOSED	
	HVN-FT46B-V6	CLOSED	
	HVN-FT46B-V7	CLOSED	
	HVN-FT46B	LIVE ZERO	
HVN-FT46C	CHILL WTR INLET CHL2C, RA-3-171 FT		
	HVN-FT46C-V1H	OPEN	
	HVN-FT46C-V2L	OPEN	
	HVN-FT46C-V3B	CLOSED	
	HVN-FT46C-V4	CLOSED	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
	HVN-FT46C-V5	CLOSED	
	HVN-FT46C-V6	CLOSED	
	HVN-FT46C-V7	CLOSED	
	HVN-FT46C	LIVE ZERO	
HVN-PI104	CHILL WTR COMPRESSION TK1, TB-11-138 FT		
	HVN-PI104-V1	OPEN	
	HVN-PI104-V2	CLOSED	
HVN-FT13A	CHILL WTR INLET CHL1A, TX-12-68 FT		
	HVN-FT13A-V1H	OPEN	
	HVN-FT13A-V2L	OPEN	
	HVN-FT13A-V3B	CLOSED	
	HVN-FT13A-V4	CLOSED	
	HVN-FT13A-V5	CLOSED	
	HVN-FT13A-V6	CLOSED	
	HVN-FT13A-V7	CLOSED	
	HVN-FT13A-V8	CLOSED	
	HVN-FT13A	LIVE ZERO	
HVN-PI169	CHILL WTR COMPRESSION TK2, RA-3.9-190 FT		
	HVN-PI169-V1	CLOSED	
	HVN-PI169-V2	OPEN	
	HVN-PI169-V3	CLOSED	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-PDT111	CHILL WTR SUPPLY/RETURN JTB-RAK-21, TC-3-95 FT		
	HVN-PDT111-V1H	OPEN	
	HVN-PDT111-V2L	OPEN	
	HVN-PDT111-V3B	CLOSED	
	HVN-PDT111-V4	CLOSED	
	HVN-PDT111-V5	CLOSED	
	HVN-PDT111-V6	CLOSED	
	HVN-PDT111-V7	CLOSED	
	HVN-PDT111-V8	OPEN	
	HVN-PDT111-V9	OPEN	
	HVN-PDT111-V10	OPEN	
	HVN-PDIC111, JIB-RAK-21, TC-3-95 FT	LIVE ZERO	
HVN-PDIC111	CHILL WTR SUPPLY/RETURN JTB-RAK-21, TC-3-95 FT		
	HVN-PDIC111-V1	OPEN	
HVN-PV111	CHILL WTR SUPPLY/RETURN, TC-2-97 FT		
	HVN-PV111-V1	OPEN	
HVN-PDT172	CHILLER SPLY/RTN, RA-4-180 FT		
	HVN-PDT172-V1H	OPEN	
	HVN-PDT172-V2L	OPEN	
	HVN-PDT172-V3B	CLOSED	
	HVN-PDT172-V4	CLOSED	
	HVN-PDT172-V5	CLOSED	
	HVN-PDT172-V6	CLOSED	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
	HVN-PDT172-V7	CLOSED	
	HVN-PDT172-V8	CLOSED	
	HVN-PDT172-V9	CLOSED	
	HVN-PDT172-V10	OPEN	
	HVN-PDIC172, RA-4-180 FT	LIVE ZERO	
HVN-PDIC172	CHILL WTR SPLY/RTN, RA-4-180 FT		
	HVN-PDIC172-V1	OPEN	
HVN-PV172	CHILL WTR SPLY/RTN, RA-4-180 FT		
	HVN-PV172-V1	OPEN	
HVN-PI3A	CHILL WTR PMP P1A DISCH, TB-15-68 FT		
	HVN-PI3A-V2	CLOSED	
HVN-PI3B	CHILL WTR PMP P1B DISCH, TX-15-68 FT		
	HVN-PI3B-V2	CLOSED	
HVN-PI16A	CHILL WTR PMP P1A SUCT, TB-16-68 FT		
	HVN-PI16A-V2	CLOSED	
HVN-PI52B	CHILL WTR PMP P4B SUCT, RA-3.9-168 FT		
	HVN-PI52B-V1	CLOSED	
	HVN-PI52B-V2	OPEN	
	HVN-PI52B-V3	CLOSED	
HVN-PI16B	CHILL WTR PMP P1B SUCT, TX-16-68 FT		
	HVN-PI16B-V2	CLOSED	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-PI52A	CHILL WTR PMP P4A SUCT, RA-3.9-168 FT		
	HVN-PI52A-V1	CLOSED	
	HVN-PI52A-V2	OPEN	
	HVN-PI52A-V3	CLOSED	
HVN-PI54A	CHILL WTR PMP P4A DISCH, RA-3.9-168 FT		
	HVN-PI54A-V1	CLOSED	
	HVN-PI54A-V2	OPEN	
	HVN-PI54A-V3	CLOSED	
HVN-PI54B	CHILL WTR PMP P4B DISCH, RA-3.9-168 FT		
	HVN-PI54B-V1	CLOSED	
	HVN-PI54B-V2	OPEN	
	HVN-PI54B-V3	CLOSED	
HVN-PI60A	CHILL WTR PMP P2A SUCT, RA-3.9-180 FT		
	HVN-PI60A-V1	CLOSED	
	HVN-PI60A-V2	OPEN	
	HVN-PI60A-V3	CLOSED	
HVN-PI60B	CHILL WTR PMP P2B SUCT, RA-3.9-180 FT		
	HVN-PI60B-V1	CLOSED	
	HVN-PI60B-V2	OPEN	
	HVN-PI60B-V3	CLOSED	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-PI62A	CHILL WTR PMP P2A DISCH, RA-4-172 FT		
	HVN-PI62A-V1	CLOSED	
	HVN-PI62A-V2	OPEN	
	HVN-PI62A-V3	CLOSED	
HVN-PI62B	CHILL WTR PMP P2B DISCH, RA-4-172 FT		
	HVN-PI62B-V1	CLOSED	
	HVN-PI62B-V2	OPEN	
	HVN-PI62B-V3	CLOSED	
HVN-AOV64A	CHILL WTR OUTLET HVW-UC5A, RC-3-180 FT		
	HVN-AOV64A-V1	OPEN	
HVN-AOV64B	CHILL WTR OUTLET HVW-UC5B, RC-3-170 FT		
	HVN-AOV64B-V1	OPEN	
HVN-AOV161	CHILL WTR OUTLET HVF-UC1, FG-7-82 FT		
	HVN-AOV161-V1	OPEN	
HVN-AOV162	CHILL WTR OUTLET HVF-UC2, FG-10-83 FT		
	HVN-AOV162-V1	OPEN	
HVN-AOV163	CHILL WTR OUTLET HVF-UC3, FG-10-100 FT		
	HVN-AOV-163-V1	OPEN	
HVN-AOV165	CHILL WTR OUTLET HVF-UC5, FE-6-152 FT		
	HVN-AOV165-V1	OPEN	
HVN-AOV166	CHILL WTR OUTLET HVF-UC6, FE-6-152 FT		
	HVN-AOV166-V1	OPEN	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-AOV167	CHILL WTR OUTLET HVF-UC7, FE-8-153 FT		
	HVN-AOV167-V1	OPEN	
HVN-AOV177	CHILL WTR OUTLET HVF-ACU1, FG-8-153 FT		
	HVN-AOV177-V1	OPEN	
HVN-AOV178	CHILL WTR OUTLET HVF-UC8, FE-6-154 FT		
	HVN-AOV178-V1	OPEN	
HVN-AOV173	CHILL WTR OUTLET HVW-UC1, RA-4-166 FT		
	HVN-AOV173-V1	OPEN	
HVN-AOV174	CHILL WTR OUTLET HVW-UC2, RA-4-166 FT		
	HVN-AOV174-V1	OPEN	
HVN-AOV175	CHILL WTR OUTLET HVW-UC3, RC-3-166 FT		
	HVN-AOV175-V1	OPEN	
HVN-AOV176	CHILL WTR OUTLET HVW-UC4, RC-3-166 FT		
	HVN-AOV176-V1	OPEN	
HVN-TV5A	CHILL WTR SPLY HVR-UC1A, AZ-93°-164 FT		
	HVN-TV5A-V1	OPEN	
HVN-TV5B	CHILL WTR SPLY HVR-UC1B, AZ-90°F-164 FT		
	HVN-TVB5B-V1	OPEN	
HVN-TV18A	CHILL WTR OUTLET HVT-UC1A, TB-2-74 FT		
	HVN-TV18A-V1	OPEN	
HVN-TV18B	CHILL WTR OUTLET HVT-UC1B, TY-2-74 FT		
	HVN-TV18B-V1	OPEN	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-TV19A	CHILL WTR OUTLET HVT-UC5A, TZ-14-76 FT		
	HVN-TV19A-V1	OPEN	
HVN-TV19B	CHILL WTR OUTLET HVT-UC5B, TZ-16-68 FT		
	HVN-TV19B-V1	OPEN	
HVN-TV20A	CHILL WTR OUTLET HVT-UC3A, TZ-4-76 FT		
	HVN-TV20A-V1	OPEN	
HVN-TV20B	CHILL WTR OUTLET HVT-UC3B, TZ-4-76 FT		
	HVN-TV20B-V1	OPEN	
HVN-TV20C	CHILL WTR OUTLET HVT-UC3C, TZ-12-76 FT		
	HVN-TV20C-V1	OPEN	
HVN-TV20D	CHILL WTR OUTLET HVT-UC3D, TZ-11-76 FT		
	HVN-TV20D-V1	OPEN	
HVN-TV21A	CHILL WTR OUTLET HVT-UC4A, TD-7-74 FT		
	HVN-TV-21A-V1	OPEN	
HVN-TV21B	CHILL WTR OUTLET HVT-UC4B, TD-8-74 FT		
	HVN-TV21B-V1	OPEN	
ACCESS TO HVN-TV23A/B/C IS VIA THE TURBINE DECK, 123 FT EL SW, FLOOR ACCESS NEAR HVT-UC24D			
HVN-TV23A	CHILL WTR OUTLET HVT-UC18A, TZ-11-113 FT		
	HVN-TV23A-V1	OPEN	
HVN-TV23B	CHILL WTR OUTLET HVT-UC18B, TZ-12-113 FT		
	HVN-TV23B-V1	OPEN	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-TV23C	CHILL WTR OUTLET HVT-UC18C, TZ-12-113 FT		
	HVN-TV23C-V1	OPEN	
HVN-TV25A	CHILL WTR OUTLET UC14A, TF-4-98 FT		
	HVN-TV25A-V1	OPEN	
HVN-TV25B	CHILL WTR OUTLET UC14B, TF-5-98 FT		
	HVN-TV25B-V1	OPEN	
HVN-TV26A	CHILL WTR OUTLET UC16A, TX-11-101 FT		
	HVN-TV26A-V1	OPEN	
HVN-TV26B	CHILL WTR OUTLET UC16B, TZ-16-101 FT		
	HVN-TV26B-V1	OPEN	
HVN-TV26C	CHILL WTR OUTLET UC16C, TC-14-101 FT		
	HVN-TV26C-V1	OPEN	
HVN-TV30A	CHILL WTR OUTLET UC25A, TE-7-130 FT		
	HVN-TV30A-V1	OPEN	
HVN-TV30B	CHILL WTR OUTLET UC25B, TE-10-130 FT		
	HVN-TV30B-V1	OPEN	
HVN-TV31A	CHILL WTR OUTLET UC21A, TZ-4-155 FT NOTE: (GO THRU GATE TB-123-G3 TO TOP (ROOF) OF MSR-2		
	HVH-TV31A-V1	OPEN	
HVN-TV31B	CHILL WTR OUTLET UC21B, TC-8-155 FT		
	HVN-TV31B-V1	OPEN	
HVN-TV32A	CHILL WTR OUTLET UC23A, TD-7-129 FT		
	HVN-TV32A-V1	OPEN	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-TV32B	CHILL WTR OUTLET UC23B, TD-7-129 FT		
	HVN-TV32B-V1	OPEN	
HVN-TV34A	CHILL WTR OUTLET UC24A, TC-12-130 FT		
	HVN-TV34A-V1	OPEN	
HVN-TV34B	CHILL WTR OUTLET UC24B, TX-16-130 FT		
	HVN-TV34B-V1	OPEN	
HVN-TV34C	CHILL WTR OUTLET UC24C, TY-16-130 FT		
	HVN-TV34C-V1	OPEN	
HVN-TV34D	CHILL WTR OUTLET UC24D, TC-12-130 FT		
	HVN-TV34D-V1	OPEN	
HVN-TV38A	CHILL WTR OUTLET UC19A, TB-4-155 FT		
	HVN-TV38A-V1	OPEN	
HVN-TV38B	CHILL WTR OUTLET UC19B, TX-8-155 FT		
	HVN-TV38B-V1	OPEN	
HVN-TV43A	CHILL WTR OUTLET HVT-UC31A, TF-15-142 FT		
	HVN-TV43A-V1	OPEN	
HVN-TV43B	CHILL WTR OUTLET HVT-UC31B, TF-16-142 FT		
	HVN-TV43B-V1	OPEN	
HVN-TV117	CHILL WTR OUTLET HVT-UC10, TB-5-82 FT		
	HVN-TV117-V1	OPEN	
HVN-TV118	CHILL WTR OUTLET HVT-UC9, TB-5-82 FT		
	HVN-TV118-V1	OPEN	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-TV119	CHILL WTR OUTLET HVT-UC6, TB-11-76 FT		
	HVN-TV119-V1	OPEN	
HVN-TV120	CHILL WTR OUTLET HVT-UC7, TB-16-74 FT		
	HVN-TV120-V1	OPEN	
HVN-TV121	CHILL WTR OUTLET HVT-UC8, TX-15-74 FT		
	HVN-TV121-V1	OPEN	
HVN-TV122	CHILL WTR INLET HVR-UC1C, 58°-165 FT		
	HVN-TV122-V1	OPEN	
HVN-TV123	CHILL WTR OUTLET HVT-UC2, TE-2-76 FT		
	HVN-TV123-V1	OPEN	
HVN-TV124	CHILL WTR OUTLET HVT-UC12, TC-2-101 FT		
	HVN-TV124-V1	OPEN	
HVN-TV126	CHILL WTR OUTLET HVT-UC13, TF-2-101 FT		
	HVN-TV126-V1	OPEN	
HVN-TV131	CHILL WTR OUTLET HVT-UC15, TB-12-111 FT		
	HVN-TV131-V1	OPEN	
HVN-TV132	CHILL WTR OUTLET HVT-UC11, TB-2-105 FT		
	HVN-TV132-V1	OPEN	
HVN-TV133	CHILL WTR OUTLET HVT-UC17, TY-12-101 FT		
	HVN-TV133-V1	OPEN	
HVN-TV136	CHILL WTR OUTLET HVT-UC22, TC-2-130 FT		
	HVN-TV136-V1	OPEN	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
HVN-TV137	CHILL WTR OUTLET HVT-UC26, TZ-1-136 FT		
	HVN-TV137-V1	OPEN	
HVN-TV138	CHILL WTR OUTLET HVT-ACU1, TD-2-136 FT		
	HVN-TV138-V1	OPEN	
HVN-TV139	CHILL WTR OUTLET HVT-UC20, TZ-9-155 FT		
	HVN-TV139-V1	OPEN	
HVN-TV151	CHILL WTR OUTLET HVT-UC27, TE-13-82 FT		
	HVN-TV151-V1	OPEN	
HVN-TV152	CHILL WTR OUTLET HVT-UC28, TC-14-72 FT		
	HVN-TV152-V1	OPEN	
HVN-TV153	CHILL WTR OUTLET HVT-UC29, TF-11-110 FT		
	HVN-TV153-V1	OPEN	
HVN-TV154	CHILL WTR OUTLET HVN-UC30, TF-11-131 FT		
	HVN-TV154-V1	OPEN	
HVN-TV155	CHILL WTR OUTLET HVT-UC32, TD-12-148 FT		
	HVN-TV155-V1	OPEN	
HVN-TV160	CHILL WTR OUTLET HVR-UC14, AP-4-109 FT		
	HVN-TV160-V1	OPEN	

INSTRUMENT & VALVE LINEUP - VENTILATION CHILLED WATER

Remarks: ____

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Signature KCN Initials Date/Time

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OSM/CRS KCN Date/Time

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - RADWASTE/FUEL BUILDINGS

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVN-CHL2A	ACB62 HVN-CHL2A RDWT BLDG CHILLER	NNS-SWG4A ACB62	RACKED IN OPEN*	
HVN-CHL2C	ACB63 HVN-CHL2C RDWT BLDG CHILLER	NNS-SWG4A ACB63	RACKED IN OPEN*	
HVN-CHL2B	ACB67 HVN-CHL2B RDWT BLDG CHILLER	NNS-SWG4B ACB67	RACKED IN OPEN*	
HVN-MOV45C	HVN-MOV45C EVAPORATOR CHILLED WATER VALVE	NHS-MCC3A1 BKR 2C	ON	
HVN-CHL2AP	HVN-CHL2AP RADWASTE BLDG CHILLER LUBE OIL PUMP	NHS-MCC3A1 BKR 4B	ON	
HVN-MOV45A	HVN-MOV45A EVAPORATOR CHILLED WTR VALVE	NHS-MCC3A1 BKR 2B	ON	
HVN-MOV55A	HVN-MOV55A CHILLED WATER FROM PMP P4A	NHS-MCC3A1 BKR 3C	ON	
HVN-P2A	HVN-P2A CHILLED WATER PUMP	NHS-MCC3A1 BKR 2D	ON	
HVN-CHL2CP	HVN-CHL2CP RADWASTE BLDG CHILLER LUBE OIL PUMP	NHS-MCC3A1 BKR 5A	ON	
HVN-CHL2APH	HVN-CHL2APH RADWASTE BLDG CHILLER OIL HEATER	NHS-MCC3A1 BKR 6E	ON	
HVN-CHL2CPH	HVN-CHL2CPH RADWASTE BLDG CHILLER OIL HEATER	NHS-MCC3A1 BKR 6F	ON	
HVN-CHL2AH	HVN-CHL2AH HVN-CHL2A SPACE HEATER	NHS-MCC3A1 BKR 1D	ON	
HVN-MOV45B	HVN-MOV45B CHILLED WATER FROM EVAPORATOR	NHS-MCC3B BKR 4B	ON	
HVN-MOV55B	HVN-MOV55B CHILLED WATER FROM PMP P4B	NHS-MCC3B BKR 4C	ON	
HVN-MOV63B	HVN-MOV63B CHILLED WATER FROM PMP P2B	NHS-MCC3B BKR 5C	ON	
HVN-P2B	HVN-P2B CHILLED WATER PUMP	NHS-MCC3B BKR 1E	ON	

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - RADWASTE/FUEL BUILDINGS

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVN-CHL2BP	HVN-CHL2BP RADWASTE BLDG CHILLER LUBE OIL PUMP	NHS-MCC3B BKR 3B	ON	
HVN-CHL2BPH	HVN-CHL2BPH RADWASTE BLDG CHILLER OIL HEATER	NHS-MCC3B BKR 2A	ON	
HVN-CHL2BH	HVN-CHL2BH SPACE HEATER FOR HVN-CHL2B	NHS-MCC3B BKR 6E	ON	
HVN-MOV63A	HVN-MOV63A CHILLED WATER P2A VALVE	NHS-MCC3A2 BKR 2C	ON	
HVN-MOV45BH	RADWASTE BLDG CHILLER CHL2B DISCH MOV HEATER	SCA-PNL3B1 BKR 5	ON	
HVN-P2BH	UNIT 1 FUEL BLDG CHILLED WATER PUMP P2B HTR	SCA-PNL3B1 BKR 7	ON	
HVN-P4BH	RADWASTE BLDG CHILLER WATER PUMP P4B HEATER	SCA-PNL3B1 BKR 4	ON	
HVN-MOV45CH	RADWASTE BLDG CHILLER CHL2C DISCH MOV HEATER	SCA-PNL3A1 BKR 4	ON	
HVN-MOV45AH	RADWASTE BLDG CHILLER CHL2C DISCH MOV HEATER			
HVN-MOV55AH/ HVN-MOV55BH	RADWASTE BLDG CHILLED WTR PUMP P4A/P4B DISCH MOV HTRS	SCA-PNL3A1 BKR 20	ON	
HVN-MOV63AH/ HVN-MOV63BH	RADWASTE BLDG CHILLED WTR PUMP P2A/P2B DISCH MOV HTRS			
HVN-P2AH	UNIT 1 FUEL BLDG CHILLED WTR PUMP P2A HEATER	SCA-PNL3A1 BKR 6	ON	
HVN-P4AH	RADWASTE BLDG CHILLED WATER PUMP P4A HEATER	SCA-PNL3A1 BKR 5	ON	
HVN-CHL2CH	HVN-CHL2C MOTOR SPACE HEATER	NHS-MCC3A2 BKR 1C	ON	

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - RADWASTE/FUEL BUILDINGS

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVN-P4A	HVN-P4A CHILLED WATER PUMP NJS-ACB344	NJS-SWG1N BKR 344	RACKED IN OPEN	
HVN-P4B	HVN-P4B CHILLED WATER PUMP NJS-ACB353	NJS-SWG1P BKR 353	RACKED IN OPEN	
HVN-PNL77A	HVN-CHL2A CONTROL POWER CKT	SCA-PNL3A1 BKR 1	ON	
	HVN-PRG2A PURGE COMPRESSOR			
HVN-PNL77B	HVN-CHL2B CONTROL POWER CKT	SCA-PNL3B1 BKR 2	ON	
	HVN-PRG2B PURGE COMPRESSOR			
HVN-PNL77C	HVN-CHL2C CONTROL POWER CKT	SCA-PNL3A1 BKR 2	ON	
	HVN-PRG2C PURGE COMPRESSOR			
HVN-CAB2	HVAC CHILLED WTR CHILLERS (RW BLDG) REFRIGERANT MONITOR	SCA-PNL3B1 BKR 9	ON	

* 4.16KV breaker 1) Check charging motor switch on.
2) Check charging spring indicates CHARGED.

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - RADWASTE/FUEL BUILDINGS

Remarks: ____

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Performed By: ______________ ______ ______ ______/___
Signature KCN Initials Date/Time

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OSM/CRS KCN Date/Time

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS BUILDINGS

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVN-CHL1A	ACB04 HVN-CHL1A V CHILLER MOT	NNS-SWG1A ACB04	RACKED IN OPEN*	
HVN-CHL1AH	HVN-CHL1AH VENT CHILLER HVN-CHL1A MOTOR SPACE HEATER	NHS-MCC1F BKR 4C	ON	
HVN-CHL1AP	HVN-CHL1AP VENT CHILLER LUBE OIL PUMP	NHS-MCC1E BKR 1D	ON	
HVN-CHL1APH	HVN-CHL1APH CRANKCASE OIL HEATER	NHS-MCC1E BKR 4F	ON	
HVN-CHL1B	ACB12 V CHILLER MOT	NNS-SWG1B ACB12	RACKED IN OPEN*	
HVN-CHL1BH	HVN-CHL1BH VENT CHILLER HVN-CHL1B MOTOR SPACE HEATER	NHS-MCC1F BKR 4D	ON	
HVN-CHL1BP	HVN-CHL1BP VENT CHILLER LUBE OIL PUMP	NHS-MCC1F BKR 4E	ON	
HVN-CHL1BPH	HVN-CHL1BPH CRANKCASE OIL HEATER	NHS-MCC1F BKR 4B	ON	
HVN-CHL1C	ACB22 HVN-CHL1C V CHILLER MOT	NNS-SWG1C ACB22	RACKED IN OPEN*	
HVN-CHL1CH	HVN-CHL1CH VENT CHILLER HVN-CHL1C MOTOR SPACE HEATER	NHS-MCC1F BKR 4F	ON	
HVN-CHL1CP	HVN-CHL1CP VENT CHILLER LUBE OIL PUMP	NHS-MCC1E BKR 3C	ON	
HVN-CHL1CPH	HVN-CHL1CPH CRANKCASE OIL HEATER	NHS-MCC1E BKR 5E	ON	
HVN-P1A	ACB01 TURB BLDG CHILLED WP MOT HVN-P1A	NNS-SWG1A ACB01	RACKED IN OPEN*	
HVN-P1AH	TURB BLDG VENT CHILLED WTR PUMP 1A HVN-CHL1A HTR	SCA-PNL1E1 BKR 4	ON	
HVN-P1B	ACB19 TURB BLDG CHILLED WP MOT HVN-P1B	NNS-SWG1B ACB19	RACKED IN OPEN*	
HVN-P1BH	TURB BLDG VENT CHILLED WATER PUMP 1B HVN-P1B HTR	SCA-PNL1F1 BKR 3	ON	
HVN-MOV24A	HVN-CHL1A CHILLED WTR VALVE	NHS-MCC1E BKR 2C	ON	

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS BUILDINGS

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
HVN-MOV24B	HVN-CHL1B CHILLED WTR VALVE	NHS-MCC1F BKR 3C	ON	
HVN-MOV24C	HVN-CHL1C CHILLED WTR VALVE	NHS-MCC1F BKR 3D	ON	
HVN-MOV4A	CHILLED WATER PUMP P1A DISCHARGE VALVE	NHS-MCC1E BKR 2D	ON	
HVN-MOV4B	CHILLED WATER PUMP P1B DISCHARGE VALVE	NHS-MCC1F BKR 3B	ON	
HVN-SOV138	TB UNIT COOLER HVT-ACU1 TCV	SCA-PNL1L1 BKR 14	ON	
HVN-SOV139	TB UNIT COOLER HVT-UC20 TCV	SCA-PNL1L1 BKR 15	ON	
HVN-SOV132	TB UNIT COOLER HVT-UC11 TCV	SCA-PNL1N1 BKR 18	ON	
HVN-MOV4AH	TURB BLDG CHILLED WATER PUMP 1A DISCH MOV HTR	SCA-PNL1E1 BKR 3	ON	
HVN-MOV4BH	TURB BLDG CHILLED WATER PUMP 1B DISCH MOV HTR	SCA-PNL1F1 BKR 2	ON	
HVN-MOV24BH	TURB BLDG VENT CHILLER 1B DISCH MOV HEATER			
HVN-MOV24CH	TURB BLDG VENT CHILLER 1C DISCH MOV HEATER			
HVN-PNL76A	HVN-CHL1A CONTROL POWER CKT	SCA-PNL1E1 BKR 1	ON	
	HVN-PRG1A PURGE COMPRESSOR			
HVN-PNL76B	HVN-CHL1B CONTROL POWER CKT	SCA-PNL1F1 BKR 1	ON	
	HVN-PRG1B PURGE COMPRESSOR			
HVN-PNL76C	HVN-CHL1C CONTROL POWER CKT	SCA-PNL1E1 BKR 2	ON	
	HVN-PRG1C PURGE COMPRESSOR			
HVN-CAB1	HVAC CHILLED WTR CHILLERS (TURB BLDG) REFRIGERANT MONITOR	SCA-PNL1E1 BKR 8	ON	

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS BUILDINGS

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
AT HTS-PNL1B TURBINE BLDG 67'EL				
N/A	HVN-CHL1A/B/C	HTS-PNL1B BKR 5	ON	

* 4.16KV breaker 1) Check charging motor switch on.
2) Check charging spring indicates CHARGED.

Remarks: ____

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Performed By: ____________ ________ ________ ______/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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OSM/CRS KCN Date/Time

ELECTRICAL LINEUP - VENTILATION CHILLED WATER - CONTAINMENT BUILDING (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND
HVN-MOV127	CONTMT CHILLED WATER ISOLATION VALVE	EHS-MCC2J BKR 3A	ON		
HVN-MOV128	CONTMT CHILLED WTR ISOLATION VALVE	EHS-MCC2J BKR 3B	ON		
HVN-MOV102	CONTROL CHILLED WTR ISOLATION VALVE	EHS-MCC2K BKR 6C	ON		
HVN-MOV130	CONTAINMENT CHILLED WTR ISOLATION VALVE	EHS-MCC2K BKR 3C	ON		
HVN-MOV22B	CONTAINMENT UNIT CLR 1B DISCHARGE VALVE	EHS-MCC2K BKR 2C	ON		
HVN-MOV129	CONTAINMENT CHILLED WTR ISOLATION VALVE	EHS-MCC2K BKR 4C	ON		
HVN-MOV22A	CONTAINMENT UNIT COOLER DISCHARGE VALVE	EHS-MCC2C BKR 4B	ON		

Remarks: ____

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Performed By: ____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________________ __________ __________
OSM/CRS KCN Date/Time

Second Review: ____________________ __________ __________
Operations Management KCN Date/Time

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - RADWASTE/FUEL BUILDINGS

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVN-CHL2A RDWST & FUEL BLDG VENT CHILLER CPRSR	STOP-START	GREEN/WHITE/RED	
HVN-CHL2B RDWST & FUEL BLDG VENT CHILLER CPRSR	STOP-START	GREEN/WHITE/RED	
HVN-CHL2C RDWST & FUEL BLDG VENT CHILLER CPRSR	STOP-START	GREEN/WHITE/RED	
HVN-MOV45A VENT CHLR DISCHARGE VALVE	CLOSE/OPEN	GREEN/RED	
HVN-MOV45B VENT CHLR DISCHARGE VALVE	CLOSE/OPEN	GREEN/RED	
HVN-MOV45C DISCHARGE VALVE	CLOSE/OPEN	GREEN/RED	
HVN-P4A CHILL WATER PUMP	STOP-START	GREEN/WHITE/RED	
HVN-P4B CHILL WATER PUMP	STOP-START	GREEN/WHITE/RED	
HVN-MOV55A V CHILL WTR PMP P4A DISCHARGE VALVE	N/A	GREEN/RED	
HVN-MOV55B V CHILL WTR PMP P4B DISCHARGE VALVE	N/A	GREEN/RED	
HVN-P2A UNIT 1 FUEL BLDG CHILL WTR PUMP	OFF-ON	GREEN/RED	
HVN-P2B UNIT 1 FUEL BLDG CHILL WTR PUMP	OFF-ON	GREEN/RED	
HVN-MOV63A CHILL WATER PUMP P2A DISCHARGE VALVE	N/A	GREEN/RED	
HVN-MOV63B CHILL WATER PUMP P2B DISCHARGE VALVE	N/A	GREEN/RED	
MWS-AOV148 CHILLED WTR CPRSN TK MAKEUP WTR VALVE	AUTO	GREEN	
SWP-MOV128 RDWST CHLR SVCE WTR SUPPLY V	NORMAL AFTER OPEN	RED	
SWP-MOV514A INLET VALVE FOR CHILLER 2A	NEUTRAL AFTER CLOSE/OPEN	GREEN/RED	
SWP-MOV514B INLET VALVE FOR CHILLER 2B	NEUTRAL AFTER CLOSE/OPEN	GREEN/RED	

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - RADWASTE/FUEL BUILDINGS

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
SWP-MOV514C INLET VALVE FOR CHILLER 2C	NEUTRAL AFTER CLOSE/OPEN	GREEN/RED	
SWP-P5A VENT CHLR 2A CND RECIRC PUMP	OFF/ON	GREEN/RED	
SWP-P5B VENT CHLR 2B CND RECIRC PUMP	OFF/ON	GREEN/RED	
SWP-P5C VENT CHLR 2C CND RECIRC PUMP	OFF/ON	GREEN/RED	
SWP-MOV129 RADWST CHLR SVCE WTR RETURN VALVE	NORMAL AFTER OPEN	RED	
HVN-AOV64A UC5A CHILL WTR SUPPLY VALVE	N/A	GREEN/RED	
HVN-AOV64B UC5B CHILL WTR SUPPLY VALVE	N/A	GREEN/RED	
HVN-AOV173 UC1 CHILL WTR SUPPLY VALVE	N/A	GREEN/RED	
HVN-AOV174 UC2 CHILL WTR SUPPLY VALVE	N/A	GREEN/RED	
HVN-AOV175 UC3 CHILL WTR SUPPLY VALVE	N/A	GREEN/RED	
HVN-AOV176 UC4 CHILL WTR SUPPLY VALVE	N/A	GREEN/RED	
RADWASTE BLDG VENT CHILLER CHL2A RESET	FAULT AFTER TEST	N/A	
RADWASTE BLDG VENT CHILLER CHL2A OIL PUMP	AUTO	N/A	
RADWASTE BLDG VENT CHILLER CHL2A PURGE SYSTEM	OFF/AUTO OFF – WHEN CHILLER IN STANDBY/ AUTO – WHEN CHILLER IN RUN	N/A	
RADWASTE BLDG VENT CHILLER CHL2A LOAD-HOLD-UNLOAD-AUTO	AUTO	N/A	
RADWASTE BLDG VENT CHILLER CHL2B RESET	FAULT AFTER RESET	N/A	
RADWASTE BLDG VENT CHILLER CHL2B OIL PUMP	AUTO	N/A	

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - RADWASTE/FUEL BUILDINGS

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
RADWASTE BLDG VENT CHILLER CHL2B PURGE SYSTEM	OFF/AUTO OFF – WHEN CHILLER IN STANDBY/ AUTO – WHEN CHILLER IN RUN	N/A	
RADWASTE BLDG VENT CHILLER CHL2B LOAD-HOLD-UNLOAD-AUTO	AUTO	N/A	
RADWASTE BLDG VENT CHILLER CHL2C RESET	FAULT AFTER RESET	N/A	
RADWASTE BLDG VENT CHILLER CHL2C OIL PUMP	AUTO	N/A	
RADWASTE BLDG VENT CHILLER CHL2C PURGE SYSTEM	OFF/AUTO OFF – WHEN CHILLER IN STANDBY/ AUTO – WHEN CHILLER IN RUN	N/A	
RADWASTE BLDG VENT CHILLER CHL2C LOAD-HOLD-UNLOAD-AUTO	AUTO	N/A	

Remarks: ____

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Performed By: ____________________ __________ __________ _______/___
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________________ ______ __________
OSM/CRS KCN Date/Time

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS BUILDINGS

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
HVN-P1A VENT CHILL WTR	STOP-START	GREEN/WHITE/RED	
HVN-P1B VENT CHILL WTR	STOP-START	GREEN/WHITE/RED	
HVN-MOV4A VENT CHILL WTR PUMP HVN-P1A DISCHARGE	N/A	GREEN/RED	
HVN-MOV4B VENT CHILL WTR PUMP HVN-P1B DISCHARGE	N/A	GREEN/RED	
MWS-AOV133 CPRSN TANK HVN-TK1 MAKEUP WATER	AUTO	GREEN	
SWP-MOV22A VENT CHLR HVN-CHL1A INLET	NORMAL AFTER CLOSE/OPEN	GREEN/RED	
SWP-MOV22B VENT CHLR HVN-CHL1B	NORMAL AFTER CLOSE/OPEN	GREEN/RED	
SWP-MOV22C VENT CHLR HVN-CHL1C	NORMAL AFTER CLOSE/OPEN	GREEN/RED	
SWP-P4A VENT CHILLER RECIRC	OFF/ON	GREEN/RED	
SWP-P4B VENT CHILLER RECIRC	OFF/ON	GREEN/RED	
SWP-P4C VENT CHILLER RECIRC	OFF/ON	GREEN/RED	
HVN-CHL1A VENT CHLR CPRSR	STOP - START	GREEN/WHITE/RED	
HVN-CHL1B VENT CHLR CPRSR	STOP - START	GREEN/WHITE/RED	
HVN-CHL1C VENT CHLR CPRSR	STOP - START	GREEN/WHITE/RED	
HVN-MOV24A VENT CHLR DISCHARGE	CLOSE - OPEN	GREEN/RED	
HVN-MOV24B VENT CHLR DISCHARGE	CLOSE - OPEN	GREEN/RED	
HVN-MOV24C VENT CHLR DISCHARGE	CLOSE - OPEN	GREEN/RED	
TURB BLDG VENT CHILLER CHL1A RESET	FAULT AFTER RESET	N/A	
TURB BLDG VENT CHILLER CHL1A OIL PUMP	AUTO	N/A	

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS BUILDINGS

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
TURB BLDG VENT CHILLER CHL1A PURGE SYST	OFF/AUTO OFF – WHEN CHILLER IN STANDBY/ AUTO – WHEN CHILLER IN RUN	N/A	
TURB BLDG VENT CHILLER CHL1A LOAD-HOLD-UNLOAD-AUTO	AUTO	N/A	
TURB BLDG VENT CHILLER CHL1B RESET	FAULT AFTER RESET	N/A	
TURB BLDG VENT CHILLER CHL1B OIL PUMP	AUTO	N/A	
TURB BLDG VENT CHILLER CHL1B PURGE SYST	OFF/AUTO OFF – WHEN CHILLER IN STANDBY/ AUTO – WHEN CHILLER IN RUN	N/A	
TURB BLDG VENT CHILLER CHL1B LOAD-HOLD-UNLOAD-AUTO	AUTO	N/A	
TURB BLDG VENT CHILLER CHL1C RESET	FAULT AFTER RESET	N/A	
TURB BLDG VENT CHILLER CHL1C OIL PUMP	AUTO	N/A	
TURB BLDG VENT CHILLER CHL1C PURGE SYST	OFF/AUTO OFF – WHEN CHILLER IN STANDBY/ AUTO – WHEN CHILLER IN RUN	N/A	
TURB BLDG VENT CHILLER CHL1C LOAD-HOLD-UNLOAD-AUTO	AUTO	N/A	

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - TURBINE/OFFGAS BUILDINGS

Remarks: ____

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Performed By: ______________________ ________ ________ ______/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ______________________ ________ ________
OSM/CRS KCN Date/Time

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - CONTAINMENT BUILDING (SAFETY RELATED)

THE FOLLOWING ITEMS ARE LOCATED ON PANEL H13-P863				
PANEL ITEM	**PANEL ITEM POSITION**	**INDICATION**	**INITIALS 1ST**	**2ND**
HVN-MOV129 CHW SPLY SHUTOFF VLV	MID AFTER OPEN	RED		
HVN-MOV127 CHW SPLY OUTBD ISOL	MID AFTER OPEN	RED		
HVN-MOV130 CHW RTN SHUTOFF VLV	MID AFTER OPEN	RED		
HVN-MOV128 CHW RTN OUTBD ISOL	MID AFTER OPEN	RED		
HVN-MOV102 CHW RTN OUTBD ISOL	MID AFTER OPEN	RED		
HVN-MOV22A CONTMT UC1A DISCH	AUTO AFTER OPEN	RED		
HVN-MOV22B CONTMT UC1B DISCH	AUTO AFTER OPEN	RED		
HVN-TV122 CONTMT UNIT CLR TCV	N/A	GREEN/RED		
HVN-TV5A CONTMT UC1A TCV	AUTO	GREEN/RED		
HVN-TV5B CONTMT UC1B TCV	AUTO	GREEN/RED		
HVN-AOV177 HVF-ACU1 TCV	N/A	GREEN/RED		

CONTROL BOARD LINEUP - VENTILATION CHILLED WATER - CONTAINMENT BUILDING (SAFETY RELATED)

Remarks: ____

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Performed By: ______________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ______________________ ______ __________
OSM/CRS KCN Date/Time

Second Review: ______________________ ______ __________
Operations Management KCN Date/Time

NORMAL OPERATING PARAMETERS - CHILLERS

Parameter	Value
Chilled Water outlet temperature	Greater than or equal to 48°F and less than or equal to 52°F
Condenser pressure	Greater than or equal to 7 psig and less than or equal to 18 psig
Evaporator pressure	Less than or equal to 5 in. HG and greater than or equal to 15 in. HG
Oil pressure, psid	Greater than or equal to 5 psid and less than or equal to 22 psid (optimum is 18 psid) NOTE: psid = [(0.5 x Evaporator pressure reading) + Oil pressure reading]
Oil temperature - sump	Greater than or equal to 120°F and less than or equal to 150°F
Oil level	Approximately 1/2 sight glass or greater

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☐ **RO** ☒

ALTERNATE PATH ☐

TITLE: **Determine Radiological Brief and Protective Clothing Requirements**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	10	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

	Perform
X	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	October 1, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Applicant determined that a high radiation area brief by RP will be required. Applicant also determined that single anti-c clothing will be worn.

Synopsis: This task will have the applicant review a RWP and Survey map to determine both the dress-out requirements and the type of brief needed for an evolution. The evolution is to perform a GVI and check for a leak in the RCIC cubicle.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to determine (1) the type of brief required, and (2) the protective clothing requirements for entry into this area.

3) Initial Conditions:

Following a quarterly Rad Survey by RP, it was reported that there was a hissing sound coming from somewhere on the north wall of the 95' elevation RCIC cubicle. RP is unable to give any more information on this. Preparations are being made for OPs to perform a GVI and check for a leak in the RCIC cubicle.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM**:	**K&A RATING**:
Determine Radiological Brief and Protective Clothing Requirements	217013001001 217004001004	G 2.3.7	3.5

REFERENCES:
RWP-2014-1057, Rev 0
EN-RP-101, Rev 7 (Section 5.4)
Handout of Survey Maps of the RCIC cubicle (Contamination & Rad)

APPLICABLE OBJECTIVES

REQUIRED MATERIALS:
RWP-2014-1057, Rev 0 (altered to fit our needs)
EN-RP-101, Rev 7
Survey Maps of the RCIC cubicle (Contam and Rad)

SIMULATOR CONDITIONS & SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Applicant determined that a high radiation area brief by RP will be required. Applicant also determined that single anti-c clothing will be worn.

PERFORMANCE:

START TIME: _______________

1.	***Procedure Step:**	1. Determine the briefing requirements for entering RCIC cubicle 95' elev.
	Standard	Applicant used the provided procedure (EN-RP-101) to determine that a **High Rad Brief** would be required.
	Cue	Provide applicant with reference material.
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	***Procedure Step:**	2. Determine the protective clothing requirements for entering the RCIC cubicle 95' elev.
	Standard	Applicant used the provided maps and RWP to determine that **Single Anti-C's** would be required.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Applicant determined that a high radiation area brief by RP will be required. Applicant also determined that single anti-c clothing will be worn.

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initial Conditions:

Following a quarterly Rad Survey by RP, it was reported that there was a hissing sound coming from somewhere on the north wall of the 95' elevation RCIC cubicle. RP is unable to give any more information on this. Preparations are being made for OPs to perform a GVI and check for a leak in the RCIC cubicle.

Initiating Cues:

The CRS has directed you to determine (1) the type of brief required, and
(2) the protective clothing requirements for entry into this area.

Answer Sheet:

Indicate what type of brief must be performed:

Answer:

Indicate what (if any) protective clothing requirements are necessary:

Answer:

Radiological Work Permit redacted for security purposes
per SUNSI checklist 2(a)

ACCESS CONTROL FOR RADIOLOGICALLY CONTROLLED AREAS

Procedure Contains NMM ECH eB REFLIB Forms: YES ☒ NO ☐

HQN Effective Date	Procedure Owner: Title: Site:	Steven Brewer Manager, RP PNPS	Governance Owner: Title: Site:	David Moore Manager, Fleet RP HQN
11/13/13				

Site	Site Procedure Champion	Title
ANO	Donnie Marvel	Manager, RP
BRP	N/A	N/A
CNS	Bob Beilke	Manager, RP
GGNS	Roy Miller	Manager, RP
IPEC	Robert Rodino	Manager, RP
JAF	Robert Brown	Manager, RP
PLP	Doug Watkins	Manager, RP
PNPS	Steven Brewer	Manager, RP
RBS	Eric Neal	Manager, RP
VY	David Tkatch	Manager, RP
W3	Daniel Frey	Manager, RP
HQN	David Moore	Manager, Fleet RP

For site implementation dates see ECH eB REFLIB using site tree view (Navigation panel).

<u>Site and NMM Procedures Canceled or Superseded By This Revision</u>

None

<u>Process Applicability Exclusion:</u> All Sites: ☐

Specific Sites: ANO ☐ BRP ☐ CNS ☐ GGNS ☐ IPEC☐ JAF ☐ PLP ☐ PNPS☐ RBS ☐ VY ☐ W3 ☐

<u>Change Statement</u>

- Editorial changes throughout the procedure to upgrade procedure style and paragraph formatting for compliance with EN-AD-101-01 (no change bars)
- Added Attachment 9.9, “Typical High Radiation Area Brief Checklist”
- Added a bullet item to step 5.4[4] referencing Attachment 9.9.
- Step 5.10[3](b) is split into two IF/THEN statements in order to avoid the use of “ELSE” for improved clarity.
- Step 5.11[9](e): sub-steps (2) and (3) (from Rev. 7) are combined into one step and reworded in order to eliminate an apparent conflict between the two steps. No change is made to the process.
- Editorial change to note statement preceding step 5.11[10] to clarify that the steps following apply only when a site’s Emergency Plan is activated.
- Step 5.13[3]: the words “and alarm (audio/visual) inspections” are deleted because the instructions that follow do not include instructions for inspection of audio or visual elements.
- Section 8.0: Updated Site Specific Commitments based on Commitment Review provided by Waterford 3.

Associated PRHQN #: PR-PRHQN-2013-00051

TABLE OF CONTENTS

1.0 PURPOSE

To provide detailed guidance for the entry requirements and associated controls for:

- Radiologically Controlled Areas (RCA)
- Radiation Areas (RA)
- High Radiation Areas (HRA)
- Locked High Radiation Areas (LHRA)
- Very High Radiation Areas (VHRA)
- Airborne Radioactivity Areas (ARA)
- Contamination Area (CA) and High Contamination Area (HCA)
- Access Control Guard responsibilities and guidance
- Access key control, issuance, transfer and inventory
- HRA, LHRA and VHRA Boundary Verifications

2.0 REFERENCES

2.1 GENERAL

[1] 10 CFR 20 “Standards for Protection Against Radiation”

[2] NRC Regulatory Guide 8.38, “Control of Access to High and Very High Radiation Areas in Nuclear Power Plants”

[3] Technical Specifications for all EN units FSAR, UFSAR or USAR as applicable for each unit

[4] INPO 05-008, “Guidelines for Radiological Protection at Nuclear Power Stations”

[5] INPO SOER 01-01, “Unplanned Radiation Exposures” Recommendations 3 and 6 (LO-WTHQN-2009-00605, CA-40)

2.0, continued

2.2 DEVELOPMENT DOCUMENTS

[1] NRC Information Notice 86-107, “Licensee Alert to Reactor Cavity (Incore Shaft) Entries”

[2] NRC Information Notice 88-79, “Misuse of Flashing Lights for High Radiation Area Controls”

[3] INPO SOER 85-3, “Excessive Personnel Radiation Exposure”

[4] WANO SOER 2001-1, “Unplanned Radiation Exposures”

[5] SER 1-04, “Continued Problems with Unplanned External Radiation Exposure”

3.0 DEFINITIONS

[1] **Accessible Area** - Areas that can reasonably be occupied by any portion of an individual’s whole body and does not require exceptional measures (e.g. the addition of ladder or scaffolding) to gain access.

[2] **Airborne Radioactivity Area** – An area accessible to individuals, in which the airborne radioactivity levels are equal to or greater than 30% of the DAC values listed in 10CFR20, Appendix B, Table 1, Column 3, **OR**, to such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours. **(10CFR20)**

[3] **ALARA** – (acronym for “as low as is reasonably achievable”) means making every reasonable effort to maintain exposures to radiation as far below the dose limits as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed material. **(10CFR20)**

3.0, continued

[4] **Barricade** – A conspicuous obstacle such as a firmly secured rope, ribbon or rigid construction (e.g. scaffolding, chain link fence, metal, etc...) by itself or used with physical structures such as existing walls or handrails that surrounds an area to prevent inadvertent entry. **(USNRC RG 8.38)**

[5] **Cocoon, Cocooning, Cocooned** – To limit access to an area or equipment by means of erecting a physical barrier that prevents inadvertent access.

[6] **Contamination Area** - An area where removable surface contamination is greater than or equal to 1000dpm/100cm^2 beta-gamma or greater than or equal to 20 dpm/100 cm^2 alpha but is less than 100,000 dpm/100 cm^2 beta-gamma.

[7] **Continuous RP Coverage –** Direct radiological surveillance provided by RP with the sole responsibility for providing constant monitoring during the entire period personnel are in the work area. Continuous surveillance may be provided as follows:

(a) Locally by maintaining visual or audible contact; **OR**

(b) Remotely by maintaining audible and telemetry, with visual contact; if available **OR**

(c) Remotely by using stay times, time keeping, and audible contact.

[8] **Direct Reading Dosimeter (DRD)** – A self-reading quartz fiber, electronic, or other type of radiation measuring device used to measure exposures to x-ray or gamma radiation which can be read directly by the individual.

[9] **Dosimeter of Legal Record (DLR)** – A device used to determine an individual's accumulated external occupational radiation exposure including DDE, LDE and SDE. This device is inclusive of, but not limited to, OSLDs (optically stimulated luminescent dosimeters) and TLDs (thermoluminescent dosimeters).

[10] **Dose or Radiation Dose** – A generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as defined in 10 CFR20.1003. **(10CFR20)**

3.0, continued

[11] **Dose Margin** – The difference between an individual's Administrative Dose Limit and their accumulated dose for a specific time period.

[12] **Dosimetry** – Individual monitoring devices issued to and worn by a single individual for assessment of dose equivalent. Dosimetry may consist of a Dosimeter of Legal Record (DLR) and/or a direct-reading dosimeter (DRD). A DRD may be an electronic alarming dosimeter (EAD) or a pocket ion chamber (PIC).

[13] **Exposure Guideline** – An exposure criterion established to ensure that an exposure limit is not exceeded. An exposure guideline may be exceeded with proper authorization.

[14] **Exposure Limit** – Maximum radiation dose permitted under specified circumstances.

[15] **High Contamination Area (HCA)** – An area where the majority of the area has removable surface contamination equal to or greater than 100,000 dpm/100cm2 beta-gamma, or equal to or greater than 500 dpm/100 cm2 alpha.

[16] **High Radiation Area** - an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates. **(10CFR20)**

[17] **Locked High Radiation Area** - An area, accessible to individuals, in which radiation levels from sources external to the body could result in an individual receiving a deep dose equivalent greater than or equal to 1 Rem (10 mSv) in 1 hour at 30 cm (≈ 12 inches) from the radiation source or from any surface that the radiation penetrates.

[18] **Major Portion of the Whole Body** – For purposes of external exposure; either the head, trunk, arm above the elbow, or leg above the knee. If an individual's upper arm can reasonably occupy a space, then that space is considered accessible. If only an extremity (e.g., a hand and lower arm) can be inserted into an area, then the area is not accessible.

[19] **Monitoring (radiation monitoring, radiation protection monitoring)** – The measurement of radiation levels, concentrations, surface area concentrations, or quantities or radioactive material and the use of the results of these measurements to evaluate potential exposures and doses. **(10CFR20)**

3.0, continued

[20] **Personal External Alarm (PEA)** – A device attached to a worker's EAD which emits a loud noise and / or vibrates to allow the worker to be aware of an EAD alarm in high-noise areas.

[21] **Radiation Area** - An area, accessible to individuals, in which radiation levels could result in an individual receiving a deep dose equivalent greater than or equal to 5 mRem (0.05 mSv) in one hour at 30 cm (~ 12 inches) from the radiation source or from any surface that the radiation penetrates. **(10CFR20)**

[22] **Radiation Protection Personnel** – RP Technicians, RP Supervisors, Radiological Support Staff with RPM approval and trained, qualified contractor ANSI 18.1 or ANSI 3.1 RP Technicians.

[23] **Radiological Barrier** - A person, rope/ribbon, or fixed structure that prevents inadvertent entry, in whole or part, of personnel into a radiological area.

[24] **Radiologically Controlled Area (RCA)** - An area where full radiological controls (such as, contamination monitoring and controlled access/egress) are in effect for the purpose of providing protection and/or information to the individual. At Fleet Nuclear facilities, the main RCA normally includes parts or all of the Auxiliary, Fuel, Radwaste, Reactor Buildings and the Turbine Buildings at BWRs.

[25] **Remote Job Coverage –** Continuous RP oversight of work activities using RMT, and consists of all of the following: telemetry dosimetry, audio communications, and if available, visual surveillance (either direct or video).

[26] **Restricted Area** – An area to which access is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area. **(10CFR20)**

[27] **Verification** – After a worker completes an action requiring confirmation, a second person will independently **OR** concurrently and by direct observation, ensure that the action has been completed as required by this procedure.

[28] **Very High Radiation Area** - An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess 500 rads (5 grays) in 1 hour at 1 meter (≈ 3 feet) from the radiation source or 1 meter from any surface that the radiation penetrates. **(10CFR20)**

4.0 RESPONSIBILITIES

[1] **RPM Peer Group** is responsible for the maintenance of this procedure and approval of any changes for access control to radiologically controlled areas.

[2] **Radiation Protection Manager (RPM)** – Responsible for:

- Overall control and implementation of this procedure.
- Authorizing all entries into LHRAs with general area dose rates greater than 1.5 R/hr in the actual work area.
- Authorizing flashing lights as alternative LHRA controls.
- Authorizing all entries into VHRAs.
- Overall responsibility for control of LHRA / VHRA Keys.

[3] **RP Supervision (RPS)** – Responsible for:

- Implementation of this procedure.
- Conducting pre-job briefings for LHRA entries where general area dose rates greater than 1.5 R/hr in the actual work area.
- Directing RP personnel that perform the provisions of this procedure.
- Concurs that the location of LHRA / VHRA Access Control Guards ensures compliance with the LHRA / VHRA access controls in this procedure.

[4] **Lead Radiation Protection Technicians (RPTs)** (The terms Watch, Shift and Chief are equivalent to Lead) – Are responsible for maintaining control/possession of the key to the key storage box AND ensuring that the key storage box is locked at all times except during periods of use.

[5] **RP Personnel** – Are responsible for performing the provisions of this procedure.

[6] **Radiation Workers** – Are responsible for being cognizant of RWP requirements, access requirements, and radiological conditions in their work areas.

5.0 DETAILS

5.1 PRECAUTIONS AND LIMITATIONS

[1] Persons working in areas where the access doors or gates are required to be locked (i.e. LHRA, VHRA), are responsible for ensuring that these doors/ gates are closed and locked upon entering or exiting the area unless an authorized access control guard is in use.

[2] A control device or locking mechanism shall NOT prevent the safe emergency egress of personnel or interfere with the safe operation of the access barrier. Individuals should always be able to exit a posted/controlled HRA/LHRA/ VHRA.

[3] Bolted flanges, hatchways, lids, etc. are considered part of the structure and do not require additional locking mechanisms.

[4] Communication to and from the Control Room should occur prior to access when normal system operation could significantly change radiological conditions (e.g. changes in Reactor Power, securing a system, by-passing a demineralizer, changing hydrogen water chemistry (HWC) flow rates, etc.)

[5] Due to ALARA considerations Locked High Radiation Areas (LHRA) and Very High Radiation Areas (VHRA) are NOT NORMALLY entered for the sole purpose of obtaining periodic survey data.

[6] **IF** temporary lead shielding is used to make a HRA/LHRA/VHRA or potential HRA/LHRA/VHRA inaccessible, **THEN** :

(a) The shielding should be secured in place or made not readily removable by the use of lock-wire, bolts or other fasteners that would require a tool to remove.

(b) A sign or label shall be placed on the shielding such as “Warning – Do Not Remove – High Radiation Levels May Result” **OR** “Danger – Do Not Remove - Very High radiation Levels May Result”.

(c) A local audible and visible radiation monitor shall be installed to warn personnel **IF** temporary shielding, used to control access to fuel transfer tube or other plant areas of greater than 100 rem/hr (1Gy) is removed.

5.1, continued

[7] **WHEN** removing or relocating installed shielding in an HRA or LHRA, **THEN** establish appropriate posting, barricades, and other required controls for the anticipated increase in dose rates prior to beginning work.

[8] No ladders, equipment or material shall be stored around or used in a manner that would allow access over the enclosure of a LHRA.

[9] An individual who is using manual dose tracking should not re-enter the RCA once computer access is restored until the electronic dose tracking system is updated with the data from the dose tracking card unless RP Supervision authorizes otherwise.

[10] For entry into an area that is a HRA/LHRA/VHRA and posted ‘Hearing Protection Required” area, issuance of additional monitoring such as a PEA is required.

- Individuals entering a HRA/LHRA/VHRA who have demonstrated difficulty in hearing electronic dosimetry alarms require additional monitoring such as a PEA.
- Use Attachment 9.1, “Questions for High Noise Entry” as an additional planning/briefing tool to ensure adequate controls.

[11] During an emergency, individuals qualified in radiation protection procedures **OR** personnel continuously escorted by such individuals may be exempted from the requirement for an RWP or equivalent while performing their assigned duties provided that they are otherwise following plant RP procedures for entry to, exit from, and work in such areas.

[12] During an emergency (e.g. medical, security, plant):

- Dosimetry should still be worn.
- Plant personnel may bypass the normal RCA entry / exit process. In such cases, all exposures should be recorded on an appropriate RWP as soon as possible after the event and a condition report generated to document the event.

[13] Access to "Very High Radiation Areas" shall normally be prohibited. In the event it is necessary to enter a "Very High Radiation Area", the entry shall be controlled in accordance with this procedure which complies with NRC Regulatory Guide 8.38, “Control of Access to High and Very High Radiation Areas in Nuclear Power Plants" with the exception of entries into a VHRA for the purpose of verification surveys to downgrade posting. These entries will be controlled in accordance with step 5.6[14].

5.1, continued

[14] Locks to Locked High Radiation Areas shall **NOT** be controlled by magnetic key card readers.

[15] Neutron dosimetry is required if exposure to neutron radiation is expected to result in a neutron dose greater than 10 mrem during the task. Refer to EN-RP-204, "Special Monitoring Requirements."

[16] The Spent Fuel Pool (SFP) barriers are to be controlled with a locking device to prevent inadvertent removal of highly activated components from the SFP.

(a) LHRA locks or VHRA locks are used to secure items stored in the SFP.

(b) This requirement applies to other underwater storage areas, e.g. cask wash down pits, refueling equipment storage pits, etc. as directed by RP Supervision.

(c) Refer to EN-RP-108, "Radiation Protection Posting," for posting instructions.

[17] Identify accessible Hot Spots during pre-job briefs.

[18] Locks for LHRA rooms shall have an individual/unique key.

[19] Each key to a LHRA shall be issued with an encumbrance (large ring or key fob) to prevent loss, misplacement or inadvertent removal from the protected area.

[20] Radiological Trip Tickets are used as a tool to ensure workers are aware of the radiation protection requirements for the area they are working in. Refer to EN-RP-100, "Radiation Worker Expectations" for instructions on the use of Trip Tickets.

NOTES

1. Steps in this procedure may be performed in any order, as long as regulatory and station Technical Specification requirements continue to be met.
2. Equivalent forms may be used in place of procedural attachments, however the form must contain as a minimum the information identified in the attachment.

5.2 RADIOLOGICALLY CONTROLLED AREA (RCA) ACCESS CONTROLS

[1] Personnel dosimetry requirements will be in accordance with the RWP.

[2] Specific monitoring and radiological controls for access to Radiologically Controlled Areas shall be listed on the appropriate RWP.

[3] Radiation workers and visitors will log into the RCA using the access control computer **OR** by the manual dose tracking process using Attachment 9.2, "Manual Dose Tracking Card."

[4] Prior to access to any RCA, radiation workers and visitors shall obtain radiological information from any of the following:

- Radiological Work Permits
- Radiological Survey Maps
- Plant Status Boards
- Direct contact with RP personnel

[5] **IF** access to a radiological area is necessary and is controlled with the use of a key (NOT applicable for LHRA/VHRA access), **THEN** Attachment 9.8, "Radiological Area Access Key Log," may be used.

5.3 RADIATION AREA ACCESS CONTROL

[1] Specific monitoring and radiological controls for access to Radiation Areas shall be listed on the appropriate RWP.

[2] As a minimum, each person entering a "Radiation Area" shall have:

- Dosimeter of Legal Record (DLR)
- Direct reading dosimeter
- Approved RWP
- White or Red Trip Ticket

5.4 HIGH RADIATION AREA (HRA) ACCESS CONTROL

[1] High Radiation Area entry points require a barricade to prevent inadvertent access.

[2] **IF** the barricade for an HRA must be temporarily removed, **THEN**, an RP Technician may maintain direct “line-of-sight” surveillance of the access to the HRA until the access/barrier is re-secured and verified.

[3] Specific monitoring and radiological controls for access to High Radiation Areas are listed on the appropriate RWP.

[4] As a minimum, each person entering a "High Radiation Area" shall have :

- DLR
- Alarming direct reading dosimeter (Electronic Dosimeter)
- Stay Time (**IF** greater than 500 mrem per entry expected)
- Approved RWP
- Pre-Job briefing on radiological conditions in the area utilizing Attachment 9.9, “Typical High Radiation Area Brief Checklist”
- Red Trip Ticket

5.4, continued

[5] RP personnel control access to HRA's for all personnel. Personnel requesting such access will be equipped with one or more of the following:

(a) A radiation monitoring device which continuously indicates the radiation dose rate in the area, **OR**

(b) A radiation-monitoring device, such as an electronic dosimeter, that has the capability to display accumulated dose and which continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after dose rate levels in the area have been established and personnel have been made knowledgeable of them, **OR**

(c) A direct reading dosimeter and a qualified representative of the RP Department with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area, and who performs periodic radiation surveillance at the frequency specified for the applicable RWP, **OR**

(d) As specified in site Technical Specifications.

[6] **WHEN** a new, unanticipated HRA is discovered, **THEN** perform the following:

(a) Ensure all personnel (if any) are immediately evacuated from the area and direct them to report to RP.

(b) Guard or barricade the area to prohibit unauthorized access.

(c) Maintain control of the area at all times. Do not leave the area unguarded for any reason until proper procedural radiological controls have been established.

NOTE

Decisions regarding operation of plant equipment and systems are the sole responsibility of licensed Operations personnel. Due to plant conditions, it may not be possible or advisable for Operations to implement requests for equipment system status change.

(d) **IF** a request is made to Operations to secure equipment or a system lineup to address HRA conditions, **THEN** confirm action has occurred and verify HRA condition has been eliminated prior to leaving area unguarded.

(e) Initiate a Condition Report to document this occurrence.

5.5 LOCKED HIGH RADIATION AREA ACCESS CONTROL

[1] Barricades and blocking devices shall be a minimum of 6 feet in height **AND** Installed in a manner such that they prevent unauthorized access.

[2] No ladders, equipment or material shall be stored around or used in a manner that would allow unauthorized access over the enclosure.

[3] **IF** a change in plant layout or radiological conditions occurs which results in areas with dose rates in excess of 1000 mRem/hr at 30 cm from the source of radiation or any surface that the radiation penetrates, **THEN** evaluate the use of locking gates **OR** "cocooning" in the affected area(s) to enhance access control **AND** to prevent unauthorized entry.

[4] **WHEN** using the cocooning method, **THEN** a sign on the barrier must be used to inform the radiation worker of the purpose of the barrier **AND** of the hazards if the barrier is removed or altered to gain access to the area.

[5] All entrances or access points to Locked High Radiation Areas shall be locked with a distinct LHRA lock for the area or room.

[6] Entrances or access points to LHRAs shall remain locked EXCEPT during periods of access by personnel under an approved RWP. The following guidelines shall be used:

(a) Lock each access to a LHRA, **OR**

(b) Establish an Access Control Guard to prevent unauthorized entry following the guidelines of section 5.10, **OR**

(c) Control access to an LHRA through the use of a barricade and red flashing light, subject to the conditions described and with RPM approval, as follows:

(1) **IF** no enclosure exists for purposes of locking a LHRA located within a large area such as containment, **AND** an enclosure can not be reasonably constructed, **THEN**

a. Ensure the provision for the use of flashing light is specified within the site's Technical Specifications for LHRAs.

b. Obtain written approval of the Radiation Protection Manager, or designee, using Attachment 9.3, "Approval for Locked High Radiation Area Deviations", for use of a barricade and red flashing lights to control access.

c. Once approved, barricade **AND**

d. Conspicuously post the area.

e. Activate the red flashing light(s) as a warning device.

5.5[6](c)(1) continued

f. Instruct personnel working or traversing in the vicinity of these alternative controls as to their meaning and significance.

[7] Use a ladder lock, if appropriate, to control access to an LHRA.

(a) The ladder lock, if used shall be a minimum of 6 feet in length as per step 5.5[1].

(b) **WHEN** ladder locks are used to prevent unauthorized access to LHRAs, **THEN** ensure that BOTH sides of the ladder are blocked to prevent unauthorized access.

[8] Control LHRA shielded containers such as floor plugs, rad waste cubicles, filter housings, and outside shielded liner storage containers when the following are met:

(a) Dose rates greater than1R/hr at 30 cm, **AND**.

(b) Contents can be accessed through the use of local installed lifting devices or readily available mobile cranes, **AND**.

(c) Bolting is not in place to prevent access without tools.

(d) Controls may include:

- o De-energize cranes with RP admin control of tag out;
- o Use of RP-controlled locks on chain hoists;
- o Use of RP-controlled locking nuts on plug bolts;
- o Removal of lifting lugs used to remove plug and lugs are controlled by RP.

[9] Specific monitoring and radiological controls for access to Locked High Radiation Areas shall be made by RP Personnel and listed on the appropriate RWP.

[10] As a minimum, each person entering a Locked High Radiation Area shall have:

- DLR
- Alarming direct reading dosimeter (Electronic Dosimeter)
- Approved RWP
- RP Lead technician or RPS approval

5.5[10], continued

- **IF** workers are in a field dose rate greater than or equal to 1R/hr, OR worker dose is expected to be greater than 500 mrem per entry, **THEN** continuous RP coverage with the use of EN-RP-141, Attachment 9.1 "Radiological Stay Time Verification Sheet" is required.

- Radiation Protection Manager's approval for entry into LHRAs with general area dose rates greater than 1.5 Rem/hr in the actual work area.

- Documented pre-job brief for entry, given by RP personnel. RPS performs the pre-job brief for entry into LHRAs with general area dose rates greater than 1.5 Rem/hr in the actual work area. This brief shall cover:

  - o Radiological conditions in the immediate work areas using most recent survey data available **AND**
  - o The scope of the work to be perfomed

- Red Trip Ticket

[11] While LHRAs are open, the access to the LHRA shall be controlled in accordance with site-specific Technical Specifications.

[12] Turnover of radiological coverage by RP personnel during Locked High Radiation Area work should be avoided.

[13] **WHEN** transfer of the LHRA key is required, **THEN** perform in accordance with Section 5.11.

[14] The following verification shall follow the initial check by the access control guard or RPT and be documented on Attachment 9.6, "LHRA / VHRA Key Log."

(a) Upon re-establishing any LHRA boundary controls following work that required access into these areas, a second person shall verify the access point(s) are securely locked.

(b) This verification shall consist of ensuring the locking mechanism has been replaced, where removed, **AND** that the access point is shut **AND** locked.

(c) **IF** the person who performed the initial check was NOT an RPT, THEN the person performing the verification shall be an RPT.

(d) **WHEN** keys are required to lock doors, **THEN** verify that the door is closed **AND** secured/locked with a physical challenge of the door.

5.5[14] continued

(e) **IF** the door is locked using a padlock and chain or cable, **THEN** inspect the lock and chain or cable for defects, **AND** physically challenge the lock.

(f) **IF** deficiencies are found during this inspection **THEN** immediately report the deficiency RP Supervision **AND** document the deficiency in a Condition Report.

[15] **IF** a new, unanticipated LHRA is discovered, **THEN** perform the following:

(a) Ensure all personnel are immediately evacuated from the area and direct them to report to RP.

(b) Guard the area and prohibit unauthorized access.

(c) Maintain control of the area at all times. **DO NOT** leave the area unguarded for any reason until proper procedural radiological controls have been established.

NOTE

Decisions regarding operation of plant equipment and systems are the sole responsibility of licensed Operations personnel. Due to plant conditions, it may not be possible or advisable for Operations to implement requests for equipment or system status changes.

(d) **IF** a request is made to Operations to secure equipment or a system lineup to address LHRA conditions, **THEN** confirm the action has occurred and verify the LHRA condition has been eliminated prior to leaving the area unguarded.

(e) Initiate a Condition Report to document this occurrence.

5.6 VERY HIGH RADIATION AREA ACCESS CONTROL

CAUTION

To the extent possible, entry into a VHRA should be forbidden unless there is a sound operational or safety reason for entering.

Without proper controls and monitoring, personnel entering these areas could receive radiation exposure with severe or life-threatening consequences.

[1] Barricades and blocking devices shall completely enclose the Very High Radiation Area sufficient to thwart undetected circumvention of the barrier.

[2] Fencing or walls around a Very High Radiation Area should extend to the overhead and preclude anyone from climbing over the barricade.

[3] All entrances or access points to Very High Radiation Areas shall be locked with a unique lock **AND** conspicuously posted.

5.6 continued

[4] Entrances or access points to VHRAs shall remain locked EXCEPT during periods of access by personnel under an approved RWP.

[5] VHRA keys are maintained under the administrative control of the Radiation Protection Manager (or designee).

[6] Each entry into a Very High Radiation Area requires the completion of EN-RP-141, Attachment 9.1, "Radiological Stay Time Verification Sheet".

[7] **WHEN** a VHRA is NOT locked, **THEN** direct surveillance, capable of preventing unauthorized or inadvertent access, in accordance with section 5.10 shall be maintained.

[8] Access control to a VHRA may be made utilizing an Access Control Guard.

[9] **IF** entry into a VHRA is made using an Access Control Guard, **THEN** the Guard shall comply with the requirements of section 5.10.

[10] Specific monitoring and radiological controls for access to Very High Radiation Areas shall be listed on the appropriate RWP.

[11] As a minimum, each person entering a Very High Radiation Area shall have a(n):

- DLR
- Alarming direct reading dosimeter (Electronic Dosimeter).
- Continuous RP coverage and Stay Time Tracking to be in accordance with EN RP-141
- Stay time and dose estimate assigned for each entry.
- Documented pre-job brief for entry given by an RPS.

  This brief shall cover radiological conditions in the immediate work area using the most recent survey data available and the scope of the work to be performed.
- Approved Job Specific RWP.
- Approval of the Radiation Protection Manager, or designee and the on-watch Shift Manager.
- Red Trip Ticket

5.6, continued

[12] Radiation Protection Manager and Shift Manager's approval:

- May only be granted following a documented evaluation of the risks and alternatives.
- May be obtained by telephone.
- **WHEN** permission is obtained, **THEN** document approval on Attachment 9.4, "VHRA Access Approval Form".
- The completed Attachment 9.4 shall be filed in the appropriate RWP file.

[13] Each Very High Radiation Area lock has a unique key which allows access to only that area.

(a) Issuance of a key for entry into a Very High Radiation Area requires the permission of the Shift Manager and Radiation Protection Manager (or designee).

(b) Complete the "Key Issue" section of Attachment 9.6 to obtain a VHRA key only after completing the pre-job brief.

[14] Turnover of radiological coverage by Radiation Protection personnel during Very High Radiation Area work requires RP Supervisor approval.

[15] The following verification shall follow the initial check by the access control guard or entrant **AND** shall be documented on Attachment 9.6.

(a) Upon re-establishing any VHRA boundary controls following work that required access into these areas, an RPT shall verify the access point is securely locked. This verification shall consist of ensuring the locking mechanism has been replaced on the access point.

(b) Where keys are required to lock doors, **VERIFY** that the door is closed **AND** secured/locked with a physical challenge of the door.

(c) **IF** the door is locked using a padlock and chain or cable, **THEN** Inspect the lock and chain or cable for defects, **AND** Physically challenge the lock.

(d) Any deficiencies found during this inspection should be:

- Documented on a condition report **AND**
- Reported to RP Supervision immediately.

5.6, continued

[16] Entry into posted VHRA by RP Technicians for the purposes of surveying to downgrade the posting:

(a) Shall be approved by the Radiation Protection Manager **AND** Shift Manager.

(b) A Pre-Job brief shall be conducted by RPS.

(c) The entry shall be performed with a minimum of two (2) RP technicians.

(d) Each RP Technician is required to have in their possession:

- An electronic dosimeter, **AND**
- Two continuously indicating high-range dose rate meters, one of which shall have telescoping capabilities (e.g., an RO-2A and a telescoping high range instrument).

(e) Post the area based on the existing radiological conditions upon exit from the area.

5.7 AIRBORNE RADIOACTIVITY AREA ACCESS CONTROL

[1] Specific monitoring and radiological controls for access to Airborne Radioactivity Areas shall be listed on the appropriate RWP.

[2] As a minimum, each person entering an Airborne Radioactivity Area shall have:

- DLR
- Direct reading dosimeter
- Approved RWP
- White or Red Trip Ticket

[3] Respiratory protection devices for access to Airborne Radioactivity Areas, if required, shall be issued in accordance with the Respiratory Protection Program Procedures.

5.8 CONTAMINATION/HIGH CONTAMINATION AREA ACCESS CONTROL

[1] Specific monitoring and radiological controls for access to Contamination Areas shall be made by RP Personnel **AND** listed on the appropriate RWP.

5.8 continued

[2] As a minimum, each person entering a Contamination Area SHOULD have:

- DLR
- Direct reading dosimeter
- Protective clothing
- Approved RWP
- White or Red Trip Ticket

5.9 MANUAL ENTRY/EXIT

[1] Use Attachment 9.2, "Manual Dose Tracking Card," for any of the following conditions:

- To track dose when the RCA electronic access system is not available **OR**
- Any other situation specified by RP.

[2] **WHEN** entering the RCA using a Dose Tracking Card, **THEN**:

- Workers should complete the entry section of the dose tracking card.
- Normally the card will remain at the control point while the individual is in the RCA.

[3] **WHEN** exiting the RCA using a Dose Tracking Card, **THEN**:

- Workers should complete the exit section of the Manual Dose Tracking Card **AND**
- Give the Direct Reading Dosimeter (DRD) to RP personnel.

5.10 ACCESS CONTROL GUARD

NOTE

Person(s) assigned duties as an Access Control Guard for LHRAs / VHRAs wears a vest or other garment as provided by Radiation Protection to identify him / her to other workers as an Access Control Guard.

[1] RP Supervision concurs that the location for the LHRA/VHRA Access Control Guard ensures unobstructed view of the LHRA/VHRA entrance point to ensure compliance with this procedure.

[2] **IF** an entry into a LHRA/VHRA is made using the conditions of an Access Control Guard, **THEN** the Access Control Guard shall be stationed, **OR** May be one of the entrants using the following guidelines:

(a) RP personnel are not required to complete Attachment 9.5, but are expected to comply with all requirements.

(b) Non-RP personnel must read, be briefed by an RPS/RPT **AND** sign a copy of Attachment 9.5, “Responsibilities for the Access Control Guard”.

(c) The Access Control Guard shall have Attachment 9.5 present with them.

(d) **IF** the door controlling access to the LHRA/VHRA is to be left open **OR** can not be secured/locked when entering, **THEN** the Access Control Guard shall remain stationed at the door until:

- The door is secured/locked, **OR**
- They are relieved by RP personnel, **OR**
- They are relieved by another RPS/RPT-briefed Access Control Guard.

(e) **IF** the Access Control Guard enters a LHRA/VHRA, **THEN** the Access Control Guard shall:

(1) Ensure that the access is secured / locked by physically challenging the access to ensure closure **AND** proper latching.

(2) Ensure that the access is secured / locked by physically challenging the access to ensure closure **AND** proper latching after any additional authorized individuals enter, **OR** any one part of the work crew exits.

5.10 continued

[3] The Access Control Guard shall prevent unauthorized entry into the LHRA / VHRA by:

(a) Obtaining verbal or written acknowledgement from the RP that the prospective entrant has permission from and is covered under the provisions of an RWP authorizing access to the LHRA / VHRA for each individual entry.

(b) **IF** RP acknowledges permission for entry; **THEN** permit entry to the area.

(c) **IF** RP does **NOT** acknowledge permission for entry, **THEN** deny entry **AND** instruct the individual to contact RP.

NOTE

This next step even applies when all individuals have left and plan on returning to complete or continue work.

[4] **WHEN** all individuals have exited the LHRA/VHRA area **AND** the Access Control Guard is no longer going to be present, **THEN**:

(a) Ensure that access door is secured / locked by physically challenging the access to ensure closure and proper latching, **AND**.

(b) Notify the RP Technician that the initial check is complete and door should be verified, **AND**.

(c) Remain at the door until the door is VERIFIED, **AND**

(d) Document verification on Attachment 9.6.

[5] **WHEN** re-establishing any LHRA / VHRA boundary, **AND** upon being notified that an initial check was completed, **THEN** RP personnel shall verify the access point(s) are secured/locked at the access point(s), **AND** document verification on Attachment 9.6.

5.11 CONTROL AND INVENTORY OF LHRA KEYS

[1] LHRA Keys should be number-stamped for identification **AND** should be of a type that is not easily reproducible.

[2] The “ready for issue” keys shall be maintained in a locked box :

- The locked box shall be kept locked by the Lead RPT except while in use;
- The key for the box SHOULD be in the control of the Lead RPT, shift tech, or RPS;
- Transfer of the key for the locked box shall be recorded in the appropriate RP log;
- **IF** the box key is lost, **THEN** control the key storage box **AND** notify the RPS.

5.11 continued

[3] Keys that are spare and not specifically assigned or "ready for issue" will be recorded in the RP logbook.

[4] The on-coming and off-going Lead RP Technicians perform a shift inventory:

(a) Inventory "ready to issue" keys as directed in step 5.11[5], **AND**

(b) Audit the "in-use" Attachment 9.6, "LHRA/VHRA Key Log," **AND**

(c) Documents in shift LHRA key inventory in the turnover log.

[5] **PERFORM** the following unless the key lock box is secured with tamper tape, tamper seals, etc. **AND** the tamper closure has not been broken.

(a) Account for all keys assigned to the "ready for issue" inventory.

(b) Ensure that Attachment 9.6 accurately reflects the current status of the keys.

(1) **IF** any key is not accounted for, **THEN** attempt to determine location of key **AND** verify that the door controlled by the key is locked and secure.

(2) **IF** key cannot be located, **THEN** notify RP Supervision **AND** record the missing key in RP log.

(3) **IF** it is determined that a LHRA key is lost, **THEN**:

a. immediately notify the Radiation Protection Manager.

b. RP Supervision will make a determination as to whether LHRA door(s)/padlock(s) will be re-keyed and new key(s) issued.

c. Initiate a Condition Report.

[6] Weekly Inventory is performed by RP Supervision or designee, who:

(a) Reviews **AND** initials any "ready for issue" Attachment(s) 9.6.

(b) Verifies proper accounting documentation for satellite issued keys.

[7] The emergency entry LHRA key issued to the Operations Shift Manager shall be inventoried monthly by the RPM or designee.

[8] Monthly Inventory is performed by the RP Supervision or designee who ensures that:

(a) ALL LHRA keys are inventoried.

5.11[8] continued

(b) The current Attachment 9.6 accurately reflects the current status of the keys assigned to the satellite issue areas.

(1) **IF** any key is not accounted for, **THEN** attempt to determine location of key, **AND** verify that the door controlled by the key is locked and secure.

(2) **IF** key cannot be located, **THEN** notify RPS **AND** RPM.

(3) Commence an investigation as to the key whereabouts.

(4) **IF** it is determined that the key is lost, **THEN** initiate a Condition Report, **AND** make a determination as to whether all LHRA doors/padlocks will be re-keyed and new keys issued.

(c) The Monthly Inventory is documented as completed in the RP Logbook **OR** other media as a permanent record.

[9] LHRA Key Issue

(a) Keys for LHRAs affected by the movement of irradiated fuel are controlled by **AND** are issued by RP Supervision or designee.

(b) Keys designated for access to LHRAs may only be issued to:

- Currently trained and qualified ANSI 3.1 RP personnel in accordance with the facility qualification matrices.
- Those Radiation Protection staff personnel approved in writing by the RPM.

(c) The issuance of a LHRA key is recorded on EN-RP-101, Attachment 9.6, "LHRA / VHRA Key Log".

(1) The key shall be issued with an encumbrance (e.g. bulky key ring or key fob).

(2) The key assignment sheet will record:

- The key number, **AND**
- Location/Door, **AND**
- Date & time of issue, **AND**
- Issued by, **AND**
- RWP, **AND**
- Individual assigned custody of the key.

(3) Key Custodians:

a. Shall Maintain control of the key at all times, **AND**

b. Shall **NOT** allow unauthorized or unqualified personnel to access LHRAs controlled by the key.

5.11[9] continued

(d) **WHEN** the RPT is responsible for multiple LHRAs (as during outages), **THEN** the Lead RPT **OR** RPS shall issue a LHRA key to the RPT for a specific area, (e.g. the Vapor Containment).

(1) Attachment 9.7, Supplemental Area Access Log" shall be maintained by the RPTs assigned to that area to record:

- The key custody, **AND**
- The LHRA areas accessed **AND**
- LHRA locked verification.

(2) Transfer of keys shall be recorded in the "Custody" block of the Custody section of Attachment 9.7.

(3) The completed Attachment 9.7 shall be maintained with the corresponding Attachment 9.6, "LHRA / VHRA Key Log".

(e) RPTs may transfer keys to one another at job sites.

(1) The new key custodian must meet the requirements of step 5.11[9](b).

(2) These transfers shall be reported to the Lead RPT **AND** recorded on Attachment 9.7, "LHRA Supplemental Area Access Log," **OR** recorded on Attachment 9.6, "LHRA/VHRA Key Log," according to the following process:

a. Verify that the new key custodian meets the requirements of step 5.11[9](b).

b. New key custodian requests that the Lead RPT complete the entries (by phone if necessary) to accept responsibility from the current key custodian.

c. Current key custodian transfers the LHRA key to the new key custodian.

d. Lead RP, upon being notified of key transfer, from the new key custodian is to:

1. Complete the appropriate entries in the "Key Transfer" column on Attachment 9.6 **AND**

2. Mark "N/A" in the appropriate blank in the columns on Attachment 9.6, if used, for "Key Return" and "Verification."

(f) Keys should be returned to the issue point at end of shift or assignment.

5.11[9], continued

(g) **WHEN** the key is returned, **THEN** Attachment 9.6 will be used to record:

- That the area(s) is / are re-locked including date and time, **AND**
- The Initials, date and time of the key's return, **AND**
- Verification of key return by Lead RP Technician or shift tech, or by RPS, RPM, etc.

NOTE

This provision allows for the emergency access to LHRA areas during activation of a site's Emergency Plan.

[10] Emergency Entry into Locked High Radiation Areas

(a) The Operations Shift Manager has control of an "Emergency Use Only" LHRA key.

(b) The use of LHRA keys, not in the possession of the RP Department, shall be limited to emergency entries into a LHRA **AND** shall be maintained by the Operations Shift Manager.

(c) In the event that use of a LHRA key is needed for access, contact with Lead RPT shall be made as soon as possible following the entry to the area.

(d) In the case of emergency entry being required and at the direction of the Operations Shift Manager, Operations personnel may utilize the Emergency Key to gain access to the LHRA.

(e) **IF** the LHRA key controlled by the Operations Shift Manager is used, **THEN**:

- notify RP Supervision
- notify the RPM
- Initiate a Condition Report.

5.12 CONTROL AND INVENTORY OF VERY HIGH RADIATION AREA (VHRA) KEYS

[1] VHRA keys will be uniquely identified (not keyed the same as any other type of locks used in the plant), **AND** be of a type that is not easily reproducible.

[2] Keys and padlocks used for control of VHRAs shall be administered through the RPM or designee.

5.12 continued

[3] VHRA Key Inventory Requirements

(a) The RPM or designee performs a VHRA key inventory monthly.

(b) The VHRA key inventory includes an audit of the current Attachment 9.6.

(c) This inventory shall account for all keys.

(d) Ensure Attachment 9.6 accurately reflects the current status of the keys.

(1) **IF** any key is not accounted for,

(2) **THEN** attempt to determine the location of key, **AND**

(3) **VERIFY** the area controlled by the missing key is locked and secure.

(4) **IF** key cannot be located,

(5) **THEN** notify all RP Personnel.

(6) Commence an investigation as to the key whereabouts.

(7) **IF** it is determined that the key is lost,

(8) **THEN** the RPM will make a determination as to whether all VHRA doors/padlocks will be re-keyed and new keys issued.

(9) Initiate a Condition Report.

(e) Monthly inventory is documented as completed:

- In the RP Logbook **OR**
- Other media as a permanent record.

5.12, continued

[4] VHRA Key Issue

(a) VHRA keys will be issued to RP Personnel only, as outlined in step 5.11[9](a), with RPM approval, for specific use.

(b) The RPM **AND** the Operations Shift Manager shall approve the issuance of VHRA keys by completing Attachment 9.4, "VHRA Access Approval Form".

(c) The issuance of VHRA keys shall be for specifically briefed activities.

(d) Issuance of VHRA keys shall be recorded on the appropriate sections of Attachment 9.6.

(e) VHRA keys should not be transferred from one custodian to another while in use.

(f) **IF** a transfer of VHRA keys is necessary, **THEN** perform the following:

(1) New Key Custodian MUST be approved by RPM and briefed by RPS.

a. Ensure the appropriate entries in the "Key Issue" columns on Attachment 9.6 are made by notifying the RPM or designee that they accept responsibility from the current key custodian.

b. This notification may be made by phone or in person.

(2) Current Key Custodian, upon approval of RPM, transfers the VHRA key to the new key custodian.

(3) RPM or designee,: upon being notified of key transfer from the new key custodian,

(4) Completes the appropriate entries in the "Key Transfer" column on Attachment 9.6 **AND**

(5) MARK "N/A" in the appropriate blank in the columns on Attachment 9.6 if used, for "Key Return" and "Verification."

(g) Upon the return of the keys, complete the appropriate sections of Attachment 9.6 following the requirements for verifications of step 5.6[15].

5.13 HIGH, LOCKED HIGH AND VERY HIGH RADIATION AREA BOUNDARY VERIFICATIONS

NOTE

Increasing the periodicity of boundary verifications should be considered during outages.

[1] High Radiation Area (HRA) Boundary verifications

(a) Shall be, at a minimum and as applicable, performed weekly, **AND**.

(b) Shall consist of the following:

- Ensuring the boundary is continuous to avoid unauthorized entry.
- Ensuring the swing gate, if used, is functional.
- Verifying the swing gate alarm, if used, is operational.
- Verifying the postings are in accordance with EN-RP-108, “Radiation Protection Posting”.
- Verifying that unauthorized access is not inadvertently created by the positioning or placement of piping, conduit, tool boxes, cable trays, ladders, scaffolding, etc., that could facilitate access to the area.
- Documenting that the check is completed in the RP Logbook or other media.

[2] Locked High Radiation Area (LHRA) and Very High Radiation Area (VHRA) Boundary verifications:

(a) Shall be, as a minimum and as applicable, performed weekly **AND**

(b) Shall consist of:

- Ensuring the locking mechanism is in place.
- Physically challenging the access entrance.
- **IF** padlock with chain/cable is used, **THEN** ensure there is no slack in the chain/cable that would allow unauthorized entry.
- **IF** cocooning or barricade is used, **THEN** ensure boundary is continuous and secure to avoid unauthorized entry.
- **WHEN** using the cocooning method, **THEN** a sign on the barrier must be used to inform the radiation worker of the purpose of the barrier **AND** the hazards present if the barrier is removed or altered to gain access to the area.

5.13[2](b) continued

- VERIFY that the door or area is posted in accordance with EN-RP-108, "Radiation Protection Posting".
- VERIFY that unauthorized access is not inadvertently created by the positioning or placement of piping, conduit, tool boxes, cable trays, ladders, scaffolding, etc., that could facilitate access to the area.
- Document that the check is completed in RP Logbook or other media.

[3] Door and gate integrity inspections:

(a) Shall be, as a minimum, conducted semi-annually **AND**

(b) Shall, at a minimum and as applicable, consist of the following:

- Verify the locking mechanism is in place.
- Verify the latch is in alignment with **AND** sits well in the frame's keyway.
- Ensure locking cylinders **AND** striker plates are intact.
- Verify the door or gate's framework is intact.
- Verify handles are in working order.
- Verify the auto closure device performs satisfactory.
- Documentation that inspection is complete in RP Logbook (or other media).

[4] **IF** defects or deficiencies are found, **THEN** Control the area **AND** Notify RPS.

6.0 INTERFACES

[1] EN-RP-100, "Radiation Worker Expectations"

[2] EN-RP-108, "Radiation Protection Posting"

[3] EN-RP-105, "Radiological Work Permits"

[4] EN-RP-109, "Hot Spot Program"

[5] EN-RP-141 "Job Coverage"

[6] EN-RP-204, "Special Monitoring Requirements"

[7] EN-RP-501, "Respiratory Protection Program"

[8] EN-IS-115, "Hearing Conservation Program"

7.0 RECORDS

[1] Attachment 9.2, "Manual Dose Tracking Card"

[2] Attachment 9.3, "Approval For Locked High Radiation Area Deviations"

[3] Attachment 9.4, "VHRA Access Approval Form"

[4] Attachment 9.6, "LHRA / VHRA Key Log"

[5] Attachment 9.7, "Supplemental Area Access Log"

[6] Attachment 9.8, "Radiological Area Access Key Log"

8.0 SITE SPECIFIC COMMITMENTS

Step	Site	Document	Commitment Number or Reference
All	W3	TS 6.12	P-2808
All	W3	IEN 86-044	P-12725
5.1 [14]	W3	LER 90-016	P-17611

9.0 ATTACHMENTS

9.1 Questions for High Noise Entry
9.2 Manual Dose Tracking Card
9.3 Approval for Locked High Radiation Area Deviations
9.4 VHRA Access Approval Form
9.5 Responsibilities for the Access Control Guard
9.6 LHRA / VHRA Key Log
9.7 LHRA Supplemental Area Access Log
9.8 Radiological Area Access Key Log
9.9 Typical High Radiation Area Brief Checklist

ATTACHMENT 9.1 **QUESTIONS FOR HIGH NOISE ENTRY**

Sheet 1 of 1

Consider the following questions to determine if additional measures should be taken prior to entry into HRA/LHRA/VHRA, Hearing Protection Required Areas, or for individuals who have demonstrated the inability to hear electronic dosimeter alarms. Check the box which applies.

If the answer to question 1 or 2 is "Yes" an additional monitoring device such as a PEA is Required.

If the answer is "Yes" to any of the other questions consider the need for additional monitoring devices such as PEAs, telemetry dosimetry, or continuous RP coverage.

1. Is the entry into a HRA/LHRA/VHRA and "Hearing Protection Required Area"? ☐ Yes ☐ No

2. Is the entry into a HRA/LHRA/VHRA and has the individual demonstrated the inability to hear an electronic dosimeter alarm? ☐ Yes ☐ No

3. Are noise levels in the work area or along the transit path such that they could prevent an individual from hearing the dosimeter alarm? ☐ Yes ☐ No

4. Will electric or air powered tools be used during the course of the job that will generate noise levels high enough to prevent someone from hearing the electronic dosimeter alarm? ☐ Yes ☐ No

5. Would it be possible during the course of the entry for the individual to receive an accumulated dose of greater than 30 mrem based on RWP EAD setpoints? ☐ Yes ☐ No

6. Will hearing protection be worn by the individual which might impair the ability to hear the electronic dosimeter alarm? ☐ Yes ☐ No

7. Will the position of the body, position of the electronic dosimeter, or the amount of protective clothing have an impact on the ability of the individual to hear the dosimeter alarm? ☐ Yes ☐ No

ATTACHMENT 9.2 **MANUAL DOSE TRACKING CARD**

Sheet 1 of 1

Name / Badge Number:	DLR #	Issue Date:	Entry Dose Margin:

Entry Section

RWP #	Date	Workers Initials*	Time In	DRD Number	DRD Dose In

* Initials indicate that the individual has read, understands and will comply with the RWP and/or entry/work requirements; they also indicate that the individual currently meets all training requirements for access to the RWP area.

Exit Section

Time Out	Dose Out	New Margin	Computer Updated (RP initial)

ATTACHMENT 9.3 **APPROVAL FOR LOCKED HIGH RADIATION AREA DEVIATIONS**

Sheet 1 of 1

This form is to be used for approval of Locked High Radiation Area deviations. Exceptions must comply with the controls required by 10CFR20, and station Technical Specifications.

Description of Deviation Requested: ____

____

____

____

____

☐ Approval for the use of barricade and red flashing light for controlling access to a LHRA.

☐ Other (specify) ____

Location of Requested Deviation: ____

Justification and/or comments (including why physical barrier can't be erected):__________

____

____

____

____

____

Deviation Requested by: ______________________________ Date: ________________

Deviation Approved by: _______________________________ Date: ________________
Radiation Protection Manager (or designee)

ATTACHMENT 9.4 **VHRA ACCESS APPROVAL FORM**

Sheet 1 of 1

Location/Description of Area: ____

Date of Request: _________________ Applicable RWP #________________________

Requestor: ________________________________ Department _________________

Access Review and Approval (all items must be completed and checked off):

☐ The RWP instructions are adequate to address radiological conditions expected for this work.

☐ The ALARA Review (<u>if required by procedure</u>) for this work is complete and dose estimate calculated if necessary.

☐ A briefing has been performed for all personnel involved with this work.

☐ A documented evaluation of the risks and alternatives associated with this entry has been performed and is adequate.

Approval: ____________________________ Date: ___________ Time: ___________
Radiation Protection Manager or designee

Approval: ____________________________ Date: ___________ Time: ___________
Operations Shift Manager

☐ The RP Manager, or designee, granted approval for access to VHRA, by telephone.

ATTACHMENT 9.5 **RESPONSIBILITIES FOR THE ACCESS CONTROL GUARD**

Sheet 1 of 1

(To be completed by all Personnel except qualified RPTs)

Date: ________________ Time: __________________

Area to be attended (Unit, Bldg, Elevation, Room #, etc.):

____

Individual signing as the Access Control Guard reads, understands and accepts the following responsibilities:

1. Have the signed Attachment 9.5 present with them while performing duties as an Access Control Guard.
2. Wears the vest / garment as provided by RP, to identify the individual as a LHRA / VHRA Guard.
3. Has received a briefing on the LHRA/VHRA boundary that he/she is guarding.
4. If the door controlling access to the LHRA/VHRA is to be left open **OR** cannot be secured/locked when entering, the Access Control Guard shall remain stationed with a direct "line-of-sight" and control at the door until:
   - Access/barrier is secured/locked and verified by RP
   - Relieved by RP qualified personnel
   - Relieved by another RPS/RPT briefed Access Control Guard
5. If the Access Control Guard enters the LHRA/VHRA, the Access Control Guard shall:
   - Ensure that the access is secured / locked by physically challenging the access to ensure closure and proper latching.
   - Ensure that the access is secured/locked by physically challenging the access to ensure closure and proper latching after any additional authorized individuals enter or any part of the work crew exits.
6. Prevent unauthorized entry into the LHRA / VHRA by performing the following actions for any individual requesting access to the area:
   - Obtain verbal or written acknowledgement from the RP that the prospective entrant has permission from and is covered under the provisions of an RWP authorizing access to the LHRA / VHRA for each individual entry.
   - IF RP acknowledges permission for entry; THEN permit entry to the area. Otherwise DENY entry and instruct the individual to contact RP.
7. Ensure that personnel are able to exit the LHRA / VHRA at any time, and are not prevented from leaving the area by a locked or obstructed access.
8. If, at any point, you do not believe that access to the LHRA / VHRA is being adequately controlled then contact RP personnel immediately
9. When all individuals have exited the LHRA/VHRA area AND the Access Control Guard is no longer going to be present:
   (a) Ensure that access door is secured / locked by physically challenging the access/barrier and ensuring proper latching
   (b) Notify the RP Technician that the initial check is complete and door(s) should be verified.
   (c) Remain at the door until the door is VERIFIED secured/locked by RP Personnel
10. Indicate completion of the initial check on Attachment 9.6.

Access Control Guard Name: ____________________________________

Access Control Guard Signature ____________________________________ Date: ________________

RP Technician Performing Brief: ____________________________________ Date: ________________

ATTACHMENT 9.6 **LHRA / VHRA KEY LOG**

Sheet 1 of 1

KEY ISSUE					KEY RETURN	AREA LOCKED	KEY TRANSFER
Key # / RWP	Location/Door Accessed	Key Issued by:	* Key Custodian (Print Name) (Signature)	Date Time Issued	Key Returned By: Init/Date/Time Key Verified Returned Init/Date/Time	** Area Locked By: Init/Date/Time Area Verified Locked by: Init/Date/Time	Transfer to: (Print Name) Init/Date/Time

RP Supervisor (or designee) Review: ________________________________ **Date**: _______________

* If key is issued to an area and Attach. 9.7, "LHRA Supplemental Access Area Access Log" is being utilized, then indicate "Attachment 9.7" for "Area Locked" column.
** If an RPT is down posting an area and a lock is no longer required, then the appropriate blank in this column "Area Locked By" should be marked "Down posted" then Initials/Date/Time placed in the "Key Returned By" block.

ATTACHMENT 9.7 **SUPPLEMENTAL AREA ACCESS LOG**

Sheet 1 of 1

Key #______________ **Location_________________________________**

Custody		Area	Entry	Verification
Key Custodian Print Name Signature	Date Time	Door / Area Accessed	Area Locked by: (Print Name) Init/Date/Time	Verified Locked by: (Print Name) Init/Date/Time

RP Supervisor (or designee) Review: _______________________________ Date: _______________

ATTACHMENT 9.8 **RADIOLOGICAL AREA ACCESS KEY LOG**

Sheet 1 of 1

Key #	Location/Door Accessed	* Key Custodian (Print Name) (Signature)	Date Time Issued	Key Returned By: Print/Date/Time

* FORM IS NOT APPLIED OR ALLOWED FOR KEY ISSUING ACCESS TO LHRA OR VHRA

ATTACHMENT 9.9 **TYPICAL HIGH RADIATION AREA BRIEF CHECKLIST**

SHEET 1 OF 1

High Radiation Area Brief Checklist

		YES	N/A	NO
1.	Discussion of scope and nature of specific work to be performed. Workers are to identify work location and travel path. Understand body position in relationship to dose rates at the work location.	☐	☐	☐
2.	Validate that the RWP is adequate for the work activity.	☐	☐	☐
3.	Brief the workers on the radiological hazards including dose rates, contamination levels and airborne activity.	☐	☐	☐
4.	Determine if EAD set points are adequate for the activity. If an anticipated EAD dose rate alarm is necessary document on EN-RP-105, Attachment 9.10	☐	☐	☐
5.	Exposure reduction items discussed including low dose waiting areas identified.	☐	☐	☐
6.	Determine RP Coverage requirements and any radiological holds points for the work activity such as surveys when systems are opened.	☐	☐	☐
7.	Anti-Contamination clothing requirements discussed? *(Discussion includes specific anti-C's to be worn, clothing to be worn underneath, and any additional materials to be used such as kneepads, Orex mat, face shield, etc)*	☐	☐	☐
8.	Discuss the proper location for dosimetry and any relocation or special monitoring situations. Define how often dosimeters are to be read.	☐	☐	☐
9.	Determine/discuss stop work criteria *(e.g., dose rate increase, airborne, etc)*	☐	☐	☐
10.	Should telemetry be used for this activity? If so, how will workers be provided job coverage including communication methods? *(e.g., When will workers need to pause and wait for an RP action, or what could trigger a worker to need RP assistance?)*	☐	☐	☐
11.	Discussion of conditions that could change: *(e.g., dose rate increase, airborne, etc)*	☐	☐	☐

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☒ **RO** ☐

ALTERNATE PATH ☐

TITLE: **Calculate Heatup Rate and Time to Uncover Core During Loss of SDC Event**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	10	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	October 2, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Heatup Rate is determined to be between 9 and 9.2°F, and
Time to TAF is determined to be between 104.5 and 106.7 hours.

Synopsis: The plant was preparing for refueling when a loss of shutdown cooling occurs. This task will have the applicant choose and use Thermal Hydraulic Curves from OSP-0037, Shutdown Operations Protection Plan to determine (1) the Heat Up Rate, and (2) the Time to Top of Active Fuel for given conditions.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

Determine (1) the Heatup Rate, and (2) the Time to Top of Active Fuel.

3) Initial Conditions:

The plant is in Mode 5; it has been shutdown for 6 days,

Preparations for refueling have just been completed.

The Reactor cavity is currently flooded, with water temperature at 130°F.

A loss of shutdown cooling has just occurred.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Calculate Heatup Rate and Time to Uncover Core During Loss of SDC Event	400077004001	G 2.1.25	4.2

REFERENCES:
OSP-0037, Rev 30

APPLICABLE OBJECTIVES
RLP-STM-0053, Obj 3, 11

REQUIRED MATERIALS:
OSP-0037, Rev 30

SIMULATOR CONDITIONS &/or SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup
2.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Heatup Rate is determined to be between 9 and 9.2°F, and
Time to TAF is determined to be between 104.5 and 106.7 hours.

PERFORMANCE:

START TIME: ________________

1.	***Procedure Step:**	1. Determine Heat Up Rate
	Standard	Applicant determined that the Heatup rate is 9°F/hr (acceptable range is between 9 and 9.2), using the correct graph on Attachment 9, page 14 of 32.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	***Procedure Step:**	2. Determine Time to TAF
	Standard	Applicant determined that the time to TAF is between 104.5 and 106.7 hours using the correct graph on Attachment 9, page 15 of 32.
	Cue	
	Notes	The applicant must use the multiplier (0.97) to achieve correct answer.
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Heatup Rate is determined to be between 9 and 9.2°F, and
Time to TAF is determined to be between 104.5 and 106.7 hours.

This completes this JPM.

STOP TIME: ________________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initiating Cues:

Determine (1) the Heatup Rate, and (2) the Time to Top of Active Fuel.

Initial Conditions:

The plant is in Mode 5; it has been shutdown for 6 days,

Preparations for refueling have just been completed.

The Reactor cavity is currently flooded, with water temperature at 130°F.

A loss of shutdown cooling has just occurred.

Answer Sheet:

1) Heatup Rate = ______________

2) Time to Top of Active Fuel = ________________

G12.1.28

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
*OPERATION SECTION PROCEDURE

*SHUTDOWN OPERATIONS PROTECTION PLAN (SOPP)

PROCEDURE NUMBER:	***OSP-0037**
REVISION NUMBER:	***030**
Effective Date:	***02/07/2013**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES

TABLE OF CONTENTS

1 PURPOSE

This procedure provides guidelines for Operations and Outage Management personnel to evaluate the availability of plant equipment required to meet the EOI Corporate Outage Management Nuclear Safety Philosophy (Attachment 10).

This procedure is intended for use when the plant is in Mode 4 or Mode 5 during scheduled, forced (unscheduled), and refueling outages.

This procedure reinforces the expectation that the Operations Shift Managers-Outage maintains overall responsibility for control of the key shutdown safety functions. Activities with the potential to challenge decay heat removal, lower reactor coolant system inventory, result in a loss of electrical power, or affect reactivity such as fuel or control rod movement are overseen by the shift manager. In addition, the Operations Shift Managers concur with the release and closure of outage and system work windows that have an impact on the shutdown safety functions. (SOER 09-01, Recommendation 3, SOER 94-01 Recommendation 3a).

SOER 09-1 should be referred to prior to making any changes to this procedure to ensure the requirements of the SOER continue to be met.

2 REFERENCES

2.1 ADM-0096, Risk Management Program Implementation and On-Line Maintenance Risk Assessment

2.2 AOP-0004, Loss of Offsite Power

2.3 AOP-0027, Fuel Handling Mishaps

2.4 AOP-0050, Station Blackout

2.5 AOP-0051, Loss of Decay Heat Removal

2.6 GOP-0002, Power Decrease/Plant Shutdown

2.7 OSP-0034, Control of Obstructions for Primary Containment/Fuel Building Operability

2.8 OSP-0041, Alternate Decay Heat Removal

2.9 SOP-0003, Reactor Recirculation System

2.10 SOP-0031, Residual Heat Removal System operating procedure.

2.11 SOP-0091, Fuel Pool Cooling and Cleanup system operating procedure

2.12 SOP-0140, Suppression Pool Cleanup And Alternate Decay Heat Removal

2.13 EN-OU-108, Shutdown Safety Management Program (SSMP)

2.14 NUMARC 91-06, “Guidelines for Industry Actions to Assess Shutdown Management.”

2.15 INPO, INPO Outage Management Guidelines.

2.16 NSAC-175L, “Safety Assessment of BWR Risk During Operations (Grand Gulf).”

2.17 EPRI Draft Report, “BWR Generic Risk Management Guidelines.”

2.18 A-15693, There will be a Standing Team for Outage Risk Oversight during future refueling outages.

2.19 10 CFR 50.65, Requirements for monitoring the effectiveness of maintenance at nuclear power plants.

2.20 EN-DC-401, Configuration Risk Management Program.

2.21 G13.18.14.0*189 Time to Boil, Heat Up Rate, and Time to Top of Active Fuel Curves Accounting for Power Uprate

2.22 G13.18.12.3*171, Shutdown Safety Function Defense in Depth Color Codes

2.23 ER-2005-0168-009, RF13 Decay Heat Evaluations

2.24 NUREG – 0612 “Control of Heavy Loads at Nuclear Power Plants”

2.25 INPO SOER 09-1, Shutdown Safety

2.26 CR-RBS-2009-3895

2.27 SOER 94-1 Recommendation 3 Non-Conservative Decision Making

3 DEFINITIONS

3.1 **Available** - For purposes of risk determination, "A system, structure, or component along with its necessary auxiliary systems, controls, instrumentation, and power supplies is capable of performing its intended function and can be placed in service by immediate manual or automatic means." [SOER 09-1 Recommendation 4]

- A system does **not** need to be operable as defined in the Technical Specifications and other License Basis Documents to be considered available.
- Credit may be taken for reasonable actions both in the Control Room and in-plant. A reasonable action would include an operator closing a breaker outside of the control room. Actions with implementing times approaching the time to boil are not reasonable.
- Credit may also be taken for temporary modifications (e.g., power supplies), contingency plans, and line-ups, provided site approved guidance is available.
- Credited temporary power or temporary backup equipment will be installed and tested versus only staged to consider a component available.
- Systems drained and/or out of service for maintenance are not credited as being available.

3.2 **Color Codes** – Color codes are used to represent the relative risk associated with outage activities.

- **GREEN – High level of safety and defense in depth exist**.
- **YELLOW – Adequate level of safety and defense in depth exist**. **Acceptable Risk.**
- **ORANGE – Failure to meet adequate level of safety and defense in depth without specific contingency plans predefined and in place**
- **RED – Failure to meet both an adequate level of safety and defense in depth.**

3.3 **Containment Closure** - A containment condition where at least one integral barrier to the release of radioactive material is provided, within the specified limits using STP-057-3804.

3.4 **Decay Heat Level** – The heat generated as a result of fission product decay is designated as High, Medium and Low. The break points between these designations are determined by the ability of specified equipment to remove the heat generated. For this procedure the break point between High and Medium Decay Heat Levels occurs when SFC and RWCU together can remove the expected Decay Heat generation. The break point between Medium and Low is when RWCU alone can remove the expected Decay Heat. The ability of this equipment to remove the decay heat is based on the maximum temperature of the Reactor Water Closed Cooling System and the Maximum Reactor Coolant Temperature. These values are set prior to the outage to establish a time frame for removing equipment from service.

3.5 **Decay Heat Removal Capability** - The ability to maintain reactor coolant system temperature/pressure and spent fuel pool temperature below specified limits following:

3.5.1. Shutdown Cooling - decay heat removal within the RCS

3.5.2. Fuel Pool Cooling - decay heat removal within the upper and lower fuel pools

3.6 **Defense in Depth** - For the purpose of managing risk during shutdown, defense in depth is the concept of:

3.6.1. Providing systems, structures and components to ensure backup of key safety functions using redundant, alternate or diverse methods;

3.6.2. Planning and scheduling outage activities in a manner that optimizes safety system availability;

3.6.3. Providing administrative controls that support and/or supplement the above elements

3.6.4. Placing a high priority on equipment problems that require operator compensatory actions (workarounds) and periodic reviewing of equipment deficiencies to assess the cumulative or aggregate effects of degraded equipment on operator ability to respond effectively to plant transients is needed. Clearly communicating any required interim compensatory actions to operators, using appropriate discussions, training, and procedures. (SOER 94-1 Recommendation 3 Non-Conservative Decision Making)(Ref. 2.27)

3.7 **Defueled** - All fuel assemblies have been removed from the reactor vessel and placed in the spent fuel pool.

3.8 **High Risk Evolution** - Outage activities, plant configurations or conditions where the plant is more susceptible to an event causing the loss of a key safety functions.

3.9 **Inventory Control** - Measures established to ensure that irradiated fuel assemblies remain covered with coolant to maintain heat transfer and shielding requirements.

3.10 **Key Shutdown Function Areas** - (1) Shutdown Cooling (2) Inventory Control (3) AC Power (4) Fuel Pool Cooling (5) Containment Control (6) Fuel Building Ventilation and (7) Reactivity Control, (8) Fire.

3.11 **Operable** - The ability of a system to perform its specified function with all applicable technical specification requirements satisfied.

3.12 **Overall Risk** – The most conservative color-code assignment found in the Shutdown Safety Level and Shutdown EOOS Safety Index. This approach insures that both defense-in-depth and core damage risk are evaluated and the most conservative value is chosen.

3.13 **Protected Equipment/Systems** - Equipment that is being relied upon to ensure a Key Shutdown Function is maintained available.

3.14 **Reactivity Control** - Measures established both to preclude inadvertent criticalities, power excursions, or losses of shutdown margin, and to predict and monitor core behavior.

3.15 **Requirement or Required** - as used in this procedure are intended to mean available as defined in 3.1 above.

3.16 **Safety Significant Change** - Any change to the outage schedule that has a meaningful or notable impact on the required equipment, systems, or flowpaths.

3.16.1. A change in the outage schedule logic that alters the previously approved start or finish dates of a work activity associated with shutdown cooling, fuel pool cooling, electrical power distribution, RCS inventory control, containment control, fuel building ventilation, or reactivity control such that the activity now enters another key safety function system outage window.

3.16.2. A change in the outage schedule logic caused by emergent work that affects the planned defense-in-depth associated with shutdown cooling, fuel pool cooling, electrical power distribution, RCS inventory control, containment control, fuel building ventilation, or reactivity control, fire, or an actual reduction in the planned defense-in-depth for these functions.

3.16.3. A change in the outage schedule logic that alters the previously approved start or finish dates or identified method of filling or draining the RCS.

3.16.4. A change in the outage schedule logic that alters the previously approved start or finish dates or identified method to perform work activities that could significantly change dose rates in a work area.

3.16.5. Any change in the outage schedule logic that causes a color change for a key shutdown function area.

Shutdown EOOS Safety Index – A measure of the core damage risk based on Probabilistic Risk Assessment (PRA) due to equipment out of service (EOOS). A computer code provides this assessment which is represented by a color code and number. Only the color code is used for this procedure. Shutdown EOOS considers the Available (Definition 3.1) status of the equipment, rather then the Technical Specification Operability status. Ref. 3.17

3.17 **Shutdown Safety Level** - The relative degree to which risk is increased and defense-in-depth is maintained. This is represented by a color code. Defense-in-depth is measured by the degree of conformance with Technical Specifications in eight key shutdown function areas: (1) Shutdown Cooling (2) Inventory Control (3) AC Power (4) Fuel Pool Cooling (5) Containment Control (6) Fuel Building Ventilation and (7) Reactivity Control, (8) Fire.

3.18 **Time to Boil/Time to Mode Change (200°)** – For the Safety Assessment of this procedure, the term Time to Boil and Time to Mode Change are synonymous. The tables and curves in the CAVHEAT computer program and this procedure have been based on reaching a temperature of 200°F. At 200°F, a mode change occurs from Mode 4 to Mode 3, when all reactor vessel head bolts are fully tensioned. If this mode change occurs the assumptions of this procedure are no longer valid. When one or more reactor vessel head closure bolts are less than fully tensioned, the times from the curves will be conservative by 12°F, to account for local vs. bulk boiling potential. Information given out to the site should be expressed as "Time to 200°F."

3.19 **Heavy Load**: Any load which has a combined weight greater than 1200 pounds.

3.20 **Reduced Inventory**: Water level at or below the reactor vessel flange with head bolts detensioned and fuel in the reactor. (SOER 09-1, Recommendation 5)

4 PROCEDURE

4.1 IMPLEMENTATION

4.1.1. When assuming the shift, or for unscheduled outage conditions, the Operating Crew will perform and/or review the following:

- Operability of Shutdown Safety Equipment
- Availability of Shutdown EOOS Equipment
- Attachments 1 through 8, determine if any change has occurred.
- The scheduled work for that shift.
- Current plant and outage status.
- Run the Shutdown EOOS computer program for the current alignment and unavailable equipment.
- Determine the Overall Risk
- Communicate this information to the Site.

4.1.2. For Mid-Cycle Outages, the tables and curves are applicable when the Before Shuffle curves and values are used. This is conservative, since the Before Shuffle tables and curves are based on decay heat produced as a result of a full cycle of fission product production. If mid-Cycle Outage tables and curves become available, they may be used provided Attachment 11, Approval for Departure from the Requirements of the Shutdown Operations Protection Plan is completed and a cover letter indicating limitations for the use of the tables and curves is attached.

4.1.3. Protected Division is a condition where credit is being taken for certain equipment to be available and/or operable to fulfill the requirement of this procedure. This condition may exist during most of the outage or during work weeks due to safety function equipment being taken out of service or testing. OSP-0022, Operations General Administrative Guidelines contains instructions and an attachment used by the OSM/CRS to aid in determination of locations for and in the documentation of Protected Division sign placement. (SOER 09-1, Recommendations 6.a and 6.b)

4.1.4. Communications of the Overall Risk to the site should be done on a regular basis, and when a change of risk occurs. The information should include: Overall Risk, when divisions are protected, which shutdown cooling trains are available, time to mode change/boil, and the Color State the various Safety Functions. This communication can be through a combination of posters, television displays, Daily Outage Reports, and meeting plant status. Additional information may be appropriate during high-risk evolutions and when contingency plans are entered.

4.1.5. Key shutdown function equipment that has been removed from service, should be returned to service as soon as maintenance and/or testing is complete. WHEN the equipment is returned to service, THEN the availability and operability of the equipment should be restored as soon as practicable to restore defense in depth and reduce the impact on the rest of the outage.

4.1.6. Heavy load risk assessment should be considered for a train, or equipment under a load path of a Heavy lift (> 1200 pounds) that is protected (e.g., it is performing the safety function and its redundant counterpart is out of service for maintenance, and the risk management action includes protecting this function). Support equipment for the protected equipment should also be considered. The following actions should be considered:

1. Revising the load path to preclude movement over the operating train, or conducting the heavy load lift at a different time, e.g., after redundant equipment has been restored to service

2. Provide additional compensatory actions of backup safety functions to enhance redundancy of safety function performance during the heavy load lift

3. Provide additional communication and awareness to the operations and maintenance personnel of the load lift and its relation to maintenance activities

4. Obtaining approval of plant management of the heavy load lift

4.1.7. The Outage Manager has the responsibility to monitor scheduled activities with respect to changes to the original scheduled sequence, and to approve any significant variations. Any changes which deviate from the guidelines in Sections 4.2 through 4.8, require the completion of Attachment 11, Approval for Departure from the Requirements of the Shutdown Operations Protection Plan. Where a change impacts a note in the Function Color State tables, Attachment 11 will be used to document the calculations and data needed for approval. For any Contingency Plans put into effect during an Orange Condition, Attachment 11 will be used to document and retain the contingency plan. This Attachment may not be used to allow deviation from Technical Specifications.

4.1.8. A multi-discipline team (Outage Risk Assessment Team – ORAT) will be formed prior to any refueling outage to review outage safety. This team remains intact through the end of the outage for the review of changes to the schedule logic. The team will use a blended approach, which employs EOOS, transition flow, and major evolutions during the outage. (Commitment A-15893)(SOER 09-1, Recommendation 4)

1. The Outage Shift Managers are part of the ORAT and participate in ORAT Pre-Outage and Outage meetings. Outage risk is assessed by this team related to the Outage schedule and focuses on release and closure of outage and system windows, and key shutdown safety functions. (SOER 09-1, Recommendation 3)

4.2 SHUTDOWN COOLING GUIDELINES

4.2.1. The Emergency Diesel Generator associated with the operable Residual Heat Removal System shall remain operable.

4.2.2. WHEN credit is taken for an alternate means of decay heat removal (e.g., RWCU or SFC), THEN one Residual Heat Removal System should normally be available as a backup.

4.2.3. Activities on the Decay Heat Removal equipment should be scheduled in detail.

4.2.4. Residual Heat Removal system outage durations should be minimized.

C 4.2.5. During shutdown operations with time to 200°F less than two hours per the CAVHEAT computer program, this procedure, or any updated curves if provided by Engineering, one or more of the following methods of core circulation is REQUIRED:

- one operating reactor recirc pump,
- one operating RHR shutdown cooling loop, or
- the SPC system operating in the ADHR mode

C 4.2.6. STP-050-0700, RCS Pressure/ Temperature Limits Verification, is required to be performed when changing decay heat removal modes or systems, and when there is an inadvertent or intentional loss of decay heat removal.

4.2.7. During periods of medium or high decay heat and greater than 23 ft. of water above the RPV flange with only one RHR Shutdown Cooling loop in operation, an alternate decay heat removal system is maintained available to be placed in service within one hour. (Reference Tech Spec. 3.9.8 Action A)

4.2.8. Flooded up condition requires greater than 23 ft in the Reactor Cavity and the Cavity Gate open.

4.3 INVENTORY CONTROL GUIDELINES

4.3.1. The Emergency Diesel Generator associated with one operable Emergency Core Cooling system shall remain operable.

4.3.2. Emergency Core Cooling system outage should be minimized.

4.3.3. Activities on the Emergency Core Cooling systems should be scheduled in detail.

4.3.4. Work activities shall not be allowed on the operable Emergency Core Cooling Systems.

4.3.5. The duration at which reduced inventory evolutions are performed shall be minimized. The time of operation at reduced inventory shall be minimized and maintenance work performed while in this mode shall be carefully reviewed, controlled, monitored, and optimized. If delays occur, the problem shall be expeditiously managed by the organization with an appropriate level of urgency. If maintenance work is performed during this time, understand the basis for the scheduling and assess if another time during the outage, with lower decay heat, would have been more appropriate. First time evolutions affecting the RCS or protected trains of shutdown cooling should be rescheduled prior to or following reduced inventory operations. (SOER 09-1, Recommendation 5)

4.3.6. Reduced inventory evolutions shall be executed per EN-OP-116, Infrequently Performed Tests or Evolutions.

4.4 **ELECTRICAL POWER DISTRIBUTION** (SOER 09-1, Recommendation 2)

4.4.1. Two offsite sources of power shall be maintained available during high risk evolutions (i.e. RPV pressure test).

4.4.2. Work shall not be allowed at the Fancy Point Switchyard until a contingency plan has been established for electrical power distribution during periods of orange conditions.

4.4.3. At least one Diesel Generator shall be maintained operable and associated with one available Emergency Core Cooling System, the available shutdown Cooling System and the Fuel Pool Cooling system.

4.4.4. Offsite power sources should be clearly identified on the refueling outage schedule.

4.4.5. Refueling outages should be divisional. This means the major work of an outage will be concentrated on one division only, while the other division remains operable.

4.4.6. A coordinator should be assigned to specifically plan the divisional bus outages and help identify temporary power requirements.

4.5 **REACTIVITY CONTROL**

4.5.1. Standby Liquid Control System outages should be minimized.

4.5.2. To ensure adequate neutron instrument response (e.g. coupling) at least two fuel bundles should be maintained around each required operable detector string. For the purpose of criticality monitoring only the Source Range Monitors are required to be coupled.

4.5.3. Detailed shutdown margin assessments should be obtained to ensure adequate shutdown margins exists, assuming control rod withdrawal errors, fuel load errors and mis-orientation errors.

4.5.4. Rod movement should <u>not</u> be allowed in a cell loaded with fuel once core loading has commenced, until after core verification.

4.5.5. Fuel loading shall only be allowed into fuel cells where the control rod is fully inserted.

4.6 CONTAINMENT CLOSURE

4.6.1. Operations maintains a list of breaches to Primary Containment per OSP-0034, Control of Obstructions for Primary Containment/Fuel Building Operability.

4.6.2. Specific individuals are assigned responsibility for closure of the containment equipment hatch, the 113' airlock, the 171' airlock, and the CRD hatch per OSP-0034, should the action be initiated by the Shift Manager or Outage Manager.

4.6.3. A timed validation for closure of the containment equipment hatch, 113' airlock, 171' airlock, and CRD hatch (if opened for the outage) will be performed and documented in the MCR logbook each refuel outage.

4.7 FUEL POOL COOLING

4.7.1. Work in the Fuel Pool Cooling System should be done non-outage if possible. <u>IF</u> work is required on the Fuel Pool Cooling System during the outage, <u>THEN</u> it should be done as early as possible in the outage and <u>not</u> after fuel offload (when the heat load is the highest). <u>IF</u> work is required after fuel offload, <u>THEN</u> a contingency plan shall be in place prior to removing the system from service.

4.8 FIRE

4.8.1. The Fire Protection System is operable per Tech Specs.

4.8.2. Fire Brigade requirements of ADM-0022, Conduct of Operations are satisfied.

4.8.3. All personnel, including contractors, are trained in the proper fire notification procedures.

4.8.4. A fire is a higher risk when Division I equipment is out of service. This is due to Division I being the protected division for a fire in the main control room. The high risk condition applies only to a fire in the Main Control Room.

4.8.5. With Division I in an outage, a fire in the Division 2 equipment could remove the plant's ability to operate a single division from the remote Shutdown Panel.

5 CONTINGENCY PLANS

Contingency Plans should be developed for situations where the systems availability drops below the planned defense-in-depth (i.e. Condition Orange) and should be available when entering the higher risk evolution for which they were developed. The personnel required to implement the contingency plan should be identified and familiar with the plan.

5.1 DECAY HEAT REMOVAL

5.1.1. Reactor Coolant System Decay Heat Removal

Reactor Coolant System Decay Heat Removal contingencies are covered in AOP-0051, Loss of Decay Heat Removal. This procedure references SOP-0031, Residual Heat Removal System operating procedure which contains guidance for shutdown cooling operations and OSP-0041, Alternate Decay Heat Removal if the required cooling is not available. The operators are aware at all times which systems are available to provide Reactor Coolant System Decay Heat Removal to meet Technical Specification Requirements.

5.1.2. Containment Pool Cooling

Containment Pool Cooling contingencies are covered in AOP-0051, Loss of Decay Heat Removal. This procedure references SOP-0091, Fuel Pool Cooling and Cleanup System as the primary method for cooling. SOP-0031, Residual Heat Removal System operating procedure is also referenced as a backup method when operated in the Fuel Pool Cooling assist mode.

5.1.3. Spent Fuel Pool Cooling

Spent Fuel Pool Cooling contingencies are covered in AOP-0051, Loss of Decay Heat Removal. This procedure also contains procedural guidance for providing backup cooling to SFC heat exchangers in the event of a loss of service water/standby service water.

5.2 Reactor Coolant System Inventory Makeup

5.2.1. Reactor coolant system inventory control contingencies are covered in different locations. The order in which procedures are implemented depends on plant activities. Initial guidance is provided by AOP-0027, Fuel Handling Mishaps. Emergency makeup sources are identified in this procedure. Routine level control for the upper pool or reactor are controlled using SOP-0091, Fuel Pool Cooling and Cleanup, SOP-0031, Residual Heat Removal, or FHP-0001, Control of Fuel Handling and Refueling Operations.

5.3 **Electrical Power Distribution**

5.3.1. Electrical Power contingencies are provided in AOP-0004, Loss of Offsite Power (including the procedure for backfeeding to the Normal Station Service transformers) and AOP-0050, Station Blackout. Specific guidance for loss of electrical power to Spent Fuel Pool cooling pump is contained in AOP-0051, Loss of Decay Heat Removal.

5.3.2. OSP-0048, Switchyard, Transformer Yard and Sensitive Equipment Controls provides controls to assure the availability of offsite power. This policy defines sensitive equipment and established controls for switchyard activities.

5.4 **Reactivity Control**

5.4.1. AOP-0027, Fuel Handling Mishaps directs the operators to scram the reactor if an inadvertent criticality should occur during fuel handling operations. In addition, reactor coolant temperature is monitored by STP-000-0005, Daily Refueling Logs and ARP-P680-3A-E08, Reactor Water Low Temperature. Reactor Engineering is notified if temperature falls below 70°F (above the minimum analyzed temperatures).

5.5 **Containment Closure**

5.5.1. Containment closure contingencies are covered in OSP-0034, Control of Obstructions for Primary Containment/Fuel Building Operability. This procedure provides controls for containment penetrations and guidance for rapid closure should the need to set containment integrity occur.

5.6 **Fire**

5.6.1. Communicate high risk evolution at the daily meeting. Do not allow potential fire hazards to occur in or around Division II equipment. Hang “PROTECTED DIVISION” signs as necessary.

6 RECORDS

6.1 WHEN Attachment 11, Approval for Departure from the Requirements of the Shutdown Operations Protection Plan, is completed, THEN it should be kept in the Control Room for seven days. The completed forms for the duration of the outage are kept in the Ops area for two years for possible retrieval for various agency inspections.

SHUTDOWN COOLING FUNCTION COLOR STATES

REFERENCE: G13.18.12.3*171, Shutdown Safety Function Defense-in-Depth Color Codes and EC-17202

Shutdown Cooling Systems Available	Hi DH/ Not FL	Med DH/ Not FL	Low DH/ Not FL	Hi DH/ Flooded Up	Med DH/ Flooded	Low DH/ Flooded	Med DH & Hydro	Low DH & Hydro
RHR A	Red	Red	Red	Yellow (TS)	Yellow (TS)	Green (TS)	N/A	N/A
RHR B	Red	Red	Red	Yellow (TS)	Yellow (TS)	Green (TS)	N/A	N/A
ADHR	Red	Red	Red	Orange	Orange	Orange	N/A	N/A
RWCU/SFC	N/A	N/A	N/A	N/A	Orange	N/A	N/A	N/A
RWCU	N/A	N/A	Red	N/A	N/A	Orange	Red NOTE 1	Yellow (TS)
SFC	N/A	N/A	N/A	N/A	Orange NOTE 2	Orange	N/A	N/A
RHR A&B	Yellow (TS)	Yellow (TS)	Green (TS)	Green	Green	Green	N/A	N/A
RHR+ADHR	Orange	Orange	Yellow	Green	Green	Green	N/A	N/A
RHR+RWCU/ SFC	N/A	N/A	N/A	N/A	Green	N/A	N/A	N/A
RHR A&B +RWCU	N/A	N/A	Green	N/A	N/A	Green	Yellow NOTES 6, 7	Green
RHR A or B + RWCU	N/A	N/A	Yellow	N/A	N/A	Green	Red	Red
RHR+SFC	N/A	N/A	N/A	N/A	Green NOTE 3	Green	N/A	N/A
ADHR+RWCU/ SFC	N/A	N/A	N/A	N/A	Yellow	N/A	N/A	N/A
ADHR+RWCU	N/A	N/A	Yellow	N/A	N/A	Green	N/A	N/A
ADHR+SFC	N/A	N/A	N/A	N/A	Yellow NOTE 4	Green	N/A	N/A
RWCU+SFC	N/A	N/A	N/A	N/A	N/A	Green	N/A	N/A
2RHR+ADHR	Green	Green	Green	Green	Green	Green	N/A	N/A

Note 1: RWCU can<u>not</u> remove all of the decay heat produced when the decay heat level is Medium. A contingency plan to use another source to provide shutdown cooling (such as Condensate or MSL flooding) must be credited to be considered ORANGE in this condition.

Note 2: This may be ORANGE if calculations show that SFC alone is capable of removing all decay heat. Otherwise SFC must be used in conjunction with RWCU.

Note 3: This may be GREEN if calculations show that SFC alone is capable of removing all decay heat. Otherwise SFC must be used in conjunction with RHR.

Note 4: This may be YELLOW if calculations show that SFC alone is capable of removing all decay heat. Otherwise SFC must be used in conjunction with ADHR.

SHUTDOWN COOLING FUNCTION COLOR STATES

Note 5: Flooded-up Condition requires that the cavity gate be open. This may be Yellow if calculations show that SFC alone is capable of removing all decay heat. Otherwise SFC must be used in conjunction with ADHR.

Note 6: Both RHR trains required.

Note 7: Considered a High Risk Evolution since RHR is not actually in service during the vessel pressure test and RWCU is not capable of removing sufficient decay heat to maintain stable temperature conditions at Medium Decay Heat conditions.

At least one of the indicated systems is incapable of removing that level of decay heat. Therefore this combination of systems cannot fill the Shutdown Cooling requirements.

INVENTORY CONTROL FUNCTION COLOR STATES

Plant Conditions ____________________ Number of Inventory Control Systems Available	RPV level < 23' above RPV Flange	RPV level > 23' above RPV Flange	RPV level < 23' and OPDRV	RPV level > 23' and OPDRC
0 ECCS Trains	Red	Red	Red	Red
1 ECCS Train	Red	Yellow	Red	Orange
2 ECCS Trains	Yellow (TS)	Green	Orange (TS)	Yellow
3 or more ECCS Trains	Green	Green	Yellow	Yellow

AC POWER CONTROL FUNCTION COLOR STATES

AC Power Control Available	0 Offsite power circuits	1 Offsite power circuit	2 Offsite power circuits
No Diesels	Red	Red	Red
Div. I Diesel (Div III req'd*)	Red	Red	Yellow (TS)
Div. I Diesel (Div III not req'd)	Red	Yellow (TS)	Green
Div. II Diesel (Div III req'd*)	Red	Red	Yellow (TS)
Div. II Diesel (Div III not req'd)	Red	Yellow (TS)	Green
Div. III Diesel*	Red	Red	Red
Div. I and II Diesels	Red	Green	Green
Div. I and III DGs (Div III req'd*)	Red	Yellow (TS)	Green
Div. I and III DGs (Div III not req'd)	Red	Green	Green
Div. II and III DGs (Div III req'd*)	Red	Yellow (TS)	Green
Div. II and III DGs (Div III not req'd)	Red	Green	Green
All 3 Diesels*	Red	Green	Green

*The Div III DG is required whenever HPCS <u>OR</u> Standby Service Water System pump SWP-P2C is required to be OPERABLE.

FUEL POOL COOLING FUNCTION COLOR STATES

Fuel Pool Cooling Available	0 SFC Heat Exchangers	1 SFC Heat Exchangers	2 SFC Heat Exchangers
No SFC Pumps	Red	Red	Red
1 SFC Pumps	Red	Orange*	Orange*
2 SFC Pumps	Red	Yellow	Green

* The colors in this table are relevant to “hot fuel” discharged to the lower pool. During a refuel outage the fuel that is discharged to the spent fuel is “hot” Hot simply means that the fuel has been in the reactor for a cycle and the decay heat associated with it is relatively high compared to the fuel already in the pool. “Hot fuel” is <u>not</u> to be confused with “recently irradiated fuel”. Recently irradiated fuel is defined in the technical specifications. The Orange conditions in this table apply to hot fuel. If the fuel is <u>not</u> hot, which would be the case if the plant is shutdown but no fuel is unloaded, the color would be Yellow instead. None of the other colors in the table are impacted by the “hot fuel” condition.

CONTAINMENT CONTROL FUNCTION COLOR STATES

Plant Status Containment Status	Normal	OPDRV	Fuel Handling (non-recently irradiated	Fuel Handling (recently irradiated)	OPDRV and Fuel Handling (non recently irradiated)	OPDRV and Fuel Handling (recently irradiated
Containment Open	Yellow (TS) (NOTE 1)	Red (NOTE 2)	Yellow(TS)	Red	Red (NOTE 2)	Red
Containment Closed	Green	Yellow (TS)	Green	Yellow (TS)	Orange	Orange

NOTE 1: Green if reactor cavity flooded (>23 feet)

NOTE 2: Orange if reactor cavity flooded (>23 feet) and time to drain to the top of flange is greater than 24 hours.

FUEL BUILDING VENTILATION FUNCTION COLOR STATES

Plant Status Number of Fuel Building Ventilation Trains Available	Movement of Recently irradiated Fuel in the Fuel Building	Movement of Non-Recently Irradiated Fuel in the Fuel Building
0 HVF Trains	Red	Orange
1 HVF Train	Orange	Yellow
2 HVF Trains	Yellow (TS)	Green

* These color codes pertain only to the movement of recently irradiated fuel in the Fuel Building. The color codes are meant to represent TS 3.6.4.7 where “recently irradiated fuel” is defined as “fuel that occupied part of a critical reactor core within the previous 24 hours.” If the fuel being moved in the Fuel Building is not recently irradiated fuel or no fuel is being handled in the Fuel Building, the color codes are relaxed as indicated in the 3rd column.

REACTIVITY CONTROL FUNCTION COLOR STATES

Plant Status ______________________ Reactivity Control Available	Mode 4 and 5 (Note 1)
All Rods In	Green
One Rod Withdrawn	Yellow (TS)
More than one Rod Withdrawn	Red

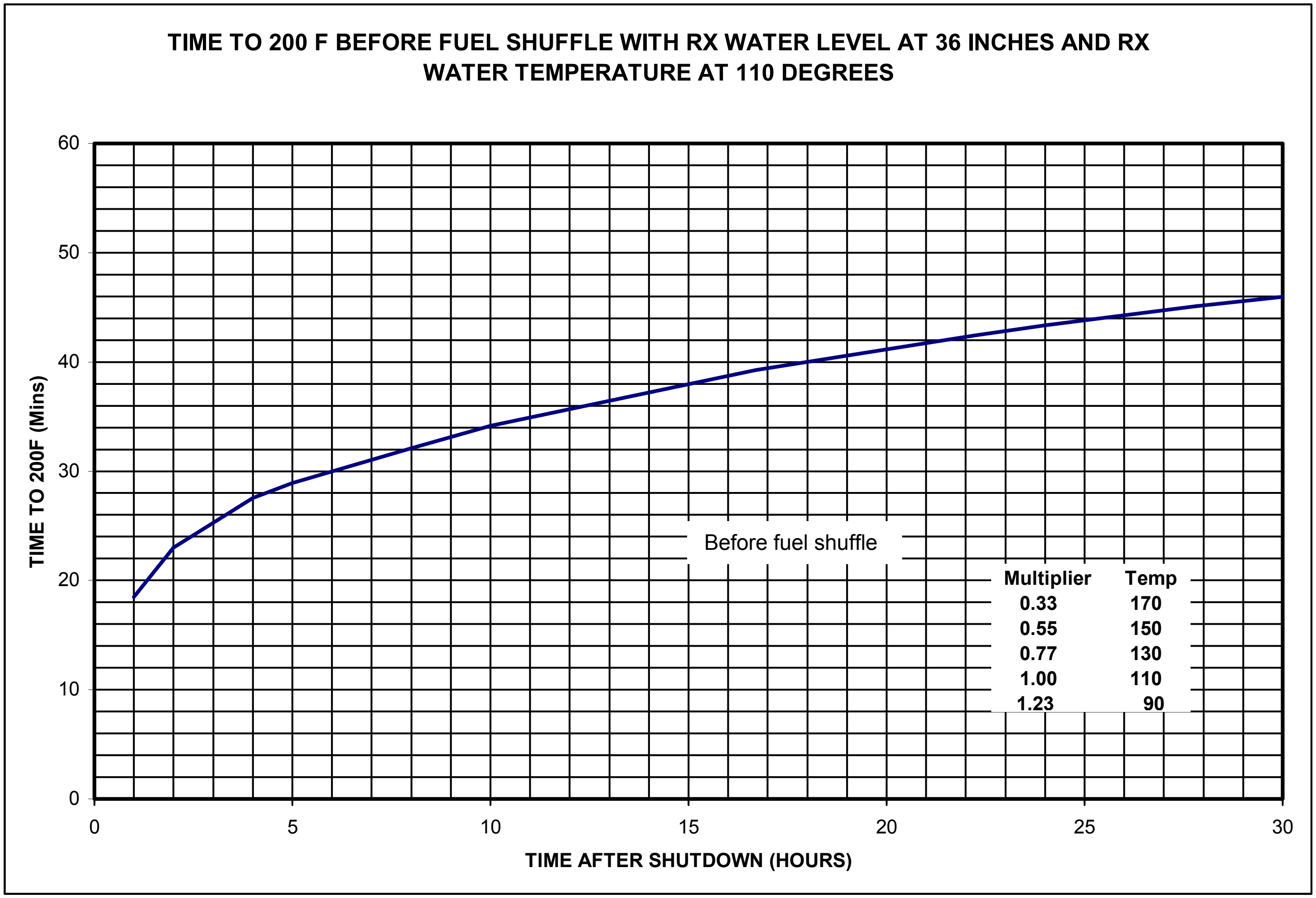
Note 1

For Mode 5, the number of rods withdrawn does not count those rods with all the fuel assemblies removed.

FIRE FUNCTION COLOR STATES

Plant Conditions	Work Requiring Hot Work Permit in Main Control Room	Work Requiring Hot Work Permit in Division I Equipment Areas	Work Requiring Hot Work Permit in Division II Equipment Areas
3 Fire Pumps Operable	Yellow	Green	Green
2 Fire Pumps Operable	Yellow (TS)	Yellow (TS)	Yellow (TS)
1 Fire Pump Operable	Orange (TS)	Orange (TS)	Orange (TS)
0 Fire Pumps Operable	Red	Red	Red
Division I Equipment (ECCS) Out-of Service	Orange	Green	Orange
Division II Equipment (ECCS) Out-of Service	Yellow	Orange	Green

THERMAL HYDRAULIC CURVES



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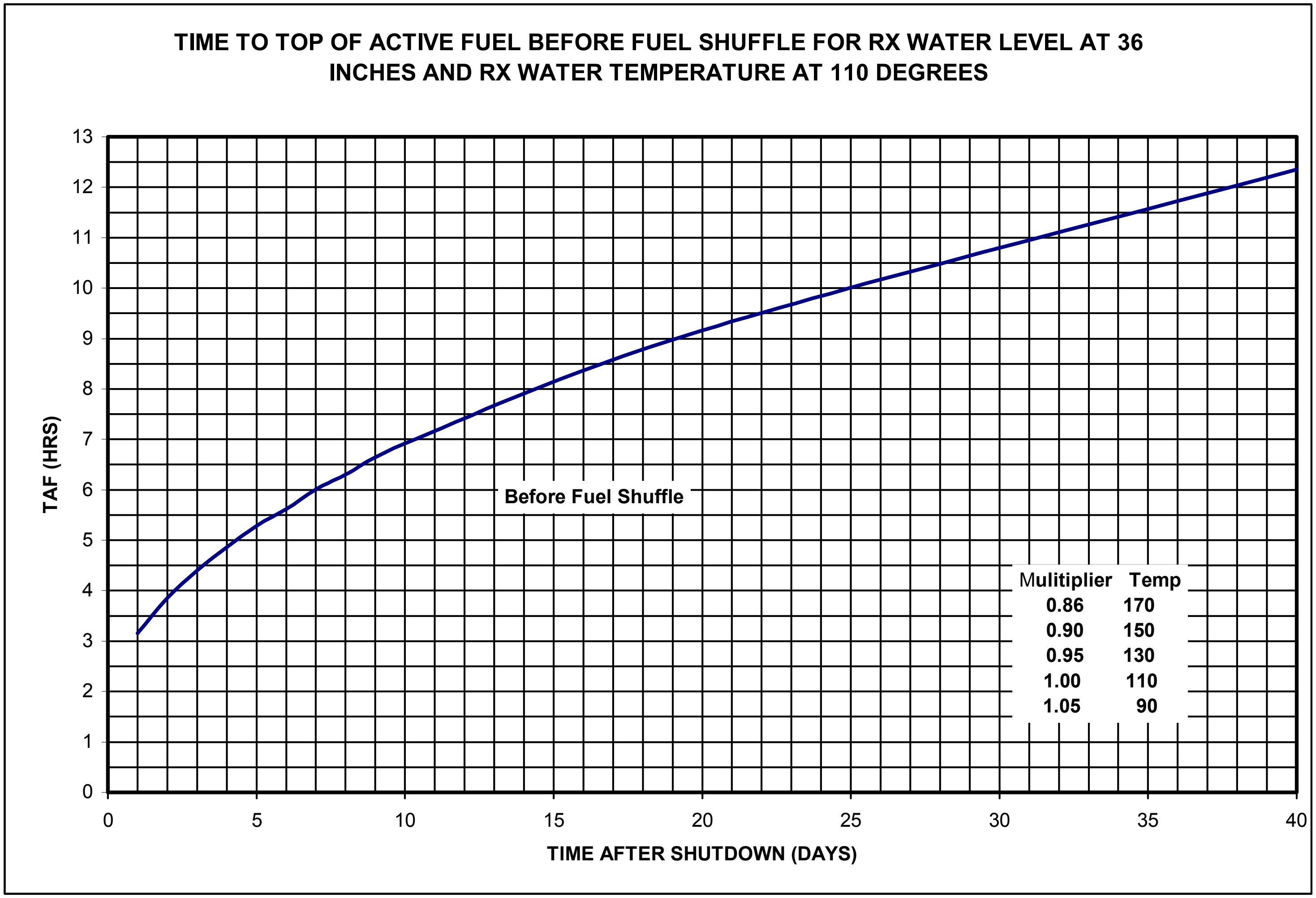

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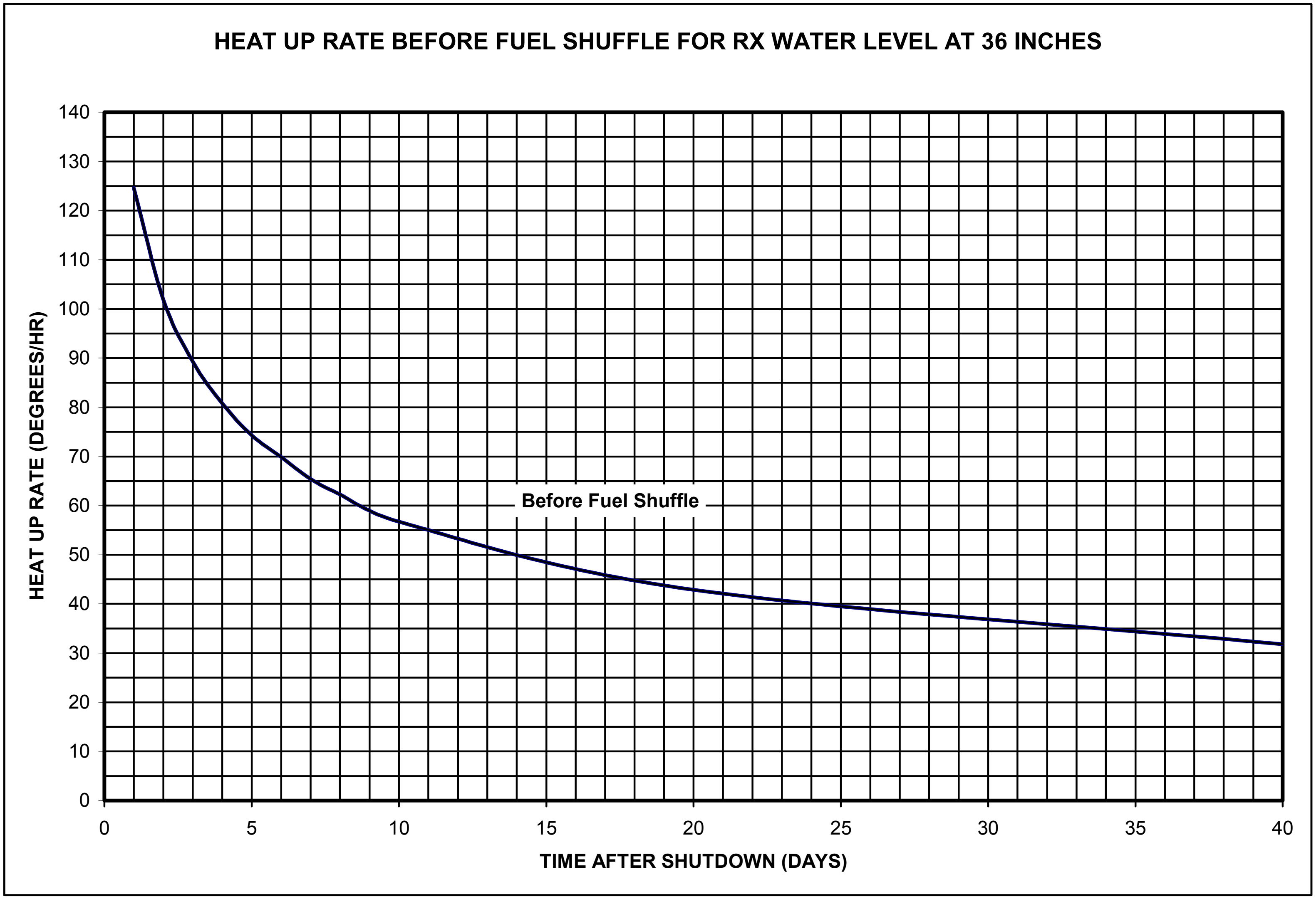

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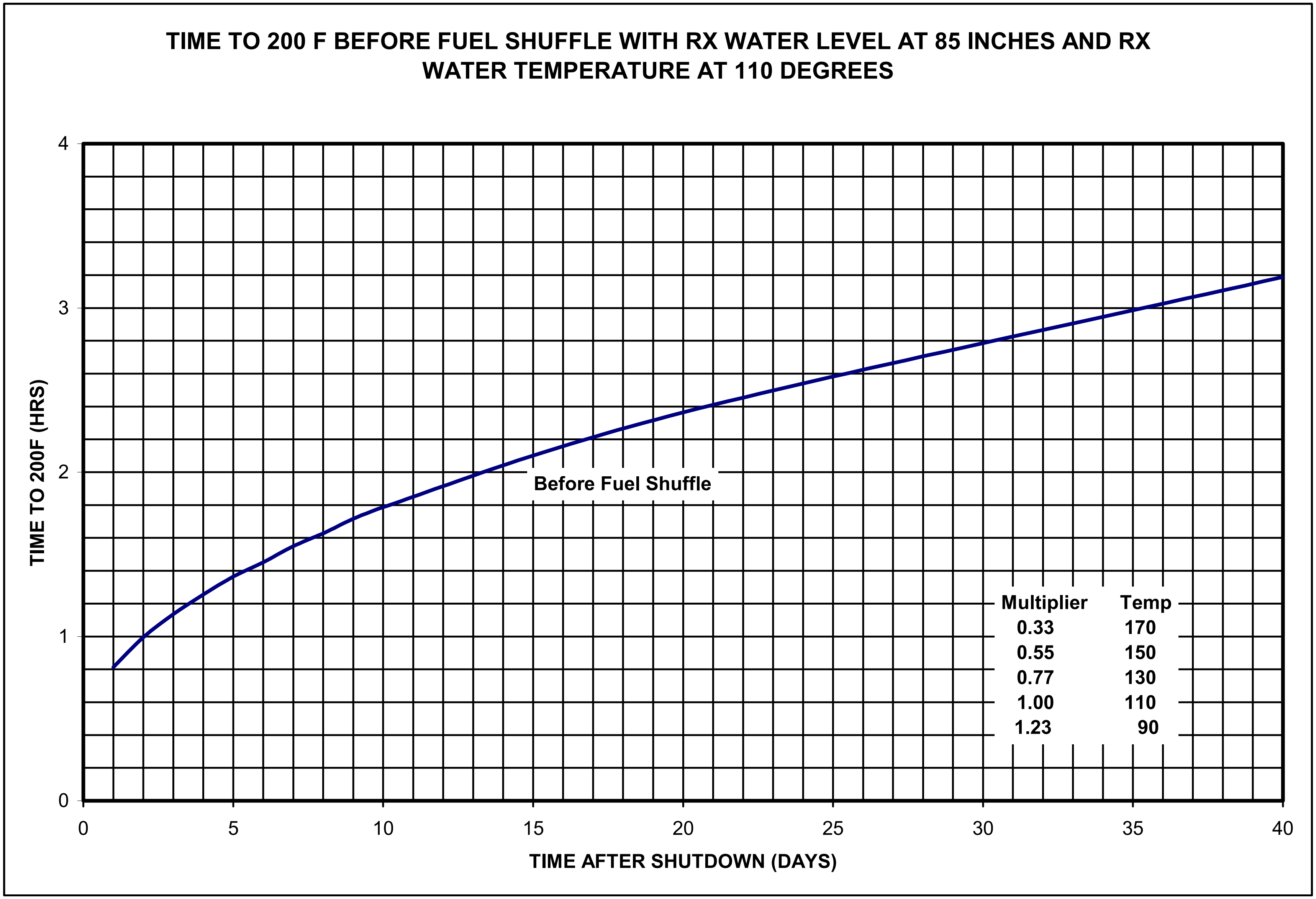

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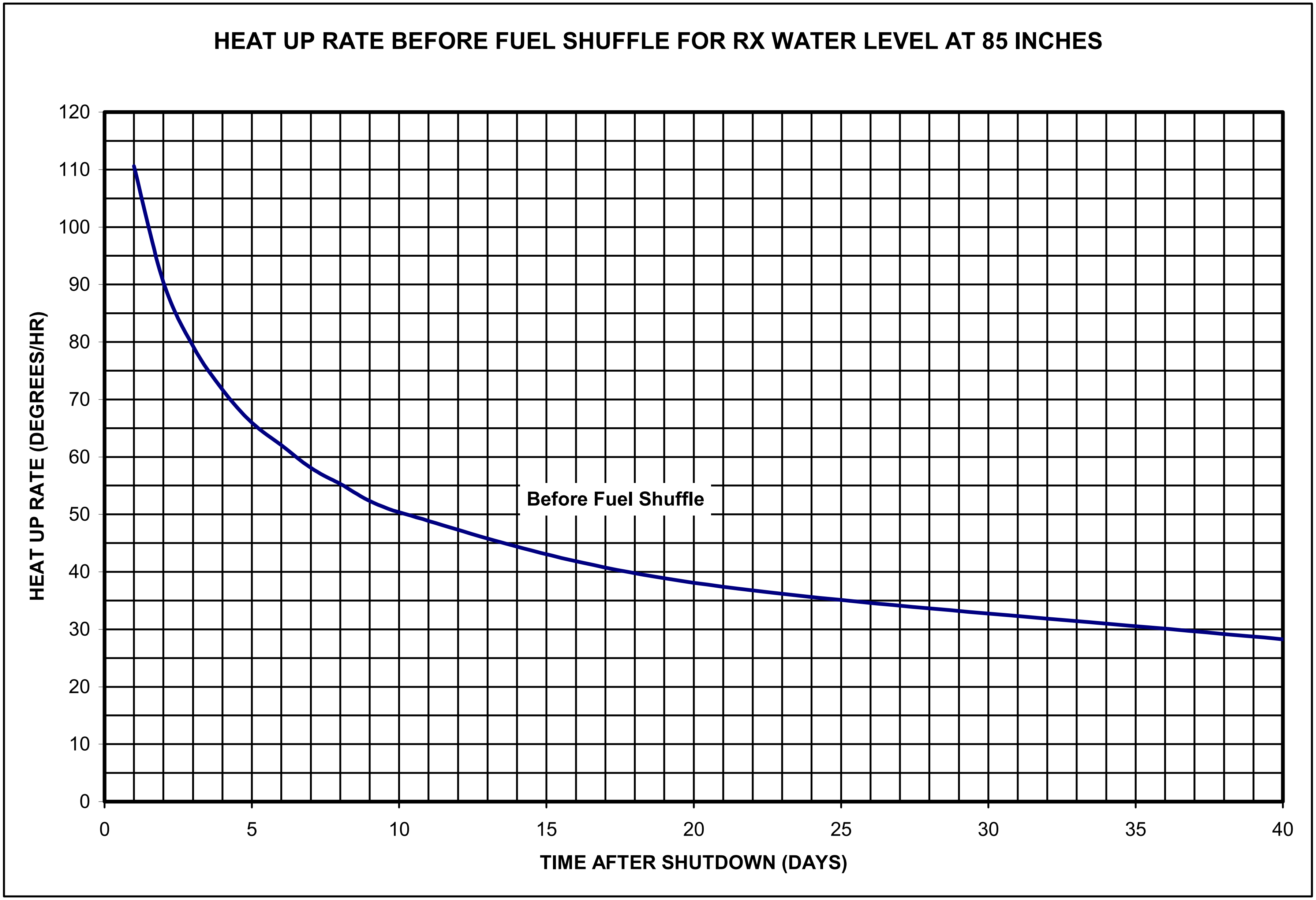

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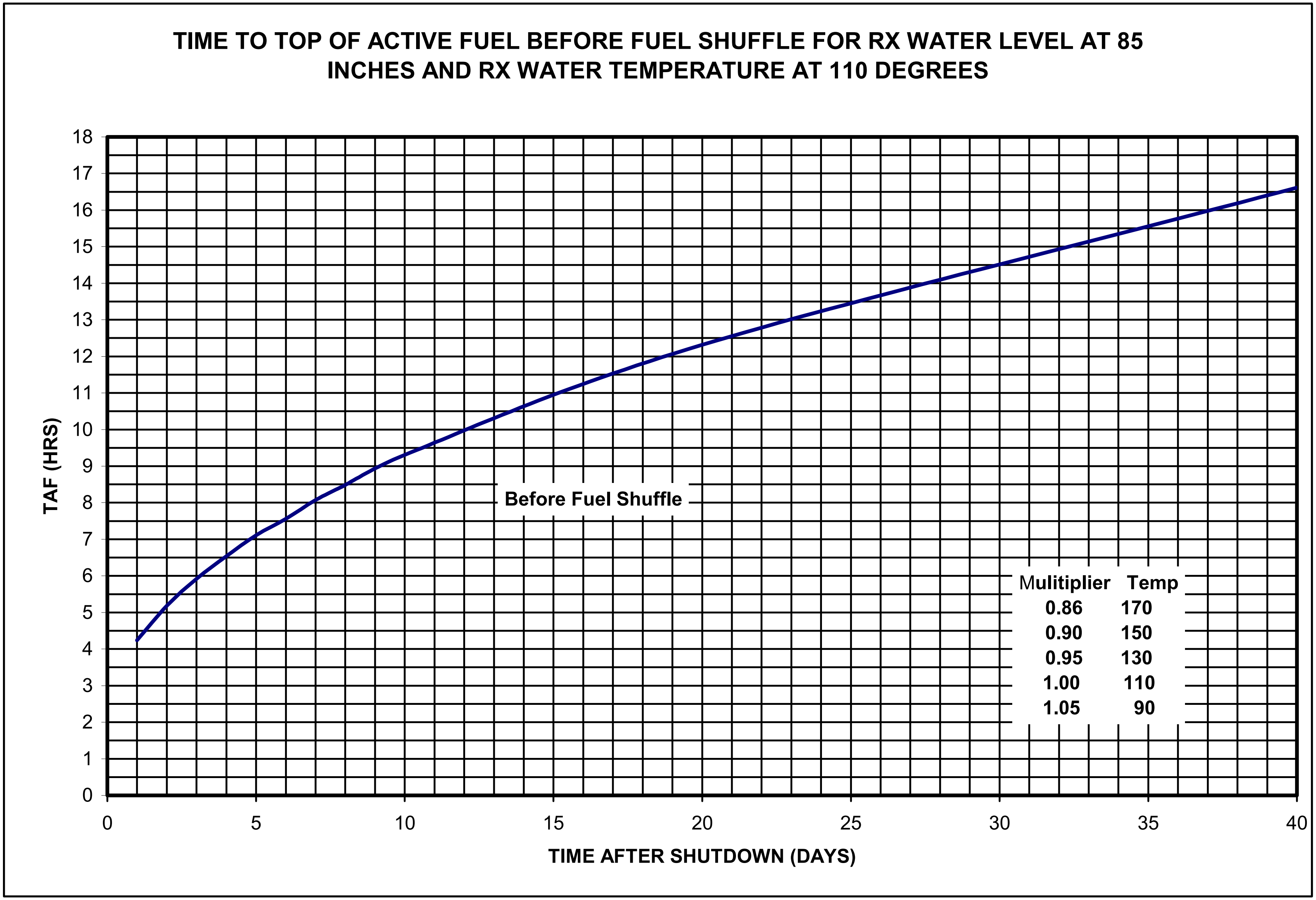

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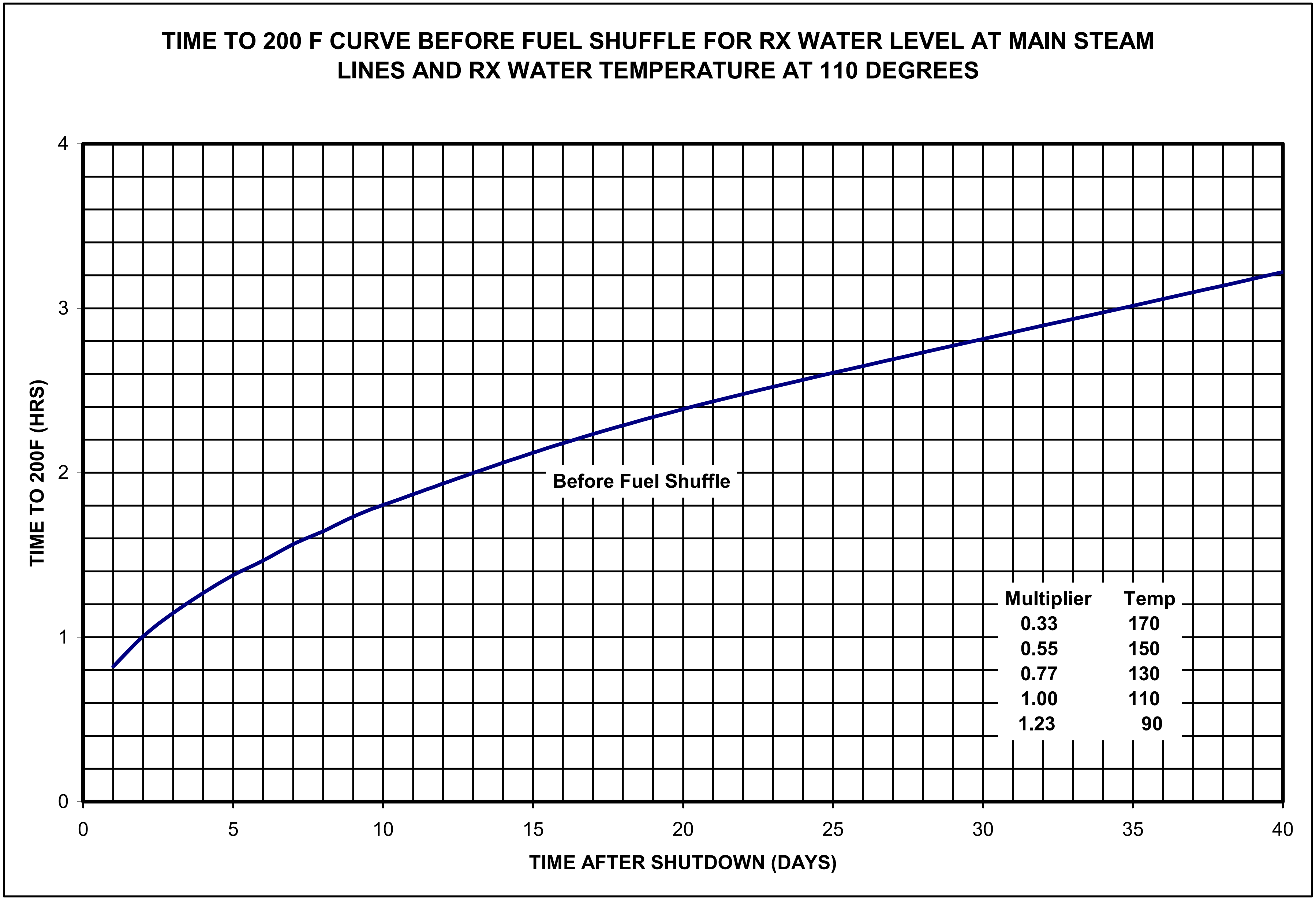

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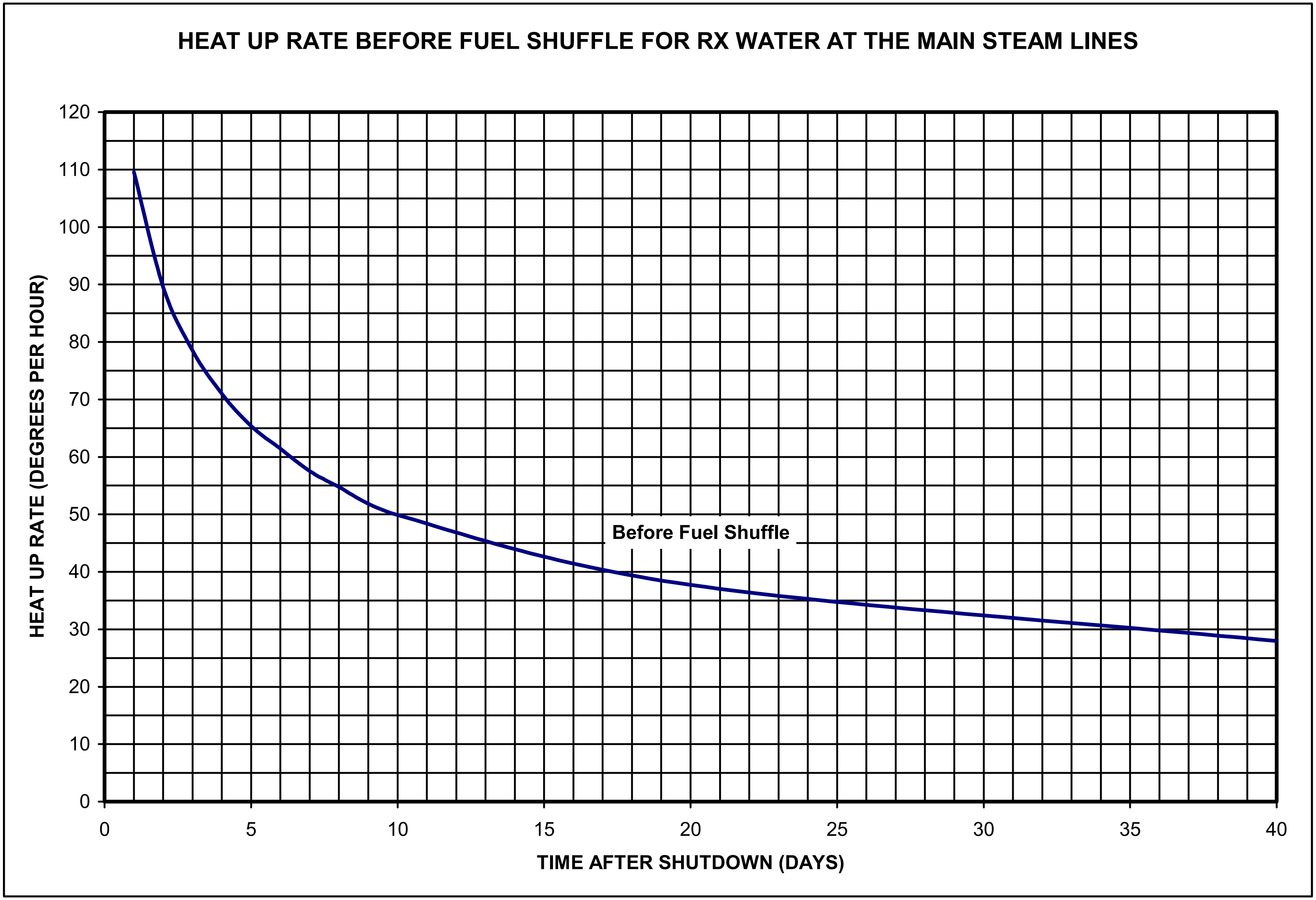

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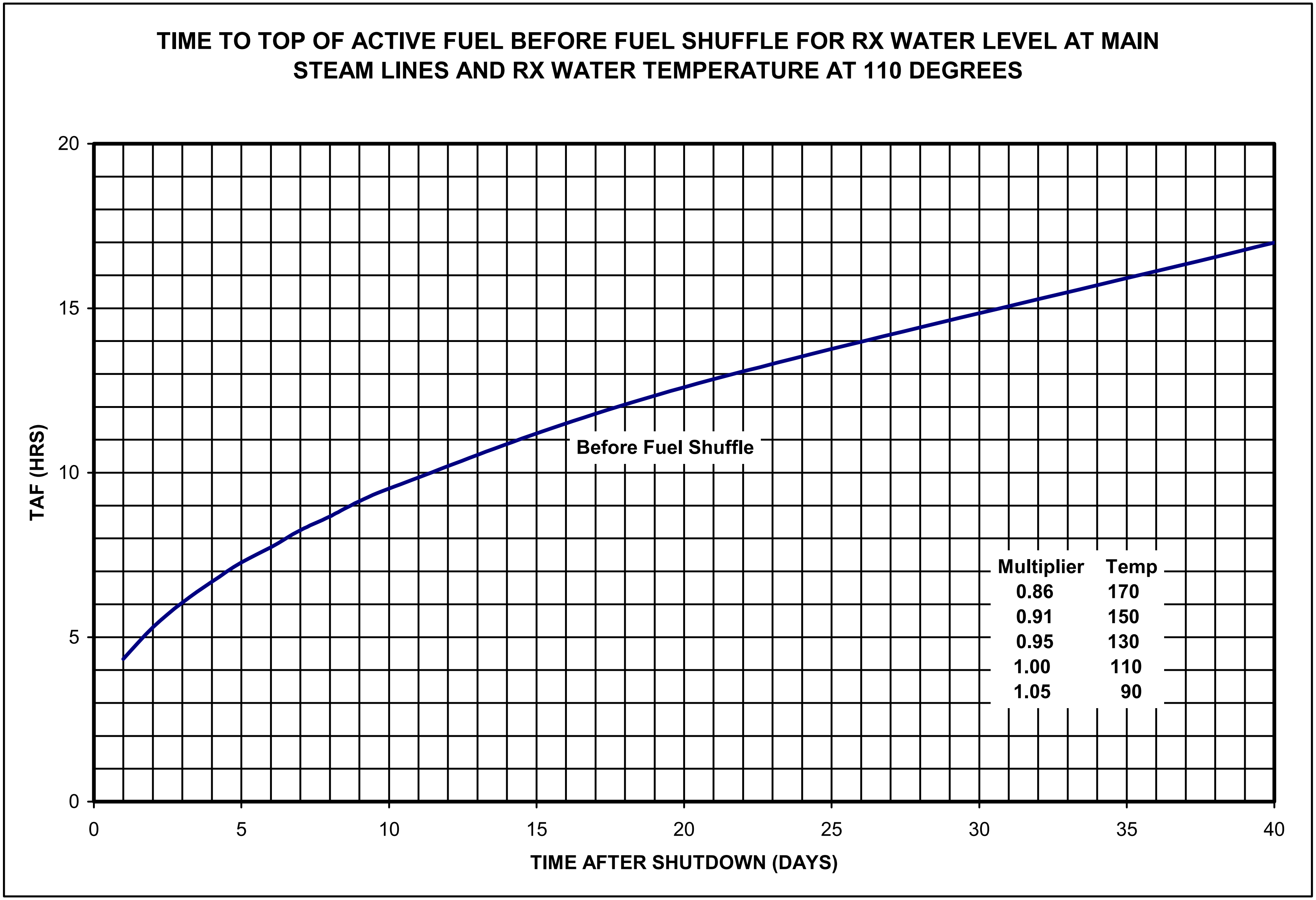

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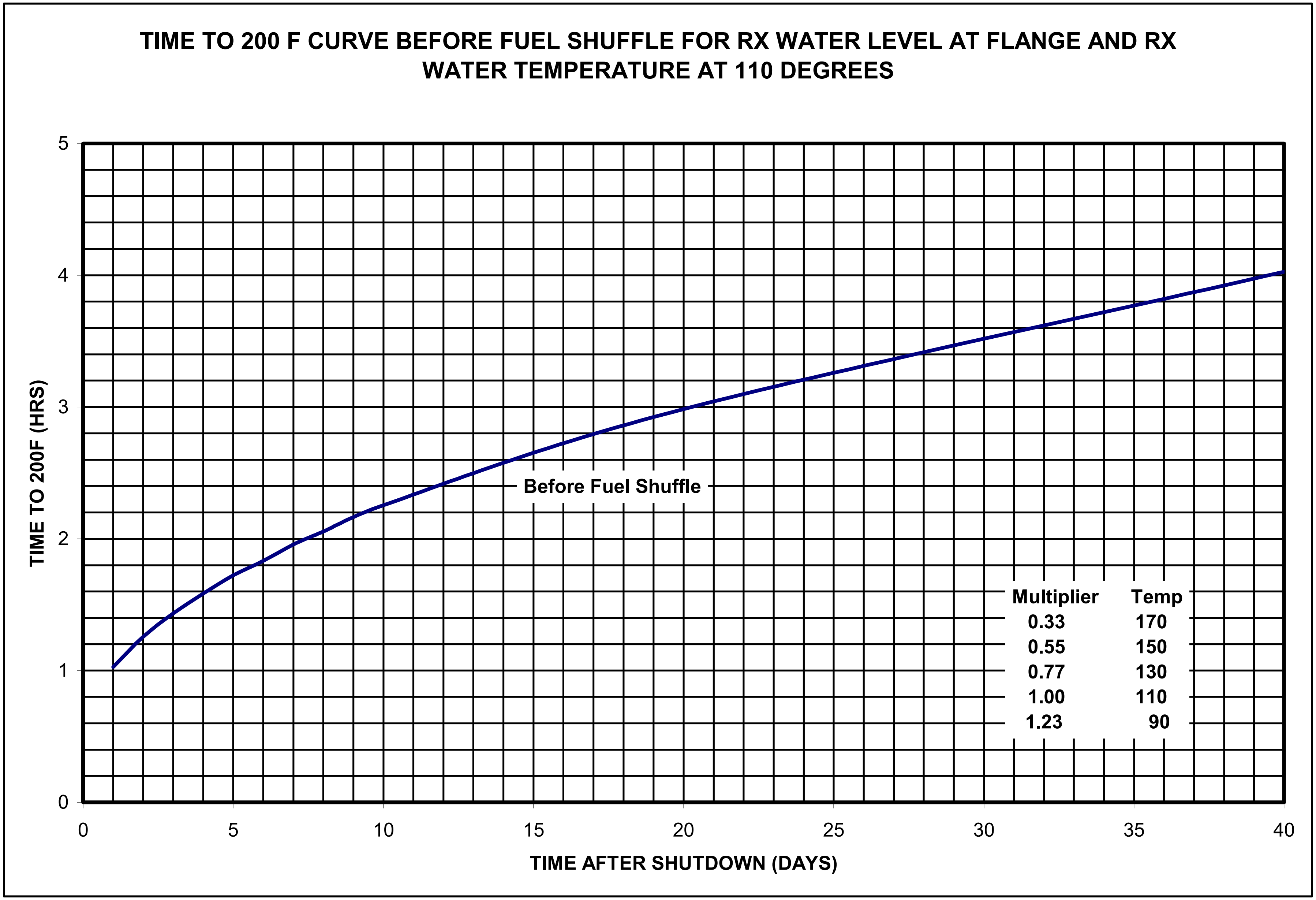

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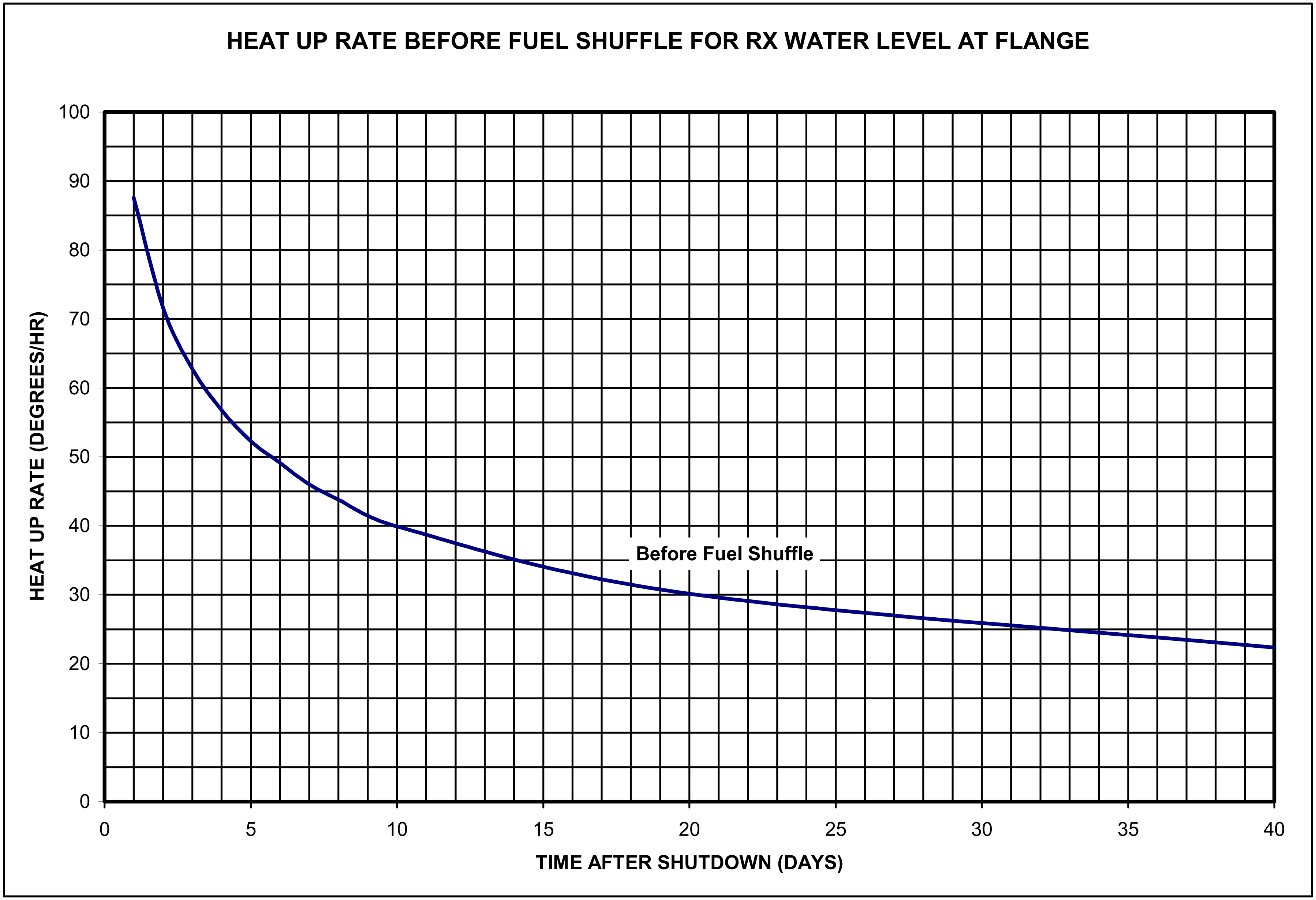

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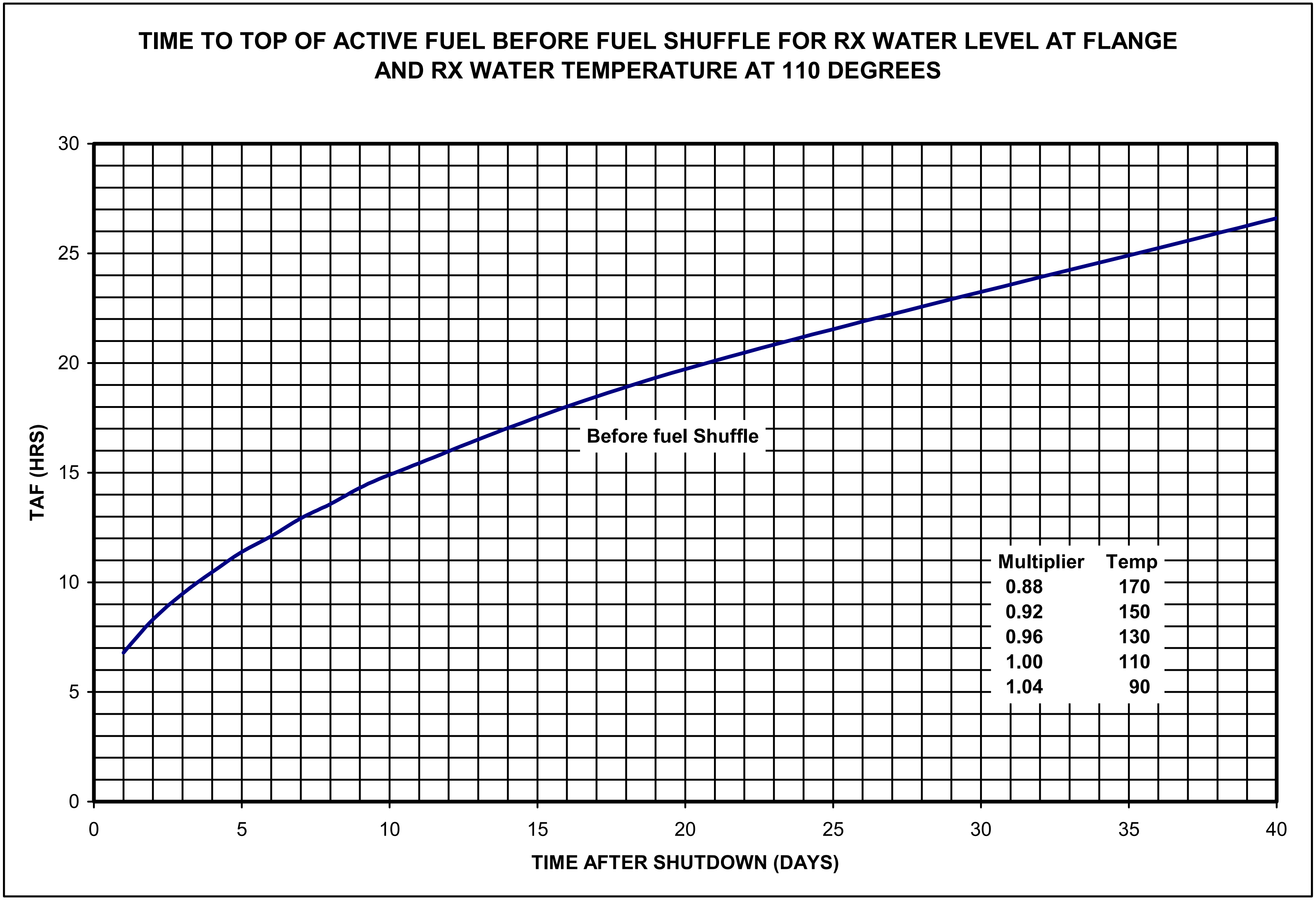

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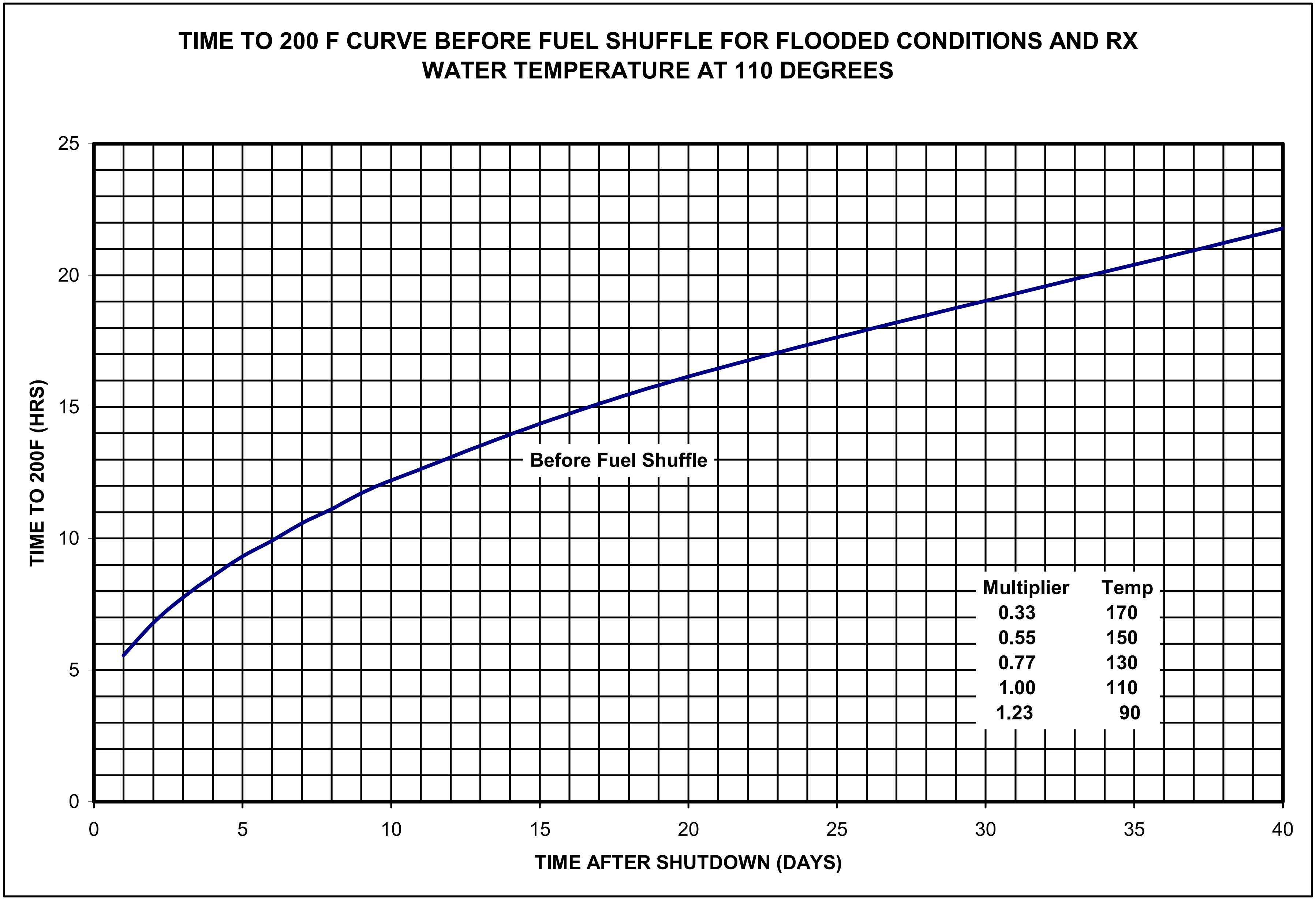

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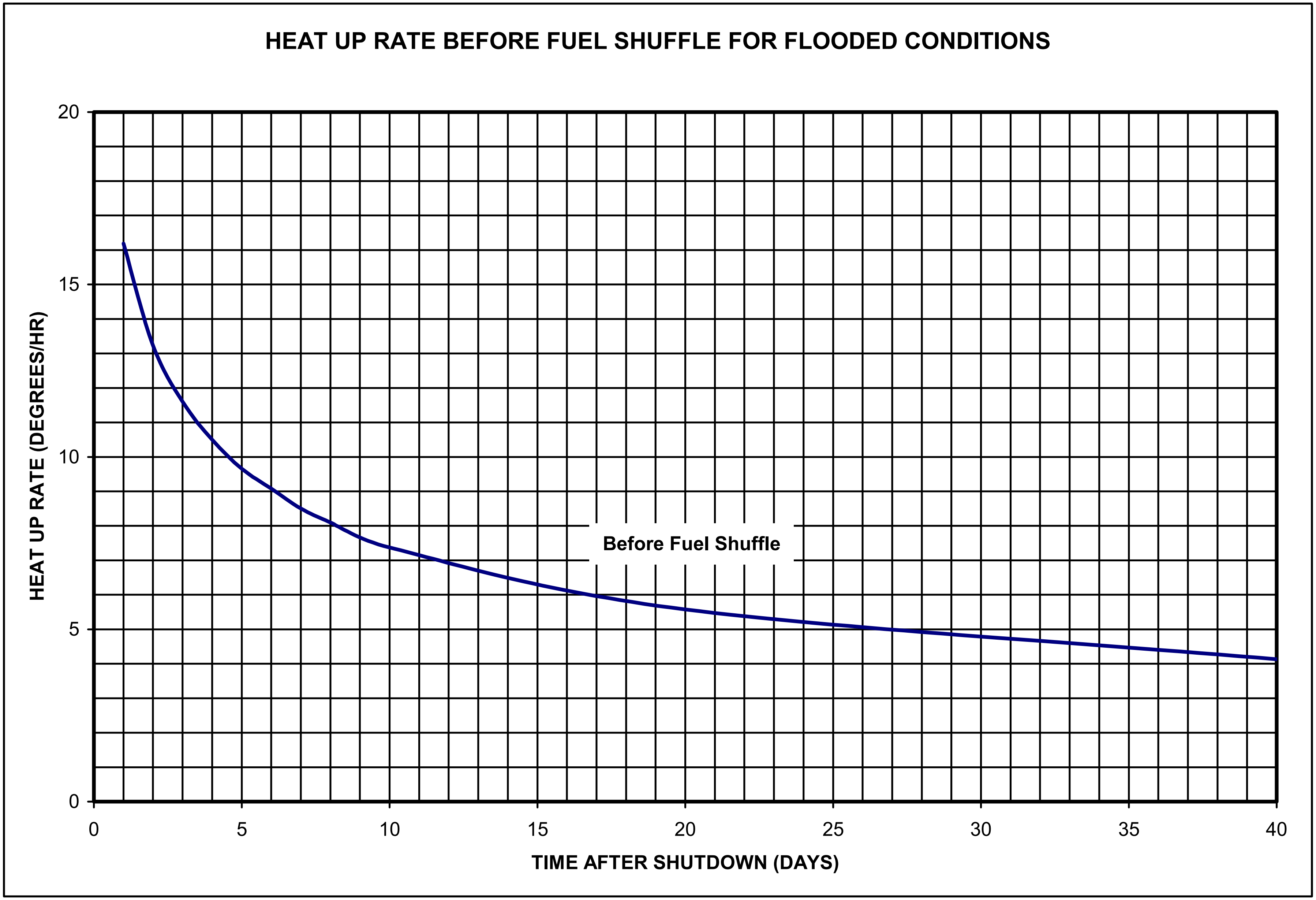
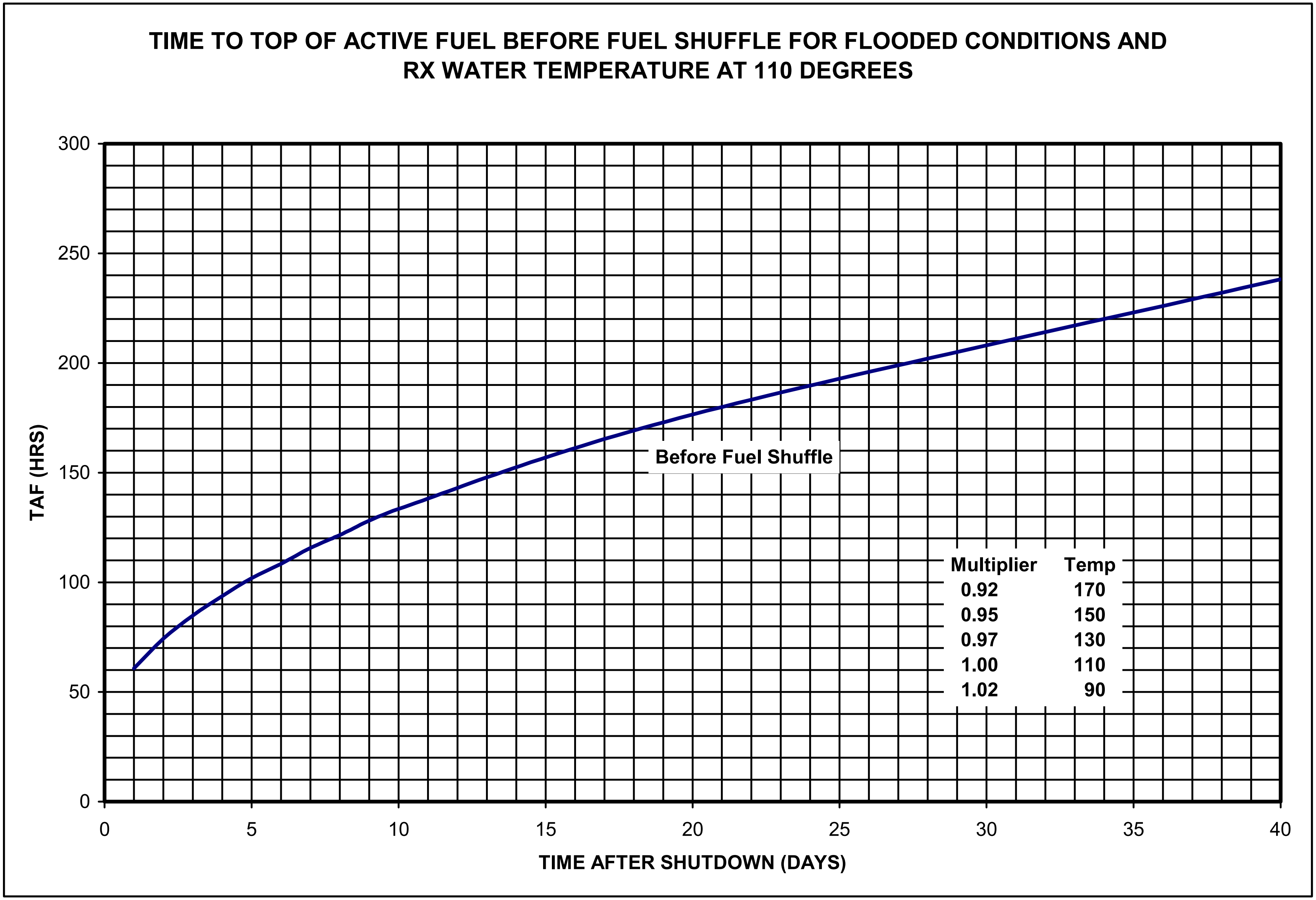
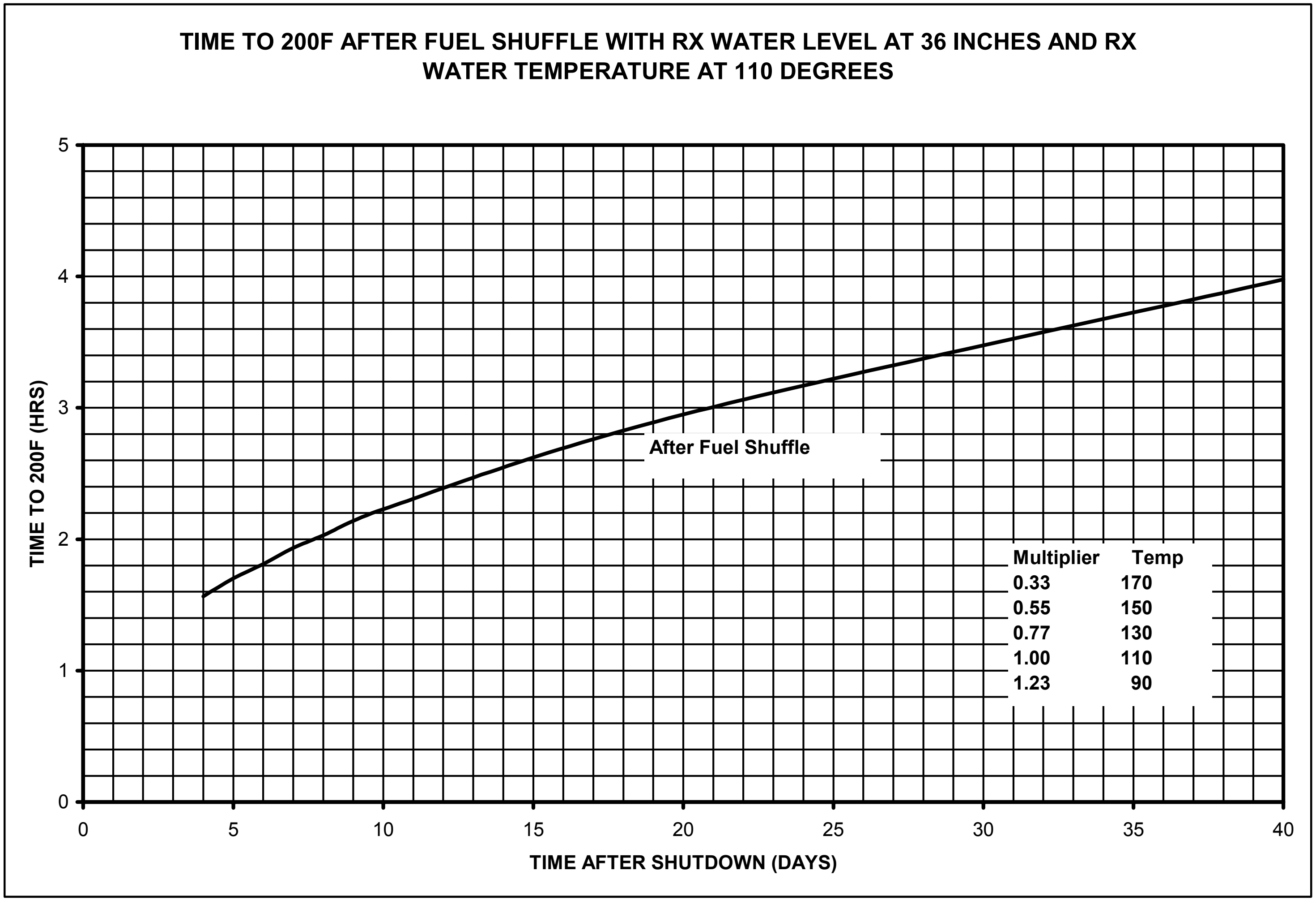



TIME TO TOP OF ACTIVE FUEL BEFORE FUEL SHUFFLE FOR FLOODED CONDITIONS AND
RX WATER TEMPERATURE AT 110 DEGREES
TAF (HRS)
300
250
200
150
100
50
0
0
5
10
15
20
25
30
35
40
TIME AFTER SHUTDOWN (DAYS)
Before Fuel Shuffle
Multiplier Temp
0.92 170
0.95 150
0.97 130
1.00 110
1.02 90

THERMAL HYDRAULIC CURVES



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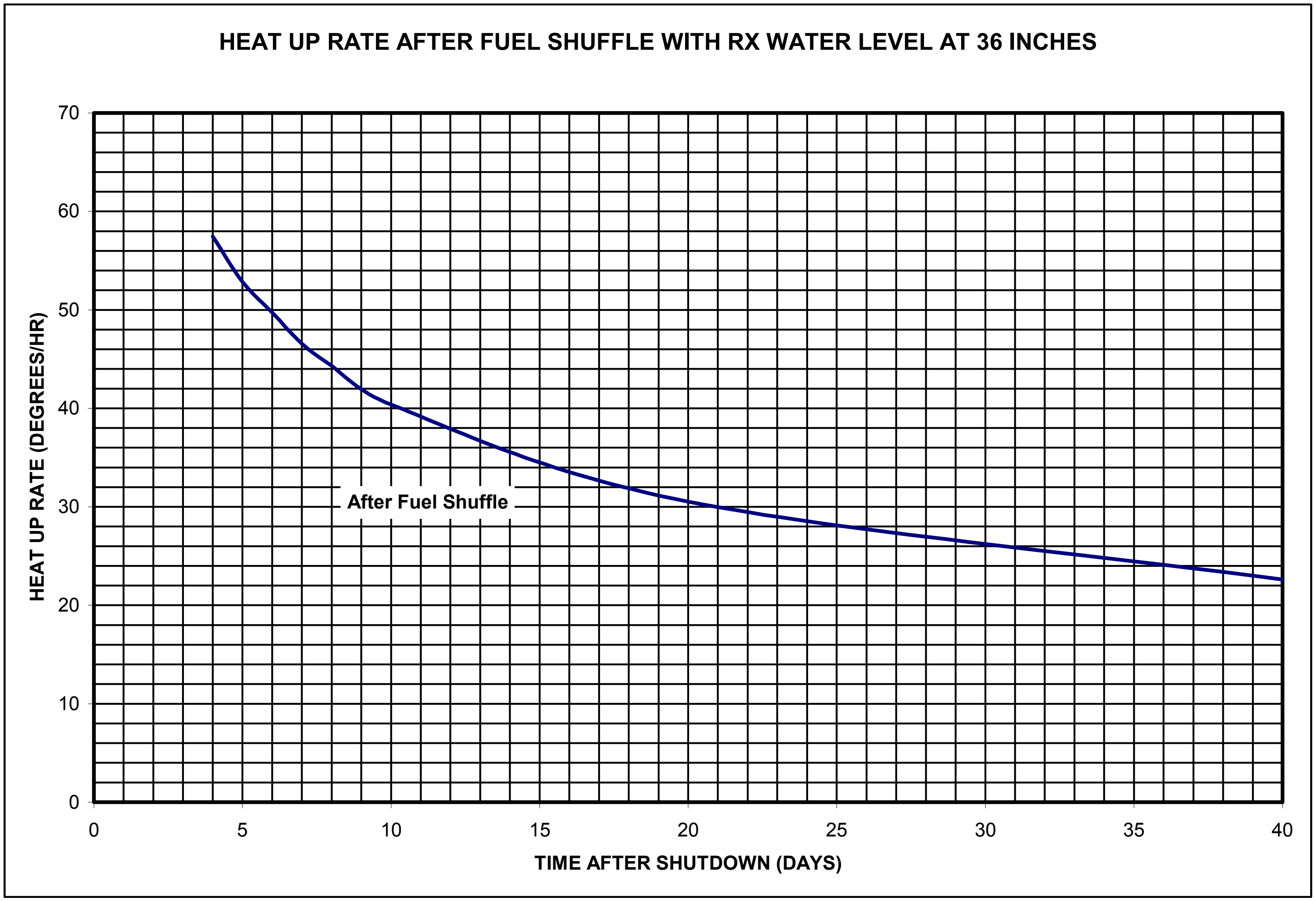

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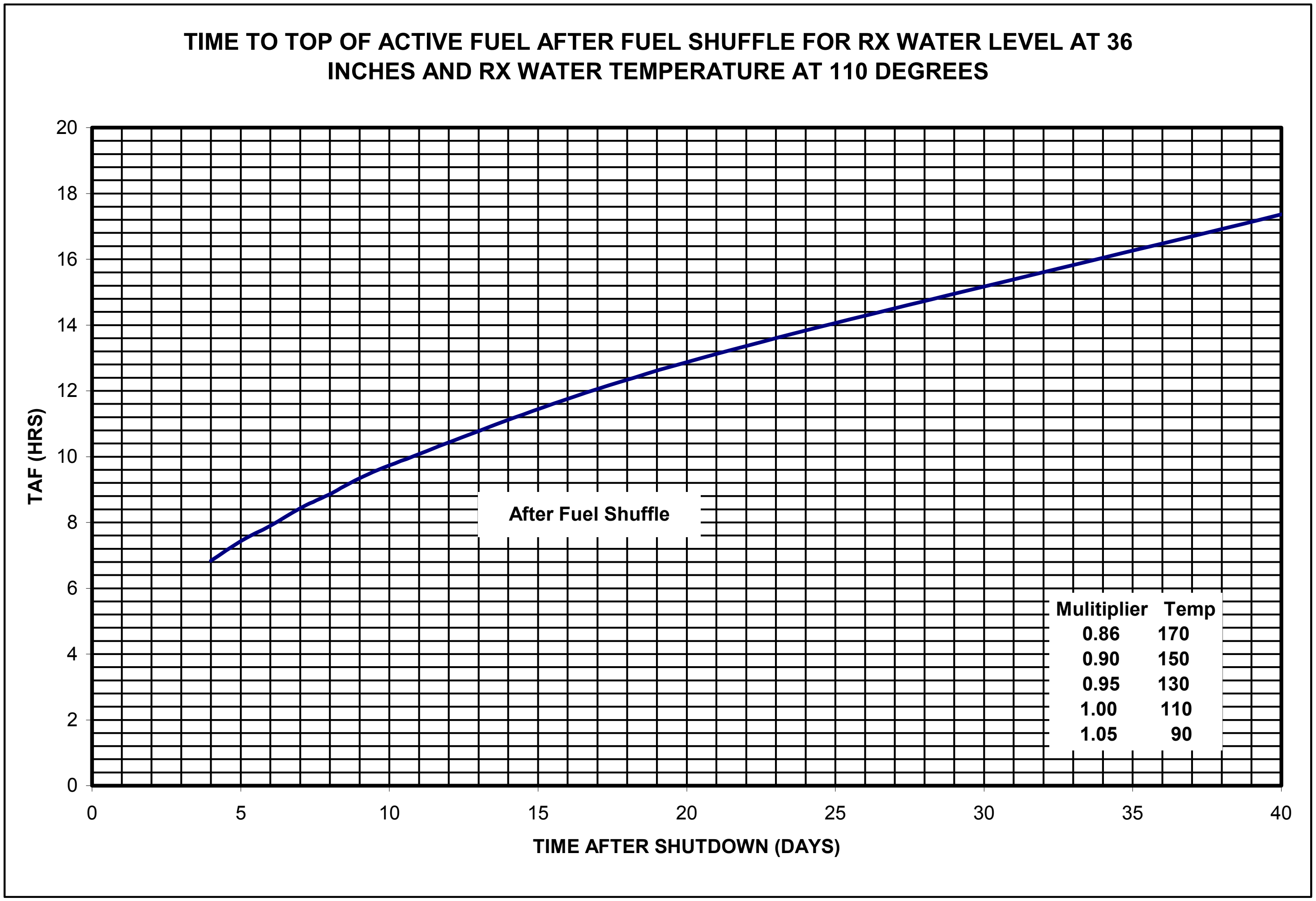

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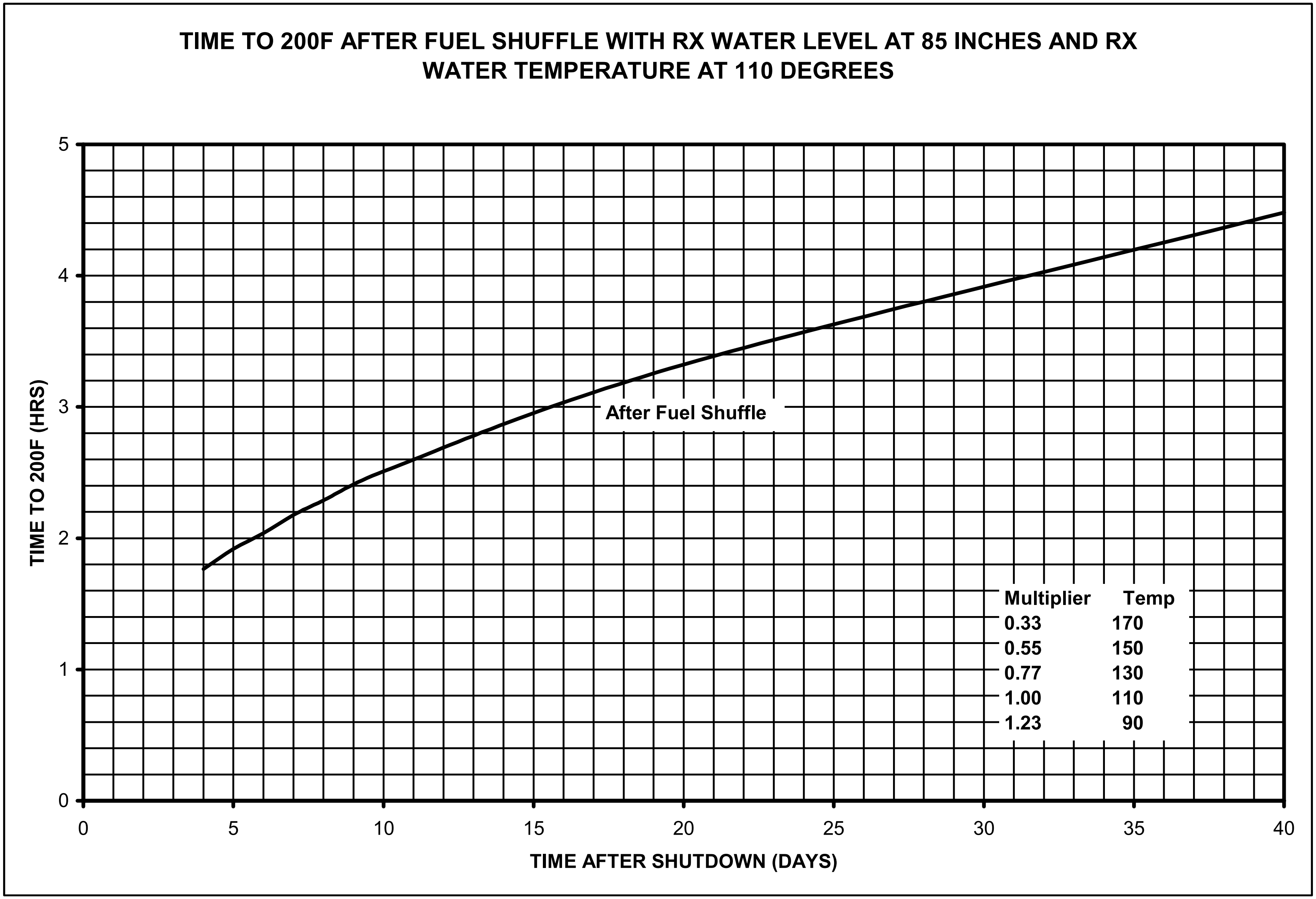

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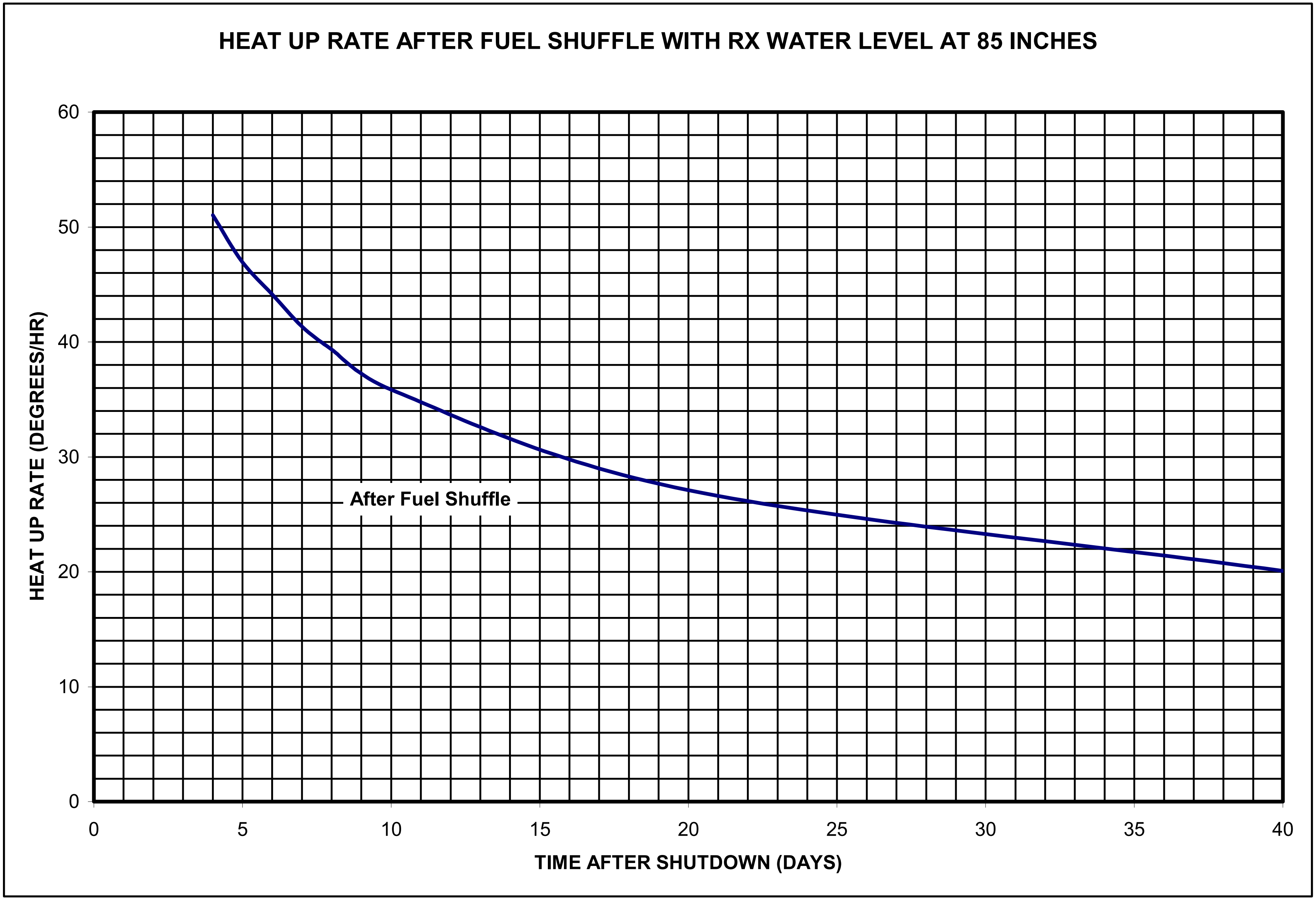

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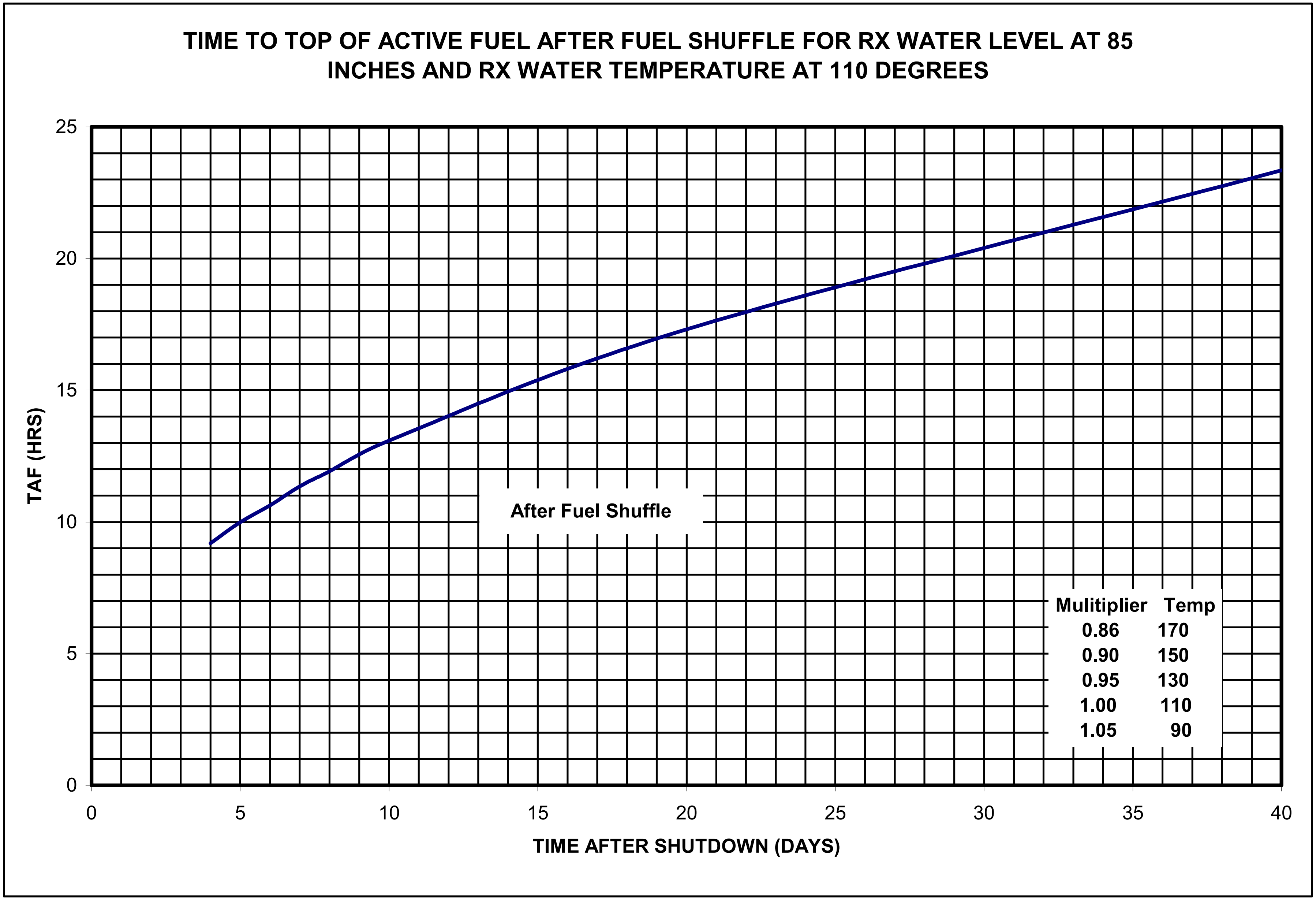

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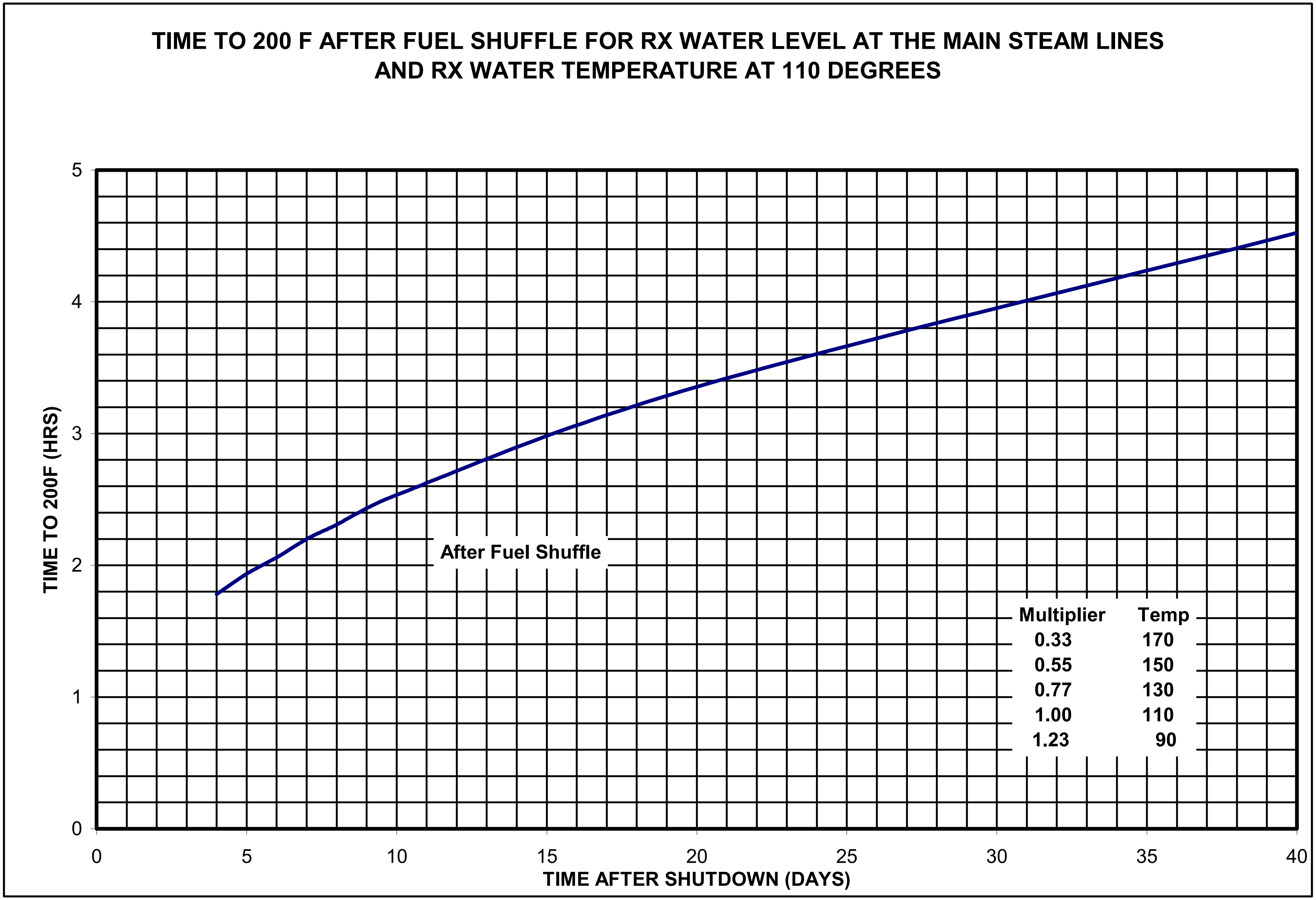

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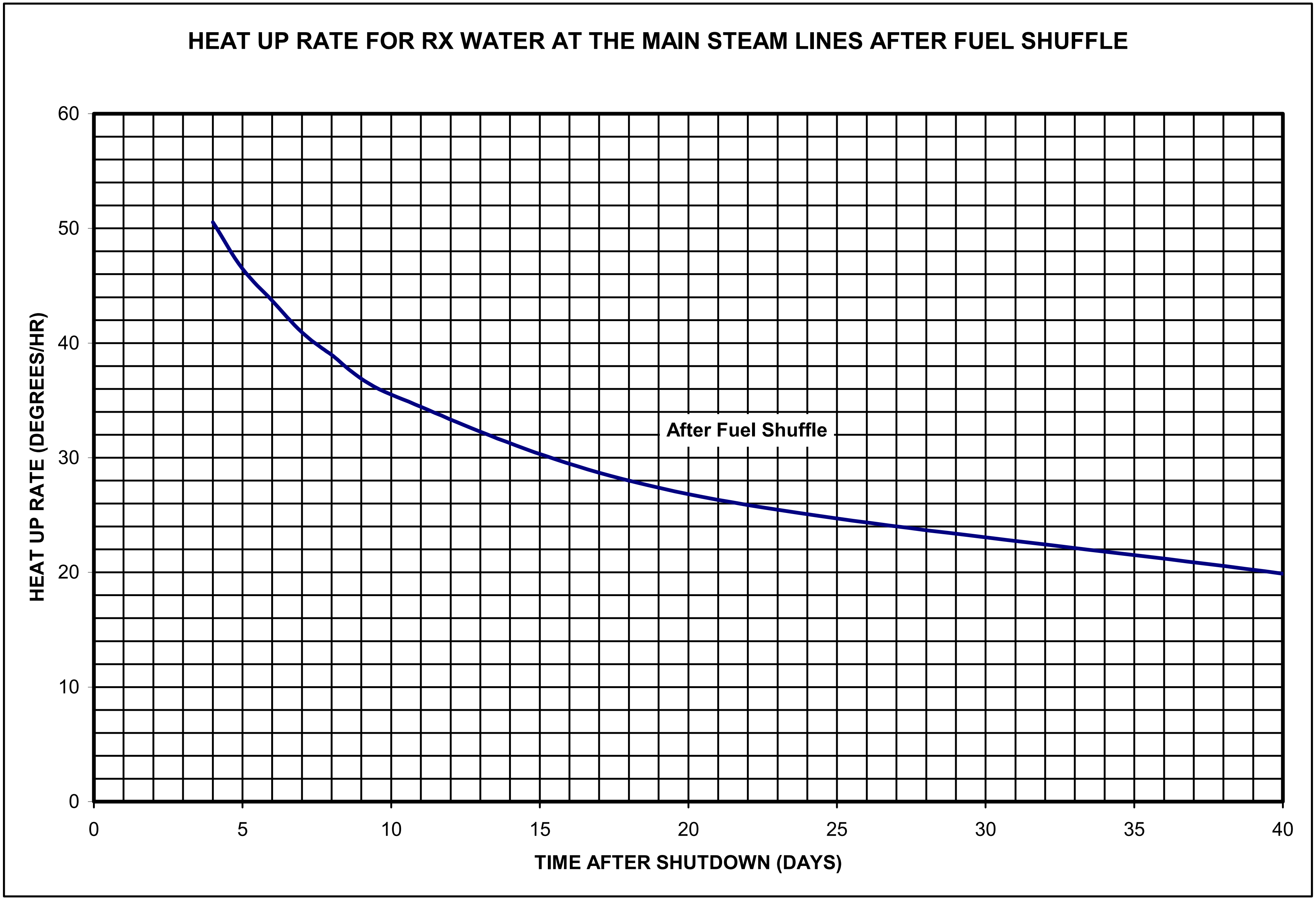

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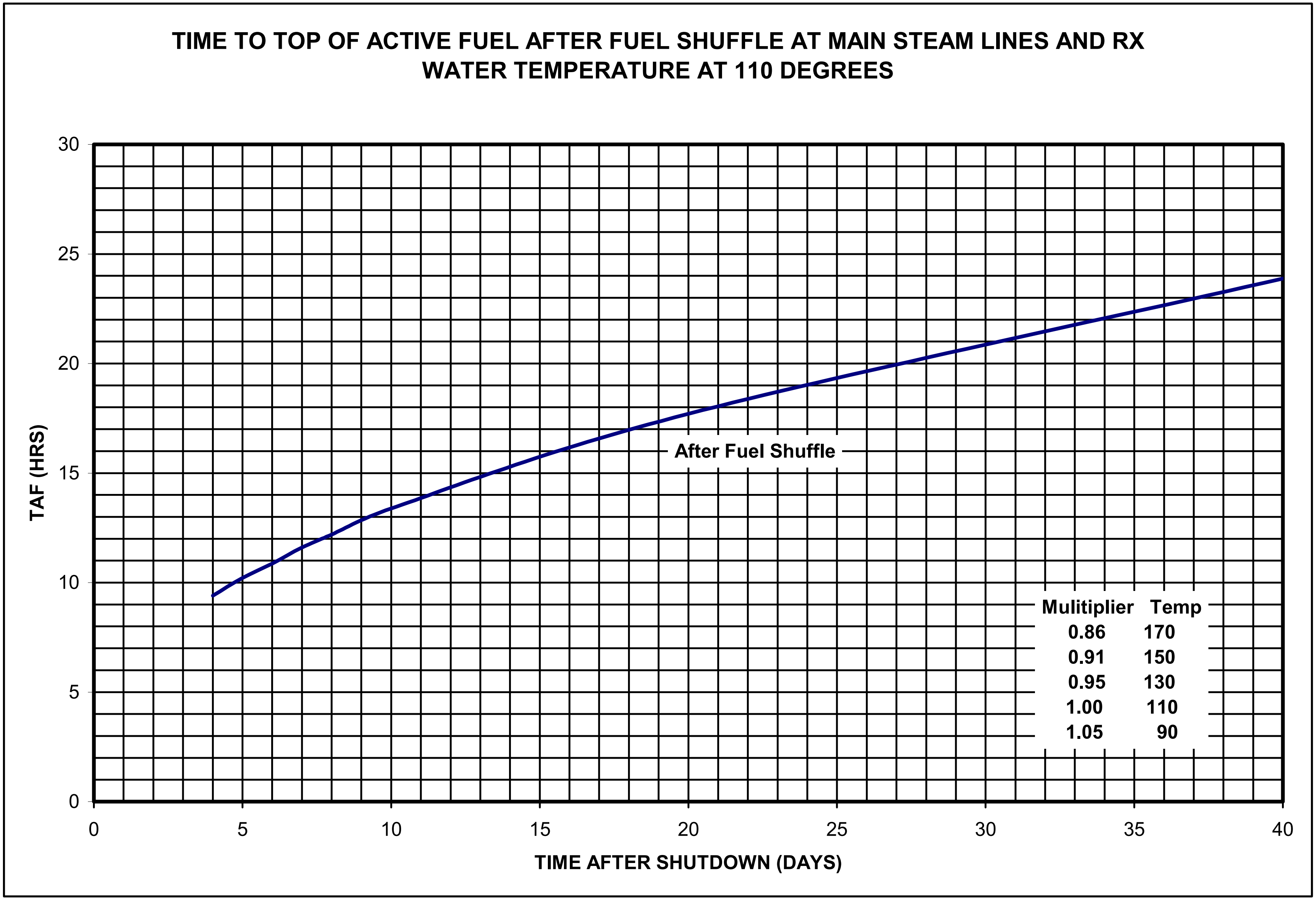

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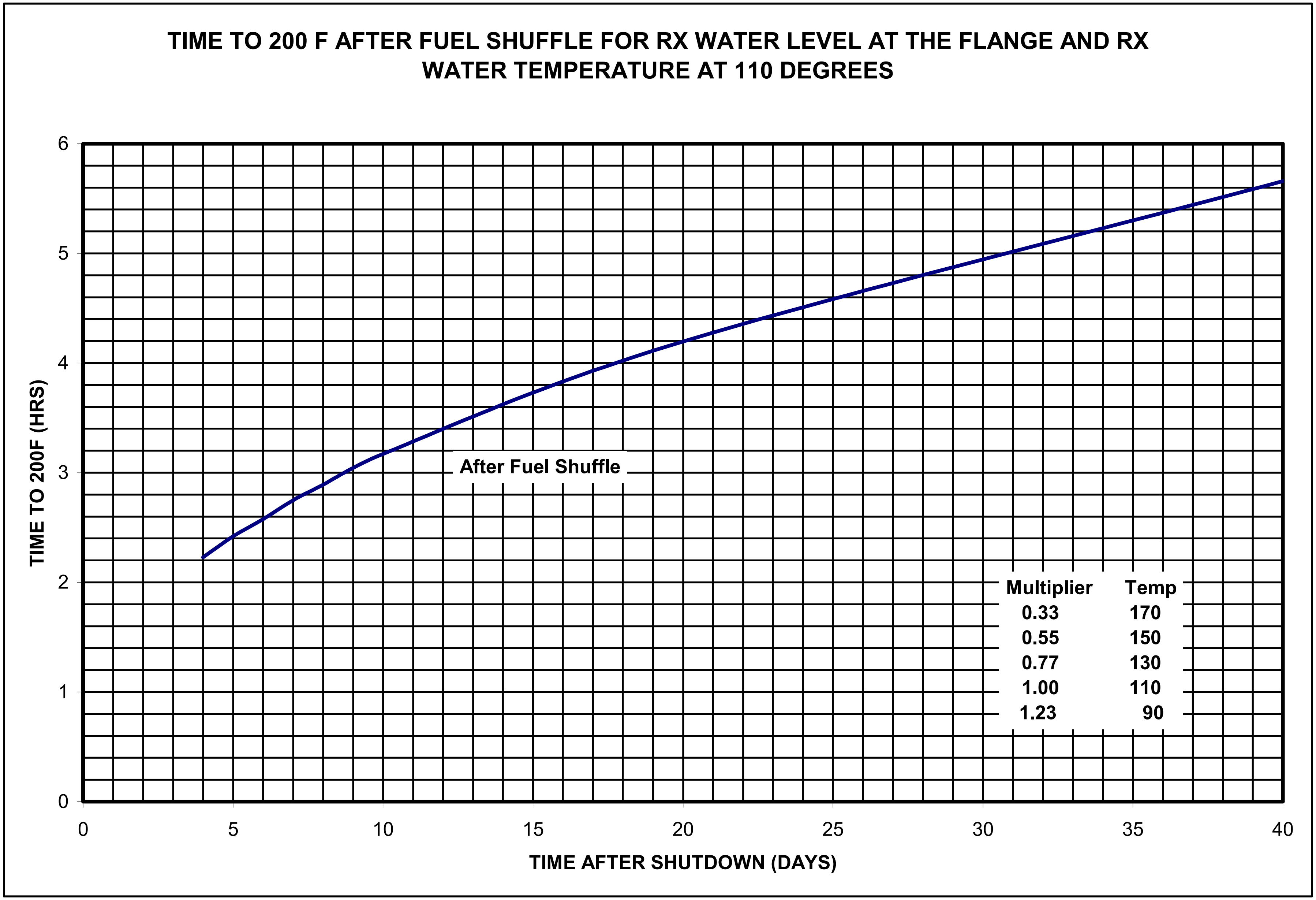

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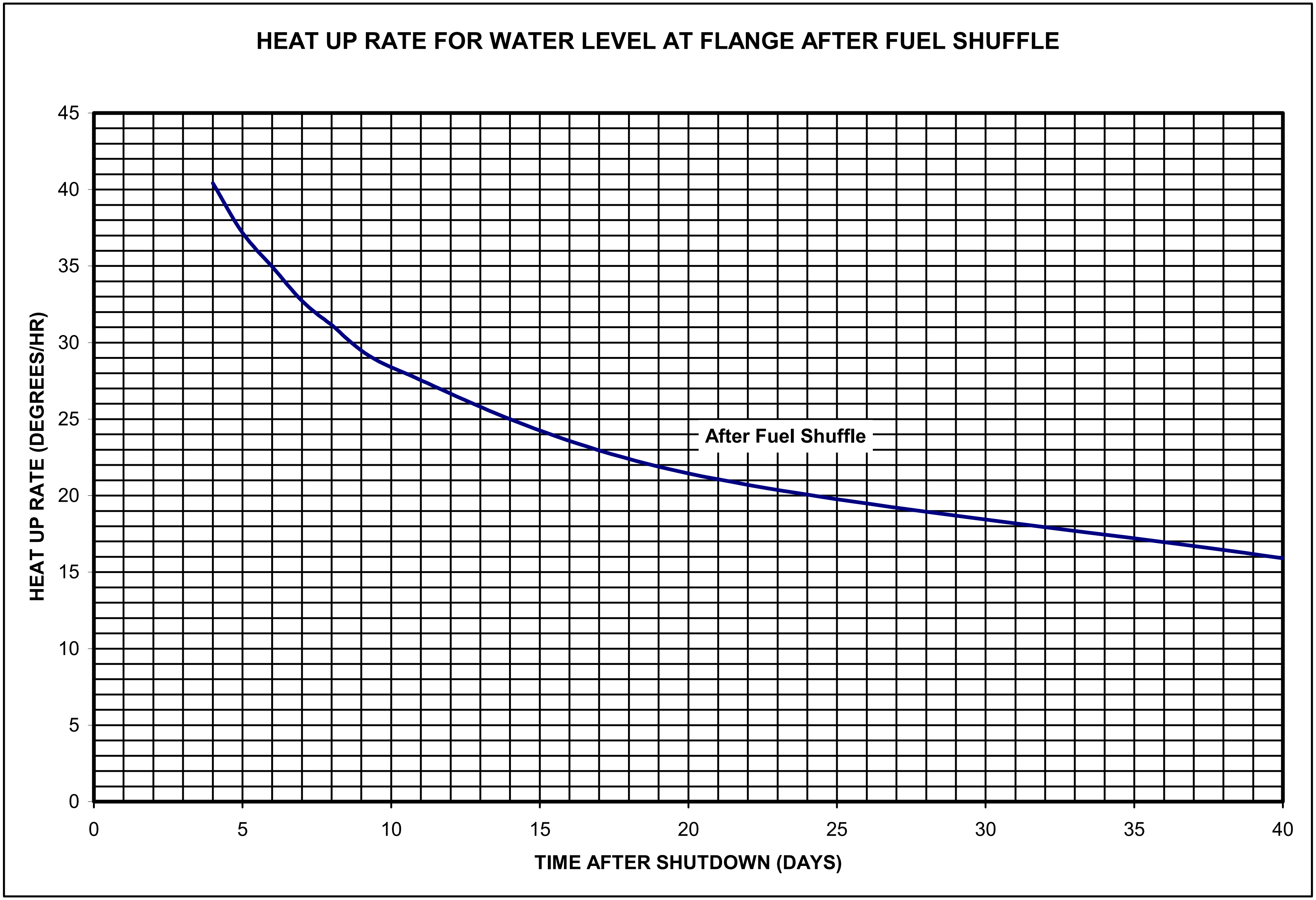

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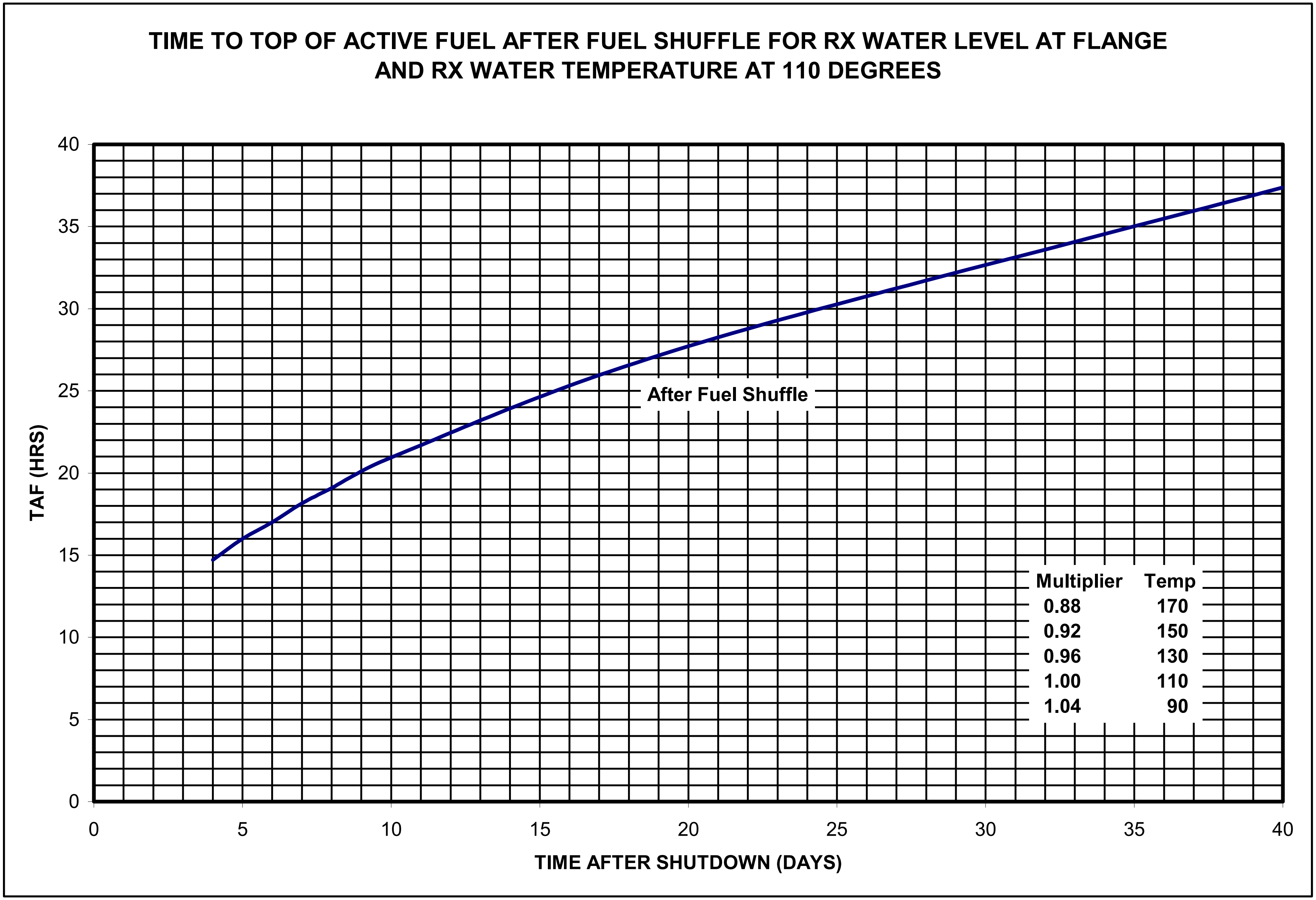

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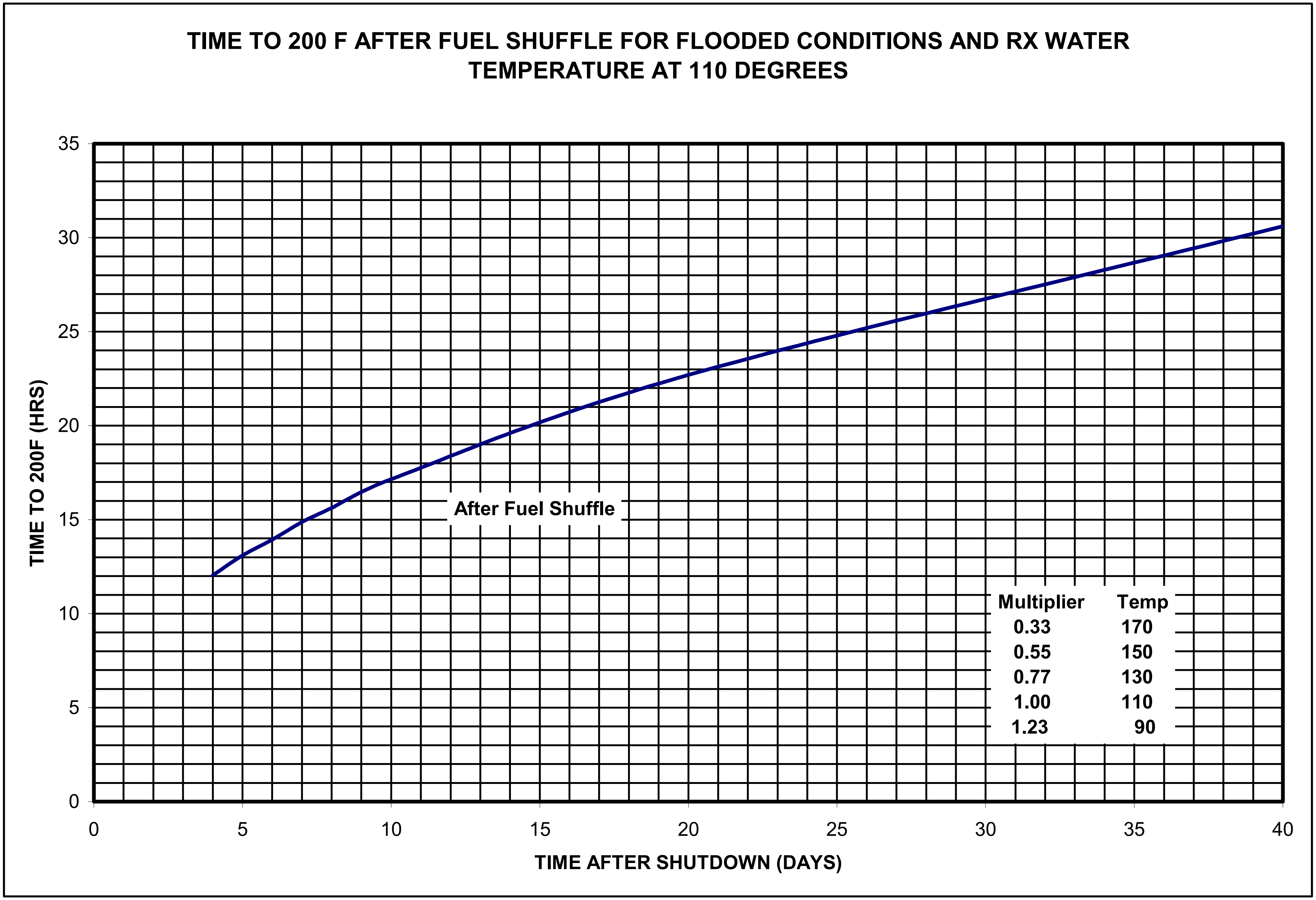

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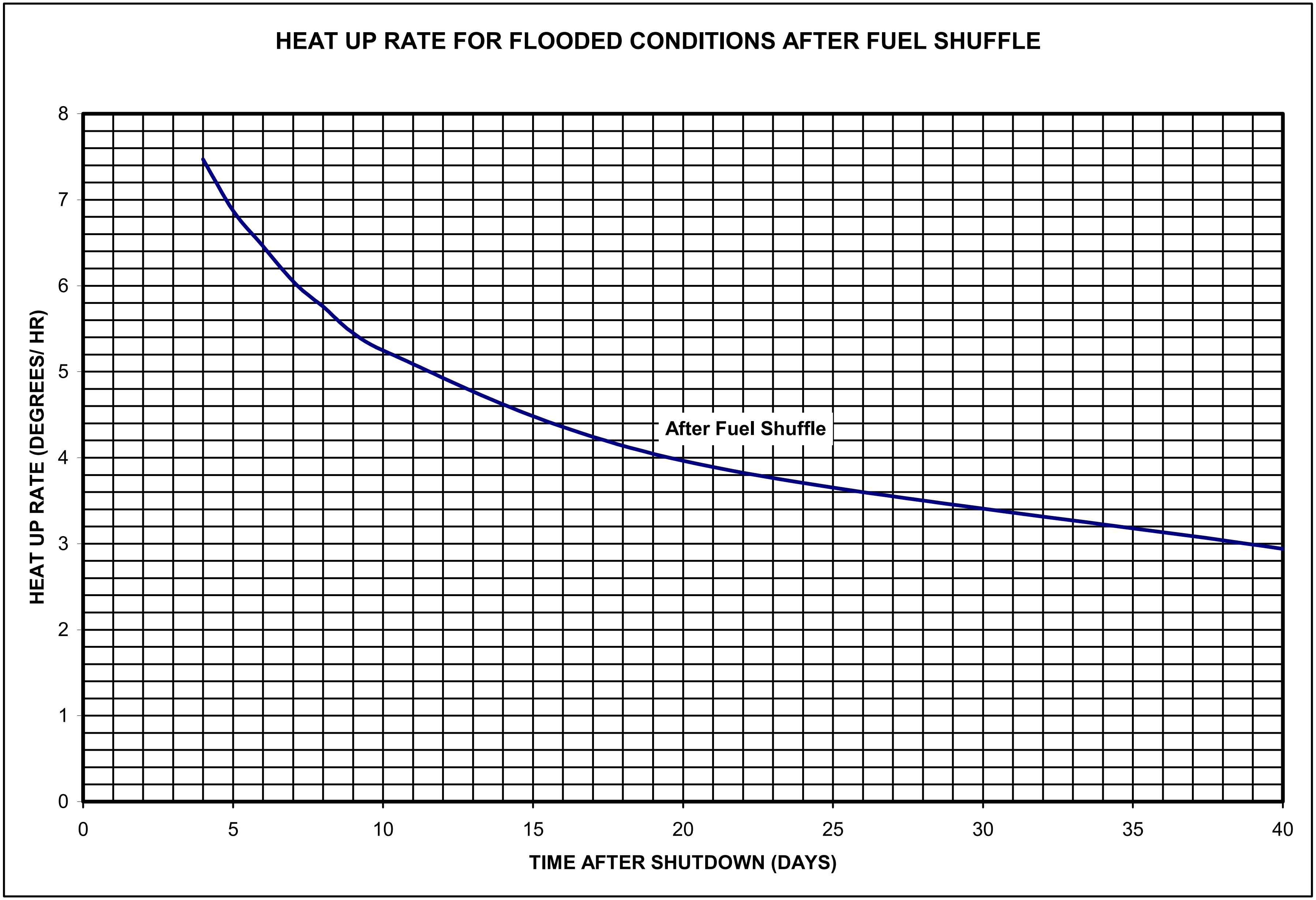

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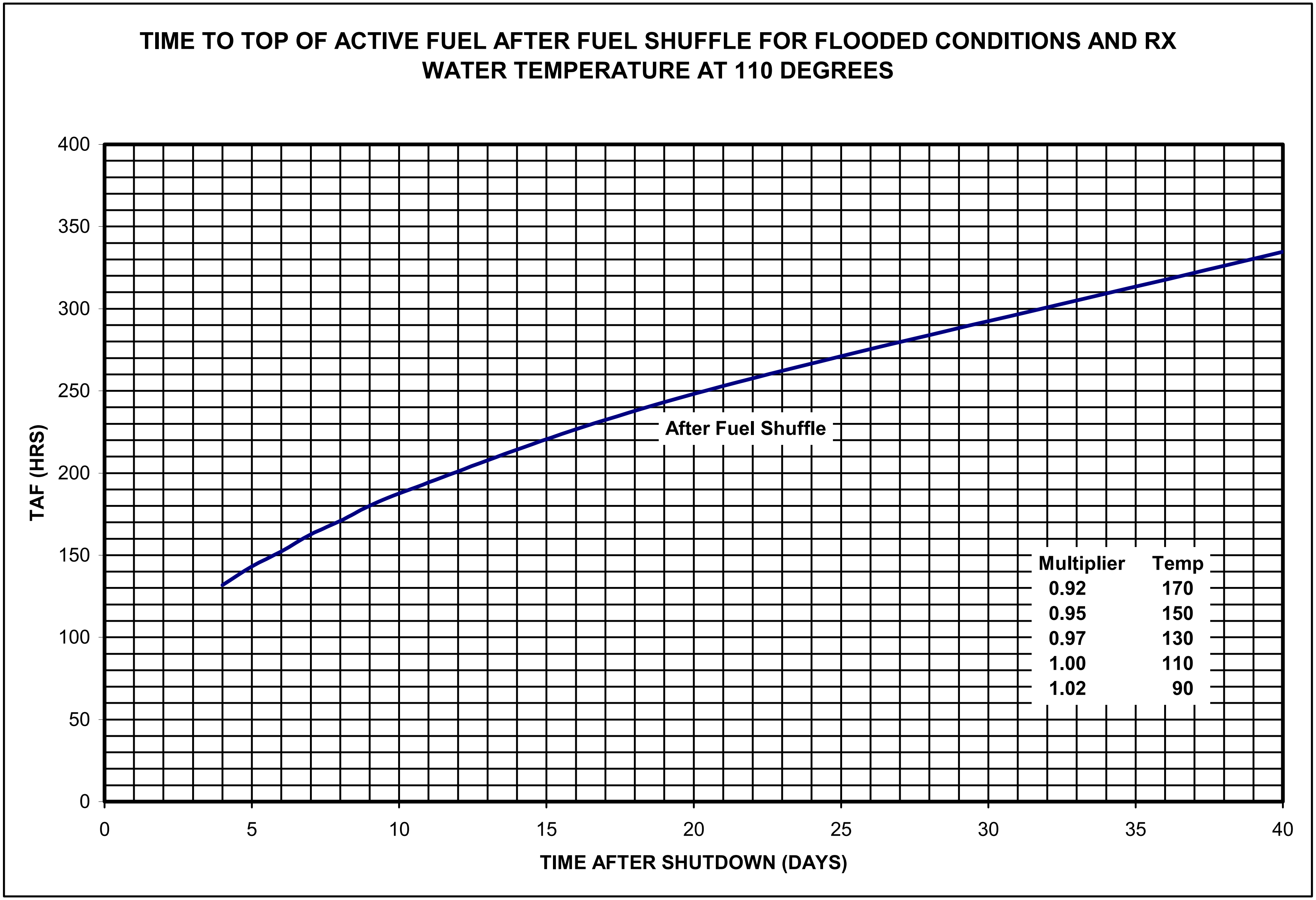

BEFORE FUEL SHUFFLE

Days After Shutdown	Decay Heat	Heat Up Rate Flooded	Heat Up Rate Flange	Heat Up Rate MSL	Heat Up Rate 85 in.	Time To Mode Change Flooded	Time To Mode Change Flange	Time To Mode Change MSL	Time To Mode Change 85 in.	Time To Top of Active Fuel Flooded	Time To Top of Active Fuel Flange	Time To Top of Active Fuel MSL	Time To Top of Active Fuel 85 in.
Days	MBtu/hr	(F/HR)	(F/HR)	(F/HR)	(F/HR)	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs
1	67.4	16.19	87.59	109.54	110.61	5.56	1.03	.82	.81	60.78	6.79	4.34	4.24
2	55.1	13.24	71.61	89.55	90.43	6.8	1.26	1.01	1.00	74.35	8.30	5.30	5.19
3	48.3	11.6	62.77	78.5	79.27	7.76	1.43	1.15	1.14	84.81	9.47	6.05	5.92
4	43.7	10.5	56.79	71.02	71.72	8.57	1.58	1.27	1.25	93.74	10.47	6.69	6.54
5	40.2	9.66	52.24	65.33	65.98	9.32	1.72	1.38	1.36	101.9	11.38	7.27	7.11
6	37.8	9.08	49.12	61.43	62.04	9.91	1.83	1.47	1.45	108.37	12.1	7.73	7.56
7	35.4	8.5	46.01	57.53	58.1	10.58	1.96	1.56	1.55	115.72	12.92	8.26	8.07
8	33.7	8.1	43.8	54.77	55.31	11.12	2.05	1.64	1.63	121.56	13.58	8.67	8.48
10	30.7	7.37	39.9	49.89	50.38	12.2	2.26	1.8	1.79	133.44	14.9	9.52	9.31
20	23.2	5.57	30.15	37.7	38.08	16.15	2.99	2.39	2.36	176.57	19.72	12.6	12.32
40	17.2	4.13	22.35	27.95	28.23	21.78	4.03	3.22	3.19	238.17	26.6	16.99	16.62

AFTER FUEL SHUFFLE

Days After Shutdown	Decay Heat	Heat Up Rate Flooded	Heat Up Rate Flange	Heat Up Rate MSL	Heat Up Rate 85 in.	Time To Mode Change Flooded	Time To Mode Change Flange	Time To Mode Change MSL	Time To Mode Change 85 in.	Time To Top of Active Fuel Flooded	Time To Top of Active Fuel Flange	Time To Top of Active Fuel MSL	Time To Top of Active Fuel 85 in.
Days	MBtu/hr	(F/hr)	(F/hr)	(F/hr)	(hrs)	(hrs)	(hrs)	(hrs)	(hrs)	(hrs)	(hrs)	(hrs)	(hrs)
4	31.09	7.47	40.41	50.53	51.03	12.05	2.23	1.78	1.76	131.74	14.71	9.40	9.19
5	28.60	6.87	37.17	46.49	46.94	13.10	2.42	1.94	1.92	143.21	16.00	10.22	9.99
6	26.90	6.46	34.95	43.71	44.14	13.93	2.57	2.06	2.04	152.31	17.01	10.87	10.63
7	25.19	6.05	32.73	40.94	41.34	14.87	2.75	2.20	2.18	162.63	18.16	11.60	11.35
8	23.98	5.76	31.16	38.97	39.35	15.63	2.89	2.31	2.29	170.84	19.08	12.19	11.92
10	21.84	5.25	28.39	35.50	35.85	17.15	3.17	2.54	2.51	187.53	20.95	13.38	13.08
20	16.51	3.97	21.45	26.83	27.09	22.70	4.20	3.35	3.32	248.15	27.72	17.70	17.31
40	12.24	2.94	15.90	19.89	20.09	30.61	5.66	4.52	4.48	334.72	37.38	23.88	23.35

EOI CORPORATE OUTAGE MANAGEMENT NUCLEAR SAFETY PHILOSOPHY

Entergy Operations' safety philosophy for the conduct of shutdown operations is to integrate nuclear safety into the planning, scheduling and implementation of outage activities. The key attribute of this process is the concept of Defense in Depth which includes: identification of shutdown risk as an element of the planning of outage activities, minimization of shutdown risk through the scheduling of activities, and providing systems, structures and components to provide a backup for key safety functions through redundant, alternate or diverse methods. Successful safe and efficient implementation of outage activities depend on the dedication and teamwork among the outage team including contractors, and meticulous performance of outage activities. The following principles are used to assure the successful management of outages at Entergy Operations:

- **Outage Management Strategy**

  - Planned outages are conducted to perform corrective maintenance, preventative maintenance, required surveillances, and plant modifications to allow the plant to operate safely until it's next planned outage, and for the remainder of its forty year operating license. Outage activities are selected consistent with this purpose to: reduce radiation exposure, improve personnel safety, improve plant operation, and meet regulatory requirements. Lists of approved activities are developed in advance to allow adequate time for design, procurement, and pre-installation activities. The Entergy Operations goal for outage duration is to conduct the shortest possible outage, while accomplishing the outage scope with the highest level of both personnel and plant safety.

  - NUMARC 91-06, "Guidelines for Industry Actions Assess Shutdown Management" is used to assess and improve outage safety by minimizing shutdown risk. The key element of this approach is the concept of Defense in Depth.

  - Defense in Depth is the concept of ensuring that the systems and alternates that perform key safety functions are available when needed, particularly during high risk evolutions. The use of the Protected Train methodology, coupled with an understanding of plant conditions and risk conditions, is a key element in minimizing shutdown risk.

  - The recommendations contained in SOER 91-01 will be used to assure the safe conduct of Infrequently Performed Tests and Evolutions. These recommendations include the use of pre-test briefings, clear and concise test procedures, and the establishment of criteria for terminating the test.

- Conservative decision making should be used to guide the day to day management of the Entergy units, including outage. Conservative decision making applies to outage planning functions such as selection of corrective maintenance and design changes as well as to the operational decisions to support outage activities. A high priority should be placed on equipment problems that require operator compensatory actions (workarounds). Equipment deficiencies should be periodically reviewed to assess the cumulative or aggregate effects of degraded equipment on operator ability to respond effectively to plant transients. Priorities for resolution should be adjusted if needed. Compensatory measures for special outage conditions should be clearly communicated to the Operating shift. The procedure and conditions requiring closure of the containment hatch are one example of a compensatory measure.

- **Outage Planning**

  - Outage planning is the process of selecting and reviewing outage activities to establish scheduling requirements based on Technical Specification, operational, and implementation requirements, and shutdown risk considerations.

  - Outage planning must include a review of Infrequently Performed Tests and evolutions to ensure adequate precautions are taken. Management oversight during test review and performance, pre-shift briefings, and the establishment of test termination criteria are some of the measure employed to ensure proper test conduct.

- **Outage Scheduling**

  - Outage scheduling is the process of integrating outage activities into a coordinated schedule which efficiently and safely accomplishes the outage scope within the restraints identified through outage planning.

  - Key milestones are established to identify pre-outage activities, such as the scope freeze date, Design Change Package issue date, and work package issue date. These milestones will be established in advance to allow time for shutdown risk assessment, work implementation planning, and parts procurement.

  - Input for the detailed outage schedule is provided by past outage successes and a review of outage projects and scope, and the resources available. The schedule must take into account an assumed reserve of resources to deal with emergent issues. The reserve is based on past outage performance and management judgment of potential for emergent work based on the planned outage activities. The detailed outage resource loading must consider the need for personnel to have a reasonable amount of time off.

- The detailed outage schedule is developed to meet the Technical Specification, operational and implementation requirements in a manner that provides for Defense in Depth under all shutdown conditions. The minimum combination of safety equipment required to maintain critical safety functions is established for each phase of the outage. Projects representing special risk conditions will be scheduled during periods when the risk is minimized due to a combination of plant condition and equipment availability. Special emphasis will be given to the scheduling of work with the potential to adversely affect Shutdown Cooling, the availability of AC power sources, and periods when the combination of reactor inventory and decay heat load could result in a short time to boiling. An independent review of shutdown risk conditions and the equipment providing critical safety functions is performed as part of the final schedule approval.

- **Outage Implementation**

  - The outage organization will be structured to provide clear project responsibility and a clear reporting relationship for both pre-outage and outage activities. This organization and the project responsibilities will be communicated to all outage personnel. Outage management shift coverage will be structured to provide outage oversight and decision making capability available on site when necessary. Clear communications through the use of scheduled outage meetings and management tours of outage work areas are used to keep the outage team informed, and to emphasize the importance of safe and efficient outage conduct.

  - While the completion of outage activities generally reduces the shutdown risk, as the plant is returned to a normal operational alignment, the period just before plant restart presents a time of high activity with a heightened potential for personnel errors. Continued management shift coverage, equivalent to that employed during the major portion of the outage, should be considered during this period and the startup testing period. This enhanced coverage may be beneficial until the unit reaches a stable point in the post-outage power ascension.

- **Outage Critique**

  - A comprehensive critique is used following each major planned outage to provide a mechanism for continued improvement. The input for these critiques is structured to facilitate input from all levels of plant personnel. The critique items are tracked between outages and reviewed as part of the planning process for the next outage to ensure that corrective actions are taken. Critiques are shared between the plant sites to allow each plant to benefit from the lessons learned.

APPROVAL FOR DEPARTURE FROM THE REQUIREMENTS OF THE SHUTDOWN OPERATIONS PROTECTION PLAN

The Shutdown Operations Protection Plan is a set of specific guidelines and minimum equipment requirements established to maintain nuclear safety during shutdown operations. Approval for departure from guidelines contained in the Shutdown Operations Procedures Plan is obtained by filling out this Attachment and obtaining the appropriate signatures. Deviations from guidelines containing a "should" require approval from the Manager Operations. Deviations from guidelines containing a "shall" require approval from the General Manager Plant Operations. This approval does not allow the deviation from Technical Specifications.

1. Description of departure - what specific requirement will not be satisfied?

2. Why is this departure necessary?

3. Estimated duration departure will be in effect?

4. Will contingency/compensatory actions be taken or in place? (Attach Contingency Plans)

5. Will this departure result in a major scheduling change requiring a "Level 2 Schedule Change Request" and Outage Risk Assessment Team review? (If so attach a copy of ORAT request)

_______________ / _______ _______________ / _______
Originator Date SRO Review Date

_______________ / _______
Approved By:* Date

*per above guidelines

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☒ **RO** ☐

ALTERNATE PATH ☐

TITLE: **Determine Personnel Call-Out Availability**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	20	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	October 3, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Operators who are not available to work have been annotated on applicant cue sheet and match the answer key.

Synopsis: This task will require an SRO to recognize which operators for a given shift are available to work after one crew member calls in sick. The SRO will use EN-OM-123, Fatigue Management Program, Section 5.2, Work Hour Limits for Covered Individuals to determine who is eligible to be called in.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

As the off-going CRS, determine any operators from the crew C schedule that are not eligible to be called in without violating fatigue rule. Annotate any ineligible operators on the cue sheet and include the reason he/she is not eligible.

3) Initial Conditions:

The plant is operating at 100% power.

A non-licensed operator has called in sick for the next day shift on March 23, 2014.

The shift will be below minimum staffing requirements.

All operators from crew C worked only the hours they were scheduled and no vacation is scheduled.

No changes to the future schedule can be made at this time (Mon-Thurs, 3/24 – 3/27)

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Determine Personnel Call-Out Availability	300013003003	G 2.1.5	3.9

REFERENCES:
EN-OM-123, Rev 5

APPLICABLE OBJECTIVES
FRR-GET-OM123, Obj 3

REQUIRED MATERIALS:
EN-OM-123, Rev 5

SIMULATOR CONDITIONS &/or SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup
2.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Operators who are not available to work have been annotated on applicant cue sheet and match the answer key.

PERFORMANCE:

START TIME: _______________

1.	***Procedure Step:**	1. Determine ineligible operators and reasons using EN-OM-123, Sect 5.2.	
	Standard	Applicant determined that Justin Lawrence is ineligible; max 16 in 24 hours. Applicant determined that Mike Melancon is ineligible; max 72 in 7 days. Applicant determined that Lane Watts is ineligible; min 34 hr break in 9 days	
	Cue	Provide the applicant the Crew C schedule and a copy of EN-OM-123.	
	Notes		
	Results	SAT ☐	UNSAT ☐

Terminating Cue: Operators who are not available to work have been annotated on applicant cue sheet and match the answer key.

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initiating Cues:

As the off-going CRS, determine any operators from the crew C schedule that are not eligible to be called in without violating fatigue rule. Annotate any ineligible operators on the cue sheet and include the reason he/she is not eligible.

Initial Conditions:

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All operators from crew C worked only the hours they were scheduled and no vacation is scheduled.

No changes to the future schedule can be made at this time (Mon-Thurs, 3/24 – 3/27)

The following are not eligible to work the day shift on Sunday, March 23, 2014:

If ______________________ worked this shift, he would violate the ________________ rule.

If ______________________ worked this shift, he would violate the ________________ rule.

If ______________________ worked this shift, he would violate the ________________ rule.

If ______________________ worked this shift, he would violate the ________________ rule.

If ______________________ worked this shift, he would violate the ________________ rule.

If ______________________ worked this shift, he would violate the ________________ rule.

If ______________________ worked this shift, he would violate the ________________ rule.

Note all times represent work hours (shift turnover time has been removed).

For this exercise, disregard the 54-hour rolling average limit.

Schedule Report for Operations / Team C

March 2014	3/08	3/09	3/10	3/11	3/12	3/13	3/14	3/15	3/16	3/17	3/18	3/19	3/20	3/21	3/22	3/23	3/24	3/25	3/26	3/27
	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU
Duplessis, John	1800 0600		1800 0600		0600 1800	0600 1830	0600 1800	0600 1900			0600 1600	0600 1600	0600 1600	0600 1600			1800 0600	1800 0600	1800 0600	1800 0600
Frost, Justin	1800 0600	1800 0600		1800 0600		0600 1800	0600 1800	0600 1800	0600 1800		0600 1600	0600 1600	0600 1600	0600 1600	0600 2000			1800 0600	1800 0600	1800 0600
Lawrence, Justin	1800 0600	1800 0600				0600 1800	0600 1800	0600 1800	0600 1800		0600 1600	0600 1600	0600 1600	0600 1600	1800 0600			1800 0600	1800 0600	1800 0600
Melancon, Mike	1800 0600	1800 0600				0600 1800	0600 1800	0600 1800	0600 1800		0600 1800	0600 1800	0600 1800	0600 1800	0600 1800		0600 1600	0600 1600	0600 1600	0600 1600
Thames, Matt	1800 0600	1800 0600	1800 0600			0600 1830	0600 1800	0600 1800	0600 1800		0600 1600	0600 1600		0600 1600	0600 1800		1800 0600	1800 0600	1800 0600	
Umberger, Dave	1800 0600	1800 0600			0700 1800	0600 1800	0600 1800	0600 1800	0600 1900		0600 1600	0600 1600	0600 1600	0600 1600			1800 0600	1800 0600	1800 0600	1800 0600
Watts, Lane	1800 0600	1800 0600		1800 0600		1800 0600	1800 0600	1800 0600		1800 0600	1800 0700		0600 1800	0600 1800	0600 1800		0600 1800	0600 1800		0600 1800

Fatigue Management Program

Procedure Contains NMM ECH eB REFLIB Forms: YES ☒ NO ☐

HQN Effective Date	**Procedure Owner:** **Title:** **Site:**	Guy H. Davant Manager, Fleet Licensing Programs HQN	**Governance Owner:** **Title:** **Site:**	John McCann VP, Regulatory Assurance HQN / WPO
2/24/2014				

Site	Site Procedure Champion	Title
ANO	Michael Chisum	Gen Mgr, Plant Ops
BRP	N/A	
CNS	N/A	
GGNS	Ogden J Miller	Gen Mgr, Plant Ops
IPEC	John Dinelli	Gen Mgr, Plant Ops
JAF	Brian Sullivan	Gen Mgr, Plant Ops
PLP	Anthony L. Williams	Gen Mgr, Plant Ops
PNPS	Steve Verrochi	Gen Mgr, Plant Ops
RBS	Richard Gadbois	Gen Mgr, Plant Ops
VY	Vincent Fallacara	Gen Mgr, Plant Ops
W3	Kimberly Cook	Gen Mgr, Plant Ops
HQN	Charles F. Arnone	GM, Fleet Ops Support - N
HQN	Karl R. Jones	GM, Fleet Ops Support - S

For site implementation dates see ECH eB REFLIB using site tree view (Navigation panel).

Site and NMM Procedures Canceled or Superseded By This Revision

Process Applicability Exclusion: All Sites: ☒

Specific Sites: ANO ☐ BRP ☐ CNS ☐ GGNS ☐ IPEC☐ JAF ☐ PLP ☐ PNPS☐ RBS ☐ VY ☐ W3 ☐

Change Statement

Editorial Changes: Clarify Attachment 9.7 per recommendations of CR-PNP-2013-06707 CA-4 & 6, to provide check boxes that require selection of Adverse to Safety or Adverse to Security condition(s) that apply. Correct attachment cross reference typos within note on Attachment 9.8.

Associated PRHQN #: PR-PRHQN-2014-00066

TABLE OF CONTENTS

1.0 PURPOSE

[1] This procedure establishes the administrative controls for fatigue management, as required by 10 CFR 26 Subpart I, and includes the following:

- Entergy's policy for the management of fatigue for all individuals who are subject to the Fitness for Duty Program described in EN-NS-102;
- Method for implementing work hour controls for Covered Individuals;
- Limitations and processes for granting waivers and exceptions of work hour controls;
- Processes and requirements regarding fatigue assessments, and;
- Program provisions for training, recordkeeping, reporting, periodic reviews and audits.

[2] Fatigue management is one of several aspects of the Fitness-for-Duty program (Reference 2.0 [4]). The Fitness-for-Duty program, including fatigue management concepts apply to:

- All persons who are granted unescorted access to an Entergy protected area, and,
- All persons who are required to physically report to an Entergy Technical Support Center (TSC) or Emergency Operations Facility (EOF) by Entergy site-specific Emergency Plan.

[3] Fatigue management concepts include:

- Knowledge of contributors to worker fatigue,
- Ability to identify symptoms of worker fatigue, and
- Responsibility of individuals to report to work well rested, mentally alert, and fit for duty with respect to fatigue consistent with Entergy Policy EN-PL-202, "Personnel Expectations Related to Fatigue Management" (Reference 2.0 [12]).

[4] Fatigue management concepts AND the following additional requirements apply to those members of the FFD population (including Entergy employees and contractor / vendor personnel) who are also identified as Covered Individuals:

- Work Hour Limits as specified in Section 5.2 of this procedure.
- Waivers and exceptions to the Work Hour Limits

1.0 cont.

[5] The potential for excessive fatigue is not solely based on actual hours worked but can result from other factors, such as:

(a) stressful working conditions

(b) sleep disorders

(c) accumulation of sleep debt

(d) disruptions of circadian rhythms associated with shift work

[6] Behavioral observation is also an aspect of the Fitness-for Duty program and includes observations related to drugs, alcohol, and fatigue. Actions in response to a suspected impaired condition must be in accordance with that program; Reference 2.0 [4].

2.0 REFERENCES

[1] 10 CFR Part 26 Subpart I, “Managing Fatigue”

[2] NEI 06-11, “Managing Personnel Fatigue at Nuclear Power Reactor Sites”, Revision 1, October 2008

[3] Regulatory Guide 5.73, “Fatigue Management for Nuclear Power Plant Personnel”, March 2009

[4] EN-NS-102, “Fitness for Duty Program”

[5] Ventyx Personnel Qualifications and Scheduling (PQ&S) User Guide

[6] ENN-HR-130, “Shared Resource Assignment”

[7] ENS-HR-130, “Entergy Shared Resources”

[8] EN-WM-104, “On Line Risk Assessment”

[9] EN-OU-108, “Shutdown Safety Management Program”

[10] EN-QV-109, “Audit Process”

[11] Entergy System Policy; “Attendance and Absenteeism”

[12] EN-PL-202, “Personnel Expectations Related to Fatigue Management”

[13] EN-EP-309, “Fatigue Management for Hurricane Response Activities”

[14] EN-IS-113, “Reporting & Investigating Occupational Injuries / Illnesses and Near Misses.”

3.0 DEFINITIONS

[1] Acute Fatigue - Fatigue from causes (e.g. restricted sleep, sustained wakefulness, task demands) occurring within the past 24 hours.

[2] Alertness - The ability to remain awake and sustain attention.

[3] Averaging Period – The duration over which the 54-hour average is calculated. The duration is in one-week (7 day) increments up to a maximum of 6 weeks. The Averaging Period may, but is not required to, correspond to the shift schedule rotation intervals.

[4] Break - An interval of time that falls between successive work periods, during which the covered individual does not perform duties for Entergy, other than one period of shift turnover at either the beginning or end of a shift, but not both. This means that one period of shift turnover can count towards the required break time.

[5] Calculation Milestone – The day and time when the work hour calculation is performed for confirming compliance with the 54-hour average limit. The Calculation Milestone for Entergy sites is set at 0000 hours Sunday.

[6] Call-in - Returning to the site when not normally scheduled for work.

[7] Circadian variation in alertness and performance - The increases and decreases in alertness and cognitive/motor functioning caused by human physiological processes (e.g. body temperature, release of hormones) that vary on an approximately 24-hour cycle.

[8] Condition Adverse to Safety or Security – A situation which may be eligible for a licensee-approved waiver of work hour controls to prevent or mitigate the condition.

Examples of Conditions Adverse to Safety include:

- Public or station personnel health or safety is jeopardized.
- Recovery from a challenge to the safety function of a system or component is delayed.
- Compliance with another NRC regulatory requirement is impaired or prevented.
- Mitigation of a Technical Specification required reactor shutdown or power reduction is impaired or prevented.
- Unplanned increase in the plant status risk color assignment.
- Compliance with site environmental permits is impaired or prevented.
- External events (weather, fire, flooding) pose a risk to station personnel.

3.0[8] cont.

Examples of Conditions Adverse to Security include:

- Compliance with the site security plan is impaired or prevented.
- Failure to implement a compensatory measure creates a condition adverse to safety.

[9] Contractor/Vendor (C/V) - An individual, not employed by Entergy, who is providing work or services to Entergy, either by contract, purchase order, oral agreement, or other arrangement.

[10] Covered Individual (or Covered Worker) - An individual subject to work hour controls. Any individual, granted unescorted access to an Entergy protected area, who performs covered work.

[11] Covered Work – Includes the following:

(a) Operating or on-site directing the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety;

(b) Performing maintenance or on-site directing the maintenance of structures, systems, and components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety;

(c) Performing Radiation Protection or Chemistry duties required as a member of the on-site emergency response organization minimum shift complement, as described in the site-specific Emergency Plan;

(d) Performing the duties of a Fire Brigade member who is responsible for understanding the effects of fire and fire suppressants on safe shutdown capability; and

(e) Performing security duties as an armed security force officer, alarm station operator, response team leader, or watchperson.

[12] Cumulative fatigue - The increase in fatigue over consecutive sleep-wake periods resulting from inadequate rest.

[13] Day-off - A calendar day (0000 – 2400) in which an individual does not start a work shift. The term ‘Day-off’ pertains to work hour limits used during a site outage.

[14] Directing - The exercise of control over a work activity by an individual who is directly involved in the execution of the work activity and either makes technical decisions for that activity without subsequent technical review, or is ultimately responsible for the correct performance of that work activity.

3.0 cont.

[15] Fatigue - The degradation in an individual's cognitive and motor functioning resulting from inadequate rest.

[16] Fatigue Tracking Record (FTR) - A database field used in PQ&S to document circumstances and disposition of situations when work hour limits are exceeded.

[17] Incidental duties - Those unscheduled work activities performed offsite, but required by Entergy, which may be excluded from the work hours calculation when the total cumulative duration is less than 30 minutes in single 10-hour or 34-hour break period (e.g., unscheduled work-related telephone call(s) to the worker during their scheduled break period).

[18] Increased threat condition - An increase in protective measure level, relative to the lowest protective measure level applicable to the site during the previous 60 days, as promulgated by an NRC advisory.

[19] Maintenance - The following onsite maintenance activities: Modification, surveillance, post- maintenance testing, and corrective and preventive maintenance of SSCs that a risk-informed evaluation process has shown to be significant to public health and safety. Predictive maintenance activities (NDE, thermography, vibration analysis, etc) that do not result in a change of state of the SSC may be excluded from covered work maintenance.

[20] Offsite - Any area outside the owner controlled area.

[21] Online - The turbine-generator output breaker is connected to the electrical grid.

[22] Onsite - Within the owner controlled area of the nuclear power plant.

[23] Outage - The turbine-generator output breaker is disconnected from the electrical grid.

[24] PQ&S - The Personnel Qualification and Scheduling software module which is part of the eSOMS suite and is currently used by Entergy as the primary tool for tracking compliance with 10 CFR 26 Subpart I work hour limits. Entergy may change to a different primary tool as long as regulatory requirements are met. Use of a method other than Entergy's primary tool, such as by contractors / vendors, requires approval by the site Subject Matter Expert (Step 4.9).

[25] Risk Informed Evaluation Process - The basis for identifying Operations and Maintenance related Covered Work (See definitions [11](a) and [11](b), respectively). Tasks subject to Covered Work requirements include, as a minimum, operation or maintenance of those systems, structures, or components (SSCs) modeled as having high safety significance in the risk assessment tool (e.g., EOOS) used for the on-line

3.0[25] cont.

risk assessment process (Reference 2.0 [8]). In addition, tasks subject to Covered Work requirements will include:

(a) Those tasks that are identified as risk significant (greater than green) through the online or shutdown risk profile evaluation process (References 2.0 [8] and 2.0 [9] respectively).

(b) Movement of new and irradiated fuel assemblies, including fuel handling for new fuel receipt and fuel movement during refueling.

(c) Dry Storage Cask (DSC) activities including fuel loading, cask dewatering / vacuum drying, seal welding, and transport of loaded DSCs.

[26] Security System Outage – An outage for maintenance or upgrades to a security system(s), during which time compensatory measures are required.

[27] Shift turnover - Those activities that are necessary to safely transfer information and responsibilities between two or more individuals between shifts. Shift turnover activities may include, but are not limited to, discussions of the status of plant equipment, and the status of ongoing activities, such as extended tests of safety systems and components. Shift turnover for security officers may include the time needed for arming / disarming. The amount of time allocated in the individual's work schedule should be appropriate for the job. (Typically ≤ 30 minutes, but in some cases durations up to 1 hour may be needed.)

[28] Tactical exercise - A force-on-force simulation used to evaluate and demonstrate the capability to defend target sets against selected attributes and characteristics of an adversary. A force-on-force tactical exercise includes all key program elements of a station's protective strategy.

[29] Travel Time - A period of time allocated to an Entergy employee who is designated as a Covered Individual and is required to travel for company business; e.g., travel to/from a new temporary work location or to attend required training or meetings. Commuting time, either at the normal work location or a temporary work location, is not Travel Time and is not included in Work Hours calculations.

[30] Watchbill– Staffing rosters tied to a departmental or organizational function.

[31] Week – Seven (7) calendar days beginning at 0000 hours on the first day and ending at 2400 hours on the seventh day.

[32] Work hours – The time periods during which a covered individual performs duties for the licensee. This includes all time periods performing duties at specific times

3.0[32] cont.

scheduled by the licensee (covered work or non-covered work, onsite or offsite) with the following exceptions:

(a) Shift turnover time may be excluded.

(b) Within-shift break and rest periods in which there is reasonable opportunity and accommodations (onsite or offsite) for restorative sleep may be excluded.

(c) Unscheduled work hours for the purpose of participating in unannounced emergency preparedness exercises and drills may be excluded.

(d) Incidental time that does not exceed a cumulative total of 30 minutes during any single break period may be excluded.

(e) A variation of up to 15 minutes between actual start/stop times and scheduled start/stop times is permitted without making an adjustment in the work hour tracking software. This allowance is not intended to be used as a means to routinely increase the duration of an individual's work shift.

[33] Work hour controls - The regulatory requirements in 10 CFR 26.205.

4.0 RESPONSIBILITIES

4.1 Site Vice Presidents

[1] Evaluating site staffing levels to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts.

[2] Authorizing use of work hour control waivers when properly justified by responsible persons (4.10 or 4.11).

[3] Ensuring that issues and trends identified in the annual program review are addressed.

4.2 General Manager, Plant Operations (GMPO)

[1] Reviewing the performance of the station in adhering to work schedules for covered work groups: evaluate the number of schedule changes and reasons for the changes and assess whether or not the schedule is effectively being implemented.

[2] Authorizing use of work hour control waivers when properly justified by responsible persons (4.10 or 4.11).

4.3 **Vice President, Regulatory Assurance**

[1] Providing resolution for program implementation issues involving interpretation of regulatory requirements.

4.4 **Director, Training**

[1] Ensuring training and examination requirements in 10 CFR 26.203(c) are satisfied.

4.5 **Director, Oversight**

[1] Conducting the periodic audit (no less frequently than nominally every 24 months) of the management of worker fatigue per 10 CFR 26.203(f).

4.6 **Directors, Regulatory & Performance Improvement**

[1] Ensuring that the annual review for the site, required by 10 CFR 26.205(e), is completed and documented by January 30 of each year.

[2] Ensuring that the annual summary of fatigue assessments, required by 10 CFR 26.211(g) is completed and documented by January 30 of each year.

4.7 **Supervisors, AA / FFD**

[1] Custodians of Fatigue Assessment Forms (Attachment 9.1), submitted by others, for at least three (3) years from the latest date on the record.

4.8 **Entergy Managers**

[1] Verifying staffing levels are adequate to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts.

[2] Providing guidelines for overtime selection process, including those required by the union contract and the fitness-for-duty requirements outlined in this procedure and in the Entergy Fitness For Duty Program (EN-NS-102).

[3] Evaluating the performance of individuals to ensure individual work schedules prevent impairment from fatigue. This includes evaluating the duration, frequency and sequencing of the hours that are worked by each individual.

[4] Communicating Fatigue Management Program requirements to appropriate personnel within his/her department.

4.9 **Managers, Regulatory Assurance**

[1] Designating a Site Regulatory Assurance point-of-contact as the Subject Matter Expert (SME) to support Fatigue Rule Program implementation including:

(a) Coordinating data collection from covered work groups for submittal of the annual report to NRC per 10 CFR 26.203(e).

(b) Supporting data compilation needed for the R&PI Director annual reviews (5.10 [2] and [5]).

(c) Assisting with interpretation of 10 CFR 26 Subpart I requirements.

(d) Approving use of alternate compliance tools (versus PQ&S), such as other programs used by contractors / vendors.

(e) Assisting with 10 CFR 26.719 notifications to the NRC, if required, in accordance with this procedure.

4.10 **Managers, Shift Operations**

[1] Determining that a waiver of work hour controls is necessary to mitigate or prevent a condition adverse to safety.

[2] Notifying the Manager, Operations - Shift whenever a waiver is required for on-shift operations personnel.

4.11 **Supervisors, Security Shift Operations**

[1] Determining that a waiver of work hour controls is necessary to maintain site security.

[2] Notifying the Manager, Security whenever a waiver is required for on-shift security personnel.

4.13 **Entergy Supervisors**

[1] Identifying individuals in their workgroup who are classified as covered individuals and ensuring these individuals are documented in the PQ&S database.

[2] Ensuring that their covered employees' watchbills, work schedules, and hours worked are entered correctly, monitored and tracked in eSOMS PQ&S software. The required training is covered by curriculum ID F-SOMS-PQSSUPV.

[3] Ensure that schedule adjustments are tested in PQ&S before a covered employee works extra hours to preclude inadvertently exceeding work hour limits.

4.13 cont.

[4] Ensuring a face-to-face capability assessment of covered workers is conducted and documented (Attachment 9.8) during the 4-hour window associated with exceeding work hour limits per an approved waiver.

[5] Monitoring the employee's performance and continued fitness-for-duty while working under a waiver.

[6] If evaluating for the issuance of a waiver and the individual's Supervisor or Manager is not on-site, this responsibility may be performed by any Manager or Supervisor who is qualified to oversee the work to be performed by the individual.

[7] Ensure eligibility for outage work hour limits (outage MDOs) is established prior to assigning an individual to an outage schedule.

[8] Monitoring and reporting concerns related to individuals' fitness for duty based on impairment from fatigue (i.e. behavioral observation program).

[9] Generating Condition Reports for use of work hour limit waivers.

4.14 **Watchbill Coordinators**

[1] Entering baseline watchbills and schedules into PQ&S.

[2] Assisting supervision with PQ&S operations including adjustments to the baseline watchbills and schedules and creation of Fatigue Tracking Records.

[3] Running PQ&S query reports to support scheduling, evaluation, and reporting activities.

[4] Data integrity in PQ&S is crucial to assure compliance with 10 CFR 26 and to assure that covered worker schedules are properly structured and maintained. Watchbill Coordinators have the highest level of software access rights and therefore must complete training prior to being granted this access level. The required training is covered by curriculum ID F-SOMS-WATCHBILL, which consists of the five modules: FLP-ESOM-PQSU1 through FLP-ESOM-PQSU5. The site eSOMS Administrator may credit course completion to a Watchbill Coordinator for any or all of these modules based on job experience and demonstrated proficiency with PQ&S, utilizing EN-TQ-212 'Conduct of Training and Qualification' guidance.

4.15 **eSOMS Administrators**

[1] Support Watchbill Coordinators in the use of PQ&S.

4.15 cont.

[2] Establish / verify proper configuration settings in PQ&S.

[3] Ensure required PQ&S records are retained for at least 3-years, as stated in 5.11 [2].

[4] Support implementation of PQ&S software upgrades.

4.16 **Contract Managers**

[1] Identify those contract individuals who are classified as covered individuals.

[2] Ensuring that their covered contract individuals' watchbills, work schedules, and hours worked are entered correctly, monitored and tracked in eSOMS PQ&S software, or an approved alternate work hour compliance tool (3.0 [24]).

[3] Ensuring that the Fatigue Assessment and Waiver processes (Sections 5.7 and 5.9) are followed when applicable for contract individuals.

[4] Evaluating the covered contract individuals' performance and continued fitness-for-duty while working under a waiver.

[5] If evaluating for the issuance of a waiver and the individual's Supervisor or Manager is not on-site, this responsibility may be performed by any Manager or Supervisor who is qualified to oversee the work to be performed by the individual.

[6] Ensure eligibility for outage work hour limits (outage MDOs) is established prior to assigning an individual to an outage schedule.

[7] Monitoring and reporting concerns related to contract individuals' fitness for duty based on impairment from fatigue (i.e. behavioral observation program).

4.17 **All Covered Individuals**

[1] Evaluating his/her personal fitness to work based on impairment from fatigue.

[2] Making a self-declaration of fatigue (which applies to all employees) and discussing his/her concerns with supervision or management in the event he/she is not fit for duty due to fatigue.

[3] Verifying his/her working hours are correctly documented regardless of whether he/she is paid for the hours worked. Each covered individual can monitor his/her documented work hours via the posted hard copy, posted electronic copy, or via access to PQ&S depending on which work practice is used by that Department.

[4] Self-monitoring and reporting concerns related to individual fitness for duty based on impairment from fatigue.

4.17 cont.

[5] Being aware of his/her work hour history with respect to work hour limits and inform supervision if there is a concern that work hour limits may be or have been exceeded.

5.0 DETAILS

5.1 IDENTIFICATION OF COVERED INDIVIDUALS

[1] Individuals Subject to Work Hour Controls

(a) The Work Hour Controls specified in this procedure apply to any individual in the population described by 1.0[2] who performs Covered Work as defined in 3.0[11]. This generally applies to Entergy employees, contractors, and vendors who perform Covered Work in the following Departments:

(1) Operations
(2) Maintenance
(3) Security
(4) Radiation Protection
(5) Chemistry

(b) Individuals in other Departments may be assigned tasks which meet the Covered Work definition. For example, an Engineer may have a temporary Covered Worker role during an outage. Work Hour Controls must also be enforced for these situations.

(c) Supervisory and management level personnel who assume a role involving the performance of covered work are also subject to the Work Hour Controls.

[2] Documenting Covered Individuals in PQ&S

(a) PQ&S is used to maintain an accurate listing of Covered Individuals and to document compliance with the Work Hour limits (Section 5.2).

(b) Supervisors and contract managers are responsible for ensuring that work schedules and hours worked for Covered Individuals are in PQ&S. An individual may not perform covered work until they have a valid work scheduled created in PQ&S.

(c) Attachment 9.3 should be used by an employee’s supervisor to notify the Watchbill Coordinator for the affected department when new Covered Individuals are identified and need to be documented in PQ&S. Example situations for adding a Covered Individual include:

- New Entergy or contractor employee assigned to Covered Work tasks

5.1[2] cont.

- Existing Entergy or contractor non-Covered Individual reassigned to a position involving Covered Work
- Shared Resource employee (Entergy employee or contractor) temporarily assigned to a position involving Covered Work at an Entergy site

(d) The Watchbill Coordinator updates PQ&S to add the Covered Individual based on the information provided in Attachment 9.3. After completing this update, the Watchbill Coordinator can develop a work schedule in PQ&S for this individual (Section 5.4).

(e) Attachment 9.4 should be used by an employee's supervisor to notify the Watchbill Coordinator for the affected department when an employee is to be removed from Covered Individual status. Example situations for deleting a Covered Individual include:

- Entergy or contractor employee reassigned to a position that does not involve Covered Work
- Entergy employee on an extended absence such as long-term medical leave
- Shared Resource employee leaving the site of a temporary covered work assignment

(f) The Watchbill Coordinator updates PQ&S to ensure that the affected individual is no longer available for active scheduling as a Covered Individual. The work schedule and actual hours worked for this individual must be retained per Section 5.11[2].

[3] Shared Resources

(a) When using Shared Resources per EN-HR-130, the worker's supervisor at the receiving site is responsible to determine if the individual will be performing covered work. Individuals performing covered work must be added to the receiving site PQ&S database (See 5.1[2]).

(b) The worker and supervisor at the originating site must ensure that a 9-day work hour history is provided to the receiving site to support preparation of a work schedule that meets work hour limits.

(c) The worker's supervisor at the receiving site must ensure that a valid work schedule for the Covered Individual is established in PQ&S which includes the 9-day work history at the originating site plus a reasonable allowance for travel time.

(d) In lieu of a 9-day work history, the receiving site may elect to provide a 34-hour break before the Covered Individual commences work.

5.1[3] cont.

(e) The worker's supervisor at the receiving site also ensures that a 9-day work history is provided at the end of the temporary assignment to support the Covered Individual returning to the originating site.

5.2 WORK HOUR LIMITS FOR COVERED INDIVIDUALS

NOTES

Work hour tracking is accomplished using the eSOMS PQ&S software. Use of an alternate compliance tool, such as by contractors / vendors, requires approval of the site SME.

Work hour limits for covered workers may only be exceeded during Exceptions (Section 5.3) or when evaluated and approved using the Waiver Process (Section 5.9).

[1] Work hour limits for individuals performing Covered Work consist of the following:

(a) Maximum of 16 work hours in any 24-hour period.

(b) Maximum of 26 work hours in any 48-hour period.

(c) Maximum of 72 work hours in any 7-day period..

(d) Minimum 10-hour break between successive work periods, except that an 8-hour break is allowed when necessary to accommodate a crew's scheduled transition between work schedules or shifts.

(e) Minimum 34-hour break in any 9-day period.

(f) 54-hour rolling average, as described in 5.2[3].

(g) Minimum Days Off (MDO), as described in 5.2[4].

[2] Limits 5.2[1](a) through (e) apply for online and offline plant conditions. Limit 5.2[1](f) must be used when the plant is online and limit 5.2[1](g) is typically applied when the plant is offline, for individuals working on outage activities. However, limit 5.2[1](f) may also be used in lieu of limit 5.2[1](g) when the plant is offline.

[3] The 54-hour rolling average limit (5.2[1](f)) is a maximum average of 54 work hours per week calculated using a rolling average period of up to 6 weeks. The requirements of the averaging calculation are modeled in the PQ&S software and include the following characteristics:

5.2[3] cont.

(a) The duration over which the work hour average is calculated is called the Averaging Period (Definition 3.0[3]). The Averaging Period may be set by the Watchbill Coordinator for the work group or for individuals. The Averaging Period must be in 1 week increments up to a maximum duration of 6 weeks.

(b) The date and time during the week when a work hour average in calculated is called the Calculation Milestone (Definition 3.0[5]). The Calculation Milestone is established in this procedure and any changes must be approved through the procedure change process.

(c) When a work shift starts during one calendar day and ends during the next calendar day, the work hours for that shift are attributed to the calendar days in which the hours were actually worked.

(d) PQ&S performs forward and backward calculations for the work hour average. The forward calculation considers future scheduled work hours to support schedule adjustments that may be needed to assure future compliance with the limit. The backward calculation is the verification of compliance with the limit based on actual hours worked for the current Averaging Period.

(e) Transitions into and out of an Averaging Period are discussed in Section 5.5.

[4] The MDO limits (5.2[1](g)) available for use during a unit outage depend on the category of covered work (Definition 3.0[11]) being performed. For the purposes of this limit, a ‘Day Off’ is defined in 3.0[13].

(a) During the first 60 days of a unit outage, the MDO limit for Maintenance covered work is a minimum of 1 day off in any rolling 7-day period, for individuals working on outage activities.

(b) During the first 60 days of a unit outage, the MDO limit for Operations, Radiation Protection, Chemistry, and Fire Brigade covered work is a minimum of 3 days off in each successive, non-rolling 15-day period, for individuals working on outage activities.

(c) During the first 60 days of a unit outage or planned security system outage, the MDO limit for Security covered work is a minimum of 4 days off in each successive, non-rolling 15-day period.

(d) During the first 60 days of an unplanned security system outage or increased threat condition, Security covered work is not subject to the 54-hour rolling average limit or the MDO limit

5.2[4] cont.

(e) The 60-day periods in (a) through (d) above may be extended for individuals in 7-day increments for each non-overlapping 7-day period that the individual worked not more than 48 hours during the unit outage, security system outage, or increased threat condition, as applicable. Note that this allowance provides for a maximum extension of 56 days based on a maximum of eight non-overlapping 7-day periods available in a 60-day period.

(f) For dual unit sites, when one unit is in an outage and the other unit is on-line, any Covered Individual who performs outage tasks may work a schedule based on the MDO limits. However, at least 2 Senior Operators and 2 Reactor Operators in the control room for the on-line unit must remain on a schedule using the 54-hour average online limit.

(g) When an Entergy employee or contractor/vendor works during two or more unit outages or security system outages (or a combination thereof) at one or more Entergy sites, and the interval(s) between successive outages is less than 9 days, the supervisor must ensure that the individual has had a 34-hour break period in the previous 9 days and that the maximum ceilings limits (5.2 [1](a) to (c)) are met.

[5] Shift turnover time may be excluded from the calculation of actual hours worked. Only one period of shift turnover, either at the beginning or the end of the shift but not both, may be excluded for purposes of calculating the break period. These allowances for excluding shift turnover time may not include activities such as holdover for late arrivals, holdover for event investigations, and early arrival for required meetings, training, and special evolution briefings.

[6] Within shift rest breaks during which the individual is provided opportunity and accommodations for restorative sleep may be excluded from the calculation of actual hours worked.

[7] When working during the transition from daylight savings time to standard time, the extra hour incurred during that shift may be excluded from the calculation of actual hours worked. The actual hours worked are used in the calculation for the reverse transition.

[8] Incidental time worked by a covered individual, when the cumulative time during a single break period exceeds a nominal 30 minutes, must be included in the work hours calculation.

5.3 EXCEPTIONS TO WORK HOUR CONTROLS

[1] Force-on-force tactical exercises

5.3 cont.

- During the conduct of NRC-evaluated force-on-force tactical exercises, hours worked in excess of 54 hours during the week of the exercise may be excluded from the calculation of the 54-hour average limit. This allowance applies to all Security personnel whose work schedules are modified to support the exercise. In the event that the exercise is conducted while the plant is offline and MDO limits are being used, the work shifts may be excluded from the MDO compliance calculation. The PQ&S code available for recording the hours over 54 and the MDOs eligible for exclusion under this provision is FTR ID "EX-FF."

[2] Common defense and security

- Work Hour Control requirements need not be met when informed in writing by the NRC that these requirements, or any subset thereof, are waived for security personnel in order to assure the common defense and security, for the duration of the period defined by the NRC. The applicable FTR ID is "EX-CDS."

[3] Plant emergencies

- Work Hour Control requirements need not be met during declared emergencies, as defined in the Site Emergency Plan. However, information regarding hours worked needs to be available in PQ&S to support a transition to post-emergency work schedules. The PQ&S code available for recording eligible hours under this provision is FTR ID "EX-PE."

[4] Hurricane Response Situations

- A site-specific rule exemption approved by NRC for Waterford-3 applies for Work Hour Control requirements during hurricane response situations as implemented in Reference 2.0 [13]. The waiver process (Section 5.9) is available for other sites to manage work force requirements in this situation.

5.4 SCHEDULES

[1] For personnel defined as covered workers in this procedure work hour schedules are developed and maintained in eSOMS PQ&S software. Details on developing a work schedule can be found in the Ventyx PQ&S User Guide (Reference 2.0[5]).

[2] When designing schedules, the following factors should be considered with the performance objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts:

- Duration of scheduled work period (typically <12 hour shifts)
- Duration of break period

5.4[2] cont.

- Consistent start times for work periods (e.g. 6 or 7 a.m.)
- Considerations of start times that are consistent with circadian factors
- Consistent stop times for work periods
- Consistent rotation (e.g., if working a 5-week shift rotation, the scheduled work days and days off are repeated every five weeks)
- Stable 24-hour shift rotation (e.g., 3x8s, 2x12s, 2x10s with four hours un-staffed)
- The impact of backward shift rotation (rotation of the start of the shift from days to night to swings)
- Rotating schedules provide suitable transition between shifts (days/nights, days/swings/nights), 8-hour shift rotations rotate forward or provide more than 24 hours between work periods to adjust circadian rhythm; 12-hour shift rotations provide 34 hours off during day/night transitions
- Long range predictability is a key aspect of fatigue mitigation
- Circadian factors - fixed vs. rotating shifts
- Allowances for margin to accommodate unscheduled time
- Training and qualification status to ensure that scheduled personnel are qualified to perform assigned duties
- Vacation scheduling
- Known short/long term absences.

[3] The following provides an overview of the <u>typical</u> scheduling process using PQ&S:

> <u>NOTE</u>
>
> Words in ***bold italics*** refers to terminology / functions in PQ&S.

- The Watchbill Coordinator (WBC) develops the baseline schedule based on input (i.e., available staffing, required shift coverage, qualifications, etc) from the group supervisor or contract manager.
- Multiple baseline watchbills may be established to cover different situations, such as online and outage conditions.

5.4[3] cont.

- The WBC ***instantiates*** the desired watchbill for a selected period of time or number of shift rotation cycles into the future.

- The WBC updates the ***instantiated*** watchbill with any known schedule variations (i.e., approved vacations, shift swaps, etc) and makes schedule adjustments, if needed, to clear any resulting rule violations.

- The WBC or supervisor / contract manager ***approves*** the final schedule. This step in PQ&S is typically completed several days prior to the schedule start date to support distribution of the schedule to affected workers. Completing this step before the first scheduled work shift commences, ensures that the assigned schedule does not exceed work hour limits. Approved schedules may be distributed by posting hardcopies printed from PQ&S and /or by providing PQ&S view access rights to affected workers.

- The supervisor or contract manager monitors actual hours worked compared to scheduled hours and ensures that any schedule variations are approved in advance. The WBC can assist the supervisor / contract manager in entering schedule variations and making other adjustments to the schedule to clear any resulting rule violations.

- In the event that a plant situation for covered work requires and warrants a schedule variation that must be approved via the waiver process (Section 5.9) the supervisor / contract manager must ensure that a PQ&S ***Fatigue Tracking Record*** is completed for or associated with each instance that rule limits are exceeded (i.e., complete or associate an FTR for every rule limit exceeded on every day that the rule limit(s) are exceeded. This data entry is necessary to assure accurate reporting of waiver usage to the NRC.

- The supervisor / contract manager periodically ***validates*** completed work histories. This step, which locks the record for documentation purposes, is typically performed at time intervals that coincide with the payroll timesheet process. This step should be completed not later than 14 calendar days following the end of the last shift worked in that schedule period.

NOTE
Data recorded in PQ&S for the work hour calculation will not necessarily be the same as data recorded in the timekeeping tool used for payroll purposes.

5.4 cont.

[4] The work hour history recorded in PQ&S needs to reflect all work hours that are subject to the work hour limits, including periods of incidental time which exceed the 30 minute limit, time periods associated with call-ins, and time periods or durations allocated for travel.

[5] In the event of a eSOMS PQ&S system outage:

- Ensure eSOMS Administrator is promptly notified to implement recovery activities.
- Maintain current approved work schedules, if possible, for the duration of the system outage.
- Manually review any schedule changes for compliance with work hour limits.
- Retain a hardcopy of any schedule changes until PQ&S is returned to service and the schedule changes can be entered into PQ&S.

5.5 TRANSITIONS

[1] Transition to Commence Covered Work

(a) When an individual is assigned as a Covered Individual in PQ&S (Step 5.1[2]) a valid work schedule must first be created and verified to be in compliance with work hour limits.

(b) A valid work schedule must include either a 9-day history of hours worked or a 34-hour break (Attachment 9.3) except as noted for contractors who are not transitioning from another Entergy site.

[2] Beginning a 54-hour Rolling Averaging Period

(a) A new averaging period is typically started for an individual transitioning from outage MDO limits or for a new Covered Individual added to the PQ&S database.

(b) The averaging period used for Covered Individuals is typically 6 weeks; however averaging periods of 1 to 5 weeks may be used if preferable for that work group. Also, the averaging period used for an individual beginning as a covered worker less than 6 weeks prior to a planned outage would be based on the time available before that individual is scheduled to transition to outage MDO limits.

5.5[2] cont.

(c) The Calculation Milestone for Entergy sites, defined as midnight Sunday, is a locked calculation parameter in PQ&S.

(d) The work hours during a partial week prior to the first Calculation Milestone are not included in the 54-hour average calculation.

(e) The first compliance check with respect to the 54-hour average limit occurs on the n^{th} Calculation Milestone, where n is the number of weeks selected for the averaging period. A new rolling compliance check is then performed weekly at the day and time of the Calculation Milestone.

[3] Ending a 54-hour Rolling Averaging Period

(a) An averaging period is typically ended when an individual transitions to MDO limits for covered work during an outage or the individual is removed from the PQ&S database of covered workers.

(b) A rolling period may not be arbitrarily ended or changed (i.e., use a different averaging period) for the purpose of adjusting the result of the 54-hour averaging calculation.

(c) An individual may be transitioned to a rolling period with a different averaging period in response to valid situations such as transfer to a work group that has a different schedule design. In such cases, up to 9 days of work history will be included in the averaging calculation for the new rolling period.

[4] Early Truncation of an Averaging Period

(a) Early truncation of an Averaging Period means that the rolling average is unexpectedly ended before the first Calculation Milestone is reached. In the following situations, compliance with the 54-hour limit is considered to be met, as long as the work schedule documented in PQ&S at the time of truncation was in compliance with the 54-hour limit:

(1) Unexpected unit outage
(2) Declared emergency per site Emergency Plan
(3) Unplanned termination of employment
(4) Unplanned security system outage (Security only)
(5) Increased threat condition (Security only)

5.5 cont.

[5] Reset from deviations

(a) A Covered Individual is considered reset from a work hours deviation (either unplanned deviation or approved via the waiver process) when:

(1) The ceiling limits (16/24, 26/48, 72/7) are met,
(2) the break limits are met (10-hour and 34 hour), and
(3) a work schedule is in place that assures compliance with the 54-hour average prior to the next Calculation Milestone or assures compliance with the Minimum Day Off limit during the current period (7-day or 15-day as applicable for the worker category).

5.6 CALCULATING HOURS WORKED

[1] Work hour limits and the associated calculation and tracking of work hours apply to those individuals who perform or direct covered work (i.e., Covered Individuals). This calculation includes all work hours regardless of whether the actual task being performed is classified as covered or non-covered work.

[2] Supervisors/Contract Managers or designee is responsible for final approval of fatigue rule work hour calculations.

[3] Work hour records should show the number of hours worked each calendar day, whether salary or hourly-paid worker. Work period start and stop times should be recorded and documented in a consistent manner.

[4] Work hours also include but are not limited to the following:

(a) All within-shift break times and rest periods during which there is no reasonable opportunity or accommodations appropriate for restorative sleep.

(b) Shift holdovers to cover for late arrivals of incoming shift members.

(c) Early arrivals of individuals for required meetings, training, or pre-shift briefings for special evolutions (these activities are not considered shift turnover activities).

(d) Holdovers for interviews needed for event investigations.

5.6[4] cont.

(e) Travel time for Entergy employees, as defined in step 3 [29], is included in work hours calculations. The amount of travel time included in the work hours calculation should be based on factors such as distance, mode of travel, and, if applicable, opportunity for rest during the travel period. If Entergy directs the individual to travel at a specific time, then that specific time must be recorded in PQ&S. If the employee is allowed to travel at their own discretion, then the travel time allowance may be recorded at any time during the unscheduled period available for travel. Regardless of what time period is used to record the travel time allowance, that time is included in the work hour calculation to verify that ceiling, break, and MDO limits are not exceeded.

(f) Call-in work periods. A call-in is considered an addition to the normal work schedule period. The work hours can be accounted for in the following three methods depending on timing and circumstances of the call-in work period:

(1) The call-in hours can be considered a separate work period. This method requires a 10-hour break before the call-in period and after the call-in period.

(2) The call-in hours can be considered an extension to the preceding or succeeding work period. Using this method, the intervening hours of the extended work period must be counted as hours worked.

(3) A waiver for the 10-hour break may be processed if the applicable requirements (Section 5.9) are met.

(g) Incidental duties (Definition 3.0[17])

(1) Supervisors may exclude from the calculation of an individual's work hours unscheduled work performed at the supervisor's request (e.g., technical assistance provided by telephone) provided the total duration of the work does not exceed 30 minutes during any single 10-hour or 34-hour break period.

(2) Break period interruptions totaling more than 30 minutes in any single 10-hour or 34-hour break period may not be treated as 'incidental duty' and must be included in the work hour calculation.

5.6[4] cont.

(h) Unannounced Emergency Plan Exercises and Drills

(1) Supervisors should exclude from the calculation of an individual's work hours the time the individual works unscheduled work hours for the purpose of participating in the actual conduct of an unannounced emergency preparedness exercise or drill.

[5] Within-Shift Breaks and Rest Periods:

(a) Time spent for meals may not be excluded from the work hour calculations.

(b) Any other break time allowed during the scheduled work day that does not allow opportunity or accommodations for restorative sleep is included in the work hour calculation.

(c) Only that portion of a break or rest period during which there is a reasonable opportunity and accommodation for restorative sleep (e.g. a rest of at least 30 minutes) may be excluded.

[6] Paid Time Not Included in the Work Hour Calculations:

(a) Pay for hours not worked:

(1) Vacation/Personal Days

(2) Short Term/Long Term Disability (STD/LTD)

(3) Jury Duty/Military Leave/ Bereavement

(4) Holiday pay

(5) Specific hours to be paid identified in union contracts – this could be a minimum amount of hours to be paid to a worker for call-ins, training, etc.

(b) Declared Plant Emergencies as defined in the Site Emergency Plan.

(c) Unannounced emergency preparedness exercises and drills.

5.6 cont.

[7] Personal and Discretionary Time

(a) Individuals may be onsite on their own personal time prior to or following their assigned shift engaged in activities such as reading, eating, and use of a fitness center. This personal time is not included in the Work Hours Calculation.

(b) Individuals may be off-site and engaged in work-related activities, at their own discretion, such as reading email, self-study time, and GET renewal. This discretionary time is not included in the Work Hours Calculation. Individuals are responsible for managing their own time and potential impact on fatigue when returning to the site.

5.7 FATIGUE ASSESSMENTS

[1] Fatigue Assessments apply to all individuals (Entergy employees and contractors) who are subject to the requirements of Entergy's Fitness-for-Duty Program (1.0 [2]). Entergy's policy for personnel expectations related to fatigue management is stated in EN-PL-202 (Reference 2.0 [12]).

[2] A Fatigue Assessment is a fitness-for-duty evaluation tool and affected individuals refusing to participate in a required fatigue assessment interview will be considered to be fatigued and may be subject to disciplinary action. Individuals who exhibit chronic fatigue should be considered for referral to the Employee Assistance Program. (Reference 2.0 [12]).

[3] Supervisor disposition of a Fatigue Assessment may entail a mandatory 10-hour (minimum) break period for the affected individual. Administration of this break period with respect to pay is in accordance with References 2.0 [11] and [12].

[4] The Fatigue Assessment is conducted by an authorized Fatigue Assessor and shall be documented on Attachment 9.1

[5] The Fatigue Assessor must meet the following:

(a) Is a supervisor or above or a staff member of the site access authorization group.

(b) May be a contractor / vendor supervisor if the individual being assessed is an employee of that contractor / vendor.

(c) Has a valid unescorted access badge which indicates that General Employee Training (GET) is current.

(d) Meets any other Fatigue Assessor limitations as stated in Steps 5.7[7] through 5.7[11] for the type of fatigue assessment being performed.

5.7[5] cont.

(e) Additional guidance for the Fatigue Assessor is provided in Attachment 9.2.

[6] There are four categories of Fatigue Assessments:

(a) Post-event (Step 5.7[7])

(b) For-cause (Step 5.7[8])

(c) Self-declaration (Steps 5.7[9] and [10])

(d) Follow-up (Step 5.7[11])

[7] Post-event Fatigue Assessment

(a) The purpose of a Post-event Fatigue Assessment is to determine if fatigue was a contributor to the event.

(b) The Post-event Fatigue Assessment is required in conjunction with Post-event drug / alcohol testing, per EN-NS-102 for the following three situations:

(1) For any event involving an injury that is or may become OSHA recordable, and where human error may have caused or contributed to the event (Reference 2.0[14]). The testing applies to the individual(s) who committed the error, not to the individual(s) who were affected by the event and whose actions likely did not cause or contribute to the event.

(2) For any event involving radiation exposures or releases of radioactivity in excess of regulatory limits, where human error may have caused or contributed to the event.

(3) For any event involving actual or potential substantial degradations of the level of safety of the plant, where human error may have caused or contributed to the event.

(c) Medical treatment may not be delayed for purposes of conducting the Post-event Fatigue Assessment.

(d) In addition to the requirements of step 5.7[5], the Fatigue Assessor for a Post-event fatigue assessment may not have:

(1) Performed or directed (on-site) the work activities during which the event occurred;

5.7[7] cont.

(2) Performed another fatigue assessment during the 24-hour period preceding the event, for any individual(s) who performed or directed (on-site) the work activities during which the event occurred; and

(3) Performed the capability assessment (Attachment 9.8) in a situation where the affected individual is performing or directing (on-site) work in excess of work hour limits as authorized by a waiver.

(e) If the Post-event Fatigue Assessment concludes that fatigue was a contributor to the event, then a 10 hour (minimum) break is required.

[8] For-cause Fatigue Assessment

(a) The purpose of a For-cause Fatigue Assessment is to evaluate the ability of an individual, to safely and competently perform his or her duties following an observed condition of apparent fatigue.

(b) The For-cause Fatigue Assessment is initiated by a supervisor based on direct behavioral observation or based on credible information provided by others indicating that the individual is exhibiting signs of fatigue. Observation for fatigue is not applicable during an individual's break period.

(c) The drug and alcohol testing requirements of the FFD Program (EN-NS-102) may also apply in a For-cause situation. If the observed condition is impaired alertness with no other behaviors or physical conditions creating a reasonable suspicion of possible substance abuse, then the assessment may be limited to evaluation for fatigue and the drug / alcohol testing is not required. If the supervisor has reason to believe that the observed condition is not due to fatigue, then the response may be limited to drug / alcohol testing and the fatigue assessment is not required.

(d) The For-cause Fatigue Assessment is not required if the affected individual completes a 10-hour break period prior to resuming his or her duties. The 10-hour break period may not be used in lieu of drug / alcohol testing, if indicated in [8](c).

(e) In addition to the requirements of step 5.7[5], the Fatigue Assessor may not be the individual who observed the condition of impaired alertness.

5.7 cont.

[9] Self-declaration Fatigue Assessment (for on-site individuals)

(a) Entergy respects and encourages the rights and responsibilities of any individual to make a self-declaration of fatigue when they are unable to safely and competently perform their assigned duties for any portion of the current work period. Individuals who exhibit chronic use of self-declaration, absent a sound medical reason, may be subject to disciplinary action (Reference 2.0 [12]).

(b) The individual must make a clear statement to his or her supervisor that he or she is making a self-declaration of fatigue under the provisions of EN-OM-123.

(c) In most cases, a self-declaration of fatigue will result in a 10-hour (minimum) break for the affected individual and a Fatigue Assessment is not required.

(d) Although unlikely, there may be situations where, instead of permitting or requiring a break, a Self-Declaration Fatigue Assessment may be performed to evaluate the individual for continued work. Duties assigned in this case may not be covered work, even if the individual is designated as a Covered Worker, until a 10-hour break is completed and the individual is no longer making a self-declaration.

(e) Following the self-declaration, the supervisor must promptly inform the individual which of the two options is being used (10-hour break OR Fatigue Assessment to support performing non-covered work) and take the required actions to implement the selected option.

(f) The supervisor must take immediate action to obtain a relief worker if the affected Covered Individual is filling a regulatory minimum staffing position. A Self-Declaration Fatigue Assessment is not required for the time interval needed for the relief worker to arrive, although compensatory measure may be used during that time interval.

[10] Self-declaration Fatigue Assessment (for off-site individuals)

(a) Offsite individuals who use a self-declaration of fatigue as the basis for not reporting to work must complete a 10-hour (minimum) break before returning to work. Since a face-to-face fatigue assessment cannot be performed for an offsite individual, the affected individual will be considered to be fatigued and the 10-hour break period commences at the time of the notification by the offsite individual.

(b) The supervisor receiving the self-declaration shall document the basic information including date and time of call, individuals name, and any reason provided for the self-declaration.

5.7 [10] cont.

(c) Additionally, the supervisor shall inform the individual that, upon returning to work, he or she must coordinate with his or her supervisor to discuss the circumstances regarding the self-declaration. Coordination with Human Resources (i.e., the site HR Business Partner) may also be appropriate to adequately assess the absence pursuant to Entergy's Fitness-for-Duty and Attendance policies. Individuals who exhibit chronic use of self-declaration, absent a sound medical reason, may be subject to disciplinary action (Reference 2.0 [12]).

[11] Follow-up Fatigue Assessment

(a) The purpose of the follow-up fatigue assessment is to determine if an individual, is capable of safely and competently resuming his or her duties in situations where the individual is requested by his or her supervisor to return to work prior to completing a mandatory 10-hour break period associated with a Post-event, For-cause, or Self-Declaration Fatigue Assessment as stated in Steps 5.7 [7] through [10].

[12] Fatigue Assessments are documented on Attachment 9.1 and consist of four parts.

(a) Part A is initiated by any supervisor or above, or a staff member of the access authorization group, to document the need for the fatigue assessment. The initiator may subsequently be the Fatigue Assessor or in some circumstances a different person may fill the role of Fatigue Assessor. In addition to providing information for subsequent steps in the fatigue assessment, the data provided in Part A is used in the annual review of fatigue assessments (5.10 [5]).

(b) Part B is completed by the assigned Fatigue Assessor to document the face-to-face meeting with the individual being assessed. Requirements for the Fatigue Assessor are stated in 5.7 [5]. During the meeting the Fatigue Assessor reviews the need for the fatigue assessment (Part A), obtains additional input from the individual being assessed (Part C) and observes for visual cues of fatigue. At the end of the meeting, the Fatigue Assessor documents his or her conclusions with respect to fatigue.

(c) Part C is completed by the individual being assessed, at the direction of the Fatigue Assessor, during the face-to-face meeting described above.

(d) Part D is completed by the individual's supervisor to document the disposition of the fatigue assessment results. If the individual's supervisor is not onsite, or is otherwise not available, an alternate supervisor or above, may complete Part D.

5.7 cont.

[13] The supervisor in Part D ensures that the completed Attachment 9.1 is transmitted to the Supervisor AA/FFD for record retention. A collective review and compilation of all fatigue assessments for the site is required at least annually (5.10 [5]) and the storage of all completed fatigue assessment forms at one location supports this effort. The record retention period at this location is a minimum of 3 years. The supervisor may also retain a copy in the individual's personnel file. However, Attachment 9.1 may contain personal information and distribution should be limited.

5.8 CONFLICT RESOLUTION

[1] If an individual disagrees with the results of a fatigue assessment, then the individual may request a second assessment by another trained, qualified and independent assessor.

[2] The individual may also follow the steps available in the Employee Concerns Program.

5.9 WAIVER PROCESS

[1] The waiver process shall be used to provide authorization in advance for Covered Workers exceeding work hour limits (Section 5.2) while performing covered work.

[2] Waivers are only permitted in situations involving a Condition Adverse to Safety or Security (3.0 [8]) AND should only be granted to address circumstances that could not have been reasonably controlled.

[3] Waiver use shall be documented in the Corrective Action Program (EN-LI-102) per step 5.9 [7](f).

[4] The waiver process is not applicable if a Covered Worker will exceed work hour limits while performing non-covered work. However, per Step 5.6 [1], work hour tracking for Covered Workers includes covered and non-covered work.

[5] Waiver documentation shall include:

(a) A description of the circumstances that necessitate the waiver.

(b) A statement of the scope of work to be performed.

(c) The time period for which the waiver is valid.

5.9 cont.

[6] The waiver process consists of two components:

(a) Documentation that plant conditions or circumstances warrant the use of a waiver (Attachment 9.7; “Waiver Basis and Approval”).

(b) Documentation that the affected Covered Individual(s) is (are) fit-for-duty, with respect to fatigue, for any work period (shift) during which one or more work hour limits will be exceeded (Attachment 9.8; “Covered Worker Capability Assessment”).

[7] Attachment 9.7; “Waiver Basis and Approval”:

(a) The purpose of Attachment 9.7 is to document that a condition exists which warrants the use of a waiver and that the Site Vice President (SVP) or General Manager, Plant Operations (GMPO) authorize work hour limits being exceeded to address that condition.

(b) Any individual may be assigned as the originator to coordinate preparation of Attachment 9.7.

(c) 9.7, Section A: The Manager, Shift Operations makes the determination that a waiver is necessary to mitigate or prevent a condition adverse to safety, OR the Supervisor, Security Shift Operations makes the determination that a waiver is necessary to maintain site security. Refer to Definition 3.0 [8] for additional information regarding “Condition Adverse to Safety or Security”.

(d) 9.7, Section B: The originator ensures that a brief description of the work to be performed is provided. Input may be obtained from multiple work groups if needed to describe the major activities being performed. Information in this section may be used by supervisors performing the capability assessment (Attachment 9.8) of individuals who are assigned work under this waiver.

(e) 9.7, Section C: The SVP, GMPO, or designee for either, authorizes the use of a waiver to exceed work hour limits. Authorization may be obtained by telecom or email. The period for which the approved waiver is valid will depend on the scope of work associated with that waiver. In no circumstances may the waiver be approved for a period exceeding 14 calendar days. If the condition persists beyond the expiration date of the waiver, step 5.9 [7] must be repeated. A new Attachment 9.7 is needed in this case.

(f) 9.7, Section D: The originator ensures that a Condition Report is initiated to document that a waiver of work hour limits is being used. Also ensure that the approved Attachment 9.7 is attached in the Condition Description.

5.9 [7] cont.

(g) The originator ensures that a supervisor in the work group(s) that will be performing work under this waiver is provided with a copy of the approved Attachment 9.7 and the Condition Report number initiated for this waiver.

[8] Attachment 9.8; "Covered Worker Capability Assessment":

(a) The purpose of Attachment 9.8 is to document that each Covered Worker who will exceed work hour limits as a result of the approved waiver condition is capable of performing those duties without impairment due to fatigue.

(b) A separate Attachment 9.8 is required for each individual and each work period that involves work hours in excess of one or more limits for the duration of the approved waiver period. Therefore, there may be multiple Attachment 9.8 Forms associated with an approved Attachment 9.7 Form.

(c) Attachment 9.8 should only be completed for Covered Workers who have accepted the additional work hours based on other overtime selection processes.

(d) Attachment 9.8 is completed by the supervisor who conducts the face-to-face capability assessment meeting with the Covered Worker. That supervisor:

(1) Shall have a valid unescorted access badge, which indicates that General Employee Training is current.

(2) Shall be qualified to direct the work being performed by the Covered Worker; OR if that supervisor is not on site, a supervisor who is qualified to provide oversight of the work may conduct the face-to-face capability assessment.

(3) Is not necessarily the organizational supervisor of the Covered Worker.

(e) Attachment 9.8 and the face-to-face capability assessment may not be performed more than 4 hours before the individual begins performing work under the waiver. If more than one work hour limit will be exceeded during the work period, the timing of the 4-hour window is based on the earliest time that a limit will be exceeded. Assistance from a Watchbill Coordinator may be needed to identify the affected work hour limits.

(f) The capability assessment must address:

(1) The potential for acute and cumulative fatigue, considering the individual's work history for at least the past 14 days.

5.9 [8] cont.

(2) The potential for circadian degradations in alertness and performance, considering the time of day for the additional work hours.

(3) The potential for impairment due to fatigue to adversely affect the risk-significant functions of the equipment or components being operated or worked on by the Covered Worker(s) who is (are) exceeding work hour limits.

(4) Whether any fatigue-related controls, conditions or counter-measures must be established while the Covered Worker is exceeding work hour limits.

(g) The applicable supervisor (5.9 [8](d)) completes Attachment 9.8 as follows:

(1) Ensure that a Condition Report has been initiated for waiver use (step 5.9 [7](f)) and record the CR number in Section A.

(2) Section B is completed for the Covered Worker being assessed. The work hour limit(s) that will be exceeded for this individual can be determined by entering the proposed schedule change in PQ&S. The covered work task(s) to be performed by this individual needs to be consistent with the scope of work description recorded in Section B of Attachment 9.7.

(3) The supervisor and the Covered Worker complete Section C during a face-to-face meeting. The meeting may not be conducted more than 4 hours before the individual begins performing any covered work under the waiver. If more than one limit will be exceeded during the work shift, the 4-hour timeframe is based on the earliest time that a limit will be exceeded. The questions in Section C are intended to provide reasonable assurance that the Covered Worker will be able to perform the assigned covered work, without fatigue-related impairment, while working hours that exceed one or more of the work hour limits. The discussion during the face-to-face meeting need not be limited to these questions.

5.9 [8] cont.

(4) The supervisor documents his / her conclusions in Section D and the supervisor and covered worker sign the completed form. If the response in D4 is ‘Yes’, the proposed schedule change in PQ&S can be finalized, and the supervisor ensures that the completed form is attached to the PQ&S FTR(s) associated with the work hour limit(s) that is (are) exceeded. If the waiver condition is resolved without work hour limits actually exceeded, the completed form does not need to be retained. If the response in D4 is ‘No’, the covered worker is not approved to exceed work hour limits and the completed form does not need to be retained.

[9] When the condition adverse to safety or security is resolved, the affected covered worker(s) schedule(s) should be adjusted in a timely manner to restore compliance with all work hour limits. Attachments 9.7 and 9.8 are not required when work hour limits are exceeded while performing non-covered work. However these occurrences should be minimized and in no case shall covered work activities be resumed while limits are exceeded, unless authorized under the waiver process or eligible for exceptions listed in Section 5.3.

[10] Discovery of work hour limits exceeded without prior approval (i.e., failure to follow the Waiver Process).

(a) Upon discovery that one or more work hour limits were exceeded for any Covered Worker, while performing covered work, and the Waiver Process was not followed or an Exception allowance (Section 5.3) does not apply, a Condition Report for violation of NRC requirements shall be processed in accordance with the Corrective Action Program (EN-LI-102). PQ&S shall also be updated to ensure that an FTR (Violation Without Waiver) is associated for every individual and every work shift affected by this circumstance. One CR may be used to describe a single condition which involves multiple workers and / or multiple work periods. These occurrences are not included in the waiver statistics for the NRC Annual Report (5.12.5), however these occurrences should be reviewed at least annually (5.10.2) to ensure that corrective actions are effective.

(b) If the condition is discovered while the affected individual is still engaged in covered work and working in excess of one or more work hour limits, the supervisor shall take prompt action to safely secure the covered activity being performed and address the fatigue aspects of the affected worker by:

- Providing sufficient time off to be in compliance with work hour limits, or
- Following the waiver / capability assessment process, if eligible.

5.10 AUDITS AND REVIEWS

[1] The Director, Oversight shall ensure that the entire Fitness for Duty Program, including the Fatigue Management Program, is periodically audited (Reference 2.0 [10]).

[2] The Director, Regulatory & Performance Improvement shall ensure that the annual review required by 10 CFR 26.205(e) is completed and documented by January 30 for the prior calendar year. Attachment 9.5 provides a typical report format.

[3] The review shall assess the adequacy of staffing levels for those activities that are subject to work hour controls.

[4] Review documentation shall include a description of the methods used, any adverse trends or other deficiencies identified by the review, and any corrective actions completed or planned.

[5] The Director, Regulatory & Performance Improvement shall ensure that the annual summary of fatigue assessments required by 10 CFR 26.211(g) is completed and documented by January 30 for the prior calendar year.

[6] Data collection at periodic intervals throughout the calendar year is encouraged to support the review and evaluation activities (5.10[2] through 5.10[5]) performed in January of the following year.

5.11 DOCUMENT STORAGE

[1] The Supervisors, AA/FFD retain documentation of the Fatigue Assessment Forms (Attachment 9.1) for at least three (3) years.

[2] Records of shift cycles, shift schedules, and actual hours worked for Covered Individuals are maintained in PQ&S or an archive database for at least three (3) years.

[3] The Corrective Action Program is used to document use of waivers (Attachment 9.7) per step 5.9 [7](f) of this procedure.

[4] Documentation of the face-to-face assessment (Attachment 9.8) performed prior to covered workers exceeding work hour limits is retained in PQ&S or an archive database for at least three (3) years.

5.12 REPORTS

[1] The Manager, Regulatory Assurance is responsible for submitting the annual FFD Program Performance Report for the site to NRC.

[2] The FFD Program Performance Report shall be submitted annually to the NRC before March 1 for the prior calendar year. [10 CFR 26.717]

[3] The FFD Program Performance Report shall contain data pertaining to the drug and alcohol aspects and the fatigue management aspects of the Fitness-for-Duty Program.

[4] Performance data pertaining to the drug and alcohol aspects of the Fitness-for Duty Program are as specified in EN-NS-102.

[5] Performance data pertaining to the fatigue management aspects of the Fitness-for-Duty Program are as follows [10 CFR 26.203(e)]:

(a) The number of instances in which each work hour control was waived for individuals not working on outage activities.

(b) The number of instances in which each work hour control was waived for individuals working on outage activities.

(c) A summary of the distribution of waiver use among individuals in each worker category.

(d) A summary of corrective actions, if any, resulting from the analyses of these data, including fatigue assessments.

[6] Submittal of the Annual FFD Program Performance Report to NRC may be in the form of: (a) standard hardcopy transmittal letter to NRC, or (b) NRC Electronic Information Exchange (EIE) General Submission Portal.

[7] The information for items [5](a) through [5](c) is accessible from the reports available in eSOMS PQ&S. Refer to the PQ&S User Guide for further guidance in retrieving reports. The information for item [5](d) is available in PCRS by performing a search for Condition Reports written per Section 5.9 for waivers.

[8] Watchbill Coordinators are responsible for providing the required data from Step [5] for their respective site to the Site, Regulatory Assurance Manager or designated SME.

[9] In the event that a condition is discovered that is a potentially significant violation or failure of Entergy's fatigue management policy or program, the affected Site Regulatory Assurance Manager shall be promptly notified and consulted regarding the need for a 24-hour report to the NRC per 10 CFR 26.719 and EN-LI-108.

6.0 INTERFACES

[1] eSOMS PQ&S software

[2] EN-TQ-212, “Conduct of Training and Qualification”

7.0 RECORDS

[1] Records of shift schedules and shift cycles of Covered Individuals (PQ&S).

[2] Records of actual hours worked for Covered Individuals (PQ&S).

[3] Documentation of Fatigue Assessments, per Attachment 9.1 (Supv, AA / FFD).

[4] Documentation of waivers authorized, per Attachment 9.7 (PCRS).

[5] Documentation of individuals assessed for exceeding work hour limits under an approved waiver, per Attachment 9.8 (PQ&S).

[6] Documentation of Audits and Reviews identified in Section 5.10.

8.0 SITE SPECIFIC COMMITMENTS

Step	Site	Document	Commitment Number or Reference
[1]	None	None	None

9.0 ATTACHMENTS

9.1 Fatigue Assessment
9.2 Fatigue Assessor Guidelines
9.3 Covered Individual PQ&S Control Form - Addition
9.4 Covered Individual PQ&S Control Form - Removal
9.5 Typical Annual Review Report
9.6 Overview of Response to Emergent Condition
9.7 Waiver Basis and Approval
9.8 Covered Worker Capability Assessment

ATTACHMENT 9.1 FATIGUE ASSESSMENT

Sheet 1 of 4

LIMITED DISTRIBUTION
Portions of this Form may contain personal information

PART A: REQUEST FOR FATIGUE ASSESSMENT (by Request Initiator)

1. Request Initiator Name (print): ____________________
   Are you the Affected Employee's Supervisor: ☐ Yes ☐ No

2. Affected Employee Name / Dept (print): ________________________
   Covered Worker? ☐ Yes ☐ No If Yes, Category: _______________
   (Security, Maintenance, Operations, etc)
   Performing an outage activity? ☐ Yes ☐ No

3a. Check box(es) for type of Fatigue Assessment and provide description in Block 3b:

☐ Post-event (see 5.7.7)
[Medical treatment may not be delayed in order to conduct a Fatigue Assessment; Complete Part A and record in Part D (Disposition Description) if Fatigue Assessment was not performed due to the need for medical treatment]
- ☐ Personnel Illness or Injury
- ☐ Radiation exposure or release
- ☐ Substantial degradation of plant safety

☐ For-cause (see 5.7.8) Reported by (print): _________________

☐ Self-declaration (see 5.7.9 / 5.7.10) [A Fatigue Assessment following a Self-declaration is only required if the employee is to resume duties prior to completing a break period of at least 10 hours.]

☐ Follow-up (see 5.7.11)
- ☐ 10-hour break not completed as specified in a Post-event FA
- ☐ 10-hour break not completed as specified in a For-cause FA
- ☐ 10-hour break not completed following a Self-declaration (SD)
  - ☐ Onsite SD ☐ Offsite SD

3b. Additional Description for Type of Fatigue Assessment
- Post-event: Briefly describe event (including date / time) and worker involvement.
- For-cause: Briefly describe observed behavior.
- Self-declaration: Briefly explain why Fatigue Assessment is being performed in lieu of a 10-hour break.
- Follow-up: State duration of break provided and reason why full 10-hour break can not be completed.

4. Request Initiator (signature): __________________ Date / Time: ____________________

Continue with Part B if the Request Initiator is also the Fatigue Assessor
OR
Provide completed / signed Form to the individual assigned as the Fatigue Assessor

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PART B: FATIGUE ASSESSMENT INTERVIEW (by Fatigue Assessor)

1. Fatigue Assessor Name (print): ___________________ Employee's Supervisor? ☐ Yes ☐ No

2. Before meeting with the employee, perform the following:
   - Review Fatigue Assessor Guidance in Attachment 9.2.
   - Review the information recorded for this fatigue assessment in Attachment 9.1, Part A.
   - Verify that you meet the Fatigue Assessor qualification requirements stated in EN-OM-123, Section 5.7
   - Review the specific steps applicable to the type of fatigue assessment being performed (5.7.7 – 5.7.11)

3. Meet with employee and:
   - Conduct introductory discussion with employee to explain purpose of the fatigue assessment.
   - Provide a reasonable period of time (10 – 20 minutes) for the employee to complete Part C.
   - Review Part C and discuss with employee for clarification if needed.
   - Observe for the following symptoms of fatigue during the meeting with the employee:

   ☐ Excessive yawning ☐ Frequent blinking ☐ Red eyes
   ☐ Difficulty concentrating ☐ Irritability ☐ Other _____________

4. Fatigue Assessor Conclusions:

   4a. Did the employee participate in the fatigue assessment process? ☐ Yes ☐ No

   4b. Based on information (verbal, written, and observed) obtained during the employee meeting, is there evidence of:

	NO	YES
Acute Fatigue? (potential for inadequate rest in the past 24 – 48 hours)		
Cumulative Fatigue? (potential for inadequate rest over the past 1 – 2 weeks)		
Circadian Rhythm disruptions? (work schedule or non-work activities that may impact the normal daily rhythm for periods of sleep and wakefulness)		
Medical factors that may contribute to fatigue?		
Home or Lifestyle factors that may contribute to fatigue		

   4c. Recommended that employee work balance of current work period / shift? ☐ Yes ☐ No

   4d. Additional comments (attach separate page, if needed)

5. Fatigue Assessor (signature): ___________________ Date / Time: _____________________

Continue with Part D if the Fatigue Assessor is the employee supervisor
OR
Provide completed / signed Form to the employee supervisor

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Portions of this Form may contain personal information

PART C: EMPLOYEE INPUT FOR FATIGUE ASSESSMENT (by Employee being assessed)

1. Employee Name / Dept (print): ______________________
2. Did the Fatigue Assessor explain the purpose of this Fatigue Assessment to you? ☐ Yes ☐ No

3. Answer the following questions to the best of your knowledge:
   (Feel free to ask the Fatigue Assessor for clarifications, if needed)

3a. List your estimated work history for the past 14 days in the following Table
(DAY 1 means today, DAY 2 means yesterday, etc)

DAY:	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Shift schedule [(a)]														
Hours worked [(b)]														

(a) Indicate ‘D’ for a day-shift schedule and ‘N’ for a night shift schedule
(b) Approximate work hours each day

3b. Have you had a break of at least 10 hours between successive work periods for each of the past 14 days?
☐ Yes ☐ No

3c. If you are a covered worker, have you been assigned to work hours in excess of EN-OM-123 limits during the past 14 days? (i.e., working under a waiver) ☐ Yes ☐ No ☐ N/A

3d. Approximately how many hours have you been awake? _________

3e. Approximately how many hours of sleep have you had in the last 24 hours? _______

3f. Approximately how many hours of sleep have you averaged in the past 5 days? _______

3g. Is your current shift schedule affecting your normal sleep routine? ☐ Yes ☐ No

3h. Are you aware of any medical conditions or other non-work circumstances affecting your level of alertness at work? ☐ Yes ☐ No (If yes, discuss with Fatigue Assessor)

3i. Do you feel capable of completing your current work period / shift without impairment due to fatigue?
☐ Yes ☐ No

3j. Additional comments (attach separate page, if needed)

4. Employee (signature): __________________ Date / Time: ____________________

Your signature indicates that you have provided the responses in Part C to the best of your knowledge and that you are participating in the Fatigue Assessment meeting.
Your signature does not indicate your concurrence with any observations or conclusions of the Fatigue Assessor.

Provide completed Part C to the Fatigue Assessor and participate in remainder of meeting

ATTACHMENT 9.1 **FATIGUE ASSESSMENT**

Sheet 4 of 4

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PART D: FATIGUE ASSESSMENT DISPOSITION (by Employee Supervisor)

1. Review information provided in Parts A, B, and C and document disposition below:

Disposition:

☐ Post-event
- Fatigue identified as a likely contributor to the event: ☐ Yes ☐ No
- Employee assigned a minimum 10-hour break before resuming duties: ☐ Yes ☐ No

☐ For-cause
- Reported For-cause observation is supported: ☐ Yes ☐ No
- Employee assigned a minimum 10-hour break before resuming duties: ☐ Yes ☐ No
- For-cause drug / alcohol testing required: ☐ Yes ☐ No

☐ Self-declaration
- Reported self-declaration is supported: ☐ Yes ☐ No
- Employee assigned a minimum 10-hour break before resuming duties: ☐ Yes ☐ No

☐ Follow-up
- Employee is capable of resuming duties without completing the 10-hour break: ☐ Yes ☐ No

3b. Additional Description for Disposition, if needed (Any actions in response to above disposition, Compensatory measures, if needed, for employees resuming duties without a break, 'Safe ride' consideration for fatigue impaired driver, Prior history of fatigue issues for this employee, Referral to ECP, etc)

4. Supervisor (signature): ______________________ Date / Time: ______________________

Transmit completed Form to site Supervisor, AA/FFD

AND

Email to "Fatigue Rule Forms"
(Please include Site Name (e.g., 'ANO') in the subject line)

ATTACHMENT 9.2 **FATIGUE ASSESSOR GUIDANCE**

Sheet 1 of 1

This attachment may be used by supervisors assigned to perform a Fatigue Assessment. Because you may not regularly perform this task, the following bulleted items provide a quick refresher on this subject as you prepare in advance for the face-to-face interview of the individual being assessed.

- There is no special training or qualification required for the Fatigue Assessor, other than having a current, active unescorted access badge. This indicates that you have completed General Employee Training (GET) which is required by NRC regulations to contain material regarding contributors to and symptoms of worker fatigue. However, a separate, optional training module is available at https://www.nantel.org which provides additional generic information about worker fatigue and the conduct of fatigue assessments. After accessing the above link, select the “Course Materials” Tab and select the “Generic Fatigue Assessment Lesson Plan”. You do not need your Nantel login information to access this lesson plan. However, if you want a record of this training to appear in your Learning History, you do need to access this course via Plateau and use your login information.

- Section 5.7 of EN-OM-123 describes the Entergy-specific process for fatigue assessments, which are to be documented on Attachment 9.1 of EN-OM-123.

- There are four types or categories of fatigue assessment which may be performed depending on the situation:
    - Post-event (5.7.7)
    - For-cause (5.7.8)
    - Self-declaration (5.7.9 and 5.7.10)
    - Follow-up (5.7.11)

  Review the applicable procedure subsection listed above for more information before performing the face-to-face interview.

- The fatigue assessment requirement applies to any individual who is covered under Entergy’s Fitness-for-Duty Program. This includes Entergy employees, contractors, Covered Workers and non-Covered Workers.

- Studies and experiences have shown that an individual who is fatigued is more prone to errors which could have an adverse affect on safety (their own or others around them) and could contribute to mis-operation or failure of important equipment.

- In general, the purpose of the fatigue assessment process is to ensure that the affected individual is fit for duty with respect to fatigue and is capable of safely performing their assigned duties. This is analogous to the drug / alcohol testing aspect of the fitness-for duty program. Entergy’s expectation is that employees report to work alert and fit-for-duty with respect to fatigue (EN-PL-202). Keep in mind that there may be work-related or medical factors which can be fatigue contributors.

- The face-to-face assessment is a data gathering step and is not appropriate to be conducted in a confrontational or discipline nature. The conclusions of the fatigue assessor are to be based on objective information obtained through written and verbal information provided by the individual being assessed and by observation for common symptoms of fatigue.

ATTACHMENT 9.3 **COVERED INDIVIDUAL PQ&S CONTROL FORM - ADDITION**

Sheet 1 of 2

1) Person being added to PQ&S: ______________________/_____________________
Name Department

2) Supervisor or sponsor of person being added: __________________/__________________
Name Department

3) Category of Covered Work to be performed:

☐ Operating or on-site directing the operation of risk-significant systems or components.

☐ Performing maintenance or on-site directing the maintenance of risk-significant structures, systems, or components.

☐ Performing the duties of a Radiation Protection or Chemistry technician required as part of the minimum shift complement for the on-site emergency response organization.

☐ Performing the duties of a Fire Brigade member responsible for understanding the effects of fire and fire suppressants on safe shutdown capability.

☐ Performing security duties as an armed security force officer, alarm station operator, response team leader, or watchperson.

4) Reason for addition to PQ&S:

☐ New Entergy employee assigned to a position involving Covered Work

☐ Existing Entergy non-Covered Worker re-assigned to a new position involving Covered Work

☐ Shared Resource employee (List Home Site and supervisor: ________________________)

☐ Contractor employee Company Name: ___________________________________
Prior assignment was at an Entergy site? ☐ Yes ☐ No

☐ Other: ____

5) Network Login ID for person being added: _________________

(Provides a unique identifier for each person in PQ&S)

6) Person being added has a valid unescorted access badge for an Entergy site: ☐ Yes ☐ No
(Entergy's Plant Access Training for badging contains required training regarding fatigue)

ATTACHMENT 9.3 COVERED INDIVIDUAL PQ&S CONTROL FORM

Sheet 2 of 2

7) Person being added has completed FRR-GET-OM123 within the last 12 months OR has been a Covered Worker at an Entergy site within the last 12 months: ☐ Yes ☐ No

8) Requested start date for Covered Work schedule: ________________

9) Transition option for Covered Work schedule:

a ☐ Design schedule based on 9-day work history (provide data in Step 10)

b ☐ Design schedule with a 34-hour break prior to commencing Covered Work

c ☐ Person being added is a contractor whose prior assignment was not at an Entergy site

10) Work Hour history if Option 9a is selected -- Provide shift start and end times (use 24-hour format) for the 9 calendar days prior to the planned start date requested in Step 8.

Days before planned start	9	8	7	6	5	4	3	2	1
Calendar Date									
Shift start									
Shift end									

11) Supervisor / sponsor signature and date: ________________________ / ___________

Signature Date

Provide completed Form to the Watchbill Coordinator of the affected Department

This Form is not a record and may be destroyed after PQ&S data entry is complete

ATTACHMENT 9.4 **COVERED INDIVIDUAL PQ&S CONTROL FORM - REMOVAL**

Sheet 1 of 1

1) Person(s)* being removed from PQ&S: ______________________/______________________
Name Department

2) Network Login ID for person(s)* being removed: ________________
(To ensure that the correct individual is identified in PQ&S for removal from a watchbill)

*The following Table or similar pages can be used for removing multiple individuals (e.g., for a group of contract employees at the completion of a project)

CI Name	Network ID	CI Name	Network ID

3) Reason for removing from PQ&S

- ☐ Entergy or contractor employee reassigned to a position that does not involve Covered Work
- ☐ Entergy employee termination or extended absence
- ☐ Shared Resource employee returning to home site or alternate site
- ☐ Other: ____

4) Effective date for requested action: ____________________

5) Supervisor or sponsor of person(s) being removed: _______________/_______________/_______
Name Department Date

Provide completed Form to the Watchbill Coordinator of the affected Department

This Form is not a record and may be destroyed after PQ&S data entry is complete

ATTACHMENT 9.5 **TYPICAL ANNUAL REVIEW REPORT**

Sheet 1 of 5

The following provides a typical report content and format template for the annual reviews required by 10 CFR 26.205(e) and 10 CFR 26.211(g) per steps 5.10 [2] and 5.10 [5] of this procedure.

FATIGUE MANAGEMENT PROGRAM ANNUAL EFFECTIVENESS REVIEW
SITE NAME

NOTE

10 CFR 26.205(e) states: "At a minimum, this review must address—

(i) Individuals whose actual hours worked during the review period exceeded an average of 54 hours per week in any shift cycle while the individuals' work hours are subject to the requirements of § 26.205(d)(3) or in any averaging period of up to 6 weeks, using the same averaging period durations that the licensee uses to control the individuals' work hours, while the individuals' work hours are subject to the requirements of § 26.205(d)(7);

(ii) Individuals who were granted more than one waiver during the review period; and

(iii) Individuals who were assessed for fatigue under § 26.211 during the review period."

A. REVIEW OF WAIVERS GRANTED DURING THE ASSESSMENT PERIOD

- Complete the data in the attached Table. This is also the information that needs to be included in the FFD annual report submitted to NRC before March 1 of the following year as required by 10 CFR 26.203 (e) and 10 CFR 26.717 (e) per step 5.12 of this procedure.
- Data can be extracted from PQ&S database reports and through searches of PCRS.
- Provide a conclusion regarding whether the number and circumstances of the waivers seems reasonable. [See 10 CFR 26.207 and Regulatory Position C.4 of NRC Regulatory Guide 5.73, March 2009]
- Determine if any follow-up review is needed for a specific department.
- Issues requiring corrective actions that are not already planned under existing Condition Reports can be explained in Section E.

NOTE

10 CFR 26.211(g) states: “Licensees shall prepare an annual summary for each nuclear power plant site of instances of fatigue assessments that were conducted during the previous calendar year for any individual identified in § 26.4(a) through (c). Each summary must include—

(1) The conditions under which each fatigue assessment was conducted (i.e., self-declaration, for cause, post-event, followup);

(2) A statement of whether or not the individual was working on outage activities at the time of the self-declaration or condition resulting in the fatigue assessment;

(3) The category of duties the individual was performing, if the individual was performing the duties described in § 26.4(a)(1) through (a)(5) at the time of the self-declaration or condition resulting in the fatigue assessment; and

(4) The management actions, if any, resulting from each fatigue assessment.”

B. REVIEW OF FATIGUE ASSESSMENTS PERFORMED

- Prepare a summary of fatigue assessments (10 CFR 26.211(g)) conducted during the assessment period including; type of fatigue assessment, covered worker (and category) or non-covered worker, and outage or non-outage activity. This information is available in Part A of the Fatigue Assessment form, Attachment 9.1. Also include summary of management actions, if any, which is recorded in Part D of the form.
- There is no regulatory limit regarding the number of fatigue assessments performed. This information can be used as an indicator of program factors such as the design of work schedules, recurring periods of fatigue for the work force, and specific individuals with repetitive fatigue concerns.
- Determine if any follow-up review is needed for a specific department.
- Issues requiring corrective actions that are not already planned under existing Condition Reports can be explained in Section E.

C. REVIEW OF OTHER ISSUES AS DOCUMENTED IN CONDITION REPORTS

- Perform keyword search of PCRS for Condition Reports related to fatigue rule.
- For issues not already address in topics A through C, summarize the issue and corrective actions already completed or planned.
- This could include topics such as software (PQ&S), procedure (EN-OM-123), training, and work schedules.

ATTACHMENT 9.5 **TYPICAL ANNUAL REVIEW REPORT**

Sheet 3 of 5

D. OBSERVATIONS / CONCLUSIONS REQUIRING CORRECTIVE ACTION

- Based on information described in Sections A through D conclude if the Fatigue Management Program is effective, and if not, describe the new corrective actions needs and document via a new Condition Report referencing this review and assign Corrective Actions as need for the identified issues.

E. OTHER PROPOSED IMPROVEMENTS

- Use this section to provide suggestions that could improve business processes and administrative aspects of the program. In addition to data collected for sections A through D, personnel interviews (such as Supervisors, Watchbill Coordinators, and covered workers) can be used to provide information to support quantitative and qualitative conclusions.

Prepared by: ______________________ Date: ________

Approved by:______________________ Date: ________
(Director, R&PI)

ATTACHMENT 9.5 **TYPICAL ANNUAL REVIEW REPORT**

Sheet 4 of 5

WAIVER DISTRIBUTION BY TYPE OF LIMIT (A)

WORK HOUR LIMIT	OPERATIONS		MAINTENANCE		SECURITY		HP / RADPRO		CHEMISTRY		FIRE BRIGADE (B)	
Max ceilings:												
	Online	Outage	Online	Outage	Online	Outage	Online	Outage	Online	Outage	Online	Outage
16h max in 24h												
26h max in 48h												
72 max in 7d												
Rest Breaks:												
	Online	Outage	Online	Outage	Online	Outage	Online	Outage	Online	Outage	Online	Outage
10h between work periods												
34h in any 9-days												
Cumulative Fatigue Limits:												
54h Avg – Online or Outage												
Minimum Days Off – Outage:												
1 MDO / 7 days (rolling)												
3 MDO / 15 day period												
4 MDO / 15 day period												

NUMBER OF WAIVERS PER INDIVIDUAL EMPLOYEE (C)

NUMBER OF WAIVERS	OPERATIONS	MAINTENANCE	SECURITY	HP / RADPRO	CHEMISTRY	FIRE BRIGADE (B)
1						
2						
3						
4						
5						
6						
Highest number of waivers for an individual employee						

(A similar Form may also be available on the NRC Fatigue Management website)

ATTACHMENT 9.5 **TYPICAL ANNUAL REVIEW REPORT**

Sheet 5 of 5

Summary of Corrective Actions (if any) taken or planned based on above data:

____

____

____

____

NOTES:

A. Provide the total number of instances when covered work was performed under a waiver. For example, if an individual was granted a waiver for a work period that required exceeding 26h in 48h and less than 10 hours between work periods, a ‘1’ would be placed in each of the two applicable cells. In other words, one ‘waiver’ for an individual worker could count as multiple ‘instances’ of work hour limits waived. Do not record any instances where a waiver was granted but not subsequently used.

B. For individuals performing fire brigade duties and other covered duties, count them only under the fire brigade column. Do not double count these individuals.

C. This table is used to record the number(s) of work hour requirements that have been waived per individual worker (employee) in each category. The number of individuals who receive a waiver for only one work hour requirement in a worker category would be placed in row ‘1’ under that category, and the number of individuals who receive a waiver for two or more work hour requirements in a worker category would be placed in the corresponding numbered row under that category. For example, if three people from Operations each have 2 work hour requirements waived, then a ‘3’ is placed in row ‘2’ of the OPERATIONS column. (Three Operators multiplied by two requirements waived equals a total of 6 work hour requirements waived – when multiplied out, this would equal the total waivers identified in the upper section of the table for that group)

****

Plant: __________ Data provided by: ______________________________

Name / Dept / Date

Outage Dates: Bkr Open ____________ Bkr Closed ____________

(use additional lines / pages, if needed for site outage history during the reporting period)

Data source(s): check all that apply

☐ PQ&S ☐ PCRS ☐ EN-OM-123 Forms (e.g., Attachment 9.8) ☐ Other: ___________

ATTACHMENT 9.6 **OVERVIEW OF RESPONSE TO EMERGENT CONDITION**

Sheet 1 of 3

This Attachment provides a summary of considerations which can be used as an aid when addressing work schedules (especially for covered workers) in response to emergent work conditions. Emergent work can be associated with unplanned downpowers, unplanned scrams, and equipment degradation issues which may affect plant safety, security, or production.

NOTE

The processes and requirements of EN-OM-123 must be followed to ensure compliance with applicable regulations.

As stated in Section 5.2, work hour limits for individuals performing Covered Work consist of;

1. The maximum ceilings which apply at all times:
   - 16 work hours maximum in any 24-hour period,
   - 26 work hours maximum in any 48-hour period, and
   - 72 work hours maximum in any 7-day period.
2. The minimum break times which apply at all times:
   - 10-hour minimum break between successive work periods, except that an 8-hour break is allowed when necessary to accommodate a crew's scheduled transition between work schedules or shifts, and
   - 34-hour minimum break in any 9-day period.
3. The 54-hour average maximum work hours over a maximum 6-week averaging period. This limit is generally used with the plant online, but may also be used during outages if the MDO outage limit is not used.

4. Minimum Days Off (MDO) when the site is in an outage

Optional MDOs during a plant outage for up to 60 days	
Work Group	**Days Off**
Maintenance	1 day off in any rolling 7-day period
Operations Radiation Protection Chemistry Fire Brigade	3 days off in each successive, non-rolling 15-day period
Security	4 days off in each successive, non-rolling 15-day period

ATTACHMENT 9.6 **OVERVIEW OF RESPONSE TO EMERGENT CONDITION**

Sheet 2 of 3

A. Initial Assessment

- Perform initial assessment of personnel resources needed to respond to the situation
  - Which departments or work groups are affected.
  - Any special skills or qualifications needed.
  - Covered or non-covered workers needed.
  - Additional supervisory resources need to cover adjustment of work crews.
  - What is the estimated duration of the emergent condition.
- Determine if schedule changes are needed for the required resources to support the response to the situation.
- Ensure that PQ&S watchbill coordinators are available to obtain work hour history, determine existing margin to limits, and make schedule adjustments.
- Make immediate schedule adjustments, if needed, to support the initial response effort
  - Early release of some workers so that they are available to return more quickly for a modified schedule.
  - Holdover of other workers to provide extended Day One coverage.
- Identify potential gaps that may need fleet shared resources or contractor support.
- Determine if the situation meets criteria for waivers.
  - For security conditions, review the situation with the Security Manager.
  - For conditions involving safe plant operations, review the situation with the Operations Senior Manager.

NOTE
Refer to EN-OM-123 definition 3.0[8] "Condition Adverse to Safety or Security" for examples of situations that may be eligible for waiver use.

B. Schedule adjustments based on waivers

- Work with watchbill coordinators to design new schedules for required resources.
- Follow labor agreement requirements, as applicable, to populate the new schedules.
- Based on PQ&S data, identify personnel and dates when limits are exceeded.
- Ensure that qualified supervisors are available at required times to support face-to-face assessments required during the 4-hour window prior to exceeding limits.
- Ensure that required Condition Reports, PQ&S Fatigue Tracking Records, and EN-OM-123 Waiver and Covered Worker Capability Assessment Forms (Attachments 9.7 and 9.8) are completed.

C. Schedule adjustments with no waivers

- Work with watchbill coordinators to design new schedules for required resources.
- Follow labor agreement requirements, as applicable, to populate the new schedules.
- Based on PQ&S data, identify personnel and dates when limits are exceeded.
- Obtain additional resources and/or adjust work schedules to ensure that limits are not exceeded for covered work.
- Determine if work scope can be categorized as non-covered work. If so, obtain additional non-covered workers. Consider transition of existing covered workers to non-covered status.
- Be aware of potential schedule impacts due to rest period requirements for transition of non-covered workers to covered worker status.

ATTACHMENT 9.7 **WAIVER BASIS AND APPROVAL**

Sheet 1 of 2

REFER TO PROCEDURE SECTION 5.9

A. ADVERSE CONDITION REQUIRING A WAIVER:
(Check applicable box and describe circumstances that necessitate use of a waiver)

☐ Necessary to mitigate or prevent a condition adverse to safety [Definition 3.0.8]

- ☐ Public or station personnel health or safety is jeopardized.
- ☐ Recovery from a challenge to the safety function of a system or component is delayed.
- ☐ Compliance with another NRC regulatory requirement is impaired or prevented.
- ☐ Mitigation of a Technical Specification required reactor shutdown or power reduction is impaired or prevented.
- ☐ Unplanned increase in the plant status risk color assignment.
- ☐ Compliance with site environmental permits is impaired or prevented.
- ☐ External events (weather, fire, flooding) pose a risk to station personnel.

____

____

Manager, Shift Operations: ____________________ Date / Time: ________________

☐ Necessary for site security [Definition 3.0.8]

- ☐ Compliance with the site security plan is impaired or prevented.
- ☐ Failure to implement a compensatory measure creates a condition adverse to safety.

____

____

Supervisor, Security Shift Operations: _______________ Date / Time: ________________

B. SCOPE OF WORK (brief description of work to be performed under this waiver)

____

____

____

Completed by: _______________________

C. AUTHORIZATION

Use of waiver is approved for the following time period: (not to exceed 14 calendar days)

Effective Date / time:________________ Expiration Date / time: ________________

Approved: _________________________
(SVP or GMPO)

D. CONDITION REPORTING

- Initiate a Condition Report for use of a waiver.
- Attach this approved Form in the Condition Description.
- Proceed to Attachment 9.8 for assessment(s) of individual(s) working under this waiver.

The purpose of this CR is to document corrective actions that may be needed to address why there was insufficient margin in staffing or work schedules to address the unexpected situation without the use of waivers. The evaluation of the condition adverse to safety or security, described in Section A, would be the subject of a separate CR, if required, based on other applicable procedures.

ATTACHMENT 9.8 **COVERED WORKER CAPABILITY ASSESSMENT**

Sheet 1 of 3

REFER TO PROCEDURE SECTION 5.9

A. CR Number: _____________ (from Step 5.9 [7](f))

> **NOTE**
> A separate Face-to-Face assessment and Attachment 9.8 is required for each individual and for each work period (shift) during which that individual will exceed the work hour limits under the approved waiver. Use the same CR reference numbers on all Attachments 9.8 associated with the approved Attachment 9.7.

B. Covered Worker being assessed (print Name / Dept): ______________________

Supervisor performing assessment (print Name / Dept): ______________________

Limit(s) that will be exceeded for this work period (check all that apply)

- ☐ > 16 work hours in any 24-hour period
- ☐ > 26 work hours in any 48-hour period
- ☐ > 72 work hours in any 7-day period
- ☐ < 10-hour (consecutive hours) break between successive work periods
- ☐ < 34-hour (consecutive hours) break in any 9-day period
- ☐ 54-hour Rolling Average
- ☐ Minimum Day Off – Outage

Date / time that limit will be exceeded: ______________________

(Determined manually if not in a PQ&S Report)

(If more than one limit will be exceeded in the current work period, record the earliest time)

> **NOTE**
> A Face-to-Face assessment of the Covered Worker must be performed during the 4-hour window before the Covered Worker will begin performing covered work under the waiver.

Task to be performed by Covered Worker: ____________________________________

____

C. **Face-to-Face Capability Assessment** (Supervisor record information based on discussion with Covered Worker)

C1. 14-day work history for the Covered Worker: (In the following Table DAY 1 means today, DAY 2 means yesterday, etc. Data may also be provided by attaching a printout from PQ&S in lieu of completing the Table)

DAY	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Shift schedule [(a)]														
Hours worked [(b)]														

(a) Indicate ‘D’ for a day-shift schedule and ‘N’ for a night shift schedule

(b) Approximate work hours each day

C2. Have you had a break of at least 10 hours between successive work periods for each of the past 14 days?
☐ Yes ☐ No

C3. Has your schedule exceed work hour limits during another work period / shift in the past 14 days:
☐ Yes ☐ No

C4. Approximately how many hours have you been awake? _________

C5. Approximately how many hours of sleep have you had in the last 24 hours? _______

C6. Approximately how many hours of sleep have you averaged in the past 5 days? _______

C7. Is your current shift schedule affecting your normal sleep routine? ☐ Yes ☐ No

C8. Are you aware of any medical conditions or other non-work circumstances affecting your level of alertness at work? ☐ Yes ☐ No (If yes, discuss with Supervisor performing assessment)

C9. Do you feel capable of performing the assigned task during the work period that exceeds work hour limits without impairment due to fatigue? ☐ Yes ☐ No

D. Supervisor Conclusions

D1. Covered Worker participated in the Capability Assessment? ☐ Yes ☐ No

D2. Covered Worker exhibited symptoms of fatigue? ☐ Yes ☐ No

☐ Excessive yawning ☐ Frequent blinking ☐ Red eyes
☐ Difficulty concentrating ☐ Irritability ☐ Other ____________

D3. Based on this face-to-face meeting, is there evidence of:

	NO	YES
Acute Fatigue? (potential for inadequate rest in the past 24 – 48 hours)		
Cumulative Fatigue? (potential for inadequate rest over the past 1 – 2 weeks)		
Circadian Rhythm disruptions? (work schedule or non-work activities that may impact the normal daily rhythm for periods of sleep and wakefulness)		
Medical factors that may contribute to fatigue?		
Home or Lifestyle factors that may contribute to fatigue		

D4. There is reasonable assurance that the subject Covered Worker is capable of safely and competently performing the described task during the period that work hour limits will be exceeded: ☐ Yes ☐ No

ATTACHMENT 9.8 **COVERED WORKER CAPABILITY ASSESSMENT**

Sheet 3 of 3

D5. Are there any fatigue-related controls, conditions, or counter-measures required for this conclusion:
☐ Yes ☐ No If Yes, describe:____

____

Supervisor (signature): __________________ Date / Time: ____________________

Covered Worker (signature): __________________ Date / Time: ____________________

Covered Worker signature indicates that you have participated in the Capability Assessment and that you have provided information to the best of your knowledge. Signature does not indicate agreement with the Supervisor observations or conclusions.

E. DISTRIBUTION

- Attach the completed Form to the PQ&S Fatigue Tracking Record (FTR) created for the affected Covered Worker and Work Period. If the Covered Worker will exceed more than one work hour limit during this work period (see Step B), a separate FTR is required for each work hour limit to assure accurate reporting of waiver statistics. However, it is acceptable to attach the completed Form to only one of these FTRs.

  AND

- Email the completed Form to the “Fatigue Rule Forms” address in Outlook. Please include site identifier (e.g., ‘ANO’) in the subject line.

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☒ **RO** ☐

ALTERNATE PATH ☐

TITLE: **Review A Manual Tagout of HVT-UC12**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	20	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	January 15, 2014
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Applicant reviewed the prepared tagout and determined that it is

(1) not acceptable

(2) due to **not including** the HVT-UC12 Fan Breaker.

Synopsis: This task will have the applicant review a completed tagout and determine if the tagout could be approved.
The applicant will conclude that the tagout does not meet requirements.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

You are the CRS. Review the tagout and approve or disapprove as appropriate.
If disapproved, list the reason(s) why.

3) Initial Conditions:

The plant is mode 1, 100%.

Maintenance is scheduled to replace the cooler portion of HVT-UC12, Turbine Building Unit Cooler.

The eSOMS Clearance Module is unavailable due to problems with the network

A Reactor Operator has prepared a tagout to identify components and sequence to perform maintenance on HVT-UC12, Turbine Building Unit Cooler.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM**:	**K&A RATING**:
Review a Manual Tagout of HVT-UC12	300095003001	G 2.2.13	4.3

REFERENCES:
PID-22-14D, Rev 14
SOP-0064, Rev 27
SOP-0116, Rev 21
EE-001BK, Rev 11
OSP-0038, Rev 35
EN-OP-0102, Rev 16
EN-OP-0102-01, Rev 9

APPLICABLE OBJECTIVES

REQUIRED MATERIALS:
PID-22-14D, Rev 14
SOP-0064, Rev 27
SOP-0116, Rev 21
EE-001BK, Rev 11
Attachment 9.3 of EN-OP-0102-1 (attached)

SIMULATOR CONDITIONS &/or SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup
2.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Applicant reviewed the prepared tagout and determined that it is (1) not acceptable

(2) due to **not including** the HVT-UC12 Fan Breaker.

PERFORMANCE:

START TIME: ______________

1.		
	***Procedure Step:**	Determine if Tagout is approved.
	Standard	Applicant used data provided to disapprove the tagout.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.		
	***Procedure Step:**	List the reason(s) why this tagout is not approved.
	Standard	Applicant used data provided to state that the tagout did not include a necessary fan breaker for personnel protection.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Applicant reviewed the prepared tagout and determined that it is (1) not acceptable

(2) due to **not including** the HVT-UC12 Fan Breaker.

This completes this JPM.

STOP TIME: ______________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initiating Cue:

You are the CRS. Review the tagout and approve or disapprove as appropriate. If disapproved, list the reason(s) why.

Initial Conditions:

The plant is mode 1, 100%.

Maintenance is scheduled to replace the cooler portion of HVT-UC12, Turbine Building Unit Cooler.

The eSOMS Clearance Module is unavailable due to problems with the network

A Reactor Operator has prepared a tagout to identify components and sequence to perform maintenance on HVT-UC12, Turbine Building Unit Cooler.

Answer Below:

Tagout is APPROVED? ☐ YES ☐ NO

List reason(s), if any.

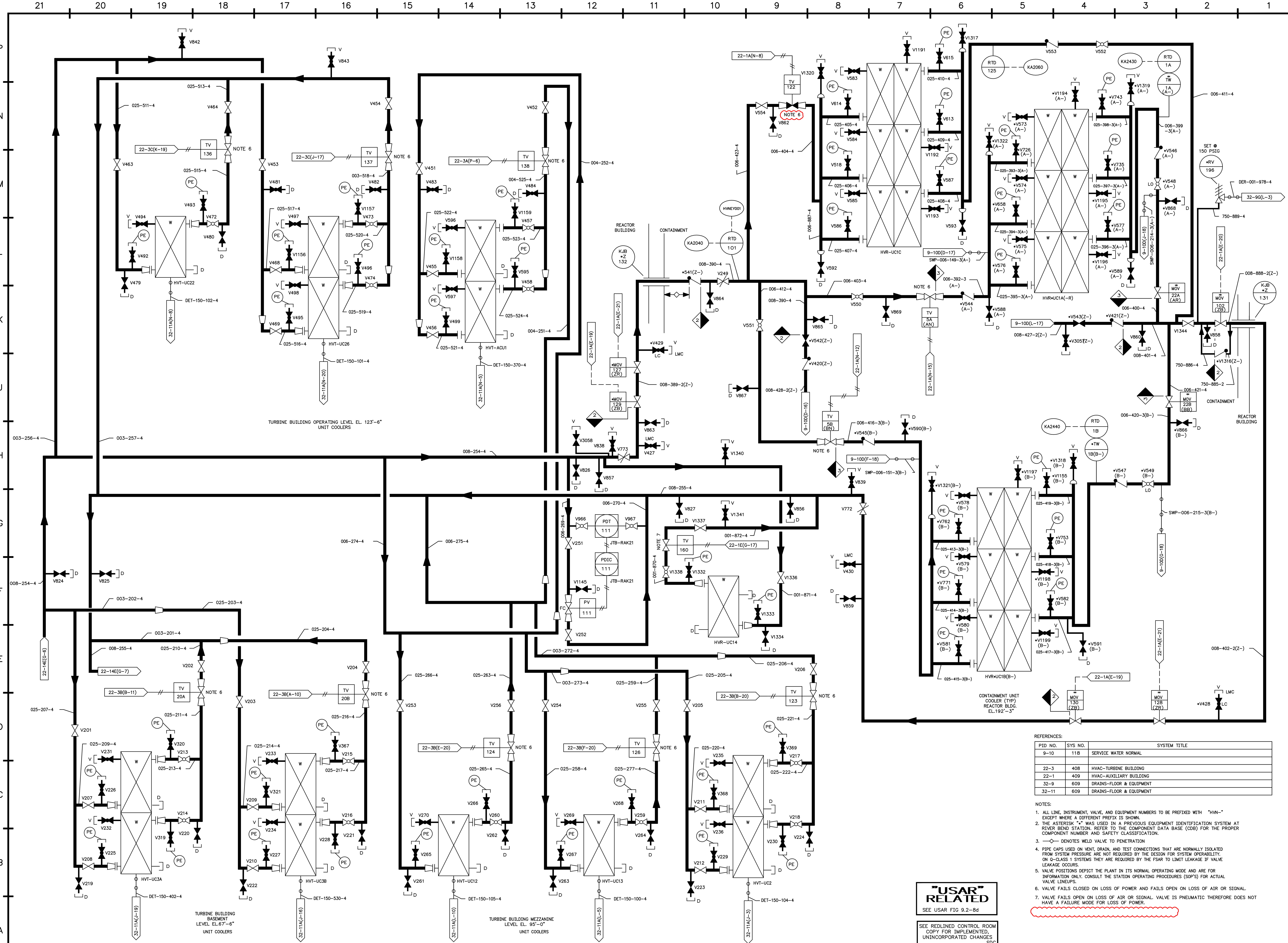
Entergy	NUCLEAR MANAGEMENT MANUAL	NON-QUALITY RELATED	EN-OP-102-01	REV. 9
		INFORMATIONAL USE	PAGE 7 OF 30	

Protective and Caution Tagging Forms & Checklist

ATTACHMENT 9.3 — **TAGOUT TAGS SHEET**

CLEARANCE: ___MANUAL___________ TAGOUT: ________________

Tag Serial No.	Tag Type	Equipment Equipment Description Equipment Location	Place. Seq.	Placement Configuration	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time	Rest. Seq.	Restoration Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time	Placement/Removal Tag Notes
	DANGER	HVN-V260 TURB BLDG COOLER HVT-UC12 OUTLET	1	CLOSED							
	DANGER	HVN-V253 TURB BLDG COOLER HVT-UC12 INLET ISOLATION	2	CLOSED							
	DANGER	HVN-V261 TURB BLDG COOLER HVT-UC12 INLET HEADER DRAIN	3	UNCAP OPEN							
	DANGER	HVN-V270 TURB BLDG COOLER HVT-UC12 VENT	4	UNCAP OPEN							
	DANGER	HVT-UC12 Unit Cooler Control Switch	5	STOP							



REFERENCES:

PID NO.	SYS NO.	SYSTEM TITLE
9–10	118	SERVICE WATER NORMAL
22–3	408	HVAC–TURBINE BUILDING
22–1	409	HVAC–AUXILIARY BUILDING
32–9	609	DRAINS–FLOOR & EQUIPMENT
32–11	609	DRAINS–FLOOR & EQUIPMENT

NOTES:

1. ALL LINE, INSTRUMENT, VALVE, AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "HVN–" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.
2. THE ASTERISK "*" WAS USED IN A PREVIOUS EQUIPMENT IDENTIFICATION SYSTEM AT RIVER BEND STATION. REFER TO THE COMPONENT DATA BASE (CDB) FOR THE PROPER COMPONENT NUMBER AND SAFETY CLASSIFICATION.
3. —◇— DENOTES WELD VALVE TO PENETRATION
4. PIPE CAPS USED ON VENT, DRAIN, AND TEST CONNECTIONS THAT ARE NORMALLY ISOLATED FROM SYSTEM PRESSURE ARE NOT REQUIRED BY THE DESIGN FOR SYSTEM OPERABILITY. ON Q–CLASS 1 SYSTEMS THEY ARE REQUIRED BY THE FSAR TO LIMIT LEAKAGE IF VALVE LEAKAGE OCCURS.
5. VALVE POSITIONS DEPICT THE PLANT IN ITS NORMAL OPERATING MODE AND ARE FOR INFORMATION ONLY. CONSULT THE STATION OPERATING PROCEDURES (SOP'S) FOR ACTUAL VALVE LINEUPS.
6. VALVE FAILS CLOSED ON LOSS OF POWER AND FAILS OPEN ON LOSS OF AIR OR SIGNAL.
7. VALVE FAILS OPEN ON LOSS OF AIR OR SIGNAL. VALVE IS PNEUMATIC THEREFORE DOES NOT HAVE A FAILURE MODE FOR LOSS OF POWER.

"USAR" RELATED
SEE USAR FIG 9.2–8d

SEE REDLINED CONTROL ROOM COPY FOR IMPLEMENTED, UNINCORPORATED CHANGES
SDC

MICROFILM	NO.	DATE	REASON	DFT	CHKD	RE	CGS
	14	10/14/10	INCORP EC 25163	TBS	N/A	N/A	SDJ
	13	11/13/01	INCORP ER00–0694–000; SUPERSEDE KC–PID–22–14D REV A	MJP	NWG	N/A	TBS
	12	11–17–97	INCORP ER96–0676; SUPERSEDE KB–PID–22–14D REV.A	MDM	TBS	N/A	MJP
	11	10–31–97	EDITORIAL CHANGE & INCORP MR96–0068; SUPERSEDE KA–PID–22–14D REV.A	MDM	MJP	N/A	CJ
	10	7–21–92	INCORP. DCN92–0251	CS	TH	OES	JMH
	9	3–21–88	INCORP. MR87–0515	CS	DWN	KAM	JRL
	8	8–16–87	INCORP. MR87–0337	ROY	JW BLT	KAM	JRL
	7	2–25–87	INCORP. MR86–1568	RLM	RJP	DNC	JRL
	6	1–30–87	INCORP. MR86–0748, MR86–1587, MR86–1588, AND MR86–1568	RLM	RJP	DNC	JRL
	5	11–14–86	INCORP. MR86–0795	RLM	RJP	WJ	JAW
	4	9–22–86	TRANSFER TO GSU MAINTENANCE, NO TECHNICAL CHANGES	RLM	RJP	WJ	KLG
	3	7–3–86	INCORP. M85–0929–00	BJD	WJ		JCB
	2	10–30–85	GENERAL REVISION	BJD	WJ		JCB
	1	5–29–85	FIRST SIGNIFICANT ISSUE	CAS LDM	RJM JCP		JCB
	0	4–16–84	ISSUED FOR INFORMATION ONLY	CAS LDM	HT JCP		WGC

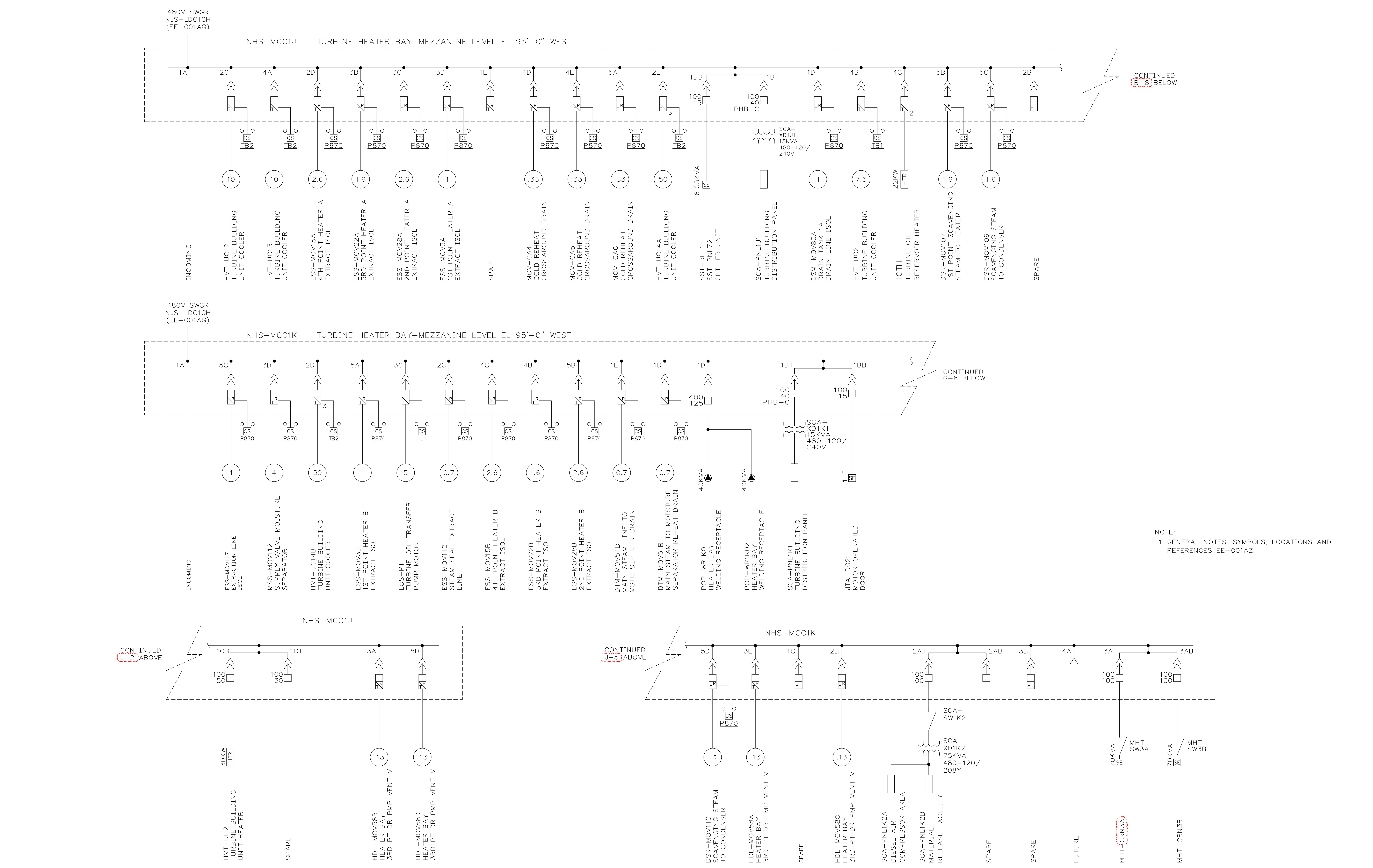
Entergy Operations, Inc.

RIVER BEND UNIT 1

ENGINEERING P & I DIAGRAM
SYSTEM 410
HVAC–CHILLED WATER

SCALE: NONE

DRAWING NUMBER	REV.
PID–22–14D	14



NOTE:
1. GENERAL NOTES, SYMBOLS, LOCATIONS AND REFERENCES EE-001AZ.

SEE REDLINED CONTROL ROOM COPY FOR IMPLEMENTED, UNINCORPORATED CHANGES
SDC

QA CAT. II

NOTE: THIS DRAWING PRODUCED BY CAD. DO NOT REVISE MANUALLY

MICROFILM	NO	DATE	REASON	DFT	CHKD	RE	CGS
	11	12/19/08	INCORP EC 12205	NWG	SA	N/A	N/A
	10	1/23/06	INCORP 05-44	TBS	NWG	N/A	N/A
	9	9/26/02	INCORP ER02-0212-000, SUPERSEDE KB-EE-001BK REV A	NWG	TBS	N/A	SA
	8	8-20-96	INCORP DCN96-0782 & SUPERCEDED KA-EE-1BK REV A	JAP	NWG	N/A	MJP
	7	4-11-96	INCORP MR93-0087, MR94-0136 AND DCN96-0255	NWG	JAP	NAR	RGF
	6	1-26-94	INCORP DCN94-0315	LLW	CJ	TT	CLD
	5	9-21-93	REDRAWN TO AUTOCAD	LLW	CJ	TT	CLD

Entergy Operations, Inc.
RIVER BEND STATION - UNIT 1
480V ONE LINE DIAGRAM
NHS-MCC1J AND
NHS-MCC1K
TURBINE BUILDING

SCALE: NONE

JOB NUMBER	DRAWING NO.	SH	CONT	REV
	EE-001BK	-	X	11

ATTACHMENT 9.3 TAGOUT TAGS SHEET

CLEARANCE: ___**MANUAL**___________ TAGOUT: _______________

Tag Serial No.	Tag Type	Equipment Equipment Description Equipment Location	Place. Seq.	Placement Configuration	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time	Rest. Seq.	Restoration Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time	Placement/Removal Tag Notes
	DANGER	HVN-V260 TURB BLDG COOLER HVT-UC12 OUTLET	1	CLOSED							
	DANGER	HVN-V253 TURB BLDG COOLER HVT-UC12 INLET ISOLATION	2	CLOSED							
	DANGER	HVN-V261 TURB BLDG COOLER HVT-UC12 INLET HEADER DRAIN	3	UNCAP OPEN							
	DANGER	HVN-V270 TURB BLDG COOLER HVT-UC12 VENT	4	UNCAP OPEN							
	DANGER	HVT-UC12 Unit Cooler Control Switch	5	STOP							

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☒ **RO** ☐

ALTERNATE PATH ☐

TITLE: **Determine if Worker is Allowed to Perform Work Without Exceeding Dose Limit**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	15	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
	Control Room
X	Classroom

Prepared:	Dave Bergstrom	**Date:**	October 9, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Applicant determined the projected dose for each of the three tasks in accordance with the key. The applicant further determined that the selected worker cannot perform all three tasks without exceeding the annual administrative dose limit.

Synopsis: The applicant reviews given plant and environmental conditions to determine potential accumulated dose for an operator to perform a set of evolutions. The applicant will then determine that the worker would exceed annual administrative dose limits if allowed to perform all of the tasks.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

As the CRS, review the radiological information for the specific tasks and the operator's year to date dose. Determine the projected dose for each task, and then determine if the worker can be allowed to complete all three tasks without exceeding the routine annual administration dose limit.

3) Initial Conditions:

The plant has scrammed and experienced an isolation of RCIC during a transient and it is necessary to send a person to make repairs. Efforts are underway to enter affected areas and attempt to manually open two RCIC isolation valves as well as make a repair to the RCIC Trip/Throttle Valve. Only one qualified individual is available to perform **ALL** three tasks. That worker's year-to-date dose is 1115 mr.

Task #	Task Description	Time to Complete Task	Dose Rate
1	Enter the Drywell to open E51-MOVF063, RCIC Turbine Steam Supply Inboard Isolation	15 minutes	1.5 R/hr
2	Enter the Steam Tunnel to open E51-MOVF064, RCIC Turbine Steam Supply Outboard Isolation	12 minutes	1.1 R/hr
3	Enter the RCIC Room to repair E51-MOVC002, RCIC Trip/Throttle Valve	20 minutes	1 R/hr

4) Solicit and answer any questions the operator may have.

ANSWER KEY

Initial Conditions:

The plant has scrammed and experienced an isolation of RCIC during a transient and it is necessary to send a person to make repairs. Efforts are underway to enter affected areas and attempt to manually open two RCIC isolation valves as well as make a repair to the RCIC Trip/Throttle Valve. Only one qualified individual is available to perform **ALL** three tasks. That worker's year-to-date dose is 1115 mr.

Initiating Cues:

As the CRS, review the radiological information for the specific tasks and the operator's year to date dose. Determine the projected dose for each task, and then determine if the worker can be allowed to complete all three tasks without exceeding the routine annual administration dose limit.

Task #	Task Description	Time to Complete Task	Dose Rate
1	Enter the Drywell to open E51-MOVF063, RCIC Turbine Steam Supply Inboard Isolation	15 minutes	1.5 R/hr
2	Enter the Steam Tunnel to open E51-MOVF064, RCIC Turbine Steam Supply Outboard Isolation	12 minutes	1.1 R/hr
3	Enter the RCIC Room to repair E51-MOVC002, RCIC Trip/Throttle Valve	20 minutes	1 R/hr

Answer Below:

Projected dose for Task 1 375 mr (+/- 2 mr)

Projected dose for Task 2 220 mr (+/- 2 mr)

Projected dose for Task 3 333 mr (+/- 2 mr)

The selected worker CAN / CANNOT *(circle one)* perform all three tasks without exceeding the annual administrative dose limit.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Determine if Worker is Allowed to Perform Work Without Exceeding Dose Limit		G 2.3.7	3.6

REFERENCES:
EN-RP-100, Rev 8
EN-RP-201, Rev 3

APPLICABLE OBJECTIVES

REQUIRED MATERIALS:
None

SIMULATOR CONDITIONS &/or SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup
2.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Applicant determined the projected dose for each of the three tasks in accordance with the key. The applicant further determined that the selected worker cannot perform all three tasks without exceeding the annual administrative dose limit.

PERFORMANCE:

START TIME: ______________

1.	***Procedure Step:**	1 Calculate the projected dose for each of the three evolutions.
	Standard	Applicant determined the projected dose for tasks 1, 2, and 3 would be 375, 220, and 333 mr respectively, within plus or minus 2 mr each.
	Cue	
	Notes	Calculation: (15 min) (1500 mr/60 min) = 375 mr task 1 (12 min) (1100 mr/60 min) = 220 mr task 2 (20 min) (1000 mr/60 min) = 333 mr task 3
	Results	SAT ☐ UNSAT ☐

2.	***Procedure Step:**	2 Calculate the difference between allowed and projected dose to determine if worker is allowed to perform all three tasks without exceeding the annual administrative dose limit.
	Standard	Applicant determined that the worker cannot perform all three tasks without exceeding the annual administrative dose limit.
	Cue	
	Notes	Calculation: of total projected dose: 375 + 220 + 333 = 928 mr Calculation: 2000 mr - 1115 mr - 928 mr = -43 mr {admin limit – ytd dose – projected} = leftover
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Applicant determined the projected dose for each of the three tasks in accordance with the key. The applicant further determined that the selected worker cannot perform all three tasks without exceeding the annual administrative dose limit

This completes this JPM.

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initial Conditions:

The plant has scrammed and experienced an isolation of RCIC during a transient and it is necessary to send a person to make repairs. Efforts are underway to enter affected areas and attempt to manually open two RCIC isolation valves as well as make a repair to the RCIC Trip/Throttle Valve. Only one qualified individual is available to perform **ALL** three tasks. That worker's year-to-date dose is 1115 mr.

Initiating Cues:

As the CRS, review the radiological information for the specific tasks and the operator's year to date dose. Determine the projected dose for each task, and then determine if the worker can be allowed to complete all three tasks without exceeding the routine annual administration dose limit.

Task #	Task Description	Time to Complete Task	Dose Rate
1	Enter the Drywell to open E51-MOVF063, RCIC Turbine Steam Supply Inboard Isolation	15 minutes	1.5 R/hr
2	Enter the Steam Tunnel to open E51-MOVF064, RCIC Turbine Steam Supply Outboard Isolation	12 minutes	1.1 R/hr
3	Enter the RCIC Room to repair E51-MOVC002, RCIC Trip/Throttle Valve	20 minutes	1 R/hr

Answer Below:

Projected dose for Task 1 ______________

Projected dose for Task 2 ______________

Projected dose for Task 3 ______________

The selected worker CAN / CANNOT *(circle one)* perform all three tasks without exceeding the annual administrative dose limit.

REFERENCE USE

ENTERGY

RIVER BEND STATION
STATION SUPPORT MANUAL
***EMERGENCY IMPLEMENTING PROCEDURE**

---

*RADIATION EXPOSURE CONTROLS

PROCEDURE NUMBER:	***EIP-2-012**
REVISION NUMBER:	***21**
Effective Date:	*** 11/15/12**

NOTE : SIGNATURES ARE ON FILE.

TemRev 1 AddCounter 12 Att Enc DS MSet REGULAR KWN OFF
*INDEXING INFORMATION

TABLE OF CONTENTS

1 PURPOSE

This procedure provides instructions for establishing special radiation exposure controls during an emergency.

2 REFERENCES

2.1 Title 10, Code of Federal Regulations, Part 20, (10 CFR 20) "Standards for Protection Against Radiation"

2.2 RBNP-024, River Bend Station Radiation Protection Plan

2.3 Company Procedure RP-205, Prenatal Monitoring

2.4 FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001

2.5 Company Procedure RP-202, Personnel Monitoring

2.6 EN-EP-FAP-009, Use of KI for the Emergency Response Organization

3 DEFINITIONS

3.1 Committed Dose Equivalent (CDE) - The dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material during the 50 year period following the intake.

3.2 Total Effective Dose Equivalent (TEDE) - The sum of the Deep Dose Equivalent (DDE) (from external exposure) and the Committed Effective Dose Equivalent (CEDE) (from internal exposure).

4 RESPONSIBILITIES

4.1 Emergency Director (ED) or Emergency Plant Manager (EPM) - The ED or EPM is responsible for authorizing individuals assigned to their responsible areas/facilities to receive exposures in excess of 10 CFR 20 limits and approving the issuance of potassium iodide (KI). Normally the Emergency Plant Manager will perform the authorizations for personnel assigned to the OSC, TSC and Security and the Emergency Director will perform the authorizations for personnel assigned to the JIC and EOF.

4.2 Radiological Coordinator (RC) or Radiological Assessment Coordinator (RAC) - The RC or RAC is responsible for advising the ED or EPM, tracking the dose history for those individuals authorized to receive exposures in excess of 10 CFR 20 limits, and notifying the Nuclear Regulatory Commission of any overexposures.

4.3 Onshift Senior Radiation Protection Technician (SRPT) - The Onshift SRPT is responsible for performing the duties of the Radiological Coordinator per this procedure until his arrival at the Technical Support Center.

5 GENERAL

5.1 During a classified emergency, the administrative exposure controls of the River Bend Station Radiation Protection Plan RBNP-024 and RP-202, Personnel Monitoring, are suspended; however, efforts shall be made to maintain personnel exposures within the limits established by 10 CFR 20.

5.2 Due to rapidly changing conditions during an emergency, administrative approvals for exceeding established exposure limits are suspended. Only the Emergency Director or Emergency Plant Manager shall have the authority for authorizing exposures in excess of 10 CFR 20 limits (included as Attachment 1 for reference).

5.3 During the emergency phase of an accident, the Radiation Work Permit (RWP) provisions of the River Bend Radiation Protection Plan are suspended, but shall be re-implemented at the termination of an emergency when the recovery phase is initiated.

5.4 Potassium Iodide (KI) (thyroid blocking agent) is available in the Control Room, Technical Support Center, Decontamination Room (Second Floor of the Services Building), Emergency Operations Facility (EOF) and the Offsite Monitoring Team Emergency Kits.

5.5 A declared pregnant female shall not be assigned any functions during a declared emergency which may cause her to exceed the dose limits of 10CFR20.1208 (See Attachment 1); however, a female who declares herself pregnant after an emergency is declared will be expected to continue to fulfill her assignment until a qualified relief can be found. In this case every effort will be made to limit the female s TEDE to the limits specified in Attachment 1, consistent with the needs of the Emergency Response Organization.

5.6 Responsibility for authorizing federal, state, and local emergency workers (Ex. EMS, fire, law enforcement, National Guard, etc.) responding to RBS to incur exposures in excess of the EPA Protective Action Guides for the general population rests with the unit of government for whom the emergency worker is employed. This also applies to the issuance of potassium iodide (KI). LDEQ is the State of Louisiana s lead agency on radiological matters to include technical assessment and emergency worker s protection during events at nuclear power plants.

6 PROCEDURE

NOTE

The actions of this procedure may be completed in any sequence, however, the sequence presented is recommended.

NOTE

During a declared emergency, the exposure limits for federal, state, and local emergency workers responding to RBS are the EPA Protective Action Guides. The responsibility for authorizing extensions above these limits or issuing KI to these emergency workers resides with the respective federal, state, or local governmental agency for which the emergency worker is employed.

6.1 The Emergency Director or Emergency Plant Manager should:

6.1.1. Use 10CFR20 exposure limits contained in Attachment 1. These limits apply to all members of the Emergency Response Organization, whether or not every person has completed Radiation Worker Training.

6.1.2. When assigning members of the emergency organization to perform tasks which may result in exposures in excess of the 10 CFR 20 limits (see Attachment 1, Section A):

1. Consult with the Radiological Coordinator or Radiological Assessment Coordinator to determine the person's current exposure history to verify the amount of exposure the individual may receive without exceeding the 10 CFR 20 limit.

2. Authorize each individual a maximum exposure limit, not to exceed the limits in Attachment 1, Section B.

NOTE

The Emergency Director or Emergency Plant Manager shall initiate a log for the documentation of emergency information. The Operations Shift Manager shall use the Control Room log.

3. Document the authorization of each individual in the log.

4. In accordance with the Entergy Operations Inc. policy concerning exposures to females who may be pregnant, no female who suspects she is pregnant should be assigned any responsibilities during an emergency which could result in exposures in excess of the 10 CFR 20 limits.

6.1.3. Ensure that any individual believed to have received greater than 25 rem (250 mSv) TEDE is promptly relieved from the Emergency Response Organization.

NOTE

SCBA's and other masks <u>do</u> <u>not</u> preclude the consideration of the dissemination of KI.

6.1.4. Authorize the use of KI, as necessary.

6.2 The Radiological Coordinator or Radiological Assessment Coordinator should:

6.2.1. Ensure that current exposure margins are readily available for the emergency organization.

6.2.2. When time permits, consult with the Emergency Director or Emergency Plant Manager on the methods available to prevent excessive exposures during the emergency.

NOTE

SCBA's and other masks _do_ _not_ *preclude the consideration of the dissemination of KI.*

6.2.3. Consult with the Emergency Director or Emergency Plant Manager regarding the use of KI by emergency response personnel involved in actions to save a life of another individual, mitigate accident consequences, or prevent major releases of radioactivity to the environment I.A.W. Section 6.4

6.2.4. Inform emergency workers who are authorized emergency exposure in excess of 10 CFR 20 limits regarding the relative risks involved with excessive radiation exposure.

6.2.5. Determine the need to process emergency worker DLRs.

6.2.6. Initiate efforts to obtain a medical evaluation of any individual who receives greater than 25 rem (250 mSv) TEDE, during emergency operations by a physician who is familiar with acute effects of radiation exposure. These individuals shall not be subjected to any further radiation exposure until approved by the Radiation Protection Manager and the General Manager of Plant Operations.

NOTE

The following notification will be made in accordance with the reporting requirements of 10 CFR 20.2202 and 20.2203.

6.2.7. As soon as practical during an emergency, make oral reports of radiation overexposures to the Nuclear Regulatory Commission followed by a written report. Written reports should be provided within 30 days as provided by 10 CFR 20.2203 except when the emergency continues for more than 30 days, then the written report shall be provided within 24 hours after termination of the emergency.

6.2.8. Ensure that TEDE dose received during an emergency is recorded on each individual's dose history file. All occupational doses, including emergency doses, are required to be included as part of an individual's accumulated dose history and can affect the individual's allowable exposure during the current and subsequent years.

6.2.9. Ensure that declared pregnant females do not exceed the dose limits specified in Attachment 1, and that radiation doses to females, who declare themselves pregnant after the declaration of an emergency, are limited to the extent practical to the limits specified in Attachment 1, consistent with the needs of the Emergency Response Organization.

6.3 The Onshift Senior Radiation Protection Technician should:

6.3.1. Assume duties of the Radiological Coordinator per this procedure until position is filled.

6.3.2. Assist in evaluating radiation exposure levels likely to be encountered during emergency operations.

NOTE

Completion of Attachment 3 is <u>*not*</u> *required unless a worker s thyroid CDE is expected to be ≥ 5 Rem. Attachment 2 may be used as a reference without completion of Attachment 3.*

6.4 Administration of Iodine Blocking Agents.

6.4.1. Assessing the Need to Issue KI

1. If there is a potential need to issue KI, potential recipients of KI may fill out their portion of Attachment 3 in advance.

2. If a worker s thyroid CDE is expected to approach 5 Rem, obtain a copy of Attachment 2, Thyroid Committed Dose Equivalent Graph, and estimate the dose commitment for the thryoid.

3. Verify your calculations/measurements/estimates and record the results on Attachment 3, Potassium Iodide Administration Form.

4. Report the results to the Emergency Director or Emergency Plant Manager and advise him as to the need to issue KI in accordance with this procedure.

5. The Emergency Director or Emergency Plant Manager may approve the issuance of KI via telecon/radio.

6.4.2. KI Issuance Requirements

1. When thyroid CDE is estimated to be 5 rem or greater the following are required:

   - The Emergency Director or Emergency Plant Manager shall designate the individuals who will receive KI.

   - The individual to receive KI shall voluntarily elect to take KI.

   - The individual to receive KI shall read Potassium Iodide precaution information provided by the drug company. The individual shall then complete the appropriate sections of Attachment 3 - Potassium Iodide Administration Form.

6.4.3. Distribution of KI

NOTE

KI is stored in the following locations: Control Room, Technical Support Center, Decontamination Room (second floor of the Services Building), Emergency Operations Facility and Offsite Monitoring Team Emergency Kits.

1. Assemble the individuals who were designated to receive KI and the individuals to administer the KI.

2. Provide the individuals designated to receive KI with copies of:

    1. Potassium Iodide precaution information provided by the drug company.

    2. Attachment 3 Pottassium Iodide (KI) Administration Form

3. Ensure personnel read and/or complete the appropriate sections of the above.

6.4.4. Guidelines for the Administration of KI

NOTE

The Emergency Director or Emergency Plant Manager can authorize the administration of KI in the field after the Field Monitoring Team members have complied with the guidelines of this procedure. Completion of the KI documentation may be accomplished at the convenience of the Emergency Director or Emergency Plant Manager.

1. If possible, KI should be administered approximately one-half hour before exposure for maximum blockage.

2. Final uptake is halved if KI is administered within 3-4 hours after exposure.

3. Little benefit is gained with KI administration 10-12 hours after exposure.

4. Once the KI is taken and the Iodine concentration is verified or the calculated dose determined, the tablets should be issued for a minimum of six (6) to a maximum of ten (10) consecutive days. One tablet is issued each day.

5. Verify that each individual receiving KI has completed and signed Attachment 3.

6. Verify that there are no YES blocks marked for allergies or iodine sensitivity on Attachment 3, Potassium Iodide Administration Form.

7. Individuals who have answered YES for allergies or iodine sensitivity to those questions on Attachment 3, will initially be considered to be iodine sensitive and must be treated as follows:

    1. The individuals will be relocated or replaced to eliminate or minimize the uptake of radioiodine in the thyroid gland, or

    2. The individuals WILL NOT receive KI without the Radiological Coordinator s or Radiological Assessment Coordinator s authorization (after evaluation of the YES answer and the Emergency

Director s or Emergency Plant Manager s concurrence).

8. Issue each individual designated to receive KI one (1) 130 mg KI tablet.

9. Forward all completed paperwork to the Radiological Coordinator or Radiological Assessment Coordinator.

6.4.5. Final Conditions

1. Ensure that each individual whose estimated exposure to radioiodine exceeded 5 rem has been identified and administered KI, as appropriate.

2. Ensure all necessary forms are completed and reviewed by the Radiological Coordinator or Radiological Assessment Coordinator and the Emergency Director or Emergency Plant Manager.

3. Ensure that each individual who was exposed to radioiodine with a calculated thyroid CDE $\geq$ 5 Rem has been scheduled for bioassay analysis.

7 DOCUMENTATION

7.1 Attachment 3 of this procedure, completed during actual events shall be submitted to permanent plant files (PPF) per EPP-2-100. Attachments from exercises/drills will be used to critique and evaluate exercises/drills performance. This documentation will not be sent to PPF and may be discarded.

RADIATION EXPOSURE LIMITS AND GUIDELINES

A. **10CFR20 RADIATION EXPOSURE LIMITS**

5 rem/yr. (50 mSv/yr.) Total Effective Dose Equivalent (TEDE) to the whole body.

50 rem/yr. (500 mSv/yr.) sum of the Deep Dose Equivalent (DDE) and the Committed Dose Equivalent (CDE) to an individual organ or tissue other than the lens of the eye.

15 rem/yr. (150 mSv/yr.) Eye Dose Equivalent (LDE) to the eye.

50 rem/yr. (500 mSv/yr.) Shallow Dose Equivalent (SDE) to the skin or an extremity.

50 mrem (0.5 mSv) in a one month period for a declared pregnant female, not to exceed 500 mrem (5 mSv) for the entire pregnancy period (10CFR20.1208).

B. **GUIDELINES FOR EMERGENCY EXPOSURES**

1. Emergency Total Effective Dose Equivalent (TEDE) limits are:
   a. 5 rem (50 mSv) for preplanned emergency actions.
   b. 10 rem (100 mSv) for immediate actions taken to prevent major damage to equipment, prevent the release of radioactive materials, or control fires.
   c. 25 rem (250 mSv) without consent and 75 rem (750 mSv) on a voluntary basis for action to save a life or to protect large populations.
2. Committed Dose Equivalent to the Thyroid

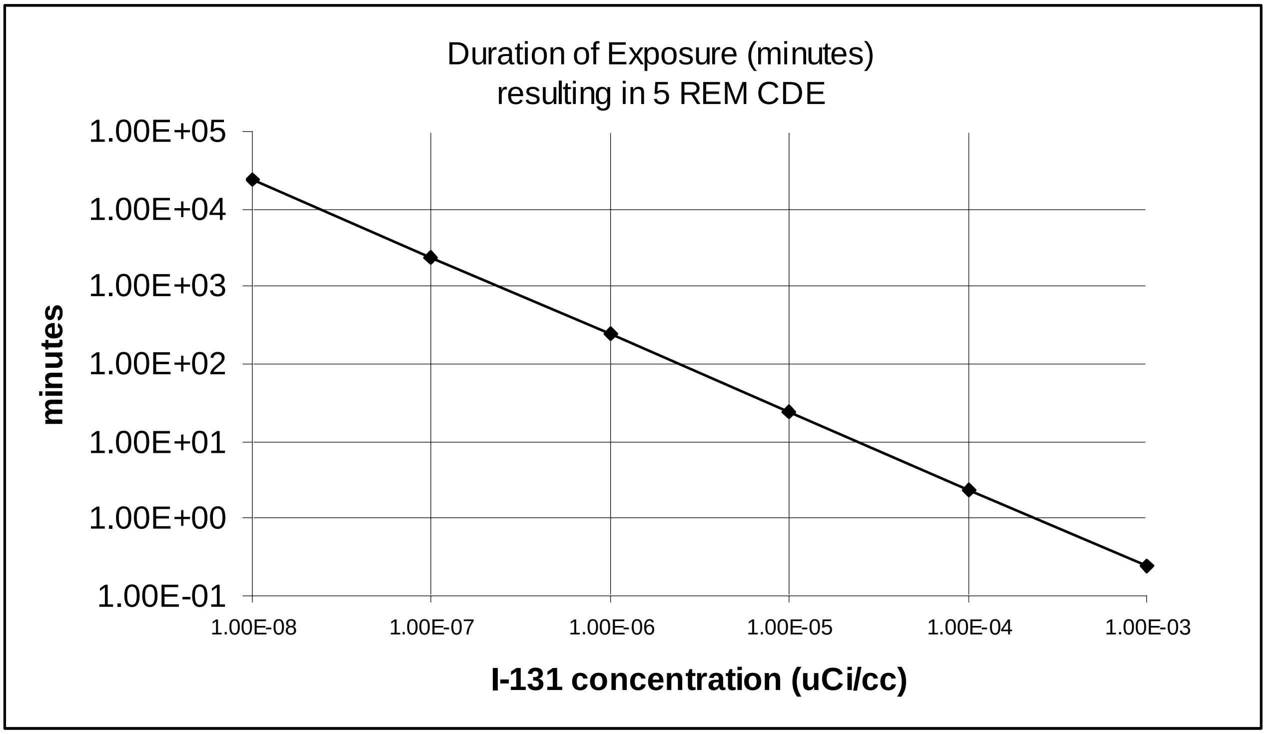
NOTE

Although RBS Emergency Plan Table 13.3-10 establishes thyroid exposure guidelines, the difficulty in monitoring thyroid exposure over a short period of time prevents use of these numbers as absolute limits. Therefore, when radioiodine airborne concentrations are known, projected thyroid doses will be calculated to prevent exceeding these guidelines.

   a. To save the life of another individual there is no specified limit. Although respirators should be used where effective to control the dose to emergency workers, thyroid dose should not be a limiting factor for lifesaving missions.
   b. To mitigate accident consequences and prevent major releases of radioactivity to the environment or control fires- 100 rem (1 Sv) Committed Dose Equivalent (CDE).
   c. Emergency duties including decontamination and first aid, but not related to protecting equipment, the public or for lifesaving - 50 rem (500 mSv) CDE.
3. Shallow Dose Equivalent to the Extremities
   a. To save the life of another individual, extremity exposure should not be a factor.
   b. To mitigate accident consequences and prevent major release of radioactivity to the environment - 100 rem (1 Sv) Shallow Dose Equivalent (SDE).
   c. When preplanned emergency actions are possible -50 rem (500 mSv) SDE.

THYROID COMMITTED DOSE EQUIVALENT GRAPH

Time to 5 REM CDE verses I-131 concentration guideline



Instructions for Use:

1. Determine the estimated or actual I-131 airborne concentration in the area(s) of interest. Divide this by the protection factor of the equipment used (if unknown, use 1). Locate this number on the Horizontal Axis.

2. Locate the duration of exposure in minutes on the Vertical Axis. Find the point at which this value intersects with the number from step 1.

3. If this point of intersection is located to the left (below) the line, the thyroid CDE is less than 5 rem.

4. If this point of intersection is located to the right (above) the line, the thyroid CDE is greater than 5 rem.

5. If this point of intersection is located on the line, the thyroid CDE is 5 rem.

POTASSIUM IODIDE (KI) ADMINISTRATION FORM

Name:____________________/_______________/_____________ __________________
Last First Middle SSN

Yes No Have you any known allergies? If so, please describe major severity of allergy and medications taken if any.

Yes No When eating seafood or shellfish, do you suffer from symptoms of stomach or bowel upset or skin eruption? If so, explain.

Yes No Has any physician told you that you have a sensivity to iodine?

Yes No If you have ever had a gallbladder dye test, kidney x-ray requiring dye injection, thyroid isotope scan, did you have any reactions?

Please explain any Yes answers:

____

____

____

*** Known Iodide Allergy/Previous Allergic Reaction: (Mark One) ☐ Yes ☐ No**

I verify that I have read and understand the precaution leaflet. I understand that taking thyroid blocking agent (KI) is strictly voluntary.

I (Mark One) ☐ **Do** ☐ **Do Not** **choose to take KI when approved.**

_________________________________ ____________________
Signature of Individual Date

Duration of Exposure: ____________ (minutes) I-131 Concentration: _____________ (μCi/cc in air)

Estimated Thyroid Dose Commitment: (Mark one) ☐ < 5 Rem ☐ ≥ 5 Rem

Respiratory Protection Worn During Exposure: (Mark One) ☐ Yes ☐ No

Respiratory Protection Factor:______________ Date of Exposure:___________________

CAUTION

If the above allergic reaction statement * is marked 'Yes', then do not administer KI.

Approved: ________________________ ____________ ☐ Mark if telecon/radio approval
ED/EPM Date/Time

Individual notified KI is approved for use: (Date/Time) _______________/____________

KI taken (Date/Time) _________________/____________

Notes:

____

____

____

PROCEDURE ACTION REQUEST FORM
(Typical)

ENTERGY

PAR

Page 1 of 1

Procedure Action Request

PROCEDURE NO.	CURRENT REV.	PROCEDURE TITLE
EIP-2-012	20	Radiation Exposure Controls

TYPE OF ACTION:

☒ PROCEDURE REVISION (PR)
☐ NEW PROCEDURE (NP)
☐ CANCEL PROCEDURE (CX)

DESCRIBE ACTION:

1. Revised Reference 2.4 - Replaced "NCRP Report No. 55, Protection of the Thyroid Gland in the Event of Releases of Radioiodine" with "FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001"

2. Changed 25 Rem to 5 Rem in the following places within EIP-2-012 to align the procedure with EN-FAP-EP-009, Use of KI for the Emergency Response Organization and with the December 2001 FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies:

   - Revised the Note preceding Section 6.4 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.1.2 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.2.1 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.5.1 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.5.3 - Changed 25 Rem to 5 Rem
   - Revised Attachment 2, Steps 3, 4, and 5 - Changed 25 Rem to 5 Rem
   - Revised Attachment 2, Page 2 - Replaced the Thyroid Committed Dose Equivalent Graph which referenced 25 Rem to a new graph which references 5 Rem.
   - Revised Attachment 3, on the line for Estimated Thyroid Dose Commitment - Changed < 25 REM to < 5 REM and changed ≥ 25 Rem to ≥ 5 Rem

3. Added Reference 2.6, EN-EP-FAP-009, Use of KI for the Emergency Response Organization

☒ PAD COMPLETED (EN-LI-100-ATT-9.1)
☒ 50.54Q REVIEW COMPLETED, (EN-EP-305)
☒ LICENSING COMMITMENTS VERIFIED
☐ CROSS DISCIPLINE REVIEW (if applicable)

REVIEW AND APPROVAL:

	SIGNATURE / KCN / DATE
PREPARER	[signature] 1350 11/13/12
TECHNICAL REVIEWER	Norman E. Tilson 1482 11/13/12
EP MANAGER	John Hurst 0628 11/13/12 For Dean Burnett

EFFECTIVE DATE: 11/15/12

I. OVERVIEW

PAD Rev. #:

Facility: River Bend Station

Proposed Activity / Document: EIP-2-012, Radiation Exposure Controls **Change/Rev. #:** 21

Description of Proposed Activity:

1. Revised Reference 2.4 - Replaced "NCRP Report No. 55, Protection of the Thyroid Gland in the Event of Releases of Radioiodine" with "FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001"

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3. Added Reference 2.6, EN-EP-FAP-009, Use of KI for the Emergency Response Organization

II. DOCUMENT REVIEW

Provide the requested information for each item below.

1. **For documents available electronically:**

   a. **List search engine or documents searched, and keywords used:**

   Performed Autonomy 50.9 search of the Emergency Plan, Technical Requirements Manual, Tech Spec Bases, Operating Bases, COLR, ODCM, and NRC Orders.

   Keywords used: "protective actions", "potassium iodide", "KI"

   b. **List relevant sections of controlled electronic documents reviewed:**

   The only relevant hit was Emergency Plan, Table 13.3-10

2. **Documents reviewed manually (hardcopy):**

   Emergency Plan

3. **For those documents that are not reviewed either electronically or manually, use the specific questions provided in Sections III and IV of Attachment 9.2 of EN-LI-100 as needed. Document below the extent to which the Attachment 9.2 questions were used.**

   Attachment 9.2 questions were used in their entirety, including for those documents reviewed electronically.

III. PROCESS REVIEW

Does the proposed activity affect, invalidate, or render incorrect, OR have the potential to affect, invalidate, or render incorrect, information contained in any of the following processes? Associated regulations and procedures are identified with each process below.

PROCESS (Regulations / Procedures)	YES	NO	REVIEW RESULTS
Chemistry / Effluents	☐	☒	
Radwaste / Process Control Program (PCP) (EN-RW-105 or contact the Radiation Protection Dept.)	☐	☒	
Radiation Protection / ALARA (10 CFR 20 / EN-RP-110 or contact the Radiation Protection Dept.)	☐	☒	
Inservice Inspection Program (10 CFR 50.55a / EN-DC-120, -351)	☐	☒	
Inservice Testing Program (10 CFR 50.55a / EN-DC-332)	☐	☒	
Maintenance Rule Program (10 CFR 50.65 / EN-DC-203, -204, -205, -206, -207)	☐	☒	
Containment Leakage Rate Testing (Appendix J) Program (10 CFR 50 Appendix J / EN-DC-334)	☐	☒	

IF any box is checked "Yes," THEN contact the appropriate department to ensure that the proposed change is acceptable and document the results in the REVIEW RESULTS column.

IV. LICENSING BASIS DOCUMENT REVIEW

Does the proposed activity affect, invalidate, or render incorrect, OR have the potential to affect, invalidate, or render incorrect, information contained in any of the following Licensing Basis Document(s)? Associated regulations and procedures are identified with each Licensing Basis Document below.

LICENSING BASIS DOCUMENTS (Regulations / Procedures)	YES	NO	REVIEW RESULTS OR SECTIONS AFFECTED OR LBDCR #
Quality Assurance Program Manual (QAPM) (10 CFR 50.54(a) / EN-QV-104)	☐	☒	
Fire Protection Program (FPP) [includes the Fire Hazards Analysis (FHA)] (OL Condition, 10 CFR 50.48 / EN-DC-128)	☐	☒	
Emergency Plan (10 CFR 50.54(q) / EN-EP-305)	☒	☐	Table 13.3-10.
Environmental Protection Plan (Appendix B of the OL, Environmental Evaluation / EN-EV-115, EN-EV-117, EN-LI-103)	☐	☒	
Security Plan and Cyber Security Plan [10 CFR 50.54(p) / EN-NS-210 or contact the site Security / IT Dept.]	☐	☒	
Operating License (OL) / Technical Specifications (TS) (10 CFR 50.90 / EN-LI-103)	☐*	☒	
TS Bases (10 CFR 50.59 / EN-LI-100 / EN-LI-101)	☐	☒	
Technical Requirements Manual (TRM) (including TRM Bases) (10 CFR 50.59 / EN-LI-100 / EN-LI-101)	☐	☒	
Core Operating Limits Report (COLR), and Pressure and Temperature Limits Report (PTLR) (TS Administrative Controls, EN-LI-113, EN-LI-100, EN-LI-101)	☐	☒	
Offsite Dose Calculation Manual (ODCM) (TS Administrative Controls or 10 CFR 50.59 / EN-LI-113 or EN-LI-100 / EN-LI-101)	☐	☒	
Updated Final Safety Analysis Report (UFSAR) (10 CFR 50.71(e) / EN-LI-113, EN-LI-100, EN-LI-101)	☐	☒	
Storage Cask Certificate of Compliance (10 CFR 72.244 / EN-LI-113)	☐*	☒	
Cask FSAR (CFSAR) (including the CTS Bases) (10 CFR 72.70 or 72.248 / EN-LI-113, EN-LI-100,EN-LI-112)	☐	☒	
10 CFR 72.212 Evaluation Report (212 Report) (10 CFR 72.48 / EN-LI-100, EN-LI-112)	☐	☒	
NRC Orders (10 CFR 50.90 / EN-LI-103 or as directed by the Order)	☐*	☒	
NRC Commitments and Obligations (EN-LI-110)	☐	☒	
Site Specific CFR Exemption (10 CFR 50.12, 10 CFR 55.11, 10 CFR 55.13, 10 CFR 72.7)	☐*	☒	

*Contact the site Licensing Department.

IF any box is checked "Yes," THEN ensure that any required regulatory reviews are performed in accordance with the referenced procedures. Prepare an LBDCR per procedure EN-LI-113 if a LBD

is to be changed, and document any affected sections or the LBDCR #. Briefly discuss how the LBD is affected in Section VII.A.

V. 10 CFR 50.59 / 10 CFR 72.48 APPLICABILITY

Can the proposed activity be dispositioned by one of the following criteria? Check the appropriate box (if any).

☐	An approved, valid 50.59/72.48 Evaluation covering associated aspects of the proposed activity already exists. Reference 50.59/72.48 Evaluation # ________________ (if applicable) or attach documentation. Verify the previous 50.59/72.48 Evaluation remains valid.
☐	The NRC has approved the proposed activity or portions thereof <u>or</u> a license amendment being reviewed by the NRC addresses the proposed activity. Reference the approval document:
☒	The proposed activity is controlled by one or more specific regulations. Examples of specific regulations are: • Maintenance Rule (50.65), • Quality Assurance Program (10 CFR 50 Appendix B) • Security Plan (50.54(p)) • Emergency Plan (50.54(q)) • Fire Protection (operating license condition) See NEI 96-07 Section 4.1 for additional guidance on specific regulations. Reference the controlling specific regulation(s): 10CFR50.54(q)

<u>IF</u> the entire proposed activity can be dispositioned by the criteria in Section V, <u>THEN</u> proceed to Section VII and provide basis for conclusion in Section VII.A.

Otherwise, continue to Section VI to perform a 50.59 and/or 72.48 Screening, or perform a 50.59 and/or 72.48 Evaluation in accordance with EN-LI-101 and/or EN-LI-112.

Changes to the IPEC Unit 1 Decommissioning Plan are to be evaluated in accordance with the 50.59 process, as allowed by the NRC in a letter to IPEC dated January 31, 1996. [IPEC-1 Letter RA960014]

VI. 50.59 / 72.48 SCREENING REVIEW

VI.A 50.59/72.48 SCREENING (Check the appropriate boxes.)

☐ 10 CFR 50.59 Screening criteria are met. [10 CFR 50.59(c)(1)]

The proposed activity meets all of the following criteria regarding design function:

- Does not adversely affect the design function of an SSC as described in the UFSAR; AND
- Does not adversely affect a method of performing or controlling a design function of an SSC as described in the UFSAR; AND
- Does not adversely affect a method of evaluation that demonstrates intended design function(s) of an SSC will be accomplished as described in the UFSAR; AND
- Does not involve a test or experiment not described in the UFSAR.

☐ The proposed activity does not involve structures, systems, or components controlled by 10 CFR 50.59.

☐ 10 CFR 72.48 Screening criteria are met. [10 CFR 72.48(c)(1)] (Applicable to sites with an ISFSI)

The proposed activity meets all of the following criteria regarding design function:

- Does not adversely affect the design function of an SSC as described in the CFSAR; AND
- Does not adversely affect a method of performing or controlling a design function of an SSC as described in the CFSAR; AND
- Does not adversely affect a method of evaluation that demonstrates intended design function(s) of an SSC will be accomplished as described in the CFSAR; AND
- Does not involve a test or experiment not described in the CFSAR.

☐ The proposed activity does not involve structures, systems, or components controlled by 10 CFR 72.48.

IF either of the 50.59 or 72.48 Screening criteria are met, THEN complete VI.B below as appropriate and proceed to Section VII.

IF the proposed activity does not meet the applicable criteria, THEN perform a 50.59 or 72.48 Evaluation in accordance with EN-LI-101 or EN-LI-112, as appropriate, attach a copy of the Evaluation to this form, and proceed to Section VII.

IF the activity does not involve systems, structures, or components controlled by 10 CFR 50.59 or by 10 CFR 72.48, THEN a 50.59 or 72.48 Screening is not required, as appropriate, and proceed to Section VII.

ATTACHMENT 9.1 PROCESS APPLICABILITY DETERMINATION FORM

VI.B BASIS

Provide a clear, concise basis for determining the proposed activity may be screened out such that a third-party reviewer can reach the same conclusions. Refer to NEI 96-07 Section 4.2 for guidance. Provide supporting documentation or references as appropriate.

VII. REGULATORY REVIEW SUMMARY

VII.A GENERAL REVIEW COMMENTS (Provide pertinent review details and basis for conclusions if not addressed elsewhere in form.)

The changes being implemented are governed by the Emergency Plan and have been reviewed under the 10CFR50.54(q) process per EN-EP-305 with no adverse impact and no reduction in effectiveness.

VII.B CONCLUSIONS

1. **Is a change to an LBD being initiated?** ☐ Yes ☒ No

   IF "Yes," THEN enter the appropriate change control process and include this form with the change package.

2. **Is a 10 CFR 50.59 Evaluation required?** ☐ Yes ☒ No

   IF "Yes," THEN complete a 50.59 Evaluation in accordance with EN-LI-101 and attach a copy to the change activity.

3. **Is a 10 CFR 72.48 Evaluation required?** ☐ Yes ☒ No

   IF "Yes," THEN complete a 72.48 Evaluation in accordance with EN-LI-112 and attach a copy to the change activity.

ATTACHMENT 9.1 PROCESS APPLICABILITY DETERMINATION FORM

VIII. SIGNATURES [1]

Preparer: Aaron Magee / [signature] / Entergy-RBS / EP / 11-13-12
Name (print) / Signature / Company / Department / Date

Reviewer: Norman E Tison / [signature] / Entergy-RBS / EP / 11-13-12
Name (print) / Signature / Company / Department / Date

Process Applicability Exclusion

Site Procedure Champion or Owner: N/A
Name (print) / Signature / Company / Department / Date

Upon completion, forward this PAD form to the appropriate organization for record storage. If the PAD form is part of a process that requires transmittal of documentation, including PAD forms, for record storage, then the PAD form need not be forwarded separately.

[1] Signatures may be obtained via electronic processes (e.g., PCRS, ER processes, Asset Suite signature), manual methods (e.g., ink signature), e-mail, or telecommunication. If using an e-mail , attach it to this form.

Procedure/Document Number: EIP-2-012	Revision: 21
Equipment/Facility/Other: River Bend Station	
Title: Radiation Exposure Controls	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the emergency plan or affect the implementation of the emergency plan):

KI

1. Revised Reference 2.4 - Replaced "NCRP Report No. 55, Protection of the Thyroid Gland in the Event of Releases of Radioiodine" with "FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001"

2. Changed 25 Rem to 5 Rem in the following places within EIP-2-012 to align the procedure with EN-FAP-EP-009, Use of KI for the Emergency Response Organization and with the December 2001 FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies:

   - Revised the Note preceding Section 6.4 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.1.2 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.2.1 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.5.1 - Changed 25 Rem to 5 Rem
   - Revised Step 6.4.5.3 - Changed 25 Rem to 5 Rem
   - Revised Attachment 2, Steps 3, 4, and 5 - Changed 25 Rem to 5 Rem
   - Revised Attachment 2, Page 2 - Replaced the Thyroid Committed Dose Equivalent Graph which referenced 25 Rem to a new graph which references 5 Rem.
   - Revised Attachment 3, on the line for Estimated Thyroid Dose Commitment - Changed < 25 REM to < 5 REM and changed $\geq$ 25 Rem to $\geq$ 5 Rem

3. Added Reference 2.6, EN-EP-FAP-009, Use of KI for the Emergency Response Organization

Part II. Activity Previously Reviewed? Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: **Justification:**	☐ YES 50.54(q)(3) Evaluation is NOT required. Enter justification below and complete Part VI. ☒ NO Continue to next part

☐ Bounding document attached (optional)

Part III. Applicability of Other Regulatory Change Control Processes

Check if any other regulatory change processes control the proposed activity.(Refer to EN-LI-100)

NOTE: For example, when a design change is the proposed activity, consequential actions may include changes to other documents which have a different change control process and are **NOT** to be included in this 50.54(q)(3) Screening.

APPLICABILITY CONCLUSION

☒ If there are no controlling change processes, continue the 50.54(q)(3) Screening.

☐ One or more controlling change processes are selected, however, some portion of the activity involves the emergency plan or affects the implementation of the emergency plan; continue the 50.54(q)(3) Screening for that portion of the activity. Identify the applicable controlling change processes below.

☐ One or more controlling change processes are selected and fully bounds all aspects of the activity. 50.54(q)(3) Evaluation is NOT required. Identify controlling change processes below and complete Part VI.

CONTROLLING CHANGE PROCESSES

10CFR50.54(q)

Procedure/Document Number: EIP-2-012	**Revision: 21**
Equipment/Facility/Other: River Bend Station	
Title: Radiation Exposure Controls	
Part IV. Editorial Change Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent? **Justification:**	☐ YES 50.54(q)(3) Evaluation is NOT required. Enter justification and complete Part VI. ☒ NO Continue to next part

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets) Does this activity affect any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II?

1. Responsibility for emergency response is assigned. [1]	☐
2. The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the emergency plan. [1]	☐
3. The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4. The process for timely augmentation of onshift staff is established and maintained. [2]	☐
5. Arrangements for requesting and using off site assistance have been made. [3]	☐
6. State and local staff can be accommodated at the EOF in accordance with the emergency plan. [3]	☐
7. A standard scheme of emergency classification and action levels is in use. [4]	☐
8. Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5]	☐
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5]	☐
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5]	☐
11. Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12. Systems are established for prompt communication to emergency response personnel. [6]	☐
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway emergency planning zone (EPZ). [7]	☐
14. Coordinated dissemination of public information during emergencies is established. [7]	☐
15. Adequate facilities are maintained to support emergency response. [8]	☐
16. Adequate equipment is maintained to support emergency response. [8]	☐
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9]	☐
18. A range of public PARs is available for implementation during emergencies. [10]	☐
19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10]	☐
20. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☒
21. The resources for controlling radiological exposures for emergency workers are established. [11]	☒
22. Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
23. Plans for recovery and reentry are developed. [13]	☐

Procedure/Document Number: EIP-2-012	Revision: 21
Equipment/Facility/Other: River Bend Station	
Title: Radiation Exposure Controls	

Part V.(Cont'd) Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets) Does this activity affect any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II?

24. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
25. Drills, exercises, and training evolutions that provide performance opportunities to develop, maintain, and demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
26. Identified weaknesses are corrected. [14]	☐
27. Training is provided to emergency responders. [15]	☐
28. Responsibility for emergency plan development and review is established. [16]	☐
29. Planners responsible for emergency plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 50.54(q)(3) Evaluation is NOT required; document the basis for conclusion below and complete Part VI.

☒ If any Part V criteria are checked, complete Part VI and perform a 50.54(q)(3) Evaluation.

BASIS FOR CONCLUSION

1. Emergency planning element(s) 20 and 21 in Part V of this form are affected by these changes because there is a potential to affect radiological exposure controls for emergency workers, and the ability to protect onsite personnel during emergencies.

A 10CFR50.54(q) evaluation will be performed to determine whether or not the effectiveness of the emergency plan is reduced and prior NRC approval is required.

Part VI. Signatures:

Preparer Name (Print) Aaron Magee	Preparer Signature [signature]	Date: 11-13-12
(Optional) Reviewer Name (Print) N/A	Reviewer Signature	Date:
Reviewer Name (Print) MILTON FRED GAYDEN Nuclear EP Project Manager	Reviewer Signature [signature]	Date: 11-13-12
Approver Name (Print) JOHN F. HURST EP manager or designee	Approver Signature [signature]	Date: 11-13-12

acting for Dean Burnett

Procedure/Document Number: EIP-2-012	Revision: 21
Equipment/Facility/Other: River Bend Station	
Title: Radiation Exposure Controls	

Part I. Description of Proposed Change:

KI

- Revised Reference 2.4 - Replaced "NCRP Report No. 55, Protection of the Thyroid Gland in the Event of Releases of Radioiodine" with "FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001"
- Added Reference 2.6, EN-EP-FAP-009, Use of KI for the Emergency Response Organization
- Changed 25 Rem to 5 Rem in the following places within EIP-2-012 to align the procedure with EN-FAP-EP-009, Use of KI for the Emergency Response Organization and with the December 2001 FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies:
  - Revised the Note preceding Section 6.4 - Changed 25 Rem to 5 Rem
  - Revised Step 6.4.1.2 - Changed 25 Rem to 5 Rem
  - Revised Step 6.4.2.1 - Changed 25 Rem to 5 Rem
  - Revised Step 6.4.5.1 - Changed 25 Rem to 5 Rem
  - Revised Step 6.4.5.3 - Changed 25 Rem to 5 Rem
  - Revised Attachment 2, Steps 3, 4, and 5 - Changed 25 Rem to 5 Rem
  - Revised Attachment 2, Page 2 - Replaced the Thyroid Committed Dose Equivalent Graph which referenced 25 Rem to a new graph which references 5 Rem.
  - Revised Attachment 3, on the line for Estimated Thyroid Dose Commitment - Changed < 25 REM to < 5 REM and changed ≥ 25 Rem to ≥ 5 Rem

Part II. Description and Review of Licensing Basis Affected by the Proposed Change:

The EN-LI-100 Process Applicability Determination Form states that no other licensing basis documents were affected, invalidated, or rendered incorrect, nor is there the potential to affect, invalidate, or render incorrect said documents.

Part III. Describe How the Proposed Change Complies with Relevant Emergency Preparedness Regulation(s) and Previous Commitment(s) Made to the NRC:

Previous Commitments to the NRC – Per EN-LI-110 the licensing management system used for tracking NRC commitments was searched and no results were found related to the proposed changes or the RBS Emergency Plan for these changes.

Site Compliance:

10 CFR 50.47(b)(10) - Emergency Protective Actions
10 CFR 50.47(b)(11) - Emergency Radiological Exposure Control
Site Compliance: The use of potassium iodide (KI) has been established as a protective action for the emergency response organization at River Bend Station when specific radiological criteria have been met and approval has been granted by the Emergency Director or the Emergency Plant Manager. Information regarding the use of KI is maintained in EIP-2-012, Radiation Exposure Controls and EN-FAP-EP-009, Use of KI for the Emergency Response Organization. The RBS Emergency Plan and EIP-2-012 are being revised to align with EN-FAP-EP-009 and FDA Guidance for Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies.

Procedure/Document Number: EIP-2-012	Revision: 21
Equipment/Facility/Other: River Bend Station	
Title: Radiation Exposure Controls	

Part IV. Description of Emergency Plan Planning Standards, Functions and Program Elements Affected by the Proposed Change:

Emergency Planning Standard - 10 CFR 50.47(b)(10) - Emergency Protective Actions
Functions:

- A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.

Program Elements - Appendix E to 10 CFR 50 does not contain any support requirements. Informing criteria appear in NUREG-0654 in Sections II.J.1–8, Section II.J.10, and Supplement 3 and in the licensee's emergency plan.

Emergency Planning Standard - 10 CFR 50.47(b)(11) - Emergency Radiological Exposure Control
Functions:

- The resources for controlling radiological exposures for emergency workers are established.

Program Elements - Section IV.E.1 of Appendix E to 10 CFR 50 provides supporting requirements. Informing criteria appear in Section II.K of NUREG-0654 and the licensee's emergency plan.

Part V. Description of Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:

1. **KI**

   Revising Reference 2.4 by replacing "NCRP Report No. 55, Protection of the Thyroid Gland in the Event of Releases of Radioiodine" with "FDA Guidance, Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001" aligns EIP-2-012 with the appropriate guidance used by the fleet.

   Adding Reference 2.6, EN-EP-FAP-009, Use of KI for the Emergency Response Organization aligns this procedure with the fleet procedure.

   The proposed changes from 25 REM to 5 REM aligns the RBS Emergency Plan with EN-FAP-EP-009, Use of KI for the Emergency Response Organization, for recommending the use of KI anytime an ERO member will be entering an airborne area or otherwise subjected to airborne contamination which results if the potential to receive 5 REM Committed Dose Equivalent to the thyroid regardless of classification. This change aligns with December 2001 FDA Guidance for Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies.

   These proposed changes have been determined to continue to meet the requirements of the RBS Emergency Plan and section IV.E.1, of Appendix E to 10CFR50 and 10CFR50.47(b)(10)and (b)(11). This change does not represent a reduction is effectiveness of the RBS Emergency Plan and does not require prior NRC approval because a range of protective actions is available for plant emergency workers during emergencies, and resources for controlling radiological exposures for emergency workers are established.

Part VI. Evaluation Conclusion

Answer the following questions about the proposed change.

1. Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒YES ☐ NO
2. Does the proposed change maintain the effectiveness of the emergency plan (i.e., no reduction in effectiveness)?	☒YES ☐ NO
3. Does the proposed change constitute an emergency action level scheme change?	☐YES ☒ NO

If questions 1 or 2 are answered NO, or question 3 answered YES, reject the proposed change, modify the proposed change and perform a new evaluation or obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es). Refer to step 5.6[8].

- This revision may be implemented without prior NRC approval.

Procedure/Document Number: EIP-2-012	Revision: 21	
Equipment/Facility/Other: River Bend Station		
Title: Radiation Exposure Controls		
Part VII. Signatures		
Preparer Name (Print) Aaron Magee	Preparer Signature AZ	Date: 11-13-12
(Optional) Reviewer Name (Print) N/A	Reviewer Signature	Date:
Reviewer Name (Print) MILTON FRED Gwynn Nuclear EP Project Manager	Reviewer Signature Milton Fred Gwynn	Date: 11-13-12
Approver Name (Print) JOHN F. HURST EP Manager or designee	Approver Signature John F. Hurst	Date: 11-13-12

acting for Dean Burnett

NUCLEAR PLANT OPERATOR
ADMINISTRATIVE
JOB PERFORMANCE MEASURE

SRO ☒ **RO** ☐

ALTERNATE PATH ☐

TITLE: **Classify an Emergency**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**15**	Actual Time (min):	
PERFORMANCE TIME:	Average Time (min):	**NA**	Actual Time (min):	**NA**

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
X	Simulator
	Control Room
	Classroom

Prepared:	Dave Bergstrom	**Date:**	October 9, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

This is a Time Critical JPM

Task Standard: Applicant classified the event as a Site Area Emergency (SS3) within fifteen minutes.

Synopsis: This JPM is meant to be performed immediately after simulator scenario #3 (IC#208). The task will have the applicant determine the classification of an event. This is a TIME CRITICAL JPM.

The plant was operating at approximately 63% power when a loss of power is experienced to NNS-A, tripping (among other things) the running CRD pump. When the operator started the standby CRD pump, it experienced a clogged suction filter and a trip of the pump. After a 20 minute LCO forces the crew to insert a scram, the CRD pump is made available to be started. The scram resulted in a hydraulic lock ATWS. The Main Turbine is subsequently tripped due to high vibration, causing SRV's to lift.

NOTE: This JPM is Administrative and will be performed in a classroom.

1) **<u>Read to the operator</u>**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) <u>Initiating Cues</u>:

You are the Emergency Director. Classify the event.

3) <u>Initial Conditions</u>:

Use the conditions of the scenario you just completed.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Classify an Emergency	300001005003	G 2.4.41	4.6

REFERENCES:
EIP-2-001, Rev 24

APPLICABLE OBJECTIVES
RCBT-EP-SRORMED Obj 16

REQUIRED MATERIALS:
EIP-2-001, Rev 24 (Simulator Copy)

SIMULATOR CONDITIONS &/or SETUP:

1. This is a classroom/Admin JPM – There is no simulator setup

2.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Applicant classified the event as a Site Area Emergency (SS3) within fifteen minutes.

PERFORMANCE:

START TIME: ____________

1.	***Procedure Step:**	1 Classify the event.
	Standard	Applicant classified the event as a Site Area Emergency (SS3) within 15 minutes.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Applicant classified the event as a Site Area Emergency (SS3) within fifteen minutes.

This completes this JPM.

STOP TIME: ________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

Initiating Cues:

You are the Emergency Director. Classify the event.

Initial Conditions:

Use the conditions of the scenario you just completed.

Answer Below:

The Emergency Action Level (EAL) Classification is:

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***EMERGENCY IMPLEMENTING PROCEDURE**

*CLASSIFICATION OF EMERGENCIES

PROCEDURE NUMBER:	***EIP-2-001**
REVISION NUMBER:	***024**
Effective Date:	***11/15/2012**

NOTE : SIGNATURES ARE ON FILE.

TemRev 2 AddCounter 1 Att Enc DS MSet REGULAR KWN OFF
REFERENCE USE

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES

TABLE OF CONTENTS

1 PURPOSE

1.1 This procedure provides guidelines for properly classifying emergencies.

2 REFERENCES

2.1 River Bend Station (RBS) Emergency Plan

2.2 EIP-2-002, Classification Actions

2.3 NEI 99-01 Rev 5, Methodology for Development of Emergency Action Levels

2.4 NUREG-1022, Event Reporting Guidelines: 10CFR50.72 and 10CFR50.73

2.5 NRC Bulletin 2005-02, Emergency Preparedness and Response Actions for Security-Based Events

2.6 NRC RIS 2003-18 Supp 2, Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels

2.7 10 CFR 50 Appendix E IV.C.2, Emergency Declaration Timeliness

3 DEFINITIONS

3.1 AFFECTING SAFE SHUTDOWN: Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable HOT or COLD SHUTDOWN condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

3.1.1. Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in HOT SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is not AFFECTING SAFE SHUTDOWN.

3.1.2. Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in COLD SHUTDOWN. HOT SHUTDOWN is achievable, but COLD SHUTDOWN is not. This event is AFFECTING SAFE SHUTDOWN.

3.2 ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA PAG exposure levels.

3.3 BOMB: Refers to an explosive device suspected of having sufficient force to damage plant systems or structures.

3.4 CIVIL DISTURBANCE: A group of persons violently protesting station operations or activities at the site.

3.5 CONFINEMENT BOUNDARY: The barrier(s) between areas containing radioactive substances and the environment. (ISFSI MPC Confinement Boundary)

3.6 CONTAINMENT CLOSURE: A containment condition where at least one integral barrier to the release of radioactive material is provided.

3.7 EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

3.8 EXTORTION: An attempt to cause an action at the station by threat of force.

3.9 FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIREs. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

3.10 GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

3.11 HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

3.12 HOSTILE ACTION: An act toward a Nuclear Power Plant or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILES, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities, (i.e., this may include violent acts between individuals in the OWNER CONTROLLED AREA.).

3.13 HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

3.14 IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

3.15 INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

3.16 INTRUSION: A person(s) present in a specified area without authorization. Discovery of a BOMB in a specified area is indication of INTRUSION into that area by a HOSTILE FORCE.

3.17 NORMAL PLANT OPERATIONS: Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into offnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

3.18 NOTIFICATION OF UNUSUAL EVENT (NOUE): Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

3.19 OWNER CONTROLLED AREA: The area within the EOI property boundary.

3.20 PROJECTILE: An object directed toward a Nuclear Power Plant that could cause concern for its continued operability, reliability, or personnel safety.

3.21 PROTECTED AREA: Encompasses all controlled areas within the security protected area fence.

3.22 SABOTAGE: Deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of SABOTAGE until this determination is made by security supervision.

3.23 SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

3.24 SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following:

3.24.1. Automatic turbine runback >25% thermal reactor power,

3.24.2. Electrical load rejection >25% full electrical load,

3.24.3. Reactor Trip,

3.24.4. Safety Injection Activation or

3.24.5. Thermal power oscillations >10%.

3.25 SITE AREA EMERGENCY: Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the SITE BOUNDARY.

3.26 SITE BOUNDARY: For classification and dose projection purposes, the site boundary is the area defined as exclusion area or exclusion zone in 10CFR100.3 (a) which is a boundary of approximately 3,000 feet (or 0.5748 mile) from the RBS reactor centerline.

3.27 STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on Entergy or its affiliates. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

3.28 UNISOLABLE: A breach or leak that cannot be promptly isolated.

3.29 UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

3.30 VALID: An indication, report, or condition, is considered to be VALID when it is verified by (1) an instrument channel check, (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator s operability, the condition s existence, or the report s accuracy is removed. Implicit in this definition is the need for timely assessment.

3.31 VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of the affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

3.32 VITAL AREA: Any area, normally within the PROTECTED AREA, which contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

4 RESPONSIBILITIES

4.1 Operations Shift Manager (OSM) - It is the responsibility of the OSM to:

4.1.1. Recognize and properly classify emergency conditions, and

4.1.2. Assume the responsibilities of the Emergency Director (ED) until relieved by the designated Emergency Director.

4.2 Control Room Supervisor (CRS) - It is the responsibility of the CRS to assume the responsibility of the OSM if the OSM becomes incapacitated.

4.3 Designated Emergency Director It is the responsibility of the designated Emergency Director to assist the OSM as requested and if the emergency is classified at ALERT or higher, relieve the OSM of the ED duties and responsibilities as soon as practical.

5 GENERAL

5.1 Anytime Emergency Operating Procedures (EOPs) or Abnormal Operating Procedures (AOPs) are initiated, this procedure should be reviewed to determine if an emergency action level has been reached.

5.2 This procedure, with Attachment 1 through Attachment 8, is a guideline for classifying emergencies. In a situation not covered by the Emergency Action Levels, the OSM (Emergency Director) must use his best judgment in determining the appropriate emergency classification.

5.2.1. Attachment 1 is a matrix that is useful as a quick review to determine if an EAL INITIATING CONDITION is met.

5.2.2. The Emergency Action Levels and bases in Attachments 2 - 8 are consistent with the definitions and INITIATING CONDITIONs in the RBS Emergency Plan.

5.2.3. Attachment 10 is the user aid that presents the EALs in chart format.

5.3 For Emergency Action Levels based on plant instrumentation, the indication shall be a VALID indication. When all indications for a certain parameter have been lost, the Emergency Director should use his best judgment and other plant indications to classify the emergency (e.g., loss of level trend on all RPV level instrumentation).

5.3.1. Attachment 9 lists the instruments used for EAL identification and provides guidance for compensatory measures when an instrument is out of service.

5.4 The assessment, classification, and declaration of an emergency condition is expected to be completed within 15 minutes after the availability of indications (i.e. plant instrumentation, plant alarms, computer displays, or incoming verbal reports) to plant operators that an EAL has been exceeded.

5.4.1. The 15 minute criterion is not to be construed as a grace period to restore plant conditions to avoid declaring the event.

5.4.2. The emergency declaration should be made promptly without waiting for the 15 minute period to elapse once the EAL is recognized as being exceeded.

5.4.3. For EALs that specify duration of the off-normal condition, such as fire lasting 15 minutes, loss of power for 15 minutes, etc.:

1. The Emergency Director shall make the declaration at the first available opportunity when the time has elapsed (not after an additional 15 minutes).

2. The declaration should be made before the EAL is met (before the time duration has elapsed) when the Emergency Director has information that the off-normal condition will not be corrected within the specified time duration.

5.5 The plant operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant operating mode is reached before the emergency classification can be made, the declaration shall be based on the mode that existed at the time the event occurred.

5.6 Initiating condition and EAL Information is presented by recognition category:

5.6.1. A Abnormal Rad Levels / Radiological Effluent

5.6.2. C Cold Shutdown / Refueling System Malfunctions

5.6.3. E Events Related to Independent Spent Fuel Storage Installations

5.6.4. F Fission Product Barrier Degradation

5.6.5. H Hazards and Other Conditions Affecting Plant Safety

5.6.6. S System Malfunction

5.7 ICs and EALs are numbered as follows:

NOTE

All sequential numbers are not used in some ICs to maintain standardization with NEI numbering and Entergy numbering system. (For example, there is no SU2, SU3, SU4, and SU5 between SU1 and SU6)

5.7.1. Initiating Conditions: X[1] X[2] X[3]

[1] Category (A, C, E, F, H, S)

[2] Classification (U-NOUE, A-Alert, S-SAE, G-GE)

[3] Sequential IC number for classification level (e.g., AU1, AU2, HA1, HA2, etc)

5.7.2. EALs: sequential number for EAL in each IC

XXX-# (e.g., AU1-1, AU1-2, etc.)

6 **PROCEDURE**

NOTE

The assessment, classification, and declaration of an emergency condition is expected to be completed within 15 minutes after the availability of indications (i.e. plant instrumentation, plant alarms, computer displays, or incoming verbal reports) to plant operators that an EAL has been exceeded

6.1 Anytime an event occurs that has the potential of causing or resulting in a hazard to personnel, onsite or offsite, the Emergency Director:

6.1.1. Should review INITIATING CONDITIONs and EALs to determine if the event should be classified as an emergency.

6.1.2. Shall classify the emergency in accordance with this procedure and implement EIP-2-002, Classification Actions, if criteria are met.

6.2 River Bend Station Senior Management or designated alternate shall:

6.2.1. Provide assistance to the OSM, as requested, if the emergency is classified as an Unusual Event (NOUE).

6.2.2. Relieve the OSM of the responsibilities of Emergency Director as soon as practical for an ALERT or higher classification and implement applicable EIP procedures.

6.2.3. The Emergency Director will review this procedure and upgrade the emergency to a SITE AREA EMERGENCY or GENERAL EMERGENCY when warranted.

6.3 Declaration of an emergency class may not be necessary if it is discovered that an event or condition had existed that met an EAL threshold but that no emergency had been declared <u>and</u> the basis for the emergency class no longer exists at the time of the discovery. (REF 2.4)

6.3.1. Cases of this nature, discovered well after the fact, may be due to a rapidly concluded event or an oversight in the emergency classification made during the event or it may be determined during a post-event review (e.g., routine log or record review).

6.3.2. Reporting requirements of 10CFR50.72 are applicable and the guidance of NUREG-1022 may be applied.

6.3.3. Notify the State and local agencies by phone.

6.4 For some events, the condition may be corrected before a declaration has been made. The key consideration in this situation is to determine whether or not further plant damage occurred while the corrective actions were being taken. In some situations, this can be readily determined, in other situations, further analyses (e.g., coolant radiochemistry sampling, may be necessary). Classify the event as indicated and terminate the emergency once assessment shows that there were no consequences from the event and other termination criteria are met. (REF 2.3)

6.5 Existing guidance for classifying transient events addresses the period of time of event recognition and classification (15 minutes). However, in cases when EAL declaration criteria may be met momentarily during the normal expected response of the plant, declaration requirements should not be considered to be met when the conditions are a part of the designed plant response, or result from appropriate Operator actions.

6.6 When two or more Emergency Action Levels are determined, declaration will be made on the highest classification level for the plant.

6.7 Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold is imminent. If, in the judgment of the Emergency Director, an imminent situation is at hand, the classification should be made as if the threshold has been exceeded.

6.8 Attachment 9 provides guidance when planning to take an instrument used to determine EAL conditions out of service or following an UNPLANNED loss of the instrument. The OSM/CRS should perform the following:

6.8.1. Evaluate out-of-service equipment and determine if other instruments or compensatory measures are in place to assess for the associated EAL entry condition.

6.8.2. Evaluate site effects and implement a contingency plan if applicable.

6.9 Attachment 10 contains the USER AIDS available to the OSM / ED to use in determining the EAL.

7 DOCUMENTATION

7.1 NONE

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Abnormal Rad Levels / Radiological Effluent	**Radiological Effluents**	**AG1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**AS1** Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR thyroid CDE for the actual or projected duration of the release *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**AA1** Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for ≥ 15 minutes *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**AU1** Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for ≥ 60 minutes *Op Mode: 1, 2, 3, 4, 5, DEFUELED*
	Abnormal Rad Levels			**AA2** Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**AU2** UNPLANNED rise in plant radiation levels *Op Mode: 1, 2, 3, 4, 5, DEFUELED*
				AA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Fission Product Barrier Degradation	**FPB Loss / Potential Loss**	**FG1** Loss of ANY two barriers AND loss or potential loss of the third barrier. *Op Mode: 1, 2, 3*	**FS1** Loss or potential loss of ANY two barriers *Op Mode: 1, 2, 3*	**FA1** ANY loss or ANY potential loss of EITHER fuel clad or RCS *Op Mode: 1, 2, 3*	**FU1** ANY loss or ANY potential loss of containment *Op Mode: 1, 2, 3*
Hazards and Other Conditions Affecting Plant Safety	**Security Events**	**HG1** HOSTILE ACTION resulting in loss of physical control of the facility *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HS1** HOSTILE ACTION within the PROTECTED AREA *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HU1** Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant *Op Mode: 1, 2, 3, 4, 5, DEFUELED*

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Hazards and Other Conditions Affecting Plant Safety	**Discretionary**	**HG2** Other conditions exist which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HS2** Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HA2** Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT. *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HU2** Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE *Op Mode: 1, 2, 3, 4, 5, DEFUELED*
	Control Room Evacuation		**HS3** Control Room evacuation has been initiated and plant control cannot be established *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HA3** Control Room evacuation has been initiated *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	
	Fire			**HA4** FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HU4** FIRE within PROTECTED AREA boundary not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA *Op Mode: 1, 2, 3, 4, 5, DEFUELED*

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Hazards and Other Conditions Affecting Plant Safety	**Toxic or Flammable gases**			**HA5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HU5** Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS *Op Mode: 1, 2, 3, 4, 5, DEFUELED*
	Natural Phenomena			**HA6** Natural or destructive phenomena affecting VITAL AREAS *Op Mode: 1, 2, 3, 4, 5, DEFUELED*	**HU6** Natural or destructive phenomena affecting the PROTECTED AREA *Op Mode: 1, 2, 3, 4, 5, DEFUELED*
System Malfunction	**Loss of AC Power**	**SG1** Prolonged loss of all offsite and all onsite AC power to emergency busses *Op Mode: 1, 2, 3*	**SS1** Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes *Op Mode: 1, 2, 3*	**SA1** AC power capability to emergency busses reduced to a single power source for ≥ 15 minutes such that any additional single failure would result in station blackout *Op Mode: 1, 2, 3*	**SU1** Loss of all offsite AC power to emergency busses for ≥ 15 minutes *Op Mode: 1, 2, 3*

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
System Malfunction	**Failure of Reactor Protection System**	**SG3** Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists *Op Mode: 1, 2*	**SS3** Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are not successful in shutting down the reactor *Op Mode: 1, 2*	**SA3** Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor *Op Mode: 1, 2*	
	Loss of DC Power		**SS4** Loss of all vital DC power for $\geq$ 15 minutes *Op Mode: 1, 2, 3*		

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
System Malfunction	**Loss of Annunciators / Indication**		**SS6** Inability to monitor a SIGNIFICANT TRANSIENT in progress *Op Mode: 1, 2, 3*	**SA6** UNPLANNED loss of safety system annunciation or indication in the control room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory non-alarming indicators are not available *Op Mode: 1, 2, 3*	**SU6** UNPLANNED loss of safety system annunciation or indication in the Control Room for ≥ 15 minutes *Op Mode: 1, 2, 3*
	RCS Leakage				**SU7** RCS leakage *Op Mode: 1, 2, 3*
	Los of Communication				**SU8** Loss of all onsite or offsite communications capabilities. *Op Mode: 1, 2, 3*
	Cladding Degradation				**SU9** Fuel clad degradation *Op Mode: 1, 2, 3*
	Inadvertent Criticality				**SU10** Inadvertent criticality *Op Mode: 3*

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
System Malfunction	**TS LCO Limit Exceeded**				**SU11** Inability to reach required operating mode within Technical Specification limits *Op Mode: 1, 2, 3*
Cold Shutdown / Refueling	**RCS Leakage**	**CG1** Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged *Op Mode:4, 5*	**CS1** Loss of RCS/RPV inventory affecting core decay heat removal capability *Op Mode:4, 5*	**CA1** Loss of RCS/RPV inventory *Op Mode:4, 5*	**CU1** RCS leakage *Op Mode:4*
	Loss of RCS Inventory				**CU2** UNPLANNED loss of RCS/RPV inventory *Op Mode: 5*
	Loss of Decay Heat Removal			**CA3** Inability to maintain plant in cold shutdown *Op Mode:4, 5*	**CU3** UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV *Op Mode: 4, 5*
	Loss of AC Power			**CA5** Loss of all offsite and all onsite AC power to emergency busses for $\geq$ 15 minutes *Op Mode: 4, 5, Defueled*	**CU5** AC power capability to emergency busses reduced to a single power source for $\geq$ 15 minutes such that any additional single failure would result in station blackout *Op Mode: 4, 5*

INITIATING CONDITION MATRIX

RECOGNITION CATEGORY		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Cold Shutdown / Refueling	**Loss of DC Power**				**CU6** Loss of required DC power for ≥ 15 minutes *Op Mode: 4, 5*
	Inadvertent Criticality				**CU7** Inadvertent criticality *Op Mode: 4, 5*
	Loss of Communication				**CU8** Loss of all onsite or offsite communications capabilities *Op Mode: 4, 5, Defueled*
ISFSI	**Confinement Boundary Damage**				**E-HU1** Damage to a loaded cask CONFINEMENT BOUNDARY *Op Mode: All*

ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENT

<table>
<tr><th></th><th>GENERAL EMERGENCY</th><th>SITE AREA EMERGENCY</th><th>ALERT</th><th>NOUE</th></tr>
<tr><td>Radiological Effluent</td>
<td>AG1 1 2 3 4 5 D

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology

<u>Emergency Action Level(s): (1 or 2 or 3)</u>
NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 > the GENERAL EMERGENCY reading for ≥ 15 minutes
<u>OR</u>
2. Dose assessment using actual meteorology indicates doses > 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY
<u>OR</u>
3. Field survey results indicate closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY</td>
<td>AS1 1 2 3 4 5 D

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR thyroid CDE for the actual or projected duration of the release

<u>Emergency Action Level(s) (1 or 2 or 3)</u>
NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes
<u>OR</u>
2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY
<u>OR</u>
3. Field survey results indicate closed window dose rates > 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY</td>
<td>AA1 1 2 3 4 5 D

Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for ≥ 15 minutes

<u>Emergency Action Level(s): (1 or 2 or 3)</u>
NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the radiation monitors in Table R1 > the ALERT reading for ≥ 15 minutes
<u>OR</u>
2. For RMS-RE107 effluent monitor:
<u>EITHER</u>
VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes
<u>OR</u>
VALID reading > 1.27E-01 μCi/ml for ≥ 15 minutes
<u>OR</u>
3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for ≥ 15 minutes</td>
<td>AU1 1 2 3 4 5 D

Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for ≥ 60 minutes

<u>Emergency Action Level(s): (1 or 2 or 3)</u>
NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on any of the radiation monitors in Table R1 > the NOUE reading for ≥ 60 minutes
<u>OR</u>
2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 60 minutes
<u>OR</u>
3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times the ODCM limit for ≥ 60 minutes</td></tr>
</table>

Table R1 EAL THRESHOLD

Method	GENERAL DRMS Threshold	SITE AREA DRMS Threshold	ALERT DRMS Threshold	NOUE DRMS Threshold
Main Plant Vent Primary Secondary	4GE125 4.70E+08 μCi/sec N/A	4GE125 4.70E+07 μCi/sec N/A	4GE125 3.06E+07 μCi/sec 1GE126 2.82E-01 μCi/ml	4GE125 3.06E+05 μCi/sec 1GE126 5.26E-03 μCi/ml
Fuel Building Vent Primary Secondary	4GE005 6.70E+07 μCi/sec N/A	4GE005 6.70E+06 μCi/sec N/A	4GE005 2.19E+06 μCi/sec 5GE005 2.82E-01 μCi/ml	4GE005 2.19E+04 μCi/sec 5GE005 4.65E-03 μCi/ml
Radwaste Building Vent Primary Secondary	N/A	N/A	4GE006 2.58E+06 μCi/sec 5GE006 6.84E-02 μCi/ml	4GE006 2.58E+04 μCi/sec 5GE006 6.84E-04 μCi/ml

Plant Modes (white boxes indicate applicable modes) 1 Power Operations 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refuel D Defueled

ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENT

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Abnormal Radiation Levels			**AA2** 1 2 3 4 5 D Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel **Emergency Action Level(s)**: (1 or 2) 1. A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered **OR** 2. A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level: RMS-RE140 2000 mR/hr RMS-RE141 2000 mR/hr RMS-RE192 2000 mR/hr RMS-RE193 2000 mR/hr RMS-RE5A 1.64E+03 uCi/sec RMS-RE5B (GE) 5.29E-04 uCi/ml	**AU2** 1 2 3 4 5 D UNPLANNED rise in plant radiation levels **Emergency Action Level(s)**: (1 or 2) 1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following: a. Water level drop in the reactor refueling cavity, spent fuel pool, or fuel transfer canal indication on Control Room Panel 870 b. Personnel observation by visual or remote means. **AND** b UNPLANNED VALID area radiation monitor alarm on any of the following: RMS-RE140 RMS-RE141 RMS-RE192 RMS-RE193 **OR** 2. UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels ***NOTE***: *For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.* *Normal can be considered the highest reading in the past 24 hours excluding the current peak value.
			AA3 1 2 3 4 5 D Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions **Emergency Action Level(s)**: 1. Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions: Main Control Room CAS	

Plant Modes (white boxes indicate applicable modes) 1 Power Operations 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refuel D Defueled

FISSION PRODUCT BARRIER

FPB Loss / Potential Loss	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
	FG1 1 2 3 4 5 D Loss of ANY two barriers AND loss or potential loss of the third barrier **Emergency Action Level(s)**: 1. Loss of any two barriers **AND** Loss or potential loss of the third barrier	**FS1** 1 2 3 4 5 D Loss or potential loss of ANY two barriers **Emergency Action Level(s):** 1. Loss or potential loss of any two barriers	**FA1** 1 2 3 4 5 D ANY loss or ANY potential loss of EITHER fuel clad or RCS **Emergency Action Level(s):** 1. Any loss or any potential loss of fuel clad **OR** Any loss or any potential loss of RCS	**FU1** 1 2 3 4 5 D ANY loss or ANY potential loss of containment **Emergency Action Level(s):** 1. Any loss or any potential loss of containment

FUEL CLAD (FC) Barrier			REACTOR COOLANT SYSTEM (RC) Barrier			PRIMARY CONTAINMENT (PC) Barrier		
Parameter	Loss	Potential Loss	Parameter	Loss	Potential Loss	Parameter	Loss	Potential Loss
FC1 Primary coolant activity level	Coolant activity > 300 µCi/gm dose equivalent I-131	None	RC1 Drywell pressure	Drywell pressure > 1.68 psid with indications of reactor coolant leak in drywell	None	PC1 Primary containment conditions	1. Rapid unexplained loss of PC pressure following initial pressure rise **OR** 2. PC pressure response not consistent with LOCA conditions	1. PC pressure > 15 psig and rising **OR** 2. a. PC hydrogen in the unsafe zone of HDOL curve **OR** b. DW hydrogen concentration > 9% **OR** 3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL
FC2 Reactor vessel water level	RPV water level cannot be restored and maintained above -186 inches	RPV water level cannot be restored and maintained above -162 inches or cannot be determined	RC2 Reactor vessel water level	RPV water level cannot be restored and maintained above -162 inches or cannot be determined	None	PC2 Reactor vessel water level	None	Entry into PC flooding procedures SAP-1 and SAP-2
FC3 Primary Containment radiation monitors	Containment radiation monitor RMS-RE16 reading > 3,000 R/hr	None	RC3 RCS Leak Rate	1. UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close **AND** High MSL flow annunciator (P601-19A- A2) **OR** 2. Indication of an UNISOLABLE HPCS, feedwater, RWCU or RCIC break **OR** 3. Emergency RPV depressurization is required	1. RCS leakage > 50 gpm inside the drywell **OR** 2. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Normal Operating Temperature (Table F2) **OR** b. Max Normal Area Radiation (Table F2)	PC3 Primary containment isolation failure or bypass	1. a. Failure of all valves in any one line to close **AND** b. Direct downstream pathway to the environment exists after PC isolation signal **OR** 2. Intentional PC venting per EOPs or SAPs **OR** 3. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Safe Operating Temperature (Table F1) **OR** b. Max Safe Area Radiation (Table F1)	None
			RC4 Drywell radiation	Drywell radiation monitor RMS-RE20 reading > 100 R/hr due to reactor coolant leakage	None	PC4 Primary containment radiation monitors	None	Containment radiation monitor RMS-RE16 reading > 10,000 R/hr
FC4 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier	RC5 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	PC5 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the Primary Containment barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Primary Containment barrier

Plant Modes (white boxes indicate applicable modes) 1 Power Operations 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refuel D Defueled

FISSION PRODUCT BARRIER

TABLE F1 PC 3 Loss of Primary Containment			
Parameter	**Area Temperature** Max Safe Operating Value	**Area Radiation Level** DRMS Grid 2	Max Safe Operating Value
RHR A equipment area	200° F	1213	9.5E+03 mR/hr
RHR B equipment area	200° F	1214	9.5E+03 mR/hr
RHR C equipment area	N/A	1215	9.5E+03 mR/hr
RCIC room	200° F	1219	9.5E+03 mR/hr
MSL Tunnel	200° F	N/A	
RWCU pump room 1 (A) / 2 (B)	200° F	N/A	

TABLE F2 RC 3 Potential Loss of RCS			
Parameter	**Area Temperature** (isolation temperature alarm)	**Area Radiation Level** DRMS Grid 2	Max Normal Operating Value
RHR A equipment area	117° F (P601-20A-B4)	1213	8.2E+01 mR/hr
RHR B equipment area	117° F (P601-20A-B4)	1214	8.2E+01 mR/hr
RHR C equipment area	N/A	1215	8.2E+01 mR/hr
RCIC room	182° F (P601-21A-B6)	1219	1.20E+02 mR/hr
MSL Tunnel	173° F (P601-19A-A1/A3/B1/B3)	N/A	
RWCU pump room 1 (A) / 2 (B)	165° F (P680-1A-A2/B2)	N/A	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Security	**HG1** 1 2 3 4 5 D HOSTILE ACTION resulting in loss of physical control of the facility **Emergency Action Level(s)**: (1 or 2) 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions **OR** 2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool	**HS1** 1 2 3 4 5 D HOSTILE ACTION within the PROTECTED AREA **Emergency Action Level(s)**: 1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision	**HA1** 1 2 3 4 5 D HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat **Emergency Action Level(s)**: (1 or 2) 1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision **OR** 2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site	**HU1** 1 2 3 4 5 D Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant **Emergency Action Level(s)**: (1 or 2 or 3) 1. A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the RBS security shift supervision **OR** 2. A credible site specific security threat notification **OR** 3. A validated notification from NRC providing information of an aircraft threat
Discretionary	**HG2** 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency **Emergency Action Level(s):** 1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area	**HS2** 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY **Emergency Action Level(s)**: 1. Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or: (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY	**HA2** 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT **Emergency Action Level(s)**: 1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels	**HU2** 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE **Emergency Action Level(s)**: 1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs

Plant Modes (white boxes indicate applicable modes) 1 Power Operations 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refuel D Defueled

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Control Room Evacuation		**HS3** 1 2 3 4 5 D Control room evacuation has been initiated and plant control cannot be established **Emergency Action Level(s)**: 1. a. Control room evacuation has been initiated **AND** b. Control of the plant cannot be established in accordance with AOP-0031, Shutdown from Outside the Main Control Room, within 15 minutes	**HA3** 1 2 3 4 5 D Control room evacuation has been initiated **Emergency Action Level(s)**: 1. AOP-0031, Shutdown from Outside the Main Control Room requires Control Room evacuation	
Fire			**HA4** 1 2 3 4 5 D FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown **Emergency Action Level(s)**: 1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems	**HU4** 1 2 3 4 5 D FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA **Emergency Action Level(s):** (1 or 2) ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed, the applicable time.* 1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area **OR** 2. EXPLOSION within the PROTECTED AREA
Toxic or Flammable Gasses			**HA 5** Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor **Emergency Action Level(s)**: ***Note:*** *If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.* 1. Access to Main Control Room, Auxiliary Building, or 95 Control Buildinga VITAL AREA (Table H2) is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor	**HU5** 1 2 3 4 5 D Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS **Emergency Action Level(s):** (1 or 2) 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS **OR** 2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an offsite ev

Plant Modes (white boxes indicate applicable modes) 1 Power Operations 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refuel D Defueled

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Natural or Destructive Phenomena

GENERAL EMERGENCY

Table H1

Uncontrolled Flooding Threshold Area Water Level

Affected Location / Parameter	Max Safe Operating Value / Indicator
Aux Bldg Crescent Area 70 EL	6 inches above floor (must be verified locally)
HPCS Room 70 EL	4 inches above floor (P870-51A-G4)
RHR A Room 70 EL	4 inches above floor (P870-51A-G4)
RHR B Room 70 EL	4 inches above floor (P870-51A-G4)
RHR C Room 70 EL	4 inches above floor (P870-51A-G4)
LPCS Room 70 EL	4 inches above floor (P870-51A-G4)
RCIC Room 70 EL	4 inches above floor (P870-51A-G4)

SITE AREA EMERGENCY

Table H2

Structures Containing Functions or Systems Required for Safe Shutdown

Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G)
Fuel Building	

ALERT

HA6 1 2 3 4 5 D

Natural or destructive phenomena affecting VITAL AREAS

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by:
   Annunciator Seismic Tape Recording System Start (P680-02A-D06)
   AND
   Event Indicator on ERS-NBI-102 is white
   AND
   Receipt of **EITHER** 1 **OR** 2:
   1. Annunciator Seismic Event High (P680-02A-C06)
   2. Annunciator Seismic Event High-High (P680-02A-B06) **AND** amber light(s) on panel NBI-101

   AND
   b. Earthquake confirmed by any of the following:
   - Earthquake felt in plant
   - National Earthquake Center
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant

OR

2. Tornado striking resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

3. Internal flooding in Auxiliary Building 70 ft elevation resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

OR

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

6. Hurricane or high SUSTAINED wind conditions $\geq$ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

NOUE

HU6 1 2 3 4 5 D

Natural or destructive phenomena affecting the PROTECTED AREA

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)

1. Seismic event identified by any 2 of the following:
   - Seismic event confirmed by activated seismic switch as indicated by receipt of **EITHER** a **OR** b:
     a. Annunciator Seismic Tape Recording SYS Start (P680-02A-D06)
     b. Event Indicator on ERS-NBI-102 is white
   - Earthquake felt in plant
   - National Earthquake Center

OR

2. Tornado striking within the PROTECTED AREA boundary

OR

3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area

OR

4. Turbine failure resulting in casing penetration or damage to turbine or generator seals

OR

5. Severe weather or hurricane conditions with indication of SUSTAINED high winds $\geq$ 74 mph within the PROTECTED AREA boundary

SYSTEM MALFUNCTION

<table>
<tr><th></th><th>GENERAL EMERGENCY</th><th>SITE AREA EMERGENCY</th><th>ALERT</th><th>NOUE</th></tr>
<tr><td>Loss of AC Power</td>
<td>SG1 1 2 3 4 5 D
Prolonged loss of all offsite and all onsite AC power to emergency busses

<u>Emergency Action Level(s)</u>:
1. a. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses
<u>AND</u>
b. Either of the following:
• Restoration of at least one emergency bus in < 4 hours is not likely
<u>OR</u>
• RPV level cannot be maintained > -162 inches</td>
<td>SS1 1 2 3 4 5 D
Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes

<u>Emergency Action Level(s)</u>:
Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses for ≥ 15 minutes</td>
<td>SA1 1 2 3 4 5 D
AC power capability to emergency busses reduced to a single power source for ≥ 15 minutes such that any additional single failure would result in station blackout

<u>Emergency Action Level(s)</u>:
Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for ≥ 15 minutes
<u>AND</u>
b. Any additional single failure will result in a station blackout</td>
<td>SU1 1 2 3 4 5 D
Loss of all offsite AC power to emergency busses for ≥ 15 minutes

<u>Emergency Action Level(s)</u>:
Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. Loss of all offsite AC power to Div I and II ENS busses for ≥ 15 minutes</td></tr>
<tr><td>Failure of Reactor Protection System</td>
<td>SG3 1 2 3 4 5 D
Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists

<u>Emergency Action Level(s)</u>:
1. a. An automatic scram failed to shutdown the reactor
<u>AND</u>
b. All manual actions do not shutdown the reactor as indicated by reactor power ≥ 5%
<u>AND</u>
c. Either of the following exist or have occurred due to continued power generation:
• Core cooling is extremely challenged as indicated by RPV level can not be maintained > -186 inches
<u>OR</u>
• Heat removal is extremely challenged as indicated by RPV pressure and Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone</td>
<td>SS3 1 2 3 4 5 D
Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are not successful in shutting down the reactor

<u>Emergency Action Level(s)</u>:
1. a. An automatic scram failed to shutdown the reactor
<u>AND</u>
b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power ≥ 5%</td>
<td>SA3 1 2 3 4 5 D
Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

<u>Emergency Action Level(s)</u>:
1. a. An automatic scram failed to shutdown the reactor
<u>AND</u>
b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%</td>
<td></td></tr>
<tr><td>Loss of DC Power</td>
<td></td>
<td>SS4 1 2 3 4 5 D
Loss of all vital DC power for ≥ 15 minutes

<u>Emergency Action Level(s)</u>:
Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

1. < 105 VDC on all vital DC busses for ≥ 15 minutes</td>
<td></td>
<td></td></tr>
</table>

SYSTEM MALFUNCTION

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of Annunciation / Indication		**SS6** 1 2 3 4 5 D Inability to monitor a SIGNIFICANT TRANSIENT in progress **<u>Emergency Action Level(s)</u>**: ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.* 1. a. UNPLANNED loss of > approximately 75% of the following for $\geq$ 15 minutes: • Control Room safety system annunciation **<u>OR</u>** • Control Room safety system indication **<u>AND</u>** b. A SIGNIFICANT TRANSIENT is in progress **<u>AND</u>** c. Compensatory indications are unavailable	**SA6** 1 2 3 4 5 D UNPLANNED loss of safety system annunciation or indication in the control room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory non-alarming indicators are not available **<u>Emergency Action Level(s)</u>**: ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.* 1. a. UNPLANNED loss of > approximately 75% of the following for $\geq$ 15 minutes: • Control Room safety system annunciation **<u>OR</u>** • Control Room safety system indication **<u>AND</u>** b. Either of the following: • A SIGNIFICANT TRANSIENT is in progress **<u>OR</u>** • Compensatory indications are unavailable	**SU6** 1 2 3 4 5 D UNPLANNED loss of safety system annunciation or indication in the Control Room for $\geq$ 15 minutes **<u>Emergency Action Level(s)</u>**: ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.* 1. UNPLANNED loss of > approximately 75% of the following for $\geq$ 15 minutes: a. Control Room safety system annunciation **<u>OR</u>** b. Control Room safety system indication
RCS Leakage				**SU7** 1 2 3 4 5 D RCS leakage **<u>Emergency Action Level(s)</u>**: <u>(1 or 2)</u> ***Note:*** *A relief valve that operates and fails to close per design should be considered applicable if the relief valve cannot be isolated.* 1. Unidentified or pressure boundary leakage > 10 gpm **<u>OR</u>** 2. Identified leakage > 35 gpm

SYSTEM MALFUNCTION

<table>
<tr><th></th><th>GENERAL EMERGENCY</th><th>SITE AREA EMERGENCY</th><th>ALERT</th><th>NOUE</th></tr>
<tr><td>Loss of Communication</td><td></td><td></td><td></td><td>SU8 1 2 3 4 5 D
Loss of all onsite or offsite communications capabilities
<u>Emergency Action Level(s)</u>: (1 or 2)
1. Loss of all of the following onsite communications methods affecting the ability to perform routine operations:
Plant radio system
Plant paging system
Sound powered phones
In-plant telephones
<u>OR</u>
2. Loss of all of the following offsite communications methods affecting the ability to perform offsite notifications:
All telephones
NRC phones
State of Louisiana Radio
Offsite notification system and hotline</td></tr>
<tr><td>Cladding Degradation</td><td></td><td></td><td>Table S1
FLOW (cfm) | Dose Rate Limit (mR/hr)
≤15 | 9000
>15-17 | 8000
>17-20 | 7000
>20-25 | 5000
>25-30 | 4000
>30-60 | 2000
>60-140 | 1000
>140-200 | 700</td><td>1 2 3 4 5 D
SU9
Fuel clad degradation
<u>Emergency Action Level(s)</u>: (1 or 2)
1. Offgas pre-treatment radiation monitor reading > the Table S1 Dose Rate Limit for the actual indicated offgas flow indicating fuel clad degradation > T.S. allowable limits
<u>OR</u>
2. Reactor coolant sample activity value indicating fuel clad degradation > T.S. allowable limits
a. > 4.0 μCi/gm dose equivalent I-131
<u>OR</u>
• > 0.2 μCi/gm dose equivalent I-131 for > 48 hours</td></tr>
<tr><td>Inadvertent Criticality</td><td></td><td></td><td></td><td>SU10 1 2 3 4 5 D
Inadvertent criticality
<u>Emergency Action Level(s)</u>:
1. UNPLANNED sustained positive period observed on nuclear instrumentation</td></tr>
</table>

SYSTEM MALFUNCTION

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
TECH SPEC Time Limit Exceeded				**SU11** 1 2 3 4 5 D Inability to reach required operating mode within Technical Specification limits **Emergency Action Level(s)**: 1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement time

Loss of RCS/RPV Inventory

GENERAL EMERGENCY

CG1 1 2 3 4 5 D

Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged

Emergency Action Level(s): (1 or 2)

1. a. RPV level < -162 inches (TAF) for ≥ 30 minutes

   AND

   b. Any containment challenge indication in Table C1

OR

2. a. RCS level cannot be monitored with core uncovery indicated by any of the following for ≥ 30 minutes:

   - RMS-RE16 reading > 100 R/hr
   - Erratic Source Range Monitor indication
   - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

   AND

   b. Any containment challenge indication in Table C1

Table C1
Containment Challenge Indications

- CONTAINMENT CLOSURE not established
- Explosive mixture inside containment
- UNPLANNED rise in containment pressure
- Secondary containmnent area radiation monitor above EOP Max Safe Operating Value below:

Area	DRMS Grid 2	Max Safe Operating Value
RHR Equip Rm A	1213	9.5E+03 mR/hr
RHR Equip Rm B	1214	9.5E+03 mR/hr
RHR Equip Rm C	1215	9.5E+03 mR/hr

SITE AREA EMERGENCY

CS1 1 2 3 4 5 D

Loss of RCS/RPV inventory affecting core decay heat removal capability

Emergency Action Level(s): (1 or 2 or 3)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. With CONTAINMENT CLOSURE not established, UNPLANNED RPV level < -49 inches

OR

2. With CONTAINMENT CLOSURE established, RPV level < -162 inches (TAF)

OR

3. RCS level cannot be monitored for ≥ 30 minutes with a loss of RCS inventory as indicated by any of the following:

   - RMS-RE16 reading > 100 R/hr
   - Erratic Source Range Monitor indication
   - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

ALERT

CA1 1 2 3 4 5 D

Loss of RCS/RPV inventory

Emergency Action Level(s): (1 or 2)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED loss of RCS inventory as indicated by RPV level < -43 inches (Level 2)

OR

2. RCS level cannot be monitored for ≥ 15 minutes with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

NOUE

CU1 1 2 3 4 5 D

RCS leakage

Emergency Action Level(s):

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. RCS leakage results in the inability to maintain or restore RPV level > +9.7 inches (Level 3) for ≥ 15 minutes

Plant Modes (white boxes indicate applicable modes) 1 Power Operations 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refuel D Defueled

COLD SHUTDOWN / REFUELING

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of RCS/RPV Inventory		•		**CU2** 1 2 3 4 5 D UNPLANNED loss of RCS/RPV inventory **Emergency Action Level(s)** (1 or 2) ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.* 1. UNPLANNED RCS level drop as indicated by either of the following: a. RCS water level drop below the RPV flange for ≥ 15 minutes when the RCS level band is established above the RPV flange **OR** b. RCS water level drop below the RPV level band for ≥ 15 minutes when the RCS level band is established below the RPV flange **OR** 2. RCS level cannot be monitored with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss
Loss of Decay Heat Removal		See Table C2 below	**CA3** 1 2 3 4 5 D Inability to maintain plant in cold shutdown **Emergency Action Level(s):** (1 or 2) 1. An UNPLANNED event results in RCS temperature > 200 °F > the specified duration in Table C2 **OR** 2. An UNPLANNED event results in RCS pressure rise > 10 psig due to a loss of RCS cooling	**CU3** 1 2 3 4 5 D UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV **Emergency Action Level(s)**: (1 or 2) ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.* 1. An UNPLANNED event results in RCS temperature exceeding 200°F **OR** 2. Loss of all RCS temperature and RCS/RPV level indication for ≥ 15 minutes

Table C2
RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not intact	Established	20 minutes*
	Not Established	0 minutes

*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.

Plant Modes (white boxes indicate applicable modes) 1 Power Operations 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refuel D Defueled

COLD SHUTDOWN / REFUELING

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of AC Power			**CA5** 1 2 3 4 5 D Loss of all offsite and all onsite AC power to emergency busses for $\geq$ 15 minutes **Emergency Action Level(s)**: ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.* 1. Loss of all offsite and all onsite AC power to Div I and Div II ENS busses for $\geq$ 15 minutes	**CU5** 1 2 3 4 5 D AC power capability to emergency busses reduced to a single power source for $\geq$ 15 minutes such that any additional single failure would result in station blackout **Emergency Action Level(s)**: ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.* 1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for $\geq$ 15 minutes **AND** b. Any additional single power source failure will result in station blackout
Loss of DC Power				**CU6** 1 2 3 4 5 D Loss of required DC power for $\geq$ 15 minutes **Emergency Action Level(s)**: ***Note:*** *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time* 1. < 105 VDC on required Vital DC busses for $\geq$ 15 minutes
Inadvertent Criticality				**CU7** 1 2 3 4 5 D Inadvertent criticality **Emergency Action Level(s)**: 1. UNPLANNED sustained positive period observed on nuclear instrumentation
Loss of Communications				**CU8** 1 2 3 4 5 D Loss of all onsite or offsite communications capabilities **Emergency Action Level(s)**: (1 or 2) 1. Loss of all of the following onsite communication methods affecting the ability to perform routine operations: Plant radio system Plant paging system Sound powered phones In-plant telephones **OR** 2. Loss of all of the following offsite communication methods affecting the ability to perform offsite notifications: All telephones NRC phones State of Louisiana Radio Offsite notification system and hotline

EVENTS RELATED TO ISFSI

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Cask Damage				**E-HU1** 1 2 3 4 5 D Damage to a loaded cask CONFINEMENT BOUNDARY **Emergency Action Levels(s):** 1. Damage to a loaded cask CONFINEMENT BOUNDARY

BASES TABLE OF CONTENT

RECOGNITION CATEGORY PAGE

EAL BASES

Introduction and Background Information

General Notes on Basis Document Use

This document provides an explanation and rationale for each Emergency Action Level (EAL) included in the RBS EAL scheme based on NEI 99-01 Revision 5. It should be used to facilitate review of the RBS EALs, provide historical documentation for future reference and serve as a resource for training. Decision makers responsible for implementation of EIP-2-001, Classification of Emergencies, may use this document as a technical reference in support of EAL interpretation.

The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 15 minutes or less in all cases of conditions present. Use of this document for assistance is not intended to delay the emergency classification.

Emergency Classification Level Thresholds

The most common bases for establishing these boundaries are the technical specifications and setpoints that have been developed in the design basis calculations and the Updated Safety Analysis Report (USAR).

For those conditions that are easily measurable and instrumented, the boundary is likely to be the EAL (observable by plant staff, instrument reading, alarm setpoint, etc.) that indicates entry into a particular emergency classification level.

In addition to the continuously measurable indicators, such as coolant temperature, coolant levels, leak rates, containment pressure, etc., the USAR provides indications of the consequences associated with design basis events. Examples include steam pipe breaks, MSIV malfunctions, and other anticipated events that, upon occurrence, place the plant immediately into an emergency classification level.

Another approach for defining these boundaries is the use of a plant specific probabilistic safety assessment (PSA - also known as probabilistic risk analysis, PRA). PSAs can be used as a good first approximation of the relevant ICs and risk associated with emergency conditions. RBS has an Individual Plant Evaluation (IPE) and an Individual Plant Evaluation for External Events (IPEEE).

Another critical element of the analysis to arrive at these threshold (boundary) conditions is the time that the plant might stay in that condition before moving to a higher emergency classification level. In particular, station blackout coping analyses performed in response to 10 CFR 50.63 and Regulatory Guide 1.155, "Station Blackout," are used to determine whether RBS enters a Site Area Emergency or a General Emergency directly, and when escalation to General Emergency is indicated. The time dimension is critical to the EAL since the purpose of the emergency classification level for state and local officials is to notify them of the level of mobilization that may be necessary to handle the emergency. This is particularly true when a Site

Introduction and Background Information

Emergency Classification Level Thresholds (Cont'd)

Area Emergency or General Emergency is IMMINENT. Establishing EALs for such conditions must take estimated evacuation time into consideration to minimize the potential for the plume to pass while evacuation is underway.

Regardless of whether or not containment integrity is challenged, it is possible for significant radioactive inventory within containment to result in EPA PAG plume exposure levels being exceeded even assuming containment is within technical specification allowable leakage rates. With or without containment challenge, however, a major release of radioactivity requiring offsite protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant. NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%.

Emergency Action Levels (EALs)

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the RBS Technical Specifications. Activities which cause the site to operate beyond that allowed by the Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

All classifications are to be based upon valid indications, reports or conditions. Indications, reports or conditions are considered valid when they are verified by (1) an instrument channel check, or (2) indications on related or redundant indications, or (3) by direct observation by plant personnel, such that doubt related to the indication s operability, the condition s existence, or the report s accuracy is removed. Implicit in this definition is the need for timely assessment.

With the emergency classification levels defined, the thresholds that must be met for each EAL to be placed under the emergency classification level can be determined. There are two basic approaches to determining these EALs. EALs and emergency classification level boundaries coincide for those continuously measurable, instrumented ICs, such as radioactivity, core temperature, coolant levels, etc. For these ICs, the EAL is the threshold reading that most closely corresponds to the emergency classification level description using the best available information.

Introduction and Background Information

Emergency Action Levels (EALs) (Cont'd)

For discrete (discontinuous) events, the approach is somewhat different. Typically, in this category are internal and external hazards such as FIRE or earthquake. The purpose for including hazards in EALs is to assure that RBS personnel and offsite emergency response organizations are prepared to deal with consequential damage these hazards may cause. If, indeed, hazards have caused damage to safety functions or fission product barriers, this should be confirmed by symptoms or by observation of such failures. Therefore, it may be appropriate to enter an Alert status for events approaching or exceeding design basis limits such as Operating Basis Earthquake (OBE), design basis wind loads, FIRE within VITAL AREAS, etc. This would give the operating staff additional support and improved ability to determine the extent of plant damage. If damage to barriers or challenges to Critical Safety Functions (CSFs) have occurred or are identified, then the additional support can be used to escalate or terminate the emergency classification level based on what has been found. Of course, security events must reflect potential for rising security threat levels.

Emergency Operating Procedures (EOP) are designed to maintain and/or restore a set of CSFs which are listed in the order of priority for restoration efforts during accident conditions.

There are diverse and redundant plant systems to support each CSF. By monitoring the CSFs instead of the individual system component status, the impact of multiple events is inherently addressed (e.g., the number of operable components available to maintain the critical safety function.).

The EOPs contain detailed instructions regarding the monitoring of these functions and provides a scheme for classifying the significance of the challenge to the functions. In providing EALs based on these schemes, the emergency classification level can flow from the EP assessment rather than being based on a separate EAL assessment. This is desirable as it reduces ambiguity and the time necessary to classify the event.

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classification levels (as the early classification may provide for more effective implementation of protective measures), it is nonetheless applicable to all emergency classification levels.

Introduction and Background Information

Treatment of Multiple Events and Classification Level Upgrading

The above discussion deals primarily with simpler emergencies and events that may not escalate rapidly. However, usable EAL guidance must also consider rapidly evolving and complex events. Hence, emergency classification level upgrading and consideration of multiple events must be addressed.

When multiple simultaneous events occur, the emergency classification level is based on the highest EAL reached. For example, two Alerts remain in the Alert category. or, an Alert and a Site Area Emergency is a Site Area Emergency. Further guidance is provided in RIS 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events.

Emergency Classification Level Downgrading

Another important aspect of usable EAL guidance is the consideration of what to do when the risk posed by an emergency is clearly lowering. RBS uses a combination approach involving recovery (generally for higher classifications) and termination (for lower classifications. Downgrading to lower emergency classification levels is not used at RBS.

Classifying Transient Events

For some events, the condition may be corrected before a declaration has been made. The key consideration in this situation is to determine whether or not further plant damage occurred while the corrective actions were being taken. In some situations, this can be readily determined, in other situations, further analyses (e.g., coolant radiochemistry sampling, may be necessary). Classify the event as indicated and terminate the emergency once assessment shows that there were no consequences from the event and other termination criteria are met.

Existing guidance for classifying transient events addresses the period of time of event recognition and classification (15 minutes). However, in cases when EAL declaration criteria may be met momentarily during the normal expected response of the plant, declaration requirements should not be considered to be met when the conditions are a part of the designed plant response, or result from appropriate Operator actions.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared.

Reporting requirements of 10 CFR 50.72 are applicable and the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, should be applied.

Introduction and Background Information

Operating Mode Applicability

The plant operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs. If an event occurs, and a lower or higher plant operating mode is reached before the emergency classification level can be declared, the emergency classification level shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the fission product barrier EALs are applicable only to events that initiate in Hot Shutdown or higher.

Plant Operating Mode Usage for RBS EALs:

MODE	TITLE	REACTOR MODE SWITH POSITION	AVERAGE REACTOR COOLANT TEMPERATIURE (ºF)
1	Power Operation	Run	N/A
2	Startup	Refuel [(a)] or Startup/Hot Standby	N/A
3	Hot Shutdown[(a)]	Shutdown	> 200
4	Cold Shutdown[(a)]	Shutdown	$\leq$ 200
5	Refueling[(b)]	Shutdown or Refuel	N/A

(a) All reactor vessel head closure bolts fully tensioned.
(b) One or more reactor vessel head closure bolts less than fully tensioned.
Defueled (D) All reactor fuel removed from reactor pressure vessel (full core offload during refueling or extended outage). This is not an operating mode designation by Technical Specifications.

AU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for $\geq$ 60 minutes

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any of the radiation monitors in Table R1 > the NOUE reading for $\geq$ 60 minutes

OR

2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for $\geq$ 60 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times the ODCM limit for $\geq$ 60 minutes

Table R1
EAL THRESHOLD

Method		NOUE DRMS Grid 6	NOUE Threshold
Main Plant Vent			
	Primary	4GE125	3.06E+05 µCi/sec
	Secondary	1GE126	5.26E-03 µCi/ml
Fuel Building Vent			
	Primary	4GE005	2.19E+04 µCi/sec
	Secondary	5GE005	4.65E-03 µCi/ml
Radwaste Building Vent			
	Primary	4GE006	2.58E+04 µCi/sec
	Secondary	5GE006	6.84E-04 µCi/ml

Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This IC addresses a potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

RBS incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases (Offsite Dose Calculation Manual - ODCM). The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in AU1 and AA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an offsite dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases should not be prorated or averaged over 60 minutes. For example, a release exceeding 4 X the ODCM limit for 30 minutes does not meet the threshold for this IC.

This Initiating Condition includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the Initiating Condition.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Any release on the routine effluent monitors in excess of the TRM limit is considered a non-routine release. Table R1 provides the monitors EAL setpoint values. Values are provided for a primary and secondary source for NOUE and Alert EAL determination. The Division I safety related monitors (DRMS 4GE125 and 4GE005) are the preferred source for main plant exhaust and fuel building EAL determination. Radwaste building preferred value is the effluent monitor (4GE006). The secondary monitors in Table R1 should be used to determine EALs if the preferred monitors are inoperable.

EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition established by the radioactivity discharge permit. This value is associated with a planned batch release.

AU1

EAL #3

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

References:

T.R. 3.11
RSP-0008, *Offsite Dose Calculation Manual* (ODCM)
G.13.18.9.6*012 Rev 0, *Effect of Core Uprate on the DRMS Process Safety Limit / Conversion Factors* / PR-C-495 Rev 2 p 4
ESK-RMS05
ESK-RMS25

AU2

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED rise in plant radiation levels

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2)

1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following:

    - Water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal indication on Control Room Panel 870
    - Personnel observation by visual or remote means

    AND

    b. UNPLANNED VALID area radiation monitor alarm on any of the following:.

    RMS-RE140
    RMS-RE141
    RMS-RE192
    RMS-RE193

OR

2. UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels

    NOTE: *For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.*

    *Normal can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

Basis:

This IC addresses elevated radiation levels as a result of a water level drop above irradiated fuel or events that have resulted, or may result, in UNPLANNED rises in radiation dose rates within plant buildings. These radiation rises represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

AU2

EAL #1

The locations of the EAL specific area radiation monitors are:

Containment	RMS-RE140, North Refueling Floor RMS-RE141, South Refueling Floor
Fuel Building	RMS-RE192, South Operating Floor RMS-RE193, North Operating Floor

The refueling pathway is a site specific combination of cavities, tubes, canals and pools. While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.
For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, increased radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

For refueling events where the water level drops below the RPV flange classification would be via CU2. This event escalates to an Alert per AA2 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Matrix for events in operating modes 1-3.

EAL #2

This EAL addresses rises in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level rises that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required as it would restrict the applicability of the Threshold. The intent is to identify loss of control of radioactive material in any monitored area.

References:

AA1

Initiating Condition - ALERT

Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for $\geq$ 15 minutes

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any of the radiation monitors in Table R1 > the ALERT reading for $\geq$ 15 minutes

OR

2. For RMS-RE107 effluent monitor:

EITHER

VALID reading > 200 times the
alarm setpoint established by a current radioactivity discharge permit for
$\geq$ 15 minutes

OR

VALID reading > 1.27E-01 μCi/ml for $\geq$ 15 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for $\geq$ 15 minutes

EAL BASES

AA1

Table R1 EAL THRESHOLD		
Method	**ALERT**	
	DRMS Grid 6	**Threshold**
Main Plant Vent		
Primary	4GE125	3.06E+07 μCi/sec
Secondary	1GE126	2.82E-01 μCi/ml
Fuel Building Vent		
Primary	4GE005	2.19E+06 μCi/sec
Secondary	5GE005	2.82E-01 μCi/ml
Radwaste Building Vent		
Primary	4GE006	2.58E+06 μCi/sec
Secondary	5GE006	6.84E-02 μCi/ml

Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This IC addresses an actual or substantial potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. RBS incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in AU1 and AA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases should not be prorated or averaged. For example, a release exceeding 600 times the ODCM limit for 5 minutes does not meet the threshold for this IC.

This Initiating Condition includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the Initiating Condition.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

AA1

Any release on the routine effluent monitors in excess of the TRM limit is considered a non-routine release. Table R1 provides the monitors EAL setpoint values. Values are provided for a primary and secondary source for NOUE and Alert EAL determination. The Division I safety related monitors (DRMS 4GE125 and 4GE005) are the preferred source for main plant exhaust and fuel building EAL determination. Radwaste building preferred value is the effluent monitor (4GE006). The secondary monitors in Table R1 should be used to determine EALs if the preferred monitors are inoperable.

EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition established by the radioactivity discharge permit. This value is associated with a planned batch release.

Historical release permits indicate that the Alert value of 200 times the radiation monitor setpoint established by the current permit may exceed the operating range of the RMS-RE107 effluent monitor in some instances. This potentially affected
monitor is listed in EAL #2 with a corresponding value for the top of its indicating range.

EAL #3

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

References:

T.R. 3.11
RSP-0008, *Offsite Dose Calculation Manual* (ODCM)
G.13.18.9.6*012 Rev 0, *Effect of Core Uprate on the DRMS Process Safety Limit / Conversion Factors* / PR-C-495 Rev 2 p 4
ESK-RMS05
ESK-RMS25

AA2

Initiating Condition - ALERT

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2)

1. A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered

<u>OR</u>

2. A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:

RMS-RE140 2000 mR/hr
RMS-RE141 2000 mR/hr
RMS-RE192 2000 mR/hr
RMS-RE193 2000 mR/hr
RMS-RE5A 1.64E+03 μCi/sec
RMS-RE5B (GE) 5.29E-04 μCi/ml

Basis:

This IC addresses rises in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from AU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

The locations of the EAL specific area radiation monitors are:

Containment	RMS-RE140	North Refueling Floor
	RMS-RE141	South Refueling Floor
Fuel Building	RMS-RE192	South Operating Floor
	RMS-RE193	North Operating Floor
	RMS-RE5A (B)	Fuel Building Ventilation Exhaust

EAL #1

Indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. Depending on available level indication, the declaration may be based on indications of water makeup rate or decrease in Refueling Water Storage Pool level. Video cameras (Security or outage-related) may allow remote observation of level.

EAL #2

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Elevated ventilation monitor readings may be an indication of a radioactivity release from the fuel, confirming that damage has occurred. Elevated background at the ventilation monitor due to water level drop may mask elevated ventilation exhaust airborne activity and needs to be considered.

While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. **Generally, elevated radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.**

The Abnormal Operating Procedure (AOP) provides a table for guidance on pool level and of potential scenarios and the expected pool level assuming no operator action. The AOP is also entered for UNPLANNED lowering of refueling cavity or lower fuel pool water level during refueling operations. When control rod blades are stored in the Spent Fuel Pool, dose rate rise in the area may be attributed to the stored items instead of uncovered fuel assemblies.

Escalation of this emergency classification level, if appropriate, would be based on AS1 or AG1.

References:

TS Table 3.3.6.2-1
Calculation G13.18.9.4*10

AA3

Initiating Condition - ALERT

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

Operating Mode Applicability: All

Emergency Action Level(s):

Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:

Main Control Room
CAS

Basis:
This IC addresses elevated radiation levels that: impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the rise in radiation levels is not a concern of this IC. The Emergency Director must consider the source or cause of the elevated radiation levels and determine if any other IC may be involved.

This IC is not meant to apply to increases in the containment dome radiation monitors as these are events which are addressed in the fission product barrier matrix EALs.

RP surveys should be performed in the CAS area if radiation above the program limit is detected outside the RCA. The Control Room area radiation monitor should be observed for EAL conditions if rising radiation levels are detected outside the RCA.

The Main Control Room and CAS are the areas at RBS requiring continuous occupancy.

References:

AS1

Initiating Condition -- SITE AREA EMERGENCY

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR thyroid CDE for the actual or projected duration of the release

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

Table R1 EAL THRESHOLD		
Method	**SITE AREA EMERGENCY** **DRMS Grid 6**	**Threshold**
Main Plant Vent Primary Secondary	 4GE125 N/A	 4.70E+07 μCi/sec
Fuel Building Vent Primary Secondary	 4GE005 N/A	 6.70E+06 μCi/sec
Radwaste Building Vent	N/A	

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the SITE BOUNDARY that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways.

EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 are not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

References:

AG1

Initiating Condition -- GENERAL EMERGENCY

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on any of the radiation monitors in Table R1 > the GENERAL EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

Table R1 EAL THRESHOLD		
Method	**GENERAL EMERGENCY** **DRMS Grid 6**	 **Threshold**
Main Plant Vent Primary Secondary	4GE125 N/A	4.70E+08 µCi/sec
Fuel Building Vent Primary Secondary	4GE005 N/A	6.70E+07 µCi/sec
Radwaste Building Vent	N/A	

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the SITE BOUNDARY that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways.

EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 are not, the results from these assessments may indicate that the classification is not warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

References:

FU1

INITIATING CONDITION – NOTIFICATION OF UNUSUAL EVENT

ANY loss or ANY potential loss of containment

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Any loss or any potential loss of containment

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss or any potential loss of containment.

The Fuel Cladding (FC) and the Reactor Coolant System (RCS) are weighted more heavily than the Primary Containment (PC) barrier. NOUE ICs associated with RCS and FC barriers are addressed under System Malfunction ICs.

Loss of containment would be a potential degradation in the level of plant safety. The PC barrier includes the drywell, the wetwell, their respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment barrier thresholds are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

FA1

INITIATING CONDITION – ALERT

Any loss or any potential loss of either fuel clad or RCS

Operating Mode Applicability: Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s):

1. Any loss or any potential loss of fuel clad

   OR

   Any loss or any potential loss of RCS

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss or potential loss of a Fuel Clad barrier or a loss or potential loss of the RCS barrier.

The Fuel Cladding and the Reactor Coolant System are weighted more heavily than the Primary Containment barrier.

Loss of either the Fuel Cladding or the Reactor Coolant System would be a substantial degradation in the level of plant safety.

The Fuel Clad barrier is the zircalloy or stainless steel fuel bundle tubes that contain the fuel pellets.

The RCS barrier is the reactor coolant system pressure boundary and includes the reactor vessel and all reactor coolant system piping up to the isolation valves.

FS1

INITIATING CONDITION – SITE AREA EMERGENCY

Loss or potential loss of any two barriers

Operating Mode Applicability: Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s):

1. Loss or potential loss of any two barriers

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates loss or potential loss of any two barriers.

Loss of 2 Fission Product Barriers would be a major failure of plant systems needed for protection of the public.

FG1

INITIATING CONDITION – GENERAL EMERGENCY

Loss of any two barriers and loss or potential loss of third barrier

Operating Mode Applicability:

Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s):

1. Loss of any two barriers

   AND

   Loss or potential loss of the third barrier

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss of any two barriers and the loss or potential loss of the third barrier.

Conditions / events required to cause the loss of 2 Fission Product Barriers with the potential loss of the third could reasonably be expected to cause a release beyond the immediate site area exceeding EPA Protective Action Guidelines.

PC1

PRIMARY CONTAINMENT
Emergency Action Level:

Primary containment conditions

EAL threshold:

LOSS:

1. Rapid unexplained loss of PC pressure following initial pressure rise

   OR

2. PC pressure response not consistent with LOCA conditions

POTENTIAL LOSS:..............

1. PC pressure > 15 psig and rising

   OR

2. a. PC hydrogen in the unsafe zone of HDOL curve

      OR

   a. DW hydrogen concentration > 9%

   OR

3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL

PC1

Bases:

LOSS Rapid unexplained loss of pressure (i.e., not attributable to condensation effects or restoration of containment or drywell unit coolers) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy released into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity. This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition. Control room indicators may include ERIS data points, P808 CMS indication, or back-panel CMS pressure indication.

POTENTIAL LOSS - The site specific pressure is based on the primary containment design pressure. Primary Containment pressure greater than 15 psig and rising is based on the design pressure of the Primary Containment. If the Containment pressure is exceeded, this represents a condition outside the analyzed conditions. This constitutes a potential loss of the Primary Containment barrier even if a failure to isolate has not occurred.

The Emergency Procedure Guidelines and Severe Accident Guidelines identify that deflagration could occur if containment hydrogen concentration reaches the HDOL or drywell hydrogen concentration reaches 9%. The deflagration of Hydrogen represents a potential loss of the primary containment. Indication of actual hydrogen concentration in the containment is affected by the environmental conditions (i.e., the presence of water vapor). The RBS hydrogen monitoring system removes water vapor from the sample before hydrogen concentration is measured and, thus, may provide readings that are higher than the actual hydrogen concentration.

The Heat Capacity Temperature Limit (HCTL) is the highest suppression pool temperature from which emergency RPV depressurization will not raise:
suppression chamber temperature above the maximum temperature capability of the suppression chamber and equipment within the suppression chamber which may be required to operate when the RPV is pressurized,

OR

Suppression chamber pressure above PC pressure limit A, while the rate of energy transfer from the RPV to the containment is greater than the capacity of the containment vent.

The HCTL is a function of RPV pressure and suppression pool water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for
the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

References:

PC2

PRIMARY CONTAINMENT
Emergency Action Level:

Reactor vessel water level

EAL Threshold:

LOSS: .... NONE

POTENTIAL LOSS:.............. Entry into PC flooding procedures SAP-1 and SAP-2

Bases:

LOSS NONE

POTENTIAL LOSS - The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into SAP-1 and SAP-2 is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and higher potential for containment failure. In conjunction with Reactor Vessel water level loss thresholds in the fuel clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

References:

PC3

PRIMARY CONTAINMENT
Emergency Action Level:

Primary containment isolation failure or bypass

EAL Threshold:

LOSS: ....1. a. Failure of all valves in any one line to close

AND

b. Direct downstream pathway to the environment exists after PC isolation signal

OR

2. Intentional PC venting per EOPs or SAPs

OR

3. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following:

a. Max Safe Operating Temperature (Table F1)

OR

b. Max Safe Area Radiation (Table F1)

POTENTIAL LOSS:............. NONE

TABLE F1			
PC 3 Loss of Primary Containment			
Parameter	**Area Temperature** Max Safe Operating Value	**Area Radiation Level** DRMS Grid 2	Max Safe Operating Value
RHR A equipment area	200º F	1213	9.5E+03 mR/hr
RHR B equipment area	200º F	1214	9.5E+03 mR/hr
RHR C equipment area	N/A	1215	9.5E+03 mR/hr
RCIC room	200º F	1219	9.5E+03 mR/hr
MSL Tunnel	200º F	N/A	
RWCU pump room 1 (A) / 2 (B)	200º F	N/A	

Bases:

These thresholds address incomplete containment isolation that allows direct release to the environment.

LOSS Failure to isolate - Inability to isolate means the primary containment isolation valve(s) did not fully close after a VALID automatic or manual isolation signal and is not isolable from the Main Control Room, or an attempt for isolation from the Main Control Room has been made and was unsuccessful. An attempt for isolation should be made upon identification and prior to the accident classification. If isolated from the Main Control Room upon identification, this INITIATING CONDITION is not applicable. Dispatch of Operators outside the Control Room for manual attempts to close the valve is not considered.

Primary Containment isolation valves are described in the Technical Specifications bases for Primary Containment, Primary Containment Airlock and Primary Containment Isolation Valves (T.S. 3.6.1.1). The Containment airlock is not considered in this EAL since airlock failure would be a potential failure mode to cause the EAL PC1 threshold.

The use of the modifier direct in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Containment Venting - Site specific EOPs and SAPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs or SAPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure when not in an accident situation should not be considered.

Area temperature or radiation The presence of area radiation or temperature Max Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The indicators should be confirmed to be caused by RCS leakage. Leakage into a closed system is to be considered a loss of primary containment only if the closed system is breached and thereby creates a path to the environment.

POTENTIAL LOSS - None

References:

PC4

PRIMARY CONTAINMENT
Emergency Action Level:

Primary containment radiation monitors

EAL Threshold:

LOSS: .... NONE

POTENTIAL LOSS: .... Containment radiation monitor RMS-RE16 reading > 10,000 R/hr

BASIS

LOSS NONE

POTENTIAL LOSS The site specific reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and fuel clad.

Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted.

References:
............Calculation G13.18.9.4-045 Rev. 0

PC5

REACTOR COOLANT SYSTEM
Emergency Action Level:

Emergency Director judgment

EAL Threshold:

LOSS: .... Any condition in the opinion of the Emergency Director that indicates loss of the Primary Containment barrier

POTENTIAL LOSS:.............. Any condition in the opinion of the Emergency Director that indicates potential loss of the Primary Containment barrier

Bases:

LOSS or **POTENTIAL LOSS** This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the primary containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be considered in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

The primary containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Primary Containment barrier. When no event is in progress (loss or potential loss of either fuel clad and/or RCS) the Primary Containment barrier status is addressed by Technical Specifications.

References:

FC1

FUEL CLAD
Emergency Action Level:

Primary coolant activity level

EAL Threshold:

LOSS:.................................. Coolant activity > 300 μCi/g dose equivalent I-131

POTENTIAL LOSS:............. NONE

Bases:

LOSS The site specific value is 300 μCi/gm dose equivalent I-131. Assessment by the EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad barrier is considered lost.

POTENTIAL LOSS - NONE

References:

FC2

FUEL CLAD
Emergency Action Level:

Reactor vessel water level

EAL Threshold:

LOSS: RPV water level cannot be restored and maintained above -186 inches

POTENTIAL LOSS: .RPV water level cannot be restored and maintained above -162 inches or cannot be determined

Bases:

LOSS - This site specific value corresponds to the level used in EOPs to indicate challenge of core cooling. This is the minimum value to assure core cooling without further degradation of the clad. Reactor vessel water level less than the minimum steam cooling RPV water level (-186) with injection is the lowest level with adequate core cooling to maintain peak clad temperature less than 1500°F where fuel clad damage (fuel rod perforation) may begin. Corrective actions as described in the Emergency Operating Procedures (EOPs) and Severe Accident Guidelines (SAGs) will be needed to mitigate fuel clad/core damage.

POTENTIAL LOSS This threshold is the same as the RCS barrier loss threshold RC2 and corresponds to the site specific water level at the top of the active fuel. Thus, this threshold indicates a potential loss of the Fuel Clad barrier and a loss of the RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency. With Reactor vessel water level less than the top of active fuel (-162), adequate core cooling is still assured but is sufficiently low that any further drop in water level could result in the significant degradation of the cladding. Corrective actions as described in the Emergency Operating Procedures (EOPs) will be needed to mitigate fuel clad/core damage.

References:

FC3

FUEL CLAD
Emergency Action Level:

Primary containment radiation monitors

EAL Threshold:

LOSS: .... Containment radiation monitor RMS-RE16 reading > 3,000 R/hr

POTENTIAL LOSS: .... NONE

Bases:

LOSS - Containment radiation monitors reading in excess of 3000 R/hr after Reactor Shutdown are indicative of both the loss of the reactor coolant system and 5% clad failure with the instantaneous release and dispersal of the reactor coolant noble gas and Iodine inventory into the drywell and containment atmosphere.

Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within Technical Specifications and are therefore indicative of fuel damage.

POTENTIAL LOSS - NONE

References:

Calculation G13.18.9.4-045 Rev. 0

FC4

FUEL CLAD
Emergency Action Level:

Emergency Director judgment

EAL Threshold:

LOSS: .... Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier

POTENTIAL LOSS:.............. Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier

Bases:

LOSS or **POTENTIAL LOSS** This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the Fuel Clad barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be considered in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

References:

RC1

REACTOR COOLANT SYSTEM
Emergency Action Level:

Drywell pressure

EAL Threshold:

LOSS: .... Drywell pressure > 1.68 psid with indications of reactor coolant leak in drywell
POTENTIAL LOSS: .... NONE

Bases:

LOSS - The site specific primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating the ECCS or equivalent makeup system.

Pressure rise due solely to loss of containment or drywell heat removal capability, testing, etc are not considered for this EAL threshold.

POTENTIAL LOSS - NONE.

References:

RC2

REACTOR COOLANT SYSTEM
Emergency Action Level:

Reactor vessel water level

EAL Threshold:

LOSS: ....RPV water level cannot be restored and maintained above -162 inches or cannot be determined

POTENTIAL LOSS:...............NONE

Bases:

LOSS - The loss EAL threshold of site specific RPV water level corresponds to the level that is used in EOPs to indicate challenge of core cooling.

This threshold is the same as the Fuel Clad barrier potential loss EAL threshold FC2 and corresponds to a challenge to core cooling. Thus, this threshold indicates a loss of the RCS barrier and potential loss of the Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

POTENTIAL LOSS NONE

References:

RC3

REACTOR COOLANT SYSTEM
Emergency Action Level:

RCS leak rate

EAL Threshold:

LOSS: 1. UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close

AND

High MSL flow annunciator (P601-19A-A2)

OR

2. Indication of an UNISOLABLE HPCS, Feedwater, RWCU or RCIC break

OR

3. Emergency RPV depressurization is required

POTENTIAL LOSS: *……1. RCS leakage > 50 gpm inside the drywell*

OR

2. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following:

b. Max Normal Operating Temperature (Table F2)

OR

b. Max Normal Area Radiation (Table F2)

TABLE F2			
RC 3 Potential Loss of RCS			
Parameter	**Area Temperature** (isolation temperature alarm)	**Area Radiation Level** DRMS Grid 2	Max Normal Operating Value
RHR A equipment area	117º F (P601-20A-B4)	1213	8.2E+01 mR/hr
RHR B equipment area	117º F (P601-20A-B4)	1214	8.2E+01 mR/hr
RHR C equipment area	N/A	1215	8.2E+01 mR/hr
RCIC room	182º F (P601-21A-B6)	1219	1.20E+02 mR/hr
MSL Tunnel	173°F (P601-19A-A1/A3/B1/B3)	N/A	
RWCU pump room 1 (A) / 2 (B)	165º F (P680-1A-A2/B2)	N/A	

Bases:

LOSS - An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this EAL threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as HPCS, Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered as MSL breaks for purposes of classification.

The leak is NOT isolable from the Main Control Room **OR** an attempt for isolation from the Main Control Room panels has been made and was not successful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification, this INITIATING CONDITION is not applicable. Dispatch of operators outside the Control Room for manual attempts to close the valve is not considered.

Plant symptoms requiring Emergency RPV depressurization per the site specific EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the suppression pool, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

POTENTIAL LOSS - This threshold is based on leakage set at a level indicative of a small breach of the RCS but which is well within the makeup capability of normal and emergency high pressure systems. Core uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible.

If the leak detection system leak rate information is unavailable (i.e., LOCA isolation, loss of power), other indicators of RCS leakage should be used. Other indications include a rise in drywell temperature and pressure and a rise in the drywell radiation monitors. If the leakage computer is unavailable, sump level and pump status may help determine if the leakage is greater than 50 gpm.

If the DFR discharge line containment isolation valves have not isolated and a pump is running continuously without lowering sump level, the leakage may be assumed to exceed 50 gpm. The second pump can be started to verify that the first pump is not degraded. It is not intended to conclude a potential loss of the RCS barrier exists if both pumps are degraded and the observed leak rate as noted by rate of rise of level in the sump or calculated by the computer is such that it clearly confirms leakage below 50 gpm.

References:

RC4

REACTOR COOLANT SYSTEM
Emergency Action Level:

Drywell radiation

EAL Threshold:

LOSS: .... Drywell radiation monitor RMS-RE20 reading > 100 R/hr

POTENTIAL LOSS: .... NONE

Bases:

LOSS The site specific reading is a value which indicates the release of reactor coolant to the drywell.

This reading is less than that specified for Fuel Clad barrier Loss EAL threshold FC4. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading rose to that value specified by the Fuel Clad Barrier EAL threshold, fuel damage would also be indicated.

POTENTIAL LOSS - NONE

References:
G13.18.9.4-051

RC5

REACTOR COOLANT SYSTEM
Emergency Action Level:

Emergency Director judgment

EAL Threshold:

LOSS: .... Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

POTENTIAL LOSS:.............. Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier

Bases:

LOSS or **POTENTIAL LOSS** This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the RCS barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be considered in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

References:

HU1

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3)

1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the RBS security shift supervision

OR

2. A credible site specific security threat notification

OR

3. A validated notification from NRC providing information of an aircraft threat

Basis:

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. Consideration shall be given to upgrading the emergency response status and emergency classification in accordance with the Safeguards Contingency Plan and Emergency Plan.

EAL #1

The Security Shift Supervisor is the designated individual on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This EAL is based on the Safeguards Contingency Plan . The Safeguards Contingency Plan is based on guidance provided in NEI 03-12.

EAL #2

This EAL is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of Unusual Event.

EAL BASES

HU1

The determination of credible is made through use of information found in the Safeguards Contingency Plan.

EAL #3

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

References:

NEI 03-12

HU2

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE

Operating Mode Applicability: All

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the NOUE emergency classification level.

References:

HU4

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed, the applicable time.*

1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area.

OR

2. EXPLOSION within the PROTECTED AREA

Table H2 **Structures Containing Functions or Systems Required for Safe Shutdown**	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G)
Fuel Building	

Basis:

This IC addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

HU4

EAL #1

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket).

EAL #2

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA.

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency Director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA4.

References:

HU5

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2)

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS

OR

2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an off-site event

Basis:

This IC is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBAs may be worn does not eliminate the need to declare the event.

This IC is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

References:

HU6

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Natural or destructive phenomena affecting the PROTECTED AREA

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)

1. Seismic event identified by any 2 of the following:

   Seismic event confirmed by activated seismic switch as indicated by receipt of **EITHER** a **OR** b:
   a. Annunciator Seismic Tape Recording SYS Start (P680-02A-D06)
   b. Event Indicator on ERS-NBI-102 is white

   Earthquake felt in plant

   National Earthquake Center

OR

2. Tornado striking within PROTECTED AREA boundary

OR

3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area

OR

4. Turbine failure resulting in casing penetration or damage to turbine or generator seals

OR

5. Severe weather or hurricane conditions with indication of SUSTAINED high winds $\geq$ 74 mph within the PROTECTED AREA boundary

HU6

	Table H1 Uncontrolled Flooding Threshold Area Water Level
Affected Location / Parameter	Max Safe Operating Value / Indicator
Aux Bldg Crescent Area 70 EL	6 inches above floor (must be verified locally)
HPCS Room 70 EL	4 inches above floor (P870-51A-G4)
RHR A Room 70 EL	4 inches above floor (P870-51A-G4)
RHR B Room 70 EL	4 inches above floor (P870-51A-G4)
RHR C Room 70 EL	4 inches above floor (P870-51A-G4)
LPCS Room 70 EL	4 inches above floor (P870-51A-G4)
RCIC Room 70 EL	4 inches above floor (P870-51A-G4)

Basis:

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

EAL #1

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

The annunciators Seismic Tape Recording SYS Start and the white event indicator are listed in the Alarm Response Procedure as verification of an earthquake event.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

EAL #2

This EAL is based on a tornado striking (touching down) within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA6.

HU6

EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps.

The EAL is only applicable to areas in Table H1 areas that contain systems required for safe shutdown of the plant and that are not designed to be partially or fully submerged. The EAL is based on VALID indication that the area water level has reached the Maximum Safe Operating Values as identified in EOP-3. Exceeding the Maximum Safe Operating Value is interpreted as a potential degradation in the level of safety of the plant and is appropriately treated as an Unusual Event.

Escalation of this emergency classification level, if appropriate, would be via HA6, or by other plant conditions.

EAL #4

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU4 and HU5.

This EAL is consistent with the definition of a NOUE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment.

Escalation of this emergency classification level, if appropriate, would be to HA6 based on damage done by PROJECTILES generated by the failure or by the radiological releases. These latter events would be classified by the radiological (A) ICs or Fission Product Barrier (F) ICs.

EAL #5

This EAL is based on the assumption that high winds within the PROTECTED AREA may have potentially damaged plant structures, listed in Table H2, containing functions or systems required for safe shutdown of the plant. The high wind site specific value is based on the wind speed (74 mph) to classify severe weather conditions as a hurricane. FSAR design basis is that all Seismic Category I structures at RBS are designed to withstand 100 mph fastest mile of sustained wind 30 ft above ground, based upon a
100-yr period of recurrence. Methods to measure wind speed in the PROTECTED AREA are not available; therefore, a sustained indication of 74 mph on the Meteorological Tower lower elevation average wind speed indication will be used to determine that this EAL is met. The upper scale for the lower elevation average meter wind speed on the MET Tower is 100 mph If the MET Tower lower average wind speed sensors are not operable, other tower sensors or sources may be considered for estimating wind speed at RBS such as NOAA or Baton Rouge regional Airport.
If damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

References:

EAL BASES

HA1

Initiating Condition - ALERT

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2)

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision
2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site

Basis:

NOTE: *Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.*

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

EAL #1

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OWNER CONTROLLED AREA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes Independent Spent Fuel Storage Installations that may be outside the PROTECTED AREA but still in the OWNER CONTROLLED AREA.

HA1

EAL #2

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

References:

NEI 03-12

EAL BASES

HA2

Initiating Condition - ALERT

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert

Operating Mode Applicability: All

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency classification level.

References:

HA3

Initiating Condition - ALERT

Control room evacuation has been initiated

Operating Mode Applicability: All

Emergency Action Level(s):

1. AOP-0031, Shutdown from Outside the Main Control Room requires Control Room evacuation

Basis:

With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency.

References:

Initiating Condition - ALERT

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown

Operating Mode Applicability: All

Emergency Action Level(s):

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems

Table H2 **Structures Containing Functions or Systems Required for Safe Shutdown**	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G)
Fuel Building	

Basis:

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radiological Effluent (A) ICs.

References:

HA5

Initiating Condition - ALERT

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor

Operating Mode Applicability: All

Emergency Action Level(s):

Note: *If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.*

1. Access to Main Control Room, Auxiliary Building, or 95 Control Building is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor

Basis:

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor. The Auxiliary Building and the 95 Control Building are included with the Main Control Room due to required operator actions per the system operating procedure to place shutdown cooling in service.

The fact that SCBAs may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

HA5

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radioactive Effluent (A) ICs.

References:

HA6

Initiating Condition - ALERT

Natural or destructive phenomena affecting VITAL AREAS

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by: .
   Annunciator Seismic Tape Recording System Start (P680-02A-D06)
   AND
   Event Indicator on ERS-NBI-102 is white
   AND
   Receipt of **EITHER** 1 **OR** 2:
   1. Annunciator Seismic Event High (P680-02A-C06)
   2. Annunciator Seismic Event High-High (P680-02A-B06) **AND** amber light(s) on panel NBI-101

   AND

   b. Earthquake confirmed by any of the following:
   - Earthquake felt in plant
   - National Earthquake Center
   - Control Room indication of degraded performance of systems required for the safe shutdown of the plant

OR

2. Tornado striking resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

3. Internal flooding in Auxiliary Building 70 ft elevation resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

OR

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems.

OR

5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems.

HA6

OR

6. Hurricane or high SUSTAINED wind conditions ≥ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

Table H2 **Structures Containing Functions or Systems Required for Safe Shutdown**	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G)
Fuel Building	

Basis:

These EALs escalate from HU6 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by Control Room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in these EALs to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction (S) ICs.

The Emergency Director may consider the Fuel Building as necessary to address the impact of the event on the loss of spent fuel cooling or spent fuel (e.g., freshly off-loaded reactor core in pool). At RBS, the term freshly off-loaded reactor core refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

EAL #1

Seismic events of this magnitude can result in a VITAL AREA being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

EAL #2

This EAL is based on a tornado striking (touching down) that has caused VISIBLE DAMAGE to structures or areas containing functions or systems required for safe shutdown of the plant.

EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. It is based on the degraded performance of systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

The areas of concern are the Auxiliary Building 70 foot elevation cubicles and crescent area that contain systems required for safe shutdown of the plant that are not designed to be partially or fully submerged. Indication may be by local verification, control room indication, or in degraded performance of systems affected by the flooding.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

EAL #4

This EAL addresses the threat to safety related equipment imposed by PROJECTILEs generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an ALERT in that the potential exists for actual or substantial potential degradation of the level of safety of the plant. Some structures on the list may not be at risk for the turbine generated missile but are included for consistency in identifying structures or areas containing systems and functions required for safe shutdown of the plant.

EAL #5

This EAL addresses vehicle crashes within the PROTECTED AREA that result in VISIBLE DAMAGE to VITAL AREAS (as shown in Table H2) or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

EAL BASES

HA6

EAL #6

This EAL is based on high winds within the PROTECTED AREA that have caused VISIBLE DAMAGE to structures or areas containing functions or systems required for safe shutdown of the plant. The high wind site specific value is based on the wind speed (74 mph) to classify severe weather conditions as a hurricane. FSAR design basis is that all Seismic Category I structures at RBS are designed to withstand 100 mph fastest mile of sustained wind 30 ft above ground, based upon a 100-yr period of recurrence. Methods to measure wind speed in the PROTECTED AREA are not available; therefore, a sustained indication of 74 mph on the Meteorological Tower lower elevation average wind speed indication will be used to determine that this EAL is met. The upper scale for the lower elevation average wind speed on the MET Tower is 100 mph. If the MET Tower lower average wind speed sensors are not operable, other tower sensors or sources may be considered for estimating wind speed at RBS such as NOAA or Baton Rouge regional Airport.

References:

HS1

Initiating Condition - SITE AREA EMERGENCY

HOSTILE ACTION within the PROTECTED AREA

Operating Mode Applicability: All

Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision

Basis:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organization readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

References:

NEI 03-12

HS2

Initiating Condition - SITE AREA EMERGENCY

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency

Operating Mode Applicability: All

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for Site Area Emergency.

References:

HS3

Initiating Condition - SITE AREA EMERGENCY

Control Room evacuation has been initiated and plant control cannot be established

Operating Mode Applicability: All

Emergency Action Level(s):

1. a. Control room evacuation has been initiated

   AND

   b. Control of the plant cannot be established in accordance with AOP-0031, Shutdown from Outside the Main Control Room, within 15 minutes

Basis:

The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions such as reactivity control (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink)..

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director judgment. The Emergency Director is expected to make a reasonable, informed judgment within 15 minutes that the plant staff has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier Degradation (F) or Abnormal Radiation Levels/Radiological Effluent (A) EALs.

References:

HG1

Initiating Condition - GENERAL EMERGENCY

HOSTILE ACTION resulting in loss of physical control of the facility

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2)

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions

OR

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool

Basis:

EAL #1

This EAL encompasses conditions under which a HOSTILE ACTION has resulted in a loss of physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location. These safety functions are reactivity control (ability to shut down the reactor and keep it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

Loss of physical control of the Control Room or remote shutdown panel capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown capability and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

EAL #2

This EAL addresses failure of spent fuel cooling systems as a result of HOSTILE ACTION if IMMINENT fuel damage is likely, such as when a freshly off-loaded reactor core is in the spent fuel pool. At RBS, the term freshly off-loaded reactor core refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

References:

NEI 03-12

Initiating Condition - GENERAL EMERGENCY

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency

Operating Mode Applicability: All

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergency.

References:

SU1

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite AC power to emergency busses for $\geq$ 15 minutes

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. Loss of all offsite AC power to Div I & II ENS busses for $\geq$ 15 minutes

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power to emergency busses.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of off-site power.

References:

EAL BASES

SU6

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of safety system annunciation or indication in the Control Room for $\geq$ 15 minutes

Operating Mode Applicability:

Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. UNPLANNED Loss of > approximately 75% of the following for $\geq$ 15 minutes:

   a. Control room safety system annunciation

   OR

   b. Control Room safety system indication

Basis:

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered e.g., SPDS, plant computer, etc..

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

EAL BASES

SU6

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This NOUE will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

References:

SU7

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

RCS leakage

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s): (1 or 2)

Note: *A relief valve that operates and fails to close per design should be considered applicable if the relief valve cannot be isolated.*

1. Unidentified or pressure boundary leakage > 10 gpm

OR

2. Identified leakage > 35 gpm

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal Control Room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated. The 15 minute EAL assessment period begins when the relief valve should have closed. An attempt for isolation from the Control Room should be made prior to classification. If operator actions from the Control Room are successful within the 15 minute EAL assessment period, this threshold is not applicable. Credit is not given for operator actions taken outside the Control Room.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation (F) ICs.

References:

RBS Technical Specification 3.4.5

SU8

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Loss of all onsite or offsite communications capabilities

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s): (1 or 2)

1. Loss of all of the following onsite communications methods affecting the ability to perform routine operations:
    - Plant radio system
    - Plant paging system
    - Sound powered phones
    - In-plant telephones

OR

2. Loss of all of the following offsite communications methods affecting the ability to perform offsite notifications:
    - All telephones
    - NRC phones
    - State of Louisiana Radio
    - Offsite notification system and hotline

Basis:

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with offsite authorities.

The availability of one method of ordinary offsite communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

References:

SU9

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Fuel clad degradation

Operating Mode Applicability: Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s): (1 or 2)

3. Offgas pre-treatment radiation monitor reading > the Table S1 Dose Rate Limit for the actual indicated offgas flow indicating fuel clad degradation > T.S. allowable limits

Table S1	
FLOW (cfm)	Dose Rate Limit (mR/hr)
≤15	9000
>15-17	8000
>17-20	7000
>20-25	5000
>25-30	4000
>30-60	2000
>60-140	1000
>140-200	700

OR

2. Reactor coolant sample activity value indicating fuel clad degradation > T.S. allowable limits

- >4.0 μCi/gm dose equivalent I-131

  OR

- >0.2 μCi/gm dose equivalent I-131 for > 48 hours

SU9

Basis:

This IC is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

EAL #1

This EAL addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

The Technical Specification limit of 290 mCi/sec Offgas pre-treatment release is equivalent to 11,210 mR/hr (assumes flow of 17.875 cfm without adjustment for instrument accuracy). The Table S1 values account for instrument inaccuracy and changing offgas flow rate. The dose rate in the table corresponds to the adjusted TS limit for that associated indicated flow. The dose rates are rounded down conservatively to more accurately read the values on the available scale. The table dose rate values may not reflect the H13-P601/22A/F03 alarm setpoint. To determine if EAL conditions are met when the pre-treatment high radiation alarm (H13-P601/22A/F03) is lit, the operator must read the actual indicated offgas flow rate on N64-R620 (Panel H13-P845) and indicated pre-treatment mR/hr value on D17-R604 (Panel H13-P600). Compare the indicated mR/hr value with the Table S1 dose rate mR/hr for the indicated flow value. If the indicated mR/hr is greater than the Table S1 value, the EAL condition is met.

EAL #2

This EAL addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits and coolant samples exceeding coolant Technical Specifications for nominal operating iodine limits for the time period specified in the Technical Specifications.

Escalation of this IC to the Alert level is via the Fission Product Barriers (F).

References:

TS 3.4.8/B 3.4.8
TS 3.7.4 / B 3.7.4
G13.18.9.6.*012 Rev 0
G13.18.9.5-019-3B
G13.18.9.5-019-3C
USAR 15.7.1
EC-5000047036

SU10

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality

Operating Mode Applicability: Mode 3 Hot Shutdown

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

Basis:

This IC addresses inadvertent criticality events. This IC indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification. This IC excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated).

This condition can be identified using period monitors. The term sustained is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration. These short term positive periods are the result of the rise in neutron population due to subcritical multiplication.

Escalation would be by the Fission Product Barrier Table (F), as appropriate to the operating mode at the time of the event.

References:

SU11

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Inability to reach required operating mode within Technical Specification limits

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement time

Basis:

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required operating mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a four hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate NOUE is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. Declaration of a NOUE is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.

References:

SA1

Initiating Condition - ALERT

AC power capability to emergency busses reduced to a single power source for ≥15 minutes such that any additional single failure would result in station blackout

Operating Mode Applicability: Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. AC power capability to Div I and II ENS busses reduced to a single power source for ≥ 15 minutes

   AND

   b. Any additional single power source failure will result in station blackout

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency diesel generator to supply power to its emergency busses. Another related condition could be the loss of all offsite power and loss of onsite emergency diesels generators with only one train of emergency busses being backfed from the unit main generator, or the loss of onsite emergency diesel generators with only one train of emergency busses being fed from offsite power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with SS1.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power.

Div III D/G and bus E22-S004 are not discussed explicitly in this IC. The loss of Div I and Div II are considered a station blackout. If Div III D/G or E22-S004 is available, entry into this IC is applicable.

References:

SA3

Initiating Condition - ALERT

Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

Operating Mode Applicability: Mode 1 Power Operation
Mode 2 Startup

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

. **AND**

b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%

Basis:

Manual scram actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to scram the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

References:

SA6

Initiating Condition - ALERT

UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. UNPLANNED loss of > approximately 75% of the following for $\geq$ 15 minutes:

- Control room safety system annunciation

  OR

- Control Room safety system indication

AND

b. Either of the following:

- A SIGNIFICANT TRANSIENT is in progress

OR.

- Compensatory indications are unavailable

Basis:

This IC is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

Recognition of the availability of computer based indication equipment is considered (e.g., SPDS, plant computer, etc.).

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

SA6

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

"Compensatory indications" in this context includes computer based information such as SPDS. This should include all computer systems available for this use depending on specific plant design and subsequent retrofits. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

References:

SS1

Initiating Condition - SITE AREA EMERGENCY

Loss of all offsite and all onsite AC power to emergency busses for
$\geq$ 15 minutes

Operating Mode Applicability:

Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses for $\geq$ 15 minutes

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of offsite power.

Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to emergency busses. Even though an emergency bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus then the bus should not be considered operable. If this bus was the only energized bus then a SAE per SS1 should be declared.

Escalation to General Emergency is via Fission Product Barrier Degradation (F) or IC SG1, "Prolonged loss of all offsite and all onsite AC power to emergency busses."

References:

SS3

Initiating Condition - SITE AREA EMERGENCY

Automatic scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor

Operating Mode Applicability: Mode 1 Power Operation
Mode 2 Startup

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

   AND

   b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power $\geq$ 5%

Basis:

Automatic and manual scrams are not considered successful if action away from the reactor control console was required to scram the reactor.

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual scram actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual scram actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

References:

SS4

Initiating Condition - SITE AREA EMERGENCY

Loss of all vital DC power for ≥ 15 minutes

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. < 105 VDC on all vital DC busses for ≥ 15 minutes

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation to a General Emergency would occur by Abnormal Radiation Levels/Radiological Effluent (A), Fission Product Barrier Degradation (F).

References:

SS6

Initiating Condition - SITE AREA EMERGENCY

Inability to monitor a SIGNIFICANT TRANSIENT in progress

Operating Mode Applicability: Mode 1 Power Operation
Mode 2 Startup
Mode 3 Hot Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. Loss of > approximately 75% of the following for $\geq$ 15 minutes :

- Control Room safety system annunciation

OR

- Control Room safety system indication

AND

b. A SIGNIFICANT TRANSIENT is in progress

AND

c. Compensatory indications are unavailable

Basis:

This IC is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

"Planned" and UNPLANNED actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not an ameliorating factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

A Site Area Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

Site specific indications needed to monitor safety functions necessary for protection of the public must include Control Room indications, computer generated indications and dedicated annunciation capability.

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

"Compensatory indications" in this context includes computer based information such as SPDS. This should include all computer systems available for this use depending on specific plant design and subsequent retrofits.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

References:

SG1

Initiating Condition - GENERAL EMERGENCY

Prolonged loss of all offsite and all onsite AC power to emergency busses

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s):

1. a. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses.

   AND

   b. Either of the following:

   - Restoration of at least one emergency bus in < 4 hours is not likely

   OR

   - RPV level can not be maintained > -162 inches

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

SG1

Although it may be difficult to predict when power can be restored, it is necessary to give the Emergency Director a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that loss or potential loss of Fission Product Barriers is IMMINENT?

2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

Thus, indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with particular emphasis on Emergency Director judgment as it relates to IMMINENT loss or potential loss of fission product barriers and degraded ability to monitor fission product barriers.

References:

SG3

Initiating Condition - GENERAL EMERGENCY

Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists

Operating Mode Applicability:

Mode 1 Power Operation
Mode 2 Startup

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

   AND

   b. All manual actions do not shutdown the reactor as indicated by reactor power $\geq$ 5%

   AND

   c. Either of the following exist or have occurred due to continued power generation:

   - Core cooling is extremely challenged as indicated by RPV level cannot be restored and maintained > -186 inches

   OR

   - Heat removal is extremely challenged as indicated by RPV pressure and Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum offsite intervention time.

References:

CU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

RCS leakage

Operating Mode Applicability: Mode 4 . Cold Shutdown

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. RCS leakage results in the inability to maintain or restore RPV level > +9.7 inches (Level 3) for $\geq$ 15 minutes

Basis:

This IC is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA1 or CA3.

References:

CU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of RCS/RPV inventory

Operating Mode Applicability: Mode 5 Refueling

Emergency Action Level(s): (1 or 2)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED RCS level drop as indicated by either of the following:

   a. RCS water level drop below the RPV flange for $\geq$ 15 minutes when the RCS level band is established above the RPV flange

   OR

   b. RCS water level drop below the RPV level band for $\geq$ 15 minutes when the RCS level band is established below the RPV flange

OR

2. RCS level cannot be monitored with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Basis:

This IC is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that lower RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level lowering below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of a NOUE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA1 or CA3.

CU2

EAL #1

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to reductions in flooded reactor cavity level, which is addressed by AU2 EAL1, until such time as the level drops to the level of the vessel flange.

If RPV level continues to drop and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA1 would be appropriate.

EAL #2

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA1 or CA3.

References:

CU3

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV

Operating Mode Applicability:	Mode 4 Mode 5	Cold Shutdown Refueling
Emergency Action Level(s):	(1 or 2)	

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED event results in RCS temperature exceeding 200 ºF.

OR

2. Loss of all RCS temperature and RCS/RPV level indication for ≥ 15 minutes.

Basis:

This IC is a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that lower water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid rises in RCS/RPV temperatures depending on the time since shutdown.

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, EAL 2 would result in declaration of a NOUE if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication.

Escalation to Alert would be via CA1 based on an inventory loss or CA3 based on exceeding its temperature criteria.

References:

CU5

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

AC power capability to emergency busses reduced to a single power source for $\geq$ 15 minutes such that any additional single failure would result in station blackout

Operating Mode Applicability: Mode 4 Cold Shutdown
Mode 5 Refueling

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for $\geq$ 15 minutes

   AND

   b. Any additional single power source failure will result in station blackout

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of onsite emergency diesels generators with only one train of emergency busses being fed from offsite power (or backfed from offsite power through the main transformer). The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA5.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power.

Div III D/G and bus E22-S004 are not discussed explicitly in this IC. The loss of Div I and Div II are considered a station blackout. If Div III D/G or E22-S004 is available, entry into this IC is applicable.

References:

CU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of required DC power for $\geq$ 15 minutes

Operating Mode Applicability: Mode 4 Cold Shutdown
Mode 5 Refueling

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. < 105 VDC on required Vital DC busses for $\geq$ 15 minutes

Basis:

The purpose of this IC and its associated EAL is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations.

It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA3.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

References:

CU7

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality

Operating Mode Applicability:	Mode 4	Cold Shutdown
	Mode 5	Refueling

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

Basis:

This IC addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events . This IC indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification.

This condition can be identified using period monitors. The term sustained is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration. These short term positive periods are the result of the rise in neutron population due to subcritical multiplication.

Escalation would be by Emergency Director Judgment.

References:

CU8

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of all onsite or offsite communications capabilities

Operating Mode Applicability:	Mode 4	Cold Shutdown
	Mode 5	Refueling
	Mode D	Defueled

Emergency Action Level(s): (1 or 2)

1. Loss of all of the following onsite communication methods affecting the ability to perform routine operations:
   - Plant radio system
   - Plant paging system
   - Sound powered phones
   - In-plant telephones

<u>OR</u>

2. Loss of all of the following offsite communication methods affecting the ability to perform offsite notifications:
   - All telephones
   - NRC phones
   - State of Louisiana Radio
   - Offsite notification system and hotline

Basis:

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary offsite communications is sufficient to inform federal, state, and local authorities of plant issues. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from radio transmissions, individuals being sent to offsite locations, etc.) are being utilized to make communications possible.

References:

CA1

Initiating Condition - ALERT

Loss of RCS/RPV inventory

Operating Mode Applicability: Mode 4....... Cold Shutdown
Mode 5....... Refueling

Emergency Action Level(s): (1 or 2)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED loss of RCS inventory as indicated by RPV level < -43 inches (Level 2)

OR

2. RCS level cannot be monitored for $\geq$ 15 minutes with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Basis:

These EALs are not applicable when the RPV is defueled and serve as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level lowering and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

EAL #1

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

EAL #2

In the cold shutdown mode, normal RCS level and RPV level instrumentation systems will usually be available. In the refueling mode, normal means of RPV level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS1.

References:

CA3

Initiating Condition - ALERT

Inability to maintain plant in cold shutdown

Operating Mode Applicability: Mode 4 Cold Shutdown
Mode 5 Refueling

Emergency Action Level(s): (1 or 2)

1. An UNPLANNED event results in RCS temperature > 200 °F for > the specified duration in Table C2

OR

2. An UNPLANNED event results in RCS pressure rise > 10 psig due to a loss of RCS cooling

Table C2: RCS Reheat Duration Thresholds		
RCS	**Containment Closure**	**Duration**
Intact	N/A	60 minutes*
Not intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then the EAL is not applicable.		

Basis:

EAL #1
The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established.) As discussed above, RCS integrity should be assumed to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams) The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible

Finally, the EAL addresses complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established.

The (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

EAL #2

The 10 psig pressure rise addresses situations where, due to high decay heat loads, the time provided to restore temperature control, should be less than 60 minutes. The RCS pressure setpoint chosen should be 10 psig or the lowest pressure that the site can read on installed Control Board instrumentation that is equal to or greater than 10 psig.

Escalation to Site Area Emergency would be via CS1 should boiling result in significant RPV level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

The Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded.

.**References:**

CA5

Initiating Condition - ALERT

Loss of all offsite and all onsite AC power to emergency busses for $\geq$ 15 minutes

Operating Mode Applicability:	Mode 4	Cold Shutdown
	Mode 5	Refueling
	Mode D	Defueled

Emergency Action Level(s):

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. Loss of all offsite and all on-site AC power to Div I & Div II ENS busses for $\geq$ 15 minutes

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to Div I & Div II compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, raising the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to emergency busses. Even though an emergency bus may be re-energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not functional on the energized bus, then the bus should not be considered restored for this EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent ICs.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

References:

CS1

Initiating Condition - SITE AREA EMERGENCY

Loss of RCS/RPV inventory affecting core decay heat removal capability

Operating Mode Applicability: Mode 4 Cold Shutdown
Mode 5 Refueling

Emergency Action Level(s): (1 or 2 or 3)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. With CONTAINMENT CLOSURE not established, UNPLANNED RPV level < -49 inches

OR

2. With CONTAINMENT CLOSURE established, RPV level < -162 inches (TAF)

OR

3. RCS level cannot be monitored for ≥ 30 minutes with a loss of RCS inventory as indicated by any of the following:
   - RMS-RE16 reading > 100 R/hr
   - Erratic Source Range Monitor indication
   - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Basis:

These EALs are not applicable when the RPV is defueled.

Under the conditions specified by this IC, continued reduction in RCS level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG1 or AG1.

EAL #3

In the cold shutdown mode, normal RCS level and RPV level instrumentation systems will usually be available. In the refueling mode, normal means of RPV level indication may not be available. Redundant means of RPV level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

CS1

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

References:

COP-1050 NEDC-33045P
Calculation G13.18.9.4-047 Rev. 0

CG1

Initiating Condition - GENERAL EMERGENCY

Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged

Operating Mode Applicability: Mode 4 Cold Shutdown
Mode 5 Refueling

Emergency Action Level(s): (1 or 2)

Note: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. RPV level < - 162 inches (TAF) for $\geq$ 30 minutes

   AND

   b. Any containment challenge indication in Table C1

OR

2. a. RCS level cannot be monitored with core uncovery indicated by any of the following for $\geq$ 30 minutes:

   - RMS-RE16 reading > 100 R/hr
   - Erratic Source Range Monitor indication
   - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

   AND

   b. Any containment challenge indication in Table C1

	Table C1 Containment Challenge Indications	
• CONTAINMENT CLOSURE <u>not</u> established • Explosive mixture inside containment • UNPLANNED rise in containment pressure • Secondary containment area radiation monitor above EOP Max Safe Operating Value below:		
Area	DRMS Grid 2	Max Safe Operating Value
RHR Equip Rm A	1213	9.5E+03 mR/hr
RHR Equip Rm B	1214	9.5E+03 mR/hr
RHR Equip Rm C	1215	9.5E+03 mR/hr

Basis:

These EALs are not applicable when the RPV is defueled.

This IC represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission
product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE. The GE is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the Fuel Clad barrier. Examples include initial vessel level and shutdown heat removal system design.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen. If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to GE would not occur.

In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gasses in Containment. However, Containment monitoring and/or sampling should be performed to verify this assumption and a General Emergency declared if it is determined that an explosive mixture exists.

EAL #2

Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

In the cold shutdown mode, normal RCS level and RPV level instrumentation systems will usually be available. In the refueling mode, normal means of RPV level indication may not be available. Redundant means of RPV level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the RPV lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

References:

COP-1050
NEDC-33045P
Calculation G13.18.9.4-047 Rev. 0

E-HU1

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Damage to a loaded cask CONFINEMENT BOUNDARY

Operating Mode Applicability: All

Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

Basis:

A NOUE in this IC is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

This EAL addresses a dropped cask, a tipped over cask, EXPLOSION, PROJECTILE damage, FIRE damage or natural phenomena affecting a cask (e.g., seismic event, tornado, etc.).

References:

EAL INSTRUMENTATION CROSS REFERENCE

Introduction

The following guidance is provided to aid in decision making regarding when compensatory actions are required for Out of Service (OOS) Emergency Action Level (EAL) equipment and what constitutes acceptable compensating actions. This enclosure is intended for operations use when assessing the impact of out of service EAL instruments. The criteria below are designed to address various situations within the EALs of the Entergy Nuclear plants and propose a means of dealing with each one. Allowed outage times (AOT) that are open-ended without compensating actions or greater than 7 days are not generally considered acceptable.

If any EAL equipment is out of service, compensating action should be put into place to provide alternative means of making an EAL declaration. In some cases, installed redundant equipment provides this compensation. In other cases, the TS or TRM provide alternate actions. The following general guidance addresses various situations and how to address them.

1. If an EAL entry condition is determined by a single instrument which has no Technical Requirements Manual (TRM) or Technical Specification (T/S) required compensatory action, then preplanned, documented compensatory actions should be provided to address the alternate means of making the EAL entry determination when the instrument is inoperable. This preplanned action should be implemented immediately upon removal of the instrument from service (or discovery that it is out of service).
2. If an EAL entry condition is determined by a single instrument which has a TRM or T/S required compensatory action, then that compensating action may be used as the alternative action for EAL entry provided that the compensatory action can be accomplished in a relatively / reasonably short time frame.
3. If an EAL entry condition is part of a statement with multiple OR clauses, each of which is directed at the same parameter, then each clause in the OR statement can be considered as compensatory action for the others, assuming the subject clause can itself be met (e.g. does not rely on the out of service instrument also).

EAL INSTRUMENTATION CROSS REFERENCE

4. If an EAL entry condition contains several different process monitoring instruments which are monitoring separate processes or parameters, but are grouped in the EAL so that any of them can initiate entry into the EAL, then they do not serve as compensating action for one another.
5. If an EAL entry condition is monitored by multiple instruments (at least two) no preplanned compensation is required, provided a TRM or T/S action exists (such as sampling) to address loss of both channels.
6. For multiple different parameters being monitored in a single instrument or redundant instruments, each of the parameters must have its own compensating action (e.g. different actions for the particulate, iodine and noble gas channels), since it is not necessarily true that all of the monitored parameters will react in the event of an increase in radiological effluents.
7. Compensating actions need not be based on an exact replication of the monitored parameter; a reasonable approximation can suffice in the case where only one instrument is installed and the parameter is not otherwise controlled.
8. Some EALs use parameters which will be indicated by multiple alarms and indications, some of which may require brief diagnostic efforts by the shift crew, or which may be determined by actions which are obvious and skill of the craft driven. These do not require preplanned documented contingencies, unless all means of determination are lost.

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
AU1 EAL 2 AA1 EAL 2	RMS-RE107 LWS-FE197 CWS-FE113	Liquid effluent radiological release	1. TR 3.3.11.2 LCO 2. If the instrument fails or exceeds the alarm setpoint during discharge, refer to Alarm Response Procedures, ARP-RMS-DSPL230 / 1LE107 and ARP-LWS-PNL187/4/A-4. 3. If the instrument is OOS prior to a batch discharge, TR provides contingency actions to allow discharge. 4. CSW-FT113 - Per TR if inoperable, estimate flow rate once every 4 hours during actual releases. Refer to ARP-LWS-PNL187/4/A-4 for low flow alarm on CSW-FT113. **5.** LWS-FE197 - Per TR if inoperable, estimate flow rate once every 4 hours during actual releases.
AU1 EAL 1 AA1 EAL 1	RMS-RE5A/5B RMS-RE6A/6B RMS-RE125/126	Gaseous effluent radiological release	TR 3.3.11.3 LCO TS 3.3.6.2 LCO Two channels use alternate channel Grab sample analysis
AS1 EAL 1 AS1 EAL 2 AG1 EAL 1 AG1 EAL 2	RMS-RE5A RMS-RE125	Gaseous effluent radiological release	TR 3.3.11.3 LCO TS 3.3.6.2 LCO Two channels use alternate channel (RMS-RE5B, RMS-RE126) to perform dose assessment IAW EIP-2-024 and classify on EAL 2 if conditions are met Field Monitoring Team survey/sample analysis and use FMT reading to perform dose assessment IAW EIP-2-024 and classify on EAL 2 if conditions are met or classify on EAL 3 if dose assessment is not available and conditions are met.
AS1 EAL 2 AG1 EAL 2	MMS - Meteorological Tower Any one of the following sources satisfy TRM requirements: RMS-DSPL232 AMI-80 local AMI-80 Control Room MMS-TR5/6 Instruments: MMS-TWR1 MMS-TR5 Primary Recorder MMS-TR6 Secondary Recorder	Actual Meteorological Data for Dose Assessment	TR 3.3.12 1. Refer to STP-000-0001 2. Procedures provide guidance to obtain the data. EAL is based on sustained (≥ 15 minutes in duration) hurricane force wind ≥ 74 mph to 89 mph. Other procedures give guidance to monitor the weather, AOP-0029, *Severe Weather Operation*, and ENS-EP-302, *Severe Weather Response*, and would be entered prior to wind speed of ≥ 74 mph. 1. If both channels are inoperable, call the National Weather Service or Baton Rouge Metropolitan Airport NWS - 9-1-504-522-7330 (daytime) Airport - 9-225-355-1066 Additional 24 hr numbers in Emergency Phone book 3. Weather for St. Francisville may be monitored on the internet at http://www.weather.com or a similar site from the NWS. 4. If one channel is inoperable or removed from service, use the redundant channel. Per the TRM, a channel check of

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
	MMS-ST1A 30 Primary WS transmitter MMS-SY1A -30 Primary WS processor module MMS-ST1B 30 Secondary WS transmitter MMS-SY1B -30 Secondary WS processor module MMS-ST2A 150 Primary WS transmitter MMS-SY2A -150 Primary WS processor module MMS-ST2B 150 Secondary WS transmitter MMS-SY2B -150 Secondary WS processor module		the operable channel is required once per 24 hrs. 5. If the AMI-80 MET printer/printout is out of service in the Control Room, obtain MET data from the AMI-80 in the Environmental Lab or locally at the Met Tower. MET data is also available from any DRMS or ERIS computer. Refer to EIP-2-024 Attachment 5 for guidance on obtaining data from ERIS computer. 6. EIP-2-024 Attachment 4 provides instructions for obtaining data from the National Weather Service and the alternate method of determining stability class for dose projections.
AU2 EAL 1 AA2 EAL 2	Area Radiation Monitor RMS-RE140 RMS-RE141 RMS-RE192 RMS-RE193	Area Radiation	Use portable monitors during fuel handling Use RE140 if RE141 OOS and RE141 if RE140 OOS Use RE192 if RE193 OOS and RE193 if RE192 OOS RP survey CUE to survey: Report of fuel handling accident Report of lowering pool level
AA2 EAL 2	RMS-RE5A RMS-RE5B	FB Effluent	RMS-RE5A / 5B Use operable channel TR 3.3.11.3 LCO TS 3.3.6.2 LCO
AU2 EAL 2 AA3 EAL 1	Area Radiation Monitor RMS-RE21A RMS-RE21B RMS-RE138 RMS-RE140 RMS-RE141 RMS-RE143 RMS-RE144 RMS-RE145 RMS-RE146 RMS-RE147 RMS-RE149 RMS-RE151	Area Radiation	Local RP survey Cue to survey: -Report of mishandling of radioactive material -Other indications of reactor coolant leak (i.e., area temperature, floor drain sump level) -Report from personnel transitioning the area of EAD indication of rising radiation levels

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
	RMS-RE152 RMS-RE162 RMS-RE164 RMS-RE165 RMS-RE166 RMS-RE200 RMS-RE201 RMS-RE202 RMS-RE203 RMS-RE204 RMS-RE210 RMS-RE211 RMS-RE212 RMS-RE213 RMS-RE214 RMS-RE215 RMS-RE216 RMS-RE217 RMS-RE218 RMS-RE219 RMS-RE170 RMS-RE167 RMS-RE181 RMS-RE182 RMS-RE186 RMS-RE187 RMS-RE188 RMS-RE191 RMS-RE192 RMS-RE193 RMS-RE195 RMS-RE196		
AU2 EAL 1 AA2 EAL 1	SFC-LT133 SFC-LT136 SFC-LT112 SFC-LT28A SFC-LT28B	Fuel Pools Level	TS 3.7.6 TS 3.9.6 TS 3.9.7 Redundant channels for Spent Fuel Pool (LT28A/B) For Refueling cavity and transfer pools in Modes 4 & 5,

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
			personnel observation or cameras. (irradiated fuel not stored in these pools in Modes 1, 2, or 3)
FPB - PC1	CMS-PT4A CMS-PT4B CMS-PR2A CMS-PR2B CMS-AR2A CMS-AR2B CMS-AT25A CMS-AT25B (CMS-P7A / B) RPV Pressure B21-PT078A-D SP Temperature CMS-RTD24A, C, E, G, J CMS-RTD24B, D, F, H, K CMS-TR24A CMS-TR24B	CNMT Pressure CNMT / DW hydrogen HCTL	Redundant channels, use other division. If P808 recorder PR2A and 2B (green pen) inoperable, use ERIS points CMSPY019 or CMSPY020 TR 3.3.14 - If P808 recorder AR2A and AR2B inoperable, use ERIS points or local indication on CMS-PNL12A/B TS 3.3.1.1 TS 3.6.2.1 RPV Pressure redundant RPS channels Redundant divisional channels
FPB PC2	B21-LTN044 C B21-LTN044 D B21-LTN044 E B21-R610C P601 B21-R610E P601 B21-R615 P601	RPV level FZ	TS 3.3.3.1.3 Redundant channels, use any of the following: B21-R610C indicator P601-17B B21-R610E indicator P601-20B B21-R615 recorder P601-20B ERIS point B21EA005 (R610C) ERIS point B21EA006 (R610D) ERIS point B21EA023 (R610E)
FPB PC3	P632/P642 Riley Temp Switches: RHR A E31-N608 RHR B E31-N610 MST E31-N604 RCIC E31-N602 RWCU P1A E31-N621 RWCU P1B E31-N622	PC isolation instruments fail safe Area temperature RHR rooms, RCIC, RWCU pump room, MST Area radiation level in RHR or RCIC	TS 3.3.6.1, TR 3.3.6.1 PC isolation instruments Isolation status: valve position indication Area Temperature: redundant channels use other division / fail safe instruments. If both channels inop, use area radiation and floor drain sump level as alternate indication for decision making. Area RAD monitors inop: local RP surveys Cues to survey: report of system leaks, rise in sump level, or rise in area temperature

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
	Area Radiation Monitors: RHR A RMS-RE213 RHR B RMS-RE214 RHR C RMS-RE215 RCIC RMS-RE219		
FPB - PC4	RMS-RE16A RMS-RE16B	CNMT Radiation level	TS 3.3.3.1 LCO TR 3.3.3.2 LCO Two channels use alternate channel PASS sample If both channel inop, have RP estimate CNMT radiation level per RPP-0098 Review radiological effluent release EALs
FPB PC5	N/A (ED discretion)		
FPB - FC1	N/A	Coolant activity	Sample analysis
FPB FC2	B21-LTN044 C B21-LTN044 D B21-LTN044 E B21-R610C P601 B21-R610E P601 B21-R615 P601	RPV level FZ	TS 3.3.3.1.3 Redundant channels, use any of the following: B21-R610C indicator P601-17B B21-R610E indicator P601-20B B21-R615 recorder P601-20B ERIS point B21EA005 (R610C) ERIS point B21EA006 (R610D) ERIS point B21EA023 (R610E)
FPB FC3	RMS-RE16A RMS-RE16B	CNMT Radiation level	TS 3.3.3.1 LCO TR 3.3.3.2 LCO Two channels use alternate channel PASS sample If both channel inop, have RP estimate CNMT radiation level per RPP-0098 Review radiological effluent release EALs
FPB FC4	N/A (ED discretion)		
FPB - RC1	C71-N650A P691 C71-N650B P692 C71-N650C P693 C71-N650D P694	DW pressure	TS 3.3.1.1 LCO, TS 3.3.6.1.1 TS 3.3.6.2 TS 3.3.7.1.1 Redundant channels

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
FPB RC2	B21-LTN044 C B21-LTN044 D B21-LTN044 E B21-R610C P601 B21-R610E P601 B21-R615 P601	RPV level FZ	TS 3.3.3.1.3 Redundant channels, use any of the following: B21-R610C indicator P601-17B B21-R610E indicator P601-20B B21-R615 recorder P601-20B ERIS point B21EA005 (R610C) ERIS point B21EA006 (R610D) ERIS point B21EA023 (R610E)
FPB RC3	MSL Flow E31-N686 A (B, C, D) MSL A E31-N687 A (B, C, D) MSL B E31-N688 A (B, C, D) MSL C E31-N689 A (B, C, D) MSL D MST temperature E31-R608 PT 1 E31-N604A (B, C, D, E, F) P632/P642 Riley Temp Switches: RHR A E31-N608 RHR B E31-N610 MST E31-N604 RCIC E31-N602 RWCU P1A E31-N621 RWCU P1B E31-N622 Area Radiation Monitors: RHR A RMS-RE213 RHR B RMS-RE214 RHR C RMS-RE215 RCIC RMS-RE219 HPCS RMS-RE217	MSL Hi Flow MST temp PC isolation instruments fail safe Area temperature RHR rooms, RCIC, RWCU pump room, MST Area RAD RHR and RCIC	TS 3.3.6.1 TR 3.3.6.1 Redundant channels for MSL flow and MST area temperature TS 3.3.6.1, TR 3.3.6.1 PC isolation instruments Isolation status: valve position indication Area Temperature: redundant channels use other division / fail safe instruments. If both channels inop, use AB area radiation and floor drain sump level as alternate indication for decision making. Area RAD monitors inop: local RP surveys
FPB - RC3	DFR-LT105 (DW) DFR-L107 (CNMT)	RCS leak in DW	TS 3.4.5 / 3.4.7 Sump level indications P870

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
	DFR-L128 (pedestal) Leakage Computer		DFR-LI105 (DW floor drain sump level) DFR-LI107 (CNMT floor drain sump level) DFR-LI128 (Pedestal floor drain sump level) ERIS computer points group DFR DFRLY001 DW DFRLY004 CNMT DFRLY005 Pedestal Manual calculation Use best judgment using alternate indications: 1. One DW floor drain sump pump cannot maintain or lower sump level with either pump running and <u>not</u> isolated 2. Both pumps running cannot lower sump level and <u>not</u> isolated
FPB RC4	RMS-RE20A RMS-RE20B	DW radiation levels	TS 3.3.3.1 LCO TR 3.3.3.2 LCO Two channels use alternate channel If both channel inop, have RP estimate DW radiation level per RPP-0098 Review radiological effluent release EALs
FPB RC5	N/A (ED discretion)		
HU1 EAL 1 HU1 EAL 2 HU1 EAL 3 HA1 EAL 1 HA1 EAL 2 HS1 HG1 EAL 1 HG1 EAL 2	N/A (Security events)		
HU2 HA2 HS2 HG2	N/A (ED discretion)		
HA3 HS3	N/A (control room evacuation)		
HU4 HA4	Fire Protection Supervisory Panel, RDAC panels, fire detectors, smoke detectors	Fire in PA	TR 3.3.7.4 Actions of LCO

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
			Refer to SOP-0036 and TR 3.3.7.4 for other detectors in the OOS zone.
HU5 HA5	N/A Portable instruments	Toxic, corrosive, asphyxiant or flammable gas	
HU6 EAL 1 HA6 EAL 1	Seismic Monitoring ERS-NBS4A ERS-NBS4B ERS-NBS2D ERS-NBE1A / ERS-NBR2H ERS-NBE1B/ ERS-NBR2I ERS-NBE1C/ ERS-NBR2J ERS-NBE1D/ERS-NBR2K ERS-NBI101 ERS-NBI102	Seismic event	TR 3.3.7.5 Felt earthquake Per AOP-0028, Seismic Event, and ARP P680/02A/B06, C06, and D06 ERS-NBS4A detects any event greater than 0.01g ERS-NBS4B detects OBE ERS-NBS2D detects OBE and SSE
HU6 EAL 2, 4 HA6 EAL 2, 4, 5	N/A (event based)		
HU6 EAL 3 HA6 EAL 3	DFR-LS2A (LPCS) DFR-LS2B (RHR A) DFR-LS2C (RCIC) DFR-LS2D (RHR C) DFR-LS2E (RHR B) DFR-LS2F (HPCS) DFR-LS8A (crescent area) DFR-LS8B (crescent area) Leakage Computer	Flooding in AB	Sump level indications P870 DFR-LI134 (LPCS) DFR-LI135 (RHR A) DFR-LI136 (RCIC) DFR-LI137 (RHR C) DFR-LI138E (RHR B) Back Panel P819 indications DFR-ES134 (LPCS) DFR-ES135 (RHR A) DFR-ES136 (RCIC) DFR-ES137 (RHR C) DFR-ES138 (RHR B) DFR-ES139 (HPCS) ERIS or PMS computer points group DFR Manual calculation Personnel observation and report
HU6 EAL 5 HA6 EAL 6	MMS - Meteorological Tower	Wind Speed	TR 3.3.12

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
	Any one of the following sources satisfy TRM requirements: RMS-DSPL232 AMI-80 local AMI-80 Control Room MMS-TR5/6 Instruments: MMS-TWR1 MMS-TR5 Primary Recorder MMS-TR6 Secondary Recorder MMS-ST1A 30 Primary WS transmitter MMS-SY1A -30 Primary WS processor module MMS-ST1B 30 Secondary WS transmitter MMS-SY1B -30 Secondary WS processor module MMS-ST2A 150 Primary WS transmitter MMS-SY2A -150 Primary WS processor module MMS-ST2B 150 Secondary WS transmitter MMS-SY2B -150 Secondary WS processor module		2. Refer to STP-000-0001 Step 66 3. Procedures provide guidance to obtain the data. EAL is based on sustained (≥ 15 minutes in duration) hurricane force wind ≥ 74 mph. Other procedures give guidance to monitor the weather, AOP-0029, *Severe Weather Operation*, and ENS-EP-302, *Severe Weather Response*, and would be entered prior to wind speed of ≥ 74 mph. 4. If both channels are inoperable, call the National Weather Service or Baton Rouge Metropolitan Airport NWS - 9-1-504-522-7330 (daytime) Airport - 9-225-355-1066 Additional 24 hr numbers in Emergency Phone book 5. Weather for St. Francisville may be monitored on the internet at http://www.weather.com or a similar site from the NWS. 6. If one channel is inoperable or removed from service, use the redundant channel. Per the TRM, a channel check of the operable channel is required once per 24 hrs. 7. If the AMI-80 MET printer/printout is out of service in the Control Room, obtain MET data from the AMI-80 in the Environmental Lab or locally at the Met Tower. MET data is also available from any DRMS or ERIS computer. Refer to EIP-2-024 Attachment 5 for guidance on obtaining data from ERIS computer. EIP-2-024 Attachment 4 provides instructions for obtaining data from the National Weather Service and the alternate method of determining stability class for dose projections.
SU1 SA1 SS1 SG1	N/A (loss of power)		
SU6 SA6 SS6	N/A (loss of annunciators/indications)		
SU7	Leak Detection System/Computer	RCS Leakage	TS 3.4.5 / 3.4.7

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
	DFR-LT105 DW FLR DFR-FT107 CNMT FLR DFR-LT128 Pedestal DER-LT118 DW EQ DER-LT119 CNMT EQ		Manual calculation per SOP P870 DFR-LI105 DW Floor Drain Sump level P870 DFR-LI128 Pedestal Floor Drain Sump level P870 DFR LI107 CNMT Floor Drain Sump level ERIS computer point DFRLY001 DW floor drain ERIS computer point DFRLY005 Pedestal floor drain ERIS computer point DFRLY004 CNMT floor drain Use best judgment using alternate indications of coolant leak: RMS-RE112 reading alert or alarm P642 E31A-FIM03 DW Air Clrs Cond Flow P691(P692, P693, P694) C71-N650A (B, C, D) DW pressure rise P625 B21-N667 C (G, L, R) DW pressure rise P618 (P629) B21-N694 A (E, B, F) DW pressure rise
	Acoustic monitors SVV-ZE10A-R Temp Recorder (Tail pipe temperatures) B21-R614	Stuck open SRV	Temp Recorder (Tail pipe temperatures) B21-R614 Acoustic monitors SVV-ZE10A-R
SU8	N/A (loss of communication capability)		Note: For loss of communication equipment, review for impact on security event EALs HU1, HA1, HS1, HG1
SU9	D17-REN012 D17-R604 D17-FI115 (OFG-PDIS117)	Fuel Clad Failure Offgas Pre-treat	TR 3.3.7.8.2 Grab sample analysis (EAL 2.3) Cues to take sample Post-treatment D17/R601A/B readings rise or MSL rad monitor D17-R610A/C reading rise
SU10	SRM A- D C51-K600 Period meter	Positive period	TS 3.3.1.2 LCO Actions
SU11	N/A (event based)		
SA3 SS3 SG3	P680 Full Core Display CR position indication APRM A H IRM A-H B21-LTN044 C FZ	ATWS Power level indication	TS/TR 3.3.4.1, 3.3.1.1 RACS cabinet P651 and/or P652 per SOP-0071 OD-7 printout from PPC or Cyclops IRM or APRM indication of power, multiple channels Redundant channels

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
	B21-LTN044 D FZ B21-LTN044 E FZ	RPV level	
SS4	N/A (loss of DC power)		
CU1 CU2 CA1 CS1 CG1	B21-LTN081A B, C, D (LVL 3) B21-LTN091A, E, B, F (LVL 2) B21-LTN044 C FZ B21-LTN044 D FZ B21-LTN044 E FZ	RPV level	TS 3.3.6.1 TS 3.3.3.1.3 Redundant channels
CU2	B21-LT-N027	Shutdown Range level	No compensatory instrument, OSM determine actions Report or observation on refuel floor Refuel floor area radiation level rise
CU3 CA3	E12-R601 E12-T/CN002A, B E12-T/CN004A, B	RCS Temperature	TS 3/4/11 TS LCO
CU5 CA5	N/A (loss of AC power to essential busses)		
CU6	N/A (loss of DC power)		
CU7	SRM A- D C51-K600 Period meter	Inadvertent Criticality (Positive period)	TS 3.3.1.2 LCO Actions
CU8	N/A (loss of communication capability)		Note: For loss of communication equipment, review for impact on security event EALs HU1, HA1, HS1, HG1
CS1 CG1	RMS-RE16A RMS-RE16B	CNMT Radiation level	TS 3.3.3.1 LCO TR 3.3.3.2 LCO Two channels use alternate channel PASS sample If both channel inop, have RP estimate CNMT radiation level per RPP-0098 Review radiological effluent release EALs
CG1	Area Radiation Monitors: RHR A RMS-RE213 RHR B RMS-RE214 RHR C RMS-RE215	Loss/potential loss of containment	RP survey Judgment of specific area using DRMS to observe radiation levels in surrounding areas. Monitor temperature in these areas.

EAL INSTRUMENTATION CROSS REFERENCE

EAL	EAL INSTRUMENT(S)	PARAMETER	COMPENSATORY MEASURE(S)
CG1	CMS-AR2A CMS-AR2B DMS-AT25A CMS-AT25B	Explosive mixture in containment	TR 3.3.14 - If P808 recorder AR2A and AR2B inoperable, use ERIS points or local indication on CMS-PNL12A/B
CG1	CMS-PT4A CMS-PT4B CMS-PR2A CMS-PR2B	Containment Pressure	Redundant channels, use other division. If P808 recorder PR2A and 2B (green pen) inoperable, use ERIS points CMSPY019 or CMSPY020
E-HU1	N/A		

EMERGENCY CLASSIFICATION USER AID 1 MODES 1 - 3

Plant Modes (white boxes indicate applicable modes)	1	Power Operations	2	Startup	3	Hot Shutdown	4	Cold Shutdown	5	Refuel	D	Defueled

ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENT — OPERATING MODES: 1 2 3 4 5 D

Radiological Effluents

GENERAL EMERGENCY — AG1 1 2 3 4 5 D

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology

Emergency Action Level: (1 or 2 or 3)

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on any of the radiation monitors in Table R1 > the GENERAL EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

SITE AREA EMERGENCY — AS1 1 2 3 4 5 D

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR thyroid CDE for the actual or projected duration of the release

Emergency Action Level(s) (1 or 2 or 3)

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

ALERT — AA1 1 2 3 4 5 D

Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for ≥ 15 minutes

Emergency Action Level(s): (1 or 2 or 3)

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any of the radiation monitors in Table R1 > the Alert reading for ≥ 15 minutes

OR

2. For RMS-RE107 effluent monitor:
   EITHER
   VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes
   OR
   VALID reading > 1.27E-01 µCi/ml for ≥ 15 minutes

OR

3. Confirmed sample analysis for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for ≥ 15 minutes

NOUE — AU1 1 2 3 4 5 D

Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for ≥ 60 minutes

Emergency Action Level(s): (1 or 2 or 3)

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any of the radiation monitors in Table R1 > the NOUE reading for ≥ 60 minutes

OR

2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 60 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times the ODCM limit for ≥ 60 minutes

Abnormal Radiation Levels

ALERT — AA2 1 2 3 4 5 D

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel

Emergency Action Level(s): (1 or 2)

1. A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered

OR

2. A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:
   - RMS-RE140 2000 mR/hr
   - RMS-RE141 2000 mR/hr
   - RMS-RE192 2000 mR/hr
   - RMS-RE193 2000 mR/hr
   - RMS-RE5A 1.64E+03µCi/sec
   - RMS-RE5B (GE) 5.29E-04µCi/ml

NOUE — AU2 1 2 3 4 5 D

UNPLANNED rise in plant radiation levels

Emergency Action Level(s): (1 or 2)

1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following:
   - Water level drop in the reactor refueling cavity, spent fuel pool, or fuel transfer canal indication on Control Room Panel 870
   - Personnel observation by visual or remote means.

   AND

   b. UNPLANNED VALID area radiation monitor alarm on any of the following:
   - RMS-RE140
   - RMS-RE141
   - RMS-RE192
   - RMS-RE193

OR

2. UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels

***NOTE:** For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.*

* Normal can be considered the highest reading in the past 24 hours excluding the current peak value.

ALERT — AA3 1 2 3 4 5 D

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

Emergency Action Level: (s)

1. Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:
   - Main Control Room
   - CAS

Table R1 EAL THRESHOLD

Method	GENERAL DRMS	GENERAL Threshold	SITE AREA DRMS	SITE AREA Threshold	ALERT DRMS	ALERT Threshold	NOUE DRMS	NOUE Threshold
Main Plant Primary / Secondary	4GE125 / N/A	4.70E+08µCi/sec	4GE125 / N/A	4.70E+07µCi/sec	4GE125 / 1GE126	3.06E+07µCi/sec / 2.82E-01µCi/ml	4GE125 / 1GE126	3.06E+05µCi/sec / 5.26E-03µCi/ml
FB Vent Primary / Secondary	4GE005 / N/A	6.70E+07µCi/sec	4GE005 / N/A	6.70E+06µCi/sec	4GE005 / 5GE005	2.19E+06µCi/sec / 2.82E-01µCi/ml	4GE005 / 5GE005	2.19E+04µCi/sec / 4.65E-03µCi/ml
RW Vent Primary / Secondary	N/A		N/A		4GE006 / 5GE006	2.58E+06µCi/sec / 6.84E-02µCi/ml	4GE006 / 5GE006	2.58E+04µCi/sec / 6.84E-04µCi/ml

FISSION PRODUCT BARRIER — OPERATING MODES: 1 2 3 4 5 D

FPB Loss / Potential Loss

GENERAL EMERGENCY — FG1 1 2 3 4 5 D

Loss of ANY two barriers AND loss or potential loss of third barrier

Emergency Action Level(s):

1. Loss of any two barriers
   AND
   Loss or potential loss of the third barrier

SITE AREA EMERGENCY — FS1 1 2 3 4 5 D

Loss or potential loss of ANY two barriers

Emergency Action Level(s):

1. Loss or potential loss of any two barriers

ALERT — FA1 1 2 3 4 5 D

ANY loss or ANY potential loss of EITHER fuel clad or RCS

Emergency Action Level(s):

1. Any loss or any potential loss of fuel clad
   OR
   Any loss or any potential loss of RCS

NOUE — FU1 1 2 3 4 5 D

ANY loss or ANY potential loss of containment

Emergency Action Level(s):

1. Any loss or any potential loss of containment

FUEL CLAD (FC) Barrier

Parameter	Loss	Potential Loss
FC1 Primary coolant activity level	Coolant activity > 300 µCi/gm dose equivalent I_{131}	None
FC2 Reactor vessel water level	RPV water level cannot be restored and maintained above -186 inches	RPV water level cannot be restored and maintained above -162 inches or cannot be determined
FC3 Primary containment radiation monitors	Containment radiation monitor RMS-RE16 reading > 3,000 R/hr	None
FC4 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier

REACTOR COOLANT SYSTEM (RC) Barrier

Parameter	Loss	Potential Loss
RC1 Drywell pressure	Drywell pressure > 1.68 psid with indications of reactor coolant leak in drywell.	None
RC2 Reactor vessel water level	RPV water level cannot be restored and maintained above -162 inches or cannot be determined	None
RC3 RCS Leak Rate	1. UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close **AND** High MSL flow annunciator (P601-19A-A2) **OR** 2. Indication of an UNISOLABLE HPCS, feedwater, RWCU or RCIC break **OR** 3. Emergency RPV depressurization is required	1. RCS leakage > 50 gpm inside the drywell **OR** 2. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Normal Operating Temperature (Table F2) **OR** b. Max Normal Area Radiation (Table F2)
RC4 Drywell radiation	Drywell radiation monitor RMS-RE20 reading > 100 R/hr due to reactor coolant leakage	None
RC5 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier

PRIMARY CONTAINMENT (PC) Barrier

Parameter	Loss	Potential Loss
PC1 Primary containment conditions	1. Rapid unexplained loss of PC pressure following initial pressure rise **OR** 2. PC pressure response not consistent with LOCA conditions	1. PC pressure > 15 psig and rising **OR** 2. a. PC hydrogen in the unsafe zone of HDOL curve **OR** b. DW hydrogen concentration > 9% **OR** 3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL
PC2 Reactor vessel water level	None	Entry into PC flooding procedures SAP-1 and SAP-2
PC3 Primary containment isolation failure or bypass	1. a. Failure of both valves in any one line to close **AND** b. Direct downstream pathway to the environment exists after PC isolation **OR** 2. Intentional PC venting per EOPs or SAPs **OR** 3. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Safe Operating Temperature (Table F1) **OR** b. Max Safe Area Radiation (Table F1)	None
PC4 Primary containment radiation monitors	None	Containment radiation monitor RMS-RE16 reading > 10,000 R/hr
PC5 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the Primary Containment barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Primary Containment barrier

TABLE F2 — RC 3 Potential Loss of RCS

Parameter	Area Temperature (isolation temperature alarm)	Area Radiation Level DRMS Grid 2	Max Normal Operating Value
RHR A equip area	117° F (P601-20A-B4)	1213	8.2E+01 mR/hr
RHR B equip area	117° F (P601-20A-B4)	1214	8.2E+01 mR/hr
RHR C equip area	N/A	1215	8.2E+01 mR/hr
RCIC room	182° F (P601-21A-B6)	1219	1.20E+02 mR/hr
MSL Tunnel	173° F (P601-19A-A1/A3/B1/B3)	N/A	
RWCU pump room 1 (A) / 2 (B)	165° F (P680-1A-A2/B2)	N/A	

TABLE F1 — PC 3 Loss of Primary Containment

Parameter	Area Temperature Max Safe Operating Value	Area Radiation Level DRMS Grid 2	Max Safe Operating Value
RHR A equip area	200° F	1213	9.5E+03 mR/hr
RHR B equip area	200° F	1214	9.5E+03 mR/hr
RHR C equip area	N/A	1215	9.5E+03 mR/hr
RCIC room	200° F	1219	9.5E+03 mR/hr
MSL Tunnel	200° F	N/A	
RWCU pump room 1 (A) / 2 (B)	200° F	N/A	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY — OPERATING MODES: 1 2 3 4 5 D

Security

GENERAL EMERGENCY — HG1 1 2 3 4 5 D

HOSTILE ACTION resulting in loss of physical control of the facility

Emergency Action Level(s): (1 or 2)

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions

OR

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool

SITE AREA EMERGENCY — HS1 1 2 3 4 5 D

HOSTILE ACTION within the PROTECTED AREA

Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision

ALERT — HA1 1 2 3 4 5 D

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat

Emergency Action Level(s): (1 or 2)

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision

OR

2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site

NOUE — HU1 1 2 3 4 5 D

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant

Emergency Action Level(s): (1 or 2 or 3)

1. A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the RBS security shift supervision

OR

2. A credible site specific security threat notification

OR

3. A validated notification from NRC providing information of an aircraft threat

Discretionary

GENERAL EMERGENCY — HG2 1 2 3 4 5 D

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area

SITE AREA EMERGENCY — HS2 1 2 3 4 5 D

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or: (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY

ALERT — HA2 1 2 3 4 5 D

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels

NOUE — HU2 1 2 3 4 5 D

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs

Control Room Evacuation

SITE AREA EMERGENCY — HS3 1 2 3 4 5 D

Control room evacuation has been initiated and plant control cannot be established

Emergency Action Level(s):

1. a. Control room evacuation has been initiated
   AND
   b. Control of the plant cannot be established in accordance with AOP-0031, Shutdown from Outside the Main Control Room, within 15 minutes

ALERT — HA3 1 2 3 4 5 D

Control room evacuation has been initiated

Emergency Action Level(s):

1. AOP-0031, Shutdown from Outside the Main Control Room requires Control Room evacuation

Fire

ALERT — HA4 1 2 3 4 5 D

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown

Emergency Action Level(s):

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems

NOUE — HU4 1 2 3 4 5 D

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA

Emergency Action Level(s): (1 or 2)

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed, the applicable time.*

1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area

OR

2. EXPLOSION within the PROTECTED AREA

Toxic or Flammable Gasses

ALERT — HA5 1 2 3 4 5 D

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor

Emergency Action Level(s):

***NOTE:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.*

1. Access to Main Control Room, Auxiliary Building, or 95' Control Building is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor

NOUE — HU5 1 2 3 4 5 D

Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS

Emergency Action Level(s) (1 or 2)

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS

OR

2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an offsite event

Natural or Destructive Phenomena

ALERT — HA6 1 2 3 4 5 D

Natural or destructive phenomena affecting VITAL AREAS

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by:
   Annunciator "Seismic Tape Recording System Start" (P680-02A-D06)
   AND
   Event Indicator on ERS-NBI-102 is white
   AND
   Receipt of **EITHER** 1 **OR** 2:
   1. Annunciator "Seismic Event High" (P680-02A-C06)
   2. Annunciator "Seismic Event High-High" (P680-02A-B06) **AND** amber light(s) on panel NBI-101

   AND

   b. Earthquake confirmed by any of the following:
   - Earthquake is felt in plant
   - National Earthquake Center
   - Control Room indication of degraded performance of systems required for safe shutdown of the plant

OR

2. Tornado striking resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

3. Internal flooding in Auxiliary Building 70 ft elevation resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

OR

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

6. Hurricane or high SUSTAINED wind conditions ≥ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

NOUE — HU6 1 2 3 4 5 D

Natural or destructive phenomena affecting the PROTECTED AREA

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)

1. Seismic event identified by any 2 of the following:
   - Seismic event confirmed by activated seismic switch as indicated by receipt of **EITHER** a **OR** b:
     a. Annunciator "Seismic Tape Recording SYS Start" (P680-02A-D06)
     b. Event Indicator on ERS-NBI-102 is white
   - Earthquake felt in plant
   - National Earthquake Center

OR

2. Tornado striking within the PROTECTED AREA boundary

OR

3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area

OR

4. Turbine failure resulting in casing penetration or damage to turbine or generator seals

OR

5. Severe weather or hurricane conditions with indication of SUSTAINED high winds ≥ 74 mph within the PROTECTED AREA boundary

Table H2 — Structures Containing Functions or Systems Required for Safe Shutdown

Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G)
Fuel Building	

Table H1 — Uncontrolled Flooding Threshold Area Water Level

Affected Location / Parameter	Max Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Room 70'EL	4 inches above floor (P870-51A-G4)
RHR A Room 70'EL	4 inches above floor (P870-51A-G4)
RHR B Room 70'EL	4 inches above floor (P870-51A-G4)
RHR C Room 70'EL	4 inches above floor (P870-51A-G4)
LPCS Room 70'EL	4 inches above floor (P870-51A-G4)
RCIC Room 70'EL	4 inches above floor (P870-51A-G4)

EVENTS RELATED TO ISFSI — OPERATING MODES: 1 2 3 4 5 D

Cask Damage

NOUE — E-HU1 1 2 3 4 5 D

Damage to a loaded cask CONFINEMENT BOUNDARY

Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY

SYSTEM MALFUNCTION — OPERATING MODES: 1 2 3 4 5 D

Loss of AC Power

GENERAL EMERGENCY — SG1 1 2 3 4 5 D

Prolonged loss of all offsite and all onsite AC power to emergency busses

Emergency Action Level(s):

1. a. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses
   AND
   b. Either of the following:
   - Restoration of at least one emergency bus in < 4 hours is not likely
   OR
   - RPV level cannot be maintained > -162 inches.

SITE AREA EMERGENCY — SS1 1 2 3 4 5 D

Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes

Emergency Action Level(s):

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. Loss of all offsite power and all onsite AC power to Div I, II and III ENS busses for ≥ 15 minutes

ALERT — SA1 1 2 3 4 5 D

AC power capability to emergency busses reduced to a single power source for ≥ 15 minutes such that any additional single failure would result in station blackout

Emergency Action Level(s):

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for ≥ 15 minutes
   AND
   b. Any additional single failure will result in a station blackout

NOUE — SU1 1 2 3 4 5 D

Loss of all offsite AC power to emergency busses for ≥ 15 minutes

Emergency Action Level(s):

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. Loss of all offsite AC power to Div I and II ENS busses for ≥ 15 minutes

Failure of Reactor Protection System

GENERAL EMERGENCY — SG3 1 2 3 4 5 D

Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor
   AND
   b. All manual actions do not shutdown the reactor as indicated by reactor power ≥ 5%
   AND
   c. Either of the following exist or have occurred due to continued power generation:
   - Core cooling is extremely challenged as indicated by RPV level cannot be restored and maintained > -186 inches
   OR
   - Heat removal is extremely challenged as indicated by RPV pressure and Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone

SITE AREA EMERGENCY — SS3 1 2 3 4 5 D

Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are not successful in shutting down the reactor

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor
   AND
   b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power ≥ 5%

ALERT — SA3 1 2 3 4 5 D

Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor
   AND
   b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%

Loss of DC Power

SITE AREA EMERGENCY — SS4 1 2 3 4 5 D

Loss of all vital DC power for ≥ 15 minutes

Emergency Action Level(s):

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. < 105 VDC on all vital DC busses ≥ 15 minutes

Loss of Annunciation / Indication

SITE AREA EMERGENCY — SS6 1 2 3 4 5 D

Inability to monitor a SIGNIFICANT TRANSIENT in progress

Emergency Action Level(s):

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. UNPLANNED loss of > approximately 75% of the following for ≥ 15 minutes:
   - Control Room safety system annunciation
   OR
   - Control Room safety system indication

   AND

   b. A SIGNIFICANT TRANSIENT is in progress
   AND
   c. Compensatory indications are unavailable

ALERT — SA6 1 2 3 4 5 D

UNPLANNED loss of safety system annunciation or indication in the control room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory non-alarming indicators are not available

Emergency Action Level(s):

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. a. UNPLANNED loss of > approximately 75% of the following for ≥ 15 minutes:
   - Control Room safety system annunciation
   OR
   - Control Room safety system indication

   AND

   b. Either of the following:
   - A SIGNIFICANT TRANSIENT is in progress
   OR
   - Compensatory indications unavailable

NOUE — SU6 1 2 3 4 5 D

UNPLANNED loss of safety system annunciation or indication in the Control Room for ≥ 15 minutes

Emergency Action Level(s):

***NOTE:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.*

1. UNPLANNED loss of > approximately 75% of the following for ≥ 15 minutes:
   a. Control Room safety system annunciation
   OR
   b. Control Room safety system indication

RCS Leakage

NOUE — SU7 1 2 3 4 5 D

RCS leakage

Emergency Action Level(s): (1 or 2)

***NOTE:** A relief valve that operates and fails to close per design should be considered applicable if the relief valve cannot be isolated.*

1. Unidentified or pressure boundary leakage > 10 gpm

OR

2. Identified leakage > 35 gpm

Loss of Communication

NOUE — SU8 1 2 3 4 5 D

Loss of all onsite or offsite communication capabilities

Emergency Action Level(s): (1 or 2)

1. Loss of all of the following onsite communications methods affecting the ability to perform routine operations:
   - Plant radio system
   - Plant paging system
   - Sound powered phones
   - In-plant telephones

OR

2. Loss of all of the following offsite communications methods affecting the ability to perform offsite notifications:
   - All telephones
   - NRC phones
   - State of Louisiana Radio
   - Offsite notifications system and hotline

Cladding Degradation

Table S1

Flow (cfm)	Dose Rate (mR/hr)
≤15	9000
>15-17	8000
>17-20	7000
>20-25	5000
>25-30	4000
>30-60	2000
>60-140	1000
>140-200	700

NOUE — SU9 1 2 3 4 5 D

Fuel clad degradation

Emergency Action Level(s): (1 or 2)

1. Offgas pre-treatment radiation monitor reading > the Table S1 Dose Rate Limit for the actual indicated offgas flow indicating fuel clad degradation > T.S. allowable limits

OR

2. Reactor coolant sample activity value indicating fuel clad degradation > T.S. allowable limits
   - > 4.0 µCi/gm dose equivalent I-131
   OR
   - > 0.2 µCi/gm dose equivalent I-131 for > 48 hours

Inadvertent Criticality

NOUE — SU10 1 2 3 4 5 D

Inadvertent criticality

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

TECH SPEC Time Limit Exceeded

NOUE — SU11 1 2 3 4 5 D

Inability to reach required operating mode within Technical Specification limits

Emergency Action Level(s):

1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement time

EMERGENCY CLASSIFICATION USER AID 2 MODES 4, 5, and Defueled

Plant Modes (white boxes indicate applicable modes)	1	Power Operations	2	Startup	3	Hot Shutdown	4	Cold Shutdown	5	Refuel	D	Defueled

ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENT — OPERATING MODES: 1 2 3 4 5 D

Radiological Effluents

GENERAL EMERGENCY

AG1 (1 2 3 4 5 D)

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology

Emergency Action Level: (1 or 2 or 3)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on any of the radiation monitors in Table R1 > the GENERAL EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

SITE AREA EMERGENCY

AS1 (1 2 3 4 5 D)

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR thyroid CDE for the actual or projected duration of the release

Emergency Action Level(s) (1 or 2 or 3)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

ALERT

AA1 (1 2 3 4 5 D)

Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for ≥ 15 minutes

Emergency Action Level(s): (1 or 2 or 3)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any of the radiation monitors in Table R1 > the Alert reading for ≥ 15 minutes

OR

2. For RMS-RE107 effluent monitor:
   EITHER
   VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes
   OR
   VALID reading > 1.27E-01 μCi/ml for ≥ 15 minutes

OR

3. Confirmed sample analysis for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for ≥ 15 minutes

NOUE

AU1 (1 2 3 4 5 D)

Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for ≥ 60 minutes

Emergency Action Level(s): (1 or 2 or 3)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.*

1. VALID reading on any of the radiation monitors in Table R1 > the NOUE reading for ≥ 60 minutes

OR

2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 60 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times the ODCM limit for ≥ 60 minutes

Abnormal Radiation Levels

ALERT

AA2 (1 2 3 4 5 D)

Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel

Emergency Action Level(s): (1 or 2)

1. A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered

OR

2. A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:
   - RMS-RE140 2000 mR/hr
   - RMS-RE141 2000 mR/hr
   - RMS-RE192 2000 mR/hr
   - RMS-RE193 2000 mR/hr
   - RMS-RE5A 1.64E+03μCi/sec
   - RMS-RE5B (GE) 5.29E-04μCi/ml

AA3 (1 2 3 4 5 D)

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

Emergency Action Level: (s)

1. Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:
   - Main Control Room
   - CAS

NOUE

AU2 (1 2 3 4 5 D)

UNPLANNED rise in plant radiation levels

Emergency Action Level(s): (1 or 2)

1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following:
   - Water level drop in the reactor refueling cavity, spent fuel pool, or fuel transfer canal indication on Control Room Panel 870
   - Personnel observation by visual or remote means.

   AND

   b. UNPLANNED VALID area radiation monitor alarm on any of the following:
   - RMS-RE140
   - RMS-RE141
   - RMS-RE192
   - RMS-RE193

OR

2. UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels

NOTE: *For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.*

* Normal can be considered the highest reading in the past 24 hours excluding the current peak value.

Table R1 EAL THRESHOLD

Method	GENERAL DRMS	GENERAL Threshold	SITE AREA DRMS	SITE AREA Threshold	ALERT DRMS	ALERT Threshold	NOUE DRMS	NOUE Threshold
Main Plant Primary / Secondary	4GE125 N/A	4.70E+08μCi/sec	4GE125 N/A	4.70E+07μCi/sec	4GE125 1GE126	3.06E+07μCi/sec 2.82E-01μCi/ml	4GE125 1GE126	3.06E+05μCi/sec 5.26E-03μCi/ml
FB Vent Primary / Secondary	4GE005 N/A	6.70E+07μCi/sec	4GE005 N/A	6.70E+06μCi/sec	4GE005 5GE005	2.19E+06μCi/sec 2.82E-01μCi/ml	4GE005 5GE005	2.19E+04μCi/sec 4.65E-03μCi/ml
RW Vent Primary / Secondary	N/A		N/A		4GE006 5GE006	2.58E+06μCi/sec 6.84E-02μCi/ml	4GE006 5GE006	2.58E+04μCi/sec 6.84E-04μCi/ml

EVENTS RELATED TO ISFSI — OPERATING MODES: 1 2 3 4 5 D

Confinement Boundary damage / loss

NOUE

E-HU1 (1 2 3 4 5 D)

Damage to a loaded cask CONFINEMENT BOUNDARY

Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY — OPERATING MODES: 1 2 3 4 5 D

Security

GENERAL EMERGENCY

HG1 (1 2 3 4 5 D)

HOSTILE ACTION resulting in loss of physical control of the facility

Emergency Action Level(s): (1 or 2)

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions

OR

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool

SITE AREA EMERGENCY

HS1 (1 2 3 4 5 D)

HOSTILE ACTION within the PROTECTED AREA

Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision

ALERT

HA1 (1 2 3 4 5 D)

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat

Emergency Action Level(s): (1 or 2)

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision

OR

2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site

NOUE

HU1 (1 2 3 4 5 D)

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant

Emergency Action Level(s): (1 or 2 or 3)

1. A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the RBS security shift supervision

OR

2. A credible site specific security threat notification

OR

3. A validated notification from NRC providing information of an aircraft threat

Discretionary

HG2 (1 2 3 4 5 D)

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area

HS2 (1 2 3 4 5 D)

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or: (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY

HA2 (1 2 3 4 5 D)

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels

HU2 (1 2 3 4 5 D)

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE

Emergency Action Level(s):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs

Control Room Evacuation

HS3 (1 2 3 4 5 D)

Control room evacuation has been initiated and plant control cannot be established

Emergency Action Level(s):

1. a. Control room evacuation has been initiated

   AND

   b. Control of the plant cannot be established in accordance with AOP-0031, Shutdown from Outside the Main Control Room, within 15 minutes

HA3 (1 2 3 4 5 D)

Control room evacuation has been initiated

Emergency Action Level(s):

1. AOP-0031, Shutdown from Outside the Main Control Room requires Control Room evacuation

Fire

HA4 (1 2 3 4 5 D)

FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown

Emergency Action Level(s):

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems

HU4 (1 2 3 4 5 D)

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA

Emergency Action Level(s): (1 or 2)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed, the applicable time.*

1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area

OR

2. EXPLOSION within the PROTECTED AREA

Toxic or Flammable Gasses

HA5 (1 2 3 4 5 D)

Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor

Emergency Action Level(s):

NOTE: *If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.*

1. Access to Main Control Room, Auxiliary Building, or 95' Control Building is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor

HU5 (1 2 3 4 5 D)

Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS

Emergency Action Level(s) (1 or 2)

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS

OR

2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an offsite event

Natural or Destructive Phenomena

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown

Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G)
Fuel Building	

HA6 (1 2 3 4 5 D)

Natural or destructive phenomena affecting VITAL AREAS

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)

1.a. Seismic event > Operating Basis Earthquake (OBE) as indicated by:
   Annunciator "Seismic Tape Recording System Start" (P680-02A-D06)
   AND
   Event Indicator on ERS-NBI-102 is white
   AND
   Receipt of **EITHER** 1 **OR** 2:
   1. Annunciator "Seismic Event High" (P680-02A-C06)
   2. Annunciator "Seismic Event High-High" (P680-02A-B06) **AND** amber light(s) on panel NBI-101

   AND

   b. Earthquake confirmed by any of the following:
   - Earthquake is felt in plant
   - National Earthquake Center
   - Control Room indication of degraded performance of systems required for safe shutdown of the plant

OR

2. Tornado striking resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

3. Internal flooding in Auxiliary Building 70 ft elevation resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

OR

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

6. Hurricane or high SUSTAINED wind conditions ≥ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

HU6 (1 2 3 4 5 D)

Natural or destructive phenomena affecting the PROTECTED AREA

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)

1. Seismic event identified by any 2 of the following:
   - Seismic event confirmed by activated seismic switch as indicated by receipt of **EITHER** a **OR** b:
     a. Annunciator "Seismic Tape Recording SYS Start" (P680-02A-D06)
     b. Event Indicator on ERS-NBI-102 is white
   - Earthquake felt in plant
   - National Earthquake Center

OR

2. Tornado striking within the PROTECTED AREA boundary

OR

3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area

OR

4. Turbine failure resulting in casing penetration or damage to turbine or generator seals

OR

5. Severe weather or hurricane conditions with indication of SUSTAINED high winds ≥ 74 mph within the PROTECTED AREA boundary

Table H1 Uncontrolled Flooding Threshold Area Water Level

Affected Location / Parameter	Max Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Room 70'EL	4 inches above floor (P870-51A-G4)
RHR A Room 70'EL	4 inches above floor (P870-51A-G4)
RHR B Room 70'EL	4 inches above floor (P870-51A-G4)
RHR C Room 70'EL	4 inches above floor (P870-51A-G4)
LPCS Room 70'EL	4 inches above floor (P870-51A-G4)
RCIC Room 70'EL	4 inches above floor (P870-51A-G4)

COLD SHUTDOWN / REFUELING — OPERATING MODES: 1 2 3 4 5 D

Loss of RCS/RPV Inventory

GENERAL EMERGENCY

CG1 (1 2 3 4 5 D)

Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged

Emergency Action Level(s): (1 or 2)

1. a. RPV level < -162 inches (TAF) for ≥ 30 minutes

   AND

   b. Any containment challenge indication in Table C1

OR

2. a. RCS level cannot be monitored with core uncovery indicated by any of the following for ≥ 30 minutes:
   - RMS-RE16 reading > 100 R/hr
   - Erratic source range monitor indication
   - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

   AND

   b. Any containment challenge indication in Table C1

Table C1 Containment Challenge Indications

- CONTAINMENT CLOSURE not established
- Explosive mixture inside containment
- UNPLANNED rise in containment pressure
- Secondary containment area radiation monitor above EOP Max Safe Operating Value below:

Area	DRMS Grid 2	Max Safe Operating Value
RHR Equip Rm A	1213	9.5E+03 mR/hr
RHR Equip Rm B	1214	9.5E+03 mR/hr
RHR Equip Rm C	1215	9.5E+03 mR/hr

SITE AREA EMERGENCY

CS1 (1 2 3 4 5 D)

Loss of RCS/RPV inventory affecting core decay heat removal capability

Emergency Action Level(s): (1 or 2 or 3)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. With CONTAINMENT CLOSURE not established, UNPLANNED RPV level < -49 inches

OR

2. With CONTAINMENT CLOSURE established, RPV level < -162 inches (TAF)

OR

3. RCS level cannot be monitored for ≥ 30 minutes with a loss of RCS inventory as indicated by any of the following:
   - RMS-RE16 reading > 100 R/hr
   - Erratic Source Range Monitor indication
   - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

ALERT

CA1 (1 2 3 4 5 D)

Loss of RCS inventory

Emergency Action Level(s): (1 or 2)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED loss of RCS inventory as indicated by RPV level < -43 inches (Level 2)

OR

2. RCS level cannot be monitored for ≥ 15 minutes with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

NOUE

CU1 (1 2 3 4 5 D)

RCS leakage

Emergency Action Level(s):

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. RCS leakage results in the inability to maintain or restore RPV level > +9.7 inches (Level 3) for ≥ 15 minutes

CU2 (1 2 3 4 5 D)

UNPLANNED loss of RCS/RPV inventory

Emergency Action Level(s): (1 or 2)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. UNPLANNED RCS level drop as indicated by either of the following:
   a. RCS water level drop below the RPV flange for ≥ 15 minutes when the RCS level band is established above the RPV flange
   OR
   b. RCS water level drop below the RPV level band for ≥ 15 minutes when the RCS level band is established below the RPV flange

OR

2. RCS level cannot be monitored with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Loss of Decay Heat Removal

CA3 (1 2 3 4 5 D)

Inability to maintain plant in cold shutdown

Emergency Action Level(s): (1or 2)

1. An UNPLANNED event results in RCS temperature > 200 °F > the specified duration in Table C2

OR

2. An UNPLANNED event results in RCS pressure rise > 10 psig due to a loss of RCS cooling

Table C2 RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not intact	Established	20 minutes*
	Not Established	0 minutes

*If and RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.

CU3 (1 2 3 4 5 D)

UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV

Emergency Action Level(s): (1 or 2)

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. An UNPLANNED event results in RCS temperature exceeding 200°F

OR

2. Loss of all RCS temperature and RCS/RPV level indication for ≥ 15 minutes

Loss of AC Power

CA5 (1 2 3 4 5 D)

Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes

Emergency Action Level(s):

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. Loss of all offsite and all onsite AC power to Div I and Div II ENS busses for ≥ 15 minutes

CU5 (1 2 3 4 5 D)

AC power capability to emergency busses reduced to a single power source for ≥ 15 minutes such that any additional single failure would result in station blackout

Emergency Action Level(s):

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for ≥ 15 minutes

   AND

   b. Any additional single power source failure will result in station blackout

Loss of DC Power

CU6 (1 2 3 4 5 D)

Loss of required DC power for ≥ 15 minutes

Emergency Action Level(s):

NOTE: *The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.*

1. < 105 VDC on required Vital DC busses for ≥ 15 minutes

Inadvertent Criticality

CU7 (1 2 3 4 5 D)

Inadvertent criticality

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

Loss of Communications

CU8 (1 2 3 4 5 D)

Loss of all onsite or offsite communications capabilities

Emergency Action Level(s): (1 or 2)

1. Loss of all of the following onsite communication methods affecting the ability to perform routine operations:
   - Plant radio system
   - Plant paging system
   - Sound powered phones
   - In-plant telephones

OR

2. Loss of all of the following offsite communication methods affecting the ability to perform offsite notifications:
   - All telephones
   - NRC phones
   - State of Louisiana Radio
   - Offsite notification system and hotline

EIP-2-001 ATT 10 USER AID 2 Revision D

PROCEDURE ACTION REQUEST FORM
(Typical)

ENTERGY

PAR

Page 1 of 1

Procedure Action Request

PROCEDURE NO.	CURRENT REV.	PROCEDURE TITLE
EIP-2-001	23	Classification of Emergencies

TYPE OF ACTION:

☒ PROCEDURE REVISION (PR)
☐ NEW PROCEDURE (NP) ☐ CANCEL PROCEDURE (CX)

DESCRIBE ACTION:

1. The changes on pages 53 and 66 of the numbering format of the EAL Threshold for the loss of RC3. Item 1.a. was changed to 1, Item 1.b. was changed to 2, and item 2. was changed to 3. These changes are considered numbering changes in accordance with Regulatory Guide 1.219. The EAL Threshold for the loss of RC3 now read 1. OR 2. OR 3. rather than 1.a OR 1.b OR 2. These changes were done to improve the human factoring for the use of the EAL and do not change the intent of the EAL.

2. Pg. 67 – EAL Bases (Table F2) -- Main Steam Line Tunnel temperature changed from 144°F to 173°F.

3. Pg. 110 -- EAL Bases (SU7) – Added the following statements to the "Basis" section:

   The 15 minute EAL assessment period begins when the relief valve should have closed. An attempt for isolation from the Control Room should be made prior to classification. If operator actions from the Control Room are successful within the 15 minute EAL assessment period, this threshold is not applicable. Credit is not given for operator actions taken outside the Control Room.

4. Pg. 127 -- EAL Bases (SG3) – Added the following statement to section 1.c:

   Core cooling is extremely challenged as indicated by RPV level cannot be "restored and" maintained >-186 inches.

5. Revised all sections and attachments of EIP-2-001, Classification of Emergencies based on the change from NEI 99-01 Revision 4 EALs to NEI 99-01 Revision 5 EALs.

☒ PAD COMPLETED (EN-LI-100-ATT-9.1) ☒ 50.54Q REVIEW COMPLETED, (EN-EP-305)

☒ LICENSING COMMITMENTS VERIFIED ☒ CROSS DISCIPLINE REVIEW (if applicable)

REVIEW AND APPROVAL:

SIGNATURE / KCN / DATE

PREPARER Aaron Magee 1350 10/31/12

TECHNICAL REVIEWER Norman E Tison Norman E Tison 1492 10/31/12

EP MANAGER /Dee Burnett/0201/10/31/12

EFFECTIVE DATE: 11/15/12

CROSS DISCIPLINE REVIEW FORM (TYPICAL)

PROCEDURE EIP-2-001 REVISION 24

PART 1 CROSS DISCIPLINE REVIEW

Cross Discipline Review Group	**Cross Discipline Reviewer**
Operations	672 Glenn Krause

PART 2 RETURN

RETURN TO: EP MAIL CODE: R-TC-02 BY: 10/31/12

PART 3 REVIEW SUMMARY

YES ☒	NO ☐	Submitted procedure changes are consistent with departmental processes. If "no", comment below:

Comments:

N/A

YES ☐	NO ☒	Changes to other department procedures must be made due to the submitted procedure change. If "yes", list description of required changes and tracking numbers below:

Description of required procedure changes
(preparer should identify effected procedures first, reviewer should identify any additional procedures):

N/A

Other Comments:

None

REVIEWED BY: ______________ 1350 10/31/12

SIGNATURE KCN/DATE

ATTACHMENT 9.1 PROCESS APPLICABILITY DETERMINATION FORM

I. OVERVIEW

PAD Rev. #:______

Facility: River Bend Station

Proposed Activity / Document: EIP-2-001 **Change/Rev. #:** 24

Description of Proposed Activity:

1. The changes on pages 53 and 66 of the numbering format of the EAL Threshold for the loss of RC3. Item 1.a. was changed to 1, Item 1.b. was changed to 2, and item 2. was changed to 3. These changes are considered numbering changes in accordance with Regulatory Guide 1.219. The EAL Threshold for the loss of RC3 now read 1. OR 2. OR 3. rather than 1.a OR 1.b OR 2. These changes were done to improve the human factoring for the use of the EAL and do not change the intent of the EAL.

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5. Revised all sections and attachments of EIP-2-001, Classification of Emergencies based on the change from NEI 99-01 Revision 4 EALs to NEI 99-01 Revision 5 EALs.

II. DOCUMENT REVIEW

Provide the requested information for each item below.

1. For documents available electronically:

a. List search engine or documents searched, and keywords used:

Performed Autonomy 50.9 search of the Emergency Plan, Technical Requirements Manual, Tech Spec Bases, Operating Bases, COLR, ODCM, and NRC Orders.

Keywords used: "EAL", "EAL Bases", "Main Steam Tunnel", "144°F", "173°F", "relief valve"

No relevant hits.

b. List relevant sections of controlled electronic documents reviewed:

Emergency Plan

2. **Documents reviewed manually (hardcopy):**

   Emergency Plan

3. **For those documents that are not reviewed either electronically or manually, use the specific questions provided in Sections III and IV of Attachment 9.2 of EN-LI-100 as needed. Document below the extent to which the Attachment 9.2 questions were used.**

   Attachment 9.2 questions were used in their entirety, including for those documents reviewed electronically.

III. PROCESS REVIEW

Does the proposed activity affect, invalidate, or render incorrect, OR have the potential to affect, invalidate, or render incorrect, information contained in any of the following processes? Associated regulations and procedures are identified with each process below.

PROCESS (Regulations / Procedures)	YES	NO	REVIEW RESULTS
Chemistry / Effluents	☐	☒	
Radwaste / Process Control Program (PCP) (EN-RW-105 or contact the Radiation Protection Dept.)	☐	☒	
Radiation Protection / ALARA (10 CFR 20 / EN-RP-110 or contact the Radiation Protection Dept.)	☐	☒	
Inservice Inspection Program (10 CFR 50.55a / EN-DC-120, -351)	☐	☒	
Inservice Testing Program (10 CFR 50.55a / EN-DC-332)	☐	☒	
Maintenance Rule Program (10 CFR 50.65 / EN-DC-203, -204, -205, -206, -207)	☐	☒	
Containment Leakage Rate Testing (Appendix J) Program (10 CFR 50 Appendix J / EN-DC-334)	☐	☒	

IF any box is checked "Yes," THEN contact the appropriate department to ensure that the proposed change is acceptable and document the results in the REVIEW RESULTS column.

ATTACHMENT 9.1 PROCESS APPLICABILITY DETERMINATION FORM

IV. LICENSING BASIS DOCUMENT REVIEW

Does the proposed activity affect, invalidate, or render incorrect, OR have the potential to affect, invalidate, or render incorrect, information contained in any of the following Licensing Basis Document(s)? Associated regulations and procedures are identified with each Licensing Basis Document below.

LICENSING BASIS DOCUMENTS (Regulations / Procedures)	YES	NO	REVIEW RESULTS OR SECTIONS AFFECTED OR LBDCR #
Quality Assurance Program Manual (QAPM) (10 CFR 50.54(a) / EN-QV-104)	☐	☒	
Fire Protection Program (FPP) [includes the Fire Hazards Analysis (FHA)] (OL Condition, 10 CFR 50.48 / EN-DC-128)	☐	☒	
Emergency Plan (10 CFR 50.54(q) / EN-EP-305)	☒	☐	
Environmental Protection Plan (Appendix B of the OL, Environmental Evaluation / EN-EV-115, EN-EV-117, EN-LI-103)	☐	☒	
Security Plan and Cyber Security Plan [10 CFR 50.54(p) / EN-NS-210 or contact the site Security / IT Dept.]	☐	☒	
Operating License (OL) / Technical Specifications (TS) (10 CFR 50.90 / EN-LI-103)	☐*	☒	
TS Bases (10 CFR 50.59 / EN-LI-100 / EN-LI-101)	☐	☒	
Technical Requirements Manual (TRM) (including TRM Bases) (10 CFR 50.59 / EN-LI-100 / EN-LI-101)	☐	☒	
Core Operating Limits Report (COLR), and Pressure and Temperature Limits Report (PTLR) (TS Administrative Controls, EN-LI-113, EN-LI-100, EN-LI-101)	☐	☒	
Offsite Dose Calculation Manual (ODCM) (TS Administrative Controls or 10 CFR 50.59 / EN-LI-113 or EN-LI-100 / EN-LI-101)	☐	☒	
Updated Final Safety Analysis Report (UFSAR) (10 CFR 50.71(e) / EN-LI-113, EN-LI-100, EN-LI-101)	☐	☒	
Storage Cask Certificate of Compliance (10 CFR 72.244 / EN-LI-113)	☐*	☒	
Cask FSAR (CFSAR) (including the CTS Bases) (10 CFR 72.70 or 72.248 / EN-LI-113, EN-LI-100,EN-LI-112)	☐	☒	
10 CFR 72.212 Evaluation Report (212 Report) (10 CFR 72.48 / EN-LI-100, EN-LI-112)	☐	☒	
NRC Orders (10 CFR 50.90 / EN-LI-103 or as directed by the Order)	☐*	☒	
NRC Commitments and Obligations (EN-LI-110)	☐	☒	
Site Specific CFR Exemption (10 CFR 50.12, 10 CFR 55.11, 10 CFR 55.13, 10 CFR 72.7)	☐*	☒	

*Contact the site Licensing Department.

IF any box is checked "Yes," THEN ensure that any required regulatory reviews are performed in accordance with the referenced procedures. Prepare an LBDCR per procedure EN-LI-113 if a LBD is to be

changed, and document any affected sections or the LBDCR #. Briefly discuss how the LBD is affected in Section VII.A.

V. 10 CFR 50.59 / 10 CFR 72.48 APPLICABILITY

Can the proposed activity be dispositioned by one of the following criteria? Check the appropriate box (if any).

☐	An approved, valid 50.59/72.48 Evaluation covering associated aspects of the proposed activity already exists. Reference 50.59/72.48 Evaluation # ________________ (if applicable) or attach documentation. Verify the previous 50.59/72.48 Evaluation remains valid.
☒	The NRC has approved the proposed activity or portions thereof <u>or</u> a license amendment being reviewed by the NRC addresses the proposed activity. Reference the approval document: <u>NRC Letter RBC-51027 for Main Steam Line Tunnel temperature changed from 144°F to 173°F</u> <u>NRC Letter RBC-51043 for NEI 99-01 Revision 5 EALs</u>
☒	The proposed activity is controlled by one or more specific regulations. Examples of specific regulations are: • Maintenance Rule (50.65), • Quality Assurance Program (10 CFR 50 Appendix B) • Security Plan (50.54(p)) • Emergency Plan (50.54(q)) • Fire Protection (operating license condition) See NEI 96-07 Section 4.1 for additional guidance on specific regulations. Reference the controlling specific regulation(s): <u>10CFR50.54(q)</u>

<u>IF</u> the entire proposed activity can be dispositioned by the criteria in Section V, <u>THEN</u> proceed to Section VII and provide basis for conclusion in Section VII.A.

Otherwise, continue to Section VI to perform a 50.59 and/or 72.48 Screening, or perform a 50.59 and/or 72.48 Evaluation in accordance with EN-LI-101 and/or EN-LI-112.

Changes to the IPEC Unit 1 Decommissioning Plan are to be evaluated in accordance with the 50.59 process, as allowed by the NRC in a letter to IPEC dated January 31, 1996. [IPEC-1 Letter RA960014]

VI. 50.59 / 72.48 SCREENING REVIEW

VI.A 50.59/72.48 SCREENING (Check the appropriate boxes.)

☐	**10 CFR 50.59 Screening criteria are met.** [10 CFR 50.59(c)(1)] **The proposed activity meets all of the following criteria regarding design function:** • **Does not adversely affect the design function of an SSC as described in the UFSAR; AND** • **Does not adversely affect a method of performing or controlling a design function of an SSC as described in the UFSAR; AND** • **Does not adversely affect a method of evaluation that demonstrates intended design function(s) of an SSC will be accomplished as described in the UFSAR; AND** • **Does not involve a test or experiment not described in the UFSAR.**
☐	**The proposed activity does not involve structures, systems, or components controlled by 10 CFR 50.59.**
☐	**10 CFR 72.48 Screening criteria are met.** [10 CFR 72.48(c)(1)] **(Applicable to sites with an ISFSI)** **The proposed activity meets all of the following criteria regarding design function:** • **Does not adversely affect the design function of an SSC as described in the CFSAR; AND** • **Does not adversely affect a method of performing or controlling a design function of an SSC as described in the CFSAR; AND** • **Does not adversely affect a method of evaluation that demonstrates intended design function(s) of an SSC will be accomplished as described in the CFSAR; AND** • **Does not involve a test or experiment not described in the CFSAR.**
☐	**The proposed activity does not involve structures, systems, or components controlled by 10 CFR 72.48.**

IF either of the 50.59 or 72.48 Screening criteria are met, THEN complete VI.B below as appropriate and proceed to Section VII.

IF the proposed activity does not meet the applicable criteria, THEN perform a 50.59 or 72.48 Evaluation in accordance with EN-LI-101 or EN-LI-112, as appropriate, attach a copy of the Evaluation to this form, and proceed to Section VII.

IF the activity does not involve systems, structures, or components controlled by 10 CFR 50.59 or by 10 CFR 72.48, THEN a 50.59 or 72.48 Screening is not required, as appropriate, and proceed to Section VII.

VI.B BASIS

Provide a clear, concise basis for determining the proposed activity may be screened out such that a third-party reviewer can reach the same conclusions. Refer to NEI 96-07 Section 4.2 for guidance. Provide supporting documentation or references as appropriate.

VII. REGULATORY REVIEW SUMMARY

VII.A GENERAL REVIEW COMMENTS (Provide pertinent review details and basis for conclusions if not addressed elsewhere in form.)

Main Steam Line Tunnel temperature change from 144°F to 173°F has received prior NRC approval. Reference NRC letter RBC-51027.

NEI 99-01 Revision 5 EALs have received prior NRC approval. Reference NRC letter RBC-51043.

All other changes being implemented are governed by the Emergency Plan and have been reviewed under the 10CFR50.54(q) process per EN-EP-305 with no adverse impact and no reduction in effectiveness.

VII.B CONCLUSIONS

1. **Is a change to an LBD being initiated?** ☐ Yes ☒ No

   IF "Yes," THEN enter the appropriate change control process and include this form with the change package.

2. **Is a 10 CFR 50.59 Evaluation required?** ☐ Yes ☒ No

   IF "Yes," THEN complete a 50.59 Evaluation in accordance with EN-LI-101 and attach a copy to the change activity.

3. **Is a 10 CFR 72.48 Evaluation required?** ☐ Yes ☒ No

   IF "Yes," THEN complete a 72.48 Evaluation in accordance with EN-LI-112 and attach a copy to the change activity.

ATTACHMENT 9.1 PROCESS APPLICABILITY DETERMINATION FORM

VIII. SIGNATURES [1]

Preparer: Aaron Magee / [signature] / EOI-River Bend / EP / 10/31/12
Name (print) / Signature / Company / Department / Date

Reviewer: Norman E Tison / Norman E. Tison / Entergy / RBS EP / 10/31/12
Name (print) / Signature / Company / Department / Date

Process Applicability Exclusion

Site Procedure Champion or Owner: N/A
Name (print) / Signature / Company / Department / Date

Upon completion, forward this PAD form to the appropriate organization for record storage. If the PAD form is part of a process that requires transmittal of documentation, including PAD forms, for record storage, then the PAD form need not be forwarded separately.

[1] Signatures may be obtained via electronic processes (e.g., PCRS, ER processes, Asset Suite signature), manual methods (e.g., ink signature), e-mail, or telecommunication. If using an e-mail , attach it to this form.

Procedure/Document Number: EIP-2-001	**Revision: 24**
Equipment/Facility/Other: River Bend Station	
Title: Classification of Emergencies	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the emergency plan or affect the implementation of the emergency plan):

Revised all sections and attachments of EIP-2-001, Classification of Emergencies based on the change from NEI 99-01 Revision 4 EALs to NEI 99-01 Revision 5 EALs.

Part II. Activity Previously Reviewed? Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below:	☒YES 50.54(q)(3) Evaluation is NOT required. Enter justification below and complete Part VI.	☐ NO Continue to next part

Justification:

This revision supports the conversion from NEI 99-01 Revision 4 EALs to NEI 99-01 Revision 5 EALs. The NRC staff has completed its review of the proposed changes to the site's EAL scheme and supporting documentation in accordance with Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Section IV.B.(1). Based on the enclosed safety evaluation, the staff concludes that the proposed changes meet the standards in 10 CFR 50.47(b) and the requirements of Appendix E to 10 CFR Part 50, and provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.
See Attached NRC Approval Letter.
Reference NRC TAC NO. ME6846
Reference RBS RBC-51043, RBG-47223

☒ Bounding document attached (optional)

Part III. Applicability of Other Regulatory Change Control Processes

Check if any other regulatory change processes control the proposed activity.(Refer to EN-LI-100)

NOTE: For example, when a design change is the proposed activity, consequential actions may include changes to other documents which have a different change control process and are **NOT** to be included in this 50.54(q)(3) Screening.

APPLICABILITY CONCLUSION

☐ If there are no controlling change processes, continue the 50.54(q)(3) Screening.
☐ One or more controlling change processes are selected, however, some portion of the activity involves the emergency plan or affects the implementation of the emergency plan; continue the 50.54(q)(3) Screening for that portion of the activity. Identify the applicable controlling change processes below.
☐ One or more controlling change processes are selected and fully bounds all aspects of the activity. 50.54(q)(3) Evaluation is NOT required. Identify controlling change processes below and complete Part VI.

CONTROLLING CHANGE PROCESSES

Part IV. Editorial Change Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent? **Justification:**	☐YES 50.54(q)(3) Evaluation is NOT required. Enter justification and complete Part VI.	☐ NO Continue to next part

Procedure/Document Number: EIP-2-001	Revision: 24
Equipment/Facility/Other: River Bend Station	
Title: Classification of Emergencies	

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets) Does this activity affect any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II?	
1. Responsibility for emergency response is assigned. [1]	☐
2. The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the emergency plan. [1]	☐
3. The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4. The process for timely augmentation of onshift staff is established and maintained. [2]	☐
5. Arrangements for requesting and using off site assistance have been made. [3]	☐
6. State and local staff can be accommodated at the EOF in accordance with the emergency plan. [3]	☐
7. A standard scheme of emergency classification and action levels is in use. [4]	☐
8. Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5]	☐
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5]	☐
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5]	☐
11. Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12. Systems are established for prompt communication to emergency response personnel. [6]	☐
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway emergency planning zone (EPZ). [7]	☐
14. Coordinated dissemination of public information during emergencies is established. [7]	☐
15. Adequate facilities are maintained to support emergency response. [8]	☐
16. Adequate equipment is maintained to support emergency response. [8]	☐
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9]	☐
18. A range of public PARs is available for implementation during emergencies. [10]	☐
19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10]	☐
20. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐

Procedure/Document Number: EIP-2-001	Revision: 24
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Title: Classification of Emergencies	

21. The resources for controlling radiological exposures for emergency workers are established. [11]	☐
22. Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
23. Plans for recovery and reentry are developed. [13]	☐
24. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
25. Drills, exercises, and training evolutions that provide performance opportunities to develop, maintain, and demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
26. Identified weaknesses are corrected. [14]	☐
27. Training is provided to emergency responders. [15]	☐
28. Responsibility for emergency plan development and review is established. [16]	☐
29. Planners responsible for emergency plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 50.54(q)(3) Evaluation is NOT required; document the basis for conclusion below and complete Part VI.

☐ If any Part V criteria are checked, complete Part VI and perform a 50.54(q)(3) Evaluation.

BASIS FOR CONCLUSION

Part VI. Signatures:

Preparer Name (Print) Aaron Magee	Preparer Signature	Date: 10/31/12
(Optional) Reviewer Name (Print) N/A	Reviewer Signature	Date:
Reviewer Name (Print) David K. Townsend Nuclear EP Project Manager	Reviewer Signature	Date: 10/31/12
Approver Name (Print) Dee Burnett EP manager or designee	Approver Signature	Date: 10/31/12

Procedure/Document Number: EIP-2-001	**Revision: 24**
Equipment/Facility/Other: N/A	
Title: Classification of Emergencies	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the emergency plan or affect the implementation of the emergency plan):

1. The changes on pages 53 and 66 of the numbering format of the EAL Threshold for the loss of RC3. Item 1.a. was changed to 1, Item 1.b. was changed to 2, and item 2. was changed to 3. These changes are considered numbering changes in accordance with Regulatory Guide 1.219. The EAL Threshold for the loss of RC3 now read 1. OR 2. OR 3. rather than 1.a OR 1.b OR 2. These changes were done to improve the human factoring for the use of the EAL and do not change the intent of the EAL.

2. Pg. 67 – EAL Bases (Table F2) -- Main Steam Line Tunnel temperature changed from 144°F to 173°F.

3. Pg. 110 -- EAL Bases (SU7) – Added the following statements to the "Basis" section:

   The 15 minute EAL assessment period begins when the relief valve should have closed. An attempt for isolation from the Control Room should be made prior to classification. If operator actions from the Control Room are successful within the 15 minute EAL assessment period, this threshold is not applicable. Credit is not given for operator actions taken outside the Control Room.

4. Pg. 127 -- EAL Bases (SG3) – Added the following statement to section 1.c:

   Core cooling is extremely challenged as indicated by RPV level cannot be "restored and" maintained >-186 inches.

Part II. Activity Previously Reviewed? Is this activity fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report? If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below:	☒YES 50.54(q)(3) Evaluation is NOT required. Enter justification below and complete Part VI.	☒ NO Continue to next part

Justification:

Change Item #2 from Part I of this document: The change on Page 67 of the Main Steam Line Tunnel temperature from 144°F to 173°F was previously approved by the NRC. The NRC staff has completed its review of the proposed change to the site's EALs to reflect the changes to the allowable value and related setpoints to Technical Specification (TS) 3.3.6.1. Based on the enclosed safety evaluation, the staff concludes that the proposed change provides reasonable assurance that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and that such activities will be conducted in compliance with the Commission's regulations.
See Attached NRC Approval Letter.
Reference NRC TAC NO. ME6843
Reference RBS RBC-51027

☒ Bounding document attached (optional)

Part III. Applicability of Other Regulatory Change Control Processes

Check if any other regulatory change processes control the proposed activity.(Refer to EN-LI-100)

NOTE: For example, when a design change is the proposed activity, consequential actions may include changes to other documents which have a different change control process and are **NOT** to be included in this 50.54(q)(3) Screening.

APPLICABILITY CONCLUSION

☐ If there are no controlling change processes, continue the 50.54(q)(3) Screening.
☐ One or more controlling change processes are selected, however, some portion of the activity involves the emergency plan or affects the implementation of the emergency plan; continue the 50.54(q)(3) Screening for that portion of the activity. Identify the applicable controlling change processes below.
☐ One or more controlling change processes are selected and fully bounds all aspects of the activity. 50.54(q)(3) Evaluation is NOT required. Identify controlling change processes below and complete Part VI.

Procedure/Document Number: EIP-2-001	**Revision: 24**	
Equipment/Facility/Other: N/A		
Title: Classification of Emergencies		
CONTROLLING CHANGE PROCESSES 10CFR50.54(q)		
Part IV. Editorial Change Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent? **Justification:** <u>Change Item #1 from Part I of this document:</u> The changes on pages 53 and 66 of the numbering format of the EAL Threshold for the loss of RC3. Item 1.a. was changed to 1, Item 1.b. was changed to 2, and item 2. was changed to 3. These changes are considered numbering changes in accordance with Regulatory Guide 1.219. The EAL Threshold for the loss of RC3 now read 1. <u>OR</u> 2. <u>OR</u> 3. rather than 1.a <u>OR</u> 1.b <u>OR</u> 2. These changes were done to improve the human factoring for the use of the EAL and do not change the intent of the EAL.	☒YES 50.54(q)(3) Evaluation is NOT required. Enter justification and complete Part VI.	☒ NO Continue to next part

Procedure/Document Number: EIP-2-001	**Revision: 24**
Equipment/Facility/Other: N/A	
Title: Classification of Emergencies	

Part V. Emergency Planning Element/Function Screen (Associated 10 CFR 50.47(b) planning standard function identified in brackets) Does this activity affect any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II?	
1. Responsibility for emergency response is assigned. [1]	☐
2. The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the emergency plan. [1]	☐
3. The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	☐
4. The process for timely augmentation of onshift staff is established and maintained. [2]	☐
5. Arrangements for requesting and using off site assistance have been made. [3]	☐
6. State and local staff can be accommodated at the EOF in accordance with the emergency plan. [3]	☐
7. A standard scheme of emergency classification and action levels is in use. [4]	☒
8. Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5]	☐
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5]	☐
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5]	☐
11. Systems are established for prompt communication among principal emergency response organizations. [6]	☐
12. Systems are established for prompt communication to emergency response personnel. [6]	☐
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway emergency planning zone (EPZ). [7]	☐
14. Coordinated dissemination of public information during emergencies is established. [7]	☐
15. Adequate facilities are maintained to support emergency response. [8]	☐
16. Adequate equipment is maintained to support emergency response. [8]	☐
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9]	☐
18. A range of public PARs is available for implementation during emergencies. [10]	☐
19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10]	☐
20. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	☐

Procedure/Document Number: EIP-2-001	Revision: 24
Equipment/Facility/Other: N/A	
Title: Classification of Emergencies	

21. The resources for controlling radiological exposures for emergency workers are established. [11]	☐
22. Arrangements are made for medical services for contaminated, injured individuals. [12]	☐
23. Plans for recovery and reentry are developed. [13]	☐
24. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	☐
25. Drills, exercises, and training evolutions that provide performance opportunities to develop, maintain, and demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	☐
26. Identified weaknesses are corrected. [14]	☐
27. Training is provided to emergency responders. [15]	☐
28. Responsibility for emergency plan development and review is established. [16]	☐
29. Planners responsible for emergency plan development and maintenance are properly trained. [16]	☐

APPLICABILITY CONCLUSION

☐ If no Part V criteria are checked, a 50.54(q)(3) Evaluation is NOT required; document the basis for conclusion below and complete Part VI.

☒ If any Part V criteria are checked, complete Part VI and perform a 50.54(q)(3) Evaluation.

BASIS FOR CONCLUSION

Change item #3 from Part I of this document: Emergency planning element(s) 7 in Part V of this form are affected by this changes because there is a potential to affect emergency classification and action levels

Change item #4 from Part I of this document: Emergency planning element(s) 7 in Part V of this form are affected by this changes because there is a potential to affect emergency classification and action levels

A 10CFR50.54(q) evaluation will be performed to determine whether or not the effectiveness of the emergency plan is reduced and prior NRC approval is required.

Part VI. Signatures:

Preparer Name (Print) Aaron Magee	Preparer Signature AM	Date: 10/31/12
(Optional) Reviewer Name (Print) N/A	Reviewer Signature	Date:
Reviewer Name (Print) David K. Townsend Nuclear EP Project Manager	Reviewer Signature DKTownsend	Date: 10/31/12
Approver Name (Print) Dean Burnett EP manager or designee	Approver Signature [signature]	Date: 10/31/12

Procedure/Document Number: EIP-2-001	**Revision: 24**
Equipment/Facility/Other: N/A	
Title: Classification of Emergencies	

Part I. Description of Proposed Change:

1. Pg. 110 -- EAL Bases (SU7) – Added the following statements to the "Basis" section:

   The 15 minute EAL assessment period begins when the relief valve should have closed. An attempt for isolation from the Control Room should be made prior to classification. If operator actions from the Control Room are successful within the 15 minute EAL assessment period, this threshold is not applicable. Credit is not given for operator actions taken outside the Control Room.

2. Pg. 127 -- EAL Bases (SG3) – Added the following statement to section 1.c:

   Core cooling is extremely challenged as indicated by RPV level cannot be "restored and" maintained >-186 inches

Part II. Description and Review of Licensing Basis Affected by the Proposed Change:

The EN-LI-100 Process Applicability Determination form states that no other licensing basis documents other than the Emergency Plan were affected, invalidated, or rendered incorrect, nor is there the potential to affect, or render incorrect said documents.

Part III. Describe How the Proposed Change Complies with Relevant Emergency Preparedness Regulation(s) and Previous Commitment(s) Made to the NRC:

Previous Commitments to the NRC - Per EN-LI-110 the licensing management system used for tracking NRC commitments was searched and no results were found related to the proposed changes.

Site Compliance:

1. **EAL Bases (SU7)**

   10 CFR 50.47(b)(4) - Emergency Classification System

   Site Compliance: The EAL Bases for SU7 was revised to provide additional guidance clarifying when the 15 minute assessment period begins and the classification determination if the relief valve is closed within 15 minutes of assessment. This additional guidance enhances the capability to assess, classify, and declare the emergency condition within 15 minutes after the availability of indications that the EAL has been exceeded and to declare the emergency as soon as possible following the identification of the appropriate emergency classification level.

2. **EAL Bases (SG3)**

   10 CFR 50.47(b)(4) - Emergency Classification System

   Site Compliance: The EAL Bases for SG3 was revised to add verbiage correcting an oversight from the submittal of NEI 99-01 Revision 5 EALs. The words "restored and" were in the Rev 5 NEI guidance and were missed in the original submittal. This additional verbiage continues to support the accuracy of the classification and the timeliness of the classification.

Part IV. Description of Emergency Plan Planning Standards, Functions and Program Elements Affected by the Proposed Change:

Emergency Planning Standard - 10 CFR 50.47(b)(4) - Emergency Classification System
Functions:

- A standard scheme of emergency classification and action levels is in use.

Program Elements - Sections IV.B and IV.C of Appendix E to 10 CFR 50 provide supporting requirements. Informing criteria appear in Section II.D of NUREG-0654 and the licensee's emergency plan.

Procedure/Document Number: EIP-2-001	Revision: 24
Equipment/Facility/Other: N/A	
Title: Classification of Emergencies	

Part V. Description of Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:

1. **EAL Bases (SU7)**

   Additional guidance was added to clarify when the 15 minute assessment period begins and the classification determination if the relief valve is closed within 15 minutes of assessment. This additional guidance enhances the capability to assess, classify, and declare the emergency condition within 15 minutes after the availability of indications that the EAL has been exceeded and to declare the emergency as soon as possible following the identification of the appropriate emergency classification level in accordance with Section IV.C.2 of Appendix E to 10 CFR Part 50.

2. **EAL Bases (SG3)**

   This additional verbiage was added to correct an oversight from the submittal of NEI 99-01 Revision 5 EALs. The words "restored and" were in the Rev 5 NEI guidance and were missed in the original submittal. This additional verbiage continues to support the accuracy of the classification and the timeliness of the classification in accordance with Section IV.C.2 of Appendix E to 10 CFR Part 50.

Part VI. Evaluation Conclusion

Answer the following questions about the proposed change.

1. Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?	☒YES ☐ NO
2. Does the proposed change maintain the effectiveness of the emergency plan (i.e., no reduction in effectiveness)?	☒YES ☐ NO
3. Does the proposed change constitute an emergency action level scheme change?	☐YES ☒ NO

If questions 1 or 2 are answered NO, or question 3 answered YES, reject the proposed change, modify the proposed change and perform a new evaluation or obtain prior NRC approval under provisions of 10 CFR 50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es). Refer to step 5.6[8].

Part VII. Signatures

Preparer Name (Print) Aaron Magee	Preparer Signature	Date: 10-30-12
(Optional) Reviewer Name (Print) N/A	Reviewer Signature	Date:
Reviewer Name (Print) David K. Townsend Nuclear EP Project Manager	Reviewer Signature	Date: 10/31/12
Approver Name (Print) Dean Burnett EP Manager or designee	Approver Signature	Date: 10/31/12

Facility: RIVER BEND STATION	Date of Examination: 3/24/2014
Exam Level: RO ☑ SRO-I ☐ SRO-U ☐	Operating Test No.: ______________

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. (S1) Initiate RCIC for level control	A,E,L,N,S	4
b. (S2) Perform STP to Slow Stroke the MSIVs	N,S	3
c. (S3) Alternate Feedwater Level Control channels	A,N,S	2
d. (S4) Parallel offsite power source to standby diesel generator	D,S	6
e. (S5) Initiate Standby Liquid Control	A,E,L,N,S	1
f. (S6) Emergency operation of containment coolers with Service water	D,E,S,EN	5
g. (C1) Defeating Offgas high radiation isolation interlock	C,D,E,L	9
h. (C2) Bypass an LPRM	C,D	7
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. (P1) Alternating Control Building chilled water pump and chiller within the standby division	D,EN	9
j. (P2) Cross connecting DG air receivers within a single division	N	6
k. (P3) Align Instrument Air diesel air compressor backup to safety relief valve header	A,D,E,L,R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3 4
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4 6
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1 5
(EN)gineered safety feature	- / - / ≥1 (control room system) -
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1 4
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1 5
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected) 0
(R)CA	≥ 1 / ≥ 1 / ≥ 1 1
(S)imulator	

Facility: RIVER BEND STATION	Date of Examination: 3/24/2014
Exam Level: RO ☐ SRO-I ☑ SRO-U ☐	Operating Test No.: ______________

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. (S1) Initiate RCIC for level control	A.E,L,N,S	4
b. (S2) Perform STP to Slow Stroke the MSIVs	N,S	3
c. (S3) Alternate Feedwater Level Control channels	A,N,S	2
Instant does not perform S4		
e. (S5) Initiate Standby Liquid Control	E,L,N,S	1
f. (S6) Emergency operation of containment coolers with Service water	A,D,E,S,EN	5
g. (C1) Defeating Offgas high radiation isolation interlock	C,D,E,L	9
h. (C2) Bypass an LPRM	C,D	7
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. (P1) Alternating Control Building chilled water pump and chiller within the standby division	D,EN	9
j. (P2) Cross connecting DG air receivers within a single division	N	6
k. (P3)Align Instrument Air diesel air compressor backup to safety relief valve header	A,D,E,L,R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3 4
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4 5
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1 5
(EN)gineered safety feature	- / - / ≥1 (control room system) -
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1 4
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1 5 (3 AP)
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected) 0
(R)CA	≥ 1 / ≥ 1 / ≥ 1 1
(S)imulator	

Facility: RIVER BEND STATION Exam Level: RO ☐ SRO-I ☐ SRO-U ☑	Date of Examination: 3/24/2014 Operating Test No.: ______________

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
(S1) Initiate RCIC for level control	A.E,L,N,S	4
(S6) Emergency operation of containment coolers with Service water	D,E,S,EN	5
(C1) Defeating Offgas high radiation isolation interlock	C,D,E,L	9

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

System / JPM Title	Type Code*	Safety Function
(P2) Cross connecting DG air receivers within a single division	N	6
(P3) Align Instrument Air diesel air compressor backup to safety relief valve header	A,D,E,L,R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3 2
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4 3
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1 4
(EN)gineered safety feature	- / - / ≥1 (control room system) 1
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1 3
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1 2
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected) 0
(R)CA	≥ 1 / ≥ 1 / ≥ 1 1
(S)imulator	

NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE
SRO ☒ RO ☒

ALTERNATE PATH ☒

TITLE: **Initiate Reactor Core Isolation Cooling for Level Control**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	14	Actual Time (min):	

JPM RESULTS*: (Circle one) *
Refer to Grading Instructions at end of JPM

SAT UNSAT

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
X	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	September 4, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Reactor Core Isolation Cooling is running, after an inadvertent trip, lined up for RPV Level Control.

Synopsis: The reactor is shutdown, pressurized and MSIVs are closed following an automatic isolation. This task will align RCIC for level control of the RPV using hard card (OSP-53, Attach. 6). As an alternate path, there is an inadvertent trip of RCIC which the operator will reset per SOP-0035, Section 5.2.

NOTE: If in the Plant or the Control Room, **Caution** the operator NOT to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to initiate Reactor Core Isolation Cooling (RCIC); and to restore and maintain RPV level from -20 to 51 inches.

3) Initial Conditions:

The reactor is shutdown and pressurized; MSIV's are closed.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM**:	**K&A RATING**:
Initiate RCIC for Level Control with Inadvertent Trip	217007001001 217010001001	A4.04 A4.05	3.6 / 3.6 4.1 / 4.1

REFERENCES:
OSP-0053, Rev 17, Attach 6
SOP-0035, Rev 45

APPLICABLE OBJECTIVES
RLP-STM-0209, Obj 8

REQUIRED MATERIALS:
OSP-0053, Rev 17 Attach 6 (Sim Copy-Hard Card)
SOP-0035, Rev 45 (Sim. Copy)

SAFETY FUNCTION:
__4__

SIMULATOR CONDITIONS & SETUP:

1. IC # 212
2. Required Power: Shutdown, pressurized, MSIV's closed.
3. HPCS racked out/ tagged out.
4. Feed Pumps tripped.
5. RHR-A in Suppression Pool Cooling.
6. Event T1: Malfunction: RCIC Turbine trip to activate when turbine speed reaches 90% delete in 10 seconds; this will simulate a spurious trip and allow resetting the trip.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Reactor Core Isolation Cooling is running, being used for RPV Level Control

PERFORMANCE:

START TIME: ______________

1.	**Procedure Step:**	1. Arm and depress, RCIC MANUAL INITIATION Pushbutton.
	Standard	Applicant located/identified and turned the collar fully clockwise, and depressed the RCIC Manual Initiation Pushbutton.
	Cue	
	Notes	The applicant will use the Hard Card for the initiation.
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	2. Verify the following: • E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE **Opens**.
	Standard	Applicant located/identified and verified that E51-F045 Opened.
	Cue	
	Notes	The RCIC turbine will trip at 90% speed.
	Results	SAT ☐ UNSAT ☐

3.	**Procedure Step:**	2. Verify the following: • RCIC STEAM SUPPLY and EXHAUST DRAIN POT ISOLATION VALVES Close.
	Standard	Applicant located/identified and verified that the RCIC Steam Supply and Exhaust Drain Pot Isolation Valves closed.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

4.	**Procedure Step:**	2. Verify the following: • E51-C002C, GLAND SEAL COMPRESSOR Starts.
	Standard	Applicant located/identified and verified that the RCIC Gland Seal Compressor started.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	2. Verify the following: • E51-F013, RCIC INJECT ISOL VALVE Opens.
	Standard	Applicant located/identified and verified that E51-F013, RCIC Injection Isolation Valve Opened.
	Cue	
	Notes	The injection valve will go closed again as the RCIC turbine trips.
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	3. Verify RCIC Turbine comes up to speed and stabilizes at 2300–4600 rpm.
	Standard	Applicant recognized the RCIC turbine tripped by turbine full speed not being achieved and a slowing of turbine speed as well as a status light.
	Cue	As CRS accept report that RCIC has tripped. Direct the applicant to, “Inject with RCIC using the SOP.” If asked, indicate that no trip units are in
	Notes	Applicant should transition from Hard Card to SOP-0035, Reactor Core Isolation Cooling, Section 5.2. (Recovery from RCIC Turbine Trip During Auto Initiation).
	Results	SAT ☐ UNSAT ☐

ALTERNATE PATH:

SOP-0035
Section 5.2, Recovery from RCIC Turbine Trip During AUTO Initiation

PROCEDURE NOTE

This Section is intended to allow restart of RCIC after turbine trip for other reasons than system isolation.

7.	***Procedure Step:**	5.2.1 Close E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.
	Standard	Applicant located and closed the Trip/Throttle Valve.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

	Procedure Step:	5.2.2 <u>IF</u> a RCIC Turbine Overspeed or local manual trip has occurred, <u>THEN</u> reset the turbine throttle valve locally.
	Standard	NA
	Cue	
	Notes	No applicant action is necessary – the turbine does not require being reset locally.

8.	**Procedure Step:**	5.2.3 Throttle E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR open to obtain 2500 to 3500 rpm on E51-C002-1, RCIC TURBINE SPEED.
	Standard	Applicant throttled the RCIC Trip & Throttle Valve and obtained 2500-3500 rpm on the RCIC turbine speed meter.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

9.	***Procedure Step:**	5.2.4 Open E51-F013, RCIC INJECT ISOL VALVE.
	Standard	Applicant opened the RCIC injection isolation valve.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

Open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR in very small increments and allow time for the turbine to respond between adjustments to prevent an overspeed.

10.	***Procedure Step:**	5.2.5 Slowly throttle open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR until HVY-C002, RCIC TURBINE GOV VLV indicates that the governor has control.
	Standard	Applicant slowly throttled open the RCIC Trip & Throttle Valve and observed the HVY-C002, RCIC Pump/Flow Controller until the governor took control.
	Cue	
	Notes	There will be deviation/response of the meter to flow exceeding 600 gpm.
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

Governor control is verified by lowering the turbine rpm slightly using RCIC PUMP/FLOW CONTROLLER, HVY-C002. If the rpm drops and is held steady, the governor is in full control.

11.	**Procedure Step:**	5.2.6 WHEN the governor has control, THEN open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.
	Standard	Applicant verified governor control per procedure note above then opened the Trip & Throttle valve completely.
	Cue	
	Notes	When the trip throttle valve green and red lights are both on, the governor has control.
	Results	SAT ☐ UNSAT ☐

12.	**Procedure Step:**	5.2.7 IF RCIC operation is desired, THEN refer to one of the following sections: • Refer to section 5.7 for level control. • Refer to section 5.8 for pressure control.
	Standard	Applicant chose and referred to Section 5.7 of SOP-0035.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

SOP-0035
Section 5.7, RPV Level Control

	Procedure Step:	5.7.1 IF RCIC operating AND aligned to the CST, THEN shift to inject to the RPV as follows:
	Standard	NA
	Cue	
	Notes	No applicant action is necessary

13.	**Procedure Step:**	5.7.2 With E51-R600, RCIC PUMP FLOW CONTROLLER HVYC002, in AUTO OR MANUAL, adjust RCIC flow setpoint as required to maintain RPV water level.
	Standard	Applicant verifies that the RCIC pump flow controller is set for 600 gallons per minute.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Reactor Core Isolation Cooling is running, being used for RPV Level Control

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

The reactor is shutdown and pressurized; MSIV's are closed.

INITIATING CUE:

The CRS has directed you to initiate Reactor Core Isolation Cooling (RCIC); and to restore and maintain RPV level from -20 to 51 inches.

INITIATING RCIC

1 Arm and depress, **RCIC MANUAL INITIATION** Pushbutton.

2 Verify the following:

- **E51-F045**, RCIC STEAM SUPPLY TURBINE STOP VALVE **Opens**.
- RCIC STEAM **SUPPLY and EXHAUST DRAIN POT** ISOLATION VALVES **Close**.
- E51-C002C, GLAND **SEAL COMPRESSOR Starts**.
- E51-F013, RCIC **INJECT** ISOL **VALVE Opens**.

3 Verify RCIC **Turbine** comes up to **speed** and stabilizes at **2300 4600 rpm**.

4 Verify RCIC **injection flow**.

5 Verify E51-F019, RCIC **MIN FLOW VLV** TO SUPPRESSION POOL, **Closes**.

6 **Adjust** flow **controller** as required to achieve desired injection rate.

CONTINUOUS USE

***G12.1.6**

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***SYSTEM OPERATING PROCEDURE**

**REACTOR CORE ISOLATION COOLING SYSTEM (SYS #209)*

PROCEDURE NUMBER:	***SOP-0035**
REVISION NUMBER:	***045**
Effective Date:	*** 06/13/2013**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
SOP-0035R044EC-A	Correct typographical error made during incorporation of SOP-0035R042CM-1. The Gland Seal Compressor must be started prior to opening the E51-F045. Moved step for starting Gland Seal Compressor to Step 4.2.5.

TABLE OF CONTENTS

1 **PURPOSE**

1.1 To provide instructions for the operation of the Reactor Core Isolation Cooling (RCIC) System.

2 **PRECAUTIONS AND LIMITATIONS**

2.1 Starting the RCIC Pump with an injection line low pressure condition may cause damage due to water hammer. If the RCIC System Line Fill Pump is to be shutdown for an extended period, the RCIC Pump should not be allowed to start.

C 2.2 When performing tests or system lineups, the potential exists for water hammer to occur if the system has not been properly filled and vented.

2.3 If narrow range RPV water level reaches Level 8 during RCIC operation, E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE and E51-F013, RCIC INJECT ISOL VALVE will automatically close which shuts down the RCIC Turbine. The RCIC Turbine will restart automatically at RPV Level 2.

C 2.4 The Min Flow valve flow transmitter may go into saturation during pump operation. This condition may delay min. flow valve opening by as long as 21 seconds. The pump vendor has specified that the RCIC pump can be run for 30 seconds in a dead headed condition before experiencing pump degradation.

2.5 Operation of the RCIC Turbine below 2300 rpm may result in turbine exhaust check valve damage due to chattering.

2.6 Operation of the RCIC Turbine below 1700 rpm may result in insufficient pump flow for cooling of pump internals.

2.7 In the event of a RCIC Turbine overspeed or local manual trip, the Turbine Trip and Throttle Valve must be reset locally. All other trips can be reset remotely from Control Room.

C

2.8 If an overspeed event occurs during the operation of the RCIC Turbine, aligned CST to CST, with a pressure greater than 2000 psig, then the CST piping may have been over-pressurized. The following shall be checked prior to declaring the RCIC system operable:

- IF E51-PIR001 was valved in during the overspeed event, THEN calibrate or replace it.
- Recalibrate transmitter loops associated with flow control transmitters E51-FTN051 and E51-FTN003.
- Perform inspection of piping and equipment as directed by System Engineering.
- Calibration check of E51-PCVF015, RCIC Turb Lube Oil Clr Inlet Press Cntrl Vlv

2.9 Cooling for the Gland Seal Compressor is provided by the airflow through the compressor. Do not allow the compressor to operate at discharge air temperature of 370°F or greater as indicated by Annunciator P601-21A-H01, RCIC GS COMP TRIP AIR TEMP HIGH-HIGH.

2.10 The oil temperature leaving the Turbine Lube Oil Cooler should be maintained at 40°F to 160°F. The RCIC System should be shutdown if oil temperature or pump bearing temperatures reach 180°F.

2.11 While warming up the RCIC system, steam flashing in the RCIC line dP transmitters will cause an invalid actuation of the isolation logic for E51-MOVF063, F064, and F076. This ESF action is not reportable when it occurs in this manner.

C 2.12 When the RCIC System is undergoing maintenance, testing, or any condition which could "bottle up" the steam supply line (i.e., close the steam line drain valves), then E51-F063, RCIC STEAM SUPPLY INBD ISOL VALVE and E51-F064, RCIC STEAM SUPPLY OUTBD ISOL VALVE should be closed to prevent an unexpected ESF actuation.

C 2.13 If maintenance has been performed on the RCIC Turbine, the slow roll, manual startup Section 4.3 of this procedure should be performed to ensure operability of RCIC.

2.13.1. Following any maintenance activity that opens the RCIC turbine lube oil system, including oil changes, oil samples, and if needed, troubleshooting, three 5-minute slow rolls and a final 30 minute slow roll, each followed by a 15-30 minute shutdown period and oil level check, should be completed to ensure all air has been vented from the oil system. This does not include adding small amounts of oil to maintain oil level in the sightglass.

C 2.14 Anytime RCIC is to be run, Suppression Pool Cooling should be placed in service per SOP-0031, Residual Heat Removal to ensure adequate mixing of the Suppression Pool for temperature monitoring.

C 2.15 There is a potential for early realignment of the HPCS and RCIC suctions from the CST to the Suppression Pool. When the suction swap occurs, flow in the CST suction line drops to zero. The trip signal may clear at this time. If needed the RCIC system may be realigned to the CST if local CST level instruments indicate 3.5' or greater and HPCS suction remains on the Suppression Pool.

C

2.16 The outlet of E51-RVF090 is not routed to a floor drain. If this relief were to lift then personnel in the RCIC area may become contaminated.

2.17 If RCIC is running in support of testing the Technical Specifications require average suppression pool temperature monitoring per STP-057-0700, Suppression Pool Average Water Temperature Verification During Testing That Adds Heat to the Suppression Pool.

2.18 High velocity flushes of the RCIC/RHR backfill system shall not be performed with the reactor temperature greater than or equal to 200°F until additional detailed analysis on the RCIC/RHR steam supply line flow elbow has been completed by Engineering.

2.19 RCIC/RHR Backfill should not be left in service longer than 12 hours when the RCIC Isolation valves are closed. Engineering should be notified before exceeding the 12 hours.

2.20 The RCIC pump should not be operated below 50% of rated flow for sustained periods of time. Operation at a 10 to 20% minimum flow condition is intended for startup and shutdown transients only. This is not an intended normal operating condition for the pump because severe internal cavitation at the high-head condition can result in pump damage.

3 PREREQUISITES FOR STARTUP AND OPERATION

3.1 Check Suppression Pool level is operable per Technical Specification 3.6.2.2.

3.2 Check the Instrument Air System is in operation per SOP-0022, Instrument Air System.

3.3 Check the below electric systems are in service and aligned to RCIC:

3.3.1. 125VDC per SOP-0049, 125 VDC System

3.3.2. 120VAC per SOP-0048, 120 VAC System

3.3.3. 480VAC per SOP-0047, 480 VAC System

3.4 Check CST level is greater than 11 ft 1 in.

3.5 Check the Remote Shutdown System is in standby per SOP-0027, Remote Shutdown System.

3.6 Check the Reactor Feed Water Line A downstream of FWS-MOV7A to the Reactor Vessel is lined up per SOP-0009, Reactor Feedwater System.

3.7 Verify the system is lined up for startup.

4 SYSTEM STARTUP

4.1 Placing the RCIC System in Standby

C 4.1.1. IF the RCIC System is to be filled and vented, THEN perform the following:

1. IF Suppression Pool Suction piping has been drained and it is necessary to fill/vent piping, THEN perform the following:

CAUTION

Overpressurization during filling/venting of RCIC suction piping could result in lifting E12-RVF036, RHR HEAT EXCHGR A PRESS RELIEF VLV (set at 75 psig). DO NOT allow RCIC suction piping to exceed 50 psig during this evolution.

NOTE

The installed hose used for system fill and vent has been evaluated by EC-1417 and has been screened from EN-DC-136, Temporary Modifications. However, the requirements of RBNP-097, Control and Use of Temporary Hoses still apply.

1) Inspect vent hose prior to use.
2) At Aux Bldg. 78-ft el in the Crescent Area, verify RHS-V120, RHR B LOOP HX DISCH TO RCIC VENT is closed.
3) Remove pipe cap downstream of RHS-V120.
4) Install hose downstream of RHS-V120 and route to floor drain.
5) At Aux Bldg. 70-ft el in the Crescent Area, verify E51-VF032, RCIC PUMP SUCTION LINE PE TEST CONNECTION is closed.
6) Remove pipe cap downstream of E51-VF032.
7) Attach fill hose from CNS source to E51-VF032.
8) Open fully RHS-V120.
9) Open CNS source.
10) Throttle two turns open E51-VF032.

11) Monitor E51-R064, RCIC PUMP SUCT PRESS to ensure that 50 psig is not exceeded.

12) WHEN a steady stream of water issues from RHS-V120, THEN close E51-VF032 and CNS source.

13) Close RHS-V120.

14) Remove hose from the connection downstream of RHS-V120.

15) Install pipe cap on connection downstream of RHS-V120.

16) Remove hose from the connection downstream of E51-VF032 and CNS source.

17) Install pipe cap on connection downstream of E51-VF032.

2. Start E51-C003, RCIC LINE FILL PUMP.

NOTE

The installed hose used for system fill and vent has been evaluated by EC-1417 and has been screened from EN-DC-136, Temporary Modifications. However, the requirements of RBNP-097, Control and Use of Temporary Hoses still apply.

3. Inspect vent hose prior to use.
4. At Aux Bldg. 70-ft el in the Crescent Area, verify RHS-V120, RHR B LOOP HX DISCH TO RCIC VENT is closed.
5. Remove pipe cap downstream of RHS-V120.
6. Install hose downstream of RHS-V120 and route to floor drain.
7. C Open RHS-V120.
8. WHEN a steady stream of water issues from RHS-V120, THEN close RHS-V120.
9. Remove hose from the connection downstream of RHS-V120.
10. Install pipe cap on connection downstream of RHS-V120.
11. At Aux Bldg. 95-ft el, verify ICS-V3002, RCIC PUMP DISCHARGE VENT is closed.
12. Remove pipe cap downstream of ICS-V3002.

13. Install hose downstream of ICS-V3002 and route to floor drain.

C 14. Open ICS-V3002.

15. WHEN a steady stream of water issues from ICS-V3002, THEN close ICS-V3002.

16. Remove hose from the connection downstream of ICS-V3002.

17. Install pipe cap on connection downstream of ICS-V3002.

4.1.2. Verify E51-C003, RCIC LINE FILL PUMP is running.

NOTE

The following step causes P601-21A-D03, DIV I RCIC ISOL RESET KEYSWITCH IN RESET POSITION and P601-21A-E03, DIV II RCIC ISOL RESET KEYSWITCH IN RESET POSITION to alarm when the respective switch is placed in RESET.

4.1.3. Place the following switches in RESET and check the white lights above the switches are off:

- E51A-S16, RCIC DIV 1 ISOLATION RESET
- E51A-S25, RCIC DIV 2 ISOLATION RESET

4.1.4. Place the following switches in NORMAL:

- E51A-S16, RCIC DIV 1 ISOLATION RESET
- E51A-S25, RCIC DIV 2 ISOLATION RESET

4.1.5. Close the following valves:

1. E51-F026, RCIC STM SUPPLY DR POT DN STREAM ISOL VALVE
2. E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE

NOTE

While warming up the RCIC System, the possibility exists for a RCIC Steam Line isolation due to steam flashing in the RCIC Steam Line ΔP Transmitters.

4.1.6. Log in the Main Control Room Log that an ESF actuation could occur.

4.1.7. Verify the following valves are closed:

- E51-F076, RCIC WARMUP LINE SHUT OFF VALVE
- E51-F063, RCIC STEAM SUPPLY INBD ISOL VALVE

4.1.8. Open E51-F064, RCIC STEAM SUPPLY OUTBD ISOL VALVE.

CAUTION

The maximum calculated heatup rate for RCIC is 450°F/hr. Exceeding this rate can result in a stress in excess of the maximum design basis transient stress. Do not exceed 450°F/hr when warming the RCIC Steam Supply Line.

NOTE

The following step causes Annunciators, P602-21A-B02, RCIC WARMUP LINE ISO VLV E51-F076 NOT FULLY CLOSED, and P601-21A-B03, RCIC TURBINE STEAM SPLY WATER DRAIN TRAP LVL HI to alarm, as condensate builds up in the drain line.

NOTE

A cold system requires a slower re-pressurization rate than a hot system due to steam hammer.

4.1.9. Throttle E51-F076, RCIC WARMUP LINE SHUT OFF VALVE open to pressurize the RCIC Steam Line while monitoring pressure on E51-R602, RCIC TURB STM PRESS.

4.1.10. IF a RCIC Steam Supply Drain Trap high level alarm is received, THEN drain condensate from the RCIC Steam Line as follows:

1. Open the following valves:
    - E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE
    - E51-F026, RCIC STM SUPLY DR POT DN STREAM ISOL VALVE
    - E51-F054, RCIC STM SPLY DR TRAP BYPASS VALVE

2. WHEN the high level condition no longer exists, THEN close the following valves:

   - E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE
   - E51-F026, RCIC STM SUPLY DR POT DN STREAM ISOL VALVE
   - E51-F054, RCIC STM SPLY DR TRAP BYPASS VALVE

4.1.11. WHEN RCIC Steam Line pressure has equalized with Reactor pressure, THEN open E51-F063, RCIC STEAM SUPPLY INBD ISOL VALVE.

4.1.12. Close E51-F076, RCIC WARMUP LINE SHUT OFF VALVE.

4.1.13. Open the following valves:

1. E51-F026, RCIC STM SUPLY DR POT DN STREAM ISOL VALVE
2. E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE

4.1.14. Verify E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HYVC002 in Auto at 600 gpm.

4.1.15. Close E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.

NOTE

After a local manual trip or mechanical overspeed, the Turbine Trip Throttle Valve must be manually reset at the turbine.

Refer To Attachment 5, RCIC Trip Throttle valve diagram

4.1.16. IF a RCIC turbine overspeed or local manual trip exist, THEN perform the following:

1. Verify CLOSED E51-MOVC002, RCIC TRIP & THROTTLE VALVE.

NOTE

The movement of the emergency trip rod must be in a path parallel with its normal motion, there should be no twisting action associated with the movement of the emergency trip rod.

2. At the turbine, PUSH and HOLD the emergency trip rod, against spring pressure towards the RCIC trip & throttle valve.
3. IF required, THEN lift up on the manual hand trip lever.

4. <u>WHEN</u> 5 seconds have elapsed, <u>THEN</u> SLOWLY RELEASE the emergency trip rod.

<u>NOTE</u>

Slight manual manipulation of the tappet nut assembly may be necessary if trouble is incurred while attempting to manually reset the RCIC turbine.

5. Verify the square edge (flat) of the emergency head lever mates with the square edge (flat) of the tappet nut and that the head lever is engaged with the tappet nut.

6. Verify the trip lever and tappet nut freely resets and mates with the underside of the tappet nut (metal to metal contact). Push down on the top of the tappet nut to assure it is fully seated against the head bracket.

<u>NOTE</u>

If any binding of the mechanism occurs while resetting the trip mechanism, then notify the Shift Manager and the System Engineer.

7. Verify the trip hook lever is engaged on the latch lever of the trip & throttle valve.

8. Inform the Control Room the RCIC trip mechanism is reset.

4.1.17. Open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR and verify RCIC TRIP & THROTTLE VALVE POSITION red light is on.

4.1.18. Verify all RCIC alarms are clear and inoperability status lights are off.

4.1.19. Place the RCIC/RHR Backfill system in service per Section 4.5.

4.2 Manual RCIC Startup

NOTE

At the direction of the CRS/OSM Steps 4.2.1 through 4.2.3 may be performed after RCIC is placed in service.

4.2.1. Notify Radiation Protection prior to running RCIC.

C 4.2.2. Place RHR into Suppression Pool Cooling mode per SOP-0031, Residual Heat Removal.

4.2.3. Place Containment Purge in service per SOP-0059, Containment HVAC System.

4.2.4. IF RCIC is running in support of testing, THEN begin monitoring the suppression pool average temperature per STP-057-0700, Suppression Pool Average Water Temperature Verification During Testing That Adds Heat to the Suppression Pool.

4.2.5. Start E51-C002C, GLAND SEAL COMPRESSOR.

4.2.6. IF it is desired to simulate a RCIC injection startup by using pump flow directed to the CST, THEN continue at Step 4.2.7.
Otherwise Go To Step 4.2.11.

4.2.7. Open E51-F059, RCIC TEST RETURN VLV TO CST.

4.2.8. Make a plant announcement notifying plant personnel in the Auxiliary Building, Containment, and RCIC Room of RCIC start.

4.2.9. Verify annunciator H13-P601-21A-B03, RCIC TURBINE STEAM SPLY WATER DRAIN TRAP LVL HI is clear.

NOTES

- *The following step may cause Annunciator, P601-21A-H04, RCIC DISCH LINE FILL PUMP DISCH PRESSURE LOW.*
- *Opening E51-MOVF022 to approximately 25% open establishes a flow path and minimizes the use of RCIC pump minimum flow. Throttling E51-MOVF022 to approximately 25% open establishes a pump discharge pressure similar to the discharge pressure that would occur if RCIC were injecting into the reactor with the reactor at operating pressure.*
- *Use local valve position indication for 25% OPEN.*

CAUTION

If an overspeed event occurs during CST to CST operation the down stream piping may be over pressurized. The following shall be performed prior to declaring the RCIC system operable:

- **Calibrate or replace E51-PIR001, IF it was valved in during the overspeed event.**
- **Recalibrate transmitter loops associated with flow control transmitters E51-FTN051 and E51-FTN003.**
- **Perform inspection of piping and equipment.**
- **Calibration check of E51-PCVF015, RCIC Turb Lube Oil Clr Inlet Press Cntrl Vlv**

4.2.10. Open E51-F022, RCIC TEST BYPASS VLV TO CST to approximately 25% open to establish a RCIC pump discharge pressure (after pump start) of approximately 1000 psig.

CRITICAL STEP

4.2.11. Open E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE.

4.2.12. Verify the following valves are closed:

- E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE
- E51-F026, RCIC STM SUPLY DR POT DN STREAM ISOL VALVE
- E51-F004, RCIC TURB EXH DR POT UP STREAM ISOL VALVE
- E51-F005, RCIC TURB EXH DR POT DN STREAM ISOL VALVE

4.2.13. Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is closed.

4.2.14. Establish a discharge flow path per one of the following:

NOTE

If the reactor is at power, then initiation of RCIC with flow to the reactor is considered a Loss of Feedwater Heating. Therefore entry into AOP-0007, Loss of Feedwater Heating is required.

- To inject into the vessel perform the following:

  1) Open E51-F013, RCIC INJECT ISOL VALVE.

  2) Verify closed E51-F022, RCIC TEST BYPASS VLV TO CST.

  3) Verify closed E51-F059, RCIC TEST RETURN VLV TO CST.

  4) WHEN it is required to control RPV water level with RCIC, THEN Go To Section 5.7.

  5) Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is closed.

OR

CAUTION

If an overspeed event occurs during CST to CST operation the CST return piping may be over pressurized. System checks will be required before further RCIC operation.

- RPV Pressure control (CST to CST)

  1) IF necessary, THEN swap RCIC suction to the CST per Section 5.6.2 or EOP-0005, Enclosure 3 Defeating RCIC High S/P Water Level Suction Transfer Interlock as directed by the OSM/CRS.

  2) Verify Open E51-F059, RCIC TEST RETURN VLV TO CST.

  3) Throttle E51-F022, RCIC TEST BYPASS VLV TO CST open to establish desired discharge pressure on E51-R601, RCIC PUMP DISCH PRESS.

  4) WHEN it is required to control RPV pressure with RCIC, THEN Go To Section 5.8.

5) Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is closed.

4.3 RCIC Slow Roll Startup

CAUTION

If RCIC is running in support of testing the Technical Specifications require average suppression pool temperature monitoring per STP-057-0700, Suppression Pool Average Water Temperature Verification During Testing That Adds Heat To The Suppression Pool.

NOTE

Section 4.3 can be performed if a slow turbine start is required. If Section 4.3 is performed, it is desirable to place RCIC in standby condition for 12 hours to allow system cooldown to ambient temperature. This recommended cooldown period is not applicable when performing surveillance testing per Notes of Tech Spec SRs 3.5.3.3 and 3.5.3.4.

4.3.1. Notify Radiation Protection prior to running RCIC.

C 4.3.2. Place RHR into Suppression Pool Cooling mode per SOP-0031, Residual Heat Removal.

4.3.3. Place Containment Purge in service per SOP-0059, Containment HVAC System.

4.3.4. IF RCIC is running in support of testing, THEN begin monitoring the suppression pool average temperature per STP-057-0700, Suppression Pool Average Water Temperature Verification During Testing That Adds Heat To The Suppression Pool.

4.3.5. Start E51-C002C, GLAND SEAL COMPRESSOR.

NOTE

Closing E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR will inop the RCIC System and require entry into an LCO until the system has been restored to its standby lineup.

H13-P601/21A/G03 RCIC SYSTEM INOPERATIVE will alarm when E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR is closed.

4.3.6. Close E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.

NOTE

H13-P601/21A/A03 RCIC PUMP DISCHARGE FLOW LOW and H13-P601/21A/E04 RCIC TURBINE BRG OIL PRESS LOW will alarm until RCIC turbine is up to speed.

4.3.7. Open E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE.

4.3.8. Verify the following valves are closed:

- E51-F025 RCIC STM SPLY DR POT UP STREAM ISOL VALVE
- E51-F026 RCIC STM SUPLY DR POT DN STREAM ISOL VALVE
- E51-F004 RCIC TURB EXH DR POT UP STREAM ISOL VALVE
- E51-F005 RCIC TURB EXH DR POT DN STREAM ISOL VALVE

CAUTION

Operation below 2300 rpm may cause turbine exhaust check valve damage due valve chattering. Therefore minimize operation below 2300 rpm. Ref 7.13

CRITICAL STEP

4.3.9. Throttle E51-MOVC002, RCIC TRIP & THROTTLE VALVE open and bring turbine speed up to 2500 to 3500 rpm, as indicated on E51-C002-1, RCIC TURB SPEED and the RCIC TRIP & THROTTLE VALVE position and RCIC TRIP & THROTTLE VALVE operator have dual position indication.

4.3.10. Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is open.

4.3.11. Open E51-F059, RCIC TEST RETURN VLV TO CST.

4.3.12. Throttle E51-F022, RCIC TEST BYPASS VLV TO CST open to achieve a flow of greater than or equal to 200 gpm while maintaining turbine speed between 2500 and 3500 rpm.

4.3.13. Allow the RCIC Turbine to operate for 5 minutes while observing the turbine, pump, and governor actuator for any oil leaks.

4.3.14. Place E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HYVC002 in Manual and zero the meter deviation.

4.3.15. Place E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HYVC002 in Auto and adjust to maintain desired flow.

NOTE

Open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR in very small increments and allow time for the turbine to respond between adjustments to prevent an overspeed.

4.3.16. Slowly throttle open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR until HVY-C002, RCIC TURBINE GOV VLV indicates that the governor has control.

NOTE

Governor control is verified by lowering the turbine rpm slightly using E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HYVC002. If the rpm drops and is held steady, the governor is in full control.

CRITICAL STEP

4.3.17. WHEN the governor has control, THEN open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.

4.3.18. IF desired, THEN establish a discharge flow path per one of the following:

NOTE

If the reactor is at power, then initiation of RCIC with flow to the reactor is considered a Loss of Feedwater Heating. Therefore entry into AOP-0007, Loss of Feedwater Heating is required.

- To inject into the vessel perform the following:

  1) Open E51-F013, RCIC INJECT ISOL VALVE.

  2) WHEN it is required to control RPV water level with RCIC, THEN Go To Section 5.7, RPV Level Control.

  3) Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is closed.

OR

CAUTION

If an overspeed event occurs during CST to CST operation the CST return piping may be over pressurized. System checks will be required before further RCIC operation.

- RPV Pressure control (CST to CST)

  1) Open E51-F059, RCIC TEST RETURN VLV TO CST.

  2) Throttle E51-F022, RCIC TEST BYPASS VLV TO CST open to establish desired discharge pressure on E51-R601, RCIC PUMP DISCH PRESS.

  3) WHEN it is required to control RPV pressure with RCIC, THEN Go To Section 5.8, RPV Pressure Control.

  4) Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is closed.

NOTE

After any maintenance activity that opens the RCIC turbine lube oil system, including oil changes, oil samples, and if needed, troubleshooting, three 5-minute slow rolls and a final 30 minute slow roll, each followed by a 15-30 minute shutdown period and oil level check, should be completed to ensure all air has been vented from the oil system.

4.3.19. IF additional RCIC slow rolls are NOT required, THEN Go To Step 4.3.24.

4.3.20. WHEN an additional RCIC slow roll is required,
AND RCIC has operated for the minimum amount of time indicated below,
THEN shut down RCIC per Steps 6.1.1 through 6.1.10.

1. First slow roll – 5 minutes
2. Second slow roll – 5 minutes
3. Third slow roll – 5 minutes
4. Final slow roll – 30 minutes

4.3.21. WHEN RCIC has been secured for 15-30 minutes, THEN add oil as necessary to re-establish level just below the maximum level indication.

NOTE

Having to add oil after the third or final slow roll could be indicative of an oil leak.

4.3.22. IF oil addition was required after the third or final slow roll, THEN perform the following:

1. Shut down RCIC by completing Section 6.
2. Contact RCIC System Engineer.
3. Initiate a Condition Report.

4.3.23. IF an additional RCIC slow roll is required, THEN repeat steps 4.3.7 through 4.3.22.

4.3.24. WHEN RCIC is no longer required, THEN shut down RCIC by completing Section 6.

4.4 Manual Initiation

4.4.1. IF RCIC is running in support of testing, THEN begin monitoring the suppression pool average temperature per STP-057-0700, Suppression Pool Average Water Temperature Verification During Testing That Adds Heat To The Suppression Pool.

4.4.2. Arm and depress E51A-S37, RCIC MANUAL INITIATION Pushbutton.

4.4.3. Go To Section 5.1.

4.5 Placing the RCIC/RHR Backfill into Service

4.5.1. Fill and Vent the RHR/RCIC Backfill system a follows:

1. Verify the Reference Leg Backfill System is filled and vented per SOP-0001, Nuclear Boiler Instrumentation, Section 4.1.

NOTE

The following steps show filling and venting the RHR/RCIC Backfill "HI" System with the "LO" system in parenthesis.

2. Verify ICS-V3016(V3026), RCIC/RHR BACKFILL HI(LO) SIDE FILL VALVE is closed.

3. Connect a vent hose to the ICS-V3017(V3027), RCIC/RHR BACKFILL HI(LO) SIDE TEST VALVE and route to a suitable drain.

4. Open ICS-V3017(V3027), RCIC/RHR BACKFILL HI(LO) SIDE TEST VALVE.

5. Establish flow by slowly opening ICS-V3010(V3020), RCIC/RHR BACKFILL HI(LO) SIDE INLET VALVE.

6. Throttle ICS-V3012(V3022) to a flow between 0.24 and 0.72 gph as indicated on ICS-FI301(FI302) RCIC/RHR BACKFILL HI(LO) SIDE FLOW INDICATOR.

7. Flush the flow meter bypass line by slowly opening ICS-V3011(V3021) RCIC/RHR BACKFILL HI(LO) SIDE BYPASS VALVE.

8. Unlock and open ICS-V3015(V3025) RCIC/RHR BACKFILL HI(LO) SIDE BYPASS VALVE and vent until air is purged from the system.

9. WHEN the air is purged from the system, THEN close and lock ICS-V3015(V3025) RCIC/RHR BACKFILL HI(LO) SIDE BYPASS VALVE.

10. Close and lock ICS-V3011(V3021) RCIC/RHR BACKFILL HI(LO) SIDE BYPASS VALVE.

11. Close ICS-V3017(V3027), RCIC/RHR BACKFILL HI(LO) SIDE TEST VALVE.

12. IF desired, THEN remove the vent hose from ICS-V3017(V3027), RCIC/RHR BACKFILL HI(LO) SIDE TEST VALVE and install the cap.

13. IF venting the LO(HI) side, THEN repeat Steps 4.5.1.2 through 4.5.1.12 for the other side.

4.5.2. Place the RCIC/RHR Backfill Hi and Lo Side Systems in service

1. Verify the RCIC/RHR Backfill Hi and Lo Side has been filled and vented per Section 4.5.1

2. Place the RCIC/RHR Backfill Hi Side in Service as follows:

   1) Verify ICS-V3016, RCIC/RHR BACKFILL HI SIDE FILL VALVE is closed.

   2) Close ICS-V3010, RCIC/RHR BACKFILL HI SIDE INLET VALVE.

NOTE

Very little flow should be present.

   3) Depressurize venting through ICS-V3017, RCIC/RHR BACKFILL HI SIDE TEST VALVE.

   4) Close and cap ICS-V3017, RCIC/RHR BACKFILL HI SIDE TEST VALVE.

   5) Open slowly ICS-V3016, RCIC/RHR BACKFILL HI SIDE FILL VALVE.

CAUTION

ICS-V3012, RCIC/RHR BACKFILL HI SIDE METERING VALVE is not designed to provide system isolation. Using excessive force to close this valve will result in damage. Do NOT use excess force when closing this valve

   6) Close and then throttle open ICS-V3012, RCIC/RHR BACKFILL HI SIDE METERING VALVE $^1/_8$ to ¼ turn.

7) Open slowly ICS-V3010, RCIC/RHR BACKFILL HI SIDE INLET VALVE.

8) Open very slowly ICS-V3012, RCIC/RHR BACKFILL HI SIDE METERING VALVE while observing ICS-FI301 for a slow, smooth rise in backfill flow.

9) On ICS-FI301, check flow is between 0.24 and 0.72 gph.

3. Place the RCIC/RHR Backfill Lo Side in Service as follows:

1) Verify ICS-V3026, RCIC/RHR BACKFILL LO SIDE FILL VALVE is closed.

2) Close ICS-V3020, RCIC/RHR BACKFILL LO SIDE INLET VALVE.

NOTE

Very little flow should be present.

3) Depressurize venting through ICS-V3027, RCIC/RHR BACKFILL LO SIDE TEST VALVE..

4) Close and cap ICS-V3027, RCIC/RHR BACKFILL LO SIDE TEST VALVE.

5) Open slowly ICS-V3026, RCIC/RHR BACKFILL LO SIDE FILL VALVE.

CAUTION

ICS-V3022, RCIC/RHR BACKFILL LO SIDE METERING VALVE is not designed to provide system isolation. Using excessive force to close this valve will result in damage. Do NOT use excess force when closing this valve

6) Close and then throttle open ICS-V3022, RCIC/RHR BACKFILL LO SIDE METERING VALVE 1/8 to 1/4 turn.

7) Open slowly ICS-V3020, RCIC/RHR BACKFILL LO SIDE INLET VALVE.

8) Open very slowly ICS-V3022, RCIC/RHR BACKFILL HI SIDE METERING VALVE while observing ICS-FI302 for a slow, smooth rise in backfill flow.

9) On ICS-FI302, check flow is between 0.24 and 0.72 gph.

5 SYSTEM OPERATION

5.1 Operation from Automatic/Manual Initiation

NOTE

If the reactor is at power, then initiation of RCIC with flow to the reactor is considered a Loss of Feedwater Heating. Therefore entry into AOP-0007, Loss of Feedwater Heating is required.

5.1.1. Verify the following:

1. E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE is open.
2. E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE is closed.
3. E51-F026, RCIC STM SUPLY DR POT DN STREAM ISOL VALVE is closed.
4. E51-F004, RCIC TURB EXH DR POT UP STREAM ISOL VALVE is closed.
5. E51-F005, RCIC TURB EXH DR POT DN STREAM ISOL VALVE is closed.
6. E51-C002C, GLAND SEAL COMPRESSOR is running.
7. E51-F022, RCIC TEST BYPASS VLV TO CST is closed.
8. E51-F059, RCIC TEST RETURN VLV TO CST is closed.
9. E51-F013, RCIC INJECT ISOL VALVE is open.
10. E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is closed as flow increases to the RPV.

5.1.2. IF RCIC is running in support of testing, THEN begin monitoring the suppression pool average temperature per STP-057-0700, Suppression Pool Average Water Temperature Verification During Testing That Adds Heat To The Suppression Pool.

C 5.1.3. Place RHR into Suppression Pool Cooling mode per SOP-0031, Residual Heat Removal.

5.1.4. Notify Radiation Protection RCIC is in service.

NOTE

RCIC control system or flow may become unstable if pump flow lowers below 450 gpm (less than or equal to 75% rated flow).

5.1.5. IF the RCIC control system or flow becomes unstable, THEN perform the following:

1. Transfer E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HVYC002 to Manual.
2. Adjust speed demand output to obtain the desired pump flow.

5.1.6. WHEN automatic RCIC operation is no longer required, THEN perform the following:

1. Place E51-C002C, GLAND SEAL COMPRESSOR to START.
2. Depress RCIC INITIATION RESET Pushbutton and check white light is off.

5.1.7. IF RCIC operation is desired, THEN Refer to one of the following Sections.

- Refer to Section 5.7 for level control.
- Refer to Section 5.8 for pressure control.

5.1.8. WHEN RCIC is no longer required, THEN shut down RCIC per Section 6.

5.2 Recovery from RCIC Turbine Trip During AUTO Initiation

NOTE

This section is intended to allow restart of RCIC after turbine trip for other reasons than system isolation.

5.2.1. Close E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.

5.2.2. IF a RCIC Turbine overspeed or local manual trip has occurred, THEN reset the turbine throttle valve locally.

5.2.3. Throttle E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR open to obtain 2500 to 3500 rpm on E51-C002-1, RCIC TURBINE SPEED.

5.2.4. Open E51-F013, RCIC INJECT ISOL VALVE.

NOTE

Open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR in very small increments and allow time for the turbine to respond between adjustments to prevent an overspeed.

5.2.5. Slowly throttle open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR until HVY-C002, RCIC TURBINE GOV VLV indicates that the governor has control.

NOTE

Governor control is verified by lowering the turbine rpm slightly using RCIC PUMP FLOW FLOW CONTROLLER HYVC002. If the rpm drops and is held steady, the governor is in full control.

CRITICAL STEP

5.2.6. WHEN the governor has control, THEN open E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.

5.2.7. IF RCIC operation is desired, THEN Refer to one of the following Sections.

- Refer to Section 5.7 for level control.
- Refer to Section 5.8 for pressure control.

5.2.8. WHEN RCIC is no longer required, THEN shut down RCIC per Section 6.

5.3 Resetting a RCIC overspeed trip

NOTE

After a local manual trip or mechanical overspeed, the Turbine Trip Throttle Valve must be manually reset at the turbine.

Refer to Attachment 5, RCIC Trip Throttle valve diagram

5.3.1. Locally verify E51-MOVC002, RCIC TRIP & THROTTLE VALVE is closed using the handwheel.

NOTE

The movement of the emergency trip rod must be in a path parallel with its normal motion, there should be no twisting action associated with the movement of the emergency trip rod.

5.3.2. At the turbine, PUSH and HOLD the emergency trip rod, against spring pressure towards the RCIC trip & throttle valve.

5.3.3. IF required, THEN lift up on the manual hand trip lever.

5.3.4. WHEN 5 seconds have elapsed, THEN SLOWLY RELEASE the emergency trip rod.

NOTE

Slight manual manipulation of the tappet nut assembly may be necessary if trouble is incurred while attempting to manually reset the RCIC turbine.

5.3.5. Verify the square edge (flat) of the emergency head lever mates with the square edge (flat) of the tappet nut and that the head lever is engaged with the tappet nut.

5.3.6. Verify the trip lever and tappet nut freely resets and mates with the underside of the tappet nut (metal to metal contact). Push down on the top of the tappet nut to assure it is fully seated against the head bracket.

NOTE

If any binding of the mechanism occurs while resetting the trip mechanism, then notify the Shift Manager and the System Engineer.

5.3.7. Verify the trip hook lever is engaged on the latch lever of the trip & throttle valve.

5.3.8. Inform the Control Room the RCIC trip mechanism is reset.

5.4 Alternate Suppression Pool Makeup

NOTE

At the direction of the CRS/OSM, Steps 5.4.1 through 5.4.3 may be performed after RCIC is placed in service.

5.4.1. Notify Radiation Protection prior to running RCIC.

5.4.2. Place RHR into Suppression Pool Cooling mode per SOP-0031, Residual Heat Removal.

5.4.3. Place Containment Purge in service per SOP-0059, Containment HVAC System.

5.4.4. IF RCIC is running in support of testing, THEN begin monitoring the suppression pool average temperature per STP-057-0700, Suppression Pool Average Water Temperature Verification During Testing That Adds Heat to the Suppression Pool.

5.4.5. Start E51-C002C, GLAND SEAL COMPRESSOR.

CRITICAL STEP

5.4.6. Open E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE.

5.4.7. Verify the following valves are closed:

- E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE
- E51-F026, RCIC STM SUPLY DR POT DN STREAM ISOL VALVE
- E51-F004, RCIC TURB EXH DR POT UP STREAM ISOL VALVE
- E51-F005, RCIC TURB EXH DR POT DN STREAM ISOL VALVE

5.4.8. Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is open.

5.4.9. WHEN RCIC is no longer required, THEN shut down RCIC per Section 6.

5.5 Operation of the RCIC Gland Seal Compressor

5.5.1. IF the compressor is being run to lower the RCIC Exhaust Drain Trap level, THEN, verify E51-F004, RCIC TURB EXH DR POT UP STREAM ISOL VALVE is open.

5.5.2. Start E51-C002C, GLAND SEAL COMPRESSOR.

NOTE

If Annunciator, P601-21A-A02, RCIC TURBINE EXHAUST DRAIN TRAP LEVEL HIGH was alarming, then run the compressor at least 20 minutes after the alarm has cleared.

5.5.3. WHEN the GLAND SEAL COMPRESSOR is no longer needed, THEN stop E51-C002, GLAND SEAL COMPRESSOR.

5.6 Manual swap of Suppression Pool and CST suction valves

5.6.1. Swap from CST to Suppression Pool

1. Close E51-F010, RCIC PUMP CST SUCTION VALVE.
2. WHEN E51-F010 indicates dual indication, THEN open E51-F031, RCIC PUMP SUP PL SUCTION VALVE.
3. Verify both valves fully stoke to prevent adding excessive amounts of water to the Suppression Pool.

5.6.2. Swap from Suppression Pool to CST

1. Close E51-F031, RCIC PUMP SUP PL SUCTION VALVE.
2. WHEN E51-F031 indicates dual indication, THEN open E51-F010, RCIC PUMP CST SUCTION VALVE.
3. Verify both valves fully stroke to prevent adding excessive amounts of water to the Suppression Pool.

5.7 RPV Level Control

5.7.1. IF RCIC operating AND aligned to the CST, THEN shift to inject to the RPV as follows:

1. IF desired swap RCIC Suction to the CST per Section 5.6.2.
2. Open E51-F013, RCIC INJECT ISOL VALVE
3. Close the following valves
   1) E51-F022, RCIC TEST BYPASS VLV TO CST
   2) E51-F059, RCIC TEST RETURN VLV TO CST

CAUTION

Operation below 2300 rpm may cause the turbine exhaust check valve damage due to valve chattering. Therefore minimize operation below 2300 rpm. Ref 7.13

5.7.2. With E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HVYC002, in AUTO OR MANUAL, adjust RCIC flow setpoint as required to maintain RPV water level.

5.7.3. IF desired to swap to pressure control (CST to CST), THEN Go To Section 5.8 prior to reaching Level 8.

NOTE

Section 5.8 is used to augment pressure control when other sources of level control are available and RPV level is less than Level 8 and greater than Level 2.

5.8 RPV Pressure Control

5.8.1. Place E51-C002C, GLAND SEAL COMPRESSOR to START.

5.8.2. IF necessary reset any RCIC Initiation signals as follows:

1. Verify Reactor Water Level is greater than Level 2.
2. Depress the RCIC INITIATION RESET pushbutton.
3. Verify RCIC INITIATION RESET white light is off.

5.8.3. IF necessary, THEN swap RCIC suction to the CST per Section 5.6.2 or EOP-0005, Enclosure 3 Defeating RCIC High S/P Water Level Suction Transfer Interlock as directed by the OSM/CRS.

5.8.4. Open E51-F059, RCIC TEST RETURN VLV TO CST.

CAUTION
Operation below 2300 rpm may cause the turbine exhaust check valve damage due to valve chattering. Therefore minimize operation below 2300 rpm. Ref 7.13

5.8.5. Throttle open E51-F022, RCIC TEST BYPASS VLV TO CST to raise RCIC turbine rpm to greater than 2300 rpm and flow to greater than 150 gpm.

5.8.6. When RCIC pump discharge pressure is less than RCIC steam turbine pressure, Close E51-F013, RCIC INJECT ISOL VALVE.

5.8.7. Control pressure as follows:

- Throttle E51-F022, RCIC TEST BYPASS VLV TO CST open or closed to change RCIC pump Discharge pressure.
- Adjust E51-R600, RCIC PUMP FLOW CONTROLLER HYVC002 in MAN or AUTO to raise and lower pressure AND raise and lower rpm.

5.8.8. IF desired, THEN Maximize the RCIC system as follows:

1. Using E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HYVC002 raise RCIC flow to 600 gpm.
2. Throttle E51-F022, RCIC TEST BYPASS VLV TO CST to raise RCIC pump discharge pressure to 1000 to 1100 psig
3. WHEN Maximizing is no longer required, THEN Go To Step 5.8.7 to control pressure.

5.9 High Velocity Flush of RCIC/RHR Backfill during Plant Shutdown

CAUTION

High velocity flushes of the RCIC/RHR backfill system shall not be performed with the reactor temperature greater than or equal to 200ºF until additional detailed analysis on the RCIC/RHR steam supply line flow elbow has been completed under EC 468. High velocity flushes at temperatures greater than or equal to 200ºF can cause pipe stress at the flow elbow due to high temperature water.

NOTE

Note during the performance of this section the following Annuciators may alarm.

- *H13-P601-21A-C01, DIV I RCIC ISOL MN STM SPLY LINE DIFF PRESS HIGH*
- *H13-P601-21A-D01, DIV II RCIC ISOL MN STM SPLY LINE DIFF PRESS HIGH*

5.9.1. Check that the plant is in Mode 4 or 5 and reactor temperature is less than 200°F.

5.9.2. At H13-P601, verify the following valves are closed:

- E51-F076, RCIC WARMUP LINE SHUT OFF VALVE
- E51-F063, RCIC STEAM SUPPLY INBD ISOL VALVE
- E51-F064, RCIC STEAM SUPPLY OUTBD ISOL VALVE

5.9.3. Verify the CRD system is operating in accordance with SOP-0002, Control Rod Drive Hydraulics (Sys #52).

5.9.4. Place RCIC/RHR Backfill system in service per Section 4.5.

NOTE

It is acceptable to perform the following steps for each leg individually or in parallel. Parallel performance is preferred.

5.9.5. Unlock and open ICS-V3011(V3021), RCIC/RHR BACKFILL HI(LO) SIDE BYPASS VALVE.

5.9.6. Unlock and throttle open ICS-V3015(V3025), RCIC/RHR BACKFILL HI(LO) SIDE BYPASS VALVE **AND** flush for 4½ to 5 minutes per valve.

5.9.7. WHEN the flush is complete, THEN Lock closed ICS-V3015(V3025), RCIC/RHR BACKFILL HI(LO) SIDE BYPASS VALVE.

5.9.8. Lock closed ICS-V3011(V3021), RCIC/RHR BACKFILL HI(LO) side BYPASS valve.

5.9.9. Throttle ICS-V3012(V3022), RCIC/RHR BACKFILL HI(LO) SIDE METERING VALVE to adjust flow to between 0.24 and 0.72 gph on ICS-FI301(FI302) RCIC/RHR BACKFILL HI(LO) SIDE FLOW INDICATOR.

5.9.10. IF the flush was performed on a single transmitter leg, THEN reperform Steps 5.9.5 thru 5.9.9 for the other transmitter leg.

5.9.11. Vent the instrument line as follows:

1. Connect a drain hose at E31-PDT-N084A, HIGH(LOW), HIGH POINT VENT (Containment 124’ el AZ 52°, just above the instrument rack).

2. Crack open E31-PDT-N084A, HIGH(LOW), HIGH POINT VENT momentarily.

3. Close and cap, E31-PDT-N084A, HIGH(LOW), HIGH POINT VENT.

5.9.12. IF the RCIC System is not being placed in service within the next 12 hours OR if desired, THEN remove the backfill from service per Section 6.2.

6 SYSTEM SHUTDOWN

6.1 RCIC System Shutdown

6.1.1. Depress E51A-S17, RCIC TURBINE TRIP Pushbutton.

6.1.2. Verify E51-MOVC002, RCIC TRIP & THROTTLE VALVE POSITION indicates closed.

6.1.3. Verify RCIC speed lowering as indicated on E51-C002-1, RCIC TURB SPEED.

6.1.4. Reset any RCIC Initiation signals as follows:

1. Verify E51-C002C, GLAND SEAL COMPRESSOR control switch in START.
2. Depress the RCIC INITIATION RESET pushbutton.
3. Verify RCIC INITIATION RESET white light is off.

6.1.5. Close E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE and verify the following:

- E51-F025, RCIC STM SPLY DR POT UP STREAM ISOL VALVE is open.
- E51-F026, RCIC STM SUPLY DR POT DN STREAM ISOL VALVE is open.
- E51-F004, RCIC TURB EXH DR POT UP STREAM ISOL VALVE is open.
- E51-F005, RCIC TURB EXH DR POT DN STREAM ISOL VALVE is open.

6.1.6. Verify E51-F013, RCIC INJECT ISOL VALVE is closed.

6.1.7. Verify E51-F022, RCIC TEST BYPASS VLV TO CST is closed.

6.1.8. Verify E51-F059, RCIC TEST RETURN VLV TO CST is closed.

6.1.9. Verify E51-F019, RCIC MIN FLOW VLV TO SUPPRESSION POOL is closed.

6.1.10. Close E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR.

6.1.11. IF a RCIC isolation signal is not present, THEN open E51-C002 and verify RCIC TRIP & THROTTLE VALVE POSITION red light is on.

6.1.12. Verify E51-R600, RCIC PUMP FLOW FLOW CONTROLLER HVYC002 in AUTO and set to 600 gpm.

6.1.13. WHEN RCIC has been secured for 15-30 minutes, THEN add oil as necessary to re-establish level just below the maximum level indication.

6.1.14. WHEN 30 minutes have elapsed, THEN stop E51-C002C, GLAND SEAL COMPRESSOR.

6.1.15. IF RCIC System is being removed from service for maintenance, THEN close the following valves to prevent unexpected ESF actuation:

- E51-F063, RCIC STEAM SUPPLY INBD ISOL VALVE
- E51-F064, RCIC STEAM SUPPLY OUTBD ISOL VALVE

6.1.16. Check the mechanical limiter on the Turbine Governor Control Valve for signs of any movement.

6.1.17. Within 12 hours of isolating the RCIC Steam supply remove the RCIC/RHR Backfill systems from service per Section 6.2.

6.2 Removing RCIC/RHR Backfill from Service

NOTE

Steps 6.2.1 and 6.2.2 can be performed in any order. However both sides should be isolated.

6.2.1. Isolate RCIC/RHR Backfill Hi Side

1. Slowly close ICS-V3016, RCIC/RHR BACKFILL HI SIDE FILL VALVE while observing ICS-FI301 for a slow, smooth lowering in backfill flow.
2. Slowly Close ICS-V3010, RCIC/RHR BACKFILL HI SIDE INLET VALVE.

6.2.2. Isolate RCIC/RHR Backfill Lo Side

1. Slowly close ICS-V3026, RCIC/RHR BACKFILL LO SIDE FILL VALVE while observing ICS-FI302 for a slow, smooth lowering in backfill flow.

2. Slowly Close ICS-V3020, RCIC/RHR BACKFILL LO SIDE INLET VALVE.

7 REFERENCES

7.1 PID-27-6A, System 209 Reactor Core Isolation Cooling

7.2 ESK-ICS Series Reactor Core Isolation Cooling System

7.3 GE Elementary Diagram 828E539AA, Reactor Core Isolation Cooling System

7.4 3221.451-000-001, Bingham-Willamette Company RCIC Pump Instruction Manual

7.5 3221.452-000-001, Terry Company RCIC Turbine Instruction Manual

7.6 3224.110-000-030, RCIC System GEK-83376

7.7 RBS Technical Specifications Section 3.5.3

7.8 IE Bulletin 85-03 Supplement 1, Demonstrate Ability to Reset Turbine from an Inadvertent Trip

7.9 GE SIL No. 106, Suppression Pool Temperature Monitoring and Control

7.10 EEAR 90-E0093, RCIC Steam Supply Line Heatup Limitation

7.11 CR 97-0772

7.12 ER 98-0580 –HPCS and RCIC Flow induced early suction swap from CST

7.13 GE AID 56 HPCI/RCIC Turbine Exhaust Check Valve Cycling

7.14 GE SIL No 623

7.15 CR-RBS-2000-00106-0001

7.16 CR-RBS-2005-1419

7.17 EC-252, RCIC/RHR Backfill Installation

8 RECORDS

8.1 Record disposition shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
AUX BLDG, 74 FT EL, CRESCENT AREA					
E51-VF032	RCIC PUMP SUCTION LINE PE TEST CONNECTION	CLOSED/ CAPPED			
ICS-V107	E51-MOVF031 LEAKAGE MONITORING CONNECTION	LOCKED CLOSED/ CAPPED			
ICS-V3003	E51-MOVF031 BONNET PRESS EQUALIZING VALVE	LOCKED OPEN			
AUX BLDG, 70 FT EL, RCIC ROOM					
E51-VF060	RCIC WATER LEG PUMP SUCTION ISOLATION	OPEN			
E51-VF067	RCIC WATER LEG PUMP RECIRCULATION VALVE	OPEN			
E51-VF062	RCIC WATER LEG PUMP DISCHARGE ISOLATION VALVE	OPEN			
ICS-V50	RCIC WATER LEG PUMP SUCTION STRAINER PRESSURE TEST CONNECTION	CLOSED/ CAPPED			
ICS-V51	RCIC WATER LEG PUMP RECIRC STRAINER PRESSURE TEST CONNECTION	CLOSED/ CAPPED			
ICS-V42	RCIC WATER LEG PUMP SUCTION STRAINER BLOWDOWN VALVE	CLOSED/ CAPPED			
ICS-V96	RCIC WATER LEG PUMP PDI-126 LOW SIDE ISOLATION	CLOSED			
ICS-V95	RCIC WATER LEG PUMP PDI-126 HIGH SIDE ISOLATION	CLOSED			
ICS-V46	RCIC PUMP SUCTION PT-N053 PI-R002, PT-N052 ISOLATION	OPEN			
ICS-V16	RCIC PUMP MANUAL SUCTION VALVE	LOCKED OPEN			
ICS-V76	RCIC PUMP SUCTION STRAINER PRESSURE TEST CONNECTION ISOLATION	CLOSED/ CAPPED			
ICS-V45	RCIC PUMP SUCTION STRAINER PRESSURE TEST CONNECTION ISOLATION	CLOSED/ CAPPED			
ICS-V43	RCIC PUMP SUCTION STRAINER BLOWDOWN VALVE	CLOSED/ CAPPED			
E51-VF051	RCIC PUMP DRAIN VALVE	CLOSED			
E51-VF037	RCIC PUMP DRAIN VALVE	CLOSED			
ICS-V14	RCIC PUMP MANUAL DISCHARGE VALVE	LOCKED OPEN			

VALVE LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
ICS-V36	RCIC PUMP DISCHARGE PI-R001 AND PT-N050 ISOLATION	OPEN			
ICS-V37	RCIC PUMP DISCHARGE PI-R001 PT-N050 ISOLATION VALVE	OPEN			
E51-VF036	RCIC PUMP PC001 VENT VALVE	CLOSED/ CAPPED			
E51-VF050	RCIC PUMP PC001 VENT VALVE	CLOSED			
E51-V302	GLAND SEAL SUPPLY TO TURBINE TRIP VALVE	OPEN			
E51-V303	E51-PI176 ROOT ISOL	OPEN			
E51-V304	E51-PI175 ROOT ISOL	OPEN			
E51-V305	GLAND SEAL SUPPLY ISOL TO TURBINE NORTH	OPEN			
E51-V306	GLAND SEAL SUPPLY ISOL TO TURBINE SOUTH	OPEN			
E51-V307	E51-PI178 ROOT ISOL	OPEN			
E51-V308	E51-PI177 ROOT ISOL	OPEN			
E51-MOVF046	RCIC TURBINE LUBE OIL CLG WATER SUPPLY VLV	LOCKED OPEN			
ICS-V99	RCIC L.O. COOLER DRAIN LINE	CLOSED/ CAPPED			
E51-VF089	RCIC LUBE OIL COOLER PCV-SENSING LINE ISOLATION VALVE	CLOSED/ CAPPED			
ICS-V72	RCIC LUBE OIL COOLER COOLING WATER INLET PRESSURE TEST CONN.	CLOSED/ CAPPED			
ICS-V74	RCIC LUBE OIL COOLER COOLING WATER OUTLET PRESSURE TEST CONN.	CLOSED/ CAPPED			
ICS-V77	RCIC LUBE OIL COOLER COOLING WATER OUTLET DRAIN VALVE	CLOSED/ CAPPED			
ICS-V60	RCIC STEAM SUPPLY TO PT-N007 AND PI-R003 VALVE	OPEN			
ICS-V61	RCIC STEAM SUPPLY TO PT-N007 AND PI-R003 ROOT VALVE	OPEN			
ICS-V64	RCIC TRIP THROTTLE VALVE ABOVE SEAL DRAIN	OPEN			
ICS-V65	RCIC TRIP THROTTLE VALVE BELOW SEAL DRAIN	OPEN			
E51-VF048	RCIC EXHAUST LINE DRAIN POT DRAIN TEST CONNECTION	CLOSED/ CAPPED			

VALVE LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
DER-V34	RCIC PUMP VENT	CLOSED			
DER-V35	RCIC PUMP VENT	CLOSED			
ICS-V98	HIGH SIDE ISOL. ICS-FE128 WATER LEG PUMP DISCHARGE	CLOSED			
E51-V301	GLAND SEAL SUPPLY ISOL. TO TURBINE GOVERNOR VALVE	OPEN			
ICS-V97	LOW SIDE ISOL. ICS-FE128 WATER LEG PUMP DISCHARGE	CLOSED			
ICS-V300	RCIC TURBINE LUBE OIL COOLER OIL DRAIN	CLOSED/ CAPPED			
ICS-V351	RCIC TURBINE STM. SPLY. DR. POT LS-N010 ISOL.	OPEN			
ICS-V352	RCIC TURBINE STM. SPLY. DR. POT LS-N010 ISOL.	OPEN			
ICS-V353	RCIC TURBINE EXH. DR. POT LS-N037 ISOL.	OPEN			
ICS-V354	RCIC TURBINE EXH. DR. POT LS-N037 ISOL.	OPEN			
DTM-V58	RCIC STEAM SUPPLY DRAIN POT LINE DRAIN	CLOSED/ CAPPED			
E51-VF053	RCIC STM SPLY. DRAIN POT LINE DR.	CLOSED			
E51-VF052	RCIC STM SPLY. DRAIN POT LINE DR.	CLOSED/ CAPPED			
DTM-V57	RCIC STEAM SUPPLY DRAIN POT DRAIN LINE	CLOSED/ CAPPED			
DTM-V56	RCIC STEAM SUPPLY DRAIN POT DRAIN LINE	CLOSED			
AUX BLDG, 86 FT EL, RCIC ROOM					
ICS-V35	RCIC PUMP DISCHARGE FT-N003, FE-N001 HI SIDE ROOT VALVE	OPEN			
ICS-V33	RCIC PUMP DISCHARGE FT-N003, FE-N001 LO SIDE ROOT VALVE	OPEN			
ICS-V87	RCIC DISCHARGE TEST LINE TO CST DRAIN VALVE	CLOSED/ CAPPED			
ICS-V88	RCIC DISCHARGE TEST LINE TO CST DRAIN VALVE	CLOSED			
ICS-V25	MANUAL ISOLATION FOR E51-MOVF010	LOCKED OPEN			
ICS-V24	MANUAL ISOLATION FOR E51-MOVF010	LOCKED OPEN			
ICS-V3000	RCIC TEST RETURN TO CST VENT	CLOSED/ CAPPED			

VALVE LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	2ND	VALVE LABELED
AUX BLDG, 90 FT EL, RCIC ROOM					
ICS-V52	RCIC TURBINE STEAM SUPPLY DPT-N083A HIGH SIDE ROOT VALVE	LOCKED OPEN			
ICS-V54	RCIC TURBINE STEAM SUPPLY DPT-N083A LOW SIDE ROOT VALVE	LOCKED OPEN			
ICS-V56	RCIC TURBINE STEAM SUPPLY DPT-N083B LOW SIDE ROOT VALVE	LOCKED OPEN			
ICS-V58	RCIC TURBINE STEAM SUPPLY DPT-N083B HIGH SIDE ROOT VALVE	LOCKED OPEN			
ICS-V20	RCIC EXHAUST PT-N056E ROOT VALVE	OPEN			
ICS-V19	RCIC EXHAUST PT-N056A ROOT VALVE	OPEN			
ICS-V68	RCIC EXHAUST LINE RUPTURE DISC. PT-N055B AND PT-N055F ROOT	LOCKED OPEN			
ICS-V69	RCIC EXHAUST LINE RUPTURE DISC. PT-N055A AND PT-N055E ROOT	LOCKED OPEN			
ICS-V53	E31-PDT-N083A ROOT ISOL.	LOCKED OPEN			
ICS-V59	E31-PDT-N083B ROOT ISOL.	LOCKED OPEN			
AUX BLDG, 95 FT EL, RCIC ROOM					
E51-VF057	RCIC PUMP MINIMUM FLOW LINE TEST CONNECTION ISOLATION	CLOSED/ CAPPED			
E51-VF084	RCIC PUMP DISCHARGE LEAKAGE MONITORING CONNECTION VALVE	CLOSED			
E51-VF085	RCIC PUMP DISCHARGE LMC VALVE	CLOSED/ CAPPED			
E51-VF034	RCIC INJECTION LINE CHECK VALVE LMC VALVE	LOCKED CLOSED/ CAPPED			
E51-VF041	RCIC EXHAUST TO SUPPRESSION POOL ISOLATION VLV TEST CONNECTION	CLOSED/ CAPPED			
ICS-V106	RCIC EXHAUST MOV ISOLATION LMC VALVE	LOCKED CLOSED/ CAPPED			

VALVE LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
E51-VF082	RCIC EXHAUST LINE TEST CONNECTION	LOCKED CLOSED/ CAPPED			
E51-VF080	RCIC EXHAUST LINE TEST CONNECTION	LOCKED CLOSED/ CAPPED			
E51-VF083	RCIC EXHAUST LINE TEST CONNECTION	LOCKED CLOSED/ CAPPED			
ICS-V3002	RCIC PUMP DISCHARGE VENT	CLOSED/ CAPPED			
AUX BLDG, 98 FT EL, STEAM TUNNEL, S.W. CORNER					
DTM-V52	RCIC STEAM SUPPLY DRAIN POT LINE CONDENSER INLET	LOCKED OPEN			
AUX BLDG 119 FT EL, STEAM TUNNEL					
ICS-V100	RCIC INJECTION LINE OUTBOARD LMC VALVE	LOCKED CLOSED/ CAPPED			
E51-VF073	E51-MOVF064 LEAKAGE MONITORING CONN. ISOLATION VALVE	LOCKED CLOSED/ CAPPED			
ICS-V302	RCIC INJ. LINE HEADER DRAIN	LOCKED CLOSED/ CAPPED			
REACTOR BLDG, CONTAINMENT, 122 FT EL					
ICS-V6	RCIC STM SUPPLY PDT-N084B PDT-N084A ISOLATION	LOCKED OPEN			
ICS-V8	RCIC STM SUPPLY PDT-N084B/PDT-N084A ISOLATION	LOCKED OPEN			
ICS-V10	SPARE	CLOSED/ CAPPED			
ICS-V12	SPARE	CLOSED/ CAPPED			

VALVE LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	2ND	VALVE LABELED
THE FOLLOWING VALVES ARE LOCATED ON INSTRUMENT RACK H22-PNL P004					
NOTE *THE FOLLOWING E31-PDTN084A/B AND E31-PTN085A/B TRANSMITTER, RCIC/RHR BACKFILL HI SIDE VALVE LINEUP IS TO BE PERFORMED IN THE ORDER LISTED.*					
ICS-V3016	RCIC/RHR BACKFILL HI SIDE FILL VALVE	CLOSED			
ICS-V3011	RCIC/RHR BACKFILL HI SIDE BYPASS VALVE	LOCKED CLOSED			
ICS-V3018	RCIC/RHR BACKFILL HI SIDE FLUSH METERING VALVE	OPEN			
ICS-V3015	RCIC/RHR BACKFILL HI SIDE BYPASS VALVE	LOCKED CLOSED			
ICS-V3017	RCIC/RHR BACKFILL HI SIDE TEST VALVE	CLOSED/ CAPPED			
ICS-V3010	RCIC/RHR BACKFILL HI SIDE INLET VALVE	CLOSED			
ICS-V3012	RCIC/RHR BACKFILL HI SIDE METERING VALVE	OPEN			
NOTE *THE FOLLOWING E31-PDTN084A/B AND E31-PTN085A/B TRANSMITTER, RCIC/RHR BACKFILL LO SIDE VALVE LINEUP IS TO BE PERFORMED IN THE ORDER LISTED.*					
ICS-V3026	RCIC/RHR BACKFILL LO SIDE FILL VALVE	CLOSED			
ICS-V3021	RCIC/RHR BACKFILL LO SIDE BYPASS VALVE	LOCKED CLOSED			
ICS-V3028	RCIC/RHR BACKFILL LO SIDE FLUSH METERING VALVE	OPEN			
ICS-V3025	RCIC/RHR BACKFILL LO SIDE BYPASS VALVE	LOCKED CLOSED			
ICS-V3027	RCIC/RHR BACKFILL LO SIDE TEST VALVE	CLOSED/ CAPPED			
ICS-V3020	RCIC/RHR BACKFILL LO SIDE INLET VALVE	CLOSED			
ICS-V3022	RCIC/RHR BACKFILL LO SIDE METERING VALVE	OPEN			

VALVE LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
DRYWELL, 125 FT EL, AZ 20					
ICS-V102	STEAM LINE ISOLATION LMC VALVE	LOCKED CLOSED/ CAPPED			
ICS-V15	STEAM BYPASS MANUAL ISOLATION	OPEN			
ICS-V17	STEAM BYPASS LMC	CLOSED/ CAPPED			

Remarks: ____

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Performed By: ____________ ____________ ____________ ____/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________ ____________ ____________
OSM/CRS KCN Date/Time

Second Review: ____________ ____________ ____________
Operations Management KCN Date/Time

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-AOVF004	RCIC TURB DRAIN POT - AUX. BLDG, 70 FT EL, E CUBE			
	E51-AOVF004-V1	OPEN		
E51-AOVF005	CNSD PM DIS - AUX. BLDG, 70 FT EL, E CUBE			
	E51-AOVF005-V1	OPEN		
E51-AOVF025	RCIC DRAIN POT DRAINS - AUX. BLDG, 70 FT EL, E CUBE			
	E51-AOVF025-V1	OPEN		
E51-AOVF026	RCIC DRAIN POT DRAINS - AUX. BLDG, 70 FT EL, E CUBE			
	E51-AOVF026-V1	OPEN		
E51-AOVF054	RCIC DRAIN POT DRAINS - AUX. BLDG, 70 FT EL, E CUBE			
	E51-AOVF054-V1	OPEN		
E51-PTN052	RCIC PMP DISCH - AUX. BLDG, 75 FT EL, E CUBE			
	CAUTION - See Common Sensing Line Table - Reference D E51-PTN052-V1	OPEN		
	E51-PTN052-V2	CLOSED		
	E51-PTN052-V3	CLOSED		
	E51-PTN052-V4	CLOSED		
	E51-R604 H13-P601	LIVE ZERO		
E51-PTN053	RCIC PUMP SUCT - AUX. BLDG, 75 FT EL, E CUBE			
	CAUTION - See Common Sensing Line Table - Reference D E51-PTN053-V1	OPEN		
	E51-PTN053-V2	CLOSED		
	E51-PTN053-V3	CLOSED		
	E51-PTN053-V4	CLOSED		
	E51-N653 H13-P629	LIVE ZERO		
E51-PIR002	RCIC PUMP SUCTION - AUX. BLDG, 74 FT EL, E CUBE - AJ-4-75			
	CAUTION - See Common Sensing Line Table - Reference D E51-PIR002-V1	CLOSED		
	E51-PIR002-V2	CLOSED		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
E51-LSN037	RCIC TURB EXH DR POT - AUX. BLDG, 74 FT EL, E CUBE			
	E51-LSN037-V1	CLOSED		
	E51-LSN037-V2	CLOSED		
E31-PDT-N083B	RCIC STM SUPPLY DIF PRESS - AUX. BLDG, 75 FT EL, E CUBE - AJ-3-75			
	E31-PDT-N083B-V1H	OPEN		
	E31-PDT-N083B-V2L	OPEN		
	E31-PDT-N083B-V3B	CLOSED		
	E31-PDT-N083B-V4	CLOSED		
	E31-PDT-N083B-V5	CLOSED		
	E31-PDT-N083B-V6	CLOSED		
	E31-PDT-N083B-V7	CLOSED		
	E31-N683B H13-P618	LIVE ZERO		
E51-LSN010	RCIC TURB ST SPLY DR POT - AUX. BLDG, 75 FT EL, E CUBE EAST SIDE OF SKID			
	E51-LSN010-V1	CLOSED		
	E51-LSN010-V2	CLOSED		
E31-PDT-N083A	RCIC STEAM SUPPLY DIFF PRESS TRANSMITTER - AUX. BLDG, 75 FT EL, E CUBE - AJ-4-75 EAST OF SKID			
	E31-PDT-N083A-V1H	OPEN		
	E31-PDT-N083A-V2L	OPEN		
	E31-PDT-N083A-V3B	CLOSED		
	E31-PDT-N083A-V4	CLOSED		
	E31-PDT-N083A-V5	CLOSED		
	E31-PDT-N083A-V6	CLOSED		
	E31-PDT-N083A-V7	CLOSED		
	E31-N683A H13-P629	LIVE ZERO		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-PIR004	TURB STEAM DISCH PRESS INDICATOR, AUX BLDG 95 FT ELEV, “F” CUBE, RHR ‘A’ CUBICLE - H22-PNLP017			
	E51-PIR004-V1	OPEN		
	E51-PIR004-V2	CLOSED		
	E51-PIR004-V3	CLOSED		
ICS-FI128	RCIC LINE FILL PUMP DISCH - AUX. BLDG, 70 FT EL, E CUBE			
	ICS-FI128-V1H	OPEN		
	ICS-FI128-V2L	OPEN		
	ICS-FI128-V3B	CLOSED		
	ICS-FI128-V4	CLOSED		
	ICS-FI128-V5	CLOSED		
	ICS-FI128-V6	CLOSED		
	ICS-FI128-V7	CLOSED		
E51-PIR001	RCIC PUMP DISCH - AUX. BLDG, 95 FT EL, F CUBE - RHR A CUBE H22-PNLP017			
	CAUTION - See Common Sensing Line Table - Reference A E51-PIR001-V1	CLOSED		
	E51-PIR001-V2	CLOSED		
	E51-PIR001-V3	CLOSED		
	A6-E51-R001	OPEN		
E51-PTN050	RCIC PUMP DISCH - AUX. BLDG, 95 FT EL, F CUBE - RHR A CUBE H22-PNLP017			
	CAUTION - See Common Sensing Line Table - Reference A E51-PTN050-V1	OPEN		
	E51-PTN050-V2	CLOSED		
	E51-PTN050-V3	CLOSED		
	E51-PTN050-V4	CLOSED		
	A6-E51-N050	OPEN		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-PIR003	STEAM LINE PRESS - AUX. BLDG, 95 FT EL, F CUBE - RHR A CUBE H22-PNLP017			
	E51-PIR003-V1	CLOSED		
	E51-PIR003-V2	CLOSED		
	E51-PIR003-V3	CLOSED		
	A5-E51-R003	OPEN		
E51-PTN007	STEAM LINE PRESS- AUX. BLDG, 95 FT EL, F CUBE - RHR A CUBE H22-PNLP017			
	E51-PTN007-V1	OPEN		
	E51-PTN007-V2	CLOSED		
	E51-PTN007-V3	CLOSED		
	E51-PTN007-V4	CLOSED		
	A5-E51-N007	OPEN		
E51-FTN003	RCIC PUMP DISCH - AUX. BLDG, 95 FT EL, F CUBE - RHR A CUBE H22-PNLP017			
	CAUTION - See Common Sensing Line Table - Reference B E51-FTN003-V1H	OPEN		
	E51-FTN003-V9	CLOSED		
	CAUTION - See Common Sensing Line Table - Reference C E51-FTN003-V2L	OPEN		
	E51-FTN003-V8	CLOSED		
	E51-FTN003-V3B	CLOSED		
	E51-FTN003-V4	CLOSED		
	E51-FTN003-V5	CLOSED		
	E51-FTN003-V6	CLOSED		
	E51-FTN003-V7	CLOSED		
	A7-E51-N003 HIGH	OPEN		
	A8-E51-N003 LOW	OPEN		
	E51-R606 H13-P601	LIVE ZERO		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-FTN051	RCIC PUMP DISCH - AUX. BLDG, 95 FT EL, F CUBE - RHR A CUBE H22-PNLP017			
	CAUTION - See Common Sensing Line Table - Reference B E51-FTN051-V1H	OPEN		
	E51-FTN051-V9	CLOSED		
	CAUTION - See Common Sensing Line Table - Reference C E51-FTN051-V2L	OPEN		
	E51-FTN051-V8	CLOSED		
	E51-FTN051-V3B	CLOSED		
	E51-FTN051-V4	CLOSED		
	E51-FTN051-V5	CLOSED		
	A7-E51-N051-HIGH	OPEN		
	A8-E51-N051-LOW	OPEN		
	E51-N651 H13-P629	LIVE ZERO		
E51-PTN055A	RCIC TURB EXH. TO SUPPR POOL - AUX. BLDG, 95 FT EL, F CUBE H22-PNLP017			
	CAUTION - See Common Sensing Line Table - Reference E E51-PTN055A-V1	OPEN		
	E51-PTN055A-V2	CLOSED		
	E51-PTN055A-V3	CLOSED		
	A1-1E51-PTN055A	OPEN		
	E51-N655A H13-P629	LIVE ZERO		
E51-PTN056A	RCIC TURB EXH TO SUPPR POOL - AUX. BLDG, 95 FT EL, F CUBE H22-PNLP017			
	E51-PTN056A-V1	OPEN		
	CAUTION - See Common Sensing Line Table - Reference C E51-PTN056A-V2	CLOSED		
	E51-PTN056A-V3	CLOSED		
	E51-PTN056A-V4	CLOSED		
	A2-1E51-PTN056A	OPEN		
	E51-N656A H13-P629	LIVE ZERO		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-PTN055E	RCIC TURBINE EXH. TO SUPPR. POOL - AUX. BLDG, 95 FT EL, F CUBE H22-PNLP017			
	CAUTION - See Common Sensing Line Table - Reference E E51-PTN055E-V1	OPEN		
	E51-PTN055E-V2	CLOSED		
	E51-PTN055E-V3	CLOSED		
	E51-PTN055E-V4	CLOSED		
	A1-E51-N055E	OPEN		
	E51-N655E H13-P629	LIVE ZERO		
E51-PTN056E	RCIC TURB EXH TO SUPPR POOL - AUX. BLDG, 95 FT EL, F CUBE H22-PNLP017			
	CAUTION - See Common Sensing Line Table - Reference G E51-PTN056E-V1	OPEN		
	E51-PTN056E-V2	CLOSED		
	E51-PTN056E-V3	CLOSED		
	E51-PTN056E-V4	CLOSED		
	A3-E51-N056E	OPEN		
	E51-N656E H13-P629	LIVE ZERO		
E51-PTN055B	RCIC TURBINE EXH. TO SUPPR. POOL - 95 FT EL, C CUBE H22-PNL-P021			
	CAUTION - See Common Sensing Line Table - Reference F E51-PTN055B-V1	OPEN		
	E51-PTN055B-V2	CLOSED		
	E51-PTN055B-V3	CLOSED		
	E51-PTN055B-V4	CLOSED		
	A3-E51-N055B	OPEN		
	E51-N655B H13-P618	LIVE ZERO		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-PTN055F	RCIC TURB EXH TO SUPPR POOL - 95 FT EL, C CUBE H22-PNLP021			
	CAUTION - See Common Sensing Line Table - Reference F E51-PTN055F-V1	OPEN		
	E51-PTN055F-V2	CLOSED		
	E51-PTN055F-V3	CLOSED		
	A3-E51-N055F	OPEN		
	E51-N655F H13-P618	LIVE ZERO		
ICS-PDI126	RCIC DISCH LINE FILL PUMP - 74 FT EL, C CUBE - EAST WALL JPB-RAK-7			
	ICS-PDI126-V1H	CLOSED		
	CAUTION - See Common Sensing Line Table - Reference H ICS-PDI-126-V2L	CLOSED		
	ICS-PDI126-3B	OPEN		
	ICS-PDI126-V4	CLOSED		
	ICS-PDI126-V5	CLOSED		
	ICS-PDI126-V6	CLOSED		
	ICS-PDI126-V7	CLOSED		
	ICS-PDI126-V8	CLOSED		
	ICS-PDI126-V9	CLOSED		
ICS-PI131	RCIC LINE FILL PUMP SUCT - AUX. BLDG, 74 FT EL, C CUBE - EAST WALL			
	CAUTION - See Common Sensing Line Table - Reference H ICS-PI131-V1	CLOSED		
	ICS-PI131-V2	CLOSED		
	ICS-PI131-V3	CLOSED		
	ICS-PI131-V4	CLOSED		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-LTN035A	CONDENSATE STORAGE TANK - FG-5-71 F TUNNEL			
	E51-LTN035A-V1	OPEN		
	E51-LTN035A-V2	CLOSED		
	E51-LTN035A-V3	CLOSED		
	E51-N635A H13-P629	LIVE ZERO		
E51-LTN035E	CONDENSATE STORAGE TANK - FG-5-71 F TUNNEL			
	E51-LTN035E-V1	OPEN		
	E51-LTN035E-V2	CLOSED		
	E51-LTN035E-V3	CLOSED		
	E51-N635E H13-P629	LIVE ZERO		
E51-LTN036A	SUPPRESSION POOL - 123 FT EL, AZ 260° - OUTER WALL			
	E51-LTN036A-V1	OPEN		
	E51-LTN036A-V2	OPEN		
	E51-LTN036A-V3	OPEN		
	E51-LTN036A-V4	CLOSED		
	E51-LTN036A-V5	CLOSED		
	E51-LTN036A-V6	CLOSED		
	E51-LTN036A-V7	CLOSED		
	E51-N636A H13-P629	LIVE ZERO		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS	
			1ST	2ND
E31-PDT-N084B	RCIC STEAM SUPPLY DIFF PRESS TRANSMITTER - 118 FT EL, AZ 50□ H22-P015			
	CAUTION - See Common Sensing Line Table - Reference J E31-PDT-N084B-V1H	OPEN		
	E31-PDT-N084B-V2L	OPEN		
	E31-PDT-N084B-V3B	CLOSED		
	E31-PDT-N084B-V4	CLOSED		
	E31-PDT-N084B-V5	CLOSED		
	E31-PDT-N084B-V6	CLOSED		
	A5-E31-N084B-HIGH	OPEN		
	A6-E31-N084B-LOW	OPEN		
	E31-N684B H13-P618	LIVE ZERO		
E31-PT-N085B	RCIC STEAM SUPPLY PRESSURE TRANSMITTER - 115 FT EL, AZ 34□			
	CAUTION - See Common Sensing Line Table - Reference J E31-PT-N085B-V1	OPEN		
	E31-PT-N085B-V2	CLOSED		
	E31-PT-N085B-V3	CLOSED		
	A5-E31-N085B	OPEN		
	E31-N685B H13-P618	LIVE ZERO		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS	
			1ST	2ND
E31-PDT-N084A	RCIC STEAM LINE SUPPLY DIFF PRESS TRANSMITTER - 118 FT EL, AZ 34° H22-P004			
	CAUTION - See Common Sensing Line Table - Reference I E31-PDT-N084A-V1H	OPEN		
	E31-PDT-N084A-V2L	OPEN		
	E31-PDT-N084A-V3B	CLOSED		
	E31-PDT-N084A-V4	CLOSED		
	E31-PDT-N084A-V5	CLOSED		
	E31-PDT-N084A-V6	CLOSED		
	E31-PDT-N084A-V7	CLOSED		
	E31-PDT-N084A HI POINT VENT (124 FT EL, AZ 52°)	CLOSED/ CAPPED		
	B6-E31-N084-HIGH	LOCKED/ OPEN		
	E31-PDT-N084A HI POINT VENT (124 FT EL, AZ 52°)	CLOSED/ CAPPED		
	B7-E31-N084-LOW	LOCKED/ OPEN		
	E31-N684A H13-P629	LIVE ZERO		
E31-PT-N085A	RCIC STEAM SUPPLY PRESSURE TRANSMITTER - 118 FT EL, AZ 34° H22-P004			
	CAUTION - See Common Sensing Line Table - Reference I E31-PT-N085A-V1	OPEN		
	E31-PT-N085A-V2	CLOSED		
	B6-E31-N085A	OPEN		
	E31-N685A H13-P629	LIVE ZERO		

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
E51-LTN036E	SUPPRESSION POOL - 120 FT EL, AZ 69□ - OUTER WALL			
	E51-LTN036E-V1	OPEN		
	E51-LTN036E-V2	OPEN		
	E51-LTN036E-V3	OPEN		
	E51-LTN036E-V4	CLOSED		
	E51-LTN036E-V5	CLOSED		
	E51-LTN036E-V6	CLOSED		
	E51-LTN036E-V7	CLOSED		
	E51-N636E H13-P629	LIVE ZERO		

CAUTION

The following table shows instruments on common sensing lines. Operation of isolation valves for these instruments may cause perturbations in associated instruments. Do not operate isolation valves unless Operations has been notified.

COMMON SENSING LINE TABLE

REFERENCE	INSTRUMENT	DESCRIPTION
REF. A COMMON SENSING LINES	E51-PIR0001	RCIC PUMP DISCH.
	E51-PTN050	RCIC PUMP DISCH.
REF. B COMMON SENSING LINES	E51-FTN003(H)	RCIC PUMP DISCH.
	E51-FTN051(H)	RCIC PUMP DISCH.
REF. C COMMON SENSING LINES	E51-FTN003(L)	RCIC PUMP DISCH.
	E51-FTN051(L)	RCIC PUMP DISCH.

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

REFERENCE	INSTRUMENT	DESCRIPTION
REF. D COMMON SENSING LINES	E51-PTN052	RCIC PUMP SUCTION
	E51-PIR002	RCIC PUMP SUCTION
	E51-PTN053	RCIC PUMP SUCTION
REF. E COMMON SENSING LINES	E51-PTN055A	RCIC TURB EXH TO SUPPRESSION POOL
	E51-PTN055E	RCIC TURB EXH TO SUPPRESSION POOL
REF. F COMMON SENSING LINES	E51-PTN055B	RCIC TURB EXH TO SUPPRESSION POOL
	E51-PTN055F	RCIC TURB EXH TO SUPPRESSION POOL
REF. G COMMON SENSING LINES	E51-PTN056E	RCIC TURB EXH TO SUPPRESSION POOL
	E51-PIR004	RCIC TURB EXH TO SUPPRESSION POOL
REF. H COMMON SENSING LINES	ICS-PDI-126(L)	RCIC DISCH LINE FILL PUMP
	ICS-PI-131	RCIC LINE FILL PUMP SUCTION
REF. I COMMON SENSING LINES	E51-PDTN084A(H)	RCIC TURB STEAM SUPPLY
	E51-PTN085A	RCIC TURB STEAM SUPPLY
REF. J COMMON SENSING LINES	E31-PDTN084B(H)	RCIC TURB STEAM SUPPLY
	E31-PTN085B	RCIC TURB STEAM SUPPLY

INSTRUMENT AND VALVE LINEUP - REACTOR CORE ISOLATION COOLING SYSTEM (SAFETY RELATED)

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ELECTRICAL LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS 1st	INITIALS 2nd
E51-C002	RCIC TURB TRIP THROT VALVE	ENB-MCC1 BKR 1B	ON		
E51-F010	RCIC PUMP SUCT VV CNDS STOR TK	ENB-MCC1 BKR 1C	ON		
E51-F013	RCIC INJ SHUTOFF VALVE	ENB-MCC1 BKR 4C	ON		
E51-F019	RCIC MIN FLOW VV SUPPR POOL	ENB-MCC1 BKR 5B	ON		
E51-F022	RCIC TEST FCV TO CNDS STOR	ENB-MCC1 BKR 2B	ON		
E51-F031	RCIC PUMP SUCT SUPP POOL VALVE	ENB-MCC1 BKR 2C	ON		
E51-F045	RCIC STEAM TO TURB VALVE	ENB-MCC1 BKR 4B	ON		
E51-F059	RCIC TEST RTN CNDS STOR VALVE	ENB-MCC1 BKR 3C	ON		
E51-F068	RCIC TURB EXH VV TO SUPPR POOL	ENB-MCC1 BKR 5C	ON		
E51-MOVF063	RCIC & RHR STEAM SUPPLY VALVE	EHS-MCC2D BKR 3C	ON		
E51-MOVF063	ALTERNATE FEED FOR MCR FIRE	EHS-MCC2D BKR 5B	ON		
E51-C003	RCIC FILL SUB SYS PUMP MOTOR	EHS-MCC2E BKR 1F	ON		
E51-F064	RCIC STM SPLY LINE OUTBD ISOL VALVE (MST 121 FT EL, N.W. CORNER)	EHS-MCC2L BKR 4B	ON		
E51-MOVF063	E51-SW63 BRKR 1 ALT DIV I PWR E51-MOVF063	EHS-MCC2L BKR 6AT	OFF		
E51-MOVF063	E51-SW63 BRKR 2 ALT DIV I PWR E51-MOVF063	EHS-MCC2L BKR 6AB	OFF		
E51-SW63	DIV I ALT PWR SUPPLY E51-MOVF063	NA	OPEN		
E51-F076	RCIC STEAM SUPPLY BYPASS VALVE	EHS-MCC2D BKR 4A	ON		
E51-MOVF077	ICS VAC BRK ISOL VALVE OUT	EHS-MCC2G BKR 4C	ON		
E51-MOVF078	ICS VACUUM BREAKER ISOLATION VALVE	EHS-MCC2H BKR 2B	ON		
E51-C002C	BYS-INV01B RELIABLE BUS INVERTER & E51-C002C P.S.	BYS-SWG01B BKR 529	CLOSED		
H13-P601	RCIC TURBINE VALVE CONTROLS	ENB-PNL02A DISC 6	ON		
H13-P621	RCIC TURBINE RELAY AND TRIP LOGIC	ENB-PNL02A DISC 7	ON		

ELECTRICAL LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS 1st	2nd
H13-P632	RCIC POWER SUPPLY E51-K603	ENB-PNL02A DISC 10	ON		
H13-P618	DIV II RCIC RELAY LOGIC	ENB-PNL02B DISC 11	ON		
H13-P601	RCIC TURBINE VALVE CONTROLS	ENB-PNL02B DISC 6	ON		
E51-C002C	RCIC GLAND SEAL AIR COMPRESSOR STARTER	E51-STR2C	ON		

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Operations Management KCN Date/Time

CONTROL BOARD LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
E51-F025 RCIC STM SPLY DR POT UP STREAM ISOL VALVE	OPEN	RED		
E51-F026 RCIC STM SUPLY DR POT DN STREAM ISOL VALVE	OPEN	RED		
E51A-S17, RCIC TURBINE TRIP	NOT DEPRESSED	N/A		
E51-F022 RCIC TEST BYPASS VLV TO CST	AUTO	GREEN		
E51-F059 RCIC TEST RETURN VLV TO CST	AUTO	GREEN		
E51-F019 RCIC MIN FLOW VLV TO SUPPRESSION POOL	AUTO	GREEN		
E51-F054 RCIC STM SPLY DR TRAP BYPASS VALVE	CLOSE	GREEN / RED		
E51-C002C GLAND SEAL COMPRESSOR	AUTO	GREEN / WHITE		
E51-F077 RCIC TURB EXH VAC BRKR DN STREAM ISOL VALVE	AUTO	RED		
E51-F078 RCIC TURB EXH VAC BRKR UP STREAM ISOL VALVE	AUTO	RED		
E51-F068 RCIC TURBINE EXHAUST TO SUPPRESSION POOL	OPEN KEY REMOVED	RED		
E51A-S19, RCIC DIV 1 OUT OF SERVICE	OFF	N/A		
E51A-S20, RCIC DIV 2 OUT OF SERVICE	OFF	N/A		
E51-R600 RCIC PUMP FLOW FLOW CONTROLLER HYVC002	AUTO	600		
E51A-S16, RCIC DIV 1 ISOLATION RESET	NORMAL KEY REMOVED	CIRCLE ONE WHITE LIGHT ON / OFF		
E51A-S25, RCIC DIV 2 ISOLATION RESET	NORMAL KEY REMOVED	CIRCLE ONE WHITE LIGHT ON / OFF		
E51A-S23, RCIC DIV 1 MANUAL ISOLATION	NOT DEPRESSED	N/A		
RCIC INITIATION RESET	NOT DEPRESSED	WHITE LIGHT OFF		
E51A-S37, RCIC MANUAL INITIATION	DISARM	N/A		
E51-F076 RCIC WARMUP LINE SHUT OFF VALVE	AUTO	GREEN		

CONTROL BOARD LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
E51-F063 RCIC STEAM SUPPLY INBD ISOL VALVE	AUTO	CIRCLE ONE GREEN / RED		
E51-F064 RCIC STEAM SUPPLY OUTBD ISOL VALVE	AUTO	CIRCLE ONE GREEN / RED		
E51-F045 RCIC STEAM SUPPLY TURBINE STOP VALVE	AUTO	GREEN		
E51-MOVC002 RCIC TRIP & THROTTLE VALVE POSITION	N/A	CIRCLE ONE GREEN / RED		
E51-C002 RCIC TRIP & THROTTLE VALVE OPERATOR	AUTO	RED		
HVY-C002 RCIC TURBINE GOV VLV	N/A	RED		
E51-F013 RCIC INJECT ISOL VALVE	AUTO	GREEN		
E51-F004 RCIC TURB EXH DR POT UP STREAM ISOL VALVE	OPEN	RED		
E51-F005 RCIC TURB EXH DR POT DN STREAM ISOL VALVE	OPEN	RED		
E51-F010 RCIC PUMP CST SUCTION VALVE	AUTO	RED		
E51-C003 RCIC LINE FILL PUMP	NEUTRAL	CIRCLE ONE GREEN / RED		
E51-F031 RCIC PUMP SUP PL SUCTION VALVE	AUTO	GREEN		
THE FOLLOWING CONTROL IS LOCATED ON PANEL H13-P632				
E51A-S45 RCIC POWER SUPPLY MONITOR TEST	NOT DEPRESSED	N/A		
THE FOLLOWING CONTROL IS LOCATED ON PANEL H13-P621				
E51A-43A, RCIC LOGIC A CONTROL POWER MONITOR TEST	NOT DEPRESSED	N/A		
THE FOLLOWING CONTROL IS LOCATED PANEL H13-P618				
E51A-S43B, RCIC BUS B POWER TEST	NOT DEPRESSED	N/A		

CONTROL BOARD LINEUP - REACTOR CORE ISOLATION COOLING (SAFETY RELATED)

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RCIC TRIP THROTTLE VALVE DIAGRAM

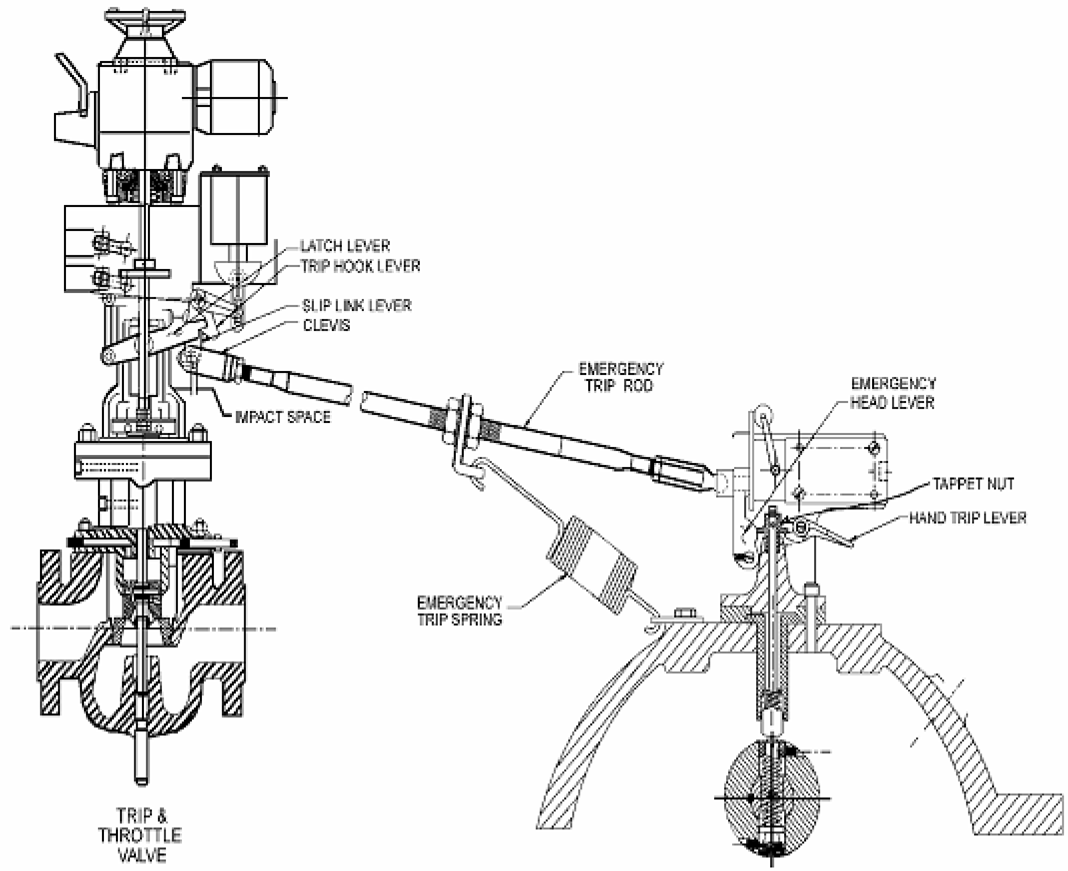


Figure 1

RCIC TRIP THROTTLE VALVE DIAGRAM

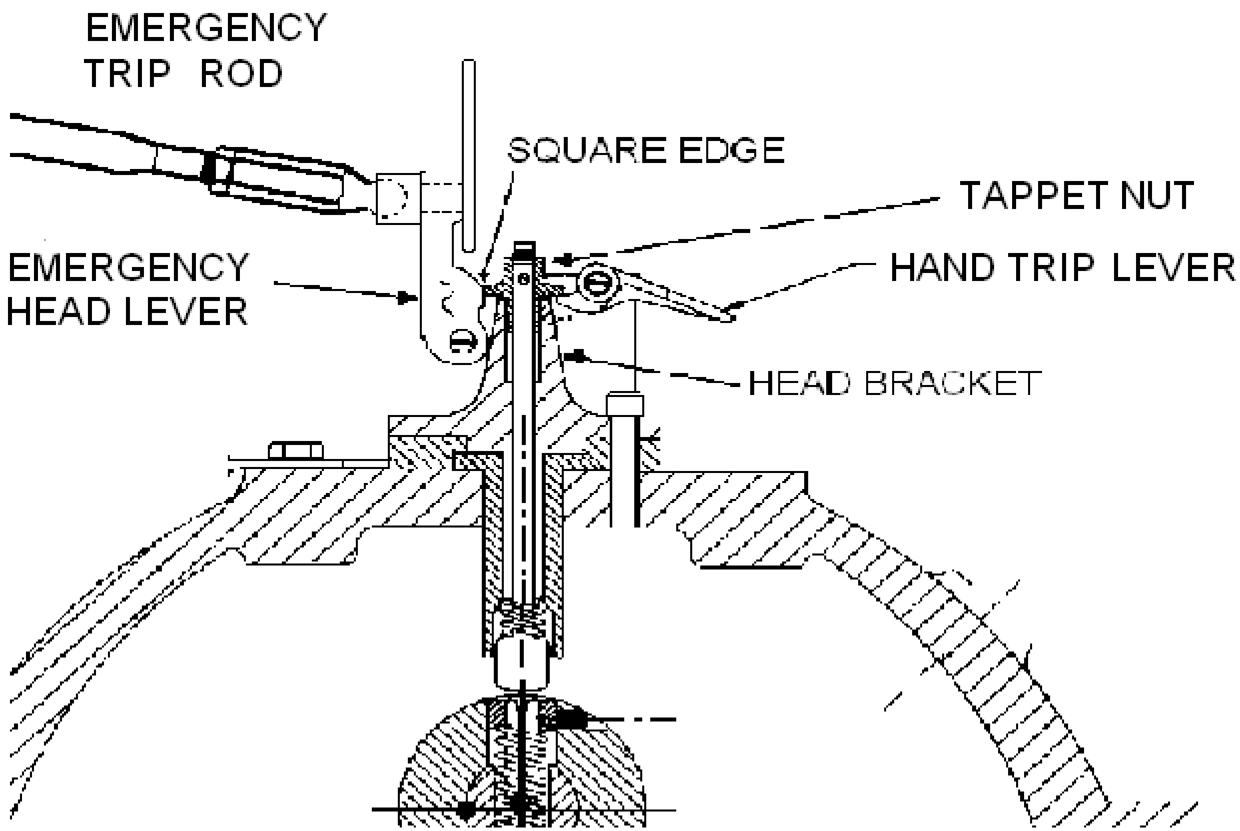


Figure 2

RCIC OPERATION WITH A LOSS OF AC AND DC POWER

CAUTION

C **The steps contained within this Attachment provide operational guidance in response to a catastrophic event in which both AC and DC power become unavailable and a RPV injection with the RCIC system is required to restore and maintain reactor water level. The event that would result in this condition is unanalyzed and beyond the design basis of the plant. Good operator judgment is to be used in conjunction with this guidance as all plant scenarios cannot be anticipated or proceduralized. The Shift Manager permission shall be obtained prior to executing this attachment.**

1 Prerequisites:

1.1 Loss of AC and DC power to the RCIC system.

1.2 RCIC is required to restore and maintain reactor water level.

1.3 Permission has been granted by Operations Shift Manager to perform this Attachment.

2 Precautions/Precautions/Considerations:

2.1 Personnel safety should be considered paramount when this Attachment is implemented as this evolution will take several knowledgeable Operators with close communication and coordination of activities

2.2 During operation of the RCIC turbine using this Attachment, the RCIC gland sealing steam, steam leakoff's from the E51-C002, RCIC TRIP & THROTTLE VALVE OPERATOR, and HVY-C002, RCIC TURBINE GOV VLV will be exhausting directly into the RCIC room due to loss of the Gland Seal Compressor.

RCIC OPERATION WITH A LOSS OF AC AND DC POWER

2.3 When using this Attachment, the following design features of the RCIC system will NOT be available:

- All automatic system initiations
- All automatic system isolations
- Automatic/Manual flow control
- Automatic minimum flow control pump protection
- Automatic CST to Suppression Pool suction swap
- Electrical interlocks to prevent opening either/both RCIC suction paths simultaneously
- Gland Seal Compressor
- Flow indication
- Hydraulic governor
- Normal communications and lighting

2.4 Turbine trip on mechanical overspeed is the only protective feature available. Design rated RCIC turbine speed is 4600 rpm. Do not operate the RCIC turbine greater than 5000 rpm to avoid the turbine trip on mechanical overspeed. Expected mechanical overspeed trip speed is ~5460 rpm. A mechanical overspeed condition may be reset IAW SOP-0035. After an overspeed event, to reset the Trip and Throttle valve it must first be closed, latchup lever engaged, and then manually opened.

2.5 E51-MOVF019, RCIC MIN FLOW ISOLATION VALVE should remain open unless maximum flow to the RPV is required (Flow through minimum flow valve is ~80 GPM). This ensures that the pump does not overheat as the flow requirements lower.

RCIC OPERATION WITH A LOSS OF AC AND DC POWER

NOTE

A tool box with the required equipment (with the exception of the tachometer) has been staged on the Aux Bldg 141' west. The tachometer can be obtained from the cold tool room.

2.6 Tools/equipment needed that should be available and maintained:

- Two adjustable wrenches are required to remove the nuts on the RCIC governor lever to servo linkage assembly pin.
- Pliers/Channel locks
- Flashlights
- C A battery operated tachometer should be used to monitor the speed of the RCIC turbine. There is currently a piece of reflective tape located on the RCIC pump coupling/shaft under the coupling guard.
- Sound powered or battery operated communication devices should be used to communicate between Operators at the following locations:
  - 70' RCIC turbine room
  - 95' RCIC cubicle at E51-MOVF013, RCIC INJECTION VALVE
  - 108' Crescent Area near RWCU room, E51-MOVF019, RCIC MIN FLOW ISOLATION VALVE
  - RHR-A cubicle 95' elevation at panel H22-PNL017
  - Main Control Room.

2.7 RCIC steam line pressure and RCIC pump discharge pressure may be monitored in the RHR-A cubicle 95' elevation at panel H22-PNL017. Instrument E51-PIR003 for RCIC Steam line pressure and E51-PIR001 for RCIC pump discharge pressure are both located on this panel.

2.8 IF time permits, THEN consider de-energizing DC power supply to RCIC system turbine control and MOV's to prevent automatic response if normal DC power is restored. Refer to Attachment 3, Electrical Lineup - Reactor Core Isolation Cooling (Safety Related) of this procedure.

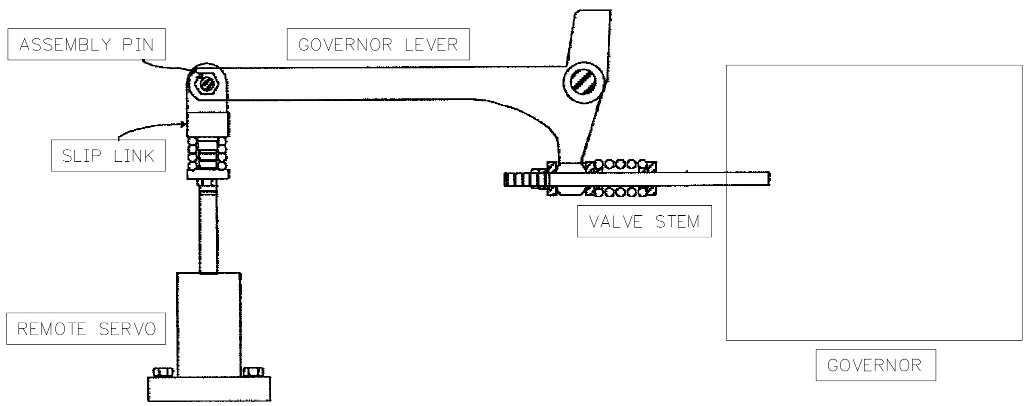
2.9 IF RPV water level and RCIC Flow alternate indication is needed, THEN have I&C perform Attachment 7, RCIC Alternate Flow Indication and RPV Water Level Indication.

RCIC OPERATION WITH A LOSS OF AC AND DC POWER

2.10 This Attachment assumes that the RCIC system is in its normal standby lineup when power is lost. IF the Condensate Storage Tank normal RCIC suction supply is not available through E51-F010, RCIC PUMP CST SUCTION VALVE, THEN E51-F031, RCIC PUMP SUP PL SUCTION VALVE may be opened AND E51-F010, RCIC PUMP CST SUCTION VALVE may be closed using the handwheels.

3 RCIC Operation

3.1 Remove the assembly pin that attaches the governor lever from the remote servo slip link on the governor valve (E51-HYVC002) (see attached picture). This will prevent any interference from the hydraulic governor once the turbine starts.



3.2 The following action will be performed locally using the handwheel.

3.2.1. Open E51-MOVF019, RCIC MIN FLOW ISOLATION VALVE

3.2.2. Close E51-MOVC002, RCIC TRIP & THROTTLE VALVE

3.2.3. Open E51-MOVF045, RCIC STEAM SUPPLY VALVE

3.2.4. Open E51-MOVF013, RCIC INJECTION VALVE

3.3 Assure that the battery operated tachometer is setup and ready for use

RCIC OPERATION WITH A LOSS OF AC AND DC POWER

3.4 Slowly crack open the E51-MOVC002, RCIC TRIP & THROTTLE VALVE while monitoring turbine speed. Allow the turbine to accelerate until it reaches a steady state speed.

3.5 Verify RCIC turbine speed is at least 1700 rpm by manually adjusting the E51-MOVC002, RCIC TRIP & THROTTLE VALVE.

3.6 Maintain RPV water level in the desired level band using one or more of the following methods:

- Adjusting turbine speed and injection flow using the E51-MOVC002, RCIC TRIP AND THROTTLE VALVE. Pump discharge pressure may be monitored using gage E51-PIR001 located in RHR-A cubicle 95' elevation at panel H22-PNL017. Monitor and verify that RCIC discharge pressure remains above the RCIC steam supply pressure using above gage and E51-PIR003 for RCIC Steam line pressure. This will indicate that RPV injection is in progress.

- Throttling the E51-MOVF019, RCIC MIN FLOW VLV TO SUPPRESSION POOL closed will raise injection to the RPV. If the E51-MOVF019, RCIC MIN FLOW VLV TO SUPPRESSION POOL valve is throttled closed to raise flow to the RPV, later flow reductions should first be performed by reopening the minimum flow valve to ensure adequate cooling flow through the RCIC pump.

3.7 If it is necessary to quickly stop the RCIC turbine the manual trip thumb lever may be depressed which will trip the Trip and Throttle valve, stopping the steam supply to the turbine

3.8 <u>IF</u> RPV inventory cannot be maintained below the desired level band, with the turbine speed greater than 1700 rpm and the minimum flow valve open, <u>THEN</u> close E51-MOVC002, RCIC TRIP & THROTTLE VALVE.

RCIC ALTERNATE FLOW INDICATION AND RPV WATER LEVEL INDICATION

1 **PURPOSE**

C This Attachment provides instructions for installing DMM to provide RPV Wide range Level indication and RCIC flow indication in the event that the Control Building is lost.

2 **OBTAINING E51-N003 RCIC FLOW DATA**

2.1 Purpose

To provide general guidance for determination of RCIC Flow during major event with portable DMM (Fluke 789 or equivalent).

2.2 Prerequisites

2.2.1. Auxiliary Building Elevation 95', RHR-A pump room is accessible.

2.3 Required Equipment

- One portable Digital Multimeter
  - One located in Main Control Room EOP Cabinet,
  - One located in the SRV-1, SRV Battery Cart on Aux Building 141' el West side along Containment wall Az 55°.

2.4 Instructions (I&C)

2.4.1. Obtain the Portable DMM

2.4.2. Obtain Tools in the SRV Cart on Aux Bldg. 141 West side at Containment AZ 55°.

2.4.3. Locate panel RCIC H22*P017 SECTION A DIVISION 1 in RHR-A pump room Elevation 95' near Column line AJ and 3.

2.4.4. At terminal block DD in H22*P017 SECTION A, de-terminate cable 1ICSNRX417 from points 4 and 5.

NOTE

In Steps 2.4.5 and 2.4.6 refer to Figure 1 Lead Connections for the location of the meter leads

2.4.5. Connect the Red positive lead from the digital multimeter position 1 to point 4, terminal block DD of H22*P017.

2.4.6. Connect the Black negative lead from the digital multimeter position 2 to point 5, terminal block DD of H22*P017.

NOTE

For Step 2.4.7 refer to Figure 2 Switch Position 3. The symbol on the DMM that corresponds to position 3 is shown below.

2.4.7. The DMM shall be set to position 3 to provide the 24VDC loop excitation voltage.

2.4.8. Read the indicated milli-amp value.

2.4.9. Determine RCIC flow using TABLE 1 - RCIC Flow Conversion

3 OBTAINING REACTOR LEVEL WITHOUT INSTALLED INSTRUMENTATION

3.1 Purpose

To provide general guidance for determination of Reactor Level during major event with portable DMM (Fluke 789 or equivalent)

3.2 Prerequisites

3.2.1. Auxiliary Building Elevation 141’ is accessible.

3.3 Required Equipment

- One portable Digital Multimeter from one of the following locations:
  - One located in Main Control Room EOP Cabinet,
  - One located in the SRV-1, SRV Battery Cart on Aux Building 141’ el West side along Containment wall Az 55°.
- Tools for opening RCP-TCA15 or RCP-TCA12 located in the toolbox on the SRV Battery Cart on Aux Building 141” el along the containment wall Az 55°.

3.4 Instructions

NOTE

Obtaining Reactor level may be obtained from two locations. Obtaining Reactor level via Containment electrical penetration termination cabinet RCP-TCA15 is preferred because the terminal board is located lower in the cabinet. Containment electrical penetration termination cabinet RCP-TCA12 may be used, however the cabinet's terminal board is in the upper portion which may require a ladder.

NOTE

Perform Section 3.4.1 (preferred) or 3.4.2.

3.4.1. Perform the following to obtain reactor water level from Containment electrical penetration termination cabinet RCP-TCA15 (Preferred)

1. Obtain the equipment:

   - One portable Digital Multimeter

   - Tools for opening RCP-TCA15 or RCP-TCA12 located in the toolbox on the SRV Cart on Aux Building 141" el. at Containment AZ 55°.

2. Locate Containment electrical penetration termination cabinet RCP-TCA15 located in AB 141' el east side, Containment azimuth 310°.

3. Using tools from the tool box, starting at the top, remove all four covers from termination cabinet RCP-TCA15.

4. In Containment electrical penetration termination cabinet RCP-TCA15, de-terminate cable 1RHSNBX407 from terminal TB-84 points 1, 2 and 3.

NOTE

In Steps 3.4.1.5 and 3.4.1.6 refer to Figure 1 Lead Connections for the location of the meter leads.

5. Connect the Red positive lead from the digital multimeter position 1 to terminal TB-84 point 1 in RCP-TCA15.

6. Connect the Black negative lead from the digital multimeter position 2 to terminal TB-84 point 2 in RCP-TCA15.

NOTE

For Step 3.4.1.7 refer to Figure 2 Switch Position 3. The symbol on the DMM that corresponds to position 3 is shown below.

250 Ω
mA HART
LOOP POWER

7. The DMM switch shall be set to position 3 to provide the 24VDC loop excitation voltage.

8. Read the indicated milli-amp value.

9. Determine Reactor level using TABLE 2 - Reactor Water Level Conversion.

3.4.2. Perform the following to obtain reactor water level from Containment electrical penetration termination cabinet RCP-TCA12 (Alternate)

1. Locate Containment electrical penetration termination cabinet RCP-TCA12 located in AB 141’ el west side, at Containment azimuth 50°.

2. Using tools from the tool box, starting at the top, remove all four covers from termination cabinet RCP-TCA12.

3. In Containment electrical penetration termination cabinet RCP-TCA12, de-terminate cable 1CSLNRX401 from terminal TB-85 points 1, 2 and 3.

NOTE

In Steps 3.4.2.4 and 3.4.2.5 refer to Figure 1 Lead Connections for the location of the meter leads

4. Connect the Red positive lead from the digital multimeter position 1 to terminal TB-85 point 1 in RCP-TCA12.

5. Connect the Black negative lead from the digital multimeter position 2 to terminal TB-85 point 2 in RCP-TCA12.

NOTE

For Step3.4.2.6 refer to Figure 2 Switch Position 3. The symbol on the DMM that corresponds to position 3 is shown below.

6. The DMM switch shall be set to position 3 to provide the 24VDC loop excitation voltage.

7. Read the indicated milli-amp value.

8. Determine Reactor level using TABLE 2 - Reactor Water Level Conversion.

Figure 1
LEAD CONNECTIONS

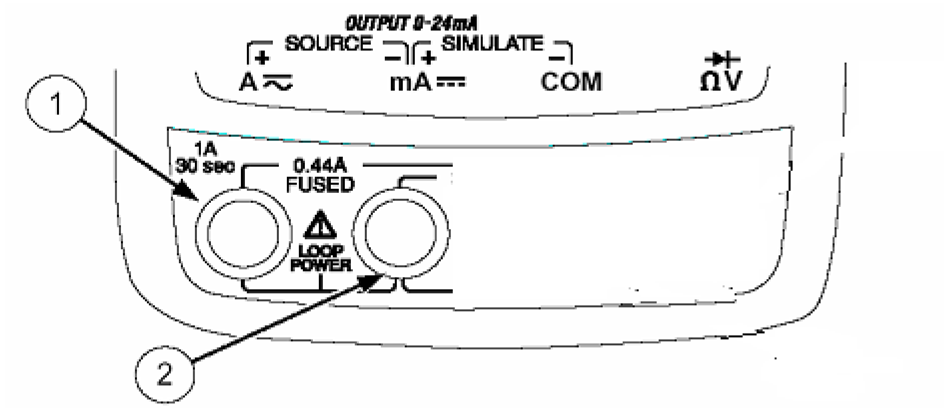


Figure 2
Switch Position

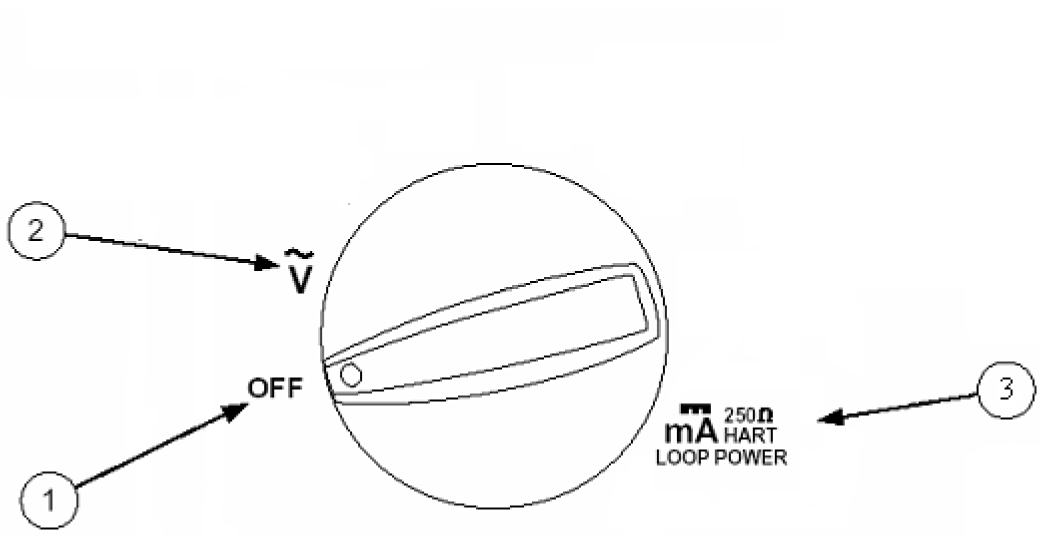


TABLE 1 - RCIC Flow Conversion

RCIC Flow Transmitter E51-FTN003 Flow Vs DMM Current Reading

current (ma)	flow (GPM)
4	0
4.25	100
4.5	141
4.75	173
5	200
5.5	245
6	283
6.5	316
7	346
7.5	374
8	400
8.5	424
9	447
9.5	469
10	490
10.5	510
11	529
11.5	548
12	566
12.5	583
13	600
13.5	616
14	632
14.5	648
15	663
15.5	678
16	693
16.5	707
17	721
17.5	735
18	748
18.5	762
19	775
19.5	787
20	800

Flow = 200*SQRT(i - 4) where i is DMM current reading

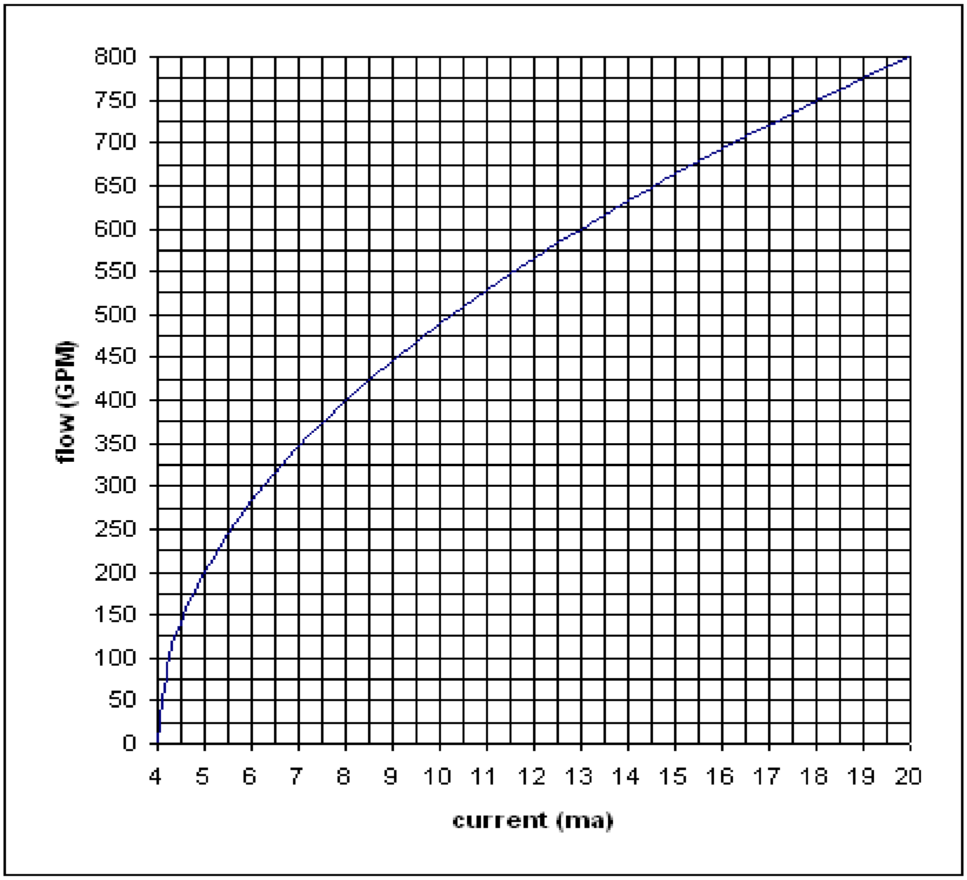
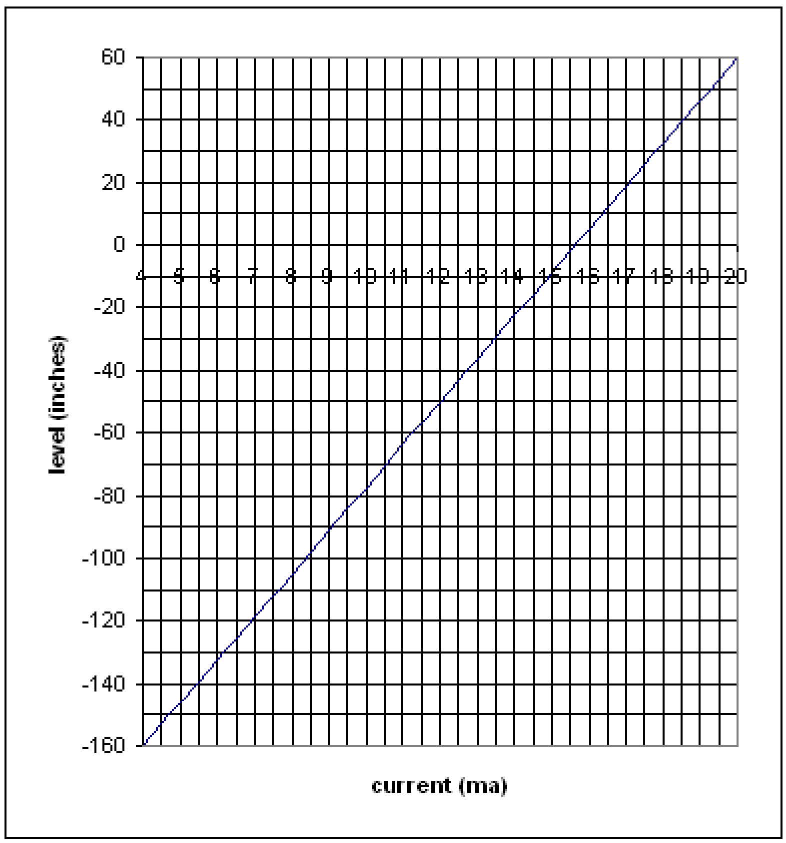


TABLE 2 - Reactor Water Level Conversion

Reactor Water Level transmitter B21-LTN091A/B Water Level Vs DMM Current Reading

Current (ma)	Level (in)
4	-160
4.5	-153
5	-146
5.5	-139
6	-133
6.5	-126
7	-119
7.5	-112
8	-105
8.5	-98
9	-91
9.5	-84
10	-78
10.5	-71
11	-64
11.5	-57
12	-50
12.5	-43
13	-36
13.5	-29
14	-23
14.5	-16
15	-9
15.5	-2
16	5
16.5	12
17	19
17.5	26
18	33
18.5	39
19	46
19.5	53
20	60

level = (13.75)*i - 215 where i is DMM current reading



NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE

SRO ☒ RO ☒

ALTERNATE PATH ☐

TITLE: **Perform STP-109-6302 (MSIV Quarterly Partial Stroke Operability Test)**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	15	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
X	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	March 4, 2014
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	March 4, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	March 4, 2014

EXAMINER INFO SHEET

Task Standard: MSIV Partial Stroke Operability Test has been completed for B21-AOVF028A. (STP-109—6302, Section 7.1)

.

Synopsis: The reactor is operating with the reactor at 100%. This task will test MSIVs partial stroke.

NOTE: If in the Plant or the Control Room, **Caution** the operator NOT to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied.
Inform me when you have completed the task.

2) Initiating Cues:

The CRS has directed you to perform STP-109-6302 (MSIV Quarterly Partial Stroke Operability Test) for B21-AOVF028A.

3) Initial Conditions:

- The reactor is operating at 100%.
- All MSIV's are open.
- The status lights on the back panels have been verified ENERGIZED, STP-109-6302 is complete through step 6.6.16.
- Step 6.7 is ready to be performed.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
MSIV Partial Stroke Operability Test	239017001001	239001 A4.01	4.2 / 4.0

Reason for Revision
Revision 2 due to reject of the previous JPM.

REFERENCES:
STP-109-6302, Rev 15

APPLICABLE OBJECTIVES
RLP-STM-0109, Obj 7, 8

REQUIRED MATERIALS:
Marked up copy of STP-109-6302,
MSIV Quarterly Partial Stroke Operability Test

SAFETY FUNCTION:
3

SIMULATOR CONDITIONS & SETUP:

1. IC # 217
2. Rx Power: 100% operating.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: MSIV Partial Stroke Operability Test has been completed for B21-AOVF028A. (STP-109—6302, Section 7.1)

PERFORMANCE:

START TIME: ____________________

STP-109-6302
MSIV Quarterly Partial Stroke Operability Test

Prerequisites

1.	**Procedure Step:**	6.7 Record pressure as indicated from IAS-PI105, INSTRUMENT AIR HEADER PRESS on Panel H13-P870:
	Standard	Applicant records instrument air pressure from correct pressure instrument.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

When performing STP-051-0201 in conjunction with this procedure...
This note is NA

7 PROCEDURE
7.1 B21-AOVF028A, MSL A OUTBD MSIV (Partial Stroke Close), Operability Test

PROCEDURE CAUTION

CAUTION

- **Do not place the MSL A OUTBD MSIV handswitch (B21-AOVF028A) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL A OUTBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

2.	**Procedure Step:**	7.1.1 Verify Main Steam Lines B, C, and D are not isolated.
	Standard	Applicant verified red lights ON and green lights OFF for inboard and outboard B, C, and D MSIVs.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	***Procedure Step:**	7.1.2 Place B21H-S1A, MSL A OUTBD MSIV handswitch in OPEN/SLOW TEST.
	Standard	Applicant positioned the A outboard MSIV switch from AUTO to Open/Slow Test (turning the switch clockwise).
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

The next two steps meet the partial stroke exercise requirement.

4.	***Procedure Step:**	7.1.3 Depress B21H-S3A, MSL A OUTBD MSIV TEST pushbutton to begin slow closing B21-AOVF028A. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3A.
	Standard	Applicant depressed the S3A pushbutton. Applicant released the S3A pushbutton, when dual indication (red and green lights ON), and prior to high flow in any other steam line.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	7.1.4 Verify that the remote position indication depicts a fully open valve (red light only).
	Standard	Applicant verifies that the green light is OFF and the red light is ON.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	7.1.5 IF B21-AOVF028A was successfully partial stroke closed and fully opened as indicated in steps 7.1.3 and 7.1.4, THEN record as Acceptable for B21-AOVF028A on Data Sheet 1, OTHERWISE record as Unacceptable.
	Standard	Applicant circled “A” on Data Sheet 1 for B21-AOVF028A
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

7.	**Procedure Step:**	7.1.6 Place B21A-S1A, MSL A OUTBD MSIV handswitch in AUTO.
	Standard	Applicant positioned the A outboard MSIV switch from Open/Slow Test to AUTO (turning the switch counter-clockwise).
	Cue	
	Notes	Step 7 is not critical due to the logic still enabling all trips to close the MSIVs The next two steps are for independent verification of valve/switch position
	Results	SAT ☐ UNSAT ☐

Terminating Cue: MSIV Partial Stroke Operability Test has been completed for B21-AOVF028A. (STP-109—6302, Section 7.1).

This completes this JPM.

STOP TIME: ____________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

- The reactor is operating at 100%.
- All MSIV's are open.
- The status lights on the back panels have been verified ENERGIZED, STP-109-6302 is complete through step 6.6.16.
- Step 6.7 is ready to be performed.

INITIATING CUE:

The CRS has directed you to perform STP-109-6302 (MSIV Quarterly Partial Stroke Operability Test) for B21-AOVF028A.

CONTINUOUS USE

*G12.1.15

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***SURVEILLANCE TEST PROCEDURE**

**MSIV QUARTERLY PARTIAL STROKE OPERABILITY TEST*

PROCEDURE NUMBER:	***STP-109-6302**
REVISION NUMBER:	***015**
Effective Date:	***08/20/2009**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
STP-109-6302R014EC-A	Add Note prior to section 7 for clarification on procedure performance.

TABLE OF CONTENTS

1 PURPOSE/APPLICABILITY

1.1 Purpose

1.1.1. This test is performed to verify the operational readiness of the Main Steam Isolation Valves in accordance with the requirements in the ASME Boiler and Pressure Vessel Code, Section XI, Technical Specification 5.5.6, and Technical Requirements Manual (TRM TR 5.5.6)

1.2 Applicability

1.2.1. Modes 1, 2 and 3

2 REFERENCES

2.1 Pump and Valve Inservice Testing Plan, River Bend First 10 year Inspection Interval

2.2 RBS Technical Specifications and Technical Requirements Manual (TRM)

2.3 Drawings

2.3.1. P&ID-3-1A

2.3.2. P&ID-3-1C

2.4 ADM-0015, Station Surveillance Test Program

2.5 CEP-IST-4, Standard on Inservice Testing, ENS

2.6 TQ-104, Engineering Support Personnel Training Program

2.7 ADM-0007, Selection, Training, Qualification and Evaluation of Plant Staff Personnel

2.8 GE SIL 477/ED-89-0297

2.9 OSP-0042, ASME Section XI Inservice Testing Implementation

3 DEFINITIONS

3.1 NONE

4 REQUIRED EQUIPMENT

4.1 NONE

5 PRECAUTIONS AND LIMITATIONS

5.1 The partial stroke exercise of the MSIVs will consist of placing the associated MSIV control switch in the "OPEN/SLOW TEST" position and depressing the associated MSIV "TEST" pushbutton until the remote valve position indicating lights indicate dual position. When the MSIV indicates dual position, the operator will immediately release the MSIV "TEST" pushbutton.

5.2 Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation. ERIS computer points C33EA013 through C33EA017 provide Main Steam Line flow in Mlbm/hr from the Main Steam Line Elbow Taps. Flow indicators, C33-R603A, B, C, and D, provided on H13-P680 may also be used.

5.3 OSP-0042 contains a list of Generic Precautions and Limitations.

6 PREREQUISITES

6.1 Verify this is the most current approved revision and CN of this STP. ________ *(Initials)*

6.2 Obtain OSM/CRS permission to begin this test. ________ *(Initials)*

6.3 Inform the on-shift Nuclear Control Operator of test performance. ________ *(Initials)*

6.4 STP-051-0201, RPS-Main Steam Line Isolation Valve - Closure Chfunct should be performed in conjunction with this STP. ________ *(Initials)*

6.5 Each test performer has read and understands this STP and the Generic Precautions and Limitations list found in OSP-0042, and is qualified to perform IST testing per reference 2.6 or 2.7.

(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)
(Signature)	(Print Name)	(Initials)

6.6 Check the following:

6.6.1. Status light "B21-F022A PILOT SOLENOID A ENERGIZED" (H13-P622) is on.

(Initials)

6.6.2. Status light "B21-F022A PILOT SOLENOID B ENERGIZED" (H13-P622) is on.

(Initials)

6.6.3. Status light "B21-F022B PILOT SOLENOID A ENERGIZED" (H13-P622) is on.

(Initials)

6.6.4. Status light "B21-F022B PILOT SOLENOID B ENERGIZED" (H13-P622) is on.

(Initials)

6.6.5. Status light "B21-F022C PILOT SOLENOID A ENERGIZED" (H13-P622) is on.

(Initials)

6.6.6. Status light "B21-F022C PILOT SOLENOID B ENERGIZED" (H13-P622) is on.

(Initials)

6.6.7. Status light "B21-F022D PILOT SOLENOID A ENERGIZED" (H13-P622) is on.

____
(Initials)

6.6.8. Status light "B21-F022D PILOT SOLENOID B ENERGIZED" (H13-P622) is on.

____
(Initials)

6.6.9. Status light "B21-F028A PILOT SOLENOID A ENERGIZED" (H13-P623) is on.

____
(Initials)

6.6.10. Status light "B21-F028A PILOT SOLENOID B ENERGIZED" (H13-P623) is on.

____
(Initials)

6.6.11. Status light "B21-F028B PILOT SOLENOID A ENERGIZED" (H13-P623) is on.

____
(Initials)

6.6.12. Status light "B21-F028B PILOT SOLENOID B ENERGIZED" (H13-P623) is on.

____
(Initials)

6.6.13. Status light "B21-F028C PILOT SOLENOID A ENERGIZED" (H13-P623) is on.

____
(Initials)

6.6.14. Status light "B21-F028C PILOT SOLENOID B ENERGIZED" (H13-P623) is on.

____
(Initials)

6.6.15. Status light "B21-F028D PILOT SOLENOID A ENERGIZED" (H13-P623) is on.

____
(Initials)

6.6.16. Status light "B21-F028D PILOT SOLENOID B ENERGIZED" (H13-P623) is on.

____
(Initials)

C 6.7 Record pressure as indicated from IAS-PI105, INSTRUMENT AIR HEADER PRESS on Panel H13-P870:

__________psi.

____
(Initials)

NOTE

When performing STP-051-0201 in conjunction with this procedure, the Procedure section (Section 7) of STP-051-0201 should be completed first. Upon successful completion of the Procedure section (Section 7) of STP-051-0201, the Procedure section (Section 7) steps in this procedure can take credit for the valve operations performed by STP-051-0201.

7 PROCEDURE

7.1 B21-AOVF028A, MSL A OUTBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL A OUTBD MSIV handswitch (B21-AOVF028A) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL A OUTBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.1.1. Verify Main Steam Lines B, C, and D are not isolated.

_____________ *(Initials)*

CRITICAL STEP

7.1.2. Place B21H-S1A, MSL A OUTBD MSIV handswitch in OPEN/SLOW TEST.

_____________ *(Initials)*

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.1.3. Depress B21H-S3A, MSL A OUTBD MSIV TEST pushbutton to begin slow closing B21-AOVF028A. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3A.

____
(Initials)

7.1.4. Verify that the remote position indication depicts a fully open valve (red light only).

____
(Initials)

7.1.5. IF B21-AOVF028A was successfully partial stroked closed and fully opened as indicated in Steps 7.1.3 and 7.1.4, THEN record as Acceptable for B21-AOVF028A on Data Sheet 1, OTHERWISE record as Unacceptable.

____
(Initials)

CRITICAL STEP

7.1.6. Place B21H-S1A, MSL A OUTBD MSIV handswitch in AUTO.

____
(Initials)

7.1.7. Independently Verify B21-AOVF028A, MSL A OUTBD MSIV remote position indication depicts a fully open valve (red light only).

____
(IND VERIF)

7.1.8. Independently Verify B21H-S1A, MSL A OUTBD MSIV handswitch in AUTO.

____
(IND VERIF)

7.2 B21-AOVF022A, MSL A INBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL A INBD MSIV handswitch (B21-AOVF022A) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL A INBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.2.1. Verify Main Steam Lines B, C, and D are not isolated.

____________ *(Initials)*

CRITICAL STEP

7.2.2. Place B21H-S1B, MSL A INBD MSIV handswitch in OPEN/SLOW TEST.

____________ *(Initials)*

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.2.3. Depress B21H-S3B, MSL A INBD MSIV TEST pushbutton to begin slow closing B21-AOVF022A. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3B.

____________ *(Initials)*

7.2.4. Verify that the remote position indication depicts a fully open valve (red light only).

____________ *(Initials)*

7.2.5. IF B21-AOVF022A was successfully partial stroked closed and fully opened as indicated in Steps 7.2.3 and 7.2.4, THEN record as Acceptable for B21-AOVF022A on Data Sheet 1, OTHERWISE record as Unacceptable.

_____________ *(Initials)*

CRITICAL STEP

7.2.6. Place B21H-S1B, MSL A INBD MSIV handswitch in AUTO.

_____________ *(Initials)*

7.2.7. Independently Verify B21-AOVF022A, MSL A INBD MSIV remote position indication depicts a fully open valve (red light only).

_____________ ***(IND VERIF)***

7.2.8. Independently Verify B21H-S1B, MSL A INBD MSIV handswitch in AUTO.

_____________ ***(IND VERIF)***

7.3 B21-AOVF028B, MSL B OUTBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL B OUTBD MSIV handswitch (B21-AOVF028B) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL B OUTBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.3.1. Verify Main Steam Lines A, C, and D are not isolated.

____
(Initials)

CRITICAL STEP

7.3.2. Place B21H-S1E, MSL B OUTBD MSIV handswitch in OPEN/SLOW TEST.

____
(Initials)

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.3.3. Depress B21H-S3E, MSL B OUTBD MSIV TEST pushbutton to begin slow closing B21-AOVF028B. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3E.

____
(Initials)

7.3.4. Verify that the remote position indication depicts a fully open valve (red light only).

____
(Initials)

7.3.5. IF B21-AOVF028B was successfully partial stroked closed and fully opened as indicated in Steps 7.3.3 and 7.3.4, THEN record as Acceptable for B21-AOVF028B on Data Sheet 1, OTHERWISE record as Unacceptable.

____
(Initials)

CRITICAL STEP

7.3.6. Place B21H-S1E, MSL B OUTBD MSIV handswitch in AUTO.

____
(Initials)

7.3.7. Independently Verify B21-AOVF028B, MSL B OUTBD MSIV remote position indication depicts a fully open valve (red light only).

____
(IND VERIF)

7.3.8. Independently Verify B21H-S1E, MSL B OUTBD MSIV handswitch in AUTO.

____
(IND VERIF)

7.4 B21-AOVF022B, MSL B INBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL B INBD MSIV handswitch (B21-AOVF022B) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL B INBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.4.1. Verify Main Steam Lines A, C, and D are not isolated.

____
(Initials)

CRITICAL STEP

7.4.2. Place B21H-S1F, MSL B INBD MSIV handswitch in OPEN/SLOW TEST.

____
(Initials)

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.4.3. Depress B21H-S3F, MSL B INBD MSIV TEST pushbutton to begin slow closing B21-AOVF022B. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3F.

____
(Initials)

7.4.4. Verify that the remote position indication depicts a fully open valve (red light only).

____
(Initials)

7.4.5. IF B21-AOVF022B was successfully partial stroked closed and fully opened as indicated in Steps 7.4.3 and 7.4.4, THEN record as Acceptable for B21-AOVF022B on Data Sheet 1, OTHERWISE record as Unacceptable.

____
(Initials)

CRITICAL STEP

7.4.6. Place B21H-S1F, MSL B INBD MSIV handswitch in AUTO.

____
(Initials)

7.4.7. Independently Verify B21-AOVF022B, MSL B INBD MSIV remote position indication depicts a fully open valve (red light only).

____
(IND VERIF)

7.4.8. Independently Verify B21H-S1F, MSL B INBD MSIV handswitch in AUTO.

____
(IND VERIF)

7.5 B21-AOVF028C, MSL C OUTBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL C OUTBD MSIV handswitch (B21-AOVF028C) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL C OUTBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.5.1. Verify Main Steam Lines A, B, and D are not isolated.

______ *(Initials)*

CRITICAL STEP

7.5.2. Place B21H-S1J, MSL C OUTBD MSIV handswitch in OPEN/SLOW TEST.

______ *(Initials)*

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.5.3. Depress B21H-S3J, MSL C OUTBD MSIV TEST pushbutton to begin slow closing B21-AOVF028C. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3J.

______ *(Initials)*

7.5.4. Verify that the remote position indication depicts a fully open valve (red light only).

______ *(Initials)*

7.5.5. IF B21-AOVF028C was successfully partial stroked closed and fully opened as indicated in Steps 7.5.3 and 7.5.4, THEN record as Acceptable for B21-AOVF028C on Data Sheet 1, OTHERWISE record as Unacceptable.

____
(Initials)

CRITICAL STEP

7.5.6. Place B21H-S1J, MSL C OUTBD MSIV handswitch in AUTO.

____
(Initials)

7.5.7. Independently Verify B21-AOVF028C, MSL C OUTBD MSIV remote position indication depicts a fully open valve (red light only).

____
(IND VERIF)

7.5.8. Independently Verify B21H-S1J, MSL C OUTBD MSIV handswitch in AUTO.

____
(IND VERIF)

7.6 B21-AOVF022C, MSL C INBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL C INBD MSIV handswitch (B21-AOVF022C) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL C INBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.6.1. Verify Main Steam Lines A, B, and D are not isolated.

____
(Initials)

CRITICAL STEP

7.6.2. Place B21H-S1K, MSL C INBD MSIV handswitch in OPEN/SLOW TEST.

____
(Initials)

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.6.3. Depress B21H-S3K, MSL C INBD MSIV TEST pushbutton to begin slow closing B21-AOVF022C. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3K.

____
(Initials)

7.6.4. Verify that the remote position indication depicts a fully open valve (red light only).

____
(Initials)

7.6.5. IF B21-AOVF022C was successfully partial stroked closed and fully opened as indicated in Steps 7.6.3 and 7.6.4, THEN record as Acceptable for B21-AOVF022C on Data Sheet 1, OTHERWISE record as Unacceptable.

____
(Initials)

CRITICAL STEP

7.6.6. Place B21H-S1K, MSL C INBD MSIV handswitch in AUTO.

____
(Initials)

7.6.7. Independently Verify B21-AOVF022C, MSL C INBD MSIV remote position indication depicts a fully open valve (red light only).

____
(IND VERIF)

7.6.8. Independently Verify B21H-S1K, MSL C INBD MSIV handswitch in AUTO.

____
(IND VERIF)

7.7 B21-AOVF028D, MSL D OUTBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL D OUTBD MSIV handswitch (B21-AOVF028D) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL D OUTBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.7.1. Verify Main Steam Lines A, B, and C are not isolated.

_____________ *(Initials)*

CRITICAL STEP

7.7.2. Place B21H-S1N, MSL D OUTBD MSIV handswitch in OPEN/SLOW TEST.

_____________ *(Initials)*

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.7.3. Depress B21H-S3N, MSL D OUTBD MSIV TEST pushbutton to begin slow closing B21-AOVF028D. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3N.

_____________ *(Initials)*

7.7.4. Verify that the remote position indication depicts a fully open valve (red light only).

_____________ *(Initials)*

7.7.5. IF B21-AOVF028D was successfully partial stroked closed and fully opened as indicated in Steps 7.7.3 and 7.7.4, THEN record as Acceptable for B21-AOVF028D on Data Sheet 1, OTHERWISE record as Unacceptable.

____
(Initials)

CRITICAL STEP

7.7.6. Place B21H-S1N, MSL D OUTBD MSIV handswitch in AUTO.

____
(Initials)

7.7.7. Independently Verify B21-AOVF028D, MSL D OUTBD MSIV remote position indication depicts a fully open valve (red light only).

____
(IND VERIF)

7.7.8. Independently Verify B21H-S1N, MSL D OUTBD MSIV handswitch in AUTO.

____
(IND VERIF)

7.8 B21-AOVF022D, MSL D INBD MSIV (Partial Stroke Close), Operability Test

CAUTION

- **Do not place the MSL D INBD MSIV handswitch (B21-AOVF022D) in CLOSE as this will cause the MSIV to fully close.**
- **Exercise care when the MSL D INBD MSIV TEST pushbutton is depressed to avoid fully closing the MSIV. Isolation of a main steam line with the Mode Switch in RUN inputs a reactor trip signal to one of the divisional logics of the Reactor Protection System.**
- **Steam flow greater than or equal to 137.6% (4.520 Mlbm/hr) in any steam line will cause a MSIV isolation.**

7.8.1. Verify Main Steam Lines A, B, and C are not isolated.

_____________ *(Initials)*

CRITICAL STEP

7.8.2. Place B21H-S1P, MSL D INBD MSIV handswitch in OPEN/SLOW TEST.

_____________ *(Initials)*

NOTE

The next two steps meet the partial stroke exercise requirement.

CRITICAL STEP

7.8.3. Depress B21H-S3P, MSL D INBD MSIV TEST pushbutton to begin slow closing B21-AOVF022D. WHEN the remote position indication depicts a not fully open valve (dual indication), THEN immediately release B21H-S3P.

_____________ *(Initials)*

7.8.4. Verify that the remote position indication depicts a fully open valve (red light only).

_____________ *(Initials)*

7.8.5. <u>IF</u> B21-AOVF022D was successfully partial stroked closed and fully opened as indicated in Steps 7.8.3 and 7.8.4, <u>THEN</u> record as Acceptable for B21-AOVF022D on Data Sheet 1, <u>OTHERWISE</u> record as Unacceptable.

_______________ *(Initials)*

CRITICAL STEP

7.8.6. Place B21H-S1P, MSL D INBD MSIV handswitch in AUTO.

_______________ *(Initials)*

7.8.7. Independently Verify B21-AOVF022D, MSL D INBD MSIV remote position indication depicts a fully open valve (red light only).

_______________ ***(IND VERIF)***

7.8.8. Independently Verify B21H-S1P, MSL D INBD MSIV handswitch in AUTO.

_______________ ***(IND VERIF)***

7.9 Test Completion

7.9.1. Verify that the Independent Verifications in Sections7 have been performed and initialed as applicable.

_______________ *(Initials)*

7.9.2. Notify the on-shift Nuclear Control Operator of test completion.

_______________ *(Initials)*

7.9.3. Notify the OSM/CRS of the test completion.

_______________ *(Initials)*

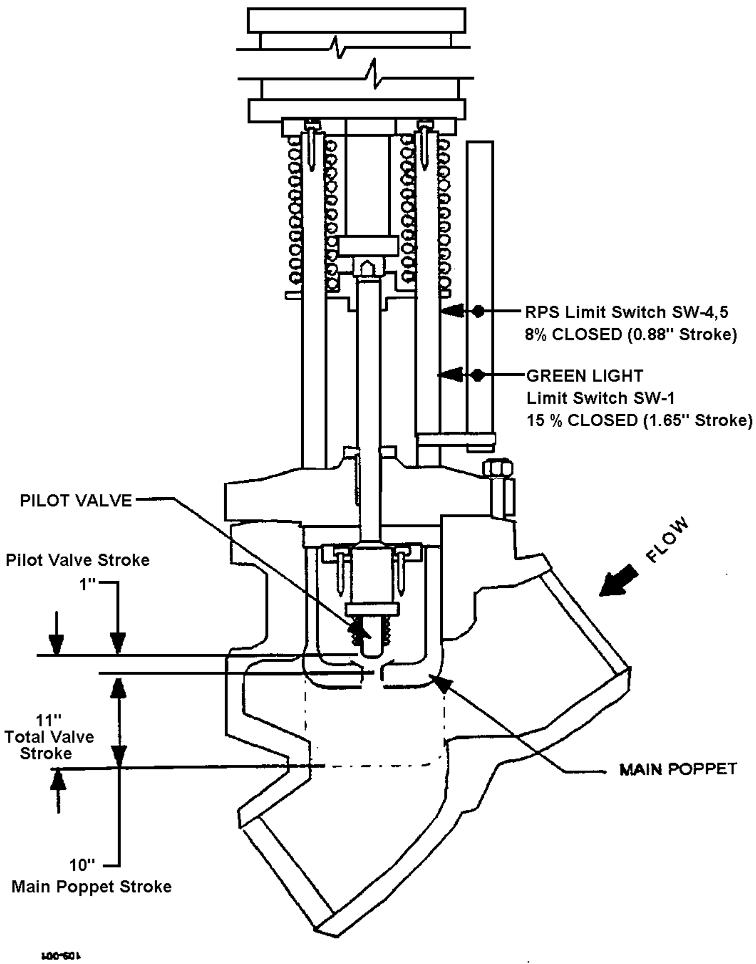
8 <u>ACCEPTANCE CRITERIA</u>

8.1 See appropriate data sheet for acceptance criteria.

9 <u>RECORDS</u>

9.1 Records shall be dispositioned in accordance with ADM-0015, Station Surveillance Program.

MAIN STEAM ISOLATION VALVE DIAGRAM



MAIN STEAM ISOLATION VALVE DATA SHEET

STEP	VALVE NUMBER	STROKE DIRECTION	VALVE ACCEPTANCE DETERMINATION (CIRCLE ONE)
7.1.5	B21-AOVF028A	OPEN	
7.1.5		CLOSED	A U
7.2.5	B21-AOVF022A	OPEN	
7.2.5		CLOSED	A U
7.3.5	B21-AOVF028B	OPEN	
7.3.5		CLOSED	A U
7.4.5	B21-AOVF022B	OPEN	
7.4.5		CLOSED	A U
7.5.5	B21-AOVF028C	OPEN	
7.5.5		CLOSED	A U
7.6.5	B21-AOVF022C	OPEN	
7.6.5		CLOSED	A U
7.7.5	B21-AOVF028D	OPEN	
7.7.5		CLOSED	A U
7.8.5	B21-AOVF022D	OPEN	
7.8.5		CLOSED	A U

ACCEPTANCE CRITERIA:

ACCEPTABLE (A): Each MSIV is considered acceptable if the MSIV repositions to the required position (dual indication on the remote position indication light) when the associated MSIV "TEST" pushbutton is depressed AND returns to the full open position (red light only) when the "TEST" pushbutton is released.

UNACCEPTABLE (U): Each MSIV is considered unacceptable if the MSIV fails to exhibit the required change of position.

NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE
SRO ☒ RO ☒

ALTERNATE PATH ☒

TITLE: **Alternate Feedwater Level Control Channels**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	5	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
X	Simulator
	Control Room

Prepared: Dave Bergstrom **Date:** September 4, 2013

Reviewed: Jeff Reynolds **Date:** January 22, 2014
(Operations Representative)

Approved: Joey Clark **Date:** January 27, 2014
(Facility Reviewer)

EXAMINER INFO SHEET

Task Standard: Reactor Feedwater Level Control Channel has been swapped to A; FWLC is in Manual and maintaining level in the green band.

Synopsis: The reactor is at 100% power with FWLC Channel B selected. This task will align FWLC Channel A for level control using SOP-0009, Section 5.1. As an alternate path, there is a gradual upscale failure of the RPV Level Control Signal, which the operator will respond to by taking manual control of the FWLC System per AOP-0006, Condensate/Feedwater Failures.

NOTE: If in the Plant or the Control Room, **Caution** the operator NOT to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to Swap Feedwater Level Control Channel from B to A.

3) Initial Conditions:

The reactor is at 100% power.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Alternate Feedwater Level Control Channels	259018001001	259001 A2.07 A4.05 AA1.02	3.7 / 3.8 4.0 / 3.9 4.0 / 4.0

REFERENCES:
SOP-0009, Rev 62
AOP-0006, Rev 19

APPLICABLE OBJECTIVES
RLP-STM-0107 Feedwater Level Control, Obj 14

REQUIRED MATERIALS:
SOP-0009, Rev 6 (Sim Copy)
AOP-0006, Rev 19 (Sim. Copy)

SAFETY FUNCTION:
__**4**__

SIMULATOR CONDITIONS & SETUP:

1. IC # 213
2. Required Power: 100%.
3. FWLC Channel B selected.
4. Event T1: zdi6(69) = 1 (Master FWLC AUTO selected)
5. Malfunction: B21001B (FWLC A transmitter failure) ; delay 5 sec, ramp to 60 in 3 minutes on T1 ; (A level will ramp upscale)

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Reactor Feedwater Level Control Channel has been swapped to A; FWLC is in Manual and maintaining level in the green band.

PERFORMANCE:

START TIME: ______________

	Procedure Step:	5.1.1 IF automatically controlling level on the Master Flow controller, THEN alternate the feedwater level control signals as follows:.
	Standard	NA
	Cue	
	Notes	No applicant action is necessary.

1.	***Procedure Step:**	5.1.1.1 Ensure no deviation on C33-R600, FW REG VALVES MASTER FLOW CONTROLLER and place to MANUAL.
	Standard	Applicant located/identified and verified no deviation existed on C33-R600 by observing the needle to the left of the tape set; Applicant depressed the left black button on the Flow Controller and observed the yellow light ON and the green light OFF
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	***Procedure Step:**	5.1.1.2 Swap the level control input by depressing either A or B on the RX LVL A/B SELECT pushbutton.
	Standard	Applicant located/identified and depressed the A Select pushbutton.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	**Procedure Step:**	5.1.1.3 Check for proper operation, then return C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to AUTO as follows: 1) Adjust tape set 2 inches above actual vessel level and observe the deviation signal is positive.
	Standard	Applicant located/identified and adjusted the tape set up two inches. Applicant noted a positive deviation signal by observing the needle to the left of the tape set moving down.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

4.	**Procedure Step:**	5.1.1.3 Check for proper operation, then return C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to AUTO as follows: 2) Lower tape set 2 inches below actual vessel level and observe the deviation signal is negative.
	Standard	Applicant adjusts the tape set down two inches and noted a negative deviation signal by observing the needle to the left of the tape set moving up.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	5.1.1.3 Check for proper operation, then return C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to AUTO as follows: 3) Match tape set to actual vessel level and observe in order to null the deviation signal.
	Standard	Applicant adjusted the tape set to null the deviation signal by observing the needle to the left of the tape set moving to the null position.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	***Procedure Step:**	5.1.1.3 Check for proper operation, then return C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to AUTO as follows: 4) <u>WHEN</u> the level signal is nulled, <u>THEN</u> depresses the AUTO Pushbutton and check the green light above the pushbutton is on.
	Standard	Applicant located/identified and observed the deviation signal to be null. Applicant depressed the right black button on the Flow Controller and noted the yellow light OFF and the green light above the button ON.
	Cue	
	Notes	When the AUTO pushbutton is depressed, a malfunction will begin ramping in. The A level signal begins rising which will cause a signal to the FWLC system to lower reactor water level. When the applicant notices this abnormal situation, the applicant will transition to the ALTERNATE PATH.
	Results	SAT ☐ UNSAT ☐

<u>ALTERNATE PATH:</u>

AOP-0006

IMMEDIATE OPERATOR ACTIONS

7.	***Procedure Step:**	5.1 Manually control the feedwater level control system and/or reduce reactor power to mitigate any level transient..
	Standard	Applicant placed the FW REG VALVES MASTER FLOW CONTROLLER to Manual by depressing the left black button on C33-R600. Applicant adjusted the Master Controller to obtain an actual RPV level in the green band prior to an RPS actuation.
	Cue	
	Notes	ARP-680-3-C08 directs swapping the controller back to B level control.
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Reactor Feedwater Level Control Channel has been swapped to A; FWLC is in Manual and maintaining level in the green band.

This completes this JPM.

STOP TIME: ____________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

The reactor is at 100% power.

INITIATING CUE:

The CRS has directed you to Swap Feedwater Level Control Channel from B to A.

*G12.1.6

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***SYSTEM OPERATING PROCEDURE**

**REACTOR FEEDWATER SYSTEM (SYS #107)*

PROCEDURE NUMBER:	***SOP-0009**
REVISION NUMBER:	***060**
Effective Date:	***08/22/2013**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
SOP-0009R059EC-A	Provide clarification on Startup Feedwater Reg Valve position limitations to ensure adequate margin for valve modulation while maintaining reactor level by adding P&L 2.22 and Cautions at Steps 4.6.1 and 4.7.1. (Ref CR-RBS-2013-4392 CA 11).

TABLE OF CONTENTS

1 PURPOSE

1.1 The purpose of this procedure is to provide instructions for operation of the Feedwater and Feedwater Level Control Systems.

2 PRECAUTIONS AND LIMITATIONS

2.1 The RFP should be tripped if any of the following occur:

2.1.1. Either RFP/Motor or Gear Increaser Lube Oil temperature reaches 190°F

2.1.2. Pump bearing temperature reaches 218°F

2.1.3. Motor bearing temperature reaches 195°F

2.1.4. Gear increaser bearing temperature exceeds 190°F

2.2 If seal parameters exceed the following, then perform an orderly down power per GOP-002 Plant Shutdown, or GOP-0005, Power Maneuvering, to within the capacity of the remaining operating RFP's **OR** start another pump and secure the affected pump.

- Seal cooling temperature with the RFP running is greater than 190°F
- Seal leakage exceeds a solid pencil stream.

2.3 Anytime FWS-V75, S/U RECIRCULATION MANUAL ISOLATION VALVE is closed FWS-MOV103, LONG CYCLE CLEANUP ISOL and its bypass valve FWS-V90, FEEDWATER SYSTEM S/U RECIRC ISOL VLV BYP should be closed and tagged out. This will prevent overpressurization of the low-pressure feedwater piping downstream of FWS-FV104, START UP RECIRC FCV.

2.4 Following initial startup of the Feedwater Pump Lube Oil System per Section 4.1, if the FWL-P5A(B)(C), GEAR INCR AUX OIL PMP Control Switch is moved from AUTO, the auto start feature of the pump will be deactivated. To reactivate the auto start feature, in addition to returning the Control Switch to AUTO, the RX FWP P1A(B)(C) LUBE OIL SYSTEM START Pushbutton must be depressed.

2.5 Operation with feedpump oil level "visible" below the add mark in the sight glass, is not recommended. This will not result in immediate machine degradation but does decrease the amount of oil that is being cooled and may decrease the life of internal components.

2.6 Gear increaser oil additions are based on use of the tubular sight glasses. Oil level should be in the lower 1/2 inch of the tubular sight glass. Oil addition is required when oil level is at the bottom of the tubular sight glass.

2.7 FWL-P3A(B)(C), RX FWP A(B)(C) AUX OIL PMP 3A(B)(C) DC oil pumps are provided to protect the feed pump bearings on loss of power to the feed pumps. Feed pumps should not be run with FWL-P3A(B)(C) out of service.

2.7.1. The DC Oil Pump has the capacity to allow the RFP to operate but should only be used if the RFP is required to assure adequate core cooling.

2.8 Normal Feedwater Pump Motor current should be greater than 200 amps. Operation of a Feedwater Pump Motor below 200 amps indicates a minimum flow valve malfunction that could lead to pump damage. If the motor amps are less than 200 amps, then pump flow can be checked using the following computer points CNMFY007, CNMFY008, CNMFY009. Flow should be greater than or equal to 3050 gpm.

2.9 RFP/Motor and Gear Increaser temperature limits are as follows:

2.9.1. Normal Lube Oil: 120°F-150°F

2.9.2. Maximum Lube Oil: 190°F

2.9.3. Maximum Motor Bearing: 185°F

2.9.4. Maximum Pump Bearing: 200°F

2.9.5. Maximum Gear Increaser Bearings: 190°F

2.9.6. Maximum Seal Cooling Temperature with RFP running: 190°F

2.10 Lube Oil pressure limits for RFP start are as follows:

2.10.1. RFP Motor: 10 to 20 psig

2.10.2. RFP Gear Increaser: 15 to 30 psig

2.11 Maximum allowable differential pressure across a RFP filter is as follows:

2.11.1. RFP Lube Oil Filter, FWL-FLT28A/B/C: 5 psig

2.11.2. Gear Increaser Lube Oil Filter, FWL-FLT30A/B/C: 25 psig

2.12 Maximum normal seal cooling water temperature with the RFP running is 140°F.

2.13 RFP Full Load Motor Current should be limited to 311 amps; however, operation above 311 amps has been evaluated and pre-approved as long as amps are limited to less than 350 amps. A Condition Report is required to be generated when amps exceed 311 amps for trending and evaluation of motor long term degradation under this condition.

2.13.1. Reactor power should be maintained as high as possible while allowing for adequate control margin for FWREG position and RFP amps.

2.14 RFP Starts are limited as follows:

2.14.1. After a minimum 60-minute idle period, two consecutive starts are allowed.

2.14.2. After pump has reached normal operating temperature due to running for greater than 15 minutes, one start is permissible.

2.14.3. The motor must run for 15 minutes or stand idle for 60 minutes before additional start attempts can be made.

2.14.4. Avoid starting RFPs during pump coastdown. (Approximately 2 minutes)

2.15 Low Flow Conditions Limitations:

2.15.1. If a RFP is to be secured during a planned shutdown, its min flow valve should be operational.

2.15.2. Isolation of RFP min flow valves is acceptable provided one of the three min flow valves remains in automatic.

2.15.3. If a RFP is to be secured during an unplanned shutdown, the RFP(s) with isolated min flow valve(s) should be secured first.

2.15.4. Avoid sustained reactor feed pump operation under low flow conditions. Sustained operation with low flow and high vibration leads to accelerated wear of bearings, seals, and rotating components. Options to reduce vibration such as opening the reactor Feed Pump Min Flow Valve or the Long Cycle Cleanup Valve to increase Feed Pump flow and/or lowering Rx power as needed to allow shutting down a Reactor Feed Pump should be considered. It is recommended that the min flow valves <u>not</u> be used during operation below the power range until the reactor is shutdown due to increased sensitivity to level and power excursions that can result in a possible reactor scram.

2.15.5. When manually opening the feed pumps min flow valve(s) for low load conditions to lower vibrations and/or to maintain min amps on pumps, priority should be given to using FWR-FV2B or FWR-FV2C. Using FWR-FV2A results in additional vibration due to differences in min flow piping runs.

2.15.6. Whenever FWS-FV104, START UP RECIRC FCV is open with RWCU in service, feedwater line thermal stratification may occur. Monitor feedwater header temperature per SOP-0110, Tamaris Temperature Scanner, display 33.

2.16 If a RFP trip occurs and a restart is attempted, unusually high differential pressure across the pump discharge valve may prevent the valve from opening.

2.17 The maximum permissible feedwater flow through the startup level control valve is 10% or 1,312,576 1bm/hr.

2.18 If a RFP loses suction pressure and continues to operate, it should be tripped immediately and a thorough maintenance inspection shall be performed.

2.19 Feedwater system may be partially drained during loss of offsite power due to loss of instrument air. This condition allows various feedwater lines to drain to the condenser and results in the Condensate Pumps operating in excess of design flow rate when restarted. Prior to return to service, the feedwater system must be filled and vented.

2.20 When a RFP has been secured, to reduce RFP discharge pressure and vibration, a Condensate Pump may be secured per SOP-0007.

2.21 FWREG position should be limited to less than or equal to 92% open to allow an adequate margin for valve modulation while maintaining reactor level.

2.21.1. Reactor power should be maintained as high as possible while allowing for adequate control margin for FWREG position and RFP amps.

2.21.2. Starting a RFP with feed reg valves near 92% open can adversely impact reactor water level and feed pump suction pressure because the FWLCS may not be able to compensate when the associated min flow valve comes open. Opening the feed pump discharge valve further challenges the FWLCS. Lowering power to approx 85% should be consider to provide control margin for the feed reg valves before the RFP is started.

2.22 C33-LVF002, START UP FWREG VALVE position should be limited to less than or equal to 65% open to allow an adequate margin for valve modulation while maintaining reactor level.

2.23 All controls and indications are on H13-P680 unless otherwise noted.

2.24 Excessive venting with RFP Suction Temperature >150 ^{o}F offsets normal seal water flow and can overheat internal seal components. Seals are very sensitive to temperatures above 150 ^{o}F. If the seal outlet temperature rises above 140^{o}F (FWS-TI12A, B, C or FWS-TI13A, B, C), seal venting should be stopped as soon as possible after a steady stream of water issues from the vent. IF Reactor Feed Pump has not been isolated from hot, pressurized CNM/FWS, THEN venting is not required.

C 2.25 Leakage through HWC valves allows hydrogen to continue to be introduced into the Feedwater System. This includes idle Reactor Feed Pumps. Sampling may be required to ensure hydrogen pockets do not exist prior to performing feedwater system maintenance.

2.26 C33 and B21 Narrow Range Reactor Water Level instrument channels on different reference legs may indicate varying levels due to local temperatures in the drywell, thermal growth of sensing lines, dynamic effects in the reactor downcomer, etc. The STP-000-0001 channel check criteria account for these sensed pressure differences as well as instrument inaccuracies.

3 PREREQUISITES FOR STARTUP AND OPERATIONS

3.1 Verify the below listed Electrical Systems are in operation:

3.1.1. 125 VDC per SOP-0049, 125 VDC System

3.1.2. 120 VAC per SOP-0048, 120 VAC System

3.1.3. 480 VAC per SOP-0047, 480 VAC System

3.1.4. 13.8 kV per SOP-0045, 13.8 kV System

3.2 Verify Condensate System is in operation per SOP-0007, Condensate System.

3.3 Verify Feedwater System is filled and vented.

3.4 Verify Turbine Plant Component Cooling Water System (CCS) is operating and supplying the RFP Lube Oil Coolers, Gear Increaser Coolers, Seal Water Coolers, and Feed Pump Motor Coolers per SOP-0017, Turbine Plant Component Cooling Water System.

3.5 Verify all reactor RFP/Motor and Gear Increaser oil levels normal.

3.6 Verify Instrument Air System is in operation per SOP-0022, Instrument Air System.

3.7 Verify system is lined up for startup.

4 **SYSTEM STARTUP**

4.1 Reactor Feed Pump/Motor and Gear Increaser Lube Oil Startup

NOTE

All controls and indications in this section are located on H13-P870 unless otherwise noted.

FWL-TCV65A(B)(C) regulates the gear increaser heat exchanger lube oil flow to maintain oil temperature greater than or equal to 97°F and less than or equal to 117°F.

FWL-TCV66A(B)(C) regulates feedwater pump bearing lube oil heat exchanger flow to maintain oil temperature greater than or equal to 120°F and less than or equal to 140°F.

4.1.1. Locally, verify the RFP/Motor Oil Reservoir level is approximately midrange on FWL-LI19A(B)(C).

4.1.2. Check operation of FWL-P2A(B)(C), RX FWP A(B)(C) AUX OIL PMP 2A(B)(C) as follows:

1. Place the pump control switch to START.
2. On H13-P680, check red RX FWP P1A(B)(C) MN LO PMP PRESS NORM light is on.
3. Return the pump control switch to STOP.

4.1.3. Check operation of FWL-P3A(B)(C), RX FWP A(B)(C) AUX OIL PMP 3A(B)(C) as follows:

1. Place the pump control switch to START.
2. On H13-P680, check red RX FWP P1A(B)(C) MN LO PMP PRESS NORM light is on.
3. Return the pump control switch to STOP.

4.1.4. Locally, verify RFP Gear Increaser oil level is visible in the tubular sight glass.

4.1.5. Check operation of FWL-P5A(B)(C), GEAR INCR AUX OIL PMP as follows:

1. Place the pump control switch to START.
2. On H13-P680, check red RX FWP P1A(B)(C) GEAR INCR LO PRESS NORM light is on.
3. Return the pump control switch to STOP.

4.1.6. Place the control switches for the following pumps in AUTO.

1. FWL-P1A(B)(C), RX FWP A(B)(C) MN OIL PMP 1A(B)(C).
2. FWL-P5A(B)(C), GEAR INCR AUX OIL PMP 5A(B)(C).

4.1.7. At H13-P680, depress RX FWP P1A(B)(C) LUBE OIL SYSTEM START Pushbutton and check the following occur:

1. FWL-P1A(B)(C), RX FWP A(B)(C) MN OIL PMP starts.
2. FWL-P5A(B)(C), GEAR INCR AUX OIL PMP P5A(B)(C) starts.
3. RX FWP P1A(B)(C) MN LO PMP PRESS NORM red light is on.
4. RX FWP P1A(B)(C) GEAR INCR LO PRESS NORM red light is on.

4.1.8. Place the control switches for the following pumps in AUTO:

1. FWL-P2A(B)(C), RX FWP A(B)(C) AUX OIL PMP 2A(B)(C)
2. FWL-P3A(B)(C), RX FWP A(B)(C) AUX OIL PMP 3A(B)(C)

4.1.9. Verify proper oil flow through sight glasses on the feed pump, motor bearings and the gear increaser supply.

4.2 Filling and Venting a Reactor Feed Pump Using CNS

NOTE

This section shall only be used when restoring a Reactor Feed Pump that has been tagged out for maintenance or other reasons while the plant is at power or CNM temperature is greater than 150°F.

Step 4.2.4 through 4.2.14 may be performed at any time prior to tagout release to prepare for the fill and vent.

4.2.1. Verify that a full tagout isolating the pump is installed.

NOTE

The minimum flow manual isolation valves are closed during CNS fill to prevent possibly drawing a vacuum on the RFP if the minimum flow valves were to leak by.

4.2.2. Verify closed FWR-V1(V2)(V3), RFP A(B)(C) MIN FLOW MANUAL ISOL.

4.2.3. Perform a partial tagout and close the following valves for the applicable Reactor Feed Pump:

1. RFP-P1A
    - FWS-V8, RF PUMP A DISCH DRAIN VALVE
    - DET-V15, RFP A CASING DRAIN
    - DET-V16, RFP A CASING DRAIN
    - DET-V17, RFP A CASING DRAIN
    - DET-V18, RFP A CASING DRAIN
2. RFP-P1B
    - FWS-V10, RF PUMP B DISCH DRAIN VALVE
    - DET-V19, RFP B CASING DRAIN
    - DET-V20, RFP B CASING DRAIN
    - DET-V21, RFP B CASING DRAIN
    - DET-V22, RFP B CASING DRAIN

3. RFP-P1C

   - FWS-V12, RF PUMP C DISCH DRAIN VALVE
   - DET-V11, RFP C CASING DRAIN
   - DET-V12, RFP C CASING DRAIN
   - DET-V13, RFP C CASING DRAIN
   - DET-V14, RFP C CASING DRAIN

4.2.4. Verify closed CNM-V3030(V3033)(V3036), FEEDWATER PUMP FWS-1A(1B)(1C) HYDROGEN SUPPLY ISOLATION.

4.2.5. Verify closed CNM-V213(V203)(V194), FEEDWATER PUMP FWS-1A(1B)(1C) HYDROGEN INJECTION MAINTENANCE ISOLATION.

4.2.6. Verify closed CNM-V3037(V3038)(V3039), FEEDWATER PUMP FWS-1A(1B)(1C) SUCTION HYDROGEN INJECTION DRAIN.

<u>WARNING</u>

Hydrogen concentrations in localized areas from the Hydrogen Injection System provide potential ignition/explosive hazards. Do <u>not</u> perform system operations that could introduce an ignition source without taking proper precautions.

4.2.7. Using non-spark producing tools and proper ventilation equipment, remove cap from CNM-V3037(V3038)(V3039), FEEDWATER PUMP FWS-1A(B)(C) SUCTION HYDROGEN INJECTION DRAIN.

4.2.8. At CNM-V3037(V3038)(V3039), FEEDWATER PUMP FWS-1A(B)(C) SUCTION HYDROGEN INJECTION DRAIN install the following:

- A 2 inch reducer (600 psig or greater)
- A (600 psig or greater) check valve which allows flow to the suction header
- A hose connection.

4.2.9. Verify closed CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE and remove cap.

4.2.10. At CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE install the following:

- hose connection
- temporary strainer with a strainer blow down valve

4.2.11. Install temporary vent hoses at FWS-V37(V43)(V48), RF PUMP A(B)(C) DISCH VENT VALVE and FWS-PI8A(B)(C)-V1 and run to a floor drain.

4.2.12. Attach a 3/4 inch (or 1 inch) hose to CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE hose connection and run the other end to a floor drain.

4.2.13. Open CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE and flush hose to the floor drain.

4.2.14. WHEN flushing is complete, THEN close CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE.

4.2.15. Connect the hose from CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE hose connection, to CNM-V3037(V3038)(V3039), FEEDWATER PUMP FWS-1A(1B)(1C) SUCTION HYDROGEN INJECTION DRAIN hose connection.

WARNING

Hydrogen concentrations in localized areas from the Hydrogen Injection System provide potential ignition/explosive hazards. Do not perform system operations that could introduce an ignition source without taking proper precautions.

4.2.16. Commence filling as follows:

1. Slowly open FWS-V37(V43)(V48), RF PUMP A(B)(C) DISCH VENT VALVE.
2. Slowly open FWS-PI8A(B)(C)-V1, FDWTR PUMP P1B DISCH.
3. IF during the performance of this section suction pressure on CNM-PI72A(B)(C) cannot be maintained below 100 psig, THEN close CNM-V213(V203)(V194), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN INJECTION MAINTENANCE ISOLATION and:
   1) Allow system leakage to complete the pump fill.
   2) Go To step 4.2.18.

4. Open CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG DRAIN VALVE.

5. Open CNM-V3037(V3038)(V3039), FEEDWATER PUMP FWS-1A(B)(C) SUCTION HYDROGEN INJECTION DRAIN.

6. Open CNM-V213(V203)(V194), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN INJECTION MAINTENANCE ISOLATION.

CAUTION

CNS system piping and temporary hoses are not designed for pressures exceeding 150 psig. Leaking isolation valves could cause pressures in excess of 100 psig. Do not exceed 100 psig as read on CNM-PI72A(B)(C), FEEDWATER PUMP FWS-P1A(B)(C) SUCTION.

4.2.17. WHEN pressure at CNM-PI72A(B)(C) begins to increase, THEN throttle CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE to maintain pressure at CNM-PI72A(B)(C), FEEDWATER PUMP FWS-P1A(B)(C) SUCTION less than 100 psig.

4.2.18. WHEN water begins to issue from FWS-PI8A(B)(C)-V1, FDWTR PUMP P1B DISCH, THEN close FWS-PI8A(B)(C)-V1, FDWTR PUMP P1B DISCH.

NOTE

Steps 4.2.19 and 4.2.20 can be performed concurrently.

4.2.19. Vent the pump seals per Section 4.3.

4.2.20. WHEN water issues from FWS-V37(V43)(V48), RF PUMP A(B)(C) DISCH VENT VALVE, THEN close FWS-V37(V43)(V48).

4.2.21. Close the following valves:

1. CNM-V3037(V3038)(V3039), FEEDWATER PUMP FWS-1A(B)(C) SUCTION HYDROGEN INJECTION DRAIN

2. CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE

4.2.22. Open temporary strainer blowdown valve to relieve any pressure from hose and drain hose.

4.2.23. Disconnect hose and all fittings.

4.2.24. Install caps on the following valves:

- CNM-V3037(V3038)(V3039), FEEDWATER PUMP FWS-1A(B)(C) SUCTION HYDROGEN INJECTION DRAIN
- CNS-V426, CNDS TRANSFER LINE TO OFFGAS BLDG. DRAIN VALVE

4.2.25. Align the following valves as required by the Hydrogen Injection System:

- CNM-V213(V203)(V194), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN INJECTION MAINTENANCE ISOLATION
- CNM-V3030(V3033)(V3036), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN SUPPLY ISOLATION

4.2.26. Complete the full release of the clearance for the pump.

4.2.27. Verify open FWR-V1(V2)(V3), RFP A(B)(C) MIN FLOW MANUAL ISOL.

4.2.28. Go To Section 4.5 for pump Startup.

4.3 Reactor Feed Pump Seal Venting (Cold and Warm Conditions)

NOTE

All valve manipulations for pump venting are performed locally at the pump.

CAUTION

The steps listed below are generally written for venting RFP seals during cold conditions (<150°F). However, when RFP suction temperature is >150 °F, then vent the small seal water area very slowly to prevent the temperature of the seal vent discharge tubing from increasing. Vent each seal at least 10 minutes. If the seal outlet temperature rises above 140°F (FWS-TI12A, B, C or FWS-TI13A, B, C), seal venting should be stopped as soon as possible after a steady stream of water issues from the vent. Venting at an excessive rate when the RFP suction temperature >150°F can cause the seal to overheat.

IF Reactor Feed Pump has not been isolated from hot, pressurized CNM/FWS, THEN venting is not required. The volume of seal and seal cooler is very small (approximately 3 gallons).

NOTE

Steps 4.3.1 through 4.3.6 can be performed simultaneously when venting cold water (less than 150°F). Reference CR-RBS-2010-0575 CA 24)

4.3.1. Inboard Seal Cooling Water

1. Throttle open CCS-V3103A(B)(C), INBOARD SEAL VENT FOR FWS-P1A(B)(C) until a steady steam of water issues from the vent.

2. IF RFP suction temperature is less than 150°F, THEN continue to vent for at least 10 minutes then close the valve.

3. IF RFP suction temperature is greater than or equal to 150°F, THEN close CCS-V3103A(B)(C).

4.3.2. Inboard Seal Supply

1. Open FWS-V3014(V3018)(V3022), FWS-P1A(B)(C) INBD SEAL SUPPLY VENT ISOL.

2. Throttle open FWS-V3015(V3019)(V3023), FWS-P1A(B)(C) INBD SEAL SUPPLY VENT ISOL until a steady steam of water issues from the vent.

3. IF RFP suction temperature is less than 150°F, THEN continue to vent for at least 10 minutes then close FWS-V3015(V3019)(V3023).

4. IF RFP suction temperature is greater than or equal to 150°F, THEN close FWS-V3015(V3019)(V3023).

5. Close FWS-V3014(V3018)(V3022), FWS-P1A(B)(C) INBD SEAL SUPPLY VENT ISOL.

4.3.3. Inboard Seal Discharge

1. Open FWS-V3002(V3006)(V3010), FWS-P1A(B)(C) INBD SEAL DISCH VENT ISOL.

2. Throttle open FWS-V3003(V3007)(V3011), FWS-P1A(B)(C) INBD SEAL DISCH VENT ISOL until a steady steam of water issues from the vent.

3. IF RFP suction temperature is less than 150°F, THEN continue to vent for at least 10 minutes then close FWS-V3003(V3007)(V3011).

4. IF RFP suction temperature is greater than or equal to 150°F, THEN close FWS-V3003(V3007)(V3011).

5. Close FWS-V3002(V3006)(V3010), FWS-P1A(B)(C) INBD SEAL DISCH VENT ISOL.

4.3.4. Outboard Seal Cooling Water

1. Throttle open CCS-V3102A(B)(C), OUTBOARD SEAL VENT FOR FWS-P1A(B)(C) until a steady steam of water issues from the vent.

2. IF RFP suction temperature is less than 150°F, THEN continue to vent for at least 10 minutes then close CCS-V3102A(B)(C).

3. IF RFP suction temperature is greater than or equal to 150°F, THEN close CCS-V3102A(B)(C).

4.3.5. Outboard Seal Supply

1. Open FWS-V3016(V3020)(V3024), FWS-P1A(B)(C) OUTBD SEAL SUPPLY VENT ISOL.

2. Throttle open FWS-V3017(V3021)(V3025), FWS-P1A(B)(C) OUTBD SEAL SUPPLY VENT ISOL until a steady steam of water issues from the vent.

3. IF RFP suction temperature is less than 150^{o}F, THEN continue to vent for at least 10 minutes then close FWS-V3017(V3021)(V3025).

4. IF RFP suction temperature is greater than or equal to 150^{o}F, THEN close FWS-V3017(V3021)(V3025).

5. Close FWS-V3016(V3020)(V3024), FWS-P1A(B)(C) OUTBD SEAL SUPPLY VENT ISOL.

4.3.6. Outboard Seal Discharge

1. Open FWS-V3004(V3008)(V3012), FWS-P1A(B)(C) OUTBD SEAL DISCH VENT ISOL.

2. Throttle open FWS-V3005(V3009)(V3013), FWS-P1A(B)(C) OUTBD SEAL DISCH VENT ISOL until a steady steam of water issues from the vent.

3. IF RFP suction temperature is less than 150^{o}F, THEN continue to vent for at least 10 minutes then close FWS-V3005(V3009)(V3013).

4. IF RFP suction temperature is greater than or equal to 150^{o}F, THEN close FWS-V3005(V3009)(V3013).

5. Close FWS-V3004(V3008)(V3012), FWS-P1A(B)(C) OUTBD SEAL DISCH VENT ISOL.

4.4 Warming a Reactor Feed Pump

4.4.1. Verify fully open FWS-V25(V26)(V27) and FWS-V66(V67)(V68), RF PMP A(B)(C) DISCHARGE WARMUP ISOLATION VALVES.

NOTE

The minimum RFP warm-up time is one hour. This will ensure the pump casing has adequate warm-up time. If the previous step has been verified as complete without manipulations in the previous hour, then the one hour minimum has been satisfied.

4.4.2. Monitor condensate/feedwater temperatures using computer points FWSTA01, FWSTA02, FWSTA03, CNMTA017, CNMTA018, CNMTA019, CNMTA020, and CNMTA021, as appropriate, and warm the Reactor Feed Pump until both RFP suction temperature and RFP discharge temperature are within 100°F of the current Feedwater temperature.

4.4.3. If desired, open DET-V15(V19)(V11) and DET-V16(V20)(V12), PMP CASING DRAINS to aid pump warm-up.

4.4.4. Close the pump casing drains when warm-up is complete.

4.5 Reactor Feed Pump Startup

4.5.1. Verify RFP/Motor and Gear Increaser Lube Oil System is in operation per Section 4.1.

4.5.2. Verify open the following CCS valves:

- CCS-V280(V279)(V278), RFP FWL-P1A(B)(C) SEAL WATER SUPPLY VALVE
- CCS-V268(V265)(V262), RFP FWL-P1A(B)(C) SEAL WATER RETURN VALVE
- CCS-V331(V333)(V335), RFP LUBE OIL COOLER FWL-E1A(B)(C) CCS INLET VALVE
- CCS-V332(V334)(V336), RFP LUBE OIL COOLER FWL-E1A(B)(C) CCS OUTLET VALVE
- CCS-V292(V291)(V290), RFP GEAR INCR LUBE OIL COOLER FWL-E2A(B)(C) CCS INLET VALVE
- CCS-V295(V294)(V293), RFP GEAR INCR LUBE OIL COOLER FWL-E2A(B)(C) CCS OUTLET VALVE

- CCS-V261(V264)(V267), RFP MOTOR COOLER FWS-E2A(B)(C) CCS INLET VALVE
- CCS-V272(V271)(V270), RFP MOTOR COOLER FWS-E2A(B)(C) CCS OUTLET VALVE

NOTE

IF Reactor Feed Pump has not been isolated from hot, pressurized CNM/FWS, THEN venting is not required.

4.5.3. Re-vent Reactor Feed Pump Seals per Section 4.3.

4.5.4. Verify Reactor Feed Pumps have been warmed per Section 4.4.

4.5.5. Verify open FWS-V28(V29)(V30), RF PUMP A(B)(C) DISCHARGE VALVE BYPASS.

NOTE

Minimum Flow Valve Controller setting of 68% corresponds to 3050 gpm.

4.5.6. Verify CNM-H/A68A(B)(C), RX FWP 1A(B)(C) MIN FLOW CONTROLLER in AUTO and set at 68%.

4.5.7. IF FWS-P1A(B)(C), RX FWP P1A(B)(C) is rotating, THEN stop the pump from rotating as follows:

1. Close FWS-V28(V29)(V30), RF PUMP A(B)(C) DISCH VALVE BYPASS
2. Close FWS-V25(V26)(V27), RF PUMP A(B)(C) DISCHARGE WARMUP ISOLATION.
3. WHEN pump at standstill, THEN open Discharge Valve Bypass and Discharge Warm-up Isolation Valves.

4.5.8. Verify an adequate number of Condensate Demineralizers in service prior to starting a Reactor Feed Pump to prevent exceeding the design flow on any one Condensate Demineralizer per SOP-0093, Condensate Demineralizer System.

4.5.9. Verify an adequate number of Condensate Filtration filters in service prior to starting a Reactor Feed Pump to prevent exceeding the design flow on any one Condensate Filtration filter per SOP-0124, Condensate Filtration System.

4.5.10. Verify FWR-FV2A(B)(C), RX FWP P1A(B)(C) MIN FLOW Valve is operable and unisolated.

4.5.11. Verify the following CCS valves for the pump(s) being start are fully open:

NOTE

The following valves are potentially throttled to maintain proper seal temperatures when the pump is in Hot Standby. Therefore, to prevent overheating of the seals, prior to starting the reactor feed pump they should be fully opened.

1. FWS-P1A
   - CCS-V5003A, RFP FWL-P1A SEAL WATER HX-E4A CCS INLET VLV
   - CCS-V5004A, RFP FWL-P1A SEAL WATER HX-E4B CCS INLET VLV
2. FWS-P1B
   - CCS-V5003B, RFP FWL-P1B SEAL WATER HX-E4C CCS INLET VLV
   - CCS-V5004B, RFP FWL-P1B SEAL WATER HX-E4D CCS INLET VLV
3. FWS-P1C
   - CCS-V5003C, RFP FWL-P1C SEAL WATER HX-E4E CCS INLET VLV
   - CCS-V5004C, RFP FWL-P1C SEAL WATER HX-E4F CCS INLET VLV

NOTE

The Reactor Feed Pump should be started within 5 minutes of closing P73-PIT-R115A(B)(C)-V2, DRAIN VALVE to prevent buildup of hydrogen in the pump.

4.5.12. IF the HWC System is in service AND hydrogen injection is isolated to the pump, THEN perform the following:

1. Close P73-PIT-R115A(B)(C)-V2, DRAIN VALVE.
2. Verify P73-VF114A(B)(C), OUTLET PRESSURE GAUGE ISOLATION is open.

4.5.13. Momentarily depress FWS-P1A(B)(C), RX FWP P1A(B)(C) STOP pushbutton to reset any trips.

NOTE

Releasing the Reactor Feed Pump START pushbutton prior to FWR-FV2A(B)(C), RX FWP P1A(B)(C) MIN FLOW reaching the full open position will result in a pump trip.

CRITICAL STEP

4.5.14. Start FWS-P1A(B)(C), RX FWP P1A(B)(C) by maintaining the START pushbutton depressed until FWR-FV2A(B)(C), RX FWP P1A(B)(C) MIN FLOW Valve has opened and the pump has started.

NOTE

Motor amps should be limited to less than or equal to 311 amps. However, operation above 311 amps has been pre-approved as long as amps are less than 350 amps. A Condition Report is required for trending and evaluation of motor long term degradation when operating above 311 amps.

4.5.15. Check motor amps at FWS-A03(B03)(C03) are greater than 200 but less than or equal to 311.

4.5.16. IF the motor amps are less than 200, THEN verify the minimum flow valve is open by using the following computer points to verify flow is greater than or equal to 3050 gpm.

- FWS-P1A CNMFY007
- FWS-P1B CNMFY008
- FWS-P1C CNMFY009

4.5.17. Open FWS-MOV26A(B)(C), RX FWP P1A(B)(C) DISCH VLV.

4.5.18. Verify closed FWS-MOV109, FEED PUMP BYPASS.

4.5.19. Verify Reactor Feed Pump seals have been vented by reperforming Section 4.3 .

4.5.20. Contact System Engineering if higher than normal seal leakage and/or seal temperatures are encountered.

4.5.21. Verify FWL-TCV66A(B)(C) is maintaining lube oil temperature greater than or equal to 120°F and less than or equal to 140°F.

4.5.22. Verify FWL-TCV65A(B)(C) is maintaining gear increaser lube oil temperature greater than or equal to 97°F and less than or equal to 117°F.

4.5.23. Observe Seal Cooler temperatures. Seal cooler temperatures should be as follows:

1. IF the RFP is operating, THEN maximum Seal Cooler differential temperature should be 50°F.
2. IF the RFP is operating, THEN Seal Cooler outlet temperature should be greater than 100°F and less than 140°F.
3. IF the RFP is shutdown, THEN maximum Seal Cooler outlet temperature should be 300°F.

NOTE

If minor seal leakage is noted and/or higher than normal seal temperatures are noted after pump start, a one time seal venting may help. Continuous venting will not improve the situation.

4.5.24. Inform System Engineering and reperform seal venting if Seal Cooler differential temperature is greater than 50°F.

4.5.25. IF the HWC System is in service AND hydrogen injection is isolated to the pump, THEN restore hydrogen injection to the pump as follows:

1. On P73-P500, verify P73-AOV-F111A(B)(C), HYDROGEN ISOLATION TO FEEDWATER PUMP A(B)(C) switch is in AUTO.

CAUTION

The potential for an uncontrolled hydrogen injection with subsequent high main steam line radiation level isolation exists when hydrogen supply line pressure to the reactor feed pumps as indicated on P73-PIT-R115A(B)(C) HYDROGEN WATER CHEMISTRY SYS HYDROGEN OUTLET PRESSURE TRANSMITTER is greater than its respective reactor feed pump suction pressure as indicated on CNM-PI72A(B)(C), FEEDWATER PUMP FWS-P1A(B)(C).

Step 4.5.25 should be performed slowly to prevent any adverse impacts on main steam line radiation monitors or the offgas system. Do not exceed a depressurization rate of 20 psig/min as indicated on P73-PIT-R115A(B)(C). (Ref. CR-2002-0216 and CR-2002-1530)

NOTE

Performance of the following step may cause the "Low Hydrogen Pressure" annunciator on P73-P500 and the "HWC Trouble" annunciator on H13-P845 in the Main Control Room until system startup is complete.

2. Slowly throttle open the following manual hydrogen supply isolation valves to maintain less than or equal to 20 psig/min depressurization rate as indicated on P73-PIT-R115A(B)(C):

   1) CNM-V213(V203)(V194), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN INJECTION MAINTENANCE ISOLATION

   2) CNM-V3030(V3033)(V3036), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN SUPPLY ISOLATION

3. Purge H2 from the line to HWC-AF1, HYDROGEN FLAME ARRESTOR by opening the nitrogen bottle valve AND the vent rig purge valve for two minutes.

4. WHEN the two minutes has been completed, THEN close the nitrogen bottle valve AND the vent rig purge valve.

WARNING
Only non-sparking tools should be used on hydrogen system piping or components.

NOTE

Refer To Attachment 5, Hydrogen Vent Rig for removal of vent rig.

5. Disconnect the vent rig from P73-PIT-R115A(B)(C)-V2, DRAIN VALVE and install the instrument cap.

6. Close HWC-V007, CALIBRATION VENT CONNECTION

7. Remove the vent rig.

4.5.26. Locally verify breaker relay trip flags are reset for Reactor Feed Pump started in Step 4.5.14.

4.6 Establishing Flow to the Vessel Through the Startup Level Control Valve

CAUTION
Maximum design feedwater flow through the startup level control valve is 10%. Operation above 10% reactor power while controlling level with startup level control may result in reactor water level decrease. Do not exceed 10% reactor power while maintaining level with startup level control.
C33-LVF002 START UP FWREG VALVE position should be limited to less than or equal to 65% open to allow an adequate margin for valve modulation while maintaining reactor level.

NOTE

Depending upon reactor pressure, long cycle recirculation to the condenser may be used to adjust the Condensate/Feedwater flow through the startup level control valve to maintain stable level control.

4.6.1. Verify Feedwater System is aligned to long cycle cleanup per SOP-0007, Condensate System.

4.6.2. Contact Chemistry to verify feedwater chemistry is within limits for feeding the vessel.

4.6.3. Verify CNM-H/A68A(B)(C), RX FWP 1A(B)(C) MIN FLOW CONTROLLER in AUTO.

4.6.4. Verify 1 ELEM on the SINGLE ELEMENT THREE ELEMENT SELECT is selected.

4.6.5. Place C33-R602, START UP FWREG VALVE FLOW CONTROLLER in MANUAL.

4.6.6. Verify open FWS-MOV105, S/U FW REG VLV ISOL.

NOTE

A 50% setting of the startup FWREG Valve Controller is an approximate setting. Further adjustment will be required to balance system flow and maintain RPV Level.

4.6.7. Establish flow to the RPV as follows:

1. Adjust C33-LVF002, START UP FWREG VLV to an initial setting of 50%.
2. Close the following valves:
   - FWS-MOV27A, FWREG VLV 1A INLT Valve
   - FWS-MOV27B, FWREG VLV 1B INLT Valve
   - FWS-MOV27C, FWREG VLV 1C INLT Valve
3. Place FWS-H/A104, FW START UP RECIRC FCV FLOW CONTROLLER in MANUAL
4. Verify CNM-H/A114, MAIN CNDS RECIRC FLOW CONTROLLER in AUTO and set at 34%.
5. Fully close FWS-FV104, START UP RECIRC FCV AND verify CNM-FCV114, MAIN CNDS RECIRC modulates to maintain flow.

CAUTION

A rapid decrease in RPV level may result if RWCU is in service with feedwater pressure significantly less than RPV pressure and the feedwater header unisolated. Do not unisolate a feedwater header with RWCU in service and feedwater pressure significantly less than RPV pressure.

Unisolating a feedwater header with feedwater pressure significantly higher than RPV pressure could cause a rapid increase in feedwater flow rate and may result in a significant power increase. Do not unisolate a feedwater header with feedwater pressure significantly higher than RPV pressure.

6. Throttle open FWS-FV104, START UP RECIRC FCV, to obtain a first point heater outlet pressure as read on computer point FWSPA04 and FWSPA05, of approximately 35 psid above RPV pressure.

CRITICAL STEP

7. Lineup at least one feedwater header to the reactor by opening B21-F065A(B), A(B) FW INBD ISOL, and FWS-MOV7A(B), A(B) FW OUTBD ISOL.

4.6.8. Establish the OSM/CRS requested reactor water level as follows:

- Adjust setpoint for CNM-H/A114 as desired but in no case < 10%.
- Verify FWS-MOV103, LONG CYCLE CLEANUP ISOL is open.
- Throttle close FWS-FV104, START UP RECIRC FCV, to raise RPV level.
- Throttle open FWS-FV104, START UP RECIRC FCV, to lower RPV level.

4.7 Placing Startup Level Control in Automatic

CAUTION

C33-LVF002, START UP FWREG VALVE position should be limited to less than or equal to 65% open to allow an adequate margin for valve modulation while maintaining reactor level.

4.7.1. Return C33-R602, START UP FWREG VALVE FLOW CONTROLLER to AUTO as follows:

1. Adjust tape set 2 inches above actual vessel level and observe the deviation signal is positive.
2. Lower tape set 2 inches below actual vessel level and observe the deviation signal is negative.
3. Match tape set to actual vessel level in order to null the deviation signal.
4. Depress the AUTO Pushbutton and check green light above the pushbutton is on.

4.7.2. Adjust C33-R602, START UP FWREG VALVE FLOW CONTROLLER Tape Set to maintain the level requested by the OSM/CRS.

NOTE

Closing FWS-FV104, START UP RECIRC FCV will cause C33-LVF002, START UP FWREG VLV to close, opening FWS-FV104 will cause C33-LVF002, START UP FWREG VLV to open.

4.7.3. Adjust FWS-FV104, START UP RECIRC FCV in manual to maintain C33-LVF002, START UP FWREG VALVE at midrange.

4.7.4. IF desired to secure Long Cycle Cleanup, THEN perform the following:

1. Verify FWS-FV104, START UP RECIRC FCV is in MANUAL
2. Slowly close FWS-FV104, START UP RECIRC FCV while ensuring that reactor water level is maintained by the in-service FWREG valves.
3. WHEN FWS-FV104, START UP RECIRC FCV is fully closed, THEN close FWS-FV103, LONG CYCLE CLEAN UP ISOL.

4.8 Placing a FWREG Valve in Manual with Startup Level Control Valve in Auto

NOTE

This mode is typically used during startup when power is too low for optimal operation in master level control and too high for optimal operation on the startup level control valve alone, or as a transition to operation on Master Level Control.

Operation in this mode provides some degree of automatic level control using the startup level controller; however, immediate operator response may be necessary on a plant transient to ensure RPV level control.

4.8.1. Verify C33-R601A(R613)(R601B), FWREG VALVE A(B)(C) FLOW CONTROLLER in MANUAL and set at 0%.

4.8.2. Verify the bias thumbwheel on C33-R601A, FWREG VALVE A FLOW CONTROLLER and C33-R601B, FWREG VALVE C FLOW CONTROLLER set at 50.

4.8.3. Verify C33-R600, FW REG VALVES MASTER FLOW CONTROLLER is in MANUAL, set at 0%.

4.8.4. Place C33-R601A(R613)(R601B), FWREG VALVE A(B)(C) FLOW CONTROLLER in AUTO.

4.8.5. Verify FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT Valve is closed.

4.8.6. Test stroke C33-LVF001A(B)(C), FWREG VALVE A(B)(C) as follows:

1. Station an operator locally to monitor valve position.

CRITICAL STEP

2. Use the OPEN and CLOSE Pushbuttons on C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to stroke open and closed C33-LVF001A(B)(C).

3. Check proper valve movement and smooth operation.

C 4. Check C33-LVF001A(B)(C) full closed.

5. Open FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT Valve.

4.8.7. Use the manual pushbuttons on C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to open C33-LVF001A(B)(C), FWREG VALVE A(B)(C) and then maintain C33-LVF002, START UP FWREG VALVE position greater than 20 and less than 50% open.

4.9 Transfer from StartUp Level Control to Master Level Control

4.9.1. Check feedwater flow is approximately 10% or 1.31 x 10^6 lbm/hr.

4.9.2. IF no FWREG is in service, THEN perform Section 4.8 to put a FWREG in service.

4.9.3. Verify 1 ELEM is selected on the SINGLE ELEMENT THREE ELEMENT SELECT Switch.

4.9.4. Place C33-R600, FW REG VALVES MASTER FLOW CONTROLLER in AUTO as follows:

C 1. Adjust tape set 2 inches above actual vessel level and observe the deviation signal is positive.

C 2. Lower tape set 2 inches below actual vessel level and observe the deviation signal is negative.

3. Match tape set to actual vessel level in order to null the deviation signal.

4. Depress the AUTO Pushbutton and check the green light above the pushbutton is on.

4.9.5. Place C33-R602, START UP FWREG VALVE FLOW CONTROLLER in MANUAL.

CRITICAL STEP

4.9.6. Use the manual CLOSE Pushbutton on C33-R602, START UP FWREG VALVE FLOW CONTROLLER to close C33-FV002, START UP FWREG Valve while ensuring reactor level is maintained by the Master Level Controller.

4.9.7. Adjust C33-R600, FW REG VALVES MASTER FLOW CONTROLLER Tape Set to maintain the reactor level requested by the OSM/CRS.

4.10 Single Element to Three Element Control Transfer

4.10.1. Verify feedwater flow is greater than 10% or 1.31×10^6 lbm/hr.

4.10.2. Verify RPV level is stable and being controlled automatically by C33-R600, FW REG VALVES MASTER FLOW CONTROLLER.

4.10.3. Place C33-R600, FW REG VALVES MASTER FLOW CONTROLLER in MANUAL.

4.10.4. Depress 3 ELEM on the SINGLE ELEMENT THREE ELEMENT Select Switch.

4.10.5. Place C33-R600, FW REG VALVES MASTER FLOW CONTROLLER in AUTO as follows:

C 1. Adjust tape set 2 inches above actual vessel level and observe the deviation signal is positive.

C 2. Lower tape set 2 inches below actual vessel level and observe the deviation signal is negative.

3. Match tape set to actual vessel level in order to null the deviation signal.

4. <u>WHEN</u> the level signal is nulled, <u>THEN</u> depress the AUTO Pushbutton and check green light above the pushbutton is on.

4.10.6. Readjust C33-R600, FW REG VALVES MASTER FLOW CONTROLLER Tape Set to maintain the reactor level requested by the OSM/CRS.

4.11 Placing the Second or Third FWREG Valve in Service

4.11.1. Verify at least one FWREG is in service on master level control per Section 4.9.

4.11.2. Verify closed FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT Valve.

4.11.3. Ensure C33-R601A(R613)(R601B), FWREG VALVE A(B)(C) FLOW CONTROLLER in MANUAL, set at 0%.

<u>CAUTION</u>

The FWREG will fail open if the signal failure lockup is reset with instrument air isolated to the FWREG, possibly resulting in a reactor scram and turbine trip on high level. Do <u>not</u> reset the signal failure lockup if instrument air is isolated to the FWREG Valve.

CRITICAL STEP

4.11.4. <u>IF</u> the amber CONT SIGNAL FAILURE Light is ON, <u>THEN</u> depress the A(B)(C) FWREG VLV CONT SIGNAL FAILURE RESET Pushbutton.

4.11.5. Test stroke C33-LVF001A(B)(C), FWREG VALVE A(B)(C) as follows:

1. Station an operator locally to monitor valve position.
2. Use the OPEN and CLOSE Pushbuttons on C33-R601A(R613)(R601B), FWREG VALVE A(B)(C) FLOW CONTROLLER to stroke open and closed C33-LVF001A(B)(C).
3. Check proper valve movement and smooth operation.
4. C Check C33-LVF001A(B)(C) full closed.
5. Open FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT Valve.

4.11.6. Open C33-LVF001A(B)(C), FWREG VALVE A(B)(C) until all in service FWREGs are at the same position.

4.11.7. Place C33-R601A(R613)(R601B) in AUTO.

5 SYSTEM OPERATION

5.1 Alternating Feedwater Level Control Signals

5.1.1. IF automatically controlling level on the Master Flow controller, THEN alternate the feedwater level control signals as follows:

1. Ensure no deviation on C33-R600, FW REG VALVES MASTER FLOW CONTROLLER and place to MANUAL.

2. Swap the level control input by depressing either A or B on the RX LVL A/B SELECT Pushbutton.

3. Check for proper operation, then return C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to AUTO as follows:

   C *1)* Adjust tape set 2 inches above actual vessel level and observe the deviation signal is positive.

   C *2)* Lower tape set 2 inches below actual vessel level and observe the deviation signal is negative.

   3) Match tape set to actual vessel level in order to null the deviation signal.

   4) WHEN the level signal is nulled, THEN depress the AUTO Pushbutton and check green light above the pushbutton is on.

4. Adjust C33-R600, FW REG VALVES MASTER FLOW CONTROLLER Tape Set to maintain the reactor level requested by the OSM/CRS.

5.1.2. IF automatically controlling level on the Startup FWREG Valve Flow Controller, THEN alternate the feedwater level control signals as follows:

1. Check no deviation on C33-R602, START UP FWREG VALVE FLOW CONTROLLER and place to MANUAL.

2. Swap the level control input by depressing either A or B on the RX LVL A/B SELECT Pushbutton.

3. Check for proper operation, then return C33-R602, START UP FWREG VALVE FLOW CONTROLLER to AUTO as follows:

   1) Adjust tape set 2 inches above actual vessel level and observe the deviation signal is positive.

   2) Lower tape set 2 inches below actual vessel level and observe the deviation signal is negative.

   3) Match tape set to actual vessel level in order to null the deviation signal.

   4) Depress the AUTO Pushbutton and check green light above the pushbutton is on.

4. Adjust C33-R602, START UP FWREG VALVE FLOW CONTROLLER Tape Set to maintain the level requested by the OSM/CRS.

5.2 Restoring Reactor Water Level to Normal Following a Reactor Scram from High Power

5.2.1. Check reactor water level on the narrow range is greater than 10 inches and rising.

5.2.2. Reduce the number of running Feedwater Pumps to one.

<u>NOTE</u>

Normally one FWREG is left in service. However, if necessary for level control, all three FWREG's may be taken out of service.

1. Reduce the number of in service FWREGs by taking manual control and closing the selected FWREGs and associated isolation valve:

   - For C33-LVF001A close FWS-MOV27A, FWREG VLV 1A INLT Valve
   - For C33-LVF001B close FWS-MOV27B, FWREG VLV 1B INLT Valve
   - For C33-LVF001C close FWS-MOV27C, FWREG VLV 1C INLT Valve

5.2.3. Select 1 ELEM on the SINGLE ELEMENT THREE ELEMENT Select Switch.

5.2.4. <u>WHEN</u> feedwater flow requirements are within the capability of the Startup FWREG, place the Startup FWREG in service per Section 6.4.

5.2.5. IF amber SETPOINT SETDOWN Light is on, THEN reset Set Point Setdown.

5.2.6. Adjust C33-R602, START UP FWREG VALVE FLOW CONTROLLER Tape Set to maintain the level requested by the OSM/CRS.

5.2.7. IF FWS-MOV27A(B)(C) were closed when the feedwater temperature at the feed pumps was greater than 200°F, THEN perform the following:

1. Record the feedwater temperature at the reactor feed pumps on Attachment 6, FWS-MOV27A, B, C Stroke Temperature using one of the listed temperature points.

2. Refer to Section 5.7 for further stroking requirements.

5.3 Augmenting FWREGs While at High Power with Startup FWREG

NOTE

This procedure is intended for use on a temporary basis when one FWREG is out of service or is being removed from service.

Reactor power should be maintained as high as possible while allowing for adequate control margin for FWREG position and RFP amps.

5.3.1. Close FWS-MOV105, S/U FW REG VLV ISOL.

5.3.2. Test stroke C33-LVF002, START UP FWREG VLV as follows:

1. Station an operator locally to monitor valve START UP FWREG VLV position.

2. Null tape set on C33-R602, START UP FWREG VALVE FLOW CONTROLLER, and place in AUTO.

3. Adjust tape set on C33-R602, START UP FWREG VALVE FLOW CONTROLLER until a full open signal is generated.

4. Check for proper valve movement and smooth operation.

5. Adjust tape set on controller until a full closed signal is generated.

6. Check for proper valve movement and smooth operation.

7. Check C33-LVF002, START UP FWREG VLV full closed.

5.3.3. Place C33-R602, START UP FWREG VALVE FLOW CONTROLLER in MANUAL.

5.3.4. Open FWS-MOV105, S/U FW REG VLV ISOL.

5.3.5. Open C33-LVF002, START UP FWREG VLV to 100% using the OPEN Pushbutton on C33-R602, START UP FWREG VALVE FLOW CONTROLLER while verifying level is maintained by the Master Flow Controller.

5.3.6. Set C33-R602, START UP FWREG VALVE FLOW CONTROLLER tape set to 4 inches above C33-R600, FW REG VALVES MASTER FLOW CONTROLLER tape set to maintain C33-LVF002, START UP FWREG VLV full open.

5.3.7. Place C33-R602, START UP FWREG VALVE FLOW CONTROLLER in AUTO and verify C33-LVF002, START UP FWREG VLV remains full open.

5.4 Removing Startup FWREG from FWREG Augmenting Mode

5.4.1. Place C33-R602, START UP FWREG VALVE FLOW CONTROLLER in MANUAL.

5.4.2. Close C33-LVF002, START UP FWREG VLV to 0% using the CLOSE Pushbutton on C33-R602, START UP FWREG VALVE FLOW CONTROLLER while observing level is maintained by the Master Flow Controller.

5.4.3. Check the in service C33-LVF001A(B)(C), FWREG VALVE A(B)(C) are able to maintain level while less than or equal to 92% open.

5.4.4. Adjust C33-R602, START UP FWREG VALVE FLOW CONTROLLER tape set to 34 inches.

5.5 Manual Stroking of Start Up FWREG

5.5.1. Close FWS-MOV105, S/U FW REG VLV ISOL.

5.5.2. Station an operator locally to monitor valve position.

5.5.3. Use the OPEN and CLOSE Pushbuttons on C33-R602, START UP FWREG VALVE FLOW CONTROLLER to stroke open and then closed the Start Up FWREG.

5.5.4. Check proper valve movement and smooth operation.

5.5.5. Check C33-LVF002, START UP FWREG VLV full closed.

5.5.6. Open FWS-MOV105, S/U FW REG VLV ISOL.

5.6 Mitigating Feedwater Line Thermal Stratification

5.6.1. Monitor the feedwater lines for thermal stratification per SOP-0110, Tamaris Temperature Scanner Display 33.

NOTE

The method(s) utilized will be determined based upon current plant conditions and component configuration. Consult with the OSM/CRS to determine which action is to be taken.

5.6.2. Select one of the following methods to mitigate feedwater line stratification:

NOTE

The following actions may lead to degraded water chemistry conditions.

1. Utilizing the RWCU System per SOP-0090, Reactor Water Cleanup System perform one of the following:

   1) Bypass demineralizers and reject water to the condenser for reactor water level control.

   2) Secure the RWCU System.

CAUTION

Operating a Feedwater Pump at low flow may cause excessive pump vibration and result in pump damage. Do not continue to operate the Feedwater Pump at low flow levels if excessive vibration is observed.

2. Utilizing the feedwater system, perform the following:

   1) IF operating with FWS-FV104, START UP RECIRC FCV open, THEN close FWS-FV104.

   2) Place CNM-H/A68A(B)(C), RX FWP 1A(B)(C) MIN FLOW CONTROLLER in AUTO and set tape set at 0% to maximize feedwater flow through FWR-FV2A(B)(C), RX FWP P1A(B)(C) MIN FLOW Valve.

3) IF excessive Feedwater Pump vibration is observed, THEN consider other alternatives to mitigate feedwater line stratification.

5.7 Stroking FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT to Prevent Thermal Binding

5.7.1. WHEN the feed water temperature at the FWREG valves is greater than 85°F and less than 100°F of the temperature recorded in Attachment 6, FWS-MOV27A, B, C Stroke Temperature, THEN stroke the appropriate FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT as follows:

1. Locally verify C33-LVF001A(B)(C), FWREG VALVE A(B)(C) for the valve being stroked is closed.

2. Open FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT.

3. Close FWS-MOV27A(B)(C), FWREG VLV 1A(1B)(1C) INLT.

4. Repeat this Section for each 100°F reduction in temperature until the feedwater temperature during the stroke is less than 200°F.

5.8 Isolation/Restoration of FWS-E1A(B), 1st PT HTR

CAUTION

To prevent undue loading and overstressing of any Turbine part, the 1st Point Heater can not be taken out of service when the Turbine is in service.

5.8.1. Isolation of FWS-E1A(B), 1st PT HTR.

1. Verify the Turbine is not in service.

2. Verify the Moisture Separator Reheaters are not is service

3. Isolate FWS-E1A(B), 1st PT HTR as follows:

1) Monitor the reactor feed water level during this evolution

NOTE

The following steps are performed at H13-P680 unless otherwise noted.

The bypass line contains an orifice sized to pass 25% of total feed water flow.

2) Open FWS-MOV34A(B), PT HTR E1A(B) BYP VLV.

3) Close, the following valves:

- FWS-MOV17A(B), PT HTR E1A(B) INLT VLV.
- FWS-MOV22A(B) PT HTR E1A(B) OUTL VLV.

4. IF desired close, THEN close FWS-MOV34A(B), PT HTR E1A(B) BYP VLV.

5.8.2. Restoration of FWS-E1A(B), 1st Pt HTR.

1. Verify open, FWS-MOV34A(B), PT HTR E1A(B) BYP VLV.
2. IF necessary, THEN fill and vent FWS-E1A(B), 1st PT HTR as follows:

1) Verify either a Condensate or Reactor Feed pump is operating.

2) Slowly throttle open FWS-V84(V85), 1ST POINT HEATER E1A(B) INLET ISOL BYPASS VALVE to pressurize the heater.

3) Throttle open AND when a solid stream of water issues from the valve, THEN close and cap the valve.

- FWS-V240(V242), 1ST POINT HEATER E1A(B) OUTLET TEST VALVE

NOTE

The following steps are performed at H13-P680.

4) Open the following valves:

- FWS-MOV17A(B), PT HTR E1A(B) INLT VLV.
- FWS-MOV22A(B), PT HTR E1A(B) OUTL VLV.

5) Close FWS-MOV34A(B), PT HTR E1A(B) BYP VLV.

6) Verify close FWS-V84(V85), 1ST POINT HEATER E1A(B) INLET ISOL BYPASS VALVE used to pressurize the heater.

5.9 Adding Feed Pump Gear Increaser Oil

5.9.1. Hold back spring ring on quick disconnect and attach hose.

5.9.2. Verify good connection between quick disconnect and hose.

5.9.3. Open FWL-V43A(B)(C), GEAR INCR RESERVOIR FILL ISOL VALVE.

5.9.4. Add oil to the gear increaser reservoir by rotating the oil pump handle 10-15 turns in the indicated direction.

NOTE

A dark oil level should be in the lower 1/2 inch of the tubular sight glass. Oil addition is required when oil level is at the bottom of the tubular sight glass.

5.9.5. WHEN approximately 5 minutes has elapsed to allow oil to settle into the sump, THEN check gear increaser reservoir oil level.

5.9.6. IF gear increaser reservoir level is still low, THEN repeat steps 5.9.4 and 5.9.5.

5.9.7. WHEN an oil level is established in the lower 1/2 inch of the tubular sight glass, THEN close FWL-V43A(B)(C), GEAR INCR RESERVOIR FILL ISOL VALVE.

5.9.8. Disconnect hose from quick disconnect and properly store hose.

6 SYSTEM SHUTDOWN

6.1 Reactor Feed Pump Shutdown

6.1.1. IF securing a Reactor Feed Pump for downpower, THEN monitor the following parameters:

- Normal Feedwater Pump Motor current should be greater than 200 amps and limited to 311 amps. Refer To Precautions and Limitations 2.8 and 2.13.
- FWREG position should be limited to less than or equal to 92% open to allow an adequate margin for valve modulation while maintaining reactor level
- Feed pump suction pressure should be maintained above low pressure alarm point of 280 psig.

NOTE

The following step allows opening of the Reactor Feed Pump Min Flow Valve for the Reactor Feed Pump to be secured to minimize Reactor Water Level transient on Reactor Feed Pump shutdown.

The following step can be N/Aed if the Reactor Feed Pump Min Flow Valve or Flow Controller will not function properly.

6.1.2. IF NOT already performed to reduce Reactor Feed Pump vibration levels, THEN perform the following for the Reactor Feed Pump being shutdown:

1. At H13-P680, place CNM-H/A68A(B)(C), RX FWP 1A(B)(C) MIN FLOW FLOW CONTROLLER to MANUAL for the Reactor Feed Pump to be secured.
2. Open slowly FWR-FV2A(B)(C), RX FWP 1A(B)(C) MIN FLOW VALVE using CNM-H/A68A(B)(C), RX FWP 1A(B)(C) MIN FLOW FLOW CONTROLLER while monitoring Reactor Water Level.

NOTE

Securing a Reactor Feed Pump could result in a 2 to 4" Reactor Water Level transient. It may be necessary to adjust Reactor Water Level high in the normal level control band using C33-R600, FW REG VALVES MASTER FLOW CONTROLLER tape set to ensure sufficient margin to a Flow Control Valve Runback.

6.1.3. IF desired to raise Reactor Water Level, THEN at H13-P680 adjust C33-R600, FW REG VALVES MASTER FLOW CONTROLLER tape set to desired Reactor Water Level within normal level control band.

NOTE

Closing P73-AOV-F111A(B)(C), HYDROGEN ISOLATION TO FEEDWATER PUMP A(B)(C) can cause a HWC Trouble Alarm due to Hydrogen Flowrate To Setpoint Error on P73-P500.

6.1.4. IF the HWC System is in service AND the reactor feed pump is not being immediately shut down, THEN at P73-P500, place P73-AOV-F111A(B)(C), HYDROGEN ISOLATION TO FEEDWATER PUMP A(B)(C) in CLOSE.

NOTE

With only one RFP running, FWS-MOV26A(B)(C), RX FWP 1A(B)(C) DISCH VLV for the running RFP should not be expected to close fully until after the running RFP is tripped.

System pressure across the Min Flow Valves has prevented valves from opening when required. It is permissible to manually open the min flow valve for the FWS pump being shutdown prior to closing the affected pump's discharge valve.

When a RFP is secured, a Condensate Pump should also be secured per SOP-0007 to reduce excessive RFP discharge pressure and RFP vibration levels.

6.1.5. IF the capability of meeting feed flow requirements with the remaining Feedwater Pumps is uncertain, THEN make a determination as follows:

CRITICAL STEP

1. Close FWS-MOV26A(B)(C), RX FWP 1A(B)(C) DISCH VLV for the pump being shutdown.

2. Verify the minimum flow valve for the pump being secured is open.

3. Monitor Feed Flow/Steam Flow mismatch and RPV Level to insure remaining pump(s) can maintain level.

4. IF the remaining pump(s) cannot maintain RPV Level, THEN reopen the discharge valve FWS-MOV26A(B)(C), RX FWP 1A(B)(C) DISCH VLV and discontinue this procedure.

6.1.6. IF the last Feedwater Pump is being removed from service, THEN open FWS-MOV109, FEED PUMP BYPASS.

6.1.7. Stop FWS-P1A(B)(C), RX FWP P1A(B)(C).

NOTE

The following step ensures FWR-FV2A(B)(C), RX FWP 1A(B)(C) MIN FLOW VALVE closes when Reactor Feed Pump is secured.

6.1.8. Verify CNM-H/A68A(B)(C), RX FWP 1A(B)(C) MIN FLOW FLOW CONTROLLER is in AUTO for the Reactor Feed Pump that was secured.

6.1.9. IF Reactor Water Level was intentionally raised in Step 6.1.3, THEN adjust Reactor Water Level to desired level within normal level control band using C33-R600, FW REG VALVES MASTER FLOW CONTROLLER tape set.

NOTE

The following step may be performed concurrently with the remainder of Section 6.1.

6.1.10. IF FWS-P1A(B)(C) is to remain in hot standby, THEN maintain seal temperatures as follows:

1. Maintain seal water temperature ΔT less than or equal to 50°F AND seal water outlet temperature less than or equal to 300°F as follows:

   1) FWS-P1A

   - Throttle CCS-V5003A, RFP FWL-P1A SEAL WATER HX-E4A CCS INLET VALVE, as required.
   - Throttle CCS-V5004A, RFP FWL-P1A SEAL WATER HX-E4B CCS INLET VALVE, as required.

   2) FWS-P1B

   - Throttle CCS-V5003B, RFP FWL-P1B SEAL WATER HX-E4C CCS INLET VALVE, as required.
   - Throttle CCS-V5004B, RFP FWL-P1B SEAL WATER HX-E4D CCS INLET VALVE, as required.

   3) FWS-P1C

   - Throttle CCS-V5003C, RFP FWL-P1C SEAL WATER HX-E4E CCS INLET VALVE, as required.
   - Throttle CCS-V5004C, RFP FWL-P1C SEAL WATER HX-E4F CCS INLET VALVE, as required.

6.1.11. IF the Hydrogen injection is shut down or a plant shutdown is in progress, THEN Go To step 6.1.13.

NOTE

Section 6.1.12 is performed to prevent the buildup of hydrogen in an idle reactor feed pump when the hydrogen injection system is in service due to leakage past the hydrogen injection isolation valves.

6.1.12. IF the Hydrogen injection system is in service AND a plant shutdown is not in progress, THEN perform the following for the pump being shutdown:

1. At P73-P500, verify P73-AOV-F111A(B)(C), HYDROGEN ISOLATION TO FEEDWATER PUMP A(B)(C) is closed.

2. Verify P73-AOVF111A(B)(C), HYDROGEN ISOLATION TO FEEDWATER PUMP A(B)(C) control switch is in the CLOSED position.

3. Close the following manual hydrogen supply isolation valves:

   1) CNM-V3030(V3033)(V3036), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN SUPPLY ISOLATION

   2) CNM-V213(V203)(V194), FEEDWATER PUMP FWS-1A(B)(C) HYDROGEN INJECTION MAINTENANCE ISOLATION

NOTE

Steps 6.1.13 through 6.1.20 may be performed during the following venting steps.

4. Vent the hydrogen supply line for the Reactor Feed Pump that was shutdown by performing the following:

> **WARNING**
>
> **Only non-sparking tools should be used on hydrogen system piping or components.**
>
> **The HWC System operating pressure is approximately 650 psig. Extreme caution should be used when venting.**

NOTE

Steps 6.1.12.4.2) through 6.1.12.4.7) may be performed prior to shutting down the Reactor Feed Pump.

1) IF the vent rig was previously installed, THEN Go To step 6.1.12.4.8).

NOTE

Refer to Attachment 5, Hydrogen Vent Rig for installation of the vent rig.

2) Remove pipe cap from HWC-V007, CALIBRATION VENT CONNECTION and connect one end of the vent rig.

3) Verify closed P73-PIT-R115A(B)(C)-V2, DRAIN VALVE.

4) Remove instrument cap downstream of P73-PIT-R115A(B)(C)-V2 and connect the other end of the vent rig from HWC-V007.

5) Hook up a nitrogen bottle to the vent rig purge valve.

6) Pressurize the line using the nitrogen bottle to 10 psig.

7) Using "snoop" check the fittings for leaks and tighten any leaking fittings.

8) WHEN all leaks have been stopped, THEN open HWC-V007, CALIBRATION VENT CONNECTION.

9) Purge air from the line to HWC-AF1, HYDROGEN FLAME ARRESTOR by opening the nitrogen bottle valve AND the vent rig purge valve for two minutes.

10) WHEN the two minute purge has been completed, THEN close the nitrogen bottle valve AND the vent rig purge valve.

11) Slowly open P73-PIT-R115A(B)(C)-V2 and verify pressure lowers on P73-PIT-R115A(B)(C).

12) Monitor pressure on P73-PIT-R115A(B)(C) and verify pressure lowers to approximately 0 psig.

13) Using an explosimeter check the fittings on the vent rig for hydrogen leaks.

6.1.13. On H13-P870, verify FWL-P5A(B)(C), GEAR INCR AUX OIL PMP 5A(B)(C) auto starts.

6.1.14. Verify min flow valve closes 1 - 3 minutes after pump shutdown.

6.1.15. Verify FWS-MOV26A(B)(C), RX FWP P1A (B)(C) DISCH VLV is closed.

6.1.16. On H13-P870, WHEN the 23 minute time delay allowing for pump coast down has passed, THEN verify the following:

1. FWL-P1A(B)(C), RX FWP A(B)(C) MN OIL PMP 1A(B)(C) auto stops.
2. FWL-P5A(B)(C), RX FWP A(B)(C) GEAR INC AUX OIL PMP 5A(B)(C) auto stops.
3. FWL-P2A(B)(C), RX FWP A(B)(C) AUX OIL PMP 2A(B)(C) auto starts on low oil pressure.
4. IF FWL-P2A(B)(C), RX FWP A(B)(C) AUX OIL PMP 2A(B)(C) does not maintain pressure greater than 4 psi, THEN FWL-P3A(B)(C), RX FWP A(B)(C) AUX OIL PMP 3A(B)(C) auto starts on low oil pressure.

6.1.17. On H13-P870, place FWL-P2A(B)(C), RX FWP A(B)(C) AUX OIL PMP 2A(B)(C) control switch in STOP, and verify FWL-P3A(B)(C), RX FWP A(B)(C) AUX OIL PMP 3A(B)(C) auto starts on low oil pressure.

6.1.18. On H13-P870, place FWL-P2A(B)(C), RX FWP A(B)(C) AUX OIL PMP 2A(B)(C) control switch in AUTO.

6.1.19. On H13-P870, place FWL-P3A(B)(C), RX FWP A(B)(C) AUX OIL PMP 3A(B)(C) control switch in STOP.

6.1.20. On H13-P870, place FWL-P3A(B)(C), RX FWP A(B)(C) AUX OIL PMP 3A(B)(C) control switch in AUTO.

6.1.21. IF the Hydrogen Injection System has been secured after the pump was secured, THEN perform the following to remove the vent rig:

1. Close P73-PIT-R115A(B)(C)-V2, DRAIN VALVE.

2. Purge H2 from the line to HWC-AF1, HYDROGEN FLAME ARRESTOR by opening the nitrogen bottle valve AND the vent rig purge valve for two minutes.

3. WHEN the two minutes has been completed, THEN close the nitrogen bottle valve AND the vent rig purge valve.

NOTE

Refer To Attachment 5, Hydrogen Vent Rig for removal of vent rig.

4. Disconnect the vent rig from P73-PIT-R115A(B)(C)-V2, DRAIN VALVE and install the instrument cap.

5. Close HWC-V007, CALIBRATION VENT CONNECTION.

6. Remove the vent rig.

7. Verify P73-VF114A(B)(C), OUTLET PRESSURE GAUGE ISOLATION is open.

6.1.22. Locally verify breaker relay trip flags are reset for Reactor Feed Pump stopped in Step 6.1.7.

6.2 Removing a FWREG Valve from Service

NOTE

If the FWREG Valve being removed from service is to be tagged and drained, a 2 inch hard drain pipe should be used based on lessons learned in CR-RBS-2013-0099.

6.2.1. Check feedwater flow is within the capability of the remaining FWREGs.

6.2.2. Place C33-R601A(R613)(R601B), FWREG VALVE A(B)(C) FLOW CONTROLLER in MANUAL.

6.2.3. Throttle closed the C33-LVF001A(B)(C), FWREG VALVE A(B)(C) to be removed from service while observing that reactor level is being maintained by the remaining FWREGs.

6.2.4. IF level is not being maintained by the remaining FWREGs, THEN place the FWREG that was being removed from service back in service as follows:

1. Open C33- LVF001A(B)(C), FWREG VALVE A(B)(C) to the same position as the in service FWREGs.
2. Place C33-R601A(R613)(R601B), FWREG VALVE A(B)(C) FLOW CONTROLLER in AUTO.
3. Exit this section of the procedure

6.2.5. WHEN the FWREG is fully closed, THEN locally check the valve is fully closed.

6.2.6. Close the following isolation valve for the FWREG valve that is being removed from service.

- For C33-LVF001A close FWS-MOV27A, FWREG VLV 1A INLT Valve
- For C33-LVF001B close FWS-MOV27B, FWREG VLV 1B INLT Valve
- For C33-LVF001C close FWS-MOV27C, FWREG VLV 1C INLT Valve

6.2.7. Record the temperature of the feedwater at the reactor feed pumps on Attachment 6, FWS-MOV27A, B, C Stroke Temperature, using one of the listed temperature points.

6.2.8. IF FWS-MOV27A, B, or C, FWREG VLV 1A(1B)(1C) INLT were closed with feedwater temperature at the reactor feed pumps greater than 200°F, THEN refer to Section 5.7 for further stroking requirements.

6.3 Three Element to Single Element Control Transfer

NOTE

Typically, this procedure is performed when feedwater flow is 10 to 15%.

6.3.1. Check RPV level is stable at the C33-R600, FW REG VALVES MASTER FLOW CONTROLLER setpoint.

6.3.2. Place C33-R600, FW REG VALVES MASTER FLOW CONTROLLER in MANUAL.

6.3.3. Select 1 ELEM on the SINGLE ELEMENT THREE ELEMENT SELECT.

6.3.4. Null out level error with tape setpoint on C33-R600, FW REG VALVES MASTER FLOW CONTROLLER.

6.3.5. Check for proper operation, then return C33-R600, FW REG VALVES MASTER FLOW CONTROLLER to AUTO as follows:

C 1. Adjust tape set 2 inches above actual vessel level and observe the deviation signal is positive.

C 2. Lower tape set 2 inches below actual vessel level and observe the deviation signal is negative.

3. Match tape set to actual vessel level in order to null the deviation signal.

4. Depress the AUTO Pushbutton and check the green light above the pushbutton is on.

6.3.6. Adjust C33-R600, FW REG VALVES MASTER FLOW CONTROLLER Tape Set to maintain the level requested by the OSM/CRS.

6.4 Transfer from Master Level Control to Startup Level Control

6.4.1. Check feedwater flow is less than 10% or 1.31 x 10^6 lbm/hr.

6.4.2. Verify C33-R602, START UP FWREG VALVE FLOW CONTROLLER in MANUAL, set at 0%.

6.4.3. Verify 1 ELEM on SINGLE ELEMENT THREE ELEMENT SELECT is selected.

6.4.4. Open FWS-MOV105, S/U FW REG VLV ISOL.

6.4.5. Match tape set on C33-R602, START UP FWREG VALVE FLOW CONTROLLER to actual RPV level and place in AUTO.

6.4.6. Place C33-R600, FW REG VALVES MASTER FLOW CONTROLLER in MANUAL.

6.4.7. Close C33-LVF001A(B)(C), FWREG VALVE A(B)(C) using the CLOSE Pushbutton on C33-R600, FW REG VALVES MASTER FLOW CONTROLLER while observing C33-LVF002, START FWREG VALVE maintains level.

7 REFERENCES

7.1 PID-6-1A & 1B

7.2 ESK FWL Series

7.3 ESK FWR Series

7.4 ESK FWS Series

7.5 GE Elementary Diagram 828E232AA Sheets 1-6, Feedwater Control System

7.6 GE Elementary Diagram 828E443AA, Nuclear Boiler Process Instrumentation

7.7 Bingham-Willimatte RFP Instruction Manual, 3227.500-007-001E

7.8 Electrical Machinery Co. RFP Motor Instruction Manual, 3244.401-023-001A

7.9 RBS-9512 Culp to Cahill, Environmental Qualification Program

7.10 EEAR 87-R0114, MR 90-0093

7.11 CR2003-2300

7.12 EC-912

8 RECORDS

8.1 Record disposition shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
LOCATION: TURBINE BUILDING, 67 FT EL				
FWS-V200	RF PUMP A DISCH PI8A ROOT VALVE	OPEN		
FWS-V202	RF PUMP A DISCH PI9A ROOT VALVE	OPEN		
FWS-V37	RF PUMP A DISCH VENT VALVE	CLOSED/ CAPPED		
FWS-V8	RF PUMP A DISCH DRAIN VALVE	CLOSED/ CAPPED		
FWS-V28	RF PUMP A DISCH VALVE BYPASS	OPEN		
FWS-V25	RF PUMP A DISCH WARMUP LINE ISOLATION	OPEN		
FWS-V66	RF PUMP A DISCH WARMUP LINE ISOLATION	OPEN		
FWS-V3002	FWS-P1A INBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3003	FWS-P1A INBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3004	FWS-P1A OUTBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3005	FWS-P1A OUTBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3014	FWS-P1A INBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3015	FWS-P1A INBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3016	FWS-P1A OUTBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3017	FWS-P1A OUTBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V203	RF PUMP B DISCH PI8B ROOT VALVE	OPEN		
FWS-V205	RF PUMP B DISCH PI9B ROOT VALVE	OPEN		
FWS-V43	RF PUMP B DISCH VENT VALVE	CLOSED/ CAPPED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWS-V3006	FWS-P1B INBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3007	FWS-P1B INBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3008	FWS-P1B OUTBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3009	FWS-P1B OUTBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3018	FWS-P1B INBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3019	FWS-P1B INBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3020	FWS-P1B OUTBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3021	FWS-P1B OUTBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V206	RF PUMP C DISCH PI8C ROOT VALVE	OPEN		
FWS-V208	RF PUMP C DISCH PI9C ROOT VALVE	OPEN		
FWS-V3010	FWS-P1C INBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3011	FWS-P1C INBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3012	FWS-P1C OUTBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3013	FWS-P1C OUTBD SEAL DISCH VENT ISOL	CLOSED		
FWS-V3022	FWS-P1C INBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3023	FWS-P1C INBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V3024	FWS-P1C OUTBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V10	RF PUMP B DISCH DRAIN VALVE	CLOSED/ CAPPED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWS-V29	RF PUMP B DISCH VALVE BYPASS	OPEN		
FWS-V26	RF PUMP B DISCH WARMUP ISOLATION VALVE	OPEN		
FWS-V67	RF PUMP B DISCH WARMUP ISOLATION VALVE	OPEN		
FWS-V3025	FWS-P1C OUTBD SEAL SUPPLY VENT ISOL	CLOSED		
FWS-V48	RF PUMP C DISCH VENT VALVE	CLOSED/ CAPPED		
FWS-V12	RF PUMP C DISCH DRAIN VALVE	CLOSED/ CAPPED		
FWS-V30	RF PUMP C DISCH VALVE BYPASS	OPEN		
FWS-V27	RF PUMP C DISCH WARMUP LINE ISOLATION	OPEN		
FWS-V68	RF PUMP C WARMUP ISOLATION VALVE	OPEN		
FWS-V70	FEED PUMP BYPASS LINE MANUAL ISOLATION VALVE	OPEN		
FWS-V22	FEED PUMP BYPASS LINE DRAIN VALVE	CLOSED/ CAPPED		
FWS-V34	START UP LEVEL CONTROL VALVE ISOL EQUALIZING VALVE	CLOSED		
FWS-V16	START UP LCV LINE DRAIN	CLOSED/ CAPPED		
FWS-V54	START UP LCV LINE TEST CONN	CLOSED		
FWS-V56	START UP LCV LINE TEST CONN	CLOSED		
FWS-V7	START UP LCV LINE MAN ISOL	OPEN		
FWS-V31	FWS-MOV27A BYPASS	CLOSED		
FWS-V3029	REACTOR FEEDWATER ZINC INJECTION HEADER A INLET DRAIN VALVE	CLOSED/ CAPPED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWS-V3031	REACTOR FEEDWATER ZINC INJECTION HEADER A DOWNSTREAM INLET SHUTOFF VALVE	CLOSED		
CAUTION **To prevent over pressurizing the low pressure portion of the Zinc Injection System, do not open FWS-V14, ZINC INJECTION SYS HDR A SHUTOFF VLV OR FWS-V3027, ZINC INJECTION SYS HDR A SHUTOFF VLV until CNM-V264, ZINC INJECTION SYS HDR SHUTOFF VLV AND CNM-V3019, ZINC INJECTION SYS HDR B SHUTOFF VLV are verified LOCKED OPEN.**				
FWS-V14	ZINC INJECTION SYS HDR A SHUTOFF VLV	CLOSED		
FWS-V3027	ZINC INJECTION SYS HDR A SHUTOFF VLV	CLOSED		
FWS-V50	FEEDWATER HEATER A TO VESSEL TEST CONNECTION	CLOSED		
C33-F001A	FEEDWATER LEVEL CONTROL VALVE A	CLOSED		
FWS-V53	FEEDWATER HEADER A TO RX VESSEL TEST CONNECTION	CLOSED		
FWS-V1	FEEDWATER HEADER A TO RX VESSEL ISOLATION VALVE	OPEN		
FWS-V32	FEEDWATER HEADER B TO RX VESSEL ISOLATION VLV BYPASS	CLOSED		
FWS-V3028	REACTOR FEEDWATER ZINC INJECTION HEADER B INLET DRAIN VALVE	CLOSED/ CAPPED		
FWS-V3030	REACTOR FEEDWATER ZINC INJECTION HEADER B DOWNSTREAM INLET SHUTOFF VALVE	CLOSED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
<u>CAUTION</u> To prevent over pressurizing the low pressure portion of the Zinc Injection System, do <u>not</u> open FWS-V18, ZINC INJECTION SYS HDR B SHUTOFF VLV <u>OR</u> FWS-V3026, ZINC INJECTION SYS HDR B SHUTOFF VLV until CNM-V264, ZINC INJECTION SYS HDR SHUTOFF VLV <u>AND</u> CNM-V3019, ZINC INJECTION SYS HDR B SHUTOFF VLV are verified LOCKED OPEN.				
FWS-V18	ZINC INJECTION SYS HDR B SHUTOFF VLV	CLOSED		
FWS-V3026	ZINC INJECTION HDR B SHUTOFF VLV	CLOSED		
FWS-V58	FEEDWATER HEADER B TO RX VESSEL TEST CONNECTION	CLOSED		
C33-F001B	FEEDWATER LEVEL CONTROL VALVE B	CLOSED		
FWS-V61	FEEDWATER HEADER B TO RX TEST CONNECTION	CLOSED/ CAPPED		
FWS-V2	FEEDWATER HEADER B TO RX ISOLATION VALVE	OPEN		
FWS-V33	FEEDWATER HEADER C TO RX VESSEL ISOL VLV BYPASS VLV	CLOSED		
FWS-V20	FEEDWATER HEADER C TO RX VESSEL DRAIN VALVE	CLOSED/ CAPPED		
FWS-V62	FEEDWATER HEADER C TO RX VESSEL TEST CONNECTION	CLOSED		
C33-F001C	FEEDWATER LEVEL CONTROL VALVE C	CLOSED		
FWS-V65	FEEDWATER HEADER C TO RX VESSEL TEST CONNECTION	CLOSED/ CAPPED		
FWS-V3	FEEDWATER HEADER C TO RX VESSEL ISOLATION VALVE	OPEN		
DET-V15	RFP A CASING DRAIN	CLOSED		
DET-V16	RFP A CASING DRAIN	CLOSED		
DET-V17	RFP A CASING DRAIN	CLOSED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
DET-V18	RFP A CASING DRAIN	CLOSED		
DET-V19	RFP B CASING DRAIN	CLOSED		
DET-V20	RFP B CASING DRAIN	CLOSED		
DET-V21	RFP B CASING DRAIN	CLOSED		
DET-V22	RFP B CASING DRAIN	CLOSED		
DET-V11	RFP C CASING DRAIN	CLOSED		
DET-V12	RFP C CASING DRAIN	CLOSED		
DET-V13	RFP C CASING DRAIN	CLOSED		
DET-V14	RFP C CASING DRAIN	CLOSED		
FWL-V38A	FILTER 28A INLET	OPEN		
FWL-V26A	FILTER 28A PDIS41A HI SIDE ROOT VALVE	OPEN		
FWL-V27A	FILTER 28A PDIS41A LO SIDE ROOT VALVE	OPEN		
FWL-V34A	FILTER 28A DRAIN VALVE	CLOSED		
FWL-V36A	FILTER 28A OUTLET	OPEN		
FWL-V31A	PRESSURE INSTRUMENT ISOL VALVE	OPEN		
FWL-V40A	RFP A STEP UP GEAR LUBE OIL OUTLET	OPEN		
FWL-V39A	FILTER 30A INLET	LOCKED OPEN		
FWL-V35A	FILTER 30A DRAIN VALVE	CLOSED		
FWL-V25A	FILTER 30A PDIS40A HI SIDE ROOT	OPEN		
FWL-V24A	FILTER 30A PDIS40A LO SIDE ROOT	OPEN		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWL-V37A	FILTER 30A OUTLET	OPEN		
FWL-V28A	INSTRUMENT ROOT VALVE	OPEN		
FWL-V41A	GEAR INCR LEVEL GAUGE ISOLATION	OPEN		
FWL-V42A	RFP RESERVOIR DR	CLOSED		
FWL-V43A	GEAR INCR RESERVOIR FILL ISOL VALVE	CLOSED		
FWL-V3002A	FWL-LG60A GEAR INCREASER LOWER ISOLATION VALVE	OPEN		
FWL-V3003A	FWL-LG60A GEAR INCREASER UPPER ISOLATION VALVE	OPEN		
FWL-V38B	FILTER 28B INLET	OPEN		
FWL-V26B	FILTER 28B PDIS41B HI SIDE ROOT VALVE	OPEN		
FWL-V27B	FILTER 28B PDIS41B LO SIDE ROOT VALVE	OPEN		
FWL-V34B	FILTER 28B DRAIN VALVE	CLOSED		
FWL-V36B	FILTER 28B OUTLET	OPEN		
FWL-V31B	INSTRUMENT ROOT VALVE	OPEN		
FWL-V40B	RFP B STEP UP GEAR LUBE OIL OUTLET	OPEN		
FWL-V39B	FILTER 30B INLET	LOCKED OPEN		
FWL-V35B	FILTER 30B DRAIN VALVE	CLOSED		
FWL-V25B	FILTER 30B PDIS40B HI SIDE ROOT	OPEN		
FWL-V24B	FILTER 30B PDIS40B LO SIDE ROOT	OPEN		
FWL-V37B	FILTER 30B OUTLET	OPEN		
FWL-V28B	INSTRUMENT ROOT VALVE	OPEN		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWL-V41B	GEAR INCR LEVEL GAGE ISOLATION	OPEN		
FWL-V42B	RFP RESERVOIR DR	CLOSED		
FWL-V43B	GEAR INCR RESERVOIR FILL ISOL VALVE	CLOSED		
FWL-V3002B	FWL-LG60B GEAR INCREASER LOWER ISOLATION	OPEN		
FWL-V3003B	FWL-LG60B GEAR INCREASER UPPER ISOLATION VALVE	OPEN		
FWL-V38C	FILTER 28C INLET	OPEN		
FWL-V26C	FILTER 28C PDIS41C HI SIDE ROOT VALVE	OPEN		
FWL-V27C	FILTER 28C PDIS41C LO SIDE ROOT VALVE	OPEN		
FWL-V34C	FILTER 28C DRAIN VALVE	CLOSED		
FWL-V36C	FILTER 28C OUTLET	OPEN		
FWL-V31C	INSTRUMENT ROOT VALVE	OPEN		
FWL-V40C	RFP C STEP UP GEAR LUBE OIL OUTLET	OPEN		
FWL-V39C	FILTER 30C INLET	LOCKED OPEN		
FWL-V35C	FILTER 30C DRAIN VALVE	CLOSED		
FWL-V25C	FILTER 30C PDIS40C HI SIDE ROOT	OPEN		
FWL-V24C	FILTER 30C PDIS40C LO SIDE ROOT	OPEN		
FWL-V37C	FILTER 30C OUTLET	OPEN		
FWL-V28C	INSTRUMENT ROOT VALVE	OPEN		
FWL-V41C	GEAR INCR LEVEL GAUGE ISOLATION	OPEN		
FWL-V42C	RFP RESERVOIR DR	CLOSED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWL-V43C	GEAR INCR RESERVOIR FILL ISOL VALVE	CLOSED		
FWL-V3002C	FWL-LG60C GEAR INCREASER LOWER ISOLATION VALVE	OPEN		
FWL-V3003C	FWL-LG60C GEAR INCREASER UPPER ISOLATION VALVE	OPEN		
SST-V3033	RX FEEDWATER HEADER SAMPLE STATION ISOLATION VALVE	OPEN		
TURBINE BLDG, 86 FT EL, RFP AREA				
FWS-V211	RFP DISCHARGE HEADER VENT VALVE	CLOSED/ CAPPED		
FWS-V209	RFP DISCHARGE HEADER VENT VALVE	CLOSED/ CAPPED		
FWS-V213	FEEDWATER HEADER VENT VALVE	CLOSED/ CAPPED		
FWS-V215	FEEDWATER HEADER VENT VALVE	CLOSED/ CAPPED		
FWS-V111	S/U RECIRC FE104 LO SIDE ISOL	OPEN		
FWS-V112	S/U RECIRC FE104 HI SIDE ISOL	OPEN		
FWS-V90	FEEDWATER SYSTEM S/U RECIRC ISOL VLV BYP	CLOSED		
FWS-V132	S/U RECIRC FE104 HIGH SIDE ISOL VALVE	OPEN		
FWS-V131	S/U RECIRC FE104 LO SIDE ISOL VLV	OPEN		
FWS-V235	S/U TO TURBINE PLANT SAMPLE SYSTEM	OPEN		
FWS-V106	S/U RECIRC PE TEST CONNECTION	CLOSED/ CAPPED		
FWS-V184	FEEDWATER TO RX FEN001A HI SIDE ISOL VALVE	CLOSED/ CAPPED		
FWS-V186	FEEDWATER TO RX FEN001A LO SIDE ISOL VALVE	CLOSED/ CAPPED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWS-V229	FEEDWATER TO TURBINE PLANT SAMPLE SYSTEM	OPEN		
FWS-V143	FEEDWATER HEADER TO RX DRAIN VLV	CLOSED/ CAPPED		
FWS-V134	FEEDWATER TO RX FEN001A HI SIDE ISOL VALVE	OPEN		
FWS-V133	FEEDWATER TO RX FEN001A LO SIDE ISOL VALVE	OPEN		
FWS-V238	FEEDWATER TO RX HEADER A DRAIN VALVE	CLOSED/ CAPPED		
FWS-V182	FEEDWATER TO RX FEN001B HI SIDE ISOL VALVE	CLOSED/ CAPPED		
FWS-V180	FEEDWATER TO RX FEN001B LO SIDE ISOL VALVE	CLOSED/ CAPPED		
FWS-V135	FEEDWATER TO RX FEN001B HI SIDE ISOL VALVE	OPEN		
FWS-V136	FEEDWATER TO RX FEN001B LO SIDE ISOL VALVE	OPEN		
FWS-V236	FEEDWATER TO RX HEADER B DRAIN VALVE	CLOSED/ CAPPED		
FWS-V3080A	FWS PRESSURE TRANSMITTER ROOT VALVE	OPEN		
FWS-V3080B	FWS PRESSURE TRANSMITTER ROOT VALVE	OPEN		
FWS-V3081A	NOBLE CHEM INJECTION LINE ISOLATION VALVE	OPEN		
FWS-V3081B	NOBLE CHEM INJECTION LINE ISOLATION VALVE	OPEN		
FWS-V3082A	NOBLE CHEM INJECTION LINE ISOLATION VALVE	CLOSED		
FWS-V3082B	NOBLE CHEM INJECTION LINE ISOLATION VALVE	CLOSED		
FWS-V3084A	OLNC INJECTION LINE ISOLATION VALVE	CLOSED		
FWS-V3084B	OLNC INJECTION LINE ISOLATION VALVE	CLOSED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
FWS-V3085A	OLNC INJECTION LINE TEST VALVE	CLOSED/ CAPPED		
FWS-V3085B	OLNC INJECTION LINE TEST VALVE	CLOSED/ CAPPED		
TURBINE BLDG, 70 FT EL, A HEATER BAY				
FWS-V127	1ST POINT HEADER E1A INLET PT30A ROOT VALVE	OPEN		
FWS-V84	1ST POINT HEATER E1A INLET ISOL BYPASS VALVE	CLOSED		
FWS-V95	1ST POINT HEATER E1A INLET TEST CONNECTION	CLOSED/ CAPPED		
FWS-V149	1ST POINT HEADER E1A INLET DRAIN VALVE	CLOSED/ CAPPED		
FWS-V80	1ST POINT HEATER E1A DRAIN VALVE	CLOSED/ CAPPED		
FWS-V86	1ST POINT HEATER E1A VENT VALVE	CLOSED/ CAPPED		
FWS-V97	1ST POINT HEATER E1A OUTLET TEST CONN	CLOSED		
FWS-V240	1ST POINT HEATER E1A OUTLET VENT VALVE	CLOSED/ CAPPED		
FWS-V153	1ST POINT HEATER E1A OUTLET VENT VALVE	CLOSED CAPPED		
FWS-V139	1ST POINT HEATER E1A BYPASS DRAIN	CLOSED/ CAPPED		
FWS-V220	1ST POINT HEATER E1A BYPASS TEST CONNECTION	CLOSED/ CAPPED		
FWS-V221	1ST POINT HEATER E1A BYPASS TEST CONNECTION	CLOSED/ CAPPED		
FWS-V129	1ST POINT HEATER E1A OUTLET PI32A ROOT VALVE	OPEN		
DET-V45	1ST POINT HEATER E1A SHELL SIDE DRAIN	CLOSED		
DET-V46	1ST POINT HEATER E1A SHELL SIDE DRAIN	CLOSED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
DET-V51	1ST POINT HEATER E1A SHELL SIDE RELIEF DRAIN	CLOSED		
TURBINE BLDG, 70 FT EL, B HEATER BAY				
FWS-V128	1ST POINT HEATER E1B INLET PI30B ROOT VALVE	OPEN		
FWS-V85	1ST POINT HEATER E1B INLET ISOL BYPASS	CLOSED		
FWS-V101	1ST POINT HEATER E1B INLET TEST CONNECTION	CLOSED/ CAPPED		
FWS-V147	1ST POINT HEATER E1B INLET DRAIN VALVE	CLOSED/ CAPPED		
FWS-V82	1ST POINT HEATER DRAIN VALVE	CLOSED/ CAPPED		
FWS-V89	1ST POINT HEATER VENT VALVE	CLOSED/ CAPPED		
FWS-V103	1ST POINT HEATER E1B OUTLET TEST CONNECTION	CLOSED		
FWS-V242	1ST POINT HEATER E1B OUTLET TEST VALVE	CLOSED/ CAPPED		
FWS-V151	1ST POINT HEATER E1B OUTLET DRAIN VALVE	CLOSED/ CAPPED		
FWS-V154	FWS-MOV22B 1ST PT HTR E1B OUTLET VLV DRN VLV	CLOSED/ CAPPED		
FWS-V137	1ST POINT HEATER E1B BYPASS DRAIN VALVE	CLOSED/ CAPPED		
FWS-V222	1ST POINT HEATER E1B BYPASS TEST CONNECTION	CLOSED/ CAPPED		
FWS-V223	1ST POINT HEATER E1B BYPASS TEST CONNECTION	CLOSED/ CAPPED		
FWS-V130	1ST POINT HEATER E1B OUTLET PT32B ROOT VALVE	OPEN		
FWS-V146	1ST POINT HEATER OUTLET HEADER VENT VALVE	CLOSED/ CAPPED		
DET-V65	1ST POINT HEATER E1B SHELL SIDE DRAIN	CLOSED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
DET-V66	1ST POINT HEATER E1B SHELL SIDE DRAIN	CLOSED		
DET-V71	1ST POINT HEATER E1B SHELL SIDE RELIEF DRAIN	CLOSED		
TURBINE BLDG, 70 FT EL, SOUTH END OF HOTWELL				
FWS-V108	S/U RECIRCULATION DRAIN VALVE	CLOSED/ CAPPED		
FWS-V109	S/U RECIRC TEST CONN ISOL VALVE	CLOSED/ CAPPED		
FWS-V75	S/U RECIRC MANUAL ISOL VALVE	LOCKED OPEN		
TURBINE BLDG, 95 FT EL, WEST SIDE				
FWR-V1	RFP A MIN FLOW MANUAL ISOL	OPEN		
FWR-V9	RFP A MIN FLOW LINE DRAIN	CLOSED/ CAPPED		
FWR-V4	RFP A MIN FLOW LINE MAN ISOL	LOCKED OPEN		
FWR-V2	RFP B MIN FLOW MAN ISOL	OPEN		
FWR-V13	RFP B MIN FLOW LINE DRAIN	CLOSED/ CAPPED		
FWR-V5	RFP B MIN FLOW MANUAL ISOL	LOCKED OPEN		
FWR-V3	RFP C MIN FLOW MAN ISOL	OPEN		
FWR-V17	RFP C MIN FLOW LINE DRAIN	CLOSED/ CAPPED		
FWR-V6	RFP C MIN FLOW MANUAL ISOL	LOCKED OPEN		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
STEAM TUNNEL				
FWS-V161	A FEEDWATER HEADER LMC CONNECTION ISOLATION VALVE	CLOSED/ CAPPED		
FWS-V3053	REACTOR FEEDWATER INLET HEADER A UPSTREAM VENT VALVE FOR FWS-V3052	CLOSED/ CAPPED		
FWS-V3054	REACTOR FEEDWATER INLET HEADER A DOWN STREAM TEST VALVE FOR FWS-V3052	CLOSED/ CAPPED		
FWS-V3055	REACTOR FEEDWATER INLET HEADER A UPSTREAM VENT VALVE FOR FWS-V3052	CLOSED/ CAPPED		
FWS-V163	B FEEDWATER HEADER LMC CONNECTION ISOLATION VALVE	CLOSED/ CAPPED		
B21-VF030A	A FEEDWATER HEADER OUTBOARD TEST CONNECTION	LOCKED CLOSED/ CAPPED		
B21-VF063A	A FEEDWATER HEADER OUTBOARD TEST CONNECTION ISOLATION VALVE	LOCKED CLOSED/ CAPPED		
B21-VF030B	B FEEDWATER HEADER OUTBOARD TEST CONNECTION ISOLATION VALVE	LOCKED CLOSED/ CAPPED		
B21-VF063B	B FEEDWATER HEADER OUTBOARD TEST CONNECTION ISOLATION VALVE	LOCKED CLOSED/ CAPPED		

VALVE LINEUP - FEEDWATER SYSTEM

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS	VALVE LABELED
DRYWELL, 113 FT EL				
B21-VF076A	A FEEDWATER HEADER INBOARD TEST CONNECTION ISOLATION VALVE	CLOSED/ CAPPED		
B21-VF011A	A FEEDWATER HEADER INBOARD MANUAL ISOLATION VALVE	LOCKED OPEN		
B21-VF076B	B FEEDWATER HEADER INBOARD TEST CONNECTION ISOLATION VALVE	CLOSED/ CAPPED		
B21-VF011B	B FEEDWATER HEADER ISOL MANUAL ISOLATION VALVE	LOCKED OPEN		
DRYWELL, 132 FT EL				
FWS-V120	A FEEDWATER HEADER INBOARD TEST CONNECTION ISOLATION VALVE AZ 120□	CLOSED/ CAPPED		
FWS-V124	B FEEDWATER HEADER INBOARD TEST CONNECTION ISOLATION VALVE AZ 350□	CLOSED/ CAPPED		
FWS-V126	B FEEDWATER HEADER INBOARD TEST CONNECTION INBOARD VALVE AZ 230□	CLOSED/ CAPPED		

VALVE LINEUP - FEEDWATER SYSTEM

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INSTRUMENT AND VALVE LINEUP - FEEDWATER SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWS-FT104	FDW START-UP RECIRC TZ-10, 67 FT EL, RAK-10 EAST SIDE OF FEEDWATER PUMP C		
	FWS-FT104-V1H	OPEN	
	FWS-FT104-V2L	OPEN	
	FWS-FT104-V3B	CLOSED	
	FWS-FT104-V4	CLOSED	
	FWS-FT104-V5	CLOSED	
	FWS-FT104-V6	CLOSED	
	FWS-FT104-V7	CLOSED	
	FWS-FT104-V8	OPEN	
	FWS-FT104-V9	OPEN	
	VERIFY LIVE ZERO TRANSMITTER	LIVE ZERO	
FWS-FV104	FDW START-UP RECIRC TY-11, 85 FT EL		
	FWS-FV104-V1	OPEN	
FWS-PI8A	FDWTR PUMP P1A DISCH TZ-5, 72 FT EL, NORTH END OF FEEDWATER PUMP A		
	FWS-PI8A-V1	CLOSED	
FWS-PI8B	FDWTR PUMP P1B DISCH TC-8, 72 FT EL, NORTH END OF FEEDWATER PUMP B		
	FWS-PI8B-V1	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWS-PI8C	FDWTR PUMP P1C DISCH TC-10, 68 FT EL, NORTH END OF FEEDWATER PUMP C		
	FWS-PI8C-V1	CLOSED	
FWS-PT9A	FEEDWATER PUMP P1A DISCH TZ-5, 68 FT EL, RAK-15		
	FWS-PT9A-V1	OPEN	
	FWS-PT9A-V2	CLOSED	
	FWS-PT9A-V3	OPEN	
	FWS-PT9A-V4	CLOSED	
	VERIFY LIVE ZERO ON TRANSMITTER	LIVE ZERO	
FWS-PT9B	FEEDWATER PUMP P1B DISCH TZ-8.3, 67 FT EL, RAK-17		
	FWS-PT9B-V1	OPEN	
	FWS-PT9B-V2	CLOSED	
	FWS-PT9B-V3	OPEN	
	FWS-PT9B-V4	CLOSED	
	VERIFY LIVE ZERO ON TRANSMITTER	LIVE ZERO	

INSTRUMENT AND VALVE LINEUP - FEEDWATER SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWS-PT9C	FEEDWATER PUMP P1C DISCH TZ-10, 67 FT EL, RAK-10 EAST SIDE OF FEEDWATER PUMP C		
	FWS-PT9C-V1	CLOSED	
	FWS-PT9C-V2	OPEN	
	FWS-PT9C-V3	CLOSED	
	FWS-PT9C-V4	OPEN	
	VERIFY LIVE ZERO ON TRANSMITTER	LIVE ZERO	
FWS-PT200A	RX FEEDWATER HEADER A TZ-5, 67 FT EL, H22-PNLP043 PRESSURE TRANSMITTER		
	FWS-PT200A-V1	OPEN	
	FWS-PT200A-V2	CLOSED	
	FWS-PT200A-V3	OPEN	
	FWS-PT200A-V4	CLOSED	
FWS-PT200B	RX FEEDWATER HEADER B TZ-5, 67 FT EL, H22-PNLP043 PRESSURE TRANSMITTER		
	FWS-PT200B-V1	OPEN	
	FWS-PT200B-V2	CLOSED	
	FWS-PT200B-V3	OPEN	
	FWS-PT200B-V4	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWS-I/P104	FDW START-UP RECIRC TZ-10, 68 FT EL, RAK-10 EAST SIDE OF FEEDWATER PUMP C		
	FWS-I/P104-V1	OPEN	
FWS-PT30A	FEEDWATER TO 1ST PT HTR E1A TC-4.3, 67 FT EL, RAK-7		
	FWS-PT30A-V1	OPEN	
	FWS-PT30A-V2	CLOSED	
	FWS-PT30A-V3	OPEN	
	FWS-PT30A-V4	CLOSED	
	VERIFY LIVE ZERO ON TRANSMITTER	LIVE ZERO	
FWS-PT30B	FEEDWATER TO 1ST PT HTR E1B TC-13, 72 FT EL, RAK-5		
	FWS-PT30B-V1	OPEN	
	FWS-PT30B-V2	CLOSED	
	FWS-PT30B-V3	OPEN	
	FWS-PT30B-V4	CLOSED	
	VERIFY LINE ZERO ON TRANSMITTER	LIVE ZERO	

INSTRUMENT AND VALVE LINEUP - FEEDWATER SYSTEM

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWS-PT32A	FEEDWATER OUT 1ST PT HTR E1A TC-4.3, 67 FT EL, RAK-7		
	FWS-PT32A-V1	OPEN	
	FWS-PT32A-V2	CLOSED	
	FWS-PT32A-V3	OPEN	
	FWS-PT32A-V4	CLOSED	
	VERIFY LIVE ZERO ON TRANSMITTER	LIVE ZERO	
FWS-PT32B	FEEDWATER OUT 1ST PT HTR E1B TC-12.5, 72 FT EL, RAK-5		
	FWS-PT32B-V1	OPEN	
	FWS-PT32B-V2	CLOSED	
	FWS-PT32B-V3	OPEN	
	FWS-PT32B-V4	CLOSED	
	VERIFY LIVE ZERO ON TRANSMITTER	LIVE ZERO	

INSTRUMENT AND VALVE LINEUP - FEEDWATER SYSTEM

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INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PI9A	FWL-E1C LUBE OUTLET TC-5, 72 FT EL, NORTH SIDE OF FEEDWATER PUMP A		
	FWL-PI9A-V1	OPEN	
	FWL-PI9A-V2	CLOSED	
FWL-PI9B	FWL-E1C LUBE OUTLET TC-7, 72 FT EL, NORTH SIDE OF FEEDWATER PUMP B		
	FWL-PI9B-V1	OPEN	
	FWL-PI9B-V2	CLOSED	
FWL-PI9C	FWL-E1C LUBE OUTLET TC-9, 72 FT EL, NORTH SIDE OF FEEDWATER PUMP C		
	FWL-PI9C-V1	OPEN	
	FWL-PI9C-V2	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PDIS40A	FWS-GEAR 1A INLET FLT 30A TZ-5.7, 67 FT EL, EAST SIDE OF FEEDWATER PUMP A		
	FWL-PDIS40A-V1H	OPEN	
	FWL-PDIS40A-V2L	OPEN	
	FWL-PDIS40A-V3B	CLOSED	
	FWL-PDIS40A-V4	CLOSED	
	FWL-PDIS40A-V5	CLOSED	
	FWL-PDIS40A-V6	CLOSED	
	FWL-PDIS40A-V7	CLOSED	
	FWL-PDIS40A-V8	CLOSED	
	FWL-PDIS40A-V9	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PDIS40B	FWS-GEAR 1B INLET FLT 30B TZ-7.9, 67 FT EL, EAST SIDE OF FEEDWATER PUMP B		
	FWL-PDIS40B-V1H	OPEN	
	FWL-PDIS40B-V2L	OPEN	
	FWL-PDIS40B-V3B	CLOSED	
	FWL-PDIS40B-V4	CLOSED	
	FWL-PDIS40B-V5	CLOSED	
	FWL-PDIS40B-V6	CLOSED	
	FWL-PDIS40B-V7	CLOSED	
	FWL-PDIS40B-V8	CLOSED	
	FWL-PDIS40B-V9	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PDIS40C	FWS-GEAR 1C INLET FLT 30C TZ-10, 72 FT EL, WEST SIDE OF FEEDWATER PUMP C		
	FWL-PDIS40C-V1H	OPEN	
	FWL-PDIS40C-V2L	OPEN	
	FWL-PDIS40C-V3B	CLOSED	
	FWL-PDIS40C-V4	CLOSED	
	FWL-PDIS40C-V5	CLOSED	
	FWL-PDIS40C-V6	CLOSED	
	FWL-PDIS40C-V7	CLOSED	
	FWL-PDIS40C-V8	CLOSED	
	FWL-PDIS40C-V9	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PDIS41A	FWS-P1A INLET FLT 28A TZ-6, 67 FT EL, NORTH END OF FEEDWATER PUMP A		
	FWL-PDIS41A-V1H	OPEN	
	FWL-PDIS41A-V2L	OPEN	
	FWL-PDIS41A-V3B	CLOSED	
	FWL-PDIS41A-V4	CLOSED	
	FWL-PDIS41A-V5	CLOSED	
	FWL-PDIS41A-V6	CLOSED	
	FWL-PDIS41A-V7	CLOSED	
	FWL-PDIS41A-V8	CLOSED	
	FWL-PDIS41A-V9	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PDIS41B	FWS-P1B INLET FLT 28B TZ-7.5, 67 FT EL, NORTH END OF FEEDWATER PUMP B		
	FWL-PDIS41B-V1H	OPEN	
	FWL-PDIS41B-V2L	OPEN	
	FWL-PDIS41B-V3B	CLOSED	
	FWL-PDIS41B-V4	CLOSED	
	FWL-PDIS41B-V5	CLOSED	
	FWL-PDIS41B-V6	CLOSED	
	FWL-PDIS41B-V7	CLOSED	
	FWL-PDIS41B-V8	CLOSED	
	FWL-PDIS41B-V9	CLOSED	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PDIS41C	FWS-P1C INLET FLT 28C TZ-9.5, 67 FT EL, NORTH END OF FEEDWATER PUMP C		
	FWL-PDIS41C-V1H	OPEN	
	FWL-PDIS41C-V2L	OPEN	
	FWL-PDIS41C-V3B	CLOSED	
	FWL-PDIS41C-V4	CLOSED	
	FWL-PDIS41C-V5	CLOSED	
	FWL-PDIS41C-V6	CLOSED	
	FWL-PDIS41C-V7	CLOSED	
	FWL-PDIS41C-V8	CLOSED	
	FWL-PDIS41C-V9	CLOSED	
FWL-PI21A	FWL-E2B LUBO OUTLET TZ-6, 72 FT EL, EAST SIDE OF FEEDWATER PUMP A		
	FWL-PI21A-V1	OPEN	
	FWL-PI21A-V2	CLOSED	
FWL-PI21B	FWL-E2B LUBO OUTLET TZ-8, 72 FT EL, EAST SIDE OF FEEDWATER PUMP B		
	FWL-PI21B-V1	OPEN	
	FWL-PI21B-V2	CLOSED	

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PI21C	FWL-E2B LUBO OUTLET TZ-10, 72 FT EL, EAST SIDE OF FEEDWATER PUMP C		
	FWL-PI21C-V1	OPEN	
	FWL-PI21C-V2	CLOSED	
FWL-PS1A	REAC FWP P1A GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP A		
	FWL-PS1A-V1	OPEN	
	FWL-PS1A-V2	CLOSED	
FWL-PS1B	REAC FWP P1B GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP B		
	FWL-PS1B-V1	OPEN	
	FWL-PS1B-V2	CLOSED	
FWL-PS1C	REAC FWP P1C GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP C		
	FWL-PS1C-V1	OPEN	
	FWL-PS1C-V2	CLOSED	
FWL-PS2A	REAC FWP P1A GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP A		
	FWL-PS2A-V1	OPEN	
	FWL-PS2A-V2	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PS2B	REAC FWP P1B GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP B		
	FWL-PS2B-V1	OPEN	
	FWL-PS2B-V2	CLOSED	
FWL-PS2C	REAC FWP P1C GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP C		
	FWL-PS2C-V1	OPEN	
	FWL-PS2C-V2	CLOSED	
FWL-PS3A	REAC FWP P1A GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP A		
	FWL-PS3A-V1	OPEN	
	FWL-PS3A-V2	CLOSED	
FWL-PS3B	REAC FWP P1B GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP B		
	FWL-PS3B-V1	OPEN	
	FWL-PS3B-V2	CLOSED	
FWL-PS3C	REAC FWP P1C GR 72 FT EL, EAST SIDE OF FEEDWATER PUMP C		
	FWL-PS3C-V1	OPEN	
	FWL-PS3C-V2	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PS11A	REAC FWP P1A TC-5, 72 FT EL, NORTH END OF FEEDWATER PUMP A		
	FWL-PS11A-V1	OPEN	
	FWL-PS11A-V2	CLOSED	
FWL-PS11B	REAC FWP P1B TC-7.5, 72 FT EL, NORTH END OF FEEDWATER PUMP B		
	FWL-PS11B-V1	OPEN	
	FWL-PS11B-V2	CLOSED	
FWL-PS11C	REAC FWP P1C TC-9.5, 72 FT EL, NORTH END OF FEEDWATER PUMP C		
	FWL-PS11C-V1	OPEN	
	FWL-PS11C-V2	CLOSED	
FWL-PS12A	REAC FWP P1A 72 FT EL, NORTH END OF FEEDWATER PUMP A		
	FWL-PS12A-V1	OPEN	
	FWL-PS12A-V2	CLOSED	
FWL-PS12B	REAC FWP P1B 72 FT EL, NORTH END OF FEEDWATER PUMP B		
	FWL-PS12B-V1	OPEN	
	FWL-PS12B-V2	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PS12C	REAC FWP P1C 72 FT EL, NORTH END OF FEEDWATER PUMP C		
	FWL-PS12C-V1	OPEN	
	FWL-PS12C-V2	CLOSED	
FWL-PS13A	REAC FWP P1A TC-5, 72 FT EL, NORTH END OF FEEDWATER PUMP A		
	FWL-PS13A-V1	OPEN	
	FWL-PS13A-V2	CLOSED	
FWL-PS13B	REAC FWP P1B TC-5, 72 FT EL, NORTH END OF FEEDWATER PUMP B		
	FWL-PS13B-V1	OPEN	
	FWL-PS13B-V2	CLOSED	
FWL-PS13C	REAC FWP P1C TC-9.5, 72 FT EL, NORTH END OF FEEDWATER PUMP C		
	FWL-PS13C-V1	OPEN	
	FWL-PS13C-V2	CLOSED	
FWL-PS14A	REAC FWP P1A 72 FT EL, NORTH END OF FEEDWATER PUMP A		
	FWL-PS14A-V1	OPEN	
	FWL-PS14A-V2	CLOSED	

INSTRUMENT AND VALVE LINEUP - FEEDWATER PUMP AND DRIVE LUBE OIL

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS
FWL-PS14B	REAC FWP P1B 72 FT EL, NORTH END OF FEEDWATER PUMP B		
	FWL-PS14B-V1	OPEN	
	FWL-PS14B-V2	CLOSED	
FWL-PS14C	REAC FWP P1C 72 FT EL, NORTH END OF FEEDWATER PUMP C		
	FWL-PS14C-V1	OPEN	
	FWL-PS14C-V2	CLOSED	

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ELECTRICAL LINEUP - FEEDWATER SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
FWL-P1A	REACTOR FW PUMP MAIN OIL PUMP	NHS-MCC1C1 BKR 5C	ON	
FWL-P2A	REACTOR FW PUMP AUX OIL PUMP	NHS-MCC1C1 BKR 5E	ON	
FWS-MOV103	FDW START UP RECIRC	NHS-MCC1C1 BKR 1D	ON	
FWL-P1B	REACTOR FDW PUMP MAIN OIL PUMP	NHS-MCC1D1 BKR 6A	ON	
FWL-P1C	REACTOR FDW PUMP MAIN OIL PUMP	NHS-MCC1D1 BKR 6C	ON	
FWL-P2B	REACTOR FEED PUMP AUX OIL PUMP	NHS-MCC1D2 BKR 5A	ON	
FWL-P2C	REACTOR FD PUMP STBY OIL PUMP	NHS-MCC1D2 BKR 6A	ON	
FWL-P5B	REAC FD PMP GEAR INCR AUX OIL PUMP	NHS-MCC1D2 BKR 6B	ON	
FWL-P5C	REACTOR FD PMP GEAR INCR AUX OIL PUMP	NHS-MCC1D2 BKR 5B	ON	
FWS-MOV27C	INLET TO FEEDWATER CONTROL	NHS-MCC1D2 BKR 5D	ON	
FWS-MOV17B	1ST PT HTR FDW INLET	NHS-MCC1D2 BKR 1D	ON	
FWS-MOV26C	REACTOR FDW P1C DISCHARGE	NHS-MCC1D2 BKR 4D	ON	
FWS-MOV22B	1ST POINT HTR FDW OUTLET	NHS-MCC1D2 BKR 3D	ON	
FWS-MOV34B	1ST PT HTR FDW BYPASS	NHS-MCC1D2 BKR 4C	ON	
FWS-MOV105	LEVEL CONTROL BYPASS ISOLATION	NHS-MCC1D2 BKR 1C	ON	

ELECTRICAL LINEUP - FEEDWATER SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
FWS-MOV109	REACTOR FWP BYP VALVE FROM CONDENSER	NHS-MCC1D2 BKR 2C	ON	
FWS-P5A	REAC FWP GEAR INCR AUX OIL PUMP	NHS-MCC1C2 BKR 2C	ON	
FWL-P3A	RX FWP A AUX OIL PUMP 3A	BYS-PNL03A DISC 19	ON	
FWL-P3B	RX FWP B AUX OIL PUMP 3B	BYS-PNL03B DISC 15	ON	
FWL-P3C	RX FWP C AUX OIL PUMP 3C	BYS-PNL03B DISC 16	ON	
FWS-MOV26A	REACTOR FWP P1A DISCHARGE	NHS-MCC1G BKR 3D	ON	
FWS-MOV27A	INLET TO FDW CONT	NHS-MCC1G BKR 2C	ON	
FWS-MOV17A	1ST PT HTR FEEDWATER INLET	NHS-MCC1G BKR 5D	ON	
FWS-MOV22A	1ST PT HTR FEEDWATER OUTLET	NHS-MCC1G BKR 4D	ON	
FWS-MOV34A	1ST PT HTR FEEDWATER BYPASS	NHS-MCC1G BKR 3C	ON	
FWS-P1AH	REAL FWP P1A MOTOR SPACE	NHS-MCC1G BKR 3B	ON	
FWS-MOV26B	REACTOR FWP P1B DISCHARGE	NHS-MCC1H BKR 4D	ON	
FWS-P1BH	REACTOR FWP MOTOR SPACE HEATER	NHS-MCC1H BKR 4B	ON	
FWS-P1CH	REACTOR FWP MOTOR SPACE HEATER	NHS-MCC1H BKR 4C	ON	
FWS-MOV27B	INLET TO FEEDWATER CONTROL	NHS-MCC1H BKR 3D	ON	

ELECTRICAL LINEUP - FEEDWATER SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
FWR-SOV2A,B,C	FEED AUXILIARY CONTROL	SCI-PNL01 BKR 10	ON	
FWL-SOV26A,B,C	OIL PUMP TEST SOLENOID VALVE H13P855A (FWL01) TEST SOV VLV	SCI-PNL01 BKR 19	ON	
FWL-SOV27A,B,C	OIL PUMP TEST SOLENOID VALVES			
FWL-SOV28A,B,C	OIL PUMP TEST SOLENOID VALVE			
FWS-LS10A,B,C	FEED PUMP LEAK DETECTION	SCA-PNL1C1 BKR 4	ON	
FWS-MOV103H	FWS-MOV103 (HTR)	SCA-PNL1C1 BKR 16	ON	
FWS-MOV105H	FWS-MOV105 HEATER	SCA-PNL1D1 BKR 14	ON	
FWS-MOV109H	FWS-MOV109 HEATER			
FWS-MOV17BH	FWS-MOV17B HEATER	SCA-PNL1D1 BKR 16	ON	
FWS-MOV22BH	FWS-MOV22B HEATER			
FWS-MOV34BH	FWS-MOV34B HEATER			
FWS-MOV26CH	FWS-MOV26C HEATER	SCA-PNL1D1 BKR 15	ON	
FWS-MOV27CH	FWS-MOV27C HEATER			
FWS-MOV26BH	FWS-MOV26B HEATER	SCA-PNL1H1 BKR 8	ON	
FWS-MOV27BH	FWS-MOV27B HEATER			
FWS-MOV26AH	FWS-MOV26A HEATER	SCA-PNL1G1 BKR 6	ON	
FWS-MOV27AH	FWS-MOV27A HEATER			

ELECTRICAL LINEUP - FEEDWATER SYSTEM

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS
FWS-MOV17AH	FWS-MOV17A HEATER	SCA-PNL1G1 BKR 5	ON	
FWS-MOV22AH	FWS-MOV22A HEATER			
FWS-MOV34AH	FWS-MOV34A HEATER			
FWS-AIT200-XR-A	120VAC POWER LINE CONDITIONER (LEFM ELECTRONICS)	SCA-PNL1N1 BKR 7	ON	
FWS-AIT200-XR-B	120VAC POWER LINE CONDITIONER (LEFM ELECTRONICS)	SCA-PNL1H1 BKR 11	ON	
FWS-AIT200	FWS-AIT200 A/C UNIT	SCA-PNL1H1 BKR 13	ON	
FWS-P1A	REACTOR FEED PMP MOT FWS-P1A	NPS-SWG1A ACB12	RACKED IN OPEN	
FWS-P1B	REACTOR FEED PMP MOT FWS-P1B	NPS-SWG1B ACB28	RACKED IN OPEN	
FWS-P1C	REACTOR FEED PMP MOT FWS-P1C	NPS-SWG1B ACB29	RACKED IN OPEN	
FWS-MOV7A	REACTOR FEEDWATER INLET	EHS-MCC2F BKR 4D	ON	
FWS-MOV7B	REACTOR FEEDWATER INLET	EHS-MCC2F BKR 6D	ON	
B21-MOVF065A	FDW TO REAC OUTBD ISOL VALVE	EHS-MCC2G BKR 1E	ON	
B21-MOVF065B	FDW TO REAC OUTBD ISOL VALVE	EHS-MCC2G BKR 2E	ON	
H13-P612	REACTOR HIGH LEVEL TRIP C	BYS-PNL02A2 DISC 4	ON	
H13-P613	REACTOR HIGH LEVEL TRIP B	BYS-PNL02B2 DISC 3	ON	
H13-P612	FEED WATER CONTROL SIGNALS & C51-R603B,D	VBN-PNL01B1 DISC 14	ON	

ELECTRICAL LINEUP - FEEDWATER SYSTEM

Remarks: ____

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OSM/CRS KCN Date/Time

CONTROL BOARD LINEUP - FEEDWATER SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
THE FOLLOWING CONTROLS ARE LOCATED ON H13-P680			
FWS-P1A RX FWP P1A	STOP/START	GREEN/RED & WHITE	
FWR-FV2A RX FWP P1A MIN FLOW	N/A	GREEN/RED	
RX FWP P1A LUBE OIL SYSTEM START	NOT DEPRESSED	N/A	
RX FWP P1A GEAR INCR LO PRESS NORM	N/A	NONE/RED	
RX FWP P1A MN LO PMP PRESS NORM	N/A	NONE/RED	
FWS-P1B RX FWP P1B	STOP/START	GREEN/RED & WHITE	
FWR-FV2B RX FWP P1B MIN FLOW	N/A	GREEN/RED	
RX FWP P1B LUBE OIL SYSTEM START	NOT DEPRESSED	N/A	
RX FWP P1B GEAR INCR LO PRESS NORM	N/A	NONE/RED	
RX FWP P1B MN LO PMP PRESS NORM	N/A	NONE/RED	
FWS-P1C RX FWP P1C	STOP/START	GREEN/RED & WHITE	
FWR-FV2C RX FWP 1C MIN FLOW	N/A	GREEN/RED	
RX FWP P1C LUBE OIL SYSTEM START	NOT DEPRESSED	N/A	
RX FWP P1C GEAR INCR LO PRESS NORM	N/A	NONE/RED	
RX FWP P1C MN LO PMP PRESS NORM	N/A	NONE/RED	

CONTROL BOARD LINEUP - FEEDWATER SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
FWS-MOV26A RX FWP 1A DISCH VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV26B RX FWP 1B DISCH VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV26C RX FWP 1C DISCH VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV27A FWREG VLV 1A INLT	CLOSE/OPEN	GREEN/RED	
FWS-MOV17A PT HTR E1A INLT VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV27B FWREG VLV 1B INLT	CLOSE/OPEN	GREEN/RED	
FWS-MOV17B PT HTR E1B INLT VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV27C FWREG VLV 1C INLT	CLOSE/OPEN	GREEN/RED	
FWS-MOV22A PT HTR E1A OUTL VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV22B PT HTR E1B OUTL VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV34A PT HTR E1A BYP VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV34B PT HTR E1B BYP VLV	CLOSE/OPEN	GREEN/RED	
FWS-MOV109 FEED PUMP BYPASS	CLOSE/OPEN	GREEN/RED	
FWS-MOV105 S/U FW REG VLV ISOL	CLOSE/OPEN	GREEN/RED	
FWS-MOV103 LONG CYCLE CLEANUP ISOL	CLOSE/OPEN	GREEN/RED	

CONTROL BOARD LINEUP - FEEDWATER SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
THE FOLLOWING CONTROLS ARE LOCATED ON H13-P870			
FWL-P1A RX FWP A MN OIL PMP 1A	STOP/AUTO	GREEN/RED	
FWL-P2A RX FWP A AUX OIL PMP 2A	STOP/AUTO	GREEN/RED	
FWL-SOV26A AUX OIL PUMP 2A TEST	NOT DEPRESSED	N/A	
FWL-P3A RX FWP A AUX OIL PMP 3A	STOP/AUTO	GREEN/RED	
FWL-SOV28A AUX OIL PUMP 3A TEST	NOT DEPRESSED	N/A	
FWL-P5A GEAR INCR AUX OIL PMP 5A	STOP/AUTO	GREEN/RED	
FWL-SOV27A AUX OIL PUMP 5A TEST	NOT DEPRESSED	N/A	
FWL-P1B RX FWP B MN OIL PMP 1B	STOP/AUTO	GREEN/RED	
FWL-P2B RX FWP B AUX OIL PMP 2B	STOP/AUTO	GREEN/RED	
FWL-SOV26B AUX OIL PUMP 2B TEST	NOT DEPRESSED	N/A	
FWL-P3B RX FWP B AUX OIL PMP 3B	STOP/AUTO	GREEN/RED	
FWL-SOV28B AUX OIL PUMP 3B TEST	NOT DEPRESSED	N/A	
FWL-P5B GEAR INCR AUX OIL PMP 5B	STOP/AUTO	GREEN/RED	
FWL-SOV27B AUX OIL PUMP 5B TEST	NOT DEPRESSED	N/A	
FWL-P1C RX FWP C MN OIL PMP 1C	STOP/AUTO	GREEN/RED	

CONTROL BOARD LINEUP - FEEDWATER SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
FWL-P2C RX FWP C AUX OIL PMP 2C	STOP/AUTO	GREEN/RED	
FWL-SOV26C AUX OIL PUMP 2C TEST	NOT DEPRESSED	N/A	
FWL-P3C RX FWP C AUX OIL PMP 3C	STOP/AUTO	GREEN/RED	
FWL-SOV28C AUX OIL PUMP 3C TEST	NOT DEPRESSED	N/A	
FWL-P5C GEAR INCR AUX OIL PMP 5C	STOP/AUTO	GREEN/RED	
FWL-SOV27C AUX OIL PUMP 5C TEST	NOT DEPRESSED	N/A	
THE FOLLOWING CONTROLS ARE LOCATED ON PANEL H13-P680			
RX LEVEL A OUT OF SERVICE	N/A	NONE	
RX LEVEL B OUT OF SERVICE	N/A	NONE	
SINGLE ELEMENT THREE ELEMENT SELECT	1 ELEM	N/A	
RX LVL A OR RX LVL B SELECT FOR FW LEVEL CONTROL	“A” LEVEL OR “B” LEVEL	N/A	
A FWREG VLV CONT SIGNAL FAILURE	NOT DEPRESSED	NONE	
RX FWP A HIGH LEVEL TRIP	NOT DEPRESSED	NONE	
B FWREG VLV CONT SIGNAL FAILURE	NOT DEPRESSED	NONE	
RX FWP B HIGH LEVEL TRIP	NOT DEPRESSED	NONE	
C FWREG VLV CONT SIGNAL FAILURE	NOT DEPRESSED	NONE	
RX FWP C HIGH LEVEL TRIP	NOT DEPRESSED	NONE	
SET POINT SET DOWN	NOT DEPRESSED	NONE	

CONTROL BOARD LINEUP - FEEDWATER SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
FWS-MOV7A A FW OUTBD ISOL	CLOSE/OPEN	GREEN/RED	
FWS-MOV7B B FW OUTBD ISOL	CLOSE/OPEN	GREEN/RED	
B21-F065A FEEDWATER STOP	NOT DEPRESSED	N/A	
B21-F065B FEEDWATER STOP	NOT DEPRESSED	N/A	
B21-F065A A FW INBD ISOL	CLOSE/OPEN	GREEN/RED	
B21-F065B B FW INBD ISOL	CLOSE/OPEN	GREEN/RED	
B21-AOV-F032A A FW TESTABLE CHECK	CLOSE/OPEN	N/A	
AIR SUPPLY TO A FW TESTABLE CHECK	N/A	RED	
B21-AOV-F032B B FW TESTABLE CHECK	CLOSE/OPEN	N/A	
AIR SUPPLY TO B FW TESTABLE CHECK	N/A	RED	
FWS-FV104 START UP RECIRC FCV FLOW CONTROLLER (FWS-H/A104)	MANUAL/AUTO	0%	
C33-LVF001A FWREG VALVE A FLOW CONTROLLER (C33-R601A)	MANUAL/AUTO	0%	
C33-LVF001B FWREG VALVE B FLOW CONTROLLER (C33-R613)	MANUAL/AUTO	0%	
C33-LVF001C FWREG VALVE C FLOW CONTROLLER (C33-R601B)	MANUAL/AUTO	0%	
FW REG VALVES MASTER FLOW CONTROLLER (C33-R600)	MANUAL/AUTO	0%	

CONTROL BOARD LINEUP - FEEDWATER SYSTEM

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS
C33-LVF002 START UP FW REG VALVE FLOW CONTROLLER (C33-R602)	MANUAL/AUTO	0%	
LEVEL SIGNAL DEVIATION	N/A	NONE	
THE FOLLOWING ITEM IS LOCATED ON H22-P004 (CONTAINMENT 114' EL)			
A LEVEL OUT OF SERVICE	NORM	AMBER (IF SELECTED ON H13-P680)	
THE FOLLOWING ITEM IS LOCATED ON H22-P027 (CONTAINMENT 114' EL)			
B LEVEL OUT OF SERVICE	NORM	AMBER (IF SELECTED ON H13-P680)	

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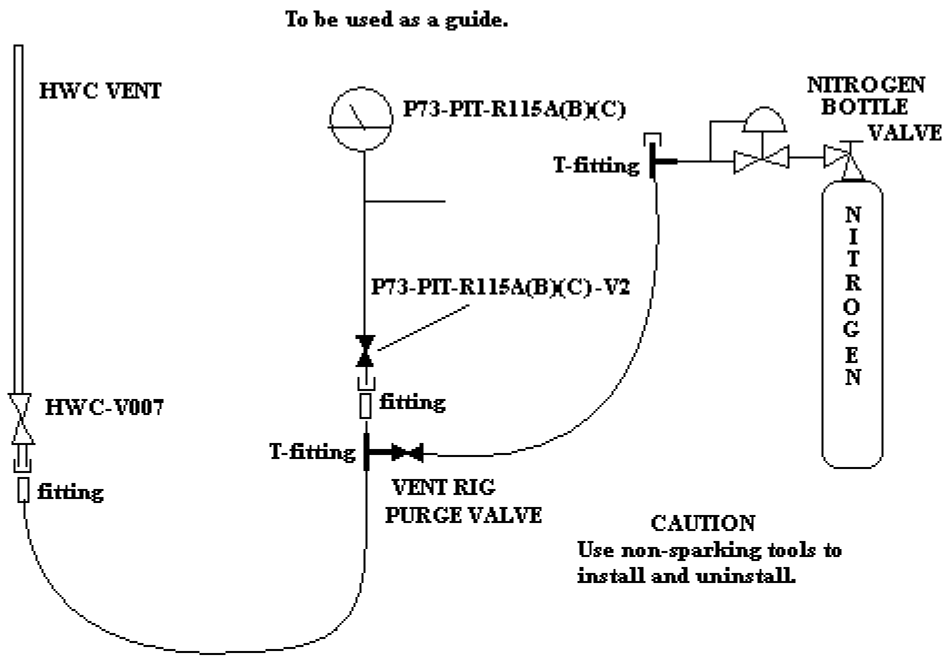
HYDROGEN VENT RIG



FWS-MOV27A, B, C STROKE TEMPERATURE

VALVE	Initial Temp	First Stroke Temp	Second Stroke Temp	Third Stroke Temp	Fourth Stroke Temp
FWS-MOV27A					
FWS-MOV27B					
FWS-MOV27C					

Note Temperature taken at one of the following points:

FWS-TA01
FWS-TA02
FWS-TA03
FWS-TA04
FWS-TA05

CONTINUOUS USE

***G12.1.7**

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***ABNORMAL OPERATING PROCEDURE**

**CONDENSATE/FEEDWATER FAILURES*

PROCEDURE NUMBER:	***AOP-0006**
REVISION NUMBER:	***019**
Effective Date:	***03/10/2013**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES

TABLE OF CONTENTS

SECTION PAGE NO.

1 PURPOSE/DISCUSSION

1.1 The purpose of this procedure is to provide instructions for the operator in the event of a Condensate/Feedwater System failure resulting in either rising or lowering reactor water level. This procedure also addresses a total loss of feedwater.

1.2 A rising reactor water level can occur from a feedwater flow control failure either in the level controller circuitry or the feedwater regulating valve. A main turbine trip, and if in the RUN mode, a reactor scram occur if reactor water level reaches Level 8.

1.3 A lowering reactor water level can be caused by a partial or total loss of feedwater flow. A partial loss of feedwater flow can be caused by a feedwater flow control failure or a trip of a condensate pump, heater drain pump, or feedwater pump. A total loss of feedwater can be caused by a trip of all running feed/condensate pumps. If a total loss of feedwater is experienced, a reactor scram occurs at Level 3.

2 PRECAUTIONS AND LIMITATIONS

If all reactor feed pumps trip and a minimum flow path for the condensate pumps is not available, a reactor feed pump must be promptly started for protection of the condensate pumps. If a reactor feed pump can not be promptly started, optional minimum flow paths for the condensate pumps must be considered.

3 SYMPTOMS

3.1 Rising level

- Feed flow/steam flow mismatch
- Reactor water level rising
- Rising neutron flux

3.2 Lowering level

- Feed flow/steam flow mismatch
- Reactor water level lowering
- Condensate pump auto trip
- Heater drain pump auto trip
- Reactor feed pump auto trip

4 AUTOMATIC ACTIONS

4.1 The following occur at reactor water Level 3:

- Reactor scram
- Recirculation pump downshift

4.2 The following occurs at reactor water Level 4:

If less than 3 reactor feed pumps are running, as sensed by reactor feed pump suction flow, a Reactor Recirculation flow control valve runback is initiated.

4.3 The following occur at reactor water Level 8:

- Reactor scram when the mode switch is in RUN
- Main turbine trip
- Reactor feed pump trip

4.4 If feed flow is less than 19.9% of rated after a 15 second time delay, Reactor Recirculation Pumps downshift.

5 IMMEDIATE OPERATOR ACTIONS

5.1 Manually control the feedwater level control system and/or reduce reactor power to mitigate any level transient.

NOTE

Steps in the following section may be performed concurrently as appropriate.

6 SUBSEQUENT OPERATOR ACTIONS

6.1 IF reactor water level cannot be maintained greater than or equal to +31 inches, THEN start any of the following equipment to maintain reactor vessel level:

- Condensate pumps per SOP-0007, Condensate System
- Heater drain pumps per SOP-0010, MSR & FW Heaters, Extraction Steam and Drains
- Reactor feed pumps per SOP-0009, Feedwater System

6.2 IF any of the following flow control valves have failed, THEN attempt to take manual control or isolate the flow control valve to control reactor vessel level:

- CNM-FV114, CONDENSATE MIN RECIRC VALVE isolated by closing CNM-V95, CNM-FV114 INLET ISOLATION VALVE
- FWS-FV104, START UP RECIRC FCV isolated by closing FWS-MOV103, LONG CYCLE CLEANUP ISOL
- FWR-FV2A, RX FWP A MIN FLOW VALVE isolated by closing FWR-V1, RFP “A” MIN FLOW MAN ISOL
- FWR-FV2B, RX FWP B MIN FLOW VALVE isolated by closing FWR-V2, RFP “B” MIN FLOW MAN ISOL
- FWR-FV2C, RX FWP C MIN FLOW VALVE isolated by closing FWR-V3, RFP “C” MIN FLOW MAN ISOL
- HDL-FV20A, HTR DR PUMPS P1A(B) RECIRC LINE CONTROL VLV
- HDL-FV20B, HTR DR PUMPS P1C(D) RECIRC LINE CONTROL VLV
- CNM-FCV200, CONDENSATE PREFLT VSL BYPASS FLOW CONTROL VALVE

6.3 IF any feedwater level control valve has failed, THEN close the associated isolation valve as follows:

- FWS-MOV27A, FWREG VLV A INLT
- FWS-MOV27B, FWREG VLV B INLT
- FWS-MOV27C, FWREG VLV C INLT

6.4 IF all the following conditions exist:

- All reactor feed pumps trip.
- CNM-FV114, MAIN CONDENSATE RECIRC FLOW CONTROL is not available for automatic operation.
- A reactor feed pump cannot be promptly started.

THEN perform any of the following:

- Place at least one Condensate Demineralizer in RECYCLE per SOP-0093, Condensate Demineralizer System.
- At TB, 67 ft el, TZ-8, JTB-RAK17, verify CNS-LV105, HOTWELL REJECT is in AUTO, at H13-P680, open CNS-LV104, CONDENSER HOTWELL LEVEL CONTROL VALVE.
- Take Manual control of CNM-FV114, MAIN CONDENSATE RECIRC FLOW CONTROL and establish minimum flow.
- Establish long cycle condensate water cleanup per SOP-0007, Condensate System.

NOTE

The following step limits backflow of RWCU to the CST via the CRD pump minimum flow lines and CNS-LV105.

C 6.5 IF all reactor feed pumps trip AND RWCU is operating, THEN perform one of the following:

- Promptly start a reactor feed pump.
- Close FWS-MOV7B

6.6 Refer To AOP-0007, Loss of Feedwater Heating.

6.7 IF CNM-P1C, CONDENSATE PUMP P1C has tripped, THEN shut down Condensate Oxygen injection per SOP-0123, Hydrogen Water Chemistry H2 and O2 System.

6.8 IF power is lost to the Condensate Pumps AND the possibility of Condensate draining to the Hotwell exists, THEN perform the following:

6.8.1. Close CNM-MOV3A(B)(C), CNDS PUMP 1A(1B)(1C) DISCH.

6.8.2. Monitor Hotwell level.

1. Take actions to isolate Hotwell as required to prevent over filling.

6.8.3. WHEN power is restored to Condensate Pumps, THEN restart as necessary.

6.9 IF all Condensate Pumps are off, THEN perform the following:

6.9.1. Close all the following valves:

- CNM-V3105A, CNM-FLT1A BACKWASH AIR SUPPLY
- CNM-V3105B, CNM-FLT1B BACKWASH AIR SUPPLY
- CNM-V3105C, CNM-FLT1C BACKWASH AIR SUPPLY
- CNM-V3105D, CNM-FLT1D BACKWASH AIR SUPPLY
- CNM-V3105E, CNM-FLT1E BACKWASH AIR SUPPLY

6.9.2. Manually line up CRD pump suction to the CST per SOP-0002.

7 REFERENCES

7.1 USAR Sections

- 5.4.9
- 7.7.1.3
- 10.4.7

7.2 System Design Criteria System Number 107

NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE

SRO ☒ RO ☒

ALTERNATE PATH ☐

TITLE: Parallel Offsite Power With Div 1 EDG Supplying ENS-SWG1A, then shutdown the Div 1 EDG.

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	22	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
X	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	September 4, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Offsite power is supplying ENS-SWG1A with the Div I EDG shut down.

Synopsis: The reactor is at 100% power. Div I EDG is the sole source of power to ENS-SWG1A. This task will parallel offsite power from RSS 1 onto the bus using SOP-0053, Standby Diesel Generator and Auxiliaries, Section 5.1, Paralleling an Offsite Power Source to the Standby Diesel from the Control Room. The task goes on to secure the EDG using section 6.1.

NOTE: If in the Plant or the Control Room, **Caution** the operator NOT to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:
"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied.
Inform me when you have completed the task.

2) Initiating Cues:

The CRS has directed you to parallel Offsite Power to ENS-SWG1A in accordance with SOP-0053 using the normal supply breaker ACB06, then shutdown the Div 1 EDG.

3) Initial Conditions:

- The reactor is at 100% power.
- Div I Standby Diesel Generator is supplying ENS-SWG1A.
- RSS 1 is energized and ENS-ACB06, Normal Supply Breaker is Open.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Parallel Offsite Power With Div 1 EDG Supplying ENS-SWG1A, then shutdown Div 1 EDG.	264009001001	264000 A2.01 295003 AA1.02	3.5 / 3.6 4.2 / 4.3

REFERENCES:
SOP-0053, Rev 329

APPLICABLE OBJECTIVES
RLP-STM-0309S, Obj 8

REQUIRED MATERIALS:
SOP-0053, Standby Diesel Generator and Auxiliaries (Sim Copy)

SAFETY FUNCTION:
__**6**__

SIMULATOR CONDITIONS & SETUP:

1. IC # 213
2. Rx Power: 100%
3. Div 1 EDG supplying ENS-SWG1A.
4. ENS-ACB06 is open.
5.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Offsite power is supplying ENS-SWG1A with the Div I EDG shut down.

PERFORMANCE:

START TIME: ____________________

SOP-0053
Section 5.1, Paralleling an Offsite Power Source to the Standby Diesel from the Control Room

PROCEDURE NOTE

The following controls and indications are located on Panel H13-P877 unless otherwise stated.

1.	***Procedure Step:**	5.1.1 IF ENS-ACB06(26), NORMAL SUPPLY BRKR is to be closed, THEN place the REMOTE SYNCH SW to NORM:
	Standard	Applicant placed the remote synch switch to NORM.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

	Procedure Step:	5.1.2 IF ENS-ACB04(24), ALTERNATE SUPPLY BRKR is to be closed, THEN place the REMOTE SYNCH SW to ALTN:
	Standard	NA
	Cue	
	Notes	No actions necessary due to initial conditions.

2.	**Procedure Step:**	5.1.3 Adjust diesel voltage, as observed on V-1RUN-1SYD**A**(B)01, RUNNING VOLTAGE to approximately 1-2 volts above V-1IN-1SYD**A**(B)01, INCOMING VOLTAGE using the STBY DIESEL GENERATOR **A**(B) VOLTAGE REGULATOR CONT.
	Standard	Applicant located/identified and used the named A voltage meters to raise the Running (EDG) Voltage 1-2 volts higher than the incoming (grid) voltage by adjusting the Div 1 EDG Voltage Regulator Controller.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	***Procedure Step:**	5.1.4 Adjust diesel speed, using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL, to bring the frequency within the range of grid frequency. Adjust speed so the SY-1-SYDA(B)01, STBY BUS A(B) SYNCHROSCOPE indicator is rotating slowly in the SLOW direction (counterclockwise) at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.
	Standard	Applicant diesel speed using the governor control to match grid frequency and caused the synchroscope to rotate counterclockwise one revolution every four to six seconds.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE CAUTION

Do not close the Normal or Alternate bus feeder breaker with the synchroscope indicator standing still if the bus is being supplied by the EGS-EG1A(B), STANDBY DIESEL GENERATOR.

When synchronizing the D/G and its connected loads back to offsite power, it is possible for the D/G to unload at a rapid rate as soon as the preferred source breaker is closed. This is due to the governor changing to droop mode. If this occurs, immediately raise the load back to the desired value using the governor control switch.

4.	***Procedure Step:**	5.1.5 When the synchroscope indicator is moving slowly in the SLOW direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close the desired feeder breaker, ENS-ACB06, NORMAL SUPPLY BRKR. Verify the red breaker closed light comes ON. If not, return the breaker handswitch to TRIP.
	Standard	Applicant closed ENS-ACB06 with the proper synchroscope indications. Applicant verified the red "breaker closed" light illuminated.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	5.1.6 As soon as diesel load has stabilized, return the REMOTE SYNC SW to OFF.
	Standard	Applicant positioned the Remote Synch Switch to OFF.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	5.1.7 WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable.
	Standard	Applicant informs the CRS of the Div 1 EDG inop condition.
	Cue	As the CRS, accept the report
	Notes	
	Results	SAT ☐ UNSAT ☐

7.	**Procedure Step:**	5.1.8 IF desired to load the Diesel Generator, THEN perform the following:
	Standard	NA
	Cue	
	Notes	No actions necessary due to initial conditions.

8.	**Procedure Step:**	5.1.9 WHEN desired, THEN shutdown the Standby Diesel Generator per section 6.1 or 6.2 of this procedure.
	Standard	NA
	Cue	
	Notes	Candidate transitions to section 6.1.

SOP-0053
Section 6.1, Shutdown of EGS-EG1A(B), STBY DIESEL GENRERATOR A(B)
from the Control Room

PROCEDURE NOTE

When reducing load, lead VARS and follow with load.

The following table is provided as a recommendation for unloading limitation. KW and KVAR values listed are approximate values only.

LOADING		TIME
≤ 1200 KVAR		
3100 KW to 2000 KW	*in*	*60 to 90 Seconds*
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds*
≤ 600 KVAR		
Then 2000 KW to 1000 KW	*in*	*60 to 90 Seconds*
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
0 KVAR		
Then 1000 KW to 200 KW	*in*	*60 to 90 Seconds*

9.	***Procedure Step:**	6.1.1 Reduce load with the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL to approximately 175 KW, and reactive load to no less than 0 KVAR using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT. Allow diesel cylinder temperatures to stabilize.
	Standard	
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

*Annunciator, P877-31A-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.*

10.	***Procedure Step:**	6.1.2 Trip ENS-ACB07(27), *STBY D/G A(B) OUTPUT BREAKER*.
	Standard	Applicant located and tripped ENS-ACB07.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

11.	**Procedure Step:**	6.1.3 Adjust the EGS-EG1A(B), STBY DIESEL GENERATOR A(B), frequency to 59.7 Hz on F-1EGSA(B)07, STBY D/G A(B) FREQUENCY using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL.
	Standard	Applicant located frequency meter and the Governor control for the Div 1 EDG, and reduced frequency to 59.7 Hz.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

12.	***Procedure Step:**	6.1.4 Depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton on H13-P877.
	Standard	Applicant depressed the Emergency Start Rest Pushbutton
	Cue	
	Notes	NOTE: Steps 6.1.5 through 6.1.16 are all performed in the field.
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Offsite power is supplying ENS-SWG1A with the Div I EDG shut down.

This completes this JPM.

STOP TIME: ____________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

- The reactor is at 100% power.
- Div I Standby Diesel Generator is supplying ENS-SWG1A.
- RSS 1 is energized and ENS-ACB06, Normal Supply Breaker is Open.

INITIATING CUE:

The CRS has directed you to parallel Offsite Power to ENS-SWG1A in accordance with SOP-0053 using the normal supply breaker ACB06, then shutdown the Div 1 EDG.

*G12.1.6

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***SYSTEM OPERATING PROCEDURE**

**STANDBY DIESEL GENERATOR AND AUXILIARIES (SYS#309)*

PROCEDURE NUMBER: ***SOP-0053**

REVISION NUMBER: ***329**

Effective Date: ***02/06/2014**

NOTE : SIGNATURES ARE ON FILE.

TemRev 0 AddCounter 175 MSet EXTENDED KWN OFF
CONTINUOUS USE
*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
SOP-0053R328EC-B	Added Precaution and Limitation 2.61 to clarify required actions if the lube oil keep warm pump fails and the jacket water keep warm system is in service - the engine is required to be air rolled every 12 hours in order to maintain operability when the lube oil temperature is above 40°F. Ref CR-RBS-2013-7535.

TABLE OF CONTENTS

1 PURPOSE

1.1 The purpose of this procedure is to outline the steps necessary to startup, operate and shutdown EGS-EG1A(B), STBY DIESEL GENERATOR A(B).

2 PRECAUTIONS AND LIMITATIONS

2.1 All instructions are written for EGS-EG1A, STBY DIESEL GENERATOR A with nomenclature for EGS-EG1B, STBY DIESEL GENERATOR B in parenthesis.

2.2 High crankcase pressure indicates the possible existence of an explosive gas mixture. Allow the engine to cool for 15 minutes to allow fumes and vapors to dissipate before removing any engine covers. With the exhaust fan running the atmospheric pressure in the room will be lower and the manometers will read higher than specified.

2.3 Placing the diesel in MAINTENANCE mode requires simultaneous operation of the STBY DIESEL ENGINE MODE switch on H13-P877 and the MAINT MODE SELECT switch on EGS-PNL3A(B). Similarly, to place the diesel back in OPERATIONAL mode requires simultaneous operation of the STBY DIESEL ENGINE MODE switch and the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B).

2.4 When the diesel is returned to the OPERATIONAL mode the FIELD FLASHING RELAY READY light located on EGE-CAB01A(B) should be lit. If not, the Exciter Shutdown Relay may have failed to reset.

2.5 EGS-EG1A(B), STBY DIESEL GENERATOR A(B) has a continuous rating of 3130 Kw at 0.8 power factor. Do not operate the diesel generator with a power factor of less than 0.8 when operating in parallel with other sources, and do not exceed 3130 Kw load.

2.6 ERIS computer points will be used to ensure voltage and watt limits are not exceeded. Frequency will be recorded using the MCR or the Local control room meter; however voltage and watt readings will be obtained from the ERIS points. Voltage and watt meters can be used for adjustments when not at the control band limits.

2.7 Diesel Generator Governor oil level shall be checked Prior to, During and Following any diesel run. Acceptable oil levels are greater than the fill mark during standby conditions and visible in the sightglass while operating.

2.8 Prior to manually starting the diesel for other than emergency conditions, the engine should be barred over 2 revolutions and air rolled with the cylinder cocks open to insure the cylinders are clear unless the start is within 4 hours of the last engine shutdown. Roll the engine per Section 4.3 if required. The origin of any water detected in a cylinder must be determined and any cylinder head that leaks due to a crack shall be replaced. (Ref. 7.21, 7.23)

2.8.1. Air rolls do <u>not</u> apply to any engine that has been removed from service after a run. However, the engine shall be rolled over with the airstart system at the time it is returned to service.

2.8.2. The OPERABLE engines are <u>not</u> required to be air-rolled if the plant is already in an Action Statement of Technical Specification 3.8.1 and 3.8.2.

2.9 Ensure that the rear air system is available prior to attempting any Barring / Air Rolling of a Diesel generator. The barring device and Air Roll function is supplied from rear air only.

2.10 Parallel the Diesel Generator to the Standby Bus with the synchroscope rotating slowly in the "fast" (clockwise) direction. Do <u>not</u> attempt to close a diesel generator output breaker with the synchroscope indicator standing still, if there is power available to the bus from another source.

2.11 If the diesel is run for one hour or greater, check and drain from the day tank any accumulated water via EGF-V11(V41), DAY TANK TK2A(2B) DRAIN.

2.12 Lube oil must be added only through the fill connection on the sump. Do <u>not</u> overfill the sump.

2.13 If EGS-EG1A(B), STBY DIESEL GENERATOR A(B) is declared inoperable, refer to Technical Specification 3.8.1 and 3.8.2.

2.14 Never have 2 synchroscopes in the same division on at the same time.

2.15 If the diesel generator is paralleled with the standby bus normal or alternate breaker and a LOCA signal occurs, the diesel generator output breaker will open. The diesel generator breaker can <u>not</u> be closed as long as bus voltage is being supplied by the normal or alternate supply and the LOCA signal still exists.

2.16 Sustained operation of the engine at critical speeds of 190, 285, 350 and 415 RPM should be avoided. (Ref. 7.19)

2.17 If a diesel start signal is activated while the diesel is <u>not</u> available, the signal will remain sealed in. If the diesel is then made available, the diesel engine will auto start. To prevent this, if Control air pressure is greater than 45 psig then Section 6.5.2 must be performed. If pressure is less than 45 psig, then the EMERGENCY START RESET switch on H13-P877 must be depressed before returning the diesel to Operational.

2.18 During a Station Blackout with the Div. 1 or 2 Diesel Generator failing to deliver power to their respective buses due to a malfunction of the Excitation System, (when diesel engine has attained rated speed) the Field Flashing of the failed D/G should be secured to conserve the battery, and to prevent heating the excitation cabinet.

2.19 Short duration runs and light load (less than 40%, or 1200 kW) operation should be avoided. After a period of light load or no-load run, the diesel should be loaded to greater than or equal to 2700 kW, for a time period as specified below:

2.19.1. At least one hour, if the engine was run at less than 1200 kW for greater than 30 minutes but less than one hour, <u>OR</u>

2.19.2. At least two hours, if the engine was run at less than 1200 kW for equal to or greater than one hour but less than 12 hours, <u>OR</u>

2.19.3. At least four hours, if the engine was run at less than 1200 kW for 12 hours or longer. (Ref. 7.22; CR-RBS-2004-3156)

2.20 To minimize crankshaft torsional stresses, continuous engine operation at critical speeds shall <u>not</u> be allowed. Minimize the time the engine is operated between 453 and 457 RPM (60.4 to 60.9 Hz). (Ref. 7.19)

2.21 Engine cylinder exhaust gas temperature should be within 75°F of the average for all cylinders. Any cylinder temperature exceeding this limit should be investigated by maintenance.

2.22 Prelube of the engine should be performed before all non-emergency starts.

2.23 Per System Engineering the following conditions should be used to determine if a 24 hour warm up is required to allow the engine mass and crankshaft temperatures to equalize, prior to any normal Diesel Generator start:

2.23.1. When after re-energizing the Lube Oil or Jacket Water Heaters from a de-energized state, the Lube Oil and Jacket Water outlet temperatures are greater than 140°F and 115°F respectively with less than or equal to a 40°F differential a 24 hour warm up is <u>not</u> required prior to any normal start. This temperature criteria should be used for Diesel Generator outages of 3 days or less.

2.23.2. If the engine block has been allowed to cool to ambient temperature, such as for maintenance with the heaters de-energized for more than 3 days, a 24 hour warm up is required with the Lube Oil Circulating Pump, Jacket Water Circulating Pump, and associated heaters operating prior to any normal start.

2.23.3. If necessary contact the System Engineer for guidance in determination of temperature criteria.

2.23.4. Use of Section 4.4, Warming Up the Diesel Post Maintenance should be minimized. Warming up by slow start and controlled slow loading is intended for situations where insufficient time is available to allow the heater to warm the system, and an expedited return to service is critical due to plant conditions or shutdown LCO status. Although EC 5759 was written for schedule preservation, and the method poses very little risk (maybe slightly more wear and tear on the Diesel over the long term), this method should <u>not</u> be made a matter of routine. Operations management or Duty Manager should approve use of Section 4.4.

2.24 Anytime work is done on the fuel oil day tank level instrumentation, the control switch for the fuel oil transfer pump must be placed in "OFF" to preclude pumping fuel oil to the roof.

2.25 If the forward starting subsystem DC control power is lost, the diesel engine will still be able to start, but there will be <u>NO</u> tripping capability.

2.26 If the diesel is started automatically on a LOCA, all automatic shutdowns are bypassed except overspeed and generator differential. The reinstatement of all trips following an automatic start requires the following:

2.26.1. DIV 2 -Depress the RHR DIV 2 INITIATION RESET pushbutton (H13-P601 INSERT 17B).

DIV 1 - Depress the LPCS/RHR DIV 1 INITIATION RESET pushbutton (H13-P601 INSERT 21B)

2.27 If the diesel is started automatically on a Loss of Power (LOP) or manually started using either of the STBY DIESEL ENGINE EMERGENCY START pushbuttons, all automatic shutdowns are bypassed except overspeed, generator differential, jacket water out high temperature, and lube oil out high temperature. The reinstatement of all trips following an above described start requires the following:

2.27.1. <u>LOP</u> - Depress STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton.

2.27.2. <u>REMOTE MANUAL EMERGENCY START</u>(CR) - Depress STBY DIESEL ENGINE A(B) EMERGENCY START RESET.

2.27.3. <u>LOCAL PANEL MANUAL EMERGENCY PB</u> - Diesel must be shutdown.

2.27.4. <u>(LOCAL, EGS-PNL4A)</u> – for LOP

2.28 The EXCITATION SHUTDOWN RESET pushbutton should only be used on a loss of excitation with the engine still running. The excitation shutdown will normally auto-reset when the engine is stopped.

2.29 The FIELD FLASHING RELAY READY white light will be energized when the K1 relay is in the reset (closed) position and the DG is not at voltage. It will deenergize when K1 is in the exciter shutdown position, the voltage relay contacts open (DG at voltage), or when the pressure switches are closed (DG at speed).

2.30 The FIELD FLASHING RELAY READY white light should be verified to be energized after any Exciter Shutdown Reset operation or any time the DG is placed in a Standby lineup.

2.31 Operating data pertaining to all diesel generator start attempts shall be obtained per PEP-0026, Diesel Generator Operating Logs.

2.32 Visual daily inspection between adjacent cylinder heads and the general block top are required during any period of continuous operation following automatic diesel generator startup. (L/C 3.3).

2.33 Whenever the Diesel is being shutdown, adjust Generator frequency to 59.7 Hz after the Generator output breaker has been opened, prior to stopping the engine. (Ref. 7.19)

2.34 Before the 12 hour air roll after an engine run, drain any liquid from the Turbo Charger Casing Drain per PEP-0026.

2.35 When the diesel is running in parallel with the grid, a fault on the grid could cause a loss of the bus associated with the diesel concurrent with a trip/lockout of the diesel. To reduce the chances of this occurring, time spent with the diesel paralleled to the grid should be minimized. (Ref. 7.11)

2.36 Duplex lube oil and fuel oil filters and strainers should be swapped while the engine is running, if at all possible. It may be loaded or unloaded, isochronous or synchronous with the grid. System pressures should be checked after the swap. If it is necessary to swap a duplex filter or strainer while shut down, the engine should be started in test mode (normal start) and run long enough to check that pressures are normal.

2.37 During diesel fuel oil unloading, a fire watch shall be stationed at the unloading area and two (2) 150 pound dry chemical extinguishers placed near unloading area. (Ref. 7.17)

2.38 EGS-EG1A(B), STBY DIESEL GENERATOR A(B) shall not be run in parallel with the Main Generator through STX-XNS1C, NORM STA XFMR. (Ref. 7.15)

2.39 Failing to de-energize control power to the K1 relay prior to depressurizing D/G control air will result in the inability of the K1 relay to auto reset when control air is restored. The K1 relay must be manually reset if this condition occurs. Control air should be restored prior to reenergizing control power to the K1 relay. (Ref. 7.36)

2.40 If desired, EGS-EG1A(B), STBY DIESEL GENERATOR A(B) may be started and run using only one air receiver tank. (Ref. TSI-015)

2.41 EGA-C4A (C5A)(C4B)(C5B) will not operate in AUTO if its associated start air receiver pressure is less than 30 psig. Placing the control switch to RUN will allow the compressor to start. This should only be used for initial startups and repressurizing. DO NOT repressurize the air receiver should pressure fall to less than 25 psig while the diesel generator is loaded, this could cause a trip or uncontrolled loading of the diesel generator.

2.42 When operating in the NORMAL mode, if a TRIP annunciator(s) should come in, and the diesel does not trip, immediately check the amber UNIT TRIPPED light. If the UNIT TRIPPED light is ON, STOP the diesel. If the light is OFF, evaluate the annunciator(s) via other instrumentation. If the trip condition does NOT exist or can not be verified, attempt to RESET the annunciators(s). If the alarm can not be reset and the diesel has run for 2 minutes, manually stop the diesel. (Ref. 7.12)

2.43 The diesel generator will continue to run without control air pressure in emergency conditions. Upon complete loss of Control air pressure, it should not be restored until the diesel is shutdown.

2.44 If the diesel is paralleled with the grid and a Ground Fault Trip/Lockout occurs, the diesel will not Auto start on an Emergency Auto signal. Refer to Section 4.7. (Ref. 7.13)

2.45 When operating the diesel generator at reduced loads, care should be exercised to avoid reverse power trips.

2.46 While in MODES 1, 2 & 3 placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. STP-000-0102, Power Distribution Alignment Check shall be performed within 1 hour unless the diesel is restored to OPERABLE status in less than 1 hour. (Ref. 7.29)

2.47 During movement of recently irradiated fuel assemblies in the Primary Containment or Fuel Building AND while in Modes 4 and 5, placing an operable Diesel Generator into MAINTENANCE mode causes the Diesel Generator to be inoperable. Tech Spec 3.8.2, AC Sources - Shutdown, shall be immediately referred to and the action requirements complied with. (Ref. 7.29)

2.48 Non-essential 125 VDC controls are fed from the BYS batteries. The BYS battery chargers are lost on a LOCA or LOP. Use AOP-0014, Loss of 125 VDC for what is lost if the BYS batteries are not available. Safety-related control functions are not affected.

2.49 Non-essential 120 VAC controls are fed from SCA-PNL15A1(B1). In the event of a LOP, EGS-TI64A(B), multi-point (Doric) temperature indicator will be lost. Therefore upon loss of this indicator the operator should use local thermometer readings. Refer to Attachment 5, Engine Parameters for alternate indications. Safety-related control functions are not affected.

2.50 Loss of FORWARD DC power prevents the following indicator lights from coming on:

- UNIT AVAIL EMERGENCY STATUS
- DC CONTROL POWER ON

- UNIT TRIPPED
- READY TO LOAD

2.51 The electric signal that actuates the Maintenance mode is momentary. MAINTENANCE mode is retained by a self-sealing pilot on pneumatic control valve EGS-PNL3A(B)-P2. There is no electrical seal-in. The RETURN TO OPERATIONAL signal energizes a solenoid valve, which opens a vent path to break this pneumatic seal-in, and P-2 defaults to the OPERATIONAL position. If while in MAINTENANCE mode, the control panel is depressurized, the P-2 self seal-in is lost, and the control system will come up in the OPERATIONAL mode when pressure is restored.

2.52 While running in the test mode, any manual EMERGENCY START signal will activate the governor and voltage regulator pre-position circuits which return the frequency to near 59.7 Hz and voltage to near 4160 v. The output breaker is <u>not</u> signaled to trip. If the DG happens to be synchronous and loaded, the net affect will be a loss of kw and kvar, over a 6 to 10 second period.

2.53 The Diesel Engine oil sump level dip stick indications are as follows:

STANDBY (Diesel Generator <u>not</u> running with keep warm oil pumps running):

- Maintain the oil sump level greater than or equal to the T7 Mark per Tech Spec 3.8.3 and less than or equal to the FULL Mark.
- As long as the oil level is maintained greater than the LOW STBY mark, the Diesel is capable of safely starting and running if required for an emergency.

RUNNING:

- Maintain oil sump level greater than or equal to the LOW RUN Mark.
- The T6 and T7 Marks are <u>not</u> used for oil sump level when the diesel is running.

C 2.54 Special requirements for restoring from Diesel Engine Maintenance/Tagouts:

- If the engine fuel oil system has been tagged out and drained for maintenance, the fuel oil lines shall be refilled by manually operating the DC Fuel Oil Pump for 1 to 2 minutes. This should be done promptly after releasing the tagout to ensure the lines are full before any diesel starts.

2.55 When ENS-SWG1A or B is deenergized such as during a bus outage, the undervoltage relays generate a Loss of Power (LOP) signal to start the associated Standby Diesel Generator. If the diesel is tagged out, the LOP signal will seal in and can go undetected until the tagout is cleared. Therefore, to prevent an auto start of the diesel upon diesel restoration, prior to restoring the diesel, relays R3A and R3B in the side panels at EGS-PNL3A(B) should be checked to ensure that the LOP start is <u>not</u> present. The relay is tripped if the red button in the middle of the relay is <u>not</u> flush (recessed) with the case. Refer to Section 6.5 of this procedure to reset the relays. (Ref. 7.37)

2.56 When reviewing this procedure for pending operations or system configuration realignments, ensure vulnerabilities to common cause and common mode failures are evaluated for current plant conditions to protect safety sources and safety trains. (SOER 03-1 Recommendation 2 Emergency Power Reliability)(Ref. 7.41)

2.57 When the Diesel is operating synchronized to the grid, the diesel generator shall be declared inoperable. This is because if a Loss Offsite Power were to occur during operations when synchronized to the grid the resultant operations with the diesel powering the Div I(II) bus will cause the diesel frequency to be outside TS 3.8.1.2 and 3.8.1.7 frequency limits. (Ref 7.39)

2.58 Starting 4.16kV and certain 480VAC loads while the DG is parallel to off-site power can result in the diesel output breaker tripping on overload condition (Ref. 7.42).

2.58.1. To prevent exceeding the maximum load rating of 3130kW when EGS-EG1A is paralleled to the off-site power supply, manual start of equipment on the following switchgears should not be permitted:

- ENS-SWG1A
- EJS-SWG1A
- EJS-SWG2A

Additionally if NNS-SWG1A is being powered from RTX-XSR1C, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1A
- NNS-SWG4A (and NNS-SWG4B if cross-tied)

Additionally if NNS-SWG1C is being powered from NNS-SWG1A AND NNS-SWG1A is being powered from RTX-XSR1C, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1C
- E22-S004

Auto start of 4.16kV loads during parallel load testing may result in overload of EGS-EG1A or trip of ENS-ACB07, STBY D/G A OUTPUT BRKR.

2.58.2. To prevent exceeding the maximum load rating of 3130kW when EGS-EG1B is paralleled to the off-site power supply, manual start of equipment on the following switchgears should not be permitted:

- ENS-SWG1B
- EJS-SWG1B
- EJS-SWG2B

Additionally if NNS-SWG1B is being powered from RTX-XSR1D, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1B
- NNS-SWG4B (and NNS-SWG4A if cross-tied)

Additionally if NNS-SWG1C is being powered from NNS-SWG1B AND NNS-SWG1B is being powered from RTX-XSR1D, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1C
- E22-S004

Auto start of 4.16kV loads during parallel load testing may result in overload of EGS-EG1B or trip of ENS-ACB27, STBY D/G B OUTPUT BRKR.

2.59 The GERB viscous damper is not required for operability of the Div I or Div II Diesel Generator. Issues with the GERB should be identified and reported via the Condition Report process. (Ref. 7.43)

2.60 Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.

2.61 If the lube oil keep warm pump fails and the jacket water keep warm system is in service, the engine is required to be air rolled every 12 hours in order to maintain operability when the lube oil temperature is above 40°F. (Reference CR-RBS-2013-7535)

3 PREREQUISITES

3.1 The Fire Protection Water System to the Standby Diesel Generator EGS-EG1A(B) Room is in service per SOP-0037, Fire Protection Water System Operating Procedure.

3.2 The Makeup Water System is available for makeup to the Jacket Water Standpipe per SOP-0099, Makeup Water System.

3.3 The Normal Service Water System is operating per SOP-0018, Normal Service Water.

3.4 The Standby Service Water System is operable per SOP-0042, Standby Service Water System.

3.5 The following electrical systems are operable:

3.5.1. 4160VAC per SOP-0046, 4.16 KV System (except on loss of power start)

3.5.2. 480VAC per SOP-0047, 480 VAC System

3.5.3. 120VAC per SOP-0048, 120 VAC System

3.5.4. 125VDC per SOP-0049, 125 VDC System

3.6 Diesel Generator Building HVAC in operation per SOP-0061, Diesel Generator Building Ventilation.

3.7 Obtain copy of PEP-0026, Diesel Generator Operating Logs for use in all start attempts.

3.8 The Instrument Air System is operable per SOP-0022, Instrument Air System.

4 SYSTEM STARTUP

4.1 Placing EGS-EG1A(B), STBY DIESEL GENERATOR A(B) in Standby

4.1.1. On Panel EGS-PNL3A(B), ENGINE CONTROL PANEL OR EHS-MCC15A(B), position the following switches in OFF:

1. GENERATOR SPACE HEATER EGS-EG1A(B)H
2. EGA-C4A(B) REAR START AIR COMPRESSOR
3. EGA-C5A(B) FORWARD START AIR COMPRESSOR
4. LUBE OIL CIRC. PUMP AND HEATER EGO-P1A(B), H1A(B)
5. JACKET WATER CIRC. PUMP & HEATER EGT-P1A(B), H1A(B)
6. FUEL OIL TRANSFER PUMP EGF-P1A(B)
7. DC FUEL OIL BOOSTER PUMP EGF-P2A(B)

4.1.2. Perform Attachment 1A(B) Valve Lineup.

4.1.3. Perform Attachment 2A(B) Instrument and Valve Lineup.

4.1.4. Perform Attachment 3A(B) Electrical Lineup.

4.1.5. Perform Attachment 4A(B) Control Board Lineup.

4.1.6. Verify that the Lube Oil Sump level is greater than T7 Mark as indicated on the engine dipstick. Add oil as needed.

4.1.7. Verify Jacket Water Standpipe level is 146” to 170” as indicated on local level indicator EGT-LI24A(B), JACKET WATER STANDPIPE LEVEL.

1. IF jacket water makeup is required, THEN Go To Section 5.15.

NOTE

It is permissible to start warming the jacket water system before warming the lube oil system, provided Maintenance has filled the lube oil cooler with oil. (CR-RBS-2010-0017-001)

4.1.8. Begin warming the diesel by performing the following steps:

- Begin warming lube oil to between 140°F and 170°F by placing the EGO-P1A(B), H1A(B), LUBE OIL CIRC. PUMP AND HEATER switch on EGS-PNL3A(B) to AUTO. Observe lube oil inlet and outlet temperature on the Trendicator. Verify the amber AUTO light comes ON.

- Begin warming jacket water to between 115°F and 160°F by placing the EGT-P1A(B), H1A(B), JACKET WATER CIRC. PUMP & HEATER switch on EGS-PNL3A(B) to AUTO, verifying the amber AUTO light comes ON. Monitor jacket water outlet temperatures on the Trendicator.

4.1.9. Verify proper oil level in EGA-C4A(C4B), REAR START AIR COMPRESSOR and EGA-C5A(C5B), FORWARD START AIR COMPRESSOR.

4.1.10. Start the compressors by placing EGA-C4A(C4B), REAR START AIR COMPRESSOR and EGA-C5A(C5B), FORWARD START AIR COMPRESSOR switches on EHS-MCC15A(B) to AUTO. Verify the compressors start and pressurize the air receivers to 250 psig as indicated on EGA-PIY26A(B), FWD START AIR PRESS and PIX26A(B), REAR START AIR PRESS. The compressors will cycle between 210 psig and 250 psig.

4.1.11. Check EGS-EG1A(B), STBY DIESEL GENERATOR A(B) fuel oil transfer system is in standby:

1. Verify one of the following discharge strainers is aligned for EGF-P1A(B):
    - For EGF-P1A, verify opened and locked for EGF-STR2A(D):
        - EGF-V122(V121)
        - EGF-V124(V123)
    - For EGF-P1B, verify opened and locked for EGF-STR2B(E):
        - EGF-V126(V125)
        - EGF-V128(V127)

2. On Panel EGS-PNL3A(B), fill the Fuel Oil Day Tank by placing EGF-P1A(B), FUEL OIL TRANSFER PUMP handswitch in AUTO. Monitor tank level on EGF-LIX16A(B), FUEL DAY TANK LEVEL Indicator.

4.1.12. At Panel EGS-PNL3A(B) perform the following:

1. Start EGF-P2A(B), DC FUEL OIL BOOSTER PUMP.

2. Verify fuel oil pressure indicates 30 to 40 psig on indicator EGF-PI27A(B).

3. WHEN the pump has run for 1 to 2 minutes, THEN place EGF-P2A(B), DC FUEL OIL BOOSTER PUMP handswitch to AUTO AND verify the amber AUTO light comes on.

4.1.13. Check EGS-EG1A(B), STBY DIESEL GENERATOR A(B) barring device disengaged and locked out.

4.1.14. At EGS-PNL2A(B), EGS-EG1A(B) PROTECTION, perform the following:

1. Reset the Gen Diff Trip Primary Protection 87G Relay.

2. Reset the PRIMARY TRIP CUTOFF and the BACK-UP TRIP CUTOFF switches. Verify the white lights above both are ON.

4.1.15. On the Engine Driven Fuel Oil Booster Pump, reset the Diesel Engine Overspeed Device by pressing the levers and verify they latch down.

4.1.16. On the engine governor, check the following:

- Governor oil level in spec per OSP-0028, LOG REPORT - NORMAL SWITCHGEAR, CONTROL, AND DIESEL GENERATOR BUILDINGS.

- Governor control settings set per OSP-0028, LOG REPORT - NORMAL SWITCHGEAR, CONTROL, AND DIESEL GENERATOR BUILDINGS unless otherwise directed.

4.1.17. On Panel H13-P877, depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton, and the STBY DIESEL ENGINE A(B) STOP RESET pushbutton.

NOTE

Steps 4.1.18 and 4.1.19 are performed to reset the DRU.

4.1.18. On EGS-PNL3A(B), depress both STOP pushbuttons.

4.1.19. WHEN at least 2 minutes has elapsed, THEN on EGS-PNL3A(B), depress the STOP RESET pushbutton.

4.1.20. Simultaneously depress the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and place the STBY DIESEL ENGINE A(B) MODE switch to OPER on H13-P877.

4.1.21. Verify the UNIT TRIPPED light on EGS-PNL3A(B) and the STBY DIESEL GENERATOR A(B) TRIPPED light on H13-P877 are OFF.

4.1.22. At EGS-PNL3A(B), verify the following lights are ON:

1. UNIT AVAIL EMERGENCY STATUS - White
2. AC CONTROL POWER ON - White
3. DC CONTROL POWER ON – White
4. FORWARD START DC POWER – White
5. REAR START DC POWER - White

4.1.23. At H13-P877, verify the STBY DIESEL GENERATOR A(B) AVAILABLE light is ON.

4.1.24. At Panel EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB. verify the FIELD FLASHING RELAY READY white light is on.

4.1.25. IF the FIELD FLASHING RELAY READY light is not on, THEN manually reset K1 relay EGE-CAB01A(B).

4.1.26. On the corner of the auxiliary skid near the Jacket Water Standpipe, verify the EGS-STOP/RUN VALVE is in the PULL-TO-RUN position.

4.1.27. At H13-P877, verify the following annunciators and status lights are reset:

1. DIESEL GENERATOR EGS-EG1A(B) SYSTEM TROUBLE (E-1)
2. DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE (E-2)
3. MAINT MODE LO SOL ENERGIZED (Status light)
4. TRIP UNIT IN CAL OR GR FAIL (Status light)

4.1.28. At panel EGS-PNL3A(B), verify all alarms required for diesel operation are reset.

4.1.29. Blowdown Rear and Forward Starting Air System as follows:

1. Unlock and open EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.

2. WHEN all condensate is removed, THEN close and lock EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.

3. Unlock and open EGA-V121(V143), FORWARD SUPPLY LINE DRIP LEG.

4. WHEN all condensate is removed, THEN close and lock EGA-V121(V143), FORWARD SUPPLY LINE DRIP LEG.

4.1.30. Drain turbocharger casing.

4.2 Placing EGS-EG1A(B), STBY DIESEL GENERATOR A(B) in Maintenance Mode

CAUTION

While in MODES 1, 2 & 3, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. STP-000-0102 shall be performed within 1 hour unless the diesel is restored to OPERABLE status in less than 1 hour. (Ref. 7.29)

During movement of recently irradiated fuel assemblies in the primary containment or fuel building AND while in Modes 4 and 5, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. Tech. Spec. 3.8.2 "AC SOURCES - SHUTDOWN" shall be immediately referred to and applicable ACTION requirements complied with. (Ref. 7.29)

NOTE

Sections 4.2.1 and 4.2.2 may be performed separately as required to place the diesel in MAINTENANCE and to return it to OPERATIONAL.

4.2.1. Place the diesel in MAINTENANCE mode by performing the following:

1. Establish communications between the control room and the local panel EGS-PNL3A(B), ENGINE CONTROL PANEL.

2. Place the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to MAINT, while simultaneously turning the keylock MAINT MODE SELECT switch on EGS-PNL3A(B) to the right.

3. Verify the Annunciator, P877-31A(B)-E02, DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE is in alarm.

4. Check Status Light P877-31A(B) MAINT MODE LO SOL ENRGZ is on.

4.2.2. <u>WHEN</u> the condition that required the diesel to be placed in the Maintenance Mode is no longer required, <u>THEN</u> perform the following:

1. Establish communications between the control room and the local panel EGS-PNL3A(B), ENGINE CONTROL PANEL.

2. Reset the DRU by performing the following:

   1) On EGS-PNL3A(B), depress both STOP pushbuttons.

   2) <u>WHEN</u> at least 2 minutes has elapsed, <u>THEN</u> on EGS-PNL3A(B), depress the STOP RESET pushbutton.

3. Return the diesel to Operational Mode by depressing the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) while simultaneously placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to the OPER position.

4. At H13-P877, verify the following:

   - The DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE alarm resets.

   - The MAINT MODE LO SOL ENRGZ status light goes off.

5. At Panel EGE-CAB01A(B), verify the FIELD FLASHING RELAY READY white light is lit.

4.3 Barring/Air Rolling Standby Diesel

4.3.1. Establish communications between the control room and the local panel EGS-PNL3A(B), ENGINE CONTROL PANEL.

CAUTION

Ensure that the rear air system is available prior to attempting any Barring / Air Rolling of a Diesel generator. The barring device and Air Roll function is supplied from rear air only.

4.3.2. Verify the diesel is in Maintenance Mode per Section 4.2.1.

4.3.3. Open the EGS-EG1A(B), STBY DIESEL GENERATOR A(B) cylinder cocks.

NOTE

If the Diesel Generator is being air rolled for the post run air roll of PEP-0026, Diesel Generator Operating Logs barring the engine with the barring device (Step 4.3.4) is not required.

4.3.4. Bar over the engine as follows:

1. Verify the barring device air hose is connected at EGA-V110(V132), REAR SUPPLY LINE DRIP LEG and barring device inlet valve.
2. Open DIV 1(2) DIESEL GENERATOR barring device inlet valve.

NOTE

The following step causes Annunciator EGS-PNL3A(B)-E03, BARRING DEVICE ENGAGED to alarm.

3. Unlock and engage the barring device.
4. Unlock and open EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.
5. Bar over the engine two revolutions and verify no liquid is expelled from the cylinder cocks.
6. Close the DIV 1(2) DIESEL GENERATOR barring device inlet valve.
7. Close and lock EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.
8. Disengage and lockout the barring device.
9. Check Annunciator EGS-PNL3A(B) E03, BARRING DEVICE ENGAGED is clear.

NOTE

Before an air roll, after an engine run, drain any liquid from the turbine casing drain per PEP-0026.

4.3.5. Air roll the engine as follows:

1. Drain turbocharger casing if not performed per Step 4.1.30.

NOTE

When the engine is rolled, annunciators LUBE OIL TANK LEVEL LOW, LUBE OIL INLET TEMP LOW, LUBE OIL OUTLET TEMP LOW, JACKET WATER IN TEMP LOW, and JACKET WATER OUT TEMP LOW. These annunciators do not require immediate action.

2. At EGS-PNL3A(3B), depress and hold the ENGINE ROLL pushbutton until Tachometer EGS-SIY43A(B) on EGS-PNL1A(B) OR EGS-SIX43A(B) on EGS-PNL3A(B) reaches 50 RPM for approximately 5 seconds, then release the pushbutton. (Ref. 7.20)

3. Check the cylinder head test valves for fluid discharge. If any fluid is discharged, record an estimate of the quantity and cylinder number in the comments section of the PEP-0026, Diesel Generator Operating Logs for the diesel run.

4.3.6. Close the diesel cylinder cocks.

4.3.7. Return the diesel to Operational Mode per Section 4.2.2.

CAUTION

The warmup method in the following section poses the risk of slightly more wear and tear on the Diesel over the long term. This method should not be made a matter of routine. Operations management or Duty Manager approval is required to use this Section.

4.4 Warming Up the Diesel Post Maintenance

4.4.1. Verify that the Lube Oil Sump level is greater than T7 Mark as indicated on the engine dipstick. Add oil as needed.

4.4.2. Begin warming lube oil to between 140°F and 170°F by placing the EGO-P1A(B), H1A(B), LUBE OIL CIRC. PUMP AND HEATER switch on EGS-PNL3A(B) to AUTO. Observe lube oil inlet and outlet temperature on the Trendicator. Verify the amber AUTO light comes ON.

4.4.3. Verify Jacket Water Standpipe level is 146" to 170" as indicated on local level indicator EGT-LI24A(B), JACKET WATER STANDPIPE LEVEL.

4.4.4. IF jacket water makeup is required, THEN Go To Section 5.15.

4.4.5. Begin warming jacket water to between 115°F and 160°F by placing the EGT-P1A(B), H1A(B), JACKET WATER CIRC. PUMP & HEATER switch on EGS-PNL3A(B) to AUTO, verifying the amber AUTO light comes ON. Monitor jacket water outlet temperatures on the Trendicator.

NOTE

The following step is to distribute clean oil over the main bearing/crankshaft and wrist pin interfaces, helping to flush out any minute traces of water that were retained in the clearances due to capillary action.

4.4.6. Bar the Diesel at least one revolution per section 4.3 steps 4.3.1 through 4.3.4.

4.4.7. Allow the engine to warm to ALL of the following minimum temperature criteria:

- Jacket Water exiting the engine block is greater than or equal to 100°F, per EGS-TI64B Position 13

AND

- Lube Oil exiting the engine block is is greater than or equal to 100°F, per EGS-TI64B Position 11

AND

- The difference between these two parameters is less than 40°F

4.4.8. Prep engine for starting including Barring and Air Roll per Section 4.3.

NOTE

After synchronizing to the grid, the diesel should be loaded to 1000 kw for 15 minutes. After 15 minutes, the load should be increased to 2500 kw.

4.4.9. Slow start, load, and parallel the Standby Diesel per one of the following:

- IF operating diesel from the Control Room, THEN slow start, load and parallel the Standby Diesel per Steps 4.5.6 through 4.5.21.

- IF operating diesel from the Local Control Panel, THEN slow start, load and parallel the Standby Diesel per Steps 4.6.6 through 4.6.23.

4.4.10. Run the diesel for a total operating time under load of at least one hour.

4.4.11. Verify the lube oil outlet temperature exceeds 155°F.

4.4.12. Shut down the Standby Diesel per one of the following:

- IF operating diesel from the Control Room, THEN shut down the Standby Diesel per Section 6.1.

- IF operating diesel from the Control Room, THEN shut down the Standby Diesel per Section 6.2.

4.5 Non-Emergency Starting, Loading and Paralleling the Standby Diesel from the Control Room

NOTE

All controls and indications are on Panel H13-P877 unless otherwise stated.

4.5.1. Start the Diesel Generator Building Ventilation per SOP-0061, Diesel Generator Building Ventilation.

4.5.2. Verify the diesel is in STANDBY per Section 4.1 of this procedure, as required.

4.5.3. Bar or air roll the engine per Section 4.3 of this procedure, if required per Precaution 2.8.

NOTE

Normally both air banks will be used. Selecting only the forward OR rear air banks is acceptable to minimize diesel starts post maintenance.

4.5.4. IF starting the Div I diesel AND it is desired to only use one starting air supply, THEN perform one of the following steps to use the desired air system:

- IF desired to only use the forward starting air supply, THEN unlock and close EGA-V150, ENGINE REAR AIR START SUPPLY.
- IF desired to only use the rear starting air supply, THEN unlock and close EGA-V149, ENGINE FWD AIR START SUPPLY

4.5.5. IF starting the Div II diesel AND it is desired to only use one starting air supply, THEN perform one of the following steps to use the desired air system:

- IF desired to only use the forward starting air supply, THEN unlock and close EGA-V154, ENGINE REAR AIR START SUPPLY.
- IF desired to only use the rear starting air supply, THEN unlock and close EGA-V153, FWD AIR START SUPPLY VALVE

4.5.6. Open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF and wait 2 minutes before proceeding.

4.5.7. At EGS-PNL1A(B), select a phase to monitor the generator voltage by placing the GENERATOR VOLTS voltmeter switch in 1-2, 2-3, or 3-1.

CRITICAL STEP

4.5.8. At EGS-PNL3A(B), start the engine by depressing the NORMAL START pushbutton and check the following:

1) On EGS-PNL-1A(B) using EGS-SIY43A(B), ENGINE SPEED OR on EGS-PNL3A(B) using EGS-SIX43A(B), observe the engine ramp to 450 rpm.

2) At approximately 450 rpm, check GENERATOR VOLTS increase to a steady state value ≥ 3740 volts and ≤ 4368 volts, as indicated on ERIS point EGSEY001(EGSEY002).

3) Check GENERATOR FREQUENCY is ≥ 58.8 Hz and ≤ 60.2 Hz.

4.5.9. Verify the following parameters are in the indicated range:

NOTE

It may take several minutes for all parameters to stabilize. It is acceptable for Turbo Oil pressure and Fuel Oil pressure to be as high as 45 psig on initial start.

1. EGO-PI5A(B), LUBE OIL PRESS 50-65 psig.
2. EGO-PI10A(B), TURBO OIL PRESS 25-40 psig.
3. EGF-PI27A(B), FUEL OIL PRESSURE 25-40 psig.
4. EGF-PDI29A(B), FUEL OIL FILTER DIFF PRESS less than 5 psid.
5. EGO-PDI7A(B), LUBE OIL FILTER DIFF PRESS less than 20 psid.
6. EGT-PI4A(B), JACKET WATER PRESS 12-30 psig.

NOTE

Crankcase pressure will increase with load. Should not exceed 1" WC with exhaust fan running.

7. EGS-PI6A(B), CRANKCASE PRESS 0 - +3 in. WC.

4.5.10. Close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

4.5.11. Verify air start valves are fully closed by insuring the air start lines upstream of the valves are not hot to touch.

4.5.12. Perform the requirements of PEP-0026, Diesel Generator Operating Logs.

4.5.13. Verify the blue REMOTE SYNC SW OFF status light is on.

CAUTION

To avoid diesel engine crankshaft critical speed, continuous operation between 453 and 457 RPM (60.4 to 60.9 HZ) shall not be permitted. (Ref. 7.19)

4.5.14. Place the SYNCHRONIZING Control Switch to GEN.

4.5.15. Adjust Standby Diesel 1A(B) INCOMING VOLTAGE V-1IN-1SYDA(B)01 to about 1-2 volts above RUNNING VOLTAGE V-1RUN-1SYDA(B)01 using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT.

4.5.16. Adjust the STANDBY DIESEL EG1A(B) speed, using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL, so that the synchroscope is rotating slowly in the FAST, or clockwise, direction at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not attempt to close the ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR with the synchroscope standing still if power is available to the bus from another source.

After the diesel output breaker is closed, apply load to generator as soon as practical to prevent reverse power trip. (Ref. 7.24)

NOTE

Sync check instrumentation requires the output breaker switch to be held in the closed position until breaker closure or synchroscope needle passes through 12 o'clock.

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.*

CRITICAL STEP

4.5.17. WHEN the synchroscope indicator is moving slowly in the FAST direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR. Verify the red breaker closed light is on.

4.5.18. Raise generator load to approximately 175 KW using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL.

4.5.19. As soon as diesel generator minimum load has stabilized, place the SYNCHRONIZING Control Switch to OFF.

4.5.20. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		TIME
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

4.5.21. IF desired to load the diesel generator, THEN raise diesel generator LOAD with the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL and adjust VARS using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

4.5.22. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

NOTE

Perform Steps 4.5.23, 4.5.24, and 4.5.25 only if it is desired to separate ENS-SWG1A(B,) 4.16 KV STANDBY BUS from the grid.

4.5.23. Adjust diesel generator load while monitoring incoming feeder breaker amps. IF the normal supply breaker is closed, THEN on H13-P877 monitor A-1ENSA(B)07, NORM SUPPLY AMPS. IF the alternate supply breaker is closed, THEN on H13-P808, monitor A-1NNSJ(H)09, NNS-ACB13(05) SPLY AMPS.

NOTE

Since the diesel generator may be supplying load to the grid, it may be necessary to lower diesel generator load to cause the feeder breaker current to lower to 100 amps.

4.5.24. WHEN the bus incoming feeder breaker current is approximately 100 amps, THEN open the incoming feeder breaker.

4.5.25. Monitor and maintain Generator Frequency between 59.5 and 59.9 Hz and Generator Volts between 4110V and 4210V.

4.6 Non-Emergency Starting, Loading and Paralleling the Standby Diesel from the Local Control Panel

NOTE

All controls and indications are on Panels EGS-PNL3A(B) and EGS-PNL1A(B) unless otherwise stated.

4.6.1. Start the Diesel Generator Building Ventilation per SOP-0061, Diesel Generator Building Ventilation.

4.6.2. Verify the diesel is in STANDBY per Section 4.1 of this procedure, as required.

4.6.3. Bar or air roll the engine per Section 4.3 of this procedure, if required per Precaution 2.8.

<u>NOTE</u>

Normally both air banks will be used. Selecting only the forward <u>OR</u> rear air banks is acceptable to minimize diesel starts post maintenance.

4.6.4. <u>IF</u> starting the Div I diesel <u>AND</u> it is desired to only use one starting air supply, <u>THEN</u> perform one of the following steps to use the desired air system:

- <u>IF</u> desired to only use the forward starting air supply, <u>THEN</u> unlock and close EGA-V150, ENGINE REAR AIR START SUPPLY.

- <u>IF</u> desired to only use the rear starting air supply, <u>THEN</u> unlock and close EGA-V149, ENGINE FWD AIR START SUPPLY

4.6.5. <u>IF</u> starting the Div II diesel <u>AND</u> it is desired to only use one starting air supply, <u>THEN</u> perform one of the following steps to use the desired air system:

- <u>IF</u> desired to only use the forward starting air supply, <u>THEN</u> unlock and close EGA-V154, ENGINE REAR AIR START SUPPLY.

- <u>IF</u> desired to only use the rear starting air supply, <u>THEN</u> unlock and close EGA-V153, FWD AIR START SUPPLY VALVE

4.6.6. Open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF and wait 2 minutes before proceeding.

4.6.7. At EGS-PNL1A(B), select a phase to monitor the generator voltage by placing the GENERATOR VOLTS voltmeter switch in 1-2, 2-3, or 3-1.

CRITICAL STEP

4.6.8. At EGS-PNL3A(B), start the engine by depressing the NORMAL START pushbutton and check the following:

1) On EGS-PNL-1A(B) using EGS-SIY43A(B), ENGINE SPEED <u>OR</u> on EGS-PNL3A(B) using EGS-SIX43A(B), observe the engine ramp to 450 rpm.

2) At approximately 450 rpm, check GENERATOR VOLTS increase to a steady state value ≥ 3740 volts and ≤ 4368volts, as indicated on ERIS point EGSEY001(EGSEY002).

3) Check GENERATOR FREQUENCY is ≥ 58.8 Hz and ≤ 60.2 Hz.

4.6.9. Verify the following parameters are in the indicated range:

NOTE

It may take several minutes for all parameters to stabilize. It is acceptable for Turbo Oil pressure and Fuel Oil pressure to be as high as 45 psig on initial start.

1. EGO-PI5A(B), LUBE OIL PRESS 50-65 psig.
2. EGO-PI10A(B), TURBO OIL PRESS 25-40 psig.
3. EGF-PI27A(B), FUEL OIL PRESSURE 25-40 psig.
4. EGF-PDI29A(B), FUEL OIL FILTER DIFF PRESS less than 5 psid.
5. EGO-PDI7A(B), LUBE OIL FILTER DIFF PRESS less than 20 psid.
6. EGT-PI4A(B), JACKET WATER PRESS 12-30 psig.

NOTE

Crankcase pressure will increase with load. Should not exceed 1" WC with exhaust fan running.

7. EGS-PI6A(B), CRANKCASE PRESS 0 - +3 in. WC.

4.6.10. Close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

4.6.11. Verify air start valves are fully closed by insuring the air start lines upstream of the valves are not hot to touch.

4.6.12. Perform the requirements of PEP-0026, Diesel Generator Operating Logs.

4.6.13. IF an unloaded run is being performed AND the unloaded run will be less than 30 minutes, THEN Go To Section 6.2 Step 6.2.3 to shutdown the Diesel Generator.

4.6.14. Select the phase of bus and generator voltage to be monitored on the BUS VOLTS and GENERATOR VOLTS voltmeters.

4.6.15. Verify the blue REMOTE SYNCHRONIZING SELECTOR SWITCH OFF light is ON.

CAUTION

To avoid diesel engine crankshaft critical speed, continuous operation between 453 and 457 RPM (60.4 to 60.9 HZ) shall not be permitted. (Ref. 7.19)

4.6.16. Place the SYNCHRONIZING CONTROL to GEN.

4.6.17. Adjust STANDBY DIESEL EG1A(B) INCOMING VOLTS to about 1-2 volts above RUNNING VOLTS using the VOLTAGE REGULATOR CONTROL.

4.6.18. Adjust the STANDBY DIESEL EG1A(B) speed, using the GOVERNOR CONTROL, so that the synchroscope is rotating slowly in the FAST, or clockwise, direction at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not attempt to close the GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) with the synchroscope standing still if power is available to the bus from another source.

After the diesel output breaker is closed, apply load to generator as soon as practical to prevent reverse power trip. (Ref. 7.24)

NOTE

Sync check instrumentation requires the output breaker switch to be held in the closed position until breaker closure or synchroscope needle passes through 12 o'clock.

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) Breaker is manipulated.*

CRITICAL STEP

4.6.19. WHEN the synchroscope indicator is moving slowly in the FAST direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close the GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B). Verify the red breaker closed light is on.

4.6.20. Raise generator load to approximately 175 KW using the GOVERNOR CONTROL.

4.6.21. As soon as diesel generator minimum load has stabilized, place the SYNCHRONIZING CONTROL to OFF.

4.6.22. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		TIME
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

4.6.23. IF desired to load the diesel generator, THEN raise diesel generator load with the GOVERNOR CONTROL and adjust VARS using the VOLTAGE REGULATOR CONTROL. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

4.6.24. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

NOTE

Perform Steps 4.6.25, 4.6.26, and 4.6.27 only if it is desired to separate ENS-SWG1A(B,) 4.16 KV STANDBY BUS from the grid.

4.6.25. Adjust diesel generator load while monitoring incoming feeder breaker amps. IF the normal supply breaker is closed, THEN on H13-P877 monitor A-1ENSA(B)07, NORM SUPPLY AMPS. IF the alternate supply breaker is closed, THEN on H13-P808, monitor A-1NNSJ(H)09, NNS-ACB13(05) SPLY AMPS.

NOTE

Since the diesel generator may be supplying load to the grid, it may be necessary to lower diesel generator load to cause the feeder breaker current to lower to 100 amps.

4.6.26. WHEN the bus incoming feeder breaker current is approximately 100 amps, THEN open the incoming feeder breaker.

4.6.27. Monitor and maintain Generator Frequency between 59.5 and 59.9 Hz and Generator Volts between 4110V and 4210V.

4.7 Manual Start of Standby Diesel with an Automatic Start Signal Present

4.7.1. Verify a valid LOCA or Undervoltage start signal exists.

4.7.2. IF the diesel generator tripped and locked out on ground fault while running parallel to the grid AND it is determined that the tripped diesel is required to mitigate the consequences of a loss of power accident, THEN the following steps should be taken in the order listed:

CAUTION

If an emergency start signal (such as LOCA or LOP) is sealed in, performance of these steps will cause the affected diesel generator to automatically start.

1. On EGS-PNL2A(B), EGS-EG1A(B) PROTECTION, RESET the GROUND FAULT relay.
2. On EGS-PNL2A(B), RESET the BACK-UP PROTECTION TRIP AND LOCKOUT relay.

3. Close GENERATOR EGS-EG1A(B) NEUTRAL BREAKER from EGS-PNL1A(B), STBY DIESEL GEN PNL or locally.

4. On Panel EGS-PNL3A(B), ENGINE CONTROL PANEL depress the STOP RESET pushbutton.

5. On EGS-PNL1A(B),STBY DSL GEN PNL depress the EXCITATION SHUTDOWN RESET pushbutton.

6. At Panel EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB. verify the FIELD FLASHING RELAY READY white light is on.

   1) IF the FIELD FLASHING RELAY READY light is not on, THEN manually reset K1 relay EGE-CAB01A(B).

4.7.3. Attempt to manually start EGS-EG1A(B), STBY DIESEL GENERATOR A(B) by depressing the EMERGENCY START pushbutton on EGS-PNL3A(B), or the STBY DIESEL ENGINE A(B) EMERGENCY START pushbutton on H13-P877.

4.7.4. IF EGS-EG1A(B), STBY DIESEL GENERATOR A(B) will not start, THEN observe any annunciators on H13-P877 or EGS-PNL3A(B) which might indicate the cause.

1. Verify starting air pressure is greater than 120 psig, and that the diesel is in the OPERATIONAL mode.

2. If necessary, Refer To Section 4.1 and verify the diesel generator is in STANDBY.

CAUTION

While in MODES 1, 2 & 3, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. STP-000-0102 shall be performed within 1 hour unless the diesel is restored to OPERABLE status in less than 1 hour. (Ref. 7.29)

During movement of recently irradiated fuel assemblies in the primary containment or fuel building AND while in Modes 4 and 5, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. Tech. Spec. 3.8.2 "AC SOURCES - SHUTDOWN" shall be immediately referred to and applicable ACTION requirements complied with. (Ref. 7.29)

4.7.5. IF the diesel will not immediately start, THEN place the diesel in MAINTENANCE mode by simultaneously placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to MAINT, while turning the keylock MAINT MODE SELECT switch on EGS-PNL3A(B) to the right.

4.7.6. At H13-P877, verify the following:

- The DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE annunciator alarms.
- The MAINT MODE LO SOL ENRGZ status light comes on.

4.7.7. Attempt to determine the cause for the fail to start.

4.7.8. IF power has been lost to EGO-P1A(B), LUBE OIL CIRC PUMP for over 12 hours AND the diesel generator has not been run in 12 hours, THEN air roll or bar the engine per Section 4.3 of this procedure.

4.7.9. IF ENS-SWG1A(B), STANDBY BUS is deenergized, OR if a LOCA exists, but not both, THEN perform the following steps:

1. Allow the diesel to automatically start by simultaneously depressing the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to the OPER position.
2. Verify all diesel parameters are normal during the start and initial operation.
3. Verify ENS-SWG1A(B), STANDBY BUS is energized by the diesel generator, normal, or alternate supply.
4. IF the Diesel Generator is the only supply to the bus, THEN Go To Section 5.16, while continuing with this section.

5. Perform fill and vent operations on the affected ECCS systems as needed.

4.7.10. IF ENS-SWG1A(B), STANDBY BUS is de-energized AND a LOCA signal is present, THEN perform the following steps:

1. Defeat the automatic start of the ECCS pumps supplied by the affected diesel by opening the following appropriate breakers:

   - LPCS Pump ENB-PNL02A - CB14, (H13-P629 LPCS PWR SUPPLY RELAYS & ISOLATORS)
   - RHR A Pump ENB-PNL02A - CB13, (H13-P629 RHR ISOLATOR CIRCUIT)
   - RHR B & C Pump ENB-PNL02B - CB10, (H13-P618 RHR PANEL ISOLATOR CKT)

2. Allow the diesel generator to auto start by simultaneously depressing the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to the OPER position.

3. Verify ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR closes to energize ENS-SWG1A(B), STANDBY BUS.

4. Verify all diesel parameters are normal.

5. Perform fill and vent operations on the affected ECCS Systems as needed.

CRITICAL STEP

6. Close the appropriate DC breakers that were opened in Step 4.7.10.1 above. If a LOCA signal is still present, the ECCS System will initiate:

   - LPCS Pump ENB-PNL02A - CB14
   - RHR A Pump ENB-PNL02A - CB13
   - RHR B & C Pump ENB-PNL02B - CB10

7. Verify the affected ECCS Systems initiate. Refer To SOP-0031, Residual Heat Removal for RHR and/or SOP-0032, Low Pressure Core Spray for LPCS.

8. IF the Diesel Generator is the only supply to the bus, THEN Go To Section 5.16.

5 SYSTEM OPERATION

5.1 Paralleling an Offsite Power Source to the Standby Diesel from the Control Room

NOTE

The following controls and indications are located on Panel H13-P877 unless otherwise stated.

5.1.1. IF ENS-ACB06(26), NORMAL SUPPLY BRKR is to be closed, THEN place the REMOTE SYNC SW to NORM.

5.1.2. IF ENS-ACB04(24), ALTERNATE SUPPLY BRKR is to be closed, THEN place the REMOTE SYNC SW to ALTN.

5.1.3. Adjust diesel voltage, as observed on V-1RUN-1SYDA(B)01, RUNNING VOLTAGE to approximately 1- 2 volts above V-1IN-1SYDA(B)01, INCOMING VOLTAGE using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT.

5.1.4. Adjust diesel speed, using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL, to bring the frequency within the range of grid frequency. Adjust speed so the SY-1-SYDA(B)01, STBY BUS A(B) SYNCHROSCOPE indicator is rotating slowly in the SLOW direction (counterclockwise) at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not close the Normal or Alternate bus feeder breaker with the synchroscope indicator standing still if the bus is being supplied by the EGS-EG1A(B), STANDBY DIESEL GENERATOR.

When synchronizing the D/G and its connected loads back to offsite power, it is possible for the D/G to unload at a rapid rate as soon as the preferred source breaker is closed. This is due to the governor changing to the droop mode. If this occurs, immediately raise the load back to the desired value using the governor control switch.

CRITICAL STEP

5.1.5. WHEN the synchroscope indicator is moving slowly in the SLOW direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close the desired feeder breaker, ENS-ACB06(26), NORMAL SUPPLY BRKR or ENS-ACB04(24), ALTERNATE SUPPLY BRKR. Verify the red breaker closed light comes ON. If not, return the breaker handswitch to TRIP.

5.1.6. As soon as diesel load has stabilized, return the REMOTE SYNC SW to OFF.

5.1.7. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

5.1.8. IF desired to load the Diesel Generator, THEN perform the following:

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		TIME
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

1. Raise diesel generator load with the GOVERNOR CONTROL and adjust VARS using the VOLTAGE REGULATOR CONTROL. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

2. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

5.1.9. WHEN desired, THEN shutdown the Standby Diesel Generator per Section 6.1 or 6.2 of this procedure.

5.2 Paralleling an Offsite Power Source to the Standby Diesel from the Local Control Panel

NOTE

The following controls and indications are on Panels EGS-PNL01A(B) and EGS-PNL03A(B) unless otherwise stated.

5.2.1. Verify the blue REMOTE SYNCHRONIZING SELECTOR SWITCH OFF light is on.

5.2.2. IF the NORMAL SPLY TO STBY BUS ENS-SWG1A(B) is to be closed, THEN place the SYNCHRONIZING CONTROL to NORM.

5.2.3. IF the ALTERNATE SPLY TO STBY BUS ENS-SWG1A(B) is to be closed, THEN place the SYNCHRONIZING CONTROL to ALTN.

5.2.4. Select the phase of bus voltage to be monitor on the BUS VOLT voltmeter.

5.2.5. Adjust diesel generator voltage, as observed on RUNNING VOLTS, to approximately 1-2 volts above INCOMING VOLTS using the VOLTAGE REGULATOR CONTROL.

5.2.6. Adjust diesel generator speed to bring the frequency within the range of grid frequency using the GOVERNOR CONTROL. Adjust speed so the SYNCHROSCOPE indicator is rotating slowly in the SLOW direction (counterclockwise) at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not close either a normal or alternate power source breaker with the synchroscope indicator standing still, if the bus is being powered from the diesel generator.

When synchronizing the D/G and its connected loads back to offsite power, it is possible for the D/G to unload at a rapid rate as soon as the preferred source breaker is closed. This is due to the governor changing to the droop mode. If this occurs, immediately raise the load back to the desired value using the governor control switch.

NOTE

Sync check instrumentation requires the output breaker switch to be held in the closed position until breaker closure or synchroscope needle passes through 12 o'clock.

CRITICAL STEP

5.2.7. WHEN the synchroscope indicator is moving slowly in the SLOW direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close the appropriate breaker, with the NORMAL SPLY TO STBY BUS ENS-SWG1A(B) or the ALTERNATE SPLY TO STBY BUS ENS-SWG1A(B). Verify the red breaker closed lights comes on. If not, return the breaker handswitch to TRIP.

5.2.8. As soon as diesel generator minimum load has stabilized, return the SYNCHRONIZING CONTROL to OFF.

5.2.9. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

5.2.10. IF desired to load the Diesel Generator, THEN perform the following:

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		TIME
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

1. Raise diesel generator load with the GOVERNOR CONTROL and adjust VARS using the VOLTAGE REGULATOR CONTROL. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

2. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

5.2.11. When desired, shutdown the Standby Diesel Generator per Section 6.1 or 6.2 of this procedure.

5.3 Operation from Automatic Start

CAUTION

During an emergency start, only the overspeed and generator differential trips are in effect.

5.3.1. Determine if cause for start is valid.

5.3.2. Dispatch an operator to the local diesel control panels to monitor diesel parameters.

5.3.3. IF the Diesel Generator is the only supply to the bus AND the LOCA and/or Undervoltage conditions have not cleared, THEN Go To Section 5.16.

CAUTION

ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR can not be closed as long as bus voltage is being supplied by the normal or alternate supply and the LOCA signal is still sealed in.

NOTE

Short duration runs and light load (less than 40%, or 1200 kW) operation should be avoided. After a period of light load or no-load run, the diesel should be loaded to greater than or equal 2700 kW in accordance with Precautions and Limitations 2.19.

5.3.4. IF the LOCA and/or Undervoltage conditions have cleared AND it is desired to load the diesel for some time period, THEN perform the following steps:

1. IF the diesel generator is supplying ENS-SWG1A(B), STANDBY BUS, THEN parallel an offsite source to the diesel per Section 5.1 of this procedure.

2. Reset the LOCA by depressing the following appropriate Divisional reset pushbutton:

   - DIV 1 – On H13-P601, Insert 21B, LPCS/RHR DIV I INITIATION RESET
   - DIV II – On H13-P601, Insert 17B, RHR DIV 2 INITIATION RESET

3. On H13-P877, depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton.

4. Raise diesel generator load to the desired value using the GOVERNOR CONTROL.

5.3.5. Shut down the diesel per Section 6.1 of this procedure when no longer needed.

5.4 Unloading Diesel Fuel Oil

CAUTION

Section 5.4, Unloading Diesel Fuel Oil is mainly written to refuel the diesels during normal operation. However, when the diesels have been running continuously the following requirements are to be followed to prevent the loss of all diesels due to material being stirred up in the fuel oil storage tanks which in turn could clog the diesel fuel oil filters:

- **Refilling one standby diesel storage tank will begin after 72 hours of continuous operation and refilling the second will begin after 96 hours of continuous operation.**
- **The Day Tank is verified full prior to filling the associated Fuel Oil Storage Tank.**
- **That refill is at a controlled rate to minimize turbulence in the storage tank and is initiated in sufficient time to allow sufficient settlement prior to refilling the next tank. (Ref. 7.16)**
- **Day Tank fill capability without the Fuel Oil Filter clogging before the next tank is refilled is required.**
- **Storage Tanks for Div I and Div II DG are filled before the HPCS DG. (Ref. 7.16)**

5.4.1. IF the Day Tank level is less than 78%, THEN prior to filling Fuel Oil Storage Tank, fill associated Day Tank as follows: (Ref. 7.16)

NOTE

Placing the Fuel Oil Transfer Pump in RUN or OFF will cause a local panel alarm and a trouble alarm in the main control room.

Filling the Day Tank higher than 78% may cause the High Day Tank Level alarm to come in. The tank will continue to fill as the piping drains into the tank after the pump turns off.

1. Place EGF-P1A(B), FUEL OIL TRANSFER PUMP to RUN.
2. WHEN Day Tank Level reaches 78%, THEN place EGF-P1A(B), FUEL OIL TRANSFER PUMP in AUTO.

5.4.2. Verify the following steps have been completed prior to bringing the diesel fuel oil tank truck into the Protected Area:

- Two (2) 150 pound wheeled dry chemical fire extinguishers are in place near the transfer station, but not in an area potentially affected by a fuel fire.
- A fire watch with no other concurrent duties is stationed at the transfer station to remain present until the tank truck leaves the Protected Area. (Ref. 7.18)
- All personnel required for the transfer (Operations, Security) are standing by at the transfer station.
- Notify Chemistry for biocide addition.

NOTE

The following step provides spill protection.

5.4.3. WHEN the tank truck is parked at the transfer station, THEN perform the following:

- Direct the tank truck driver to remain in the area.
- Place danger flagging around the tank truck in accordance with EN-IS-111 Section for Barriers and Exclusion Boundaries Flagging and follow NO SMOKING, sparks or open flames rules less than or equal to 50 feet from the trailer. (Ref. 7.17)
- Obtain a bucket or other suitable container for hose drainage.

5.4.4. Verify the following with Chemistry:

- Fuel oil properties have been tested per Technical Specifications.
- Chemistry Management has performed a visual inspection of the vendor fuel pump and lines. IF fuel is being offloaded from an Entergy owned truck, THEN N/A this step.
- Biocide has been added.

5.4.5. WHEN Steps 5.4.2 through 5.4.4 have been completed, THEN notify the OSM/CRS.

5.4.6. WHEN the OSM/CRS grants permission to unload the tank truck, THEN continue with the next step.

5.4.7. Verify EGF-V1 and EGF-V2 (V31 and V32), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN STRAINER DRAINS are closed and capped.

5.4.8. IF offloading from the company owned tanker truck, THEN drain off any accumulated water or sediment from all compartments of the storage trailer prior to hooking up the pump and filters for transferring fuel oil to the permanent storage tanks.

NOTE

Normal alignment of the Berme Drain System is with the drains aligned to the Storm Drain System for continuous draining. During fuel offload, the Berme Drain System will be isolated.

5.4.9. Close/verify closed the following valves to isolate the Berme Drain System:

1. SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE
2. SRW-V3002, D/G BLDG DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION
3. SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM

5.4.10. Hook up the fill hose to the tank fill connection.

5.4.11. Unlock and open EGF-V24(V54), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN.

CAUTION

There is no high level alarm. Monitor the storage tank indication frequently. Storage tank level rises rapidly when the tank level is above 90% and filling operations are in progress. If using air driven pump, reduce fill rate above 90% level. If using electric positive displacement pump, flow must be secured to prevent overfilling tank.

NOTE

Maximum FUEL OIL STORAGE TANK level is 96% to accommodate the performance of the fuel oil transfer pump IST STP's.

Refill is to be at a controlled rate to minimize turbulence in storage tank. (Ref. 7.16)

5.4.12. Begin fuel oil offload while periodically monitoring the following:

- At Panel EGS-PNL3A(B) on EGF-LI15A(B), FUEL STORAGE TANK LVL verify storage tank level. Monitor level during fuel addition and do not fill above 96%.
- EGF-PDI20A(B), FUEL TK1A(B) INLET STR differential during addition. IF differential pressure pegs high, THEN switch to the redundant strainer and initiate a Work Request to clean the dirty strainer.

5.4.13. WHEN fuel oil addition is complete, THEN secure the fuel oil fill line up as follows:

1. Remove fill hose connection at the tanker truck and drain as much of the fill hose as possible into the storage tank.
2. Remove fill hose from fill connection.
3. Recap the fill connection and hose.
4. Close and lock EGF-V24(V54), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN.

5.4.14. WHEN the unloading is completed, THEN move the trailer outside the Protected Area.

5.4.15. Verify the independent verification for EGF-V24(V54), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN has been completed prior to closing and locking the security gate leading to the fill valve room.

5.4.16. IF fuel oil spillage has occurred in the berme, THEN drain per Section 5.7 of this procedure.

5.4.17. IF fuel oil spillage did not occur AND Section 5.7 was not performed, THEN realign the Berme Drain System to the Storm Drain System as follows:

1. Open SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE.
2. Open SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM.

5.4.18. Log completion of the fuel oil offload and manipulated device line up along with independent verification in the MCR log.

5.4.19. After offloading diesel fuel oil, notify the Control Room/Work Management Center to order another load of diesel fuel oil if required.

5.5 Cross-Connecting Air Receivers Within a Single Division

5.5.1. Division 1 Air System

1. Close EGA-V3130(V3122), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.
2. Open EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.
3. Open EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.
4. Start the operable air compressor by placing EGA-C4A(C5A), REAR(FORWARD) START AIR COMPRESSOR to RUN.
5. WHEN the desired pressure is reached in the cross tied air receivers, THEN stop the air compressor by placing EGA-C4A(C5A), REAR(FORWARD) START AIR COMPRESSOR to OFF.
6. Close EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.
7. Close EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.
8. Open EGA-V3130(V3122), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.
9. Place the operable air compressor in AUTO.

10. Verify the restorations are independently verified and logged.

5.5.2. Division 2 Air System

1. Close EGA-V3148(V3140), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.

2. Open EGA-V3142, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

3. Open EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

4. Start the operable air compressor by placing EGA-C4B(C5B), REAR(FORWARD) START AIR COMPRESSOR to RUN.

5. <u>WHEN</u> the desired pressure is reached in the cross tied air receivers, <u>THEN</u> stop the air compressor by placing EGA-C4B(C5B), REAR(FORWARD) START AIR COMPRESSOR to OFF.

6. Close EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

7. Close EGA-V3142, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

8. Open EGA-V3148(V3140) FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.

9. Place the operable air compressor in AUTO.

10. Verify the restorations are independently verified and logged.

5.6 Cross Connecting Air Receivers Across Divisions

NOTE

The operable air compressor(s) should be operated manually when pressurizing two air receiver trains. Continuous monitoring of the hose condition is recommended, until they are isolated and removed.

Controls are located at EHS-MCC15A(15B).

5.6.1. Place the control switch for the operable compressor to OFF.

5.6.2. Install one end of an air hose to the <u>Operable</u> air receiver at:

- Div I Forward or Rear EGA-V3131, DIV 1 HOSE CONNECTION ISOLATION VALVE
- Div II Forward or Rear EGA-V3149, DIV 2 HOSE CONNECTION ISOLATION VALVE

5.6.3. Attach the other end of the hose to the <u>Inoperable</u> Air Receiver at:

- For DIV I Forward or Rear EGA-V3131
- For DIV II Forward or Rear EGA-V3149

5.6.4. <u>IF</u> pressurizing the Div I Rear air receiver train, <u>THEN</u> Close EGA-V3122, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.5. <u>IF</u> pressurizing the Div I Forward air receiver train, <u>THEN</u> Close EGA-V3130, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.6. <u>IF</u> pressurizing the Div II Rear air receiver train, <u>THEN</u> Close EGA-V3140, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.7. <u>IF</u> pressurizing the Div II Forward air receiver train, <u>THEN</u> Close EGA-V3148, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.8. Open the selected dryer outlet connection valves (from Steps 5.6.2 and 5.6.3).

5.6.9. <u>IF</u> pressurizing to or from Div I Rear air, <u>THEN</u> Open EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

5.6.10. <u>IF</u> pressurizing to or from Div I Forward air, <u>THEN</u> Open EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.

5.6.11. <u>IF</u> pressurizing to or from Div II Rear air, <u>THEN</u> Open EGA-V3142, REAR AIR START SYSTEM CROSS TIE ISOLATION VALVE.

5.6.12. IF pressurizing to or from Div II Forward air, THEN Open EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

NOTE

The operator should remain in the vicinity of the hose and compressor until the evolution is complete.

The operable air compressor(s) should be operated manually when pressurizing two air receiver trains.

5.6.13. Operate the Operable air compressor manually by placing the control switch in RUN until the air receiver train is at the desired pressure.

5.6.14. Place the control switch for the Operable compressor to OFF.

5.6.15. At the Operable air receiver, close the valve selected in Step 5.6.2:

- For DIV I Forward or Rear EGA-V3131
- For Div II Forward or Rear EGA-V3149

5.6.16. Depressurize the hose by opening the appropriate vent valve as follows:

1. Remove cap as necessary and open:
    - Div I Rear EGA-V3121, REAR AIR START SUPPLY DRAIN VALVE.
    - Div I Forward EGA-V3133, FORWARD AIR START SUPPLY DRAIN VALVE.
    - Div II Rear EGA-V3139, REAR AIR START SUPPLY DRAIN VALVE.
    - Div II Forward EGA-V3151, FORWARD AIR START SUPPLY DRAIN VALVE.
2. Monitor Air Receiver Tank pressure to assure check valve is closed.
3. When hose is depressurized, remove hose.
4. Close and replace cap as necessary on valve opened in Step 5.6.16.1.

5.6.17. At the Inoperable air receiver, close the valve selected in Step 5.6.3.

5.6.18. IF pressurizing the Div I Rear air receiver train, THEN perform the following:

1. Close EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.
2. Open EGA-V3122, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.19. IF pressurizing the Div I Forward air receiver train, THEN perform the following:

1. Close EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.

2. Open EGA-V3130, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.20. IF pressurizing the Div II Rear air receiver train, THEN perform the following:

1. Close EGA-V3142, REAR AIR START SYSTEM CROSS TIE ISOLATION VALVE.

2. Open EGA-V3140, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.21. IF pressurizing the Div II Forward air receiver train, THEN perform the following:

1. Close EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

2. Open EGA-V3148, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.22. Place the control switch for the Operable compressor to AUTO.

5.6.23. Verify the valve/control restorations are independently verified and logged.

5.7 Operation of Diesel Fuel Offload Berme Drain System Following Oily Contamination of Berme

5.7.1. Verify the following Berme Drain System Valves are closed:

1. SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE

2. SRW-V3002, D/G BLDG BERME DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION

3. SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM

CAUTION

Anytime fluid is drained to D/G Bldg Oil Phase Separator, Environmental shall be present to sample oil separator outflow. (Ref 7.14)

5.7.2. Request Environmental presence to sample oil separator outflow.

5.7.3. Drain berme area by opening the following valves:

1. SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE

2. SRW-V3002, D/G BLDG BERME DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION

5.7.4. WHEN the berme is drained, THEN flush the line, using any suitable DWS hose connection, for 15 minutes.

5.7.5. WHEN flushing is complete, THEN close SRW-V3002, D/G BLDG BERME DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION.

5.7.6. Open SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM.

5.8 Verifying Proper Operation of EGF-P1A(B), FUEL OIL TRANSFER PUMP

5.8.1. At EGS-PNL3A(B), verify EGF-P1A(B), FUEL OIL TRANSFER PUMP control switch is in the AUTO position.

5.8.2. Unlock and open valve EGF-V104(V102), DAY TANK DRAIN TO FUEL OIL STORAGE TANK.

NOTE

The Tech. Spec. minimum fuel oil day tank level is 45%.

5.8.3. WHEN EGF-TK2A(B), FUEL OIL DAY TANK TK2A(B) level lowers to 63% as indicated on EGF-LIX16A(B), FUEL DAY TANK LEVEL, OR EGF-P1A(B), FUEL OIL TRANSFER PUMP auto starts, THEN perform the following steps:

1. Close EGF-V104(V102), DAY TANK TK2A(B) DRAIN TO STORAGE TANK, and

2. Verify EGF-P1A(B), FUEL OIL TRANSFER PUMP is running.

5.8.4. Verify EGF-P1A(B), FUEL OIL TRANSFER PUMP auto stops prior to EGF-TK2A(B), FUEL OIL DAY TANK TK2A(B) level reaching 80%.

5.8.5. Lock EGF-V104(V102), DAY TANK TK2A(B) DRAIN TO STORAGE TANK.

5.9 Swapping Fuel Oil Transfer Pump EGF-P1A(B) Discharge Strainers

NOTE

Use Section 5.9.1 removing Fuel Oil Transfer Pump Discharge Strainer STR2A(B) from service or Section 5.9.2 for removing Fuel Oil Transfer Pump Discharge Strainer STR2D(E) from service.

5.9.1. Removing EGF-STRA(B), FUEL OIL TRANSFER PUMP DISCHARGE STRAINER from service.

1. On EGS-PNL3A(B), ENGINE CONTROL PANEL, place EGF-P1A(B), FUEL OIL TRANSFER PUMP control switch in ON.
2. Open and lock EGF-STR2D(E), FUEL OIL TRANSFER STRAINER inlet valve EGF-V121(V125), FUEL OIL TRANSFR PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.
3. Open EGF-V21(V51), STRAINER 2D(E) VENT and vent air from EGF-STR2D(E).
4. Close EGF-V21(V51).
5. Open and lock EGF-V123(V127), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.
6. Unlock and close EGF-V122(V126), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.
7. Unlock and close EGF-V124(V128), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.
8. On EGS-PNL3A(B), place EGF-P1A(B) control switch in AUTO.

5.9.2. Removing EGF-STRD(E), FUEL OIL TRANSFER PUMP DISCHARGE STRAINER from service.

1. On EGS-PNL3A(B), ENGINE CONTROL PANEL, place EGF-P1A(B), FUEL OIL TRANSFER PUMP control switch in ON.
2. Open and lock EGF-V122(V126) FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.
3. Open EGF-V20(V50), STRAINER STR2A(B) VENT and vent air from EGF-STR2A(B).
4. Close EGF-V20(V50).

5. Open and lock EGF-V124(V128), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.

6. Unlock and close EGF-V121(V125), FUEL OIL TRANSFR PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.

7. Unlock and close EGF-V123(V127) FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.

8. On EGS-PNL3A(B), place EGF-P1A(B) control switch in AUTO.

5.10 Swapping the Fuel Oil Duplex Filters.

NOTE

These filters are located on the right front corner of the engine, under the ladder.

5.10.1. Smoothly position the selector valve from the in-service filter to the clean filter.

5.10.2. Check fuel oil system for normal system pressures and that the annunciators clear.

5.11 Swapping EGF-STR3A(B)/ STR3D(E) FUEL OIL STRAINER

NOTE

The fuel oil strainer handle is removable from the center stem, and can easily be mispositioned. When correctly positioned, the handle will be angled at 45° between the inlet pipe and the in-service strainer; or pointing between the scribe marks on top of the square valve stem.

5.11.1. Simultaneously loosen the two diverter valve split collar hold down bolts, until the raised portions on top of the collar just comes into contact with the underside of the turning handle.

5.11.2. Slowly move the strainer handle from the in-service strainer to the clean strainer.

5.11.3. Simultaneously tighten the diverter valve split collar hold down bolts until snug, reseating the diverter valve.

5.11.4. Check for normal system pressures and that any associated annunciator alarms clear.

5.12 Swapping Lube Oil Duplex Filters EGO-FLT1A/1D (1B/1E)

NOTE

Lube Oil Duplex Filters EGO-FLT1A/1D (FLT1B/1E) should be swapped ONLY with the engine running. The diesel may be loaded or unloaded.

5.12.1. Verify EGO-V3008A(B), EGO-FLT 1A/1D(1B/1E) CROSSTIE EQUALIZE VALVE is open.

5.12.2. Verify Filter to be placed in service is pressurized by indication on EGO-PI33A(C)(E)(G).

NOTE

EGO-V1A(B), LUBE OIL FILTER 1A(B) AND 1D(E) INLET SELECTOR and EGO-V2A(B), LUBE OIL FILTER 1A(B) AND 1D(E) OUTLET SELECTOR valves share a common handwheel. Both valves will reposition when turned.

5.12.3. Rotate valve operator for EGO-V1A(B) LUBE OIL FILTER 1A(B) AND 1D(E) INLET SELECTOR and EGO-V2A(B) LUBE OIL FILTER 1A(B) AND 1D(E) OUTLET SELECTOR valves until the clean filter is in service as indicated by alignment pointer.

5.12.4. Verify that lube oil pressure and filter differential pressure is normal.

5.12.5. Initiate Work Request to have dirty filter cleaned.

5.13 Swapping Lube Oil Duplex Strainers

CAUTION

When the diesel engine is running, manipulating strainer valves too quickly may cause a pressure perturbation and subsequent diesel engine trip. Do not manipulate strainer valves too quickly. Reference 7.40

NOTE

The mid-position of the duplex strainer is lined up to both sides of the strainer. Slow operation through the mid-position will ensure proper fill and uninterrupted flow.

5.13.1. Individual manipulation of the following strainer selector valves should be performed over a period of at least 30 seconds each:

1. Position EGO-V3A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) INLET STRAINER (SELECTOR) from the In-Service Strainer to the MID-POSITION.

2. Wait 1 to 2 minutes to allow strainer to fill with oil.

3. Position EGO-V4A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) OUTLET STRAINER (SELECTOR) from the In-Service strainer to the MID-POSITION.

NOTE

Step 5.13.1.4 will cause Annunciator EGS-PNL3A(B)-(A-2) LUBE OIL STRAINER ΔP HIGH to alarm and approximately a 10 psig decrease in lube oil and turbo charger oil pressure. The pressure should recover after Step 5.13.1.5 has been completed.

NOTE

Steps 5.13.1.4 and 5.13.1.5 should be performed in rapid succession. They can also be performed simultaneously.

4. Position EGO-V3A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) INLET STRAINER (SELECTOR) from the MID-POSITION to the Clean Strainer.

5. Position EGO-V4A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) OUTLET STRAINER (SELECTOR) from the MID-POSITION to the Clean Strainer.

5.14 Restoration of the Standby Diesel from a Tripped Condition

5.14.1. Restoration from Overspeed Trip

1. Verify Maintenance and Engineering Departments have completed any required visual inspections.

2. Verify the diesel is in MAINTENANCE Mode.

3. At EGS-PNL2A(B), EGS-EG1A(B) PROTECTION, verify the following:

   1) Reset the GEN DIFF TRIP PRIMARY PROTECTION 87G Relay.

   2) Reset the PRIMARY TRIP CUTOFF and the BACK-UP TRIP CUTOFF switches. Verify the white lights above both switches are ON.

4. Reset the diesel engine overspeed device by pressing the levers down and verify they latch. (The levers are located on the Engine Driven Fuel Oil Booster Pump.)

5. At Panel EGS-PNL3A(B), ENGINE CONTROL PANEL verify all associated annunciators have reset.

5.14.2. Restoration from loss of Control Air

1. Verify proper air receiver pressure, as indicated on EGA-PIY26A(B), FWD START AIR PRESS and EGA-PIX26A(B), REAR START AIR PRESS.

2. On Panel H13-P877, depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton, and the STBY DIESEL ENGINE A(B) STOP RESET pushbutton.

3. At EGS-PNL3A(B), ENGINE CONTROL PANEL, depress the STOP RESET pushbutton.

4. Simultaneously depress the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and place the STBY DIESEL ENGINE A(B) MODE switch to OPER on H13-P877.

5. Verify the UNIT TRIPPED light on EGS-PNL3A(B) and the STBY DIESEL GENERATOR A(B) TRIPPED light on H13-P877 are OFF.

6. At EGS-PNL3A(B), verify the following lights are ON:

   1) UNIT AVAIL EMERGENCY STATUS - White

   2) AC CONTROL POWER ON - White

   3) DC CONTROL POWER ON – White

   4) FORWARD START DC POWER – White

   5) REAR START DC POWER - White

7. At H13-P877, verify the STBY DIESEL GENERATOR A(B) AVAILABLE light is ON.

8. At Panel EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB. verify the FIELD FLASHING RELAY READY white light is on.

9. <u>IF</u> the FIELD FLASHING RELAY READY light is <u>not</u> on, <u>THEN</u> manually reset K1 relay EGE-CAB01A(B).

10. On the corner of the auxiliary skid near the Jacket Water Standpipe, verify the EGS-STOP/RUN VALVE is in the PULL-TO-RUN position.

11. At H13-P877, verify the following alarms and status lights are reset:

    1) DIESEL GENERATOR EGS-EG1A(B) SYSTEM TROUBLE (E-1)

    2) DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE (E-2)

    3) MAINT MODE LO SOL ENERGIZED (Status light)

    4) TRIP UNIT IN CAL OR GR FAIL (Status light)

12. At Panel EGS-PNL3A(B), verify all annunciators required for diesel operation are reset.

NOTE

If the diesel has already tripped/stopped due to an overheat trip, initiation of a LOCA signal will not bypass the overheating trips unless the trip has cleared or been manually bypassed, and the STOP RESET depressed.

5.14.3. Restoration from a High Temperature Trip

1. Verify the one of the following:

    - The initiating fault or high temperature condition clears (temperature below setpoint)

    - At EGS-PNL3A(B), HIGH TEMPERATURE TRIP BYPASS switch in BYPASS

NOTE

If a LOCA OR LOP start signal is present, the Diesel Generator will restart when STOP RESET is actuated.

If a LOCA signal is still present after the STOP RESET is actuated, the high temperature trips will be bypassed.

2. Perform one of the following:

    - At H13-P877, depress STBY DIESEL ENGINE A(B) STOP RESET pushbutton.

    - At EGS-PNL3A(B), depress the STOP RESET pushbutton.

NOTE

If makeup water addition is required when the MWS system is unavailable due to loss of offsite power or other abnormal event, then OSP-0066 Section for Emergency Makeup Water Addition to Emergency Diesel Generation Jacket Water in the Miscellaneous Strategies Attachment could be used for Jacket Water makeup.

5.15 Makeup Water Addition to Standby Diesel Jacket Water

5.15.1. Commence water addition by throttling open the following valves:

- MWS-V376(V377), JACKET WATER STANDPIPE FILL ISOLATION VALVE
- MWS-V416(V415), DEMIN WATER TO DG EGS-EG1A(1B) ISOLATION VAVLE as needed.

5.15.2. WHEN the desired level is reached, THEN close the following valves:

- MWS-V376(V377), JACKET WATER STANDPIPE FILL ISOLATION VALVE
- MWS-V416(V415), DEMIN WATER TO DG EGS-EG1A(1B) ISOLATION VAVLE

5.15.3. Notify Chemistry of jacket water addition.

5.15.4. Log in the Main Control Room log the amount of level change in the Jacket Water Standpipe.

5.16 Operation of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) as the only power supply to the bus

CAUTION
Excessive loading can damage the Diesel Generator. Do not exceed 3130 KW on the Div I(II) DG.

NOTE

Attachment 6, KW vs KVAR (.8PF) is only applicable when the Diesel Generator is running in parallel with the grid. Adjustments to the generator power factor are normally effected by varying generator output voltage.

VOLTAGE REGULATOR CONTROL adjustment with the Diesel Generator the only supply to the bus will vary generator output voltage only.

GOVERNOR CONTROL adjustment with the Diesel Generator the only supply to the bus will vary generator frequency only by changing generator speed (RPM).

5.16.1. IF the diesel generator is the only supply to the bus, THEN perform the following:

1. Adjust volts to maintain voltage 3740 Vac to 4368Vac using the VOLTAGE REGULATOR CONTROL, as indicated on ERIS point EGSEY001(EGSEY002).

2. Adjust the STANDBY DIESEL EG1A(B) speed/frequency, using the GOVERNOR CONTROL to maintain frequency 58.8 Hz to 60.2 Hz.

NOTE

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrumentation calibration.

3. Maintain generator load, as indicated on W-1EGSA(B)07, less than 3130 KW as indicated on ERIS point EGSEY007(005).

NOTE

Short duration runs and light load (less than 40%, or 1200 kW) operation should be avoided. After a period of light load or no-load run, the diesel should be loaded to greater than or equal 2700 kW in accordance with Precautions and Limitations 2.19.

5.16.2. IF the Diesel Generator Engine was run at less than 1200 kW for greater than 30 minutes, THEN load the Diesel Generator to greater than or equal to 2700 kW per Section 5.1 or 5.2 AND operate under load for at least the applicable time in accordance with Precautions and Limitations 2.19.

5.17 Manual Air Compressor Operation

NOTE

This section is normally used to raise air receiver pressure in preparation for component tagouts.

5.17.1. Verify proper oil level in the air compressor(s) to be started.

5.17.2. Start the desired air compressor(s) by placing the associated Control Switch to RUN:

- EGA-C4A, REAR START AIR COMPRESSOR
- EGA-C4B, REAR START AIR COMPRESSOR
- EGA-C5A, FORWARD START AIR COMPRESSOR
- EGA-C5B, FORWARD START AIR COMPRESSOR

5.17.3. WHEN the desired pressure is reached in the air receiver(s) as indicated on EGA-PIY26A(B), FWD START AIR PRESS and/or EGA-PIX26A(B), REAR START AIR PRESS, THEN stop the air compressor(s) started in Step 5.17.2 by placing the associated Control Switch to OFF.

5.17.4. WHEN desired to return to automatic air compressor operation, THEN verify the following Control Switches are in AUTO:

- EGA-C4A, REAR START AIR COMPRESSOR
- EGA-C4B, REAR START AIR COMPRESSOR
- EGA-C5A, FORWARD START AIR COMPRESSOR
- EGA-C5B, FORWARD START AIR COMPRESSOR

5.18 Draining Division I(II) Jacket Water Standpipe for Level Control

5.18.1. Obtain OSM/CRS permission to drain Jacket Water Standpipe.

5.18.2. Station a dedicated operator to close EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE if Division I(II) EDG auto-starts.

5.18.3. Attach a hose to drain pipe downstream of EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE and route to floor drain.

5.18.4. Throttle open EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE slowly and monitor level change on EGT-LI24A(B) JACKET WATER STANDPIPE LEVEL.

5.18.5. When desired level is reached in the JACKET WATER STANDPIPE as indicated on EGT-LI24A(B) JACKET WATER STANDPIPE LEVEL, close EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE.

5.18.6. Secure dedicated operator.

5.18.7. Remove hose from drain pipe.

5.18.8. Notify Chemistry of approximate amount of water drained.

5.18.9. Have EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE independently verified closed.

5.18.10. Log amount drained/final level in Main Control Room Log.

6 SYSTEM SHUTDOWN

6.1 Shutdown of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) from the Control Room

NOTES

When reducing load, lead VARS and follow with load.

The following table is provided as a recommendation for unloading limitation. KW and KVAR values listed are approximate values only.

LOADING		TIME
≤ 1200 KVAR		
3100 KW to 2000 KW	*in*	*60 to 90 Seconds*
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds*
≤ 600 KVAR		
Then 2000 KW to 1000 KW	*in*	*60 to 90 Seconds*
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
0 KVAR		
Then 1000 KW to 200 KW	*in*	*60 to 90 Seconds*

6.1.1. Reduce load with the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL to approximately 175 Kw, and reactive load to no less than 0 KVAR using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT. Allow diesel cylinder temperatures to stabilize.

NOTE

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.*

6.1.2. Trip ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR.

6.1.3. Adjust the EGS-EG1A(B), STBY DIESEL GENERATOR A(B), frequency to 59.7 Hz on F-1EGSA(B)07, STBY D/G A(B) FREQUENCY using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL. (Ref. 7.19)

6.1.4. Depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton on H13-P877.

NOTE

The Turbocharger Prelube Valve EGO-V3006A(B) should be opened immediately (within one minute) after depressing the STOP pushbuttons.

6.1.5. Allow the diesel to run unloaded for approximately 2 minutes, then depress both STBY DIESEL ENGINE A(B) STOP pushbuttons simultaneously.

6.1.6. Immediately open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF valve.

6.1.7. WHEN the engine has stopped, THEN depress STBY DIESEL ENGINE A(B) STOP RESET pushbutton.

6.1.8. At EGS-PNL3A(B), depress the STOP pushbutton for HVP-FN2A(B), STBY VENT FAN.

6.1.9. WHEN the Turbocharger has coasted to a stop, THEN close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

6.1.10. IF only the forward starting air supply was used during diesel startup, THEN restore the rear starting air system as follows:

- For Div I DG, open and lock EGA-V150, ENGINE REAR AIR START SUPPLY.
- For Div II DG, open and lock EGA-V154, ENGINE REAR AIR START SUPPLY.

6.1.11. IF only the rear starting air supply was used during diesel startup, THEN restore the forward starting air system as follows:

- For Div I DG, open and lock EGA-V149, ENGINE FWD AIR START SUPPLY
- For Div II DG, open and lock EGA-V153, FWD AIR START SUPPLY VALVE

6.1.12. WHEN at least 10 minutes have elapsed after Diesel Engine shutdown, THEN verify lube oil sump level is greater than the T7 mark indicated on the sump dipstick.

CAUTION

Diesel fuel oil is a flammable liquid. Promptly wipe up any spilled oil and dispose of the rags properly.

Avoid coming in contact with fuel oil. Diesel fuel oil is a skin irritant.

NOTE

Water accumulation check of both storage and day tank shall be performed after each operation of the diesel when the period of operation is one hour or longer.

6.1.13. Check for water accumulation in the day tank and storage tank by performing the following:

1. Place a clear container under the Division I(II) Diesel Fuel Oil Day Tank drain connection. Uncap, unlock, and slowly open EGF-V11(V41), DAY TANK TK2A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V11(V41).

2. Place a clear container under the Division I(II) Diesel Fuel Oil Storage Tank drain connection. Uncap, unlock, and slowly open EGF-V25(V55), DIESEL FUEL OIL STORAGE TANK TK1A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V25(V55).

6.1.14. Return the Standby Service Water System to standby per SOP-0042, Standby Service Water System.

6.1.15. Return Diesel Generator Building HVAC to normal operation per SOP-0061, Diesel Generator Building Ventilation.

6.1.16. Verify EGS-EG1A(B), STBY DIESEL GENERATOR A(B) is in STANDBY per Attachment 4a(Attachment 4b) of this procedure.

NOTE

In the event the engine is removed from service for any reason other than the rolling over procedure prior to expiration of the 12-hr period, that engine need not be rolled over while it is out of service. The engine shall then be rolled with air once, when it is returned to service.

6.2 Shutdown of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) from the Local Control Panel

NOTES

When reducing load, lead VARS and follow with load.

The following table is provided as a recommendation for unloading limitation. KW and KVAR values listed are approximate values only.

LOADING		TIME
≤ 1200 KVAR		
3100 KW to 2000 KW	*in*	*60 to 90 Seconds*
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds*
≤ 600 KVAR		
Then 2000 KW to 1000 KW	*in*	*60 to 90 Seconds*
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
0 KVAR		
Then 1000 KW to 200 KW	*in*	*60 to 90 Seconds*

6.2.1. Reduce load with the GOVERNOR CONTROL to approximately 175 KW, and reactive load to 0 KVAR using the VOLTAGE REGULATOR CONTROL. Allow diesel cylinder temperatures to stabilize.

NOTE

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) is manipulated.*

6.2.2. Trip ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B).

6.2.3. Adjust the EGS-EG1A(B), STBY DIESEL GENERATOR A(B), frequency to 59.7 Hz using the GOVERNOR CONTROL.

6.2.4. Depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton on H13-P877.

NOTE

The Turbocharger Prelube Valve EGO-V3006A(B) should be opened immediately (within one minute) after depressing the STOP pushbuttons.

6.2.5. Allow the diesel to run unloaded for approximately 2 minutes, then depress both STOP pushbuttons simultaneously.

6.2.6. Immediately open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

6.2.7. <u>WHEN</u> the engine has stopped, <u>THEN</u> depress the STOP RESET pushbutton on EGS-PNL3A(B), ENGINE CONTROL PANEL.

6.2.8. At EGS-PNL3A(B), depress the STOP pushbutton for HVP-FN2A(B), STBY VENT FAN.

6.2.9. <u>WHEN</u> the Turbocharger has coasted to a stop, <u>THEN</u> close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

6.2.10. <u>IF</u> only the forward starting air supply was used during diesel startup, <u>THEN</u> restore the rear starting air system as follows:

- For Div I DG, open and lock EGA-V150, ENGINE REAR AIR START SUPPLY.
- For Div II DG, open and lock EGA-V154, ENGINE REAR AIR START SUPPLY.

6.2.11. <u>IF</u> only the rear starting air supply was used during diesel startup, <u>THEN</u> restore the forward starting air system as follows:

- For Div I DG, open and lock EGA-V149, ENGINE FWD AIR START SUPPLY
- For Div II DG, open and lock EGA-V153, FWD AIR START SUPPLY VALVE

6.2.12. <u>WHEN</u> at least 10 minutes have elapsed after Diesel Engine shutdown, <u>THEN</u> verify lube oil sump level is greater than the T7 mark indicated on the sump dipstick.

CAUTION
Diesel fuel oil is a flammable liquid. Promptly wipe up any spilled oil and dispose of the rags properly.
Avoid coming in contact with fuel oil. Diesel fuel oil is a skin irritant.

NOTE

Water accumulation check of both storage and day tank shall be performed after each operation of the diesel when the period of operation is one hour or longer.

6.2.13. Check for water accumulation in the day tank and storage tank by performing the following:

1. Place a clear container under the Division I(II) Diesel Fuel Oil Day Tank drain connection. Uncap, unlock, and slowly open EGF-V11(V41), DAY TANK TK2A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V11(V41).

2. Place a clear container under the Division I(II) Diesel Fuel Oil Storage Tank drain connection. Uncap, unlock, and slowly open EGF-V25(V55), DIESEL FUEL OIL STORAGE TANK TK1A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V25(V55).

6.2.14. Return the Standby Service Water to standby per SOP-0042, Standby Service Water System.

6.2.15. Return Diesel Generator Building HVAC to normal operation per SOP-0061, Diesel Generator Building Ventilation.

6.2.16. Verify EGS-EG1A(B), STBY DIESEL GENERATOR A(B) is in STANDBY per Attachment 4a(Attachment 4b) of this procedure.

NOTE

In the event the engine is removed from service for any reason other than the rolling over procedure prior to expiration of the 12-hr period, that engine need not *be rolled over while it is out of service. The engine shall then be rolled with air once, when it is returned to service.*

6.3 Emergency Shutdown of the Diesel - Loss of Control Air

6.3.1. Do not attempt to restore the air system if complete loss of control air has occurred until the diesel generator has been shutdown.

6.3.2. IF the diesel is running AND loaded, THEN perform the following steps:

1. Attempt to reduce load using the GOVERNOR CONTROL.
2. IF not successful, THEN reduce load by lowering the Load Setting Control on the engine governor towards the MIN FUEL setting.
3. If necessary, load may be reduced by pushing the Fuel rack lever towards the engine.
4. WHEN load has been reduced to approximately 175 KW, THEN trip EGS-EG1A(B) GENERATOR TO ENS-SWG1A(B) STBY BUS.
5. If possible, adjust EGS-EG1A(B) STBY DIESEL GENERATOR A(B) frequency to 59.7 Hz, using the GOVERNOR CONTROL.

6.3.3. With the diesel generator unloaded, simultaneously depress both EXCITATION SHUTDOWN pushbuttons on EGS-PNL1A(B).

6.3.4. Adjust the Load Setting Control on the engine governor to the MIN FUEL position.

6.3.5. If necessary, manually force the Fuel rack lever towards the engine to shutdown the diesel.

6.3.6. WHEN control air is restored, THEN return the diesel to STANDBY per Section 4.1 of this procedure.

6.3.7. IF frequency (unloaded) was not adjusted to 59.7 Hz prior to engine shutdown, THEN start the Diesel per Section 4.6, and then secure the diesel per Section 6.2. Loading the diesel is not required. This step resets the governor.

NOTE

In the event the engine is removed from service for any reason other than the rolling over procedure prior to expiration of the 12-hr period, that engine need not be rolled over while it is out of service. The engine shall then be rolled with air once, when it is returned to service.

6.4 Emergency Shutdown of the Diesel - Loss of DC Control Power

6.4.1. Attempt to restore DC control power if possible.

6.4.2. IF not able to restore DC power AND the diesel generator is loaded, THEN manually trip the EGS-EG1A(B) GEN TO ENS-SWG1A(B) STBY BUS breaker locally at the breaker.

6.4.3. Inside the front of EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB., de-excite the generator by depressing the tabs in on relay EGS-A(B)12K1 until they latch.

6.4.4. On diesel generator skid, stop the diesel by depressing the EGS-STOP/RUN VALVE pneumatic pushbutton.

6.4.5. WHEN DC control power is restored, THEN return the diesel to STANDBY per Section 4.1 of this procedure.

6.4.6. Start the diesel per Section 4.6, then secure the diesel per Section 6.2. Loading the diesel is not required. This step resets the governor.

6.5 Shutdown and Resetting of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) with LOCA/LOP Signal Present

6.5.1. Shutting Down the Diesel Generator

1. Secure as many loads as possible from ENS-SWG1A(B), STANDBY BUS.

NOTE

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.*

2. Depending on the desired location shut down the diesel by simultaneously depressing and holding one of the following sets of pushbuttons until the white UNIT AVAIL EMERGENCY STATUS and STBY DIESEL GENERATOR A(B) AVAILABLE lights go out:

   - At EGS-PNL3A(B), both STOP pushbuttons

     OR

   - At H13-P877, both STBY DIESEL ENGINE A(B) STOP pushbuttons

3. Verify ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR trips.

4. Verify EGS-EG1A(B), STBY DIESEL GENERATOR A(B) trips.

NOTE

The following section must be performed to prevent auto restart of the diesel generator from an unreset LOP signal upon returning the Diesel Generator to OPERATIONAL.

6.5.2. Resetting the LOP/LOCA start signals and returning the diesel generator to Standby following the shutdown per Section 6.5.1.

NOTE

Forward Start DC power and Control Air must be available.

1. Verify the LOP/LOCA signals are clear.

2. Unlock and close the following valves:

   - EGA-V161A(B), FORWARD AIR START BLOCK VALVE

   - EGA-V162A(B), REAR AIR START BLOCK VALVE

3. At EGS-PNL3A(B), ENGINE CONTROL PANEL open the following breakers in the following sequence:

    - First CB-1 CB-2, and then CB-3 CB-4.

4. Completely depressurize EGS-PNL3A(B) Control Air using one of the following methods:

    - Crack open the test fitting adjacent to EGA-PI27A(B), see Attachment 9, Fitting Location For Section 6.5.2.

    - Just inside EGS-PNL3A(B) on the right side, thigh level, crack open the black handled 3/8” service air bleed valve.

5. WHEN control air has been depressurized, THEN replace/tighten the fitting or close the 3/8” service air bleed valve.

6. At EGS-PNL3A(B), close the following breakers in the following sequence:

    - First CB-3 CB-4, and then CB-1 CB-2.

7. Verify the following lights are on:

    - FORWARD START DC POWER – White

    - REAR START DC POWER - White

8. At H13-P877, depress STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton.

9. At EGS-PNL3A(B) north side enclosure, verify relay R3A is reset, red indicator is flush with relay case.

10. At EGS-PNL3A(B) south side enclosure, verify relay R3B is reset, red indicator is flush with relay case.

11. Slowly open and lock open the following valves:

    - EGA V161A(B), FORWARD AIR START BLOCK VALVE

    - EGA-V162A(B), REAR AIR START BLOCK VALVE

12. WHEN Control air is restored, THEN using Snoop, check the fitting for air leaks.

13. Return the diesel to standby per Section 4.1 of this procedure.

7 REFERENCES

7.1 PIDs 8-9A through 8-9D

7.2 ESKs:

7.2.1. 6EGA01 through 04

7.2.2. 7EGA01 and 02

7.2.3. 11EGA01 and 06

7.2.4. 6EGF01 through 03

7.2.5. 7EGF01

7.2.6. 11EGF01 through 04

7.2.7. 6EGO01 and 02

7.2.8. 7EGO02

7.2.9. 6EGS01

7.2.10. 8EGS01 through 16

7.2.11. 7EGS03 and 04

7.2.12. 11EGS02, 03, 06, and 07

7.2.13. 6EGT01 and 02

7.2.14. 8SYD01

7.3 Delaval Drawing 09-694-74039, #0244.700-041-077.

7.4 Delaval Drawing 09-500-74039:

7.4.1. Sheet 1, #0244.700-041-081

7.4.2. Sheet 2, #0244.700-041-082

7.4.3. Sheet 3, #0244.700-041-083

7.4.4. Sheet 4, #0244.700-041-084

7.4.5. Sheet 5, #0244.700-041-085

7.4.6. Sheet 6, #0244.700-041-086

7.4.7. Sheet 7, #0244.700-041-087

7.4.8. Sheet 8, #0244.700-041-088

7.4.9. Sheet 9, #0244.700-041-089

7.5 Control System Descriptions:

7.5.1. 8-9.1

7.5.2. 8-9.2

7.5.3. 12-4

7.5.4. 24-9.3

7.5.5. 24-9.4

7.5.6. 24-9.5

7.5.7. 24-9.6

7.6 Transamerica Delaval, Inc. Instruction Manual, #3244.700-041-002

7.7 Transamerica Delaval Jacket Water Piping Schematic 09-810-74039, #0244.700-041-010

7.8 Transamerica Delaval Lube Oil Piping Schematic 09-820-74039, #0244.700-041-007

7.9 File 244.700.9, NDC File 244.700, Ray to Deddens, TDI Owners Group Recommendation for Detection of Cylinder Head Leakage

7.10 PEP-0026, Diesel Generator Operating Logs

7.11 IEIN 84-69, Supp. 1

7.12 Commitment No. 15500

7.13 Condition Report 90-0353 (NRC INFO NOTICE 89-87)

7.14 Federal NPDES Discharge Permit #LA 0042731.

7.15 CR 90-0555

7.16 Commitment No. 12824

7.17 Commitment No. 12937

7.18 Commitment No. 12938

7.19 Commitment No. 15557

7.20 Commitment No. 13361

7.21 Commitment No. 06254

7.22 Commitment No. 12866

7.23 Commitment No. 06253

7.24 CR 92-0066

7.25 CR 91-0546

7.26 MR 91-0023

7.27 MR 89-0237

7.28 MR 90-0112

7.29 CR 92-0833

7.30 MM 94-0061

7.31 MR 90-0061

7.32 MM 94-0154

7.33 CR 97-1178

7.34 CR 96-1644

7.35 ER 98-0585

7.36 CR 97-1051

7.37 CR2004-003499

7.38 ER-RB-2000-0081 (Governor replacement)

7.39 CR-RBS-2006-03776

7.40 CR-RBS-2007-2594

7.41 SOER 03-1 Recommendation 2 Emergency Power Reliability

7.42 CR-RBS-2010-00910 / EC 21835

7.43 CR-RBS-2011-06800 / ECs 24645 and 24245

8 RECORDS

8.1 Record disposition shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V112	AIR RECEIVER TK2A DRAIN	CLOSED			
EGA-V113	AIR RECEIVER TK2A PI18A ISOL	OPEN			
EGA-V120	AIR RECEIVER TK2C DRAIN	CLOSED			
EGA-V119	AIR RECEIVER TK2C PI18C ISOL	OPEN			
EGA-V121	FORWARD SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V149	ENGINE FWD AIR START SUPPLY	LOCKED OPEN			
EGA-V101	AIR RECEIVER TK1A DRAIN	CLOSED			
EGA-V105	AIR RECEIVER TK1A PI17A ISOL	OPEN			
EGA-V103	AIR RECEIVER TK1C DRAIN	CLOSED			
EGA-V107	AIR RECEIVER TK1C PI17C ISOL	OPEN			
EGA-V110	REAR SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V150	ENGINE REAR AIR START SUPPLY	LOCKED OPEN			
EGA-V161A	FORWARD AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGA-V162A	REAR AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGT-V1A	JACKET WATER STANDPIPE DRAIN VALVE	CLOSED			
MWS-V376	JACKET WATER STANDPIPE FILL ISOLATION VALVE	CLOSED			
EGF-V24	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN	LOCKED CLOSED			
EGF-V14	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER PDI-20A ISOL	OPEN			
EGF-V15	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER PDI-20A ISOL	OPEN			
EGF-V1	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	2ND	VALVE LABELED
EGF-V2	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			
EGF-V25	DIESEL FUEL OIL STORAGE TANK TK1A DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V16	FUEL OIL TRANSFER PUMP P1A DISCH PRESSURE PI-22A ISOL	OPEN			
EGF-V122	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2A ISOL	*OPEN/ CLOSED			
EGF-V124	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2A ISOL	*OPEN/ CLOSED			
* LOCKED OPEN IF DIV I STR 2A IN SERVICE					
EGF-V123	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2D ISOL	**OPEN/ CLOSED			
EGF-V121	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2D ISOL	**OPEN/ CLOSED			
**LOCKED OPEN IF DIV I STR 2D IN SERVICE					
EGF-V12	STRAINER STR2D DRAIN	CLOSED/ CAPPED			
EGF-V21	STRAINER STR2D VENT	CLOSED/ CAPPED			
EGF-V20	STRAINER STR2A VENT	CLOSED/ CAPPED			
EGF-V26	STRAINER STR2A DRAIN	CLOSED/ CAPPED			
EGF-V17	STRAINER STR2A/D DIFF PRESS PDIS-21A ISOL	OPEN			
EGF-V18	STRAINER STR2A/D DIFF PRESS PDIS-21A ISOL	OPEN			
EGF-V7	FUEL OIL TRANSFER PUMP P1A DISCH CONN	CLOSED/ CAPPED			
EGF-V5	FUEL OIL TRANSFER PUMP P1A MAN DISCH ISOL	LOCKED OPEN			
EGF-V11	DAY TANK TK2A DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V104	DAY TANK TK2A DRAIN TO STORAGE TANK	LOCKED CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	2ND	VALVE LABELED
EGF-V105	ENGINE FUEL OIL RETURN TO DAY TANK PCV-25A MAN ISOL	LOCKED OPEN			
EGF-V106	ENGINE FUEL OIL RETURN TO DAY TANK PCV-25A MAN ISOL	LOCKED OPEN			
EGF-V201	ENGINE RETURN TO DAY TANK LINE DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V3000	FUEL OIL DAY TANK RETURN PCV25A BYPASS	CLOSED			
EGF-V3001	FUEL OIL DAY TANK RETURN PCV25A BYPASS LINE VENT	CLOSED/ CAPPED			
EGF-V3002	FUEL OIL DAY TANK RETURN LINE DR.	CLOSED/ CAPPED			
EGF-V27	DAY TANK SUPPLY TO ENGINE	LOCKED OPEN			
EGF-V97	FUEL OIL WASTE TANK TK3A DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V23	DAY TANK LT16A ROOT VALVE	OPEN			
EGF-V153A	INSTRUMENT ROOT VALVE FOR EGF-PDI29A LOW SIDE	OPEN			
EGF-V154A	INSTRUMENT ROOT VALVE FOR EGF-PDI29A HIGH SIDE	OPEN			
EGF-V152A	INSTRUMENT ROOT VALVE FOR EGF-PI27A	OPEN			
EGO-V1A	LUBE OIL FILTER 1A AND 1D INLET SELECTOR	1A(D) FILTER SELECTED			
EGF-V205	EGF-TK1A SAMPLE ISOLATION	CLOSED/ COVER INSTALLED			
EGO-V2A	LUBE OIL FILTER 1A AND 1D OUTLET SELECTOR	1A(D) FILTER SELECTED			
EGO-V3A	LUBE OIL STRAINER 1A AND 1D INLET STRAINER	1A(D) STRAINER SELECTED			
EGO-V4A	LUBE OIL STRAINER 1A AND 1D OUTLET STRAINER	1A(D) STRAINER SELECTED			
DTM-V65	LUBE OIL SUMP DR VALVE	LOCKED CLOSED/ CAPPED			
EGA-V3134	EGA-C5A LUBE OIL DRAIN VALVE	CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	2ND	VALVE LABELED
EGA-V3132	EGA-C5A OUTLET DRAIN VALVE	CLOSED			
EGA-V3126	EGA-FLT12A INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3159	EGA-FLT12A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3157	EGA-FLT12A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3127	EGA-FLT14A INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3125	EGA-C4A LUBE OIL DRAIN VALVE	CLOSED			
EGA-V3123	EGA-C4A OUTLET DRAIN VALVE	CLOSED			
EGA-V3117	EGA-FLT11A INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3118	EGA-FLT13A INLET PRESS TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3153	EGA-FLT11A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3155	EGA-FLT11A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3154	EGA-FLT13A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3158	EGA-FLT14A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3156	EGA-FLT13A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3160	EGA-FLT14A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3119	EGA-DRY4A INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3128	EGA-DRY5A INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3120	EGA-DRY4A OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3129	EGA-DRY5A OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3122	REAR AIR START SUPPLY ISOLATION VALVE	OPEN			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V3130	FORWARD AIR START SUPPLY ISOLATION VALVE	OPEN			
EGA-V3121	REAR AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3133	FORWARD AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3124	REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE	CLOSED			
EGA-V3169	FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE	CLOSED			
EGA-V3131	DIV I HOSE CONNECTION ISOLATION VALVE	CLOSED/ CAPPED			
EGA-V3171	EGA-TRP14A ISOLATION FOR EGA-SOV82A	OPEN			
EGA-V3172	EGA-TRP15A ISOLATION FOR EGA-SOV83A	OPEN			
EGT-TCV20A	JACKET WATER COOLER BYPASS TEMPERATURE CONTROL VALVE	THROTTLED			
DTM-V63	CRANKCASE OIL DRAIN TO MAIN RESERVOIR DRAIN VLV.	CLOSED/ CAPPED			
DTM-V68	LUBE OIL COOLER SHELL SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3007	EGO-FLT1A SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3008	EGO-FLT1D SIDE DRAIN VALVE	CLOSED/ CAPPED			
EGO-V3008A	EGO-FLT1A/1D CROSSTIE/EQUALIZER VALVE	OPEN			
DTM-V3019	EGO-STR1A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3020	EGO-STR1D DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3017	EGO-FLT2A SIDE VENT/DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3015	EGO-FLT2A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3023	EGO-STR2A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3025	JACKET WTR STANDPIPE SAMPLE/CHEM CONN. VLV.	OPEN			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
DTM-V3031	EGT-LI24A DRAIN VALVE AND JACKET WTR STANDPIPE SAMPLE VALVE	CLOSED/ CAPPED			
EGT-V3005	EGT-E1A JACKET WATER DRAIN VLV	CLOSED/ CAPPED			
EGT-V3007	EGT-E1A JACKET WATER VENT VLV	CLOSED/ CAPPED			
DTM-V3011	EGO-FLT1A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3012	EGO-FLT1D DRAIN VALVE	CLOSED/ CAPPED			
EGO-V3006A	TURBO MANUAL PRELUBE SHUTOFF	CLOSED			
EGO-V3007A	TURBO DRIP PRELUBE THROTTLE VALVE	THROTTLED			

VALUE LINEUP - STANDBY DIESEL GENERATOR EG1A

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VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V134	AIR RECEIVER TK2B DRAIN	CLOSED			
EGA-V135	AIR RECEIVER TK2B PI18B ISOL	OPEN			
EGA-V142	AIR RECEIVER TK2D DRAIN	CLOSED			
EGA-V156	AIR RECEIVER TK2D PS32B ISOL	OPEN			
EGA-V143	FORWARD SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V123	AIR RECEIVER TK1B DRAIN	CLOSED			
EGA-V124	AIR RECEIVER TK1B PI17B ISOL	OPEN			
EGA-V131	AIR RECEIVER TK1D DRAIN	CLOSED			
EGA-V130	AIR RECEIVER TK1D PI17D ISOL	OPEN			
EGA-V132	REAR SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V154	ENGINE REAR AIR START SUPPLY	LOCKED OPEN			
EGA-V161B	FORWARD AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGA-V162B	REAR AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGT-V1B	JACKET WATER STANDPIPE DRAIN VALVE	CLOSED			
MWS-V377	JACKET WATER STANDPIPE FILL ISOL	CLOSED			
EGA-V153	FWD AIR START SUPPLY VALVE	LOCKED OPEN			
EGF-V54	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN	LOCKED CLOSED			
EGF-V44	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER PDI-20B ISOL	OPEN			
EGF-V45	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER PDI-20B ISOL	OPEN			
EGF-V31	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V32	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			
EGF-V55	DIESEL FUEL OIL STORAGE TANK TK1B DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V46	FUEL OIL TRANSFER PUMP P1B DISCH PRESSURE PI-22B ISOL	OPEN			
EGF-V126	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2B ISOL	*OPEN/ CLOSED			
EGF-V128	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2B ISOL	*OPEN/ CLOSED			
* LOCKED OPEN IF DIV II STR 2B IN SERVICE					
EGF-V125	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2E ISOL	**OPEN/ CLOSED			
EGF-V127	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2E ISOL	**OPEN/ CLOSED			
** LOCKED OPEN IF DIV II STR 2E IN SERVICE					
EGF-V56	STRAINER STR2B DRAIN	CLOSED/ CAPPED			
EGF-V50	STRAINER STR2B VENT	CLOSED/ CAPPED			
EGF-V42	STRAINER STR2E DRAIN	CLOSED/ CAPPED			
EGF-V51	STRAINER STR2E VENT	CLOSED/ CAPPED			
EGF-V47	STRAINER STR2B/E DIFF PRESS PDIS-21B ISOL	OPEN			
EGF-V48	STRAINER STR2B/E DIFF PRESS PDIS-21B ISOL	OPEN			
EGF-V37	FUEL OIL TRANSFER PUMP P1B DISCH CONN	CLOSED/ CAPPED			
EGF-V35	FUEL OIL TRANSFER PUMP P1B MAN DISCH ISOL	LOCKED OPEN			
EGF-V41	DAY TANK TK2B DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V102	DAY TANK TK2B DRAIN TO STORAGE TANK	LOCKED CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V107	ENGINE OIL RETURN TO DAY TANK PCV-25B MAN ISOL	LOCKED OPEN			
EGF-V108	ENGINE FUEL OIL RETURN TO DAY TANK PCV-25B MAN ISOL	LOCKED OPEN			
EGF-V200	ENGINE RETURN TO DAY TANK LINE DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V3004	FUEL OIL DAY TANK RETURN PCV25B BYPASS	CLOSED			
EGF-V3003	FUEL OIL DAY TANK RETURN PCV25B BYPASS LINE VENT	CLOSED/ CAPPED			
EGF-V3005	FUEL OIL DAY TANK RETURN LINE DRAIN	CLOSED/ CAPPED			
EGF-V57	DAY TANK SUPPLY TO ENGINE	LOCKED OPEN			
EGF-V96	FUEL OIL WASTE TANK TK3B DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V53	DAY TANK LT16B ROOT VALVE	OPEN			
EGF-V152B	INSTRUMENT ROOT VALVE FOR EGF-PI27B	OPEN			
EGF-V153B	INSTRUMENT ROOT VALVE FOR EGF-PDI29B LOW SIDE	OPEN			
EGF-V154B	INSTRUMENT ROOT VALVE FOR EGF-PDI29B HIGH SIDE	OPEN			
EGO-V1B	LUBE OIL FILTER 1B AND 1E INLET SELECTOR	1B (E) FILTER SELECTED			
EGA-V3135	EGA-FLT 11B INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3144	EGA-FLT 12B INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3136	EGA-FLT 13B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3137	EGA-DRY4B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3146	EGA-DRY5B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3145	EGA-FLT 14B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3138	EGA-DRY4B OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V3147	EGA-DRY5B OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3139	REAR AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3151	FORWARD AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3152	EGA-C4B LUBE OIL DRAIN VALVE	CLOSED			
EGA-V3150	EGA-C5B OUTLET DRAIN VALVE	CLOSED			
EGA-V3140	REAR AIR START SUPPLY ISOLATION VALVE	OPEN			
EGA-V3148	FORWARD AIR START SUPPLY ISOLATION VALVE	OPEN			
EGA-V3141	EGA-C4B OUTLET DRAIN VALVE	CLOSED			
EGA-V3143	EGA-C5B LUBE OIL DRAIN VALVE	CLOSED			
EGA-V3142	REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE	CLOSED			
EGA-V3170	FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE	CLOSED			
EGA-V3161	EGA-FLT11B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3162	EGA-FLT13B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3165	EGA-FLT12B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3166	EGA-FLT14B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3173	EGA-TRP15B MANUAL DRAIN ISOLATION VALVE	OPEN			
EGA-V3174	EGA-TRP14B MANUAL DRAIN ISOLATION VALVE	OPEN			
EGA-V3163	EGA-FLT11B MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3167	EGA-FLT12B MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3168	EGA-FLT14B MANUAL DRAIN ISOLATION VALVE	CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V3149	DIV 2 HOSE CONNECTION ISOLATION VALVE	CLOSED/ CAPPED			
EGA-V3164	EGA-FLT13B MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGT-TCV20B	JACKET WATER COOLER BYPASS TEMPERATURE CONTROL VLV	THROTTLED			
DTM-V64	CRANKCASE OIL DRAIN TO MAIN RESERVOIR DRAIN VALVE	CLOSED/ CAPPED			
DTM-V69	MAIN LUBE OIL COOLER SHELL SIDE DRAIN	CLOSED/ CAPPED			
DTM-V3009	EGO-FLT1B SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3010	EGO-FLT1E SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3013	EGO-FLT1B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3014	EGO-FLT1E DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3021	EGO-STR1B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3022	EGO-STR1E DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3018	EGO-FLT2B SIDE DRAIN VLV	CLOSED/ CAPPED			
DTM-V3016	EGO-FLT2B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3024	EGO-STR2B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3026	JACKET WATER STANDPIPE SAMPLE/CHEM CONN	OPEN			
DTM-V3032	EGT-LI24B DRAIN VALVE AND JACKET WTR STANDPIPE SAMPLE VALVE	CLOSED/ CAPPED			
EGO-V3008B	EGO-FLT 1B/1E CROSSTIE/EQUALIZER VLVE	OPEN			
EGT-V3006	EGT-E1B JACKET WATER DRAIN VLV	CLOSED/ CAPPED			
EGT-V3008	EGT-E1B JACKET WATER VENT VLV	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V206	EGF-TK1B SAMPLE ISOLATION	CLOSED/ CAPPED			
EGO-V2B	LUBE OIL FILTER 1B AND 1E OUTLET SELECTOR	1B(E) FILTER SELECTED			
EGO-V3B	LUBE OIL STRAINER 1B AND 1E INLET SELECTOR	1B(E) STRAINER SELECTED			
EGO-V4B	LUBE OIL STRAINER 1B AND 1E OUTLET SELECTOR	1B(E) STRAINER SELECTED			
DTM-V66	LUBE OIL SUMP DRAIN VALVE	LOCKED CLOSED			
EGO-V3006B	TURBO MANUAL PRELUBE SHUTOFF	CLOSED			
EGO-V3007B	TURBO DRIP PRELUBE THROTTLE VALVE	THROTTLED			

VALUE LINEUP - STANDBY DIESEL GENERATOR EG1B

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INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
EGF-LT16A	STBY DSL FUEL TK2A LVL (DE-4-103')			
	EGF-LT16A-V1	OPEN		
	EGF-LT16A-V2	CLOSED		
	EGF-LT16A-V3	CLOSED		
	EGF-LIX16A EGS-PNL3A (DG-4-98')	LIVE ZERO		
EGF-PI22A	FUEL TRANSFER PUMP P1A DISCHARGE PRESSURE (DC-3-103')			
	EGF-PI22A-V1	CLOSED		
	EGF-PI22A-V2	CLOSED		
	EGF-PI22A-V3	CLOSED		
	EGF-PI22A-V4	CLOSED		
EGF-PDIS21A	STBY DSL FO XFER PMP DISCH ST (DC-3-103')			
	EGF-PDIS21A-V1H	OPEN		
	EGF-PDIS21A-V2L	OPEN		
	EGF-PDIS21A-V3B	CLOSED		
	EGF-PDIS21A-V4	CLOSED		
	EGF-PDIS21A-V5	CLOSED		
	EGF-PDIS21A-V6	CLOSED		
	EGF-PDIS21A-V7	CLOSED		
EGF-LT15A	STBY DSL FUEL STOR TK1A LVL (DC-3-103')			
	EGF-LY15A-V1	OPEN		
	EGF-LI15A EGS-PNL3A (DG-4-98')	LIVE ZERO		
EGA-PS19A	AIR RCVR TK1A & TK1C (DC-3-103')			
	EGA-PS19A-V1	OPEN		
	EGA-PS19A-V2	CLOSED		
EGT-LI24A	JACKET WATER STANDPIPE LEVEL			
	EGT-LI24A-V1	OPEN		
	EGT-LI24A-V2	CLOSED/ CAPPED		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
EGF-PDI20A	FUEL TK1A INLET STR (DA-3-102')			
	EGF-PDI20A-V1H	OPEN		
	EGF-PDI20A-V2L	OPEN		
	EGF-PDI20A-V3B	CLOSED		
	EGF-PDI20A-V4	CLOSED		
	EGF-PDI20A-V5	CLOSED		
	EGF-PDI20A-V6	CLOSED		
	EGF-PDI20A-V7	CLOSED		
EGO-PI10A	EGS-PNL3A TURBO OIL PRESS (DG-4-98')			
	EGO-PI10A-V1	OPEN		
EGO-PI5A	EGS-PNL3A LUBE OIL PRESS (DG-4-98')			
	EGO-PI5A-V1	OPEN		
EGO-PDI7A	EGS-PNL3A LUBE OIL FILTER DIFF PRESS (DG-4-98')			
	EGO-PDI7A-V1H	OPEN		
	EGO-PDI7A-V2L	OPEN		
EGT-PI4A	JACKET WATER PRESS EGS-PNL3A (DG-4-98')			
	EGT-PI4A-V1	OPEN		
EGA-PS32A	AIR RCVR TK 2A & 2C (DE-4-103')			
	EGA-PS32A-V1	OPEN		
	EGA-PS32A-V2	CLOSED		
EGA-PS31A	AIR RCVR TK 1A & 1C (DE-3-103')			
	EGA-PS31A-V1	OPEN		
	EGA-PS31A-V2	CLOSED		
EGA-PS20A	AIR RCVR TK 2A & 2C (DE-3-103')			
	EGA-PS20A-V1	OPEN		
	EGA-PS20A-V2	CLOSED		
EGA-PIY26A	EGS-PNL3A FWD START AIR PRESS (DG-4-98')			
	EGA-PIY26A-V1	OPEN		
EGA-PIX26A	EGS-PNL3A REAR START AIR PRESS (DG-4-98')			
	EGA-PIX26A-V1	OPEN		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
EGA-PI18A	STBY DSL GEN. AIR RCVR TK2A (DE-3-103')			
	EGA-PI18A-V1	OPEN		
	EGA-PI18A-V2	CLOSED		
EGA-PI18C	STBY DSL GEN AIR RCVR TK2C (DE-3-103')			
	EGA-PI18C-V1	OPEN		
	EGA-PI18C-V2	CLOSED		
EGA-PI17A	STBY DSL GEN. AIR RCVR TK1A (DE-3-103')			
	EGA-PI17A-VI	OPEN		
	EGA-PI17A-V2	CLOSED		
EGA-PI17C	STBY DSL GEN. AIR RCVR TK1C (DC-3-103')			
	EGA-PI17C-V1	OPEN		
	EGA-PI17C-V2	CLOSED		
EGS-PNL3A	ENGINE CONTROL PANEL (DG-4-98') (VALVES INSIDE PANEL)			
	EGA-PSY21A-E-31F	OPEN		
	EGA-PSX-21A-E31R	OPEN		
EGA-PI27A	EGS-PNL3A CONTROL AIR PRESS (DG-4-98')			
	EGA-PI27A-V1	OPEN		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

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INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
EGF-PI22B	FUEL XFER PUMP P1B DISCH (DC-1-103')			
	EGF-PI22B-V1	CLOSED		
	EGF-PI22B-V2	CLOSED		
	EGF-PI22B-V3	CLOSED		
	EGF-PI22B-V4	CLOSED		
EGF-PDIS21B	STBY DSL FO XFER PMP DISCH ST (DC-1-103')			
	EGF-PDIS21B-V1H	OPEN		
	EGF-PDIS21B-V2L	OPEN		
	EGF-PDIS21B-V3B	CLOSED		
	EGF-PDIS21B-V4	CLOSED		
	EGF-PDIS21B-V5	CLOSED		
	EGF-PDIS21B-V6	CLOSED		
	EGF-PDIS21B-V7	CLOSED		
EGF-PDI20B	FUEL TK1B INLET STR (DA-1-102')			
	EGF-PDI20B-V1H	OPEN		
	EGF-PDI20B-V2L	OPEN		
	EGF-PDI20B-V3B	CLOSED		
	EGF-PDI20B-V4	CLOSED		
	EGF-PDI20B-V5	CLOSED		
	EGF-PDI20B-V6	CLOSED		
	EGF-PDI20B-V7	CLOSED		
EGF-LT15B	STBY DSL FUEL STOR TK1B LVL (DC-1-103')			
	EGF-LY15B-V1	OPEN		
	EGF-LI15B EGS-PNL3B (DG-2-98')	LIVE ZERO		
EGO-PI10B	EGS-PNL3B TURBO OIL PRESS (DG-2-98')			
	EGO-PI10B-V1	OPEN		
EGO-PI5B	EGS-PNL3B LUBE OIL PRESS (DG-2-98')			
	EGO-PI5B-V1	OPEN		
EGO-PDI7B	EGS-PNL3B LUBE OIL FILTER DIFF PRESS (DG-2-98')			
	EGO-PDI7B-V1H	OPEN		
	EGO-PDI7B-V2L	OPEN		
EGT-PI4B	JACKET WATER PRESS EGS-PNL3B (DG-2-98')			
	EGT-PI4B-V1	OPEN		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
EGA-PS32B	AIR RCVR TK 2B & 2D (DE-1-103')			
	EGA-PS32B-V1	OPEN		
	EGA-PS32B-V2	CLOSED		
EGA-PS31B	AIR RCVR TK 1B & 1D (DE-1-103')			
	EGA-PS31B-V1	OPEN		
	EGA-PS31B-V2	CLOSED		
EGA-PS20B	AIR RCVR TK 2B & 2D (DE-1-103')			
	EGA-PS20B-V1	OPEN		
	EGA-PS20B-V2	CLOSED		
EGA-PS19B	AIR RCVR TK1B & TK1D (DE-1-103')			
	EGA-PS19B-V1	OPEN		
	EGA-PS19B-V2	CLOSED		
EGA-PIY26B	EGS-PNL3B FWD START AIR PRESS (DG-2-98')			
	EGA-PIY26B-V1	OPEN		
EGA-PIX26B	EGS-PNL3B REAR START AIR PRESS (DG-2-98')			
	EGA-PIX26B-V1	OPEN		
EGA-PI18B	STBY DSL GEN. AIR RCVR TK2B (DE-1-103')			
	EGA-PI18B-V1	OPEN		
	EGA-PI18B-V2	CLOSED		
EGA-PI18D	STBY DSL GEN AIR RCVR TK2D (DE-1-103')			
	EGA-PI18D-V1	OPEN		
	EGA-PI18D-V2	CLOSED		
EGA-PI17B	STBY DSL GEN. AIR RCVR TK1B (DE-1-103')			
	EGA-PI17B-VI	OPEN		
	EGA-PI17B-V2	CLOSED		
EGA-PI17D	STBY DSL GEN. AIR RCVR TK1D (DE-1-103')			
	EGA-PI17D-V1	OPEN		
	EGA-PI17D-V2	CLOSED		
EGF-LT16B	STBY DSL FUEL DAY TK2B LVL (DE-2-103')			
	EGF-LT16B-V1	OPEN		
	EGF-LT16B-V2	CLOSED		
	EGF-LT16B-V3	CLOSED		
	EGF-LIX16B EGS-PNL3B (DG-2-98')	LIVE ZERO		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
EGS-PNL3B	ENGINE CONTROL PANEL (DG-2-98') (VALVES INSIDE PANEL)			
	EGS-PNL3B-V1	OPEN		
	EGS-PNL3B-V2	OPEN		
EGA-PI27B	EGS-PNL3B CONTROL AIR PRESS (DG-2-98')			
	EGA-PI27B-V1	OPEN		
EGT-LI24B	JACKET WATER STANDPIPE LEVEL			
	EGT-LI24B-V1	OPEN		
	EGT-LI24B-V2	CLOSED/ CAPPED		

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ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1A

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND
ENS-ACB07	DIESEL GENERATOR	ENS-SWG1A ACB07	RACKED IN OPEN		
EGS-ACB11	DIESEL GEN NEUT	ENS-SWG2A ACB11	RACKED IN CLOSED		
EGE-CAB01A	STBY DIESEL GEN EXC CABINET	ENB-SWG01A BKR 566	RACKED IN CLOSED		
EGF-P1A	DIESEL GENERATOR FUEL TRANSFER PUMP	EHS-MCC15A BKR 1C	ON		
EGS-EG1AH	DIESEL GENERATOR SPACE HEATER	NHS-MCC15A BKR 2A	ON		
EGO-H1A	DIESEL GENERATOR LUBE OIL HEATER	NHS-MCC15A BKR 2B	ON		
EGO-P1A	DIESEL GENERATOR LUBE OIL PUMP	NHS-MCC15A BKR 2C	ON		
EGT-H1A	DIESEL GENERATOR IMMERSION WTR HEATER	NHS-MCC15A BKR 2E	ON		
EGT-P1A	DIESEL GENERATOR COOLING WATER CIRC PUMP	NHS-MCC15A BKR 3A	ON		
EGA-C5A	FORWARD START AIR COMPRESSOR	EHS-MCC15A BKR 2D	ON		
EGA-C4A	REAR START AIR COMPRESSOR	EHS-MCC15A BKR 1A	ON		
EGA-C4A-HTR EGA-C5A-HTR	COMP MOTOR HEATER	SCV-PNL15A1 BKR 17	ON		
EGSN04	EGS-PNL4A HEATER	SCA-PNL15A1 BKR 6	ON		
EGO-P1AH	LUBE OIL CIRC PUMP HTR	SCA-PNL15A1 BKR 10	ON		
EGF-EG1AH	DIESEL TERM BOX SPACE HTR	SCA-PNL15A1 BKR 16	ON		
EGT-CNTOR01	JACKET WATER HEAT TRACE	SCA-PNL15A1 BKR 7	ON		
EGT-CNTOR02	JACKET WATER HEAT TRACE	SCA-PNL15A1 BKR 18	ON		
EGAN05	RSS RELAY CKT	SCV-PNL15A1 BKR 14	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1A

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND
EGS-PNL2A	125 VDC BACKUP PROT EGS-EG1A	ENB-PNL03A DISC 6	ON		
EGE-CAB01A	125 VDC TO D/G A EXCITATION CABINET	ENB-PNL03A DISC 7	ON		
ENS-SWG2A	125 VDC CONTROL BUS	ENB-PNL03A DISC 8	ON		
EGS-PNL2A	125 VDC DIFF PROT EGS-EG1A	ENB-PNL03A DISC 9	ON		
EGS-PNL3A	125 VDC D/G 1A REAR AIR START	ENB-PNL03A DISC 10	ON		
EGS-PNL3A	125 VDC D/G FWD AIR START & ENG STOP	ENB-PNL03A DISC 11	ON		
H13-P851	STBY D/G AUX CONTROL CKT	ENB-PNL02A DISC 18	ON		
H13-P819/H13-P841	DIV I BOP ANALOG INSTRUMENT RACKS	VBS-PNL01A DISC 11	ON		
H13-P854	BOP ANALOG INSTR. POWER SUPPLIES	VBN-PNL01A1 DISC 15	ON		
EGF-P2A	DC FUEL OIL BOOSTER PUMP	BYS-PNL02A1 DISC 19	ON		
H13-P855D	(7EGS03) ANALOG CIRC	SCI-PNL01 BKR 12	ON		
	REAR STARTING CIRCUIT	EGS-PNL3A CB 1/2	ON		
	FORWARD STARTING CIRCUIT	EGS-PNL3A CB 3/4	ON		
	FAIL TO START CIRCUIT	EGS-PNL3A CB 5/6	ON		
	TEMP INDICATOR/ HOURMETER CIRCUIT	EGS-PNL3A CB 7/8	ON		
	ALARM HORN/TEST CIRCUIT	EGS-PNL3A CB 9/10	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1A

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ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1B

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND
ENS-ACB27	DIESEL GENERATOR	ENS-SWG1B ACB 27	RACKED IN OPEN		
EGS-ACB31	DIESEL GEN NEUT	ENS-SWG2B ACB 31	RACKED IN CLOSED		
EGE-CAB01B	STBY DIESEL GEN EXC CAB	ENB-SWG01B ACB 585	RACKED IN CLOSED		
EGF-P1B	DIESEL GENERATOR FUEL TRANSFER PUMP	EHS-MCC15B BKR 1C	ON		
EGT-H1B	DIESEL GENERATOR IMMERSION WTR HEATER	NHS-MCC15B BKR 1C	ON		
EGS-EG1BH	DIESEL GENERATOR SPACE HEATER	NHS-MCC15B BKR 2B	ON		
EGT-P1B	DIESEL GENERATOR COOLING WTR CIRC PUMP	NHS-MCC15B BKR 2C	ON		
EGA-C4B	REAR START AIR COMPRESSOR	EHS-MCC15B BKR1A	ON		
EGA-C5B	FORWARD START AIR COMPRESSOR	EHS-MCC15B BKR 2D	ON		
EGO-P1B	DIESEL GENERATOR LUBE OIL PUMP	NHS-MCC15B BKR 3E	ON		
EGO-H1B	DIESEL GENERATOR LUBE OIL HEATER	NHS-MCC15B BKR 3F	ON		
EGT-CNTOR04	JACKET WATER HEAT TRACE	SCA-PNL15B1 BKR 3	ON		
EGA-C4B-HTR	REAR START AIR COMP HTR	SCV-PNL15B1 BKR 9	ON		
EGA-C5B-HTR	FORWARD START AIR COMP HTR				
EGS-EG1BH	DIESEL TERM BOX SPACE HTR	SCA-PNL15B1 BKR 5	ON		
EGO-P1BH	LUBE OIL CIRC PUMP HTR	SCA-PNL15B1 BKR 8	ON		
EGT-CNTOR05	JACKET WATER HEAT TRACE	SCA-PNL15B1 BKR 10	ON		
ENS-SWG2B	125 VDC CONTROL BUS	ENB-PNL03B DISC 2	ON		
EGS-PNL2B	125 VDC BACKUP PROT EGS-EG1B	ENB-PNL03B DISC 6	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1B

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	2ND
EGE-CAB01B	125 VDC STBY D/G B EXCITATION CABINET	ENB-PNL03B DISC 7	ON		
EGS-PNL2B	125 VDC DIFF PROT EGS-EG1B	ENB-PNL03B DISC 9	ON		
EGS-PNL3B	125 VDC D/G 1B REAR AIR START	ENB-PNL03B DISC 10	ON		
EGS-PNL3B	125 VDC D/G FWD AIR START & ENG STOP	ENB-PNL03B DISC 13	ON		
H13-P852	STBY D/G AUX CONTROL CKT	ENB-PNL02B DISC 17	ON		
H13-P820/H13-P842	DIV 2 BOP ANALOG INSTRUMENT RACKS	VBS-PNL01B DISC 11	ON		
H13-P854	BOP ANALOG INSTR. POWER SUPPLIES	VBN-PNL01A1 DISC 15	ON		
EGF-P2B	DC FUEL OIL BOOSTER PUMP	BYS-PNL02B1 DISC 20	ON		
H13-P855D	(7EGS03) ANALOG CIRC	SCI-PNL01 BKR 12	ON		
	REAR STARTING CIRCUIT	EGS-PNL3B CB 1/2	ON		
	FORWARD STARTING CIRCUIT	EGS-PNL3B CB 3/4	ON		
	FAIL TO START CIRCUIT	EGS-PNL3B CB 5/6	ON		
	TEMP INDICATOR/ HOURMETER CIRCUIT	EGS-PNL3B CB 7/8	ON		
	ALARM HORN/TEST CIRCUIT	EGS-PNL3B CB 9/10	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1B

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CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
THE FOLLOWING ITEMS ARE LOCATED ON H13-P877				
STBY DIESEL ENGINE A STOP	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A MODE	NEUTRAL	N/A		
STBY DIESEL ENGINE A EMERGENCY START	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A EMERGENCY START RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A STOP RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A STOP	NOT DEPRESSED	N/A		
STBY DIESEL GENERATOR A READY TO LOAD	N/A	OFF		
STBY DIESEL GENERATOR A TRIPPED	N/A	OFF		
STBY DIESEL GENERATOR A AVAILABLE	N/A	WHITE		
ENS-ACB11 STBY D/G A NEUTRAL BRKR	NEUTRAL AFTER CLOSE	RED/WHITE		
ENS-ACB07 STBY D/G A OUTPUT BRKR	NEUTRAL AFTER TRIP	GREEN/WHITE		
ENS-ACB07 STBY D/G A OUTPUT BRKR	RESET	N/A		
REMOTE SYNC SW OFF	OFF	BLUE		
STBY DIESEL GENERATOR A GOVERNOR CONTROL	NEUTRAL	N/A		
STBY DIESEL GENERATOR A VOLTAGE REGULATOR CONT	NEUTRAL	N/A		
STBY GEN & DISTR MANUAL BYPASS INOP	OFF	N/A		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL3A				
FUEL OIL TRANSFER PUMP EGF-P1A	AUTO	AMBER + GREEN/RED		
EGF-P2A DC FUEL OIL BOOSTER PUMP	AUTO	AMBER + GREEN/RED		
HIGH TEMPERATURE TRIP BYPASS	OPERATE	WHITE		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	2ND
EGS-EG1AH GENERATOR SPACE HEATER	AUTO	AMBER + GREEN/RED		
EGO-P1A, H1A LUBE OIL CIRC. PUMP AND HEATER	AUTO	AMBER + GREEN/RED		
EGT-P1A, H1A JACKET WATER CIRC. PUMP & HEATER	AUTO	AMBER + GREEN/RED		
EMERGENCY START	NOT DEPRESSED	N/A		
ENGINE ROLL	NOT DEPRESSED	N/A		
TEMPERATURE SELECTOR	ANY	N/A		
STOP	NOT DEPRESSED	N/A		
MAINT MODE SELECT	NOT TURNED	N/A		
STOP	NOT DEPRESSED	N/A		
RETURN TO OPERATIONAL	NOT DEPRESSED	N/A		
STOP RESET	NOT DEPRESSED	N/A		
UNIT AVAIL EMERGENCY STATUS	N/A	WHITE		
AC CONTROL POWER ON	N/A	WHITE		
DC CONTROL POWER ON	N/A	WHITE		
READY TO LOAD	N/A	OFF		
UNIT TRIPPED	N/A	OFF		
NORMAL START	NOT DEPRESSED	N/A		
SYNCHRONOUS	N/A	OFF		
STARTING	N/A	OFF		
SHUTDOWN SYSTEM ACTIVE	N/A	OFF		
FORWARD START DC POWER	N/A	WHITE		
REAR START DC POWER	N/A	WHITE		
THE FOLLOWING ITEM IS LOCATED ON EHS-MCC15A				
EGA-C4A REAR START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		
EGA-C5A FORWARD START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL2A				
PRIMARY TRIP CUTOFF	OPERATE	WHITE		
BACK-UP TRIP CUTOFF	OPERATE	WHITE		
PRIMARY PROTECTION TRIP AND LOCKOUT	RESET	NONE		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
BACK-UP PROTECTION TRIP AND LOCKOUT	RESET	NONE		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL1A				
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN RESET	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
GENERATOR EGS-EG1A NEUTRAL BREAKER	NEUTRAL	RED/WHITE		
GENERATOR EGS-EG1A TO STBY BUS ENS-SWG1A	NEUTRAL AFTER TRIP	GREEN/WHITE		
SYNCHRONIZING CONTROL	OFF	N/A		
ENS-ACB06 NORMAL SUPPLY BRKR TO STBY BUS ENS-SWG1A	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
ENS-ACB04 ALTERNATE SUPPLY BRKR TO STBY BUS ENS-SWG1A	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
BUS VOLTS VOLTMETER	OFF	N/A		
GENERATOR VOLTS VOLTMETER	OFF	N/A		
VOLTAGE REGULATOR CONTROL	NEUTRAL	N/A		
GOVERNOR CONTROL	NEUTRAL	N/A		
REMOTE SYNCHRONIZING SELECTOR SWITCH OFF	N/A	BLUE		
THE FOLLOWING ITEMS ARE LOCATED ON EGE-CAB01A				
FIELD FLASHING RELAY READY	N/A	WHITE LIGHT ENERGIZED		
*Either the NORMAL or ALTERNATE supply breaker may be closed.				

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

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CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
THE FOLLOWING ITEMS ARE LOCATED ON H13-P877				
STBY DIESEL ENGINE B STOP	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B MODE	NEUTRAL	N/A		
STBY DIESEL ENGINE B EMERGENCY START	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B EMERGENCY START RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B STOP RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B STOP	NOT DEPRESSED	N/A		
STBY DIESEL GENERATOR B READY TO LOAD	N/A	OFF		
STBY DIESEL GENERATOR B TRIPPED	N/A	OFF		
STBY DIESEL GENERATOR B AVAILABLE	N/A	WHITE		
ENS-ACB31 STBY D/G B NEUTRAL BRKR	NEUTRAL AFTER CLOSE	RED/WHITE		
ENS-ACB27 STBY D/G B OUTPUT BRKR	NEUTRAL AFTER TRIP	GREEN/WHITE		
ENS-ACB27 STBY D/G B OUTPUT BRKR	RESET	N/A		
REMOTE SYNC SW OFF	OFF	BLUE		
STBY DIESEL GENERATOR B GOVERNOR CONTROL	NEUTRAL	N/A		
STBY DIESEL GENERATOR B VOLTAGE REGULATOR CONT	NEUTRAL	N/A		
STBY GEN & DISTR MANUAL BYPASS INOP	OFF	N/A		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL3B				
EGF-P1B FUEL OIL TRANSFER PUMP	AUTO	AMBER + GREEN/RED		
EGF-P2B DC FUEL OIL BOOSTER PUMP	AUTO	AMBER + GREEN/RED		
HIGH TEMPERATURE TRIP BYPASS	OPERATE	WHITE		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
GENERATOR SPACE HEATER EGS-EG1BH	AUTO	AMBER + GREEN/RED		
EGO-P1B, H1B LUBE OIL CIRC. PUMP AND HEATER	AUTO	AMBER + GREEN/RED		
EGT-P1B, H1B JACKET WATER CIRC. PUMP & HEATER	AUTO	AMBER + GREEN/RED		
EMERGENCY START	NOT DEPRESSED	N/A		
ENGINE ROLL	NOT DEPRESSED	N/A		
TEMPERATURE SELECTOR	ANY	N/A		
STOP	NOT DEPRESSED	N/A		
MAINT MODE SELECT	NOT TURNED	N/A		
STOP	NOT DEPRESSED	N/A		
RETURN TO OPERATIONAL	NOT DEPRESSED	N/A		
STOP RESET	NOT DEPRESSED	N/A		
UNIT AVAIL EMERGENCY STATUS	N/A	WHITE		
AC CONTROL POWER ON	N/A	WHITE		
DC CONTROL POWER ON	N/A	WHITE		
READY TO LOAD	N/A	OFF		
UNIT TRIPPED	N/A	OFF		
NORMAL START	NOT DEPRESSED	N/A		
SYNCHRONOUS	N/A	OFF		
STARTING	N/A	OFF		
SHUTDOWN SYSTEM ACTIVE	N/A	OFF		
FORWARD START DC POWER	N/A	WHITE		
REAR START DC POWER	N/A	WHITE		
THE FOLLOWING ITEM IS LOCATED ON EHS-MCC15B				
EGA-C4B REAR START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		
EGA-C5B FORWARD START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	2ND
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL2B				
PRIMARY TRIP CUTOFF	OPERATE	WHITE		
BACK-UP TRIP CUTOFF	OPERATE	WHITE		
PRIMARY PROTECTION TRIP AND LOCKOUT	RESET	NONE		
BACK-UP PROTECTION TRIP AND LOCKOUT	RESET	NONE		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL1B				
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN RESET	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
GENERATOR EGS-EG1B NEUTRAL BREAKER	NEUTRAL	RED/WHITE		
GENERATOR EGS-EG1B TO STBY BUS ENS-SWG1B	NEUTRAL AFTER TRIP	GREEN/WHITE		
SYNCHRONIZING CONTROL	OFF	N/A		
ENS-ACB26 NORMAL SPLY BRKR TO STBY BUS ENS-SWG1B	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
ENS-ACB24 ALTERNATE SPLY BRKR TO STBY BUS ENS-SWG1B	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
BUS VOLTS VOLTMETER	OFF	N/A		
GENERATOR VOLTS VOLTMETER	OFF	N/A		
VOLTAGE REGULATOR CONTROL	NEUTRAL	N/A		
GOVERNOR CONTROL	NEUTRAL	N/A		
REMOTE SYNCHRONIZING SELECTOR SWITCH OFF	N/A	BLUE		
THE FOLLOWING ITEMS ARE LOCATED ON EGE-CAB01B				
FIELD FLASHING RELAY READY	N/A	WHITE LIGHT ENERGIZED		
*Either the NORMAL or ALTERNATE supply breaker may be closed.				

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

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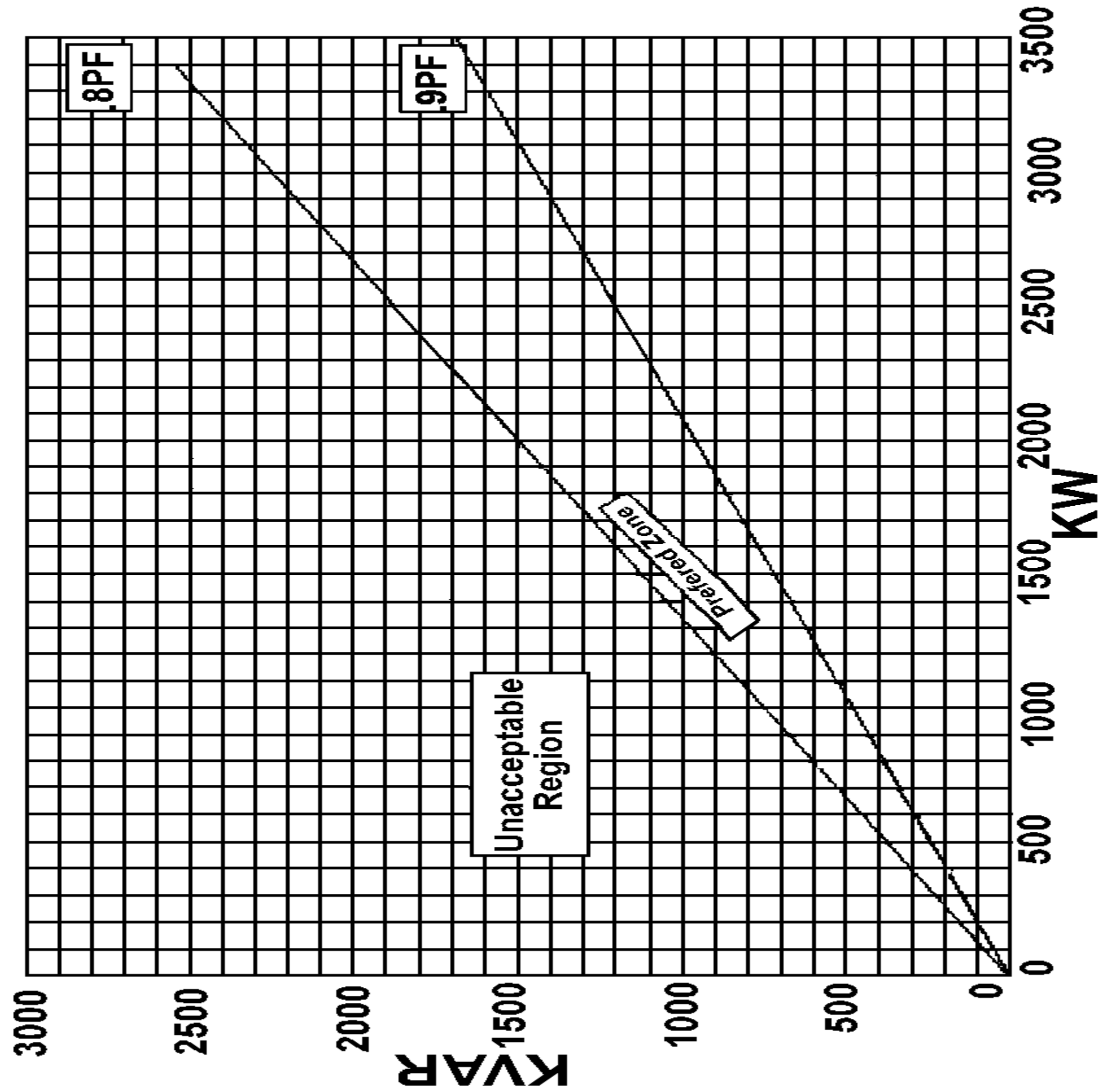
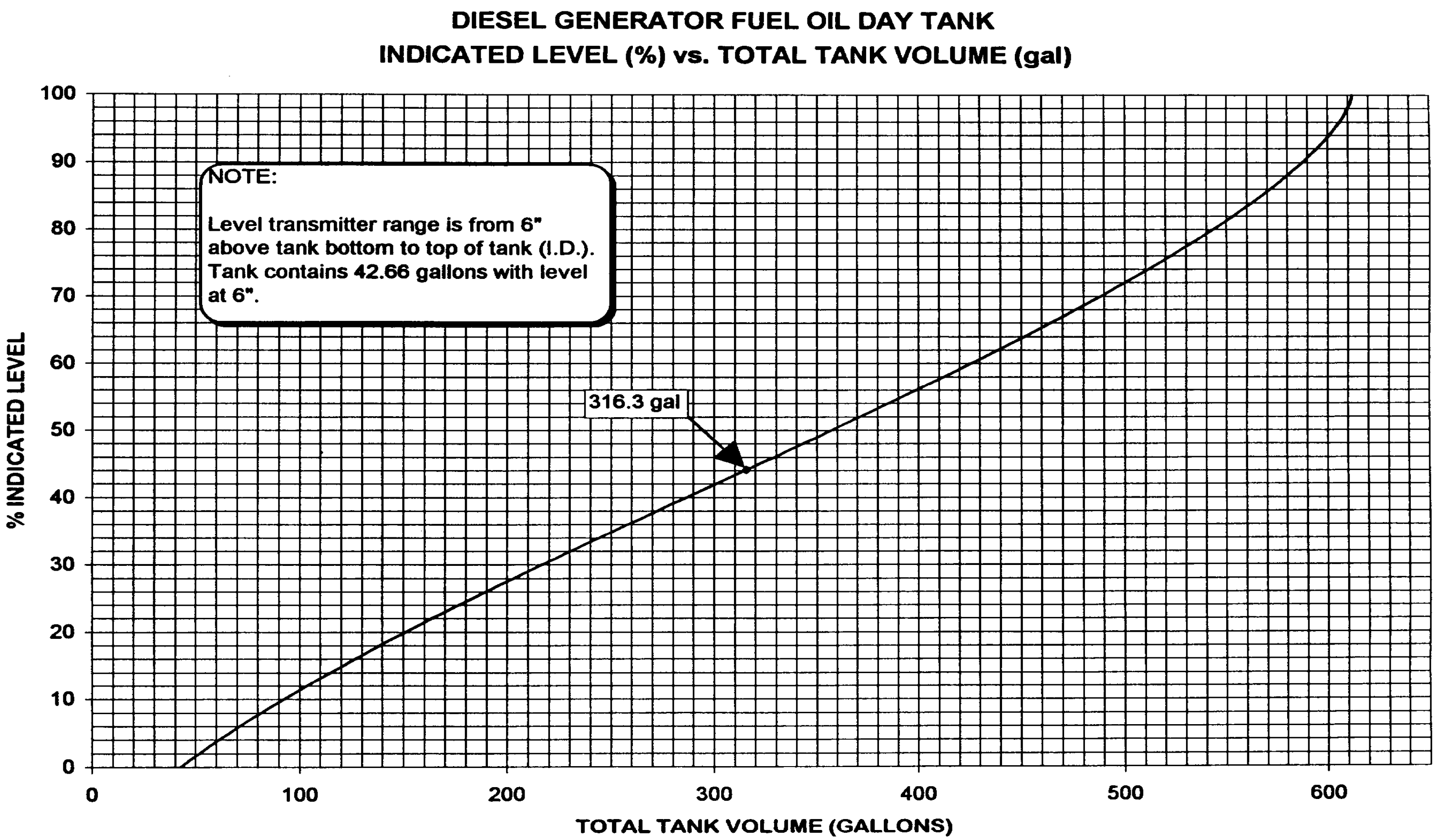
ENGINE PARAMETERS

PARAMETER	NORMAL OPERATING RANGE	NORMAL INDICATION	ALTERNATE INDICATION
Lube Oil Pressure	50-65 Psig	EGO-PI15A(B)	N/A
Turbo Oil Pressure	25-40 Psig	EGO-PI10A(B)	N/A
Fuel Oil Pressure	25-40 Psig	EGF-PI27A(B)	N/A
Fuel Oil Filter Diff Pressure	0-5 Psid	EGF-PI29A(B)	N/A
Lube Oil Filter Diff Pressure	Less Than 20 Psid	EGO-PI7A(B)	N/A
Crankcase Pressure	0-3 in. WC.	EGS-PI6A(B)	N/A
Start Air Pressure	160-250 Psig	EGA-PIY26A(B) EGA-PIX26A(B)	EGA-PI18A(B,C,D) EGA-PI17A(B,C,D)
Control Air Pressure	55-65 Psig	EGA-PI27A(B)	N/A
Governor oil level	Greater Than Fill Mark Standby Visible in sightglass Operating	Sight Glass	N/A
Jacket Water Pressure	12-30 Psig	EGT-PI4A(B)	N/A
Cylinder Temperatures	700-1000°F	EGS-TI64A(B) Positions 1-8	N/A
Jacket Water In	125-160°F	EGS-TI64A(B) Pos. 12	N/A
Jacket Water Out	130-165°F	EGS-TI64A(B) Pos. 13	EGO-TI30A(B)
Lube Oil In	130-165°F	EGS-TI64A(B) Pos. 10	EGO-TI28A(B)
Lube Oil Out	160-180°F	EGS-TI64A(B) Pos. 11	EGO-TI29A(B)
Exhaust Temperatures	600-825°F	EGS-TI64A(B) Pos. 9	N/A
Aftercooler Water In	115-155°F	EGS-TI64A(B) Pos. 14	EGO-TI27A(B)
Aftercooler Water Out	125-160°F	EGS-TI64A(B) Pos. 15	N/A
Service Water In	50-95°F	EGS-TI64A(B) Pos. 16	N/A
Service Water Out	60-105°F	EGS-TI64A(B) Pos. 17	On H13-P877 SWP-TI78A(B)
Oil Cooler Water In	115-155°F	EGS-TI64A(B) Pos. 18	EGO-TI31A(B)
Oil Cooler Water Out	120-160°F	EGS-TI64A(B) Pos.19	EGO-TI27A(B)

KW VS KVAR (.8PF)

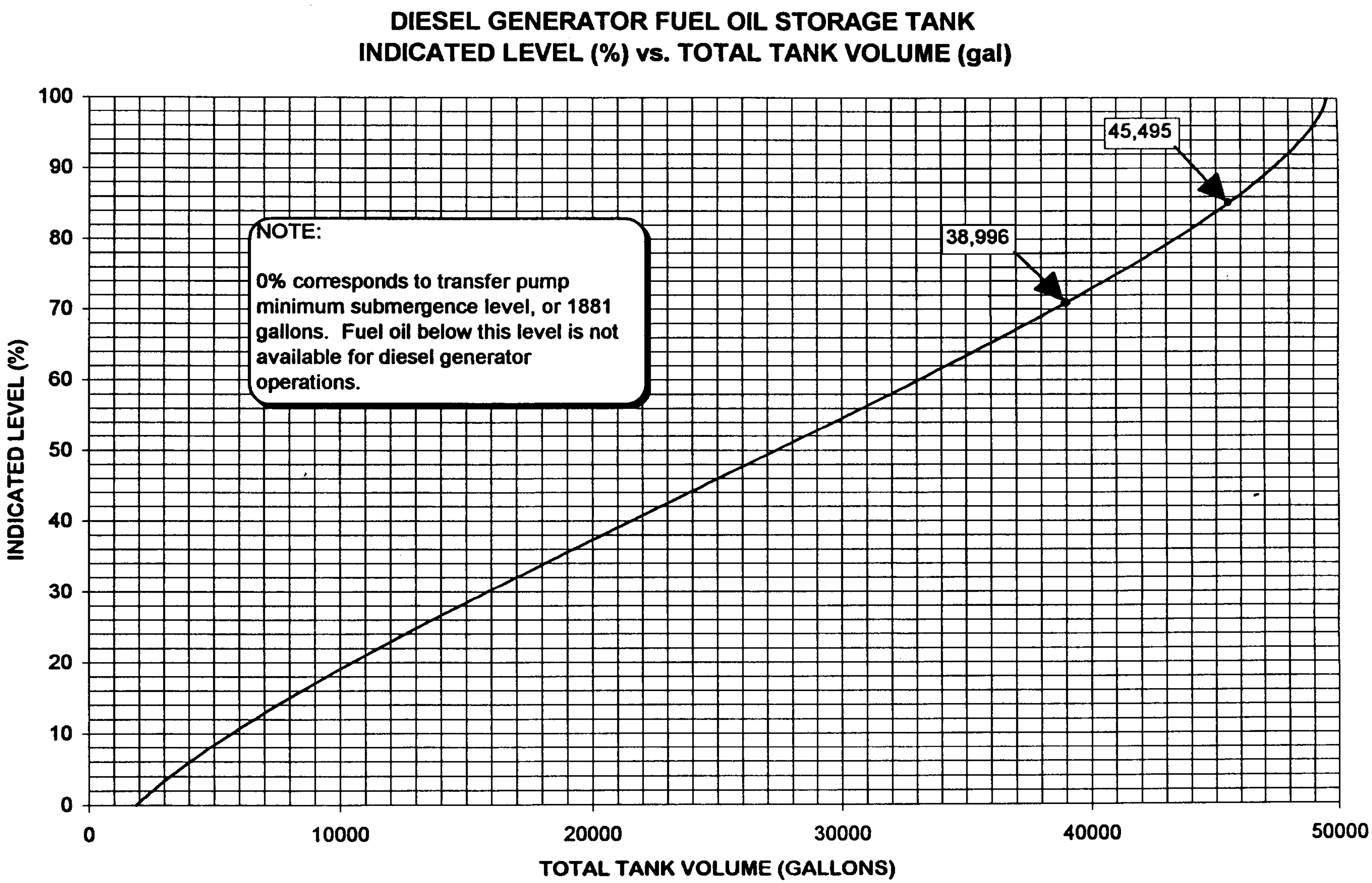


FUEL OIL DAY TANK LEVEL INDICATION

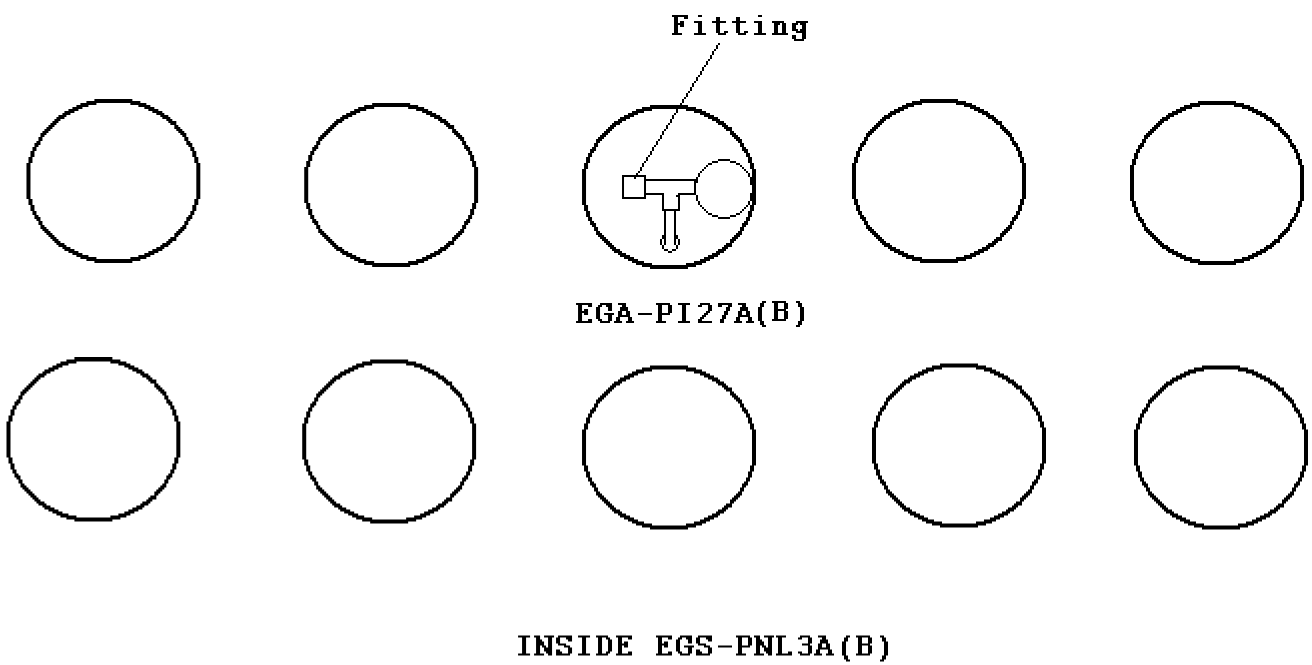


NOTE: *This graph shows the Tech Spec Limit of 316.3 gals as 44%. However, due to indication errors the minimum Tech Spec level will be 45%.*

FUEL OIL STORAGE TANK LEVEL INDICATION



FITTING LOCATION FOR SECTION 6.5.2



NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE
SRO ☒ RO ☒

ALTERNATE PATH ☒

TITLE: **Initiate Standby Liquid Control**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	5	Actual Time (min):	

JPM RESULTS*: (Circle one) SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
X	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	September 4, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

TASK STANDARD: Standby Liquid Control (SLC) Pump B injecting to the RPV and SLC pump A secured.

SYNOPSIS: The plant has experienced an ATWS and requires injection with SLC. This task will have the applicant attempt to align SLC pump A injecting to the RPV using the OSP-0053 Hard Card, but due to a failure of the A Suction Valve to Open, the Applicant will be required to inject with SLC B instead.

NOTE: If in the Plant or the Control Room, **Caution** the operator NOT to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) Read to the operator:

> "I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied.
> Inform me when you have completed the task.

2) Initiating Cues:

The CRS has directed you to inject with SLC A.

3) Initial Conditions:

A plant transient has occurred resulting in an Anticipated Transient Without Scram (ATWS) and entry into the Emergency Operating Procedures. EOP-0001a directs injecting with Standby Liquid Control.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Initiate Standby Liquid Control	222007001001	223001 A2.01 223001 A2.13	4.3/4.4 3.3/3.4

REFERENCES:
OSP-0053, Rev 034, Attachment 13

APPLICABLE OBJECTIVES:
RLP-STM-0403 Objective 3, 4, 6

REQUIRED MATERIALS:
SOP-0059, Rev 034, Section 5.14
(Simulator copy)

SAFETY FUNCTION:
__5__

SIMULATOR CONDITIONS & SETUP:

1. IC # 215
2. Required Power: Post-ATWS,with RPV level stable between Level 1 and 2
3. Enclosure 16 inserted and IAS-MOV106 is open.
4. Enclosure 24 inserted
5. Malfunction: SLC A pump suction valve fails to open.
6.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Standby Liquid Control (SLC) Pump B injecting to the RPV and SLC pump A secured.

PERFORMANCE:

START TIME: ____________

OSP-0053, Attachment 13
Hard Card.

1.	**Procedure Step:**	1. Place **SLC PUMP** A(B) (NOT BOTH), control switch to **RUN**.
	Standard	Applicant obtained a key, located/identified and manipulated the SLC Pump A keylock switch to RUN.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	2. Perform the following: • Verify the following: 1. **SQUIB CONTINUITYA**(B), light goes **Off** 2. C41-F001A(B), **SLC** PUMP A(B) **SUCT** VLV, **Opens**. 3. C41-C001A(B) **SLC PUMP** A(B), **Starts**
	Standard	Applicant located and verified that the A Squib Continuity light is OFF Applicant recognized that the A Pump Suction Valve did **not** open.
	Cue	As the CRS, acknowledge the report of the SLC Pump A failure.
	Notes	The second bullet of Step 2 will direct the applicant to the Alternate Path.
	Results	SAT ☐ UNSAT ☐

ALTERNATE PATH:

3.	**Procedure Step:**	2. Perform the following: • IF any required actions do not occur, THEN perform the following: 1. Place **SLC PUMP** A control switch to **STOP**. 2. Repeat steps 1 and 2 for the Alternate pump.
	Standard	Applicant manipulated the SLC Pump A keylock switch to STOP.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

4.	***Procedure Step:**	1. Place **SLC PUMP** B, control switch to **RUN**.
	Standard	Applicant obtained a key, located/identified and manipulated the SLC Pump B keylock switch to RUN.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	2. Perform the following: • Verify the following: 1. **SQUIB CONTINUITY** B, light goes **Off** 2. C41-F001B, **SLC** PUMP B **SUCT** VLV, **Opens**. 3. C41-C001B **SLC PUMP** B, **Starts**
	Standard	Applicant located and verified that the B Squib Continuity light is OFF Applicant located and verified that the B Pump Suction Valve opened Applicant located and verified that SLC Pump B started..
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	3. Notify CRS of SLC injection status.
	Standard	NA
	Cue	As the CRS, acknowledge the report of the SLC Pump B running.
	Notes	

7.	**Procedure Step:**	4. Verify IAS-MOV106 is Open. (Enclosure 16 may be required)	
	Standard	Applicant located/identified and verified open IAS-MOV106 red light ON and green light OFF.	
	Cue		
	Notes		
	Results	SAT ☐	UNSAT ☐

8.	**Procedure Step:**	5. Record SLC Tank Level in gallons.	
	Standard	Applicant located/identified the meter for SLC Tank level and wrote the number down (or circled the gallons on the back of the Hard Card).	
	Cue	.	
	Notes		
	Results	SAT ☐	UNSAT ☐

Terminating Cue Standby Liquid Control (SLC) Pump B injecting to the RPV and SLC pump A secured

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

A plant transient has occurred resulting in an Anticipated Transient Without Scram (ATWS) and entry into the Emergency Operating Procedures. EOP-0001a directs injecting with Standby Liquid Control.

INITIATING CUE:

The CRS has directed you to inject with SLC A.

INITIATING STANDBY LIQUID CONTROL

1. Place **SLC PUMP** A(B) (<u>NOT</u> BOTH), control switch to **RUN**.

2. Perform the following:

   - **Verify** the following:

     1. **SQUIB CONTINUITY** A(B), light goes **Off**.
     2. C41-F001A(B), **SLC** PUMP A(B) **SUCT** VLV, **Opens**.
     3. C41-C001A(B), **SLC PUMP** A(B), **Starts**.

   - <u>IF</u> any required actions do <u>not</u> occur, <u>THEN</u> perform the following:

     1. Place **SLC PUMP A(B)**, control switch to **STOP**.
     2. **Repeat** steps 1 and 2 for the **Alternate pump**.

3. **Notify CRS** of SLC injection status.

4. Verify **IAS-MOV106** is **Open**. (Enclosure 16 may be required).

5. Record **SLC Tank Level**. gallons ______________

6. Monitor **SLC Tank Level and report** to CRS when **Hot Shutdown Boron Weight** is achieved.

7. <u>WHEN</u> **SLC** injection is no longer required, <u>THEN</u> place **SLC PUMP A (B)** control switch to **STOP**.

INITIATING STANDBY LIQUID CONTROL

STANDBY LIQUID CONTROL INJECTION REQUIREMENTS

NOTE

WHEN tank level falls between values,
THEN the smaller value should be used.

TANK LEVEL PRIOR TO INJECTION GAL	TANK LEVEL AFTER INJECTION OF 69 lb Boron (approximately 16 min inj time) GAL	TANK LEVEL AFTER INJECTION OF 166 lb Boron (approximately 38 min inj time) GAL
1531	905	0
1550	924	19
1600	974	69
1700	1074	169
1800	1174	269
1900	1274	369
2000	1374	469
2100	1474	569
2200	1574	669
2300	1674	769
2400	1774	869
2500	1874	969
2600	1974	1069
2700	2074	1169
2800	2174	1269
2900	2274	1369
3000	2374	1469
3100	2474	1569
3200	2574	1669
3300	2674	1769
3400	2774	1869
3500	2874	1969
3600	2974	2069
3700	3074	2169
3800	3174	2269
3900	3274	2369
4000	3374	2469
4100	3474	2569
4200	3574	2669

NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE
SRO ☒ RO ☒

ALTERNATE PATH ☐

TITLE: **Emergency Operation of Containment Coolers with Service Water**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	10	Actual Time (min):	

JPM RESULTS*: (Circle one) SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

X	Perform
	Simulate

EVALUATION LOCATION:

	Plant
X	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	August 29, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

TASK STANDARD: Both HVR-UC1A and UC1B running with service water providing cooling and all HVN valves isolated

SYNOPSIS: This task will align service water as the cooling medium to the containment unit coolers and start a second safety related unit cooler.

NOTE: If in the Plant or the Control Room, **Caution** the operator NOT to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) Read to the operator:

> "I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied.
> Inform me when you have completed the task.

2) Initiating Cues:

> The CRS has directed you to conduct Emergency Operation of Containment Unit Coolers with Service Water in accordance with SOP-0059 Section 5.14 for BOTH Containment Unit Coolers

3) Initial Conditions:

> A plant transient has occurred resulting in entry into the Emergency Operating Procedures. EOP-0002 directs maximizing containment cooling. The containment unit coolers have no cooling water flow due to the isolation of HVN.
> RPV Level is stable between Level 1 & Level 2.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Emergency Operation of Containment Coolers with Service Water	222007001001	223001 A2.01 223001 A2.13	4.3/4.4 3.3/3.4

REFERENCES:
SOP-0059, Rev 034, Section 5.14

APPLICABLE OBJECTIVES:
RLP-STM-0403 Objective 3, 4, 6

REQUIRED MATERIALS:
SOP-0059, Rev 034, Section 5.14
(Simulator copy)

SAFETY FUNCTION:
__5__

SIMULATOR CONDITIONS & SETUP:

1. IC # 215
2. Required Power: ATWS, with RPV level stable between Level 1 and Level 2
3. Reactor water level should be stable such that HVN has isolated (except for one failed valve) but service water has not automatically valved in requiring manual action per SOP-0059 Section 5.14
4. HVN-MOV129 should have failed to isolate on Level 2 but be capable of manual isolation.
5. Override: HVN-MOV129P 100%
6. T1 LO_HVN-MOV129-G override ON
7. T1 LO_HVN-MOV129-R override OFF delay 30 seconds
8. Event T1 - zdi2(308)

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Both HVR-UC1A and UC1B running with service water providing cooling and all HVN valves isolated.

PERFORMANCE:

START TIME: ____________

PROCEDURE

NOTE:

This section is only to be used in emergencies. If it is desired to use Service Water at other times, refer to SOP-0116, Turbine and Radwaste Building HVAC Chilled Water System.

1.	**Procedure Step:**	5.14.1 Verify the following valves are closed • HVN-MOV127, CHW SPLY OUTBD ISOL
	Standard	Applicant located/identified and verified HVN-MOV127 closed by checking the GREEN indicating light ON and RED indicating light OFF
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	5.14.1 Verify the following valves are closed • HVN-MOV128, CHW RTN OUTBD ISOL
	Standard	Applicant located/identified and verified HVN-MOV128 closed by checking the GREEN indicating light ON and RED indicating light OFF.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	***Procedure Step:**	5.14.1 Verify the following valves are closed • HVN-MOV129, CHW SPLY SHUTOFF VLV
	Standard	Applicant located/identified and recognized HVN-MOV129 failed to isolate on Level 2 by checking the RED indicating light ON and GREEN indicating light OFF. Applicant took action to manually isolate HVN-MOV129 by placing the control switch in the CLOSE position and verifying the GREEN indicating light ON and RED indicating light OFF.
	Cue	As CRS accept report that HVN-MOV129 has failed to isolate.
	Notes	
	Results	SAT ☐ UNSAT ☐

4.	**Procedure Step:**	5.14.1 Verify the following valves are closed • HVN-MOV130, CHW RTN SHUTOFF VLV
	Standard	Applicant located/identified and verified HVN-MOV130 closed by checking the GREEN indicating light ON and RED indicating light OFF
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	5.14.1 Verify the following valves are closed • HVN-MOV102, CHW RTN INBD ISOL
	Standard	Applicant located/identified and verified HVN-MOV102 closed by checking the GREEN indicating light ON and RED indicating light OFF.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	***Procedure Step:**	5.14.1 Verify the following valves are closed • HVN-MOV22A, CONTMT UC1A DISCH
	Standard	Applicant located/identified and closed HVN-MOV22A placing the control switch in the CLOSE position and by checking the GREEN indicating light ON and RED indicating light OFF.
	Cue	
	Notes	*HVN-MOV22A(B) isolate on Level 1 and will therefore still be open requiring the applicant to close them. This is not a failure / alternate path.*
	Results	SAT ☐ UNSAT ☐

7.	***Procedure Step:**	5.14.1 Verify the following valves are closed • HVN-MOV22B, CONTMT UC1B DISCH
	Standard	Applicant located/identified and closed HVN-MOV22B placing the control switch in the CLOSE position and by checking the GREEN indicating light ON and RED indicating light OFF.
	Cue	
	Notes	*HVN-MOV22A(B) isolate on Level 1 and will therefore still be open requiring the applicant to close them. This is not a failure, rather a part of the initial conditions (between level 2 and level 1).* Step 7 is a continuation of the step 6 bullet. Both the 22A and B valves should be closed for this condition.
	Results	SAT ☐ UNSAT ☐

8.	***Procedure Step:**	5.14.2 At H13-P870, open the following valves: 1. SWP-MOV502A, CONTAINMENT UC SUPPLY
	Standard	Applicant located/identified and opened SWP-MOV502A by placing the control switch in the OPEN position and checking the GREEN indicating light OFF and the RED indicating light ON.
	Cue	
	Notes	*The opening of SWP-MOV502A & B are NOT sequence dependent.* *Since BOTH Unit Coolers require service water, all 4 valves will be opened.*
	Results	SAT ☐ UNSAT ☐

9.	***Procedure Step:**	5.14.2 At H13-P870, open the following valves: 1. SWP-MOV502B, CONTAINMENT UC SUPPLY
	Standard	Applicant located/identified and opened SWP-MOV502B by placing the control switch in the OPEN position and checking the GREEN indicating light OFF and the RED indicating light ON.
	Cue	
	Notes	*The opening of SWP-MOV502A & B are NOT sequence dependent.* Step 9 is a continuation of the step 8 bullet. Both the 502A and B valves should be opened for this condition.
	Results	SAT ☐ UNSAT ☐

10.	***Procedure Step:**	5.14.2 At H13-P870, open the following valves: 2) SWP-MOV503A, CONTAINMENT UC RETURN
	Standard	Applicant located/identified and opened SWP-MOV503A by placing the control switch in the OPEN position and checking the GREEN indicating light OFF and the RED indicating light ON.
	Cue	
	Notes	*The opening of SWP-MOV503A & B are NOT sequence dependent.*
	Results	SAT ☐ UNSAT ☐

11.	***Procedure Step:**	5.14.2 At H13-P870, open the following valves: 2) SWP-MOV503B, CONTAINMENT UC RETURN
	Standard	Applicant located/identified and opened SWP-MOV503B by placing the control switch in the OPEN position and checking the GREEN indicating light OFF and the RED indicating light ON
	Cue	
	Notes	*The opening of SWP-MOV503A & B are NOT sequence dependent.* Step 11 is a continuation of the step 10 bullet. Both the 503A and B valves should be opened for this condition.
	Results	SAT ☐ UNSAT ☐

12.	***Procedure Step:**	5.14.3 Verify HVR-UC1A(B), CONTMT UNIT CLR A(B) is running
	Standard	Applicant recognized that only one HVR unit cooler was running and started the second cooler by depressing its START pushbutton and by checking the RED indicating light ON and GREEN indicating light OFF
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

Terminating Cue: HVR-UC1A and HVR-UC1B are running with service water providing cooling water flow and all HVN valves are isolated

This completes this JPM.

STOP TIME: ____________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

A plant transient has occurred resulting in entry into the Emergency Operating Procedures. EOP-0002 directs maximizing containment cooling. The containment unit coolers have no cooling water flow due to the isolation of HVN.
RPV Level is stable between Level 1 & Level 2.

INITIATING CUE:

The CRS has directed you to conduct Emergency Operation of Containment Unit Coolers with Service Water in accordance with SOP-0059 Section 5.14 for BOTH Containment Unit Coolers

CONTINUOUS USE

G12.1.6

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***SYSTEM OPERATING PROCEDURE**

**CONTAINMENT HVAC SYSTEM (SYS #403)*

PROCEDURE NUMBER:	***SOP-0059**
REVISION NUMBER:	***034**
Effective Date:	***06/14/11**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
SOP-0059R033EC-A	Added Notes for Steps 5.2, 5.4, and 5.6.3 referencing the annunciators that are expected to alarm during this procedure.

TABLE OF CONTENTS

1 PURPOSE

1.1 The purpose of this procedure is to provide instructions for the operation of:

1.1.1. Annulus Pressure Control System

1.1.2. Containment/Drywell Purge System

1.1.3. Containment Cooling System

2 PRECAUTIONS AND LIMITATIONS

2.1 Altering Containment HVAC alignments or operating configurations may cause a change in radiological conditions. Radiation Protection should be kept abreast of changes.

2.2 If venting/purging of Primary Containment is being performed as directed by the Emergency Operating Procedures, the Emergency Director should be notified in order to evaluate the impact on offsite dose.

2.3 With an Auto Start signal present for GTS-FN1A(B), SGT EXH FAN A(B), the fan which is stopped will automatically restart upon receiving a low flow signal from the running train, whether abnormal conditions still exist or not. When auto start signals are cleared, before stopping the running fan, it is necessary to press the STOP Pushbutton of the non running fan to prevent an unnecessary automatic restart of that fan.

2.4 Containment pressure is maintained greater than or equal to -0.3 psig and less than or equal to +0.3 psig when in Modes 1, 2 and 3.

2.5 Containment temperature is maintained greater than or equal to 70°F to ensure operability of Standby Liquid Control Solution Class 1 supports and compliance with Environmental Design Criteria spec 215.150.

2.6 Containment to Annulus high negative differential pressure will be reached much sooner and could cause an ESF actuation when purging or venting the Containment with the Annulus Pressure Control System secured.

2.7 Containment is <u>not</u> to be vented in accordance with Section 5.9 with Standby Gas Treatment in operation. Refer To Section 5.10. Starting HVR-FN14 may cause automatic initiation of Standby Gas Treatment.

2.8 All controls and indications are located on H13-P863 unless noted otherwise.

M 2.9 HVR-UC1A(B)(C), CONTMT UNIT CLR A(B)(C) outlet temperatures are controlled by HVR-TIC26A(B)(C), CONTMT UNIT CLR 1A(B)(C) INTAKE TEMPERATURE INDICATING CONTROLLER. The pre LOCA temperature is to be less than or equal to 90°F the Technical Specification upper limit for average containment temperature during normal operation to ensure the Design Basis Accident temperature of 185°F will not be exceeded. A minimum environmental design criterion of 70°F is specified for the general containment area. The setpoints of controllers HVR-TIC26A(B)(C) may be adjusted to maintain Containment temperature greater than or equal to 70°F and less than or equal to 90°F. (Ref. 7.8)

C 2.10 Simultaneous operation of both divisions of Standby Gas Treatment on the Aux. Building, can cause excessive vacuum which draws air and potential contamination out of floor drains on the Aux Building 114' elevation. Therefore, prior to starting GTS-FN1A and B, SGT EXH FAN A and B Radiation Protection will be notified to install hardware cloth and filter media per ER-RB-2005-0342 in the Auxiliary Bldg floor drain hubs to prevent the spread of contamination.

3 PREREQUISITES FOR STARTUP AND OPERATION

3.1 Verify Normal Service Water System in operation per SOP-0018, Normal Service Water.

3.2 Verify Instrument Air System in operation per SOP-0022, Instrument Air System.

3.3 Verify the below listed electrical systems are in operation:

3.3.1. 480VAC per SOP-0047, 480 VAC System

3.3.2. 120VAC per SOP-0048, 120 VAC System

3.3.3. 125VDC per SOP-0049, 125 VDC System

3.4 Verify Chilled Water System in operation per SOP-0116, Turbine and Radwaste Building HVAC Chilled Water System.

3.5 Verify Auxiliary Building HVAC System in operation per SOP-0065, HVAC-Auxiliary Building.

3.6 Verify Standby Gas Treatment System in standby per SOP-0043, Standby Gas Treatment System.

3.7 Verify Digital Radiation Monitoring System in operation per SOP-0086, Digital Radiation Monitoring System.

3.8 Verify system is lined up for startup.

4 SYSTEM STARTUP

NOTE

The APCS is operated in the manual mode only.

4.1 Annulus Pressure Control System (APCS) Startup

4.1.1. Place one HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) to START.

4.1.2. Check HVR-AOD67A(B), EXH FAN DAMPER throttles open and maintains an Annulus pressure of less than or equal to -3 inches of water as indicated on the blue pen of the LMS-TR127, ANNULUS PRESSURE & TEMPERATURE Recorder.

CAUTION

Rapid manual adjustment of HVR-PDIC267 may cause a trip of APCS and an auto start of Standby Gas Treatment System. Do not step change the HVR-PDIC267 Controller.

4.1.3. IF Annulus Pressure is NOT being maintained less than or equal to -3 inches of water, THEN at Auxiliary Building West 114 ft el, adjust Annulus Pressure to less than or equal to -3 inches by throttling open on HVR-PDIC267, ANNULUS PRESSURE CONTROLLER.

4.1.4. Place the non running HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) in standby by placing the control switch to AUTO.

4.2 Containment Cooling System Startup

M 4.2.1. At Reactor Building 162 ft el on the containment wall verify HVR-TIC26A, B and C, CONTMT UNIT CLR 1A(B)(C) INTAKE TEMPERATURE INDICATING CONTROLLERs are set between 72°F and 84°F.

4.2.2. Depress the HVR-UC1A, CONTMT UNIT CLR A RESET Pushbutton.

4.2.3. Depress the HVR-UC1B, CONTMT UNIT CLR B RESET Pushbutton.

CRITICAL STEP

4.2.4. Start the following as directed by the CRS by depressing the START Pushbutton:

NOTE

Normally 2 unit coolers are in service. However, one may be operated during outages for temperature control.

- HVR-UC1A, CONTMT UNIT CLR A and verify HVN-TV5A opens.
- HVR-UC1B, CONTMT UNIT CLR B and verify HVN TV5B opens.
- HVR-UC1C, CONTMT UNIT CLR C and verify HVN-TV122 opens.

4.2.5. Start all four HVR-FN1A, B, C and D, CONTMT DOME RECIRC FAN A, B, C and D by taking the respective control switches to START.

4.3 Placing the Reactor Sample Panel Filter Unit in Service

NOTE

This filter unit operates continuously. This ensures continuous airflow out of the Reactor sample panels.

4.3.1. Verify HVR-DMP273, EXH FROM BWRT TO HVR-FLT9 is closed.

4.3.2. Verify HVR-DMP272, SUPPLY TO HVR-FLT9 is open.

4.3.3. Locally start HVR-FN19, HVR-FLT9 PURGE FAN by placing the control switch to START.

5 SYSTEM OPERATION

5.1 Shifting Annulus Pressure Control Fans

5.1.1. Place the Standby HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) to START.

5.1.2. Verify HVR-AOD67A(B), EXH FAN DAMPER throttles open to maintain an Annulus pressure of less than or equal to -3 inches water as indicated on the blue pen of the LMS-TR127, ANNULUS PRESSURE & TEMPERATURE Recorder.

CRITICAL STEP

5.1.3. Place the previously running HVR-FN16B(A), ANNULUS PRESS CONT FAN B(A) to STOP.

5.1.4. Verify HVR-AOD67B(A), EXH FAN DAMPER closes.

5.1.5. Place the previously running HVR-FN16B(A), ANNULUS PRESS CONT FAN B(A) in standby by placing the control switch to AUTO.

NOTE

Performance of this section causes the following Annunciators to alarm:

- *Annunciator, P863-72A-A01, ANNULUS PRESSURE HIGH*
- *Annunciator, P863-72A-C01, APCS EXHAUST FAN FN16A & B TROUBLE*
- *Annunciator, P863-73A-E06, SGT FILTER TRAIN 1GTS*FLT1B INOPERATIVE*

5.2 Standby Gas Treatment Manual Startup

5.2.1. Prior to starting GTS-FN1A(B), SGT EXH FAN A(B) contact Security to take the card readers for door AB 70-04 off line to prevent personnel injury when operating door with Standby Gas Treatment System in service.

C 5.2.2. IF both Standby Gas trains will be operated simultaneously with the suction aligned from the Aux Building for testing, THEN prior to starting GTS-FN1A and B, SGT EXH FAN A and B, notify Radiation Protection to install the hardware cloth and filter media per ER-RB-2005-0342 in the Auxiliary Bldg floor drain hubs to prevent the spread of contamination.

NOTE

This section should be used when a manual initiation per Section 5.3 is either not required or desired based on unit conditions. This section also satisfies the action requirements for TR 3.3.6.2-1.6.

Reference Technical Specifications 3.6.4.3 and 3.6.4.4 for short term LCO applicability.

The individual performing this evolution may be the designated operator.

5.2.3. IF one train of Standby Gas Treatment is inoperable AND the inoperable train is to be placed in service, THEN the following is required while the operable train is in LOCKOUT:

- A dedicated operator stationed at H13-P863 who has been briefed and understands that if a annulus high radiation OR RPV level 2 (-43 inches) OR high drywell pressure (1.68 psid) ESF initiation condition/indication should occur, the LOCKOUT/RESET switch for the Standby Gas train shall immediately be placed in RESET and fan verified to automatically start.

NOTE

Locking out the Standby Gas Treatment Train may place the plant in an LCO.

5.2.4. Place the LOCKOUT/RESET switch, for the GTS-FN1A(B), SGT EXH FAN A(B) fan not being started, in LOCKOUT.

5.2.5. Open HVR-AOD22A(22B), ANNULUS MIX SPLY TO SGT.

5.2.6. Open HVR-AOD18A(18B), AUX BLDG TO SGT ISOL.

NOTE

The Standby Gas Treatment Exhaust Fan does not receive a start signal until after the suction damper is full open, therefore, the start switch must remain depressed until GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL is full open.

CRITICAL STEP

5.2.7. Start GTS-FN1A(B), SGT EXH FAN A(B) by depressing the START Pushbutton and verify the following:

1. GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL opens.
2. GTS-FN1A(B), SGT EXH FAN A(B) starts.
3. GTS-AOD3A(B), SGT EXH FAN A(B) DISCH opens.

5.2.8. Open GTS-AOD22A(B), SGT FILTER A(B) RECIRC.

5.2.9. Place the control switch for the standby Annulus Pressure Control Fan HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) to STOP.

5.2.10. Place the control switch for the running Annulus Pressure Control Fan HVR-FN16A(B) to STOP.

5.2.11. Close the following dampers:

- HVR-AOD161, ANNULUS PRESS CONT SUCT
- HVR-AOD23A, APC FAN A SUCT
- HVR-AOD23B, APC FAN B SUCT
- HVR-AOD142, APC UP STREAM DISCH
- HVR-AOD261, APC DN STREAM DISCH

5.2.12. Place the control switch for the standby Aux. Bldg. Exhaust fan HVR-FN7A(B), AUX BLDG EXH FAN A(B) to STOP.

5.2.13. Place the control switch for the running Aux. Bldg. Exhaust fan HVR-FN7A(B) to STOP.

5.2.14. Close the following dampers:

- HVR-AOD10A, AUX BLDG EXH FAN A SUCT
- HVR-AOD10B, AUX BLDG EXH FAN B SUCT

5.2.15. Place the control switch for the standby HVR-FN6A(B), AUX BLDG SPLY FAN to STOP.

5.2.16. Place the control switch for the running HVR-FN6A(B), AUX BLDG SPLY FAN to STOP.

5.2.17. <u>WHEN</u> at least two minutes have passed, <u>THEN</u> place the LOCKOUT/RESET switch in RESET for GTS-FN1A(B), SGT EXH FAN A(B)

5.2.18. At AB 141 ft el, EJS-SWG2A(B), 480 V STANDBY SWITCHGEAR, verify breaker EJS-ACB033(073), GTS-H1A(B) is closed.

5.3 Automatic or Manual Initiation of Standby Gas

5.3.1. <u>IF</u> Standby Gas is being Manually Initiated <u>AND</u> an emergency does <u>not</u> exist, <u>THEN</u> prior to starting GTS-FN1A(B), SGT EXH FAN A(B) contact Security to take the card readers for door AB 70-04 off line to prevent personnel injury when operating door with Standby Gas Treatment System in service.

C 5.3.2. <u>IF</u> both Standby Gas trains will be operated simultaneously with the suction aligned from the Aux Building for testing, <u>THEN</u> prior to starting GTS-FN1A and B, SGT EXH FAN A and B, notify Radiation Protection to install the hardware cloth and filter media per ER-RB-2005-0342 in the Auxiliary Bldg floor drain hubs to prevent the spread of contamination.

CRITICAL STEP

5.3.3. IF manual initiation is desired, THEN turn the following switches to MAN INIT:

- HVR-AOD22A, ANNULUS MIX SPLY TO SGT
- HVR-AOD22B, ANNULUS MIX SPLY TO SGT

5.3.4. Verify the following dampers close:

- HVR-AOD161, ANNULUS PRESS CONT SUCT
- HVR-AOD23A, APC FAN A SUCT
- HVR-AOD23B, APC FAN B SUCT
- HVR-AOD142, APC UP STREAM DISCH
- HVR-AOD261, APC DN STREAM DISCH
- HVR-AOD67A, EXH FAN DAMPER
- HVR-AOD67B, EXH FAN DAMPER
- HVR-AOD10A, AUX BLDG EXH FAN A SUCT
- HVR-AOD10B, AUX BLDG EXH FAN B SUCT
- HVR-AOD263, SGT UPSTREAM SPLY ISOL (LOCA only)
- HVR-AOD264, SGT DNSTREAM SPLY ISOL (LOCA only)

5.3.5. Place the control switches for the following fans in STOP:

- HVR-FN16A, ANNULUS PRESS CONT FAN A
- HVR-FN16B, ANNULUS PRESS CONT FAN B
- HVR-FN6A, AUX BLDG SPLY FAN
- HVR-FN6B, AUX BLDG SPLY FAN
- HVR-FN7A, AUX BLDG EXH FAN A
- HVR-FN7B, AUX BLDG EXH FAN B

5.3.6. Verify the following:

- HVR-AOD22A, ANNULUS MIX SPLY TO SGT is open.
- HVR-AOD18A, AUX BLDG TO SGT ISOL is open.
- HVR-AOD22B, ANNULUS MIX SPLY TO SGT is open.
- HVR-AOD18B, AUX BLDG TO SGT ISOL is open.

5.3.7. Verify both Standby Gas Treatment Trains start by observing the following:

- GTS-FN1A, SGT EXH FAN A is running.
- GTS-AOD1A, SGT FILTER A SUCT ISOL is open.
- GTS-AOD3A, SGT EXH FAN A DISCH is open.
- GTS-AOD22A, SGT FILTER A RECIRC is open.
- GTS-FN1B, SGT EXH FAN B is running.
- GTS-AOD1B, SGT FILTER B SUCT ISOL is open.
- GTS-AOD3B, SGT EXH FAN B DISCH is open.
- GTS-AOD22B, SGT FILTER B RECIRC is open.

5.3.8. IF systems were manually initiated, THEN reset manual initiation of system by placing the following switches to RESET:

- HVR-AOD22A, ANNULUS MIX SPLY TO SGT
- HVR-AOD22B, ANNULUS MIX SPLY TO SGT

NOTE

The individual performing this evolution may be the designated operator.

5.3.9. At AB 141 ft el, EJS-SWG2A(B), 480 V STANDBY SWITCHGEAR, verify breaker EJS-ACB033(073), GTS-H1A(B) is closed.

5.3.10. IF one train of Standby Gas Treatment is inoperable AND the operable train is to be taken out of service first, THEN the following is required while the operable train is in LOCKOUT:

- A dedicated operator stationed at H13-P863 who has been briefed and understands that if a annulus high radiation OR RPV level 2 (-43 inches) OR high drywell pressure (1.68 psid) ESF initiation condition/indication should occur, the LOCKOUT/RESET switch for Standby Gas train shall immediately be placed in RESET and fan verified to automatically start.

NOTE

Following an automatic or manual initiation of GTS-FN1A(B), SGT EXH FAN A(B), the fan which is stopped will automatically restart upon receiving a LOW FLOW signal from the running train, whether or not abnormal conditions still exist.

5.3.11. Place one train of standby Gas Treatment in standby as follows:

NOTE

Select all "A" train OR all "B" train components.

1. Place GTS-FN1A(B), SGT EXH FAN A(B) in STOP and LOCKOUT.
2. Verify the following:
   1) GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL closes.
   2) GTS-AOD3A(B), SGT EXH FAN A(B) DISCH closes.
   3) IF GTS-AOD22A(B), SGT FILTER A(B) RECIRC control switch is in OPEN, THEN place GTS-AOD22A(B) in AUTO.
   4) Verify GTS-AOD22A(B) closes.
3. IF the filter train was running greater than 60 sec., THEN verify the following:
   - GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL starts.
   - GTS-AOD4A(B), DECAY HEAT REMOVAL INTK opens.

4. WHEN at least two minutes have passed to allow for system flows to stabilize, THEN place the LOCKOUT/RESET switch for GTS-FN1A(B) in RESET.

5. WHEN GTS-FN2A(B) has run for at least 30 minutes OR at the discretion of the OSM/CRS, THEN perform the following:

   1) Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in STOP.

   2) Verify GTS-AOD4A(B), DECAY HEAT REMOVAL INTK closes.

   3) Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in AUTO.

5.3.12. Monitor the following while SGTS is in operation:

- GTS-FLT1A(B), SGT FILTER TRAIN local component differential pressure instruments.
- RMS-RE11A(B), ANNULUS EXH RAD MONITOR
- RMS-RE103, SGT FILTER EXH RAD MONITOR

NOTE

Performance of this section causes the following Annunciators to alarm:

- *Annunciator, P863-72A-A01, ANNULUS PRESSURE HIGH*
- *Annunciator, P863-72A-C01, APCS EXHAUST FAN FN16A & B TROUBLE*
- *Annunciator, P863-72A-F04, AUX BLDG PRESSURE HIGH*
- *Annunciator, P863-73A-E06, SGT FILTER TRAIN 1GTS*FLT1B INOPERATIVE*
- *Annunciator, P845-B-H03, ADSORBER TRAIN "B" FLOW HI/LOW*

5.4 Restoration of Standby Gas

5.4.1. Verify the following switches are in RESET and all auto start signals are clear:

- HVR-AOD22A, ANNULUS MIX SPLY TO SGT
- HVR-AOD22B, ANNULUS MIX SPLY TO SGT

NOTE

The individual performing this evolution may be the designated operator.

5.4.2. IF one train of Standby Gas Treatment is inoperable AND the operable train is the standby train, THEN the following is required while the operable train is in LOCKOUT:

- A dedicated operator stationed at H13-P863 who has been briefed and understands that if a annulus high radiation OR RPV level 2 (-43 inches) OR high drywell pressure (1.68 psid) ESF initiation condition/indication should occur, the LOCKOUT/RESET switch for the Standby Gas train shall immediately be placed in RESET and the fan verified to automatically start.

NOTE

When auto start signals are cleared, before stopping the running Standby Gas Fan, it is necessary to press the STOP Pushbutton of the non running fan to prevent an automatic restart on a low flow signal from the running train.

Locking out the Standby Gas Treatment Train may place the plant in an LCO.

5.4.3. Place the LOCKOUT/RESET switch for the Standby Train GTS-FN1A(B), SGT EXH FAN A(B) in LOCKOUT.

5.4.4. Depress the STOP Pushbutton for the running GTS-FN1A(B), SGT EXH FAN A(B).

5.4.5. Verify the following:

- GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL is closed.
- GTS-AOD3A(B), SGT EXH FAN A(B) DISCH is closed.

5.4.6. IF either of the following control switches is in OPEN, THEN place the control switch to AUTO:

- GTS-AOD22A, SGT FILTER A RECIRC
- GTS-AOD22B, SGT FILTER B RECIRC

5.4.7. Verify the following dampers are closed:

- GTS-AOD22A
- GTS-AOD22B

5.4.8. Verify proper Filter Train Decay Heat Removal operation by observing the following:

- GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL running.
- GTS-AOD4A(B), DECAY HEAT REMOVAL INTK is open.

5.4.9. Open the following dampers:

- HVR-AOD161, ANNULUS PRESS CONT SUCT.
- HVR-AOD23A, APC FAN A SUCT.

- HVR-AOD23B, APC FAN B SUCT.
- HVR-AOD142, APC UP STREAM DISCH.
- HVR-AOD261, APC DN STREAM DISCH.

5.4.10. Close the following dampers:

- HVR-AOD22A, ANNULUS MIX SPLY TO SGT.
- HVR-AOD22B, ANNULUS MIX SPLY TO SGT.

5.4.11. Place one HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) to START.

5.4.12. Check HVR-AOD67A(B), EXH FAN DAMPER modulates to maintain an Annulus pressure of less than or equal to -3 inches water as indicated on the blue pen of the LMS-TR127, ANNULUS PRESSURE & TEMPERATURE Recorder.

5.4.13. Place the LOCKOUT/RESET switch for GTS-FN1A(B), SGT EXH FAN A(B) that was operated in Step 5.4.3 in RESET.

CAUTION

Rapid manual adjustment of HVR-PDIC267, may cause a trip of APCS and an auto start of Standby Gas Treatment System. Do not step change the HVR-PDIC267 Controller.

5.4.14. IF Annulus Pressure is NOT being automatically maintained at less than or equal to -3 inches and greater than or equal to -5 inches water, THEN at Auxiliary Building West 114 ft el, place HVR-PDIC267, ANNULUS PRESSURE CONTROLLER in MANUAL and adjust Annulus Pressure to less than or equal to -3 inches and greater than or equal to -5 inches water.

5.4.15. Place the non running HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) in standby by placing the control switch to AUTO.

5.4.16. Close the following dampers:

- HVR-AOD18A, AUX BLDG TO SGT ISOL
- HVR-AOD18B, AUX BLDG TO SGT ISOL

5.4.17. Restart Auxiliary Building HVAC per SOP-0065, HVAC-Auxiliary Building.

5.4.18. WHEN GTS-FN2A(B) has run for at least 30 minutes OR at the discretion of the OSM/CRS, THEN perform the following:

1. Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in STOP.

2. Verify GTS-AOD4A(B), DECAY HEAT REMOVAL INTK closes.

3. Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in AUTO.

5.4.19. IF Standby Gas was manually initiated for a non-emergency per Section 5.3 OR manually started per Section 5.2, THEN contact Security to place the card readers for door AB 70-04 back on line that were taken off line per step 5.2.1 or 5.3.1.

5.4.20. IF both Standby Gas trains were started for testing AND were aligned with suction from the Auxiliary Building, THEN notify Radiation Protection to remove the hardware cloth and filter media per ER-RB-2005-0342 in the Auxiliary Bldg floor drain hubs.

5.5 Containment High Volume Purge

CAUTION

Venting / Purging Containment while pressure is greater than 2 psig may cause damage to the Auxiliary Building ductwork. Do not vent / purge Containment with pressure greater than 2 psig unless directed by EOP-2, Primary Containment Control.

Operation of the Containment Purge System while the Hydrogen Mixing System is in use during Modes 1, 2, or 3 could result in increased offsite release rates. Do not operate the Containment Purge System simultaneously with the Hydrogen Mixing System during Modes 1, 2, and 3.

Technical Specifications LCO 3.6.1.3 does not allow 36 inch Primary Containment Purge Valves to be open while in mode 1, 2, or 3 for temperature and/or humidity control. Do not operate Containment Purge in modes 1, 2, or 3 for temperature and/or humidity control. (Reference Commitment #1315) These valves may be opened for pressure control, ALARA, or air quality considerations for personnel entry or for Surveillances, or special testing on the purge system that require the valves to be open. (Reference SR 3.6.1.3.1)

If venting / purging of the Primary Containment is being performed as directed by the EOPs, the Emergency Director should be notified in order to evaluate the impact on offsite dose rates. Do not operate the system without informing the Emergency Director so that offsite dose may be evaluated.

NOTE

If one Standby Gas Treatment subsystem is in the Primary Containment Purge flowpath, both Standby Gas Treatment Subsystems must be operable. In addition, only one Standby Gas Treatment Subsystem may be operating in the Primary Containment Purge flow path.

C 5.5.1. WHEN required by Tech Specs, THEN verify both trains of Standby Gas Treatment are operable.

5.5.2. Verify the following dampers are open:

- HVR-AOD164, UP STREAM ISOL SUPPLY
- HVR-AOD143, DN STREAM ISOL SUPPLY

5.5.3. Open the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOD124, CONTMT PURGE SPLY ISOL
- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD245, CONTMT PURGE TO SGT
- HVR-AOD162, CONTMT PURGE TO SGT

CAUTION

Unattended Containment Purge operation can result in an ESF actuation on Containment to Annulus high negative differential pressure. Do not operate the Containment Purge System without closely monitoring Containment and Annulus Pressures.

NOTE

The Standby Gas Treatment Exhaust Fan does not receive a start signal until after the suction damper is full open, therefore, the start switch must remain depressed until GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL is full open.

CRITICAL STEP

5.5.4. Start GTS-FN1A(B), SGT EXH FAN A(B) by depressing the START Pushbutton and verify the following:

1. GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL opens.
2. GTS-FN1A(B), SGT EXH FAN A(B) starts.
3. GTS-AOD3A(B), SGT EXH FAN A(B) DISCH opens.

CRITICAL STEP

5.5.5. Place HVR-FN8, HIGH VOL CONTMT/DW PURGE to START and verify HVR-AOD244, HIGH VOL FAN DISCH opens.

5.5.6. At AB 141 ft el, EJS-SWG2A(B), 480 V STANDBY SWITCHGEAR, verify breaker EJS-ACB033(073), GTS-H1A(B) is closed.

5.5.7. Verify proper filter operation by observing the following differential pressure and radiation indications:

- GTS-FLT1A(B), SGT FILTER TRAIN local component differential pressure instruments
- RMS-RE21A&B, CONTMT PURGE ISOL
- RMS-RE103, SGT FILTER EXH RAD MONITOR

5.5.8. WHEN Containment Purge is no longer required, THEN place HVR-FN8, HIGH VOL CONTMT/DW PURGE to STOP and verify HVR-AOD244, HIGH VOL FAN DISCH closes.

5.5.9. Depress the GTS-FN1A(B), SGT EXH FAN A(B) STOP Pushbutton and verify the following dampers close:

- GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL
- GTS-AOD3A(B), SGT EXH FAN A(B) DISCH

5.5.10. Verify proper Filter Train Decay Heat Removal operation by observing the following:

- GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL running.
- GTS-AOD4A(B), DECAY HEAT REMOVAL INTK is open.

5.5.11. Close the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOD124, CONTMT PURGE SPLY ISOL
- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL

NOTE

HVR-AOD245(AOD162) is interlocked with the containment return valve, HVR-AOV128(AOV166). The control switch for the purge to SGT dampers must be taken to CLOSE to reset the logic, even when the damper is already closed.

5.5.12. Reset the logic by momentarily placing the following control switches in CLOSE and then to the Mid position:

- HVR-AOD245, CONTMT PURGE TO SGT
- HVR-AOD162, CONTMT PURGE TO SGT

5.5.13. WHEN GTS-FN2A(B) has run for at least 30 minutes OR at the discretion of the OSM/CRS, THEN perform the following:

1. Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in STOP.
2. Verify GTS-AOD4A(B), DECAY HEAT REMOVAL INTK closes.
3. Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in AUTO.

5.6 Containment Low Volume Purge

<u>CAUTION</u>

Venting / Purging Containment while pressure is greater than 2 psig can damage the Auxiliary Building ductwork. Do <u>not</u> vent /purge Containment with pressure greater than 2 psig unless directed by EOP-2, Primary Containment Control.

Operation of the Containment Purge System while the Hydrogen Mixing System is in use during Modes 1, 2, or 3 could result in increased offsite release rates. Do <u>not</u> operate the Containment Purge System simultaneously with the Hydrogen Mixing System during Modes 1, 2, and 3.

Technical Specifications LCO 3.6.1.3 does <u>not</u> allow 36 inch Primary Containment Purge Valves to be open while in mode 1, 2, or 3 for temperature and/or humidity control. Do <u>not</u> operate Containment Purge in modes 1, 2, or 3 for temperature and/or humidity control. (Reference Commitment #1315) These valves may be opened for pressure control, ALARA, or air quality considerations for personnel entry or for Surveillances, or special testing on the purge system that require the valves to be open. (Reference SR 3.6.1.3.1)

If venting/purging of the Primary Containment is being performed as directed by the EOPs, the Emergency Director should be notified in order to evaluate the impact on offsite dose rates. Do <u>not</u> operate the system without informing the Emergency Director so that offsite dose may be evaluated.

5.6.1. Verify the following dampers are open:

- HVR-AOD164, UP STREAM ISOL SUPPLY
- HVR-AOD143, DN STREAM ISOL SUPPLY
- HVR-AOD214, AUX/CONTMT BLDG EXH ISOL
- HVR-AOD262, AUX/CONTMT BLDG EXH ISOL

5.6.2. Open the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOD124, CONTMT PURGE SPLY ISOL
- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD225, CONTMT/DW PURGE EXH ISOL

CAUTION

Unattended Containment Purge operation can result in an ESF actuation on Containment to Annulus high negative differential pressure. Do not operate the Containment Purge System without closely monitoring Containment and Annulus Pressures.

NOTE

Performance of this section causes the following annunciator to alarm:

- *Annunciator, P863-71A-F02, CONTMT/DW PURGE DAMPERS & VALVES MISALIGNED*

CRITICAL STEP

5.6.3. Place HVR-FN14, CONTMT PURGE FLT EXH FAN to START and verify the following:

- HVR-AOD238, CONTMT PURGE FLT SUCT opens.
- HVR-AOD240, CONTMT FLT EXH FAN SUCT opens.

CRITICAL STEP

5.6.4. Place HVR-FN13, LOW VOL CONTMT PURGE to START and verify HVR-AOD236, LOW VOL FAN DISCH opens.

5.6.5. Verify proper filter operation by observing the following differential pressure and radiation indications:

- HVR-FLT6, CONTMT/DRYWELL PURGE EXH FLT local component differential pressure instruments
- RMS-RE21A&B, CONTMT PURGE ISOL
- RMS-RE116, CONTMT PURGE FLT EXH

5.6.6. WHEN Containment Purge is no longer required, THEN place HVR-FN13, LOW VOL CONTMT PURGE to STOP and verify HVR-AOD236, LOW VOL FAN DISCH closes.

5.6.7. Place HVR-FN14, CONTMT PURGE FLT EXH FAN to STOP and verify the following dampers close:

- HVR-AOD238, CONTMT PURGE FLT SUCT
- HVR-AOD240, CONTMT FLT EXH FAN SUCT

5.6.8. Verify HVR-FN15, FLT6 DECAY HEAT REMOVAL starts and the following dampers open:

- HVR-AOD239, DECAY HEAT REMOVAL INTK
- HVR-AOD241, DECAY HEAT REMOVAL DISCH

5.6.9. Close the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOD124, CONTMT PURGE SPLY ISOL
- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL

5.6.10. WHEN HVR-FN15, FLT6 DECAY HEAT REMOVAL has operated at least 30 minutes OR at the discretion of the OSM/CRS, THEN place Filter Train Decay Heat Removal in standby by performing the following:

1. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in STOP.
2. Verify HVR-AOD239, DECAY HEAT REMOVAL INTK closes.
3. Verify HVR-AOD241, DECAY HEAT REMOVAL DISCH closes.
4. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in AUTO.

5.6.11. Close HVR-AOD225, CONTMT/DW PURGE EXH ISOL.

5.7 Drywell High Volume Purge

CAUTION

Operation of Drywell Purge while in Modes 1, 2, or 3 is in conflict with Technical Specification LCO 3.6.5.3. Do not operate Drywell Purge while in Modes 1, 2, or 3.

5.7.1. Release administrative controls and open the following valves:

- HVR-AOV125-V1, DRYWELL SPLY OUTBD ISOL
- HVR-AOV126-V1, DRYWELL EXH AIR OUTBD ISOL
- HVR-AOV147-V1, DRYWELL SPLY INBD ISOL
- HVR-AOV148-V1, DRYWELL EXH AIR INBD ISOL

5.7.2. Release administrative controls on the following control switches:

- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL

5.7.3. Verify the following dampers are open:

- HVR-AOD164, UP STREAM ISOL SUPPLY
- HVR-AOD143, DN STREAM ISOL SUPPLY

5.7.4. Open the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD245, CONTMT PURGE TO SGT
- HVR-AOD162, CONTMT PURGE TO SGT

CAUTION

Unattended Drywell Purge operation can result in an ESF actuation on Containment to Annulus high negative differential pressure. Do not operate the Drywell Purge System without closely monitoring Containment and Annulus Pressures.

NOTE

The Standby Gas Treatment Exhaust Fan does not receive a start signal until after the suction damper is full open, therefore, the start switch must remain depressed until GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL is full open.

Startup of the Standby Gas Treatment System may cause an Annulus Mixing System Initiation due to low Annulus Pressure Control System flow.

CRITICAL STEP

5.7.5. Start GTS-FN1A(B), SGT EXH FAN A(B) by depressing the START Pushbutton and verify the following:

1. GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL opens.
2. GTS-FN1A(B), SGT EXH FAN A(B) starts.
3. GTS-AOD3A(B), SGT EXH FAN A(B) DISCH opens.

5.7.6. IF an Annulus Mixing System Initiation is received, THEN take action in accordance with the associated annunciator Alarm Response Procedures.

CRITICAL STEP

5.7.7. Place HVR-FN8, HIGH VOL CONTMT/DW PURGE to START and verify HVR-AOD244, HIGH VOL FAN DISCH opens.

5.7.8. At AB 141 ft el, EJS-SWG2A(B), 480 V STANDBY SWITCHGEAR, verify breaker EJS-ACB033(073), GTS-H1A(B) is closed.

5.7.9. Verify proper filter operation by observing the following differential pressure and radiation indications:

- GTS-FLT1A(B), SGT FILTER TRAIN local component differential pressure instruments
- RMS-RE21A&B, CONTMT PURGE ISOL
- RMS-RE103, SGT FILTER EXH RAD MONITOR

5.7.10. WHEN Drywell Purge is no longer required, THEN place HVR-FN8, HIGH VOL CONTMT/DW PURGE to STOP and verify HVR-AOD244, HIGH VOL FAN DISCH closes.

5.7.11. Depress the GTS-FN1A(B), SGT EXH FAN A(B) STOP Pushbutton and verify the following dampers close:

- GTS-AOD1A(B), SGT FILTER A(B) SUCT ISOL
- GTS-AOD3A(B), SGT EXH FAN A(B) DISCH

5.7.12. Verify proper Filter Train Decay Heat Removal operation by observing the following:

- GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL running.
- GTS-AOD4A(B), DECAY HEAT REMOVAL INTK is open.

5.7.13. Close the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOV125 & 126, DW PURGE BACKUP ISOL

- HVR-AOV147 & 148, DW PURGE ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL

NOTE

HVR-AOD245(AOD162) is interlocked with the containment return valve, HVR-AOV128(AOV166). The control switch for the Purge to SGT damper must be taken to CLOSE to reset the logic, even when the damper is already closed.

5.7.14. Reset the logic by momentarily placing the following control switches in CLOSE and then to the Mid position:

- HVR-AOD245, CONTMT PURGE TO SGT
- HVR-AOD162, CONTMT PURGE TO SGT

5.7.15. Place administrative controls on the following control switches:

- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL

5.7.16. Close the following valves and install administrative controls:

- HVR-AOV125-V1, DRYWELL SPLY OUTBD ISOL
- HVR-AOV126-V1, DRYWELL EXH AIR OUTBD ISOL
- HVR-AOV147-V1, DRYWELL SPLY INBD ISOL
- HVR-AOV148-V1, DRYWELL EXH AIR INBD ISOL

5.7.17. <u>WHEN</u> GTS-FN2A (B) has run for at least 30 minutes <u>OR</u> at the discretion of the OSM/CRS, <u>THEN</u> perform the following:

1. Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in STOP.
2. Verify GTS-AOD4A(B), DECAY HEAT REMOVAL INTK closes.
3. Place GTS-FN2A(B), SGT A(B) DECAY HEAT REMOVAL in AUTO.

5.8 Drywell Low Volume Purge

CAUTION

Operation of Drywell Purge while in Modes 1, 2, or 3 is in conflict with Technical Specification LCO 3.6.5.3. Do not operate Drywell Purge while in Modes 1, 2, or 3.

5.8.1. Release administrative controls and open the following valves:

- HVR-AOV125-V1, DRYWELL SPLY OUTBD ISOL
- HVR-AOV126-V1, DRYWELL EXH AIR OUTBD ISOL
- HVR-AOV147-V1, DRYWELL SPLY INBD ISOL
- HVR-AOV148-V1, DRYWELL EXH AIR INBD ISOL

5.8.2. Release administrative controls on the following control switches:

- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL

5.8.3. Verify the following dampers are open:

- HVR-AOD164, UP STREAM ISOL SUPPLY
- HVR-AOD143, DN STREAM ISOL SUPPLY
- HVR-AOD214, AUX/CONTMT BLDG EXH ISOL
- HVR-AOD262, AUX/CONTMT BLDG EXH ISOL

5.8.4. Open the following valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD225, CONTMT/DW PURGE EXH ISOL

CAUTION

Unattended Containment Purge operation can result in an ESF actuation on Containment to Annulus high negative differential pressure. Do not operate the Containment Purge System without closely monitoring Containment and Annulus Pressures.

CRITICAL STEP

5.8.5. Place HVR-FN14, CONTMT PURGE FLT EXH FAN to START and verify the following:

- HVR-AOD238, CONTMT PURGE FLT SUCT opens.
- HVR-AOD240, CONTMT FLT EXH FAN SUCT opens.

CRITICAL STEP

5.8.6. Place HVR-FN13, LOW VOL CONTMT PURGE to START and verify HVR-AOD236, LOW VOL FAN DISCH opens.

5.8.7. Verify proper filter operation by observing the following differential pressure and radiation indications:

- HVR-FLT6, CONTMT/DRYWELL PURGE EXH FLT local component differential pressure instruments
- RMS-RE21A&B, CONTMT PURGE ISOL
- RMS-RE116, CONTMT PURGE FLT EXH

5.8.8. WHEN Drywell Purge is no longer required, THEN place HVR-FN13, LOW VOL CONTMT PURGE to STOP and verify HVR-AOD236, LOW VOL FAN DISCH closes.

5.8.9. Place HVR-FN14, CONTMT PURGE FLT EXH FAN to STOP and verify the following dampers close:

- HVR-AOD238, CONTMT PURGE FLT SUCT
- HVR-AOD240, CONTMT FLT EXH FAN SUCT

5.8.10. Verify HVR-FN15, FLT6 DECAY HEAT REMOVAL starts and the following dampers open:

- HVR-AOD239, DECAY HEAT REMOVAL INTK
- HVR-AOD241, DECAY HEAT REMOVAL DISCH

5.8.11. Close the following valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL

NOTE

Steps 5.8.12 and 5.8.13 are only required to be performed if entering Modes 1, 2, or 3.

5.8.12. Place administrative controls on the following control switches:

- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL

5.8.13. Close the following valves and install administrative controls:

- HVR-AOV125-V1, DRYWELL SPLY OUTBD ISOL
- HVR-AOV126-V1, DRYWELL EXH AIR OUTBD ISOL
- HVR-AOV147-V1, DRYWELL SPLY INBD ISOL
- HVR-AOV148-V1, DRYWELL EXH AIR INBD ISOL

5.8.14. WHEN HVR-FN15, FLT6 DECAY HEAT REMOVAL has operated at least 30 minutes OR at the discretion of the OSM/CRS, THEN place Filter Train Decay Heat Removal in standby by performing the following:

1. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in STOP.
2. Verify HVR-AOD239, DECAY HEAT REMOVAL INTK closes.
3. Verify HVR-AOD241, DECAY HEAT REMOVAL DISCH closes.
4. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in AUTO.

5.8.15. Close HVR-AOD225, CONTMT/DW PURGE EXH ISOL.

5.9 Containment Venting Using the Containment Purge Filter Exhaust Fan in Recirculation Mode

CAUTION

Venting / Purging Containment while pressure is greater than 2 psig may cause damage to the Auxiliary Building ductwork. Do not vent / purge Containment with pressure greater than 2 psig unless directed by EOP-2, Primary Containment Control.

Operation of the Containment Purge System while the Hydrogen Mixing System is in use during Modes 1, 2, or 3 could result in increased offsite release rates. Do not operate the Containment Purge System simultaneously with the Hydrogen Mixing System during Modes 1, 2, and 3.

Technical Specifications LCO 3.6.1.3 does not allow 36 inch Primary Containment Purge Valves to be open while in mode 1, 2, or 3 for temperature and/or humidity control. Do not operate Containment Purge in modes 1, 2, or 3 for temperature and/or humidity control. (Reference Commitment #1315).

If venting/purging of the Primary Containment is being performed as directed by the EOPs, the Emergency Director should be notified in order to evaluate the impact on offsite dose rates. Do not operate the system without informing the Emergency Director so that offsite dose may be evaluated.

NOTE

Starting HVR-FN14 with a Standby Gas Train already in operation may cause auto initiation of Division A and B Gas Treatment Systems. Do not vent Containment in accordance with Section 5.9 in this circumstance. The Standby Gas Treatment Filter should be used per Section 5.10.

5.9.1. Verify the following dampers are open:

- HVR-AOD214, AUX/CONTMT BLDG EXH ISOL
- HVR-AOD262, AUX/CONTMT BLDG EXH ISOL

5.9.2. Open the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOD124, CONTMT PURGE SPLY ISOL
- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD242, CONTMT PURGE RECIRC RTN

CAUTION

Unattended Containment Purge operation can result in an ESF actuation on Containment to Annulus high negative differential pressure. Do not operate the Containment Purge System without closely monitoring Containment and Annulus Pressures.

5.9.3. Place HVR-FN14, CONTMT PURGE FLT EXH FAN to START and verify the following:

- HVR-AOD238, CONTMT PURGE FLT SUCT opens.
- HVR-AOD240, CONTMT FLT EXH FAN SUCT opens.

CRITICAL STEP

5.9.4. Open HVR-AOD225, CONTMT/DW PURGE EXH ISOL.

5.9.5. WHEN Containment pressure has been reduced as needed, OR a DIV I or DIV II ANNULUS HIGH NEGATIVE DIFFERENTIAL PRESSURE alarm is received, THEN place HVR-FN14, CONTMT PURGE FLT EXH FAN to STOP and verify the following dampers close:

- HVR-AOD238, CONTMT PURGE FLT SUCT
- HVR-AOD240, CONTMT FLT EXH FAN SUCT

5.9.6. Verify HVR-FN15, FLT6 DECAY HEAT REMOVAL starts and the following dampers open:

- HVR-AOD239, DECAY HEAT REMOVAL INTK
- HVR-AOD241, DECAY HEAT REMOVAL DISCH

5.9.7. Close the following dampers and valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOD124, CONTMT PURGE SPLY ISOL
- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD242, CONTMT PURGE RECIRC RTN

5.9.8. WHEN HVR-FN15, FLT6 DECAY HEAT REMOVAL has operated at least 30 minutes OR at the discretion of the OSM/CRS, THEN place Filter Train Decay Heat Removal in standby by performing the following:

1. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in STOP.
2. Verify HVR-AOD239, DECAY HEAT REMOVAL INTK closes.
3. Verify HVR-AOD241, DECAY HEAT REMOVAL DISCH closes.
4. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in AUTO.

5.9.9. Close HVR-AOD225, CONTMT/DW PURGE EXH ISOL.

5.10 Containment Venting With Standby Gas Treatment Train In Operation

CAUTION

Venting / Purging Containment while pressure is greater than 2 psig can damage the Auxiliary Building ductwork. Do not vent/purge Containment with pressure greater than 2 psig unless directed by EOP-2, Primary Containment Control.

Operation of the Containment Purge System while the Hydrogen Mixing System is in use during Modes 1, 2, or 3 could result in increased offsite release rates. Do not operate the Containment Purge System simultaneously with the Hydrogen Mixing System during Modes 1, 2, and 3.

Technical Specifications LCO 3.6.1.3 does not allow 36 inch Primary Containment Purge Valves to be open while in mode 1, 2, or 3 for temperature and/or humidity control. Do not operate Containment Purge in modes 1, 2, or 3 for temperature and/or humidity control. (Reference Commitment #1315).

If venting/purging of the Primary Containment is being performed as directed by the EOPs, the Emergency Director should be notified in order to evaluate the impact on offsite dose rates. Do not operate the system without informing the Emergency Director so that offsite dose may be evaluated.

Technical Specifications LCO 3.6.4.3 does not allow operating the OPERABLE SGT in the primary containment purge flow path in modes 1, 2, or 3 with one SGT subsystem inoperable. Do not operate the OPERABLE SGT in the primary containment purge flow path in modes 1, 2, or 3 with one SGT subsystem inoperable.

5.10.1. Open the following dampers and valves:

- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD245, CONTMT PURGE TO SGT
- HVR-AOD162, CONTMT PURGE TO SGT

5.10.2. WHEN containment pressure has been reduced as needed, OR a DIV I or DIV II ANNULUS HIGH NEGATIVE DIFFERENTIAL PRESSURE alarm is received, THEN close the following dampers and valves:

- HVR-AOD127, CONTMT PURGE RTN ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL

NOTE

HVR-AOD245(AOD162) is interlocked with the containment return valve, HVR-AOV128(AOV166). The control switch for the Purge to SGT damper must be taken to CLOSE to reset the logic, even when the damper is already closed.

5.10.3. Reset the logic by momentarily placing the following control switches in CLOSE and then to the Mid position:

- HVR-AOD245, CONTMT PURGE TO SGT
- HVR-AOD162, CONTMT PURGE TO SGT

5.11 Drywell Recirculation Using the Containment Purge Filter Exhaust Fan

CAUTION

Operation of Drywell Recirculation while in Modes 1, 2, or 3 is in conflict with Technical Specification LCO 3.6.5.3. Do not operate Drywell Recirculation while in Modes 1, 2, or 3.

5.11.1. Release administrative controls and open the following valves:

- HVR-AOV125-V1, DRYWELL SPLY OUTBD ISOL
- HVR-AOV126-V1, DRYWELL EXH AIR OUTBD ISOL
- HVR-AOV147-V1, DRYWELL SPLY INBD ISOL
- HVR-AOV148-V1, DRYWELL EXH AIR INBD ISOL

5.11.2. Release administrative controls on the following control switches:

- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL

5.11.3. Open the following valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD242, CONTMT PURGE RECIRC RTN

CAUTION

Unattended Containment Purge operation can result in an ESF actuation on Containment to Annulus high negative differential pressure. Do not operate the Containment Purge System without closely monitoring Containment and Annulus Pressures.

CRITICAL STEP

5.11.4. Place HVR-FN14, CONTMT PURGE FLT EXH FAN to START and verify the following:

- HVR-AOD238, CONTMT PURGE FLT SUCT opens.
- HVR-AOD240, CONTMT FLT EXH FAN SUCT opens.

5.11.5. Verify proper filter operation by observing the following differential pressure and radiation indications:

- HVR-FLT6, CONTMT/DRYWELL PURGE EXH FLT local component differential pressure instruments
- RMS-RE116, CONTMT PURGE FLT EXH

5.11.6. WHEN Drywell Recirculation is no longer required, THEN perform the following:

1. Verify the following dampers are open:
   - HVR-AOD214, AUX/CONTMT BLDG EXH ISOL
   - HVR-AOD262, AUX/CONTMT BLDG EXH ISOL
2. Place HVR-FN14, CONTMT PURGE FLT EXH FAN to STOP and verify the following dampers close:
   - HVR-AOD238, CONTMT PURGE FLT SUCT
   - HVR-AOD240, CONTMT FLT EXH FAN SUCT
3. Verify HVR-FN15, FLT6 DECAY HEAT REMOVAL starts and the following dampers open:
   - HVR-AOD239, DECAY HEAT REMOVAL INTK
   - HVR-AOD241, DECAY HEAT REMOVAL DISCH

5.11.7. Open HVR-AOD225, CONTMT/DW PURGE EXH ISOL.

5.11.8. Close the following valves:

- HVR-AOV165, CONTMT SPLY OUTBD ISOL
- HVR-AOV123, CONTMT SPLY INBD ISOL
- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL
- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL
- HVR-AOD242, CONTMT PURGE RECIRC RTN

5.11.9. Place administrative controls on the following control switches:

- HVR-AOV125 & 126, DW PURGE BACKUP ISOL
- HVR-AOV147 & 148, DW PURGE ISOL

5.11.10. Close the following valves and install administrative controls:

- HVR-AOV125-V1, DRYWELL SPLY OUTBD ISOL
- HVR-AOV126-V1, DRYWELL EXH AIR OUTBD ISOL
- HVR-AOV147-V1, DRYWELL SPLY INBD ISOL
- HVR-AOV148-V1, DRYWELL EXH AIR INBD ISOL

5.11.11. WHEN HVR-FN15, FLT6 DECAY HEAT REMOVAL has operated at least 30 minutes OR at the discretion of the OSM/CRS, THEN place Filter Train Decay Heat Removal in standby by performing the following:

1. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in STOP.
2. Verify HVR-AOD239, DECAY HEAT REMOVAL INTK closes.
3. Verify HVR-AOD241, DECAY HEAT REMOVAL DISCH closes.
4. Place HVR-FN15, FLT6 DECAY HEAT REMOVAL in AUTO.

5.11.12. Close HVR-AOD225, CONTMT/DW PURGE EXH ISOL.

5.12 Alternating Containment Unit Coolers

5.12.1. Stop one of the running HVR-UC1A(B)(C), CONTMT UNIT CLR A(B)(C) and verify the applicable cooling water valve HVN-TV5A(B)(HVN-TV122) closes.

CRITICAL STEP

5.12.2. Start the standby HVR-UC1A(B)(C), CONTMT UNIT CLR A(B)(C) and verify the applicable cooling water valve HVN-TV5A(B)(HVN-TV122) opens.

5.13 Using the Reactor Sample Panel Filter Unit to support RWCU F/D Backwashes

NOTE

If approved by Radiation Protection Supervision, HVR-FN19, HVR-FLT9 PURGE FAN, can be used to support RWCU F/D backwashes. This permission is typically granted only when the plant is shutdown.

5.13.1. Request permission from the Radiation Protection Supervisor to use HVR-FN19, HVR-FLT9 PURGE FAN to support RWCU F/D Backwash.

5.13.2. Ensure HVR-FN19, HVR-FLT9 PURGE FAN is in service per Section 4.3.

5.13.3. Close HVR-DMP271, ISOLATION DAMPER TO BWRT AND RX SAMPLE PANEL.

5.13.4. Open HVR-DMP273, EXH FROM BWRT TO HVR-FLT9.

5.13.5. WHEN HVR-FN19, HVR-FLT9 PURGE FAN is no longer needed to support RWCU F/D backwashes, THEN proceed as follows:

1. Close HVR-DMP273, EXH FROM BWRT TO HVR-FLT9.

2. Open HVR-DMP271, ISOLATION DAMPER TO BWRT AND RX SAMPLE PANEL.

5.14 Emergency Operation of Containment Unit Coolers with Service Water

NOTE

This section is only to be used in emergencies. If it is desired to use Service Water at other times, refer to SOP-0116, Turbine and Radwaste Building HVAC Chilled Water System.

5.14.1. Verify the following valves are closed:

- HVN-MOV127, CHW SPLY OUTBD ISOL
- HVN-MOV128, CHW RTN OUTBD ISOL
- HVN-MOV129, CHW SPLY SHUTOFF VLV
- HVN-MOV130, CHW RTN SHUTOFF VLV
- HVN-MOV102, CHW RTN INBD ISOL
- HVN-MOV22A(B), CONTMT UC1A(B) DISCH

5.14.2. At H13-P870, open the following valves:

1. SWP-MOV502A(B), CONTAINMENT UC SUPPLY
2. SWP-MOV503A(B), CONTAINMENT UC RETURN

5.14.3. Verify HVR-UC1A(B), CONTMT UNIT CLR A(B) is running.

NOTE

Chilled Water or Service Water is not required when performing a breaker operability.

5.15 Performing a Breaker Operability for HVR-UC1A(B)

5.15.1. Start HVR-UC1A(B), CONTMT UNIT CLR A(B).

5.15.2. Stop HVR-UC1A(B), CONTMT UNIT CLR A(B).

5.16 Lowering or Maintaining Containment Pressure Without Using the Containment Purge Filter Exhaust Fan

CAUTION

Venting / Purging Containment while pressure is greater than 2 psig may cause damage to the Auxiliary Building ductwork. Do not vent / purge Containment with pressure greater than 2 psig unless directed by EOP-2, Primary Containment Control.

Operation of the Containment Purge System while the Hydrogen Mixing System is in use during Modes 1, 2, or 3 could result in increased offsite release rates. Do not operate the Containment Purge System simultaneously with the Hydrogen Mixing System during Modes 1, 2, and 3.

Technical Specifications LCO 3.6.1.3 does not allow 36 inch Primary Containment Purge Valves to be open while in mode 1, 2, or 3 for temperature and/or humidity control. Do not operate Containment Purge in modes 1, 2, or 3 for temperature and/or humidity control. (Reference Commitment #1315).

If venting/purging of the Primary Containment is being performed as directed by the EOPs, the Emergency Director should be notified in order to evaluate the impact on offsite dose rates. Do not operate the system without informing the Emergency Director so that offsite dose may be evaluated.

5.16.1. WHEN it is desired to lower or maintain the Containment pressure without using an exhaust fan, THEN open the following valves:

- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL

5.16.2. Monitor Containment pressure.

NOTE

SR 3.6.1.3.1 does not allow the valves to remain open for unlimited periods of time.

5.16.3. WHEN lowering of Containment pressure is complete, OR WHEN it is desired to return to a normal valve lineup, THEN close the following valves:

- HVR-AOV128, CONTMT RTN INBD ISOL
- HVR-AOV166, CONTMT RTN OUTBD ISOL

6 SYSTEM SHUTDOWN

6.1 Annulus Pressure Control System (APCS) Shutdown

NOTE

The SGTS trains will automatically start on a low flow condition of the Annulus Pressure Control System unless the fans are in lockout.

6.1.1. IF a Standby Gas Treatment System initiation is undesirable, THEN perform the following:

NOTE

Reference Technical Specifications 3.6.4.3 for LCO applicability.

1. Place GTS-FN1A, SGT EXH FAN A in lockout by depressing the LOCKOUT Pushbutton.
2. Place GTS-FN1B, SGT EXH FAN B in lockout by depressing the LOCKOUT Pushbutton.

6.1.2. Place the standby HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) in STOP.

6.1.3. Place the running HVR-FN16A(B), ANNULUS PRESS CONT FAN A(B) in STOP.

6.1.4. Verify that HVR-AOD67A(B), EXH FAN DAMPER closes.

6.1.5. IF the Annulus Pressure Control System (APCS) is being secured AND entry into the Annulus area is required, THEN verify annulus pressure has equalized with outside pressure as indicated on LMS-TR127, ANNULUS PRESSURE & TEMPERATURE Recorder.

NOTE

The Annulus pressure needs to be equalized with outside pressure prior to closing the isolation dampers to allow for opening of the equipment access doors to the Annulus Area.

6.1.6. IF it is desired to isolate the Annulus Pressure Control System, THEN close the following dampers:

- HVR-AOD161, ANNULUS PRESS CONT SUCT
- HVR-AOD23A, APC FAN A SUCT
- HVR-AOD23B, APC FAN B SUCT
- HVR-AOD142, APC UP STREAM DISCH
- HVR-AOD261, APC DN STREAM DISCH

6.2 Shutdown of Containment Unit Coolers

6.2.1. Stop the desired Containment Unit Cooler by depressing the STOP Pushbutton on the following:

- HVR-UC1A, CONTMT UNIT CLR A
- HVR-UC1B, CONTMT UNIT CLR B
- HVR-UC1C, CONTMT UNIT CLR C

6.2.2. IF desired to prevent auto restart, THEN depress the LOCKOUT Pushbutton on the following:

- HVR-UC1A, CONTMT UNIT CLR A
- HVR-UC1B, CONTMT UNIT CLR B

6.3 Shutdown of Containment Dome Recirculation Fans

6.3.1. Stop the desired HVR-FN1A, B, C and D, CONTMT DOME RECIRC FAN A, B, C and D by taking the respective control switch to STOP.

6.4 Isolation of the Reactor Sample Panel Filter Unit

6.4.1. Locally stop HVR-FN19, HVR-FLT9 PURGE FAN, by placing the control switch to STOP.

6.4.2. Close damper HVR-DMP272, SUPPLY TO HVR-FLT9.

7 REFERENCES

7.1 PID 22-1A through 1C

7.2 ESK-HVR Series

7.3 RBS Technical Specifications

7.4 SOP-0043, Standby Gas Treatment System

7.5 Environmental Design Criteria (ED-87-1297)

7.6 EEAR 88-C0171

7.7 EEAR 88-E0053

7.8 ER99-0878, HVR-TIC26A(B)(C)

8 RECORDS

8.1 Record disposition such as handling, interim storage, and transfer to PPF shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP - ANNULUS PRESSURE CONTROL SYSTEM (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
LOCATION: AUX BLDG, 114 FT EL					
HVR-V38	ANNULUS PRESSURE MONITOR HVR-PDS-248 ISOL VALVE	OPEN			

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Signature KCN Initials Date/Time

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OSM/CRS KCN Date/Time

Second Review: ______________ ______ ______
Operations Management KCN Date/Time

VALVE LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
LOCATION: REACTOR BLDG, 141 FT EL					
HVR-AOV-125	DW SUPPLY ISOL VLV (AZ 60°)	LOCKED CLOSED			
HVR-AOV-126	DW EXH ISOL VLV (AZ 320°)	LOCKED CLOSED			
HVR-AOV-147	DW SUPPLY ISOL VLV (AZ 60°)	LOCKED CLOSED			
HVR-AOV-148	DW EXH ISOL VLV (AZ 330°)	LOCKED CLOSED			
HVR-V52	INBD LMC CONN ISOL VLV (AZ 310°)	LOCKED CLOSED			
HVR-V33	AUX BLDG PRESS MONITOR PDI/PDS-247 ROOT ISOL	OPEN			
HVR-V71	SUPPLY TO DRYWELL LMC ISOL VLV (AZ 60°)	LOCKED CLOSED			
HVR-V72	EXH FROM DRYWELL LMC ISOL VLV (AZ 330°)	LOCKED CLOSED			
LOCATION: REACTOR BLDG, 162 FT EL (AZ 310°)					
HVR-DMP-271	ISOLATION DAMPER TO BWRT AND RX. SAMPLE PANEL (BELOW GRATING)	OPEN			
HVR-DMP-273	EXH FROM BWRT TO HVR-FLT9	CLOSED			
HVR-DMP-272	SUPPLY TO HVR-FLT9	OPEN			

VALVE LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

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VALVE LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ'D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
LOCATION: AUX BLDG, 114 FT EL					
HVR-V7	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60A ROOT ISOL	OPEN			
HVR-V8	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60A ROOT ISOL	LOCKED OPEN			
HVR-V9	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60C ROOT ISOL	OPEN			
HVR-V10	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60C ROOT ISOL	LOCKED OPEN			
HVR-V11	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60E ROOT ISOL	OPEN			
HVR-V12	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60E ROOT ISOL	LOCKED OPEN			
HVR-V13	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60B ROOT ISOL	OPEN			
HVR-V14	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60B ROOT ISOL	LOCKED OPEN			
HVR-V15	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60D ROOT ISOL	OPEN			
HVR-V16	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60D ROOT ISOL	LOCKED OPEN			
HVR-V17	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60F	OPEN			
HVR-V18	ANNULUS TO CONTMT PRESS DIFF TRANS HVR-PDT-60F ROOT ISOL	LOCKED OPEN			

VALVE LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

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Second Review:	Operations Management	KCN	Date/Time

INSTRUMENT LINEUP - ANNULUS PRESSURE CONTROL SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1st	INITIALS 2nd
HVR-PDT267	AUX BLDG/ANNULUS DIFF PRESS AJ-2-119 FT EL			
	HVR-PDT267-V1	OPEN		
	HVR-PDT267-V2	CLOSED		
	HVR-PDT267-V3	CLOSED		
	HVR-PDT267-V4	OPEN		
	PDIC-267, AJ-2-127 FT EL	LIVE ZERO		
HVR-PDS248	AUX BLDG/ANNULUS AN-2-114 FT EL			
	HVR-PDS248-V1	OPEN		
	HVR-PDS248-V2	CLOSED		
	HVR-PDS248-V3	CLOSED		
HVR-AOD23A	ANNULUS PRESS CONT FN16A ISOL AC-4-156 FT EL			
	HVR-SOV23A-V1	OPEN		
HVR-AOV23B	ANNULUS PRESS CONT FN16B ISOL AC-4-156 FT EL			
	HVR-SOV23B-V1	OPEN		
HVR-AOD67A	APC FAN 16A INLET AE-4-159 FT EL			
	HVR-SOV67A-V1	OPEN		
HVR-AOD67B	APC FAN FN16B INLET AE-4-160 FT EL			
	HVR-AOD67B-V1	OPEN		
HVR-AOD142	ANNULUS PRESS CONT OUT ISOL AE-5-161 FT EL			
	HVR-AOD142	IN SERVICE		

INSTRUMENT LINEUP - ANNULUS PRESSURE CONTROL SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1st	2nd
HVR-AOD261	APC OUTLET ISOLATION AE-5-161 FT EL			
	HVR-AOD261	IN SERVICE		

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INSTRUMENT LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
HVR-AOD127	CONTMT PURGE EXHAUST AZ-318°-155 FT EL			
	HVR-AOD127-V1	OPEN		
HVR-AOD129	CONTMT AIR HTR CH2 BYPASS AL-2-150 FT EL			
	HVR-AOD129-V1	OPEN		
HVR-AOD143	AUX & CONTMT/DW INL ISOL AN-4-158 FT EL			
	HVR-AOD143-V1	OPEN		
HVR-AOD162	CONTMT/DW PURGE TO SGTS AA-3-160 FT EL			
	HVR-AOD162-V1	OPEN		
HVR-AOD164	AUX CONTMT/DW INL ISOL AP-4-151 FT EL			
	HVR-AOD164-V1	OPEN		
HVR-AOD225	RECIRC FN HVR-FN14 EXH AA-5-180 FT EL			
	HVR-AOD225-V1	OPEN		
HVR-AOD236	DECAY HT FN HVR-FN14 OUT AJ-3-158 FT EL			
	HVR-AOD-SOV236-V1	OPEN		
HVR-AOD238	CONTMT/DW RECIRC FLT6 INL. AA-5-180 FT EL			
	HVR-AOD238-V1	OPEN		
HVR-AOD239	CONTMT/DW RECIRC MAKEUP AA-5-180 FT EL			
	HVR-AOD239-V1	OPEN		

INSTRUMENT LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
HVR-AOD240	RECIRC FN HVR-FN14 INLET AA-4-174 FT EL			
	HVR-AOD-SOV240-V1	OPEN		
HVR-AOD241	DECAY HT FN15 OUTLET AA-4-178 FT EL			
	HVR-AOD-SOV241-V1	OPEN		
HVR-AOD242	FN14 RECIRC TO CONTMT/DW AA-4-180 FT EL			
	HVR-AOD-SOV242-V1	OPEN		
HVR-AOD244	CONTMT/DW PURGE FN8 OUTLET AJ-3-163 FT EL			
	HVR-AOD244-V1	OPEN		
HVR-AOD245	CONTMT TO SGTS ISOL AA-3-160 FT EL			
	HVR-AOD245-V1	OPEN		
HVR-AOD264	CONTMT DEPRESS INL ISOL AJ-5-157 FT EL			
	HVR-AOD264-V1	OPEN		
HVR-AOV123	CONTMT SPLY INBD ISOL AZ 42° - 152 FT EL			
	HVR-AOV123-V1	OPEN		
HVR-AOV125	DRYWELL SPLY OUTBD ISOL AZ 54° - 143 FT EL			
	HVR-AOV125-V1	CLOSED *		
HVR-AOV126	DRYWELL EXH AIR OUTBD ISOL AZ 320° - 149 FT EL			
	HVR-AOV126-V1	CLOSED *		

INSTRUMENT LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
HVR-AOV128	CONTMT EXH AIR INBD ISOL AZ 319° - 155 FT EL			
	HVR-AOV128-V1	OPEN		
HVR-AOV147	DRYWELL SPLY INBD ISOL AZ 58° - 143 FT EL			
	HVR-AOV147-V1	CLOSED *		
HVR-AOV148	DRYWELL EXH AIR INBD ISOL AZ 321° - 145 FT EL			
	HVR-AOV148-V1	CLOSED *		
HVR-AOV165	CONTMT SPLY OUTBD ISOL AL-2-152 FT EL			
	HVR-AOV-SOV165-V1	OPEN		
HVR-AOV166	CONTMT EXH AIR OUTBD ISOL AC-1-155 FT EL			
	HVR-AOV166-V1	OPEN		
HVR-PDI247 & HVR-PDS247	AUX BLDG/OUT AUX BLDG AG-4-146 FT EL			
	HVR-PDI247-V1	OPEN		
	HVR-PDI247-V2	CLOSED		
	HVR-PDI247-V3	CLOSED		

INSTRUMENT LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
HVR-PDI121 & HVR-PDS121	CONTMT/DW PURGE FLT 5 AJ-3-146 FT EL			
	HVR-PDI121-V1H	OPEN		
	HVR-PDI121-V2L	OPEN		
	HVR-PDI121-V3B	CLOSED		
	HVR-PDI121-V4	CLOSED		
	HVR-PDI121-V5	CLOSED		
	HVR-PDI121-V6	CLOSED		
	HVR-PDI121-V7	CLOSED		
HVR-PS101	AUX BLDG FLT 6 AA-5-171 FT EL			
	HVR-PS101-V1	OPEN		
	HVR-PS101-V2	CLOSED		
	HVR-PS101-V3	CLOSED		
HVR-PDIS224	HVR-FN8 INL FLT 5 AJ-3-145 FT EL			
	HVR-PDIS224-V1H	OPEN		
	HVR-PDIS224-V2L	OPEN		
	HVR-PDIS224-V3B	CLOSED		
	HVR-PDIS224-V4	CLOSED		
	HVR-PDIS224-V5	CLOSED		
	HVR-PDIS224-V6	CLOSED		
	HVR-PDIS224-V7	CLOSED		

INSTRUMENT LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
HVR-PDI209	HVR-FLT8 FILTER AJ-3-146 FT EL			
	HVR-PDI209-V1H	OPEN		
	HVR-PDI209-V2L	OPEN		
	HVR-PDI209-V3B	CLOSED		
	HVR-PDI209-V4	CLOSED		
	HVR-PDI209-V5	CLOSED		
	HVR-PDI209-V6	CLOSED		
	HVR-PDI209-V7	CLOSED		
HVR-PDI226 & HVR-PDS226	HVR-FLT6 DEMISTER FLTR AA-5-176 FT EL			
	HVR-PDI226-V1H	OPEN		
	HVR-PDI226-V2L	OPEN		
	HVR-PDI226-V3B	CLOSED		
	HVR-PDI226-V4	CLOSED		
	HVR-PDI226-V5	CLOSED		
	HVR-PDI226-V6	CLOSED		
	HVR-PDI226-V7	CLOSED		
HVR-PDI229 & HVR-PDS229	HVR-FLT6 PREFILTER AA-5-176 FT EL			
	HVR-PDI229-V1H	OPEN		
	HVR-PDI229-V2L	OPEN		
	HVR-PDI229-V3B	CLOSED		
	HVR-PDI229-V4	CLOSED		
	HVR-PDI229-V5	CLOSED		
	HVR-PDI229-V6	CLOSED		
	HVR-PDI229-V7	CLOSED		

INSTRUMENT LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
HVR-PDI230 & HVR-PDS230	HVR-FLT6 PARTICULATE FLTR 1 AB-4-176 FT EL			
	HVR-PDI230-V1H	OPEN		
	HVR-PDI230-V2L	OPEN		
	HVR-PDI230-V3B	CLOSED		
	HVR-PDI230-V4	CLOSED		
	HVR-PDI230-V5	CLOSED		
	HVR-PDI230-V6	CLOSED		
	HVR-PDI230-V7	CLOSED		
HVR-PDI232 & HVR-PDS232	HVR-FLT6 CHARCOAL FLTR 2 AB-4-176 FT EL			
	HVR-PDI232-V1H	OPEN		
	HVR-PDI232-V2L	OPEN		
	HVR-PDI232-V3B	CLOSED		
	HVR-PDI232-V4	CLOSED		
	HVR-PDI232-V5	CLOSED		
	HVR-PDI232-V6	CLOSED		
	HVR-PDI232-V7	CLOSED		

INSTRUMENT LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
HVR-PDI235 & HVR-PDS235	HVR-FLT6 PARTICULATE FLTR 2 AA-4-176 FT EL			
	HVR-PDI235-V1H	OPEN		
	HVR-PDI235-V2L	OPEN		
	HVR-PDI235-V3B	CLOSED		
	HVR-PDI235-V4	CLOSED		
	HVR-PDI235-V5	CLOSED		
	HVR-PDI235-V6	CLOSED		
	HVR-PDI235-V7	CLOSED		
HVR-PDI150	HVR-FLT9 PREFILTER CNTMT 162 FT EL			
	HVR-PDI150	IN SERVICE		
HVR-PDI151	HVR-FLT9 HEPA CNTMT 162 FT EL			
	HVR-PDI151	IN SERVICE		

* Valves are administratively controlled by EN-OP-102, Protective and Caution Tagging or OSP-0014, Administrative Control of Equipment and/or Devices.

INSTRUCTION LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

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OSM/CRS KCN Date/Time

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Operations Management KCN Date/Time

INSTRUMENT LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1st	INITIALS 2nd
HVR-PDT60A	CONTMT TO ANNULUS DIFF. PRESS, JPB-RAK-4, AN-3-141 FT EL			
	HVR-PDT60A-V1H	LOCKED OPEN		
	HVR-PDT60A-V2L	LOCKED OPEN		
	HVR-PDT60A-V3B	LOCKED CLOSED		
	HVR-PDT60A-V4	LOCKED CLOSED		
	HVR-PDT60A-V5	LOCKED CLOSED		
	HVR-PDT60A-V6 (On 127’ Platform at AL2, Access via 114’)	LOCKED CLOSED		
	HVR-PDT60A-V7 (On 127’ Platform at AL2, Access via 114’)	LOCKED CLOSED		
	HVR-ESZ-60A, H13-P841	LIVE ZERO		
HVR-PDT60B	CONTMT TO ANNULUS DIFF. PRESS, JPB-RAK-3, AA-3-141 FT EL			
	HVR-PDT60B-V1H	LOCKED OPEN		
	HVR-PDT60B-V2L	LOCKED OPEN		
	HVR-PDT60B-V3B	LOCKED CLOSED		
	HVR-PDT60B-V4	LOCKED CLOSED		
	HVR-PDT60B-V5	LOCKED CLOSED		
	HVR-ESZ-60B, H13-P842	LIVE ZERO		

INSTRUMENT LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1st	2nd
HVR-PDT60C	CONTMT TO ANNULUS DIFF. PRESS, JPB-RAK-4, AN-3-141 FT EL			
	HVR-PDT60C-V1H	LOCKED OPEN		
	HVR-PDT60C-V2L	LOCKED OPEN		
	HVR-PDT60C-V3B	LOCKED CLOSED		
	HVR-PDT60C-V4	LOCKED CLOSED		
	HVR-PDT60C-V5	LOCKED CLOSED		
	HVR-PDT60C-V6 (On 127' Platform at AL2, Access via 114')	LOCKED CLOSED		
	HVR-ESX-60C, H13-P841	LIVE ZERO		
HVR-PDT60D	CONTMT TO ANNULUS DIFF. PRESS, JPB-RAK-3, AA-3-141 FT EL			
	HVR-PDT60D-V1H	LOCKED OPEN		
	HVR-PDT60D-V2L	LOCKED OPEN		
	HVR-PDT60D-V3B	LOCKED CLOSED		
	HVR-PDT60D-V4	LOCKED CLOSED		
	HVR-PDT60D-V5	LOCKED CLOSED		
	HVR-ESX-60D, H13-P842	LIVE ZERO		

INSTRUMENT LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1st	2nd
HVR-PDT60E	CONTMT TO ANNULUS DIFF. PRESS, JPB-RAK-4, AN-3-141 FT EL			
	HVR-PDT60E-V1H	LOCKED OPEN		
	HVR-PDT60E-V2L	LOCKED OPEN		
	HVR-PDT60E-V3B	LOCKED CLOSED		
	HVR-PDT60E-V4	LOCKED CLOSED		
	HVR-PDT60E-V5	LOCKED CLOSED		
	HVR-PDT60E-V6 (On 127' Platform at AL2, Access via 114')	LOCKED CLOSED		
	HVR-ESX-60E, H13-P841	LIVE ZERO		
HVR-PDT60F	CONTMT TO ANNULUS DIFF. PRESS, JPB-RAK-3, AA-3-141 FT EL			
	HVR-PDT60F-V1H	LOCKED OPEN		
	HVR-PDT60F-V2L	LOCKED OPEN		
	HVR-PDT60F-V3B	LOCKED CLOSED		
	HVR-PDT60F-V4	LOCKED CLOSED		
	HVR-PDT60F-V5	LOCKED CLOSED		
	HVR-ESX-60F, H13-P842	LIVE ZERO		

INSTRUMENT LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1st	2nd
HVR-TIC26A	CONTMT UNIT CLR UC1A INLET, AZ 93° - 164 FT EL			
	HVR-TIC26A-V1	OPEN		
HVR-TIC26B	CONTMT UNIT CLR UC1B INLET, AZ 90° - 164 FT EL			
	HVR-TIC26B-V1	OPEN		
HVR-TIC26C	CONTMT UNIT CLR UC1C INLET, AZ 60° - 164 FT EL			
	HVR-TIC26C-V1	OPEN		

Remarks: ____

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Performed By: ____________________ ________ ________ ____/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________________ ________ ________
OSM/CRS KCN Date/Time

Second Review: ____________________ ________ ________
Operations Management KCN Date/Time

INSTRUMENT LINEUP - ANNULUS MIXING SYSTEM (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1st	2nd
HVR-AOD22A	ANNULUS OUTLET TO SGTS AC-2-157 FT EL			
	HVR-AOD22A-V1	OPEN		
HVR-AOD22B	ANNULUS OUTLET TO SGTS AC-2-157 FT EL			
	HVR-AOD22B-V1	CLOSED		
HVR-AOD53A	ANNULUS MIX FN11A OUT AC-3-177 FT EL			
	HVR-AOD53A-V1	CLOSED		
HVR-AOD53B	ANNULUS MIX FN11B OUT AC-3-177 FT EL			
	HVR-AOD53B-V1	CLOSED		

Remarks: ____

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Performed By: ______________ ______ ______ ____/____
Signature KCN Initials Date/Time

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Reviewed By: ______________ ______ ______
OSM/CRS KCN Date/Time

Second Review: ______________ ______ ______
Operations Management KCN Date/Time

ELECTRICAL LINEUP - ANNULUS PRESSURE CONTROL SYSTEM (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS 1st	2nd
HVR-FN16A	APCS EXHAUST FAN 16A	NHS-MCC2E BKR 6A	ON		
HVR-FN16AH	APCS EXHAUST FAN MOTOR SPACE HEATER	SCA-PNL2E1 BKR 1	OFF NOTE 1		
HVR-FN16B	APCS EXHAUST FAN 16B	NHS-MCC2F BKR 4B	ON		
HVR-FN16BH	APCS EXHAUST FAN MOTOR SPACE HEATER	SCA-PNL2F1 BKR 6	OFF NOTE 1		

NOTE 1: These heaters share the same power supply as a Containment Dome Recirc Fan Motor Heater which is required to be OFF in Modes 1, 2, or 3 per TRM 3.8.13

Remarks: ______________________________

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Performed By: ____________ ____________ ____________ ______/______
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________ ________ ____________
OSM/CRS KCN Date/Time

Second Review: ____________ ________ ____________
Operations Management KCN Date/Time

ELECTRICAL LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS 1st	2nd
HVR-FN8	CNTMT/DRYWELL PURGE SUPPLY FAN	NHS-MCC2E BKR 2D	ON		
HVR-FN8H	CONTMT/DW PURGE SUPPLY FAN MOTOR SPACE HEATER	SCA-PNL2E1 BKR 1	OFF NOTE 1		
HVR-FN13	CNTMT/DRYWELL PURGE SUPPLY FAN	NHS-MCC2E BKR 4B	ON		
HVR-FN13H	CONTMT/DW PURGE SUPPLY FAN MOTOR SPACE HEATER	SCA-PNL2E1 BKR 1	OFF NOTE 1		
HVR-FLT6H	CONTROL PURGE FILTER HEATER	NHS-MCC2F BKR 1BT	ON		
HVR-FN14	CNTMT/CONTROL PURGE FILTER (FAN)	NHS-MCC2F BKR 1E	ON		
HVR-FN14H	CONTMT CONTINUOUS PURGE FLT FAN MOTOR SPACE HEATER	SCA-PNL2F1 BKR 6	OFF NOTE 1		
HVR-FN15	CNTMT/DECAY HEAT REMOVAL FAN	NHS-MCC2E BKR 4C	ON		
HVR-FN15H	CONTMT CONTINUOUS RMV FAN FLT MOTOR SPACE HEATER	SCA-PNL2E1 BKR 1	OFF NOTE 1		
HVR-FN19	REACTOR SAMPLE PANELS AND RWCU BACKWASH TANK PURGE FAN	SCA-PNL2D1 BKR 5	ON		
HVR-CH2	AUX BLDG COIL HTR	NJS-LDC1B ACB022	RACKED IN CLOSED		N/A
HVR-CH2	AUX BLDG COIL HTR CABINET BREAKER	ON HEATER CABINET	CLOSED		N/A

NOTE 1: These heaters share the same power supply as a Containment Dome Recirc Fan Motor Heater which is required to be OFF in Modes 1, 2, or 3 per TRM 3.8.13.

ELECTRICAL LINEUP - CONTAINMENT/DRYWELL PURGE SYSTEM (SAFETY RELATED)

Remarks: ____

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Performed By: ______________ ______ ______ ____/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ______________ ______ ______
OSM/CRS KCN Date/Time

Second Review: ______________ ______ ______
Operations Management KCN Date/Time

ELECTRICAL LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS 1st	2nd
HVR-UC1A	CONTMT UNIT COOLER	EJS-SWG2A ACB036	RACKED IN		
HVR-UC1B	CONTMT UNIT COOLER	EJS-SWG2B ACB076	RACKED IN		
HVR-UC1C	CONTMT UNIT COOLER	EJS-SWG2B ACB079	RACKED IN		
NOTE *Containment Unit Cooler Space Heaters and Containment Dome Recirc Fan Motor Heaters are required to be deenergized when in Mode 1, 2, & 3 per TR 3.8.13.*					
HVR-UC1CH	CONTMT UNIT COOLER SPACE HEATER	SCA-PNL2C1 BKR 9	OFF		
HVR-FN1A	CONTMT DOME RECIRC FAN	NHS-MCC2A BKR 6E	ON		
HVR-FN1AH	CONTMT DOME RECIRC FAN MOTOR HEATER	SCA-PNL2A2 BKR 3	OFF		
HVR-FN1B	CONTMT DOME RECIRC FAN	NHS-MCC2F BKR 3C	ON		
HVR-FN1BH	CONTMT DOME RECIRC FAN MOTOR HEATER	SCA-PNL2F1 BKR 6	OFF		
HVR-FN1C	CONTMT DOME RECIRC FAN	NHS-MCC2E BKR 2C	ON		
HVR-FN1CH	CONTMT DOME RECIRC FAN MOTOR HEATER	SCA-PNL2E1 BKR 1	OFF		
HVR-FN1D	CONTMT DOME RECIRC FAN	NHS-MCC2B BKR 6C	ON		
HVR-FN1DH	CONTMT DOME RECIRC FAN MOTOR HEATER	SCA-PNL2B1 BKR 6	OFF		

ELECTRICAL LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

Remarks: ____

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Performed By: ____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________________ ______ ________
OSM/CRS KCN Date/Time

Second Review: ____________________ ______ ________
Operations Management KCN Date/Time

ELECTRICAL LINEUP - ANNULUS MIXING SYSTEM (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ'D POSITION	INITIALS 1st	2nd
HVR-FN11A	ANNULUS MIXING FAN	EJS-SWG2A ACB24	RACKED OUT		
HVR-FN11B	ANNULUS MIXING FAN	EJS-SWG2B ACB64	RACKED OUT		

Remarks: ____

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Performed By: ____________ ______ ______ ____/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________ ______ ______
OSM/CRS KCN Date/Time

Second Review: ____________ ______ ______
Operations Management KCN Date/Time

CONTROL BOARD LINEUP - ANNULUS PRESSURE CONTROL SYSTEM (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1st	INITIALS 2nd
THE FOLLOWING ITEMS ARE LOCATED ON PANEL H13-P863				
HVR-AOD161, ANNULUS PRESS CONT SUCT	MID	RED		
HVR-AOD23A, APC FAN A SUCT	MID	RED		
HVR-AOD23B, APC FAN B SUCT	MID	RED		
HVR-AOD142, APC UP STREAM DISCH	MID	RED		
HVR-AOD261, APC DN STREAM DISCH	MID	RED		
HVR-FN16A, ANNULUS PRESS CONT FAN A	STOP	GREEN		
HVR-FN16B, ANNULUS PRESS CONT FAN B	STOP	GREEN		
HVR-AOD67A, EXH FAN DAMPER	N/A	GREEN		
HVR-AOD67B, EXH FAN DAMPER	N/A	GREEN		

CONTROL BOARD LINEUP - ANNULUS PRESSURE CONTROL SYSTEM (SAFETY RELATED)

Remarks: ____

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Performed By:	Signature	KCN	Initials	/ Date/Time
	Signature	KCN	Initials	/ Date/Time
	Signature	KCN	Initials	/ Date/Time

Reviewed By:	OSM/CRS	KCN	Date/Time
Second Review:	Operations Management	KCN	Date/Time

CONTROL BOARD LINEUP - CONTAINMENT/DRYWELL PURGE (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1st	2nd
THE FOLLOWING ITEMS ARE LOCATED ON PANEL H13-P863				
DIV 1 RX PLANT VENT OPERABILITY SWITCH	OFF	N/A		
DIV 2 RX PLANT VENT OPERABILITY SWITCH	OFF	N/A		
HVR-AOD164, UP STREAM ISOL SUPPLY	MID	RED		
HVR-AOD143, DN STREAM ISOL SUPPLY	MID	RED		
HVR-AOD263, SGT UPSTREAM SPLY ISOL	MID	GREEN		
HVR-AOD264, SGT DNSTREAM SPLY ISOL	MID	GREEN		
HVR-FN8, HIGH VOL CONTMT/DW PURGE	STOP	GREEN		
HVR-AOD244, HIGH VOL FAN DISCH	N/A	GREEN		
HVR-FN13, LOW VOL CONTMT PURGE	STOP	GREEN		
HVR-AOD236, LOW VOL FAN DISCH	N/A	GREEN		
HVR-AOD242, CONTMT PURGE RECIRC RTN	CLOSE	GREEN		
HVR-AOV165, CONTMT SPLY OUTBD ISOL	MID	GREEN		
HVR-AOV123, CONTMT SPLY INBD ISOL	MID	GREEN		
HVR-AOD124, CONTMT PURGE SPLY ISOL	CLOSE	GREEN		
HVR-AOV125 & 126, DW PURGE BACKUP ISOL	MID/ KEY REMOVED *	GREEN		
HVR-AOV147 & 148, DW PURGE ISOL	MID/ KEY REMOVED *	GREEN		

CONTROL BOARD LINEUP - CONTAINMENT/DRYWELL PURGE (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1st	INITIALS 2nd
HVR-AOV148, DW PURGE RTN ISOL	N/A	GREEN		
HVR-AOV126, DW PURGE BACKUP RTN ISOL	N/A	GREEN		
HVR-AOD127, CONTMT PURGE RTN ISOL	CLOSE	GREEN		
HVR-AOV128, CONTMT RTN INBD ISOL	MID	GREEN		
HVR-AOV166, CONTMT RTN OUTBD ISOL	MID	GREEN		
HVR-AOD238, CONTMT PURGE FLT SUCT	N/A	GREEN		
HVR-AOD239, DECAY HEAT REMOVAL INTK	N/A	GREEN		
HVR-AOD240, CONTMT FLT EXH FAN SUCT	N/A	GREEN		
HVR-FN14, CONTMT PURGE FLT EXH FAN	STOP	GREEN		
HVR-FN15, FLT6 DECAY HEAT REMOVAL	AUTO	GREEN		
HVR-AOD241, DECAY HEAT REMOVAL DISCH	N/A	GREEN		
HVR-AOD245, CONTMT PURGE TO SGT	MID	GREEN		
HVR-AOD162, CONTMT PURGE TO SGT	MID	GREEN		
HVR-AOD225, CONTMT/DW PURGE EXH ISOL	CLOSE	GREEN		

* Valves are administratively controlled by EN-OP-102, Protective and Caution Tagging or OSP-0014, Administrative Control of Equipment and/or Devices.

CONTROL BOARD LINEUP - CONTAINMENT/DRYWELL PURGE (SAFETY RELATED)

Remarks: ____

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Performed By: ____________________ ________ ________ ____/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________________ ______ ________
OSM/CRS KCN Date/Time

Second Review: ____________________ ______ ________
Operations Management KCN Date/Time

CONTROL BOARD LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1st	INITIALS 2nd
THE FOLLOWING ITEMS ARE LOCATED ON PANEL H13-P863				
HVR-UC1C, CONTMT UNIT CLR C	STOP NOT DEPRESSED	GREEN & WHITE		
HVR-UC1A, CONTMT UNIT CLR A	LOCKOUT	N/A		
HVR-UC1A, CONTMT UNIT CLR A	STOP NOT DEPRESSED	GREEN		
HVR-UC1B, CONTMT UNIT CLR B	LOCKOUT	N/A		
HVR-UC1B, CONTMT UNIT CLR B	STOP NOT DEPRESSED	GREEN		
HVR-FN1A, CONTMT DOME RECIRC FAN A	STOP	GREEN		
HVR-FN1B, CONTMT DOME RECIRC FAN B	STOP	GREEN		
HVR-FN1C, CONTMT DOME RECIRC FAN C	STOP	GREEN		
HVR-FN1D, CONTMT DOME RECIRC FAN D	STOP	GREEN		
THE FOLLOWING ITEMS ARE LOCATED REACTOR BLDG 162 FT EL				
HVR-TIC26A CONTMT UNIT CLR 1A INTAKE TEMPERATURE INDICATING CONTROLLER (AZ 93°)	CONTROLLER SET BETWEEN 72°F AND 84°F	N/A		
HVR-TIC26B CONTMT UNIT CLR 1B INTAKE TEMPERATURE INDICATING CONTROLLER (AZ 89°)	CONTROLLER SET BETWEEN 72°F AND 84°F	N/A		
HVR-TIC26C CONTMT UNIT CLR 1C INTAKE TEMPERATURE INDICATING CONTROLLER (AZ 60°)	CONTROLLER SET BETWEEN 72°F AND 84°F	N/A		

CONTROL BOARD LINEUP - CONTAINMENT COOLING SYSTEM (SAFETY RELATED)

Remarks: ____

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Performed By: ______________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ______________________ _______ __________
OSM/CRS KCN Date/Time

Second Review: ______________________ _______ __________
Operations Management KCN Date/Time

CONTROL BOARD LINEUP - ANNULUS MIXING SYSTEM (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	2ND
THE FOLLOWING ITEMS ARE LOCATED ON PANEL H13-P863				
DIV 1 ANNULUS MIXING SYS INOPERABILITY SWITCH	OFF	N/A		
DIV 2 ANNULUS MIXING SYS INOPERABILITY SWITCH	OFF	N/A		
HVR-FN11B, ANNULUS MIXING FAN B	ABANDONED	N/A		
HVR-FN11B, ANNULUS MXG FAN	ABANDONED	N/A		
HVR-FN11A, ANNULUS MIXING FAN A	ABANDONED	N/A		
HVR-FN11A, ANNULUS MIXING	ABANDONED	N/A		
HVR-AOD53B, ANNULUS MIX FAN B DISCH	N/A	N/A		
HVR-AOD53A, ANNULUS MIX FAN A DISCH	N/A	N/A		
LOCA SIGNAL PRESENT, HVR-FN11B NOT RUNNING	N/A	N/A		
LOCA SIGNAL PRESENT, HVR-FN11A NOT RUNNING	N/A	N/A		
HVR-AOD22B, ANNULUS MIX SPLY TO SGT	MID	GREEN		
HVR-AOD22A, ANNULUS MIX SPLY TO SGT	MID	GREEN		
HVR-AOD22A, ANNULUS MIX SPLY TO SGT	RESET	N/A		
HVR-AOD22B, ANNULUS MIX SPLY TO SGT	RESET	N/A		

CONTROL BOARD LINEUP - ANNULUS MIXING SYSTEM (SAFETY RELATED)

Remarks: ____

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Performed By: ____________ ______ ______ ____/____
Signature KCN Initials Date/Time

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Signature KCN Initials Date/Time

Reviewed By: ____________ ______ ______
OSM/CRS KCN Date/Time

Second Review: ____________ ______ ______
Operations Management KCN Date/Time

NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE

SRO ☒ RO ☒

ALTERNATE PATH ☐

TITLE: **Defeat Offgas High Radiation Isolation Interlock**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	5	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

	Perform
X	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
X	Control Room

Prepared:	Dave Bergstrom	**Date:**	September 9, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: The electrical lead from terminal 19 of TB0019 on H13-P845 Bay C is lifted and covered.

Synopsis: This task will defeat the Offgas high radiation isolation interlocks for N64-F060, Offgas Discharge to Vent Valve using EOP Enclosure 34. This will maintain the main condenser available during an ATWS.

NOTE: If in the Plant or the Control Room, **Caution** the operator **NOT** to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to install Enclosure 34 (Defeating Offgas High Radiation Isolation Interlocks).

3) Initial Conditions:

The plant has experienced an ATWS, all MSIVs are open.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM**:	**K&A RATING**:
Defeat Offgas High Radiation Isolation Interlock	200033005004	295002 AA1.02	2.9 / 2.9

REFERENCES:
EOP-0005, Rev 312, Attach 34

APPLICABLE OBJECTIVES
RLP-HLO-0516, Obj 1

REQUIRED MATERIALS:
OSP-0053, Rev 17 Attach 34

SAFETY FUNCTION:
__9__

SIMULATOR CONDITIONS & SETUP:

1. NA – This is a Control Room JPM.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: The electrical lead from terminal 19 of TB0019 on H13-P845 Bay C is lifted and covered.

PERFORMANCE:

START TIME: ______________

1.	**Procedure Step:**	3.1 OBTAIN EOP-0005 ENCL 34 tool kit from the Control Room Emergency Locker. 3.1.1 INSPECT kit for: • One (1) regular screwdriver • One (1) piece of tygon tubing
	Standard	Applicant located the key to the Control Room Emergency Locker Applicant located the Control Room Emergency Locker
	Cue	Applicant should be told to not remove the key or open the locker.
	Notes	
	Results	SAT ☐ UNSAT ☐

	Procedure Step:	3.2 DEFEAT Offgas high radiation isolation interlock as follows:
	Standard	NA
	Cue	
	Notes	No applicant action is necessary – this is a placekeeper for the procedure.

2.	**Procedure Step:**	3.2.1 Location H13-P845 Bay C
	Standard	Applicant located/identified Panel H13-P845, Bay C.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	**Procedure Step:**	3.2.1 Affected Terminal Board: TB0019 (Left side of bay, 1st column of terminal boards from panel door, top terminal board)	
	Standard	Applicant located/identified Terminal Board TB0019.	
	Cue		
	Notes		
	Results	SAT ☐	UNSAT ☐

4.	***Procedure Step:**	3.2.1.1 REMOVE the orange lead from Terminal 19 on Terminal Board TB0019 AND COVER with Tygon tubing.	
	Standard	Applicant located/identified and simulated removing the screw in a counterclockwise motion from and lifted the lead from terminal 19. Applicant then covered the lead with the provided tygon tubing.	
	Cue		
	Notes		
	Results	SAT ☐	UNSAT ☐

5.	**Procedure Step:**	3.3 VERIFY N64-F060, OFF GAS DISCH TO VENT VLV is open.	
	Standard	Applicant located and verified the Offgas Disch Valve is open (red light on and green light is off)	
	Cue	When requested, indicate the red light is on and the green light is off.	
	Notes		
	Results	SAT ☐	UNSAT ☐

Terminating Cue: Enclosure 34, Defeating Offgas High Radiation Isolation Interlocks, has been installed

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

The plant has experienced an ATWS, all MSIVs are open.

INITIATING CUE:

The CRS has directed you to install Enclosure 34 (Defeating Offgas High Radiation Isolation Interlocks).

ENCLOSURE 34	DEFEATING OFFGAS HIGH RADIATION ISOLATION INTERLOCKS

1.0 PURPOSE

To provide instructions for defeating the Offgas high radiation isolation interlocks for N64-F060, OFF GAS DISCH TO VENT VLV to maintain the main condenser available during an ATWS.

2.0 REQUIRED TOOLS-EQUIPMENT

2.1 EOP-0005 ENCL 34 tool kit containing one (1) regular screwdriver and one (1) piece of tygon tubing.

3.0 INSTRUCTIONS

3.1 OBTAIN EOP-0005 ENCL 34 tool kit from the Control Room Emergency Locker.

3.1.1 INSPECT kit for:

One (1) regular screwdriver

One (1) piece of tygon tubing

3.2 DEFEAT Offgas high radiation isolation interlocks as follows:

3.2.1 Location: H13-P845 Bay C
Affected Terminal Board: TB0019 (Left side of bay, 1st column of terminal boards from panel door, top terminal board)

1. REMOVE the orange lead from Terminal 19 on Terminal Board TB0019 AND COVER with Tygon tubing.

3.3 VERIFY N64-F060, OFF GAS DISCH TO VENT VLV is open.

4.0 REFERENCES

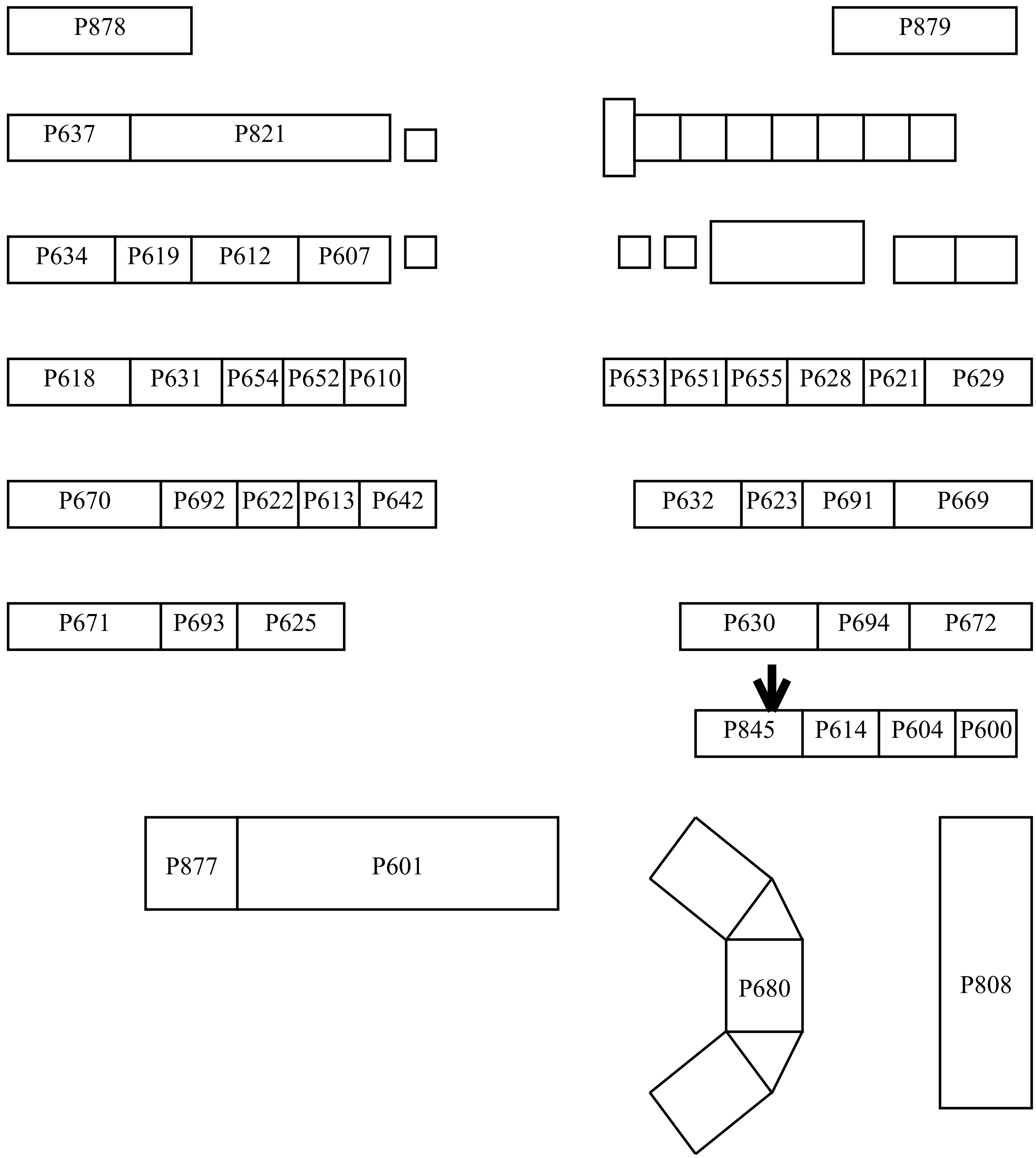
4.1 GE Elem Diag 828E243AA, Process Radiation Mon System

4.2 GE Elem Diag 828E257AA, Off-Gas Control System

4.3 PID-31-4F, OFFGAS

MAIN CONTROL ROOM NSSSS BACKPANELS

All panel numbers are prefixed with H13-



NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE
SRO ☒ RO ☒

ALTERNATE PATH ☐

TITLE: **Bypass a Local Power Range Monitor (LPRM) Detector**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	15	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

	Perform
X	Simulate

EVALUATION LOCATION:

	Plant
	Simulator
X	Control Room

Prepared: Dave Bergstrom **Date:** September 10, 2013

Reviewed: Jeff Reynolds **Date:** January 22, 2014
(Operations Representative)

Approved: Joey Clark **Date:** January 27, 2014
(Facility Reviewer)

EXAMINER INFO SHEET

Task Standard: LPRM 2B-14-31 has been bypassed using REP-0037.

Synopsis: This task will bypass an LPRM.

NOTE: If in the Plant or the Control Room, **Caution** the operator **NOT** to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:
"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:
LPRM 2B-14-31 has failed. The CRS has directed you to bypass it in accordance with REP-0037, LPRM Operability, Section 4.1.

3) Initial Conditions:
The plant is in Mode 1.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Bypass a Local Power Range Monitor (LPRM) Detector	215011001001	215005 A4.04 215005 A4.06	3.2 / 3.2 3.6 / 3.8

REFERENCES:
REP-0037, Rev 15,

APPLICABLE OBJECTIVES
RLP-STM-0503, Obj 18, 21

REQUIRED MATERIALS:
REP-0037, Rev 15 – Section 4.1

SAFETY FUNCTION:
__7__

SIMULATOR CONDITIONS & SETUP:

1. NA – This is a Control Room JPM.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: LPRM 2B-14-31 has been bypassed using REP-0037.

PERFORMANCE:

START TIME: ______________

PROCEDURE NOTE

Sections of this procedure may be performed as needed to support plant configuration. Performing the sections in sequential order is not required. Steps within a section should be performed in sequential order.

1.	**Procedure Step:**	4.1.1 Record the performance of the applicable steps of section 4.1 on the LPRM BYPASS SHEET (Attachment).
	Standard	Applicant located Attachment 2 of REP-0037.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	4.1.2 Ensure that personnel bypassing an LPRM satisfy ADM-0007 requirements for performing this procedure by being any of the following: Licensed Operator, Qualified STA, or Qualified I&C Technician.
	Standard	Applicant filled in the appropriate line on Attachment 2.
	Cue	Applicant qualifies as a Licensed Operator for the simulation of this JPM.
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	**Procedure Step:**	4.1.3 Contact the On-Duty Reactor Engineer to notify them of the intent to bypass an LPRM, so that they can evaluate potential to affect core monitoring functions.
	Standard	Applicant notified Reactor Engineer of the intent to bypass LPRM 2B-14-31. Applicant initialed the appropriate line on Attachment 2.
	Cue	As the Reactor Engineer, acknowledge the report about the intent to bypass LPRM 2B-14-31.
	Notes	
	Results	SAT ☐ UNSAT ☐

4.	**Procedure Step:**	4.1.4 Record the LPRM location and level on the LPRM BYPASS sheet.
	Standard	Applicant recorded and initialed LPRM 2B-14-31 on Attachment 2.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	4.1.5 Using Attachment 1 as a guide, determine the APRM channel associated with the LPRM.
	Standard	Applicant identified APRM A from Attachment 1. Applicant records APRM A on Attachment 2, and initialed step.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	4.1.6 Obtain permission from the Operations Shift Manager (OSM) or the Control Room Supervisor (CRS) prior to bypassing an LPRM. Request the OSM/CRS to have the At-the-Controls (ATC) operator bypass the affected APRM on 1H13-P680 prior to manipulating any switches.
	Standard	Applicant communicated/got permission to bypass LPRM 2B-14-31 Applicant communicated/requested that the ATC Operator bypass APRM A.
	Cue	As OSM/CRS, give permission to bypass the LPRM. (Applicant may request the OSM/CRS initial the step on Attachment 2) As ATC Operator, inform the applicant that APRM A is bypassed.
	Notes	
	Results	SAT ☐ UNSAT ☐

7.	**Procedure Step:**	4.1.7 Have a qualified member of plant staff (Step 4.1.2) provide concurrence with the performance of steps 4.1.8 – 4.1.17
	Standard	Applicant requested a peer check.
	Cue	Inform the applicant that you are qualified and will provide concurrence with the required steps.
	Notes	
	Results	SAT ☐ UNSAT ☐

8.	**Procedure Step:**	4.1.8 Verify that no more than 33 LPRM signals are bypassed. Record the number of bypassed LPRMs on the LPRM BYPASS SHEET
	Standard	Applicant verified the number of bypassed/failed LPRM signals. Applicant records Total Number of LPRM signals bypassed as zero and initials Attachment 2 as the Performer.
	Cue	Inform the applicant that there are no other bypassed/failed LPRM signals.
	Notes	Applicant could obtain this data from walking around to each of the LPRM panels or by viewing info from the Plant Computer.
	Results	SAT ☐ UNSAT ☐

9.	**Procedure Step:**	4.1.9 Record the number of LPRMs that are in OPERATE by placing the affected APRM METER FUNCTION SWITCH in the COUNT position. 1. There is one LPRM for every 5% division. 2. Divide the meter value by 5. 3. Record the number on the LPRM BYPASS SHEET.
	Standard	Applicant located/identified and **simulated** placing APRM A Meter Function Switch to COUNT. *(located on Panel P669)* *{Cue}* Applicant divided 80/5 and recorded 16 on the appropriate line of Attachment 2 then initialed as Performer.
	Cue	When applicant simulates placing switch in COUNT, use a pen to indicate 80% on the meter.
	Notes	
	Results	SAT ☐ UNSAT ☐

10.	**Procedure Step:**	4.1.10 Operations will determine if bypassing the LPRM will render its APRM inoperable per step 3.2.
	Standard	Applicant referenced step 3.2 of REP-0037 and determined that APRM A will not be rendered inoperable by bypassing LPRM 2B-14-31. Applicant initials as Performer on the appropriate line of Attachment 2.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

11.	**Procedure Step:**	4.1.11 Operations will determine if bypassing the LPRM will render PBDS channel A or B inoperable per step 3.3.
	Standard	Applicant referenced step 3.3 of REP-0037 and determined that PBDS will not be rendered inoperable by bypassing LPRM 2B-14-31. Applicant initials as Performer on the appropriate line of Attachment 2.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

The following step brings in ALARM No. 2168, LPRM Downscale on H13-P680.

12.	***Procedure Step:**	4.1.12 Using Attachment 1 as a guide, select the desired LPRM to be bypassed with the LPRM SELECTOR SWITCH and the METER FUNCTION SWITCH. Observe that the bypass light on the APRM panel meter is not lit
	Standard	Applicant located/identified and selected 2 on the Selector Switch. Applicant located/identified and selected B on the Function Switch. Applicant located/identified the bypass light. Applicant initials as Performer on the appropriate line of Attachment 2.
	Cue	Inform or represent to the applicant that the light is <u>not</u> lit.
	Notes	The applicant may inform the ATC Operator of the incoming ALARM
	Results	SAT ☐ UNSAT ☐

13.	***Procedure Step:**	4.1.13 Bypass the selected LPRM by placing the S1 switch of the LPRM in the BYPASS position.
	Standard	Applicant located/identified the card for 2B-14-31 and simulated placing the switch to BYPASS.
	Cue	Indicate that the switch is in the bypass position.
	Notes	The card is located on the 2^{nd} row below the meter to the far left
	Results	SAT ☐ UNSAT ☐

14.	**Procedure Step:**	4.1.14 Observe that the bypass light on the APRM panel meter is lit. Record on LPRM BYPASS SHEET.
	Standard	Applicant located/identified and noted the bypass light lit. Applicant records the current Date and Time, then initials as Performer on the appropriate line of Attachment 2.
	Cue	Indicate that the bypass light is lit. If asked, left light at top is lit.
	Notes	
	Results	SAT ☐ UNSAT ☐

15.	**Procedure Step:**	4.1.15 Determine the number of the LPRMs that are in OPERATE by placing the METER FUNCTION SWITCH for the selected APRM on the panel meter in the COUNT position. 1. There is one LPRM for every 5% division. 2. Divide the meter value by 5. 3. Check that the number of LPRMs in OPERATE is one less than recorded on the LPRM BYPASS SHEET, step 4.1.9. 4. Record the number on the LPRM BYPASS SHEET.
	Standard	Applicant located/identified and **simulated** placing APRM A Meter Function Switch to COUNT. *{Cue}* Applicant divided 75/5 and recorded 15 on the appropriate line of Attachment 2 then initialed as Performer.
	Cue	When applicant simulates placing switch in COUNT, use a pen to indicate 75% on the meter.
	Notes	
	Results	SAT ☐ UNSAT ☐

Terminating Cue: LPRM 2B-14-31 has been bypassed using REP-0037.

Cue: **This completes this JPM.**

STOP TIME: ____________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

The plant is in Mode 1.

INITIATING CUE:

LPRM 2B-14-31 has failed. The CRS has directed you to bypass it in accordance with REP-0037, LPRM Operability, Section 4.1.

*G12.1.23

RIVER BEND STATION
STATION OPERATING MANUAL
*REACTOR ENGINEERING PROCEDURE

*LPRM OPERABILITY

PROCEDURE NUMBER:	***REP-0037**
REVISION NUMBER:	***15**
Effective Date:	***February 2, 2010**

NOTE : SIGNATURES ARE ON FILE.

TemRev 2 AddCounter 84 Att Enc DS MSet REGULAR KWN OFF
REFERENCE USE
*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES

TABLE OF CONTENTS

1 PURPOSE

1.1 To provide procedural guidance for bypassing LPRMs and restoring LPRMs to service in mode 1.

1.2 To provide procedural controls to ensure that the APRM operability requirement as a function of the operable LPRMs is met.

1.3 To provide procedural controls to ensure that the Core Monitor functioning requirement as a function of the operable LPRMs is met.

2 REFERENCES

2.1 RBS Technical Specification Bases B3.3.1.1.2a-d.

2.2 GEK-83360, Power Range Neutron Monitoring System Dec., 1983

2.3 GE Elem. Diagram 851E230AA, Power Range Neutron Mon. Sys. Rev. 11.

2.4 EN-AD-103, Document Control and Records Management Activities

2.5 NEDE-24810 Vol. 2, Process Computer, June, 1981

2.6 Commitment 11825

2.7 ADM-0007, Selection, Training, Qualification and Evaluation of Plant Staff Personnel.

2.8 River Bend CR-1999-1857-015

3 PRECAUTION AND LIMITATIONS

3.1 Bypassing and un-bypassing an LPRM may affect the reading of the APRM channel associated with the LPRM. The gain of the APRM may require adjustment to indicate the Desired Fraction of Rated Thermal Power per Technical Specification 3.3.1.1's Surveillance Requirement 3.3.1.1.2.

3.2 Each APRM must have 2 operable LPRM inputs per level and a minimum of 11 operable LPRMs to be operable as required by Technical Specification Bases B3.3.1.1.2a-d.

3.3 Each PBDS channel (APRM A & B only) must have 8 valid LPRM inputs as required by Technical Specification Bases B3.3.1.3.

3.4 Bypassing and un-bypassing an LPRM may cause LPRM Drift Messages to print on the PPC printer in the Main Control Room.

3.5 This procedure is for bypassing and restoring LPRMs in mode 1 only.

4 **PROCEDURE**

NOTE

Sections of this procedure may be performed as needed to support plant configuration. Performing the sections in sequential order is not required. Steps within a section should be performed in sequential order.

4.1 Bypassing an LPRM

4.1.1. Record the performance of the applicable steps of section 4.1 on the LPRM BYPASS SHEET (Attachment 2).

4.1.2. Ensure that personnel bypassing an LPRM satisfy ADM-0007 requirements for performing this procedure by being any of the following: Licensed Operator, Qualified STA, or Qualified I&C Technician.

1. Operations will complete the determination if the APRM remains operable following the bypassing of an LPRM.

4.1.3. Contact the On-Duty Reactor Engineer to notify them of the intent to bypass an LPRM so that they can evaluate potential to affect core monitoring functions.

4.1.4. Record the LPRM location and level on the LPRM BYPASS SHEET.

4.1.5. Using Attachment 1 as a guide determine the APRM channel associated with the LPRM.

4.1.6. Obtain permission from the Operations Shift Manager (OSM) or the Control Room Supervisor (CRS) prior to bypassing an LPRM. Request the OSM/CRS to have the At-the-Controls (ATC) operator bypass the affected APRM on 1H13-P680 prior to manipulating any switches.

4.1.7. Have a qualified member of plant staff (Step 4.1.2) provide concurrence with the performance of steps (4.1.8-4.1.17).

4.1.8. Verify that no more than 33 LPRM signals are bypassed. Record the number of bypassed LPRMs on the LPRM BYPASS SHEET.

4.1.9. Record the number of LPRMs that are in OPERATE by placing the affected APRM METER FUNCTION SWITCH in the COUNT position.

1. There is one LPRM for every 5% division.

2. Divide the meter value by 5.

3. Record the number on the LPRM BYPASS SHEET. (Commitment 11825)

4.1.10. Operations will determine if bypassing the LPRM will render its APRM inoperable per step 3.2.

4.1.11. Operations will determine if bypassing the LPRM will render PBDS channel A or B inoperable per step 3.3.

NOTE

The following step brings in ALARM No. 2168 LPRM downscale on H13-P680

4.1.12. Using Attachment 1 as a guide, select the desired LPRM to be bypassed with the LPRM SELECTOR SWITCH and the METER FUNCTION SWITCH. Observe that the bypass light on the APRM panel meter is not lit. (Commitment 11825)

4.1.13. Bypass the selected LPRM by placing the S1 switch of the LPRM in the BYPASS position.

4.1.14. Observe that the bypass light on the APRM panel meter is lit. Record on LPRM BYPASS SHEET. (Commitment 11825)

4.1.15. Determine the number of the LPRMs that are in OPERATE by placing the METER FUNCTION SWITCH for the selected APRM on the panel meter in the COUNT position.

1. There is one LPRM for every 5% division.

2. Divide the meter value by 5.

3. Check that the number of LPRMs in OPERATE is one less than recorded on the LPRM BYPASS SHEET , Step 4.1.9.3.

4. Record the number on the LPRM BYPASS SHEET. (11825)

4.1.16. IF other LPRMs in the same APRM are required to be bypassed, continue with bypassing those LPRMs before continuing to step 4.1.17

4.1.17. Using either an OD-3 edit or a 3D Monicore Core Power and Flow edit, operations will verify that the APRM reading is within ± 2% of rated thermal power (RTP) or operations will adjust the APRM as follows:

1. Record the "As Found" reading of the APRM to be adjusted on the LPRM BYPASS SHEET.

2. Record the CTP readings in percent power on the LPRM BYPASS SHEET.

3. Verify or place the APRM mode switch S1 in the OPERATE position.

4. Verify or place METER FUNCTION switch S2 in the AVERAGE position.

5. Adjust the gain of the affected APRM (using feedback control potentiometer R16, located on auxiliary unit Z404) until the APRM panel meter or the PPC display reads as close as possible, the percent power recorded in step 4.1.17.2 .

6. Obtain an OD-3 or 3D Monicore Core Power and Flow edit.

7. Record the "As Left" reading of the adjusted APRM and the CTP on the LPRM BYPASS SHEET.

TS

8. Verify the absolute difference between the Average Power Range Monitor (APRM) and the calculated power ≤ 2% RTP. Record Yes or No on the LPRM BYPASS SHEET. (Tech Spec SR 3.3.1.1.2)

9. If the difference between the APRM and the calculated core thermal power cannot be adjusted within -2% to +2%, immediately notify the Operations Shift Manager/ Control Room Supervisor (OSM/CRS) and refer to LCO 3.3.1.1.

4.1.18. Request the OSM/CRS to have the ATC return the affected APRM to service.

4.1.19. Record the date and WR/WO# (if applicable) on the LPRM BYPASS SHEET .

4.1.20. Send the LPRM BYPASS SHEET , Attachment 2, to the On-Duty Reactor Engineer for review and update of the LPRM Bypass Log.

4.2 Restoring an LPRM to Service

4.2.1. Record the performance of the applicable steps of section 4.2 on the LPRM RESTORE SHEET (Attachment 3).

4.2.2. Ensure that personnel restoring an LPRM satisfy ADM-0007 requirements for performing this procedure by being any of the following: a Licensed Operator, Qualified STA, or Qualified I&C Technician.

4.2.3. Contact Reactor Engineering to notify them of the intent to restore an LPRM to service so that Reactor Engineering can evaluate the potential to affect core monitoring functions.

4.2.4. Record the LPRM location and level.

4.2.5. Using Attachment 1 as a guide, determine the APRM channel associated with the LPRM.

4.2.6. Obtain permission from the Operations Shift Manager (OSM) or the Control Room Supervisor (CRS) prior to restoring an LPRM to service. Request the OSM/CRS to have the ATC bypass the affected APRM on 1H13-P680 prior to manipulating any switches.

4.2.7. Have a qualified member of plant staff (Step 4.2.2) provide concurrence with the performance of steps (4.2.8.3 - 4.2.17).

4.2.8. Determine the number of LPRMs that are in OPERATE by placing the METER FUNCTION SWITCH for the selected APRM on the panel meter in the COUNT position.

1. There is one LPRM for every 5% division.
2. Divide the meter value by 5.
3. Record the number on the LPRM RESTORE SHEET . (Commitment 11825)

4.2.9. Using Attachment 1 as a guide, select the desired LPRM to be restored with the LPRM SELECTOR SWITCH and the METER FUNCTION SWITCH. Observe that the bypass light on the APRM panel meter is lit. (Commitment 11825)

4.2.10. Place the selected LPRM in service by placing the S1 switch of the LPRM in the OPERATE position.

4.2.11. Observe that the bypass light on the APRM panel meter is not lit. Record on LPRM RESTORE SHEET . (Commitment 11825)

4.2.12. Determine number of LPRMs that are in OPERATE by placing the METER FUNCTION SWITCH for the selected APRM on the panel meter in the COUNT position.

1. There is one LPRM for every 5% division.
2. Divide the meter value by 5.
3. Verify that the number of LPRMs in OPERATE is one greater than recorded in LPRM RESTORE SHEET , step 4.2.8.3.
4. Record the number on the LPRM RESTORE SHEET . (11825)

4.2.13. With the LPRM SELECTOR SWITCH and the METER FUNCTION SWITCH, select the desired LPRM and display the reading on the front meter.

4.2.14. Reactor engineering will evaluate the restored LPRM indication / reading as follows and provide a desired value to have I&C adjust the reading to, as necessary.

1. If in a symmetric A sequence pattern, compare the LPRM reading to a symmetric LPRM reading.
2. Does the LPRM reading compare favorably to the other LPRM readings in that string?
3. Does the LPRM reading compare favorably with other LPRM readings of a similar level in that part of the core?

4.2.15. IF the reactor engineer provides a desired value for the restored LPRM to be adjusted to, THEN I&C will adjust the LPRM gain using the appropriate LPRM GAIN Control/Switch as shown below until the LPRM indication matches the desired value.

GAIN SW (S2) POSITION	GAIN ADJUSTMENT CONTROL
L	R5
M	R3
H	R1

1. Record final adjusted value as appropriate.

4.2.16. IF other LPRMs in the same APRM are required to be restored, continue with restoring those LPRMs before continuing to step 4.2.17

4.2.17. Using either an OD-3 edit or a 3D Monicore Core Power and Flow edit, operations will verify that the APRM reading is within ± 2% of rated thermal power (RTP) or operations will adjust the APRM as follows:

1. Record the “As Found” reading of the APRM to be adjusted on the LPRM RESTORE SHEET .
2. Record the CTP readings in percent power on the LPRM RESTORE SHEET .
3. Verify or place the APRM mode switch S1 in the OPERATE position.
4. Verify or place METER FUNCTION switch S2 in the AVERAGE position.
5. Adjust the gain of the affected APRM (using feedback control potentiometer R16, located on auxiliary unit Z404) until the APRM panel meter or the Core Monitor Edit or PPC display reads as close as possible, the percent power recorded in step 4.2.17.2 .
6. Obtain an OD-3 or 3D Monicore Core Power and Flow edit.

7. Record the “As Left” reading of the adjusted APRM on the LPRM RESTORE SHEET .

TS 8. Verify the absolute difference between the Average Power Range Monitor (APRM) and the calculated power ≤ 2% RTP. Record Yes or No on the LPRM RESTORE SHEET . (Tech Spec SR 3.3.1.1.2)

9. If the difference between the APRM and the calculated core thermal power cannot be adjusted within -2% to +2%, immediately notify the Operations Shift Manager/ Control Room Supervisor (OSM/CRS) and refer to LCO 3.3.1.1.

4.2.18. Request the OSM/CRS to have the ATC operator return the affected APRM to service.

4.2.19. After the LPRM is returned to service, notify Reactor Engineering so they can determine if an OD-1 is warranted or not.

4.2.20. Send the LPRM RESTORE SHEET , Attachment 3, to the On-Duty Reactor Engineer for review and update of the LPRM Bypass Log.

5 DOCUMENTATION

5.1 Reactor Engineering is responsible for:

5.1.1. Submitting records to Permanent Plant File within 30 days of final approval

5.1.2. Ensuring that the records submitted contain the required documentation

LPRM INPUTS TO APRM CHANNELS

APRM A	APRM B	APRM C	APRM D
2A-06-39	2A-14-39	1A-14-47	1A-22-47
3A-38-39	3A-46-39	2A-46-47	3A-06-31
4A-22-23	4A-30-23	3A-30-31	4A-38-31
6A-38-07	5A-14-07	4A-14-15	5A-22-15
1B-30-47	2B-38-47	5A-46-15	2B-14-39
2B-14-31	3B-22-31	2B-06-39	3B-46-39
3B-46-31	5B-06-15	3B-38-39	4B-30-23
4B-30-15	6B-38-15	4B-22-23	5B-14-07
2C-22-39	3C-30-39	6B-38-07	2C-38-47
4C-06-23	4C-14-23	1C-30-47	3C-22-31
5C-38-23	5C-46-23	2C-14-31	5C-06-15
6C-22-07	6C-30-07	3C-46-31	6C-38-15
1D-14-47	1D-22-47	4C-30-15	3D-30-39
2D-46-47	3D-06-31	2D-22-39	4D-14-23
3D-30-31	4D-38-31	4D-06-23	5D-46-23
4D-14-15	5D-22-15	5D-38-23	6D-30-07
5D-46-15		6D-22-07	

APRM E	APRM F	APRM G	APRM H
2A-22-39	3A-30-39	1A-30-47	2A-38-47
4A-06-23	4A-14-23	2A-14-31	3A-22-31
5A-38-23	5A-46-23	3A-46-31	5A-06-15
6A-22-07	6A-30-07	4A-30-15	6A-38-15
1B-14-47	1B-22-47	2B-22-39	3B-30-39
2B-46-47	3B-06-31	4B-06-23	4B-14-23
3B-30-31	4B-38-31	5B-38-23	5B-46-23
4B-14-15	5B-22-15	6B-22-07	6B-30-07
5B-46-15	2C-14-39	1C-14-47	1C-22-47
2C-06-39	3C-46-39	2C-46-47	3C-06-31
3C-38-39	4C-30-23	3C-30-31	4C-38-31
4C-22-23	5C-14-07	4C-14-15	5C-22-15
6C-38-07	2D-38-47	5C-46-15	2D-14-39
1D-30-47	3D-22-31	2D-06-39	3D-46-39
2D-14-31	5D-06-15	3D-38-39	4D-30-23
3D-46-31	6D-38-15	4D-22-23	5D-14-07
4D-30-15		6D-38-07	

LPRM BYPASS

Step	Name (print)	Signature	Initials
4.1.2			

Step	Instruction		Initials
4.1.3	Contact Reactor Eng, RE(contacted):		
4.1.4	LPRM		
4.1.5	APRM		
4.1.6	Obtain permission to bypass LPRM / Bypass APRM		(OSM/CRS)

Step	Instructions		Performer	Concurrence
4.1.8	Total number of LPRM signals bypassed. Number:			
4.1.9.3	Affected APRM, LPRMs in operate. Number:			
4.1.10	Operations - Determine if APRM will remain operable			
4.1.11	Operations - Determine if PBDS A or B will remain operable			
4.1.12	LPRM in OPERATE			
4.1.14	LPRM in BYPASS Date/Time			
4.1.15.4	Affected APRM, LPRMs in operate. Number:			

Step	Instructions					Performer	Concurrence
4.1.17	Operations - Adjust APRM as required						
	As Found APRM	As Found CTP	As Left APRM	As Left CTP	Within ± 2% RTP		
4.1.18	Return APRM to OPERATE (as applicable)						
4.1.19	Date		WR #				

Comments

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Return to the On-Duty Reactor Engineer when Complete.

Step	Instruction	On-Duty Reactor Engineer/ Date
4.1.20	Update the LPRM BYPASS LOG	

LPRM RESTORE

Step	Name (print)	Signature	Initials
4.2.2			

Step	Instruction		Initials
4.2.3	Contact Reactor Eng, RE(contacted):		
4.2.4	LPRM		
4.2.5	APRM		
4.2.6	Obtain permission to restore LPRM / Bypass APRM		(OSM/CRS)

<table>
<tr><th>Step</th><th colspan="5">Instructions</th><th>Performer</th><th>Concurrence</th></tr>
<tr><td>4.2.8.3</td><td colspan="4">Number of LPRMs in operate. Number:</td><td></td><td></td><td></td></tr>
<tr><td>4.2.9</td><td colspan="5">LPRM in BYPASS</td><td></td><td></td></tr>
<tr><td>4.2.11</td><td colspan="2">LPRM in OPERATE Date/Time</td><td colspan="3"></td><td></td><td></td></tr>
<tr><td>4.2.12.4</td><td colspan="4">Number of LPRMs in operate. Number:</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">4.2.14</td><td colspan="2">Adjust LPRM (yes / no) (Rx Eng)
Desired Value</td><td colspan="3">As Left</td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td rowspan="3">4.2.17</td><td colspan="5">Operations - Adjust APRM as required</td><td rowspan="3"></td><td rowspan="3"></td></tr>
<tr><td>As Found APRM</td><td>As Found CTP</td><td>As Left APRM</td><td>As Left CTP</td><td>Within ± 2% RTP</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>4.2.18</td><td colspan="5">Return APRM to OPERATE</td><td colspan="2"></td></tr>
<tr><td>4.2.19</td><td colspan="5">Notify RE to determine if OD-1 is required</td><td colspan="2"></td></tr>
</table>

Comments

Return to the On-Duty Reactor Engineer when Complete.

Step	Instruction	On-Duty Reactor Engineer /Date
4.2.20	Update the LPRM BYPASS LOG	

NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE

SRO ☒ RO ☒

ALTERNATE PATH ☐

TITLE: **Alternate Control Building Chilled Water Pumps within the Standby Division**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	12	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

	Perform
X	Simulate

EVALUATION LOCATION:

X	Plant
	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	September 11, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Chilled Water is lined up to HVK Chiller D using SOP-0066, Section 5.3

Synopsis: This task will swap the standby chiller from B to D using SOP-0066, Control Building HVAC Chilled Water System This JPM is written for the field portion of the task which alternates the chilled water system only.

NOTE: If in the Plant or the Control Room, **Caution** the operator **NOT** to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to perform the local lineup for placing Control Building HVK Chiller D, in standby with HVK-P1D Chilled Water Pump. SOP-0066 has been completed through Step 5.3.3.

3) Initial Conditions:

HVK-CHL1A, Control Building Chiller A, is currently in service.
HVK-CHL1B Control Building Chiller B and 1HVK-P1B, Chilled Water Pump B, are lined up for standby operation.
The Unit Operator has placed 1HVK-CHL1B, CONTROL BLDG CHILLER B, in LOCKOUT and 1HVK-P1B, CHILLED WATER PUMP B, in STOP.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Alternate Control Building Chilled Water Pumps within the Standby Division	291011001001	290003 A4.01	3.2 / 3.2

REFERENCES:
SOP-0066, Rev 311

APPLICABLE OBJECTIVES
RLP-STM-0402, Obj 4

REQUIRED MATERIALS:
SOP-0066, Rev 313, Section 5.3

SAFETY FUNCTION:
__**9**__

SIMULATOR CONDITIONS & SETUP:

1. NA – This is an In Plant JPM.

CRITICAL ELEMENTS: Items marked with an "*****" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Chilled Water is lined up to HVK Chiller D using SOP-0066, Section 5.3.

PERFORMANCE:

START TIME: _______________

1.	***Procedure Step:**	5.3.4 Locally at the chiller which is currently in standby, unlock and close the chiller inlet valve. • HVK-V84, HVK CHL1B INLET ISOL
	Standard	Applicant located/identified the Chill Water Inlet Valve for B HVK Chiller Applicant unlocked and closed HVK-V84 by turning the handwheel fully clockwise using the chain.
	Cue	Inform the applicant that the handwheel is fully clockwise.
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	***Procedure Step:**	5.3.5 Locally at the currently out of service chiller, open and lock the chiller inlet valve. • HVK-V88, HVK CHL1D INLET ISOL
	Standard	Applicant located/identified the Chill Water Inlet Valve for D HVK Chiller Applicant opened and locked HVK-V88 by turning the handwheel fully counter clockwise using the chain.
	Cue	Inform the applicant that the handwheel is fully counter-clockwise.
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

Oil level can be lower than normal if service water temperature is low, greater than or equal to 65°F and less than or equal to 75°F.

For a non-operating chiller an oil level in or above the upper sight glass is normal. When idle, the level may be higher due to the absorption of refrigerant by the oil.

3.	**Procedure Step:**	5.3.6 Locally at the chiller being placed in standby, check the following: 1. Lube oil level greater than ¾ of lower sight glass.	
	Standard	Applicant verified lube oil level within specification.	
	Cue	Indicate an oil level in the lower half of the upper sight glass	
	Notes		
	Results	SAT ☐	UNSAT ☐

4.	**Procedure Step:**	5.3.6 Locally at the chiller being placed in standby, check the following: 2. Lube oil temperature is greater than or equal to 120°F and less than or equal to 155°F.	
	Standard	Applicant verified lube oil temperature within specification.	
	Cue	Indicate an oil temperature of 140°F.	
	Notes		
	Results	SAT ☐	UNSAT ☐

5.	**Procedure Step:**	5.3.6 Locally at the chiller being placed in standby, check the following: 3. <u>IF</u> the READY Light is off, <u>THEN</u> depress the PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton.
	Standard	NA
	Cue	Indicate that the READY light is lit.
	Notes	No applicant action is necessary for this step.

6.	**Procedure Step:**	5.3.6 Locally at the chiller being placed in standby, check the following: 4. READY Light is on.
	Standard	Applicant verified the READY light is lit.
	Cue	Indicate the READY light is ON.
	Notes	The lights are difficult to see – not very bright.
	Results	SAT ☐ UNSAT ☐

7.	**Procedure Step:**	5.3.6 Locally at the chiller being placed in standby, check the following: 5. SAFETY CIRCUIT Light is on.
	Standard	Applicant verified the SAFETY CIRCUIT Light is on.
	Cue	Indicate the safety circuit light is on.
	Notes	
	Results	SAT ☐ UNSAT ☐

8.	**Procedure Step:**	5.3.6 Locally at the chiller being placed in standby, check the following: 6. LOAD RECYCLE Light is on.
	Standard	Applicant verified the LOAD RECYCLE Light is on.
	Cue	Indicate the load recycle light is on.
	Notes	
	Results	SAT ☐ UNSAT ☐

9.	**Procedure Step:**	5.3.6 Locally at the chiller being placed in standby, check the following: 7. Refrigerant visible in evaporator sight glass.
	Standard	Applicant verified refrigerant level within specification.
	Cue	Indicate a refrigerant level in the evaporator sight glass.
	Notes	The sightglass is on the north end of the machine; it is yellow
	Results	SAT ☐ UNSAT ☐

10.	**Procedure Step:**	5.3.7 Perform the following for the chiller being placed in standby: 1. Verify SWP-P3D, CHILLER D RECIRC SWP in AUTO.
	Standard	Applicant informed the Control Room that Steps 5.3.4 through 5.3.6 have been completed.
	Cue	Accept the report as a Control Room Operator.
	Notes	The rest of the steps in this section would be performed in the MCR.
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Chilled Water is lined up to HVK Chiller D using SOP-0066, Section 5.3

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

HVK-CHL1A, Control Building Chiller A, is currently in service.

HVK-CHL1B Control Building Chiller B and 1HVK-P1B, Chilled Water Pump B, are lined up for standby operation.

The Unit Operator has placed 1HVK-CHL1B, CONTROL BLDG CHILLER B, in LOCKOUT and 1HVK-P1B, CHILLED WATER PUMP B, in STOP.

INITIATING CUE:

The CRS has directed you to perform the local lineup for placing Control Building HVK Chiller D, in standby with HVK-P1D Chilled Water Pump. SOP-0066 has been completed through Step 5.3.3.

CONTINUOUS USE

*G12.1.6

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
*SYSTEM OPERATING PROCEDURE

*CONTROL BUILDING HVAC CHILLED WATER SYSTEM (SYS #410)

PROCEDURE NUMBER: ***SOP-0066**

REVISION NUMBER: ***314**

Effective Date: ***01/13/2014**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES

TABLE OF CONTENTS

1 PURPOSE

1.1 The purpose of this procedure is to provide the specific steps necessary to startup, operate, and shutdown the Control Building HVAC Chilled Water System.

2 PRECAUTIONS AND LIMITATIONS

2.1 Normally only one Control Building Chilled Water Chiller is in operation. The non-operating division has one chiller in standby. The other two chillers are locked out and valved out of service.

2.2 The HVK-CHL1A(B)(C)(D), CONTROL BUILDING VENT CHILLERS starting is inhibited as follows:

- A chiller is prevented from restarting, by an anti-cycle time delay, until 20 minutes have elapsed from the previous start. This time delay allows for cool down of the chiller motor prior to restart.

- A chiller can <u>not</u> be started until 2 1/2 minutes have elapsed since it was stopped. This time delay allows sufficient time for the guide vanes to close and ensure no-load starting of the chiller.

2.3 Control Building Ventilation Chilled Water equipment capacities are as follows:

- Chilled Water Pumps - 100% each.

- Water Chillers - 100% each.

2.4 Even though the refrigerant is not toxic at normal temperatures, in heavy concentrations it displaces the air and can cause personnel suffocation.

2.5 When exposed to heater elements or flame, Freon refrigerant becomes highly toxic, and even in low concentrations may cause fatal or serious injury. If a flame or heating element exists in a room when Freon is present, the room or space must be evacuated. <u>IF</u> personnel are required to enter the space, <u>THEN</u> use of breathing apparatus is required until the space is ventilated and the air sampled.

2.6 The following flow transmitters require venting during HVK Loop Fill or if the chiller evaporator has been isolated and drained:

- HVK-FTY5A, B, C, and D

- HVK-FTX5A, B, C, and D

2.7 The following flow transmitters require venting during SWP Loop Fill or if the chiller condenser has been isolated and drained:

- SWP-FT69A, B, C, and D

2.8 The following valves require venting per SOP-0018, Normal Service Water during SWP Loop Fill:

- SWP-PVY32A, B, C, and D

2.9 Placing HVK-CHL1B(D) LO FLOW TRIP LOGIC BYPASS key lock switch in the BYPASS position will provide a Flow Normal signal to the Division II chiller control logic allowing associated chiller operation without minimum chilled water or service water flow.

2.10 The following apply for the applicable electro-hydraulic actuated Borg-Warner or Metrex s valves in this system:

- <u>WHEN</u> SWP-PVY32A/B/C/D are required to be physically gagged open or failed open, <u>THEN</u> the applicable HVK-CHL1A/B/C/D is INOPERABLE and UNAVAILABLE. SWP-PVY32A/B/C/D must be capable of modulating to maintain the design criteria for condenser pressure.

- HVK-TV16A/B must be capable of modulating to maintain the design criteria for the Control Room environment and to maintain divisional HVC/HVK administrative OPERABILITY.

2.11 Control Building Chiller normal operating information can be found in Attachment 5, NORMAL OPERATING PARAMETERS - CHILLERS.

2.12 Control Building Chiller and Cable Vault/Switchgear temperature controller setting information can be found in Attachment 6, CONTROLLER SETTING CORRELATIONS.

3 PREREQUISITES

3.1 Check Control Building HVAC System aligned and ready to start per SOP-0058, Control Building HVAC System.

3.2 Check Makeup Water System in operation and aligned to the Chilled Water System per SOP-0099, Makeup Water System.

3.3 Check Normal Service Water System in operation and aligned to the Chilled Water System per SOP-0018, Normal Service Water.

3.4 Check the following electrical systems are in operation and aligned to the Control Building Chilled Water System:

3.4.1. 4.16KV per SOP-0046, 4.16KV System

3.4.2. 480VAC per SOP-0047, 480VAC System

3.4.3. 120VAC per SOP-0048, 120VAC System

3.4.4. 125VDC per SOP-0049, 125VDC System

3.5 Verify the system is lined up for startup.

4 SYSTEM STARTUP

NOTE

Filling and venting is necessary only when the removal or repair of a system component has allowed the intrusion of air into the system.

Fill/vent of individual components in this section can be performed in any order. Do not backfill from running division.

4.1 Control Building Chilled Water Loop Fill and Vent

4.1.1. At H13-P863, verify STOP Pushbuttons are depressed for the following:

- HVK-CHL1A(B), CONT BLDG CHILLER A(B)
- HVK-CHL1C(D), CONT BLDG CHILLER C(D)

4.1.2. At H13-P863, verify control switches for the following are in STOP:

- HVK-P1A(B), CHILLED WATER PUMP A(B)
- HVK-P1C(D), CHILLED WATER PUMP C(D)

CAUTION

Possible damage to Chilled Water Pumps can occur if NPSH is lost to the pumps. Do not allow HVK-TK1A/B, CHILLED WATER COMPRESSION TANK level to be lost during fill/vent process.

4.1.3. Check HVK-TK1A/B levels are in the green band as read on HVK-LI1A, CHW SURGE TK A/C LEVEL and HVK-LI1B, CHW SURGE TK B/D LEVEL.

CAUTION

Possible damage to Chilled Water Pumps can occur if NPSH is lost to the pumps. Do not allow HVK-TK1A/B pressure to fall below 16 psig during fill/vent process.

4.1.4. Check HVK-TK1A/B local pressure is greater than 16 psig as read on HVK-PI31A, COMPRESSION TK TK1A and HVK-PI31B, COMPRESSION TK TK1B.

4.1.5. IF HVK-TK1A/B pressure is less than or equal to 16 psig, THEN repressurize using Section 5.8 or an external portable air supply.

4.1.6. Vent the chilled water pump discharge header using HVK-V231(V217), HVK-P1A, P1C(P1B AND P1D) DISCHARGE HEADER VENT.

4.1.7. Venting the chiller inlet piping

- Vent using HVK-V238(V228), HVK-CHL1A(B) INLET VENT.
- Vent using HVK-V234(V219), HVK-CHL1C(D) INLET VENT.

NOTE

The following flow transmitters require venting during initial loop fill or if the chiller evaporator has been isolated and drained.

4.1.8. Have I&C vent the following flow transmitters:

- HVK-FTY5A(B), CHILL WTR TO CHL1A(B) PMID 50036129(50036130)
- HVK-FTY5C(D), CHILL WTR TO CHL1C(D) PMID 50036131(50036132)
- HVK-FTX5A(B), CHILL WTR TO CHL1A(B) PMID 50036125(50036126)
- HVK-FTX5C(D), CHILL WTR TO CHL1C(D) PMID 50036127(50036128)

4.1.9. Vent the chiller evaporators locally.

4.1.10. Venting the chiller outlet piping

- Vent using HVK-V239(V229), HVK-CHL1A(B) OUTLET VENT.
- Vent using HVK-V233(V218), HVK-CHL1C(D) OUTLET VENT.

4.1.11. Venting Chilled Water inlet and outlet headers and Unit Cooler coils

1. WHEN venting a division not in service, THEN lock out AHUs in that division:
   - Depress LOCKOUT on HVC-ACU1A(B), CR AHU A(B) Lockout/Reset Pushbutton.
   - Depress LOCKOUT on HVC-ACU2A(B), CONTROL BLDG AHU A(B) Lockout/Reset Pushbutton.
   - Place HVC-ACU3A(B), EQPT RM AHU A(B) Switch to STOP.
   - Place HVC-FN2A(B), STBY SWGR RTN FAN A(B) Switch to STOP.
2. IF the entire division s piping is being filled and vented, THEN perform the following:
   1) De-energize HVK-MOV20A(B)(C)(D), CHW PUMP A(B)(C)(D) DISCH VLV.

   2) Manually throttle HVK-MOV20A(B)(C)(D) open to minimize water hammer.
3. Start chilled water pump HVK-P1A(B), CHILLED WATER PUMP A(B) or HVK-P1C(D), CHILLED WATER PUMP C(D).
4. Vent using HVK-V247(V252), LP A(B) CB AHU HVC-ACU1A(B) INLET HEADER VENT.
5. Vent using HVK-V246(V253), LP A(B) CB AHU HVC-ACU1A(B) OUTLET HEADER VENT.
6. Vent using HVK-V240(V227), HVK RETURN HEADER VENT.
7. Locally vent individual AHU cooling coils.

4.1.12. WHEN venting is complete, THEN restore to standby lineup by performing the following:

1. Stop HVK-P1A(B), CHILLED WATER PUMP A(B) or HVK-P1C(D), CHILLED WATER PUMP C(D).

2. IF HVK-MOV20A(B)(C)(D), CHW PUMP A(B)(C)(D) DISCH VLV was deenergized in Step 4.1.11.2.1), THEN re-energize HVK-MOV20A(B)(C)(D).

3. Check HVK-MOV20A(B)(C)(D) closes.

4. Verify RESET is depressed on HVC-ACU1A(B), CR AHU A(B) Lockout/Reset Pushbutton.

5. Verify RESET is depressed on HVC-ACU2A(B), CONTROL BLDG AHU A(B) Lockout/Reset Pushbutton.

6. Verify HVC-ACU3A(B), EQPT RM AHU A(B) Switch in AUTO.

7. Verify HVC-FN2A(B), STBY SWGR RTN FAN A(B) Switch in AUTO.

4.2 Control Building Chilled Water Loop Startup

4.2.1. Starting Division I Control Building Chilled Water loop with Division II Control Building Chilled Water loop in Standby.

NOTE

Control Building Chilled Water startup is performed in conjunction with SOP-0058, Control Building HVAC System startup.

After completing this section the following lineup is established:

- One Division I Chiller running
- One Division I Chiller out of service
- Either Division I Chilled Water Pump running
- One Division I Chilled Water Pump out of service
- One Division II Chiller in standby
- One Division II Chiller out of service
- Either Division II Chilled Water Pump in standby
- One Division II Chilled Water Pump out of service

The steps in this section place Division I, A components in service with C components in parentheses and Division II, B components in standby with D components in parentheses. Any combination of Chiller and Chilled Water Pump can be used within each division.

1. Verify the following valves are locked open:

   - HVK-V35(V39), HVK-CHL1A(C) INLET ISOL
   - HVK-V84(V88), HVK-CHL1B(D) INLET ISOL

2. Verify the following valves are closed:

   - HVK-V39(V35), HVK-CHL1C(A) INLET ISOL
   - HVK-V88(V84), HVK-CHL1D(B) INLET ISOL

3. At H13-P863, perform the following:

   1) Select P1A or P1C with the Division I CHILLED WATER PUMP SELECTOR Switch for the pump to be started.

   2) Select P1B or P1D with the Division II CHILLED WATER PUMP SELECTOR Switch for the pump to be in standby.

   3) Select CHL 1A (CHL 1C) on the Division I CHILLER SUPPLY FLOW ELEMENT SELECTOR for the chiller to be started.

   4) Select CHL 1B (CHL 1D) on the Division II CHILLER SUPPLY FLOW ELEMENT SELECTOR for the chiller to be in standby.

   5) Verify the following:

      a) SWP-P3A(C), CHILLER A(C) RECIRC SWP for the chiller to be started is in AUTO.

      b) SWP-P3B(D), CHILLER B(D) RECIRC SWP for the chiller to be in standby is in AUTO.

4. Locally at the chiller, check the following:

<u>NOTE</u>

Oil level can be lower than normal if service water temperature is low, greater than or equal to 65°F and less than or equal to 75°F. Manual loading of the chiller could be required upon chiller startup to prevent a trip from low oil pressure.

For a non-operating chiller an oil level in or above the upper sightglass is normal. When idle, the level may be higher due to the absorption of refrigerant by the oil.

   1) Lube oil level greater than 3/4 of lower sight glass.

   2) Lube oil temperature is greater than or equal to 120°F and less than or equal to 155°F.

   3) <u>IF</u> the READY Light is off, <u>THEN</u> depress the PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton.

   4) READY Light is on.

   5) SAFETY CIRCUIT Light is on.

   6) LOAD RECYCLE Light is on.

7) Refrigerant is visible in evaporator sight glass.

5. At H13-P863, perform the following:

1) Verify HVK-CHL1APL(1CPL), CHLD CPRSR LUBO is in AUTO.

2) Verify HVK-CHL1BPL(1DPL), CHLD CPRSR LUBO is in AUTO.

3) Start HVK-P1A or HVK-P1C, CHILLED WATER PUMP A or C as selected in Step 4.2.1.3.1.

4) Check the associated HVK-MOV20A or HVK-MOV20C, CHW PUMP A or C DISCH VLV opens.

5) Check HVC-ACU1A, CR AHU A starts.

6) Check HVC-ACU2A, CONTROL BLDG AHU A starts.

7) Check HVC-FN2A, STBY SWGR RTN FAN A starts.

8) Check HVC-ACU3A, EQPT RM AHU A starts.

9) Depress RESET on HVK-CHL1A(C), CONT BLDG CHILLER A(C) Start/Stop/Reset Pushbutton.

NOTE

The HVK-CHL1A(B)(C)(D), CONT BLDG CHILLER A(B)(C)(D) is inhibited from restarting for 20 minutes following a previous start.

CRITICAL STEP

6. At H13-P863, depress RESET on HVK-CHL1A(C) CONT BLDG CHILLER A(C) Lockout/Reset Pushbutton and check the following occurs locally at the chiller:

1) START Light comes on.

2) Oil pump starts.

3) OIL PUMP ON Light comes on.

4) SWP-MOV27A(C), RECIRC SWP-P3A(C) SPLY VLV opens.

5) SWP-P3A(C), CHILLER A(C) RECIRC PUMP starts.

NOTE

Chiller motor has a 30 second starting time delay.

6) Chiller motor starts.

7. Check the following:

   1) Chiller oil differential pressure indicates greater than or equal to 17 psid and less than or equal to 23 psid.

NOTE

Upon initial start the oil level may drop out of the lower sightglass and a low oil level pre-trip could occur. After the chiller loads, temperatures and pressures stabilize the pre-trip should clear. When running, the level may go up and down due to sloshing of the oil by moving parts. After 20 minutes of loaded operation and the upper sightglass remains full the System Engineer should be contacted for guidance.

   2) Lube oil level greater than ½ of lower sight glass and less than ¾ of upper sight glass.

NOTE

Foaming and low chiller oil level typically occur during cold weather conditions.

8. <u>IF</u> chiller oil level is lowering <u>AND</u> excessive oil foaming is present, <u>THEN</u> perform the following to manually load the chiller:

   1) Place LOAD CONTROL Switch to HOLD.

NOTE

Placing LOAD CONTROL Switch in INC raises chiller load and placing it in DEC lowers chiller load.

   2) Cycle LOAD CONTROL Switch from HOLD to INC or DEC and back to HOLD to stabilize chiller oil level and chiller operation.

   3) Maintain oil differential pressure greater than or equal to 17 psid and less than or equal to 23 psid.

   4) <u>WHEN</u> oil pressure <u>AND</u> chiller operation stabilize, <u>THEN</u> place LOAD CONTROL Switch to AUTO.

9. At H13-P863, perform the following:

   1) For the standby chiller, depress STOP then RESET on HVK-CHL1B(D), CONT BLDG CHILLER B(D) Start/Stop/Reset Pushbutton.

   2) For the standby chiller, depress RESET on HVK-CHL1B(D) Lockout/Reset Pushbutton.

   3) Place the standby Division II HVK-P1B or HVK-P1D, CHILLED WATER PUMP B or D to AUTO as selected in Step 4.2.1.3.2.

   4) Verify the second Division II HVK-P1B or HVK-P1D is in STOP.

10. At H13-P863, for the one out of service chiller in each division, perform the following:

   1) Verify LOCKOUT is depressed on the chiller Lockout/Reset Pushbutton.

   2) Verify RESET has been depressed on the chiller Start/Stop/Reset Pushbutton.

11. On the back of EHS-MCC8A, perform the following:

   1) Place HVK-CHL1APL(CPL), CHILLED COMPRESSOR LUBE OIL PUMP Switch for the running chiller to ON.

   2) Place HVK-CHL1CPL(APL) Switch for the out of service chiller to OFF.

4.2.2. Starting Division II Control Building Chilled Water loop with Division I Control Building Chilled Water loop in Standby.

NOTE

Control Building Chilled Water startup is performed in conjunction with SOP-0058, Control Building HVAC System startup.

After completing this section the following lineup is established:

- *One Division II Chiller running*
- *One Division II Chiller out of service*
- *Either Division II Chilled Water Pump running*
- *One Division II Chilled Water Pump out of service*
- *One Division I Chiller in standby*
- *One Division I Chiller out of service*
- *Either Division I Chilled Water Pump in standby*
- *One Division I Chilled Water Pump out of service*

The steps in this section place Division II, B components in service with D components in parenthesis and Division I, A components in standby with C components in parenthesis. Any combination of Chiller and Chilled Water Pump can be used within each division.

1. Verify the following valves are locked open:

   - HVK-V84(V88), HVK-CHL1B(D) INLET ISOL
   - HVK-V35(V39), HVK-CHL1A(C) INLET ISOL

2. Verify the following valves are closed:

   - HVK-V88(V84), HVK-CHL1D(B) INLET ISOL
   - HVK-V39(V35), HVK-CHL1C(A) INLET ISOL

3. At H13-P863, perform the following:

    1) Select P1B or P1D with the Division II CHILLED WATER PUMP SELECTOR Switch for the pump to be started.

    2) Select P1A or P1C with the Division I CHILLED WATER PUMP SELECTOR Switch for the pump to be in standby.

    3) Select CHL 1B (CHL 1D) on the Division II CHILLER SUPPLY FLOW ELEMENT SELECTOR for the chiller to be started.

    4) Select CHL 1A (CHL 1C) on the Division I CHILLER SUPPLY FLOW ELEMENT SELECTOR for the chiller to be in standby.

    5) Verify the following:

        a) SWP-P3B(D), CHILLER B(D) RECIRC SWP for the chiller to be started is in AUTO.

        b) SWP-P3A(C), CHILLER A(C) RECIRC SWP for the chiller to be in standby is in AUTO.

4. Locally at the chiller, check the following:

<u>NOTE</u>

Oil level can be lower than normal if service water temperature is low, greater than or equal to 65°F and less than or equal to 75°F. Manual loading of the chiller could be required upon chiller startup to prevent a trip from low oil pressure.

For a non-operating chiller an oil level in or above the upper sightglass is normal. When idle, the level may be higher due to the absorption of refrigerant by the oil.

    1) Lube oil level greater than 3/4 of lower sight glass.

    2) Lube oil temperature is greater than or equal to 120°F and less than or equal to 155°F.

    3) <u>IF</u> the READY Light is off, <u>THEN</u> depress the PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton.

    4) READY Light is on.

    5) SAFETY CIRCUIT Light is on.

    6) LOAD RECYCLE Light is on.

7) Refrigerant is visible in evaporator sight glass.

5. At H13-P863, perform the following:

1) Verify HVK-CHL1BPL(1DPL), CHLD CPRSR LUBO is in AUTO.

2) Verify HVK-CHL1APL(1CPL), CHLD CPRSR LUBO is in AUTO.

3) Start HVK-P1B or HVK-P1D, CHILLED WATER PUMP B or D as selected in Step 4.2.2.3.1).

4) Check the associated HVK-MOV20B or HVK-MOV20D, CHW PUMP B or D DISCH VLV opens.

5) Check HVC-ACU1B, CR AHU B starts.

6) Check HVC-ACU2B, CONTROL BLDG AHU B starts.

7) Check HVC-FN2B, STBY SWGR RTN FAN B starts.

8) Check HVC-ACU3B, EQPT RM AHU B starts.

9) Depress RESET on HVK-CHL1B(D), CONT BLDG CHILLER B(D) Start/Stop/Reset Pushbutton.

NOTE

The HVK-CHL1A(B)(C)(D), CONT BLDG CHILLER A(B)(C)(D) is inhibited from restarting for 20 minutes following a previous start.

CRITICAL STEP

6. At H13-P863, depress RESET on HVK-CHL1B(D), CONT BLDG CHILLER B(D) Lockout/Reset Pushbutton and verify the following occurs locally at the chiller:

1) START Light comes on.

2) Oil pump starts.

3) OIL PUMP ON Light comes on.

4) SWP-MOV27B(D), RECIRC SWP-P3B(D) SPLY VLV opens.

5) SWP-P3B(D), CHILLER B(D) RECIRC PUMP starts.

NOTE

Chiller motor has a 30 second starting time delay.

6) Chiller motor starts.

7. Check the following:

1) Chiller oil differential pressure indicates greater than or equal to 17 psid and less than or equal to 23 psid.

NOTE

Upon initial start the oil level may drop out of the lower sightglass and a low oil level pre-trip could occur. After the chiller loads, temperatures and pressures stabilize the pre-trip should clear. When running, the level may go up and down due to sloshing of the oil by moving parts. After 20 minutes of loaded operation and the upper sightglass remains full the System Engineer should be contacted for guidance.

2) Lube oil level greater than ½ of lower sight glass and less than ¾ of upper sight glass.

NOTE

Foaming and low chiller oil level typically occur during cold weather conditions.

8. IF chiller oil level is lowering AND excessive oil foaming is present, THEN perform the following to manually load the chiller:

1) Place LOAD CONTROL Switch to HOLD.

NOTE

Placing LOAD CONTROL Switch in INC raises chiller load and placing it in DEC lowers chiller load.

2) Cycle LOAD CONTROL Switch from HOLD to INC or DEC and back to HOLD to stabilize chiller oil level and chiller operation.

3) Maintain oil differential pressure greater than or equal to 17 psid and less than or equal to 23 psid.

4) WHEN oil pressure AND chiller operation stabilize, THEN place LOAD CONTROL Switch to AUTO.

9. At H13-P863, perform the following:

    1) For the standby chiller, depress STOP then RESET on HVK-CHL1A(C), CONT BLDG CHILLER A(C) Start/Stop/Reset Pushbutton.

    2) For the standby chiller, depress RESET on HVK-CHL1A(C) Lockout/Reset Pushbutton.

    3) Place the standby Division I HVK-P1A or HVK-P1C, CHILLED WATER PUMP A or C to AUTO as selected in Step 4.2.2.3.2).

    4) Verify the second Division I HVK-P1A or HVK-P1C is in STOP.

10. At H13-P863, for the one out of service chiller in each division, perform the following:

    1) Verify LOCKOUT is depressed on the chiller Lockout/Reset Pushbutton.

    2) Verify RESET has been depressed on the chiller Start/Stop/Reset Pushbutton.

11. On the back of EHS-MCC8A, perform the following:

    1) Place HVK-CHL1APL(CPL), CHILLED COMPRESSOR LUBE OIL PUMP Switch for the chiller placed in standby to ON.

    2) Place HVK-CHL1CPL(APL) Switch for the out of service chiller to OFF.

5 SYSTEM OPERATION

5.1 Alternating Control Building Chilled Water Pump within the Running Division

NOTE

When necessary, the operating pump in the running division can be changed to the alternate pump in the same division without changing divisions.

5.1.1. At H13-P863, perform the following:

NOTE

Steps 1 and 2 are to be performed in a timely manner to limit the time two chilled water pumps are running.

1. Place the non-running HVK-P1A(B)(C)(D), CHILLED WATER PUMP A(B)(C)(D) Switch to START and check the following:

   1) The associated HVK-MOV20A(B)(C)(D), CHW PUMP A(B)(C)(D) DISCH VLV opens.

   2) HVK-P1A(B)(C)(D) starts.

CRITICAL STEP

2. Stop HVK-P1A(B)(C)(D) that was running and check associated HVK-MOV20A(B)(C)(D) closes.

3. Select the current running Chilled Water Pump on the CHILLED WATER PUMP SELECTOR.

5.2 Alternating Control Building Chilled Water Pump within the Standby Division

5.2.1. IF alternating standby Control Building Chilled Water Pump and Chiller, THEN Go To Section 5.3.

5.2.2. At H13-P863, perform the following:

1. Place the standby HVK-P1A(B)(C)(D), CHILLED WATER PUMP A(B)(C)(D) to STOP.

2. Place the previously out of service HVK-P1A(B)(C)(D) to AUTO.

3. Select the Chilled Water Pump from Step 2 on the CHILLED WATER PUMP SELECTOR for the standby division.

NOTE

Alternating Control Building Chilled Water Pump and Chiller within the standby division will cause the following annunciator to alarm:

Division 1: Annunciator, P863-74A-C01, DIV 1 CONT BLDG CHILLED WATER SYS INOPERATIVE

Division 2: Annunciator, P863-74A-C06, DIV 2 CONT BLDG CHILLED WATER SYS INOPERATIVE

5.3 Alternating Control Building Chilled Water Pump and Chiller within the Standby Division

5.3.1. Check that the currently operating chiller has been running for at least 20 minutes.

NOTE

The controls and indications in this section are located at H13-P863, unless otherwise specified.

The standby chiller is the chiller which is aligned for automatic start but is not operating.

5.3.2. Depress LOCKOUT on HVK-CHL1A(B)(C)(D), CONT BLDG CHILLER (A)(B)(C)(D) Lockout/Reset Pushbutton for the standby chiller.

5.3.3. Place the standby HVK-P1A(B)(C)(D), CHILLED WATER PUMP A(B)(C)(D) to STOP.

5.3.4. Locally at the chiller which is currently in standby, unlock and close chiller inlet valve.

- HVK-V35, HVK-CHL1A INLET ISOL
- HVK-V39, HVK-CHL1C INLET ISOL
- HVK-V84, HVK-CHL1B INLET ISOL
- HVK-V88, HVK-CHL1D INLET ISOL

5.3.5. Locally at the currently out of service chiller, open and lock the chiller inlet valve.

- HVK-V35, HVK-CHL1A INLET ISOL
- HVK-V39, HVK-CHL1C INLET ISOL
- HVK-V84, HVK-CHL1B INLET ISOL
- HVK-V88, HVK-CHL1D INLET ISOL

5.3.6. Locally at the chiller being placed in standby, check the following:

NOTE

Oil level can be lower than normal if service water temperature is low, greater than or equal to 65°F and less than or equal to 75°F.

For a non-operating chiller an oil level in or above the upper sightglass is normal. When idle, the level may be higher due to the absorption of refrigerant by the oil.

1. Lube oil level greater than ¾ of lower sight glass.
2. Lube oil temperature is greater than or equal to 120°F and less than or equal to 155°F.
3. IF the READY Light is off, THEN depress the PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton.
4. READY Light is on.
5. SAFETY CIRCUIT Light is on.
6. LOAD RECYCLE Light is on.
7. Refrigerant visible in evaporator sight glass.

5.3.7. Perform the following for the chiller being placed in standby:

1. Verify SWP-P3A(B)(C)(D), CHILLER A(B)(C)(D) RECIRC SWP in AUTO.

2. Verify HVK-CHL1A(B)(C)(D)PL, CHLD CPRSR LUBO in AUTO.

5.3.8. Select the desired Chilled Water Pump on the CHILLED WATER PUMP SELECTOR for the standby division.

5.3.9. Place HVK-P1A(B)(C)(D), CHILLED WATER PUMP A(B)(C)(D) selected in Step 5.3.8 to AUTO.

5.3.10. Select the chiller being placed in standby on the CHILLER SUPPLY FLOW ELEMENT SELECTOR Switch.

5.3.11. Depress RESET on HVK-CHL1A(B)(C)(D), CONT BLDG CHILLER A(B)(C)(D) Lockout/Reset Pushbutton for the chiller being placed in standby.

5.3.12. Depress STOP then RESET on HVK-CHL1A(B)(C)(D) Start/Stop/Reset Pushbutton for the chiller being placed in standby.

5.3.13. WHEN alternating Division I Chiller only, THEN on the back of EHS-MCC8A, perform the following:

1. Place HVK-CHL1APL(CPL), CHLD CPRSR LUBO for the standby chiller to ON.

2. Place HVK-CHL1CPL(APL) for the out of service chiller to OFF.

NOTE

Alternating divisions of Control Building Chilled Water will cause the following annunciator to alarm:

Alternating from Division 1 to Division 2:

H13-P863/74A/A01, CONTROL BLDG CHILLER 1A OR 1C AUTO TRIP
H13-P863/74A/A02, CONTROL ROOM AHU 1A AUTO TRIP
H13-P863/74A/B01, CONTROL BLDG CHILLER 1A OR 1C PRE-TRIP
H13-P863/74A/B04, CONTROL ROOM AHU HIGH DISCHARGE TEMPERATURE
H13-P863/74A/C01, DIV 1 CONT BLDG CHILLED WATER SYS INOPERATIVE
H13-P863/74A/C02, STBY SWGR AIR HDLG UNIT 2A AUTO TRIP
H13-P863/74A/D02, DIV 1 CONTROL BLDG VENT SYS INOP
H13-P863/74A/B06, CONTROL BLDG CHILLER 1B OR 1D PRE-TRIP

Alternating from Division 2 to Division 1:

H13-P863/74A/A06, CONTROL BLDG CHILLER 1B OR 1D AUTO TRIP
H13-P863/74A/A07, CONTROL ROOM AHU 1B AUTO TRIP
H13-P863/74A/B04, CONTROL ROOM AHU HIGH DISCHARGE TEMPERATURE
H13-P863/74A/B06, CONTROL BLDG CHILLER 1B OR 1D PRE-TRIP
H13-P863/74A/C06, DIV 2 CONT BLDG CHILLED WATER SYS INOPERATIVE
H13-P863/74A/C07, STBY SWGR AIR HDLG UNIT 2B AUTO TRIP
H13-P863/74A/D07, DIV 2 CONTROL BLDG VENT SYSTEM INOP
H13-P863/74A/B01, CONTROL BLDG CHILLER 1A OR 1C PRE-TRIP

5.4 Alternating Divisions of Control Building Chilled Water

5.4.1. Check that the operating chiller has been running for at least 20 minutes.

NOTE

The controls and indications in this section are located at H13-P863, unless otherwise specified.

CRITICAL STEP

5.4.2. Stop the running Control Building Chilled Water Pump.

5.4.3. Verify the running chiller automatically trips.

NOTE

Chiller 1B/1D or 1A/1C pre-trip comes in and clears.

Division I Chilled Water Pumps have a 30 second start time delay.

5.4.4. Check that the standby chilled water pump starts and its discharge valve opens.

5.4.5. IF the standby chilled water pump does not start, THEN Go To Step 5.4.7.

5.4.6. Check automatic start of the standby AHUs and fans which are in AUTO.

NOTE

Steps 5.4.7 thru 5.4.11 resets the chiller logic and places the chiller in standby. A chiller can not be started until 2 ½ minutes have elapsed since it was stopped. This time delay allows sufficient time for the guide vanes to close and ensure no-load starting of the chiller.

5.4.7. Check the previously running AHUs and fans have stopped.

5.4.8. Verify at least 3 minutes has elapsed since chiller was stopped, THEN Reset trips on the previously running AHUs as follows:

- Depress STOP on HVC-ACU1A(B), CR AHU A(B).
- Depress STOP on HVC-ACU2A(B), CONTROL BLDG AHU A(B).
- Place HVC-ACU3A(B), EQPT RM AHU A(B) Switch to STOP then back to AUTO.

5.4.9. IF when resetting the AHUs in Step 5.4.8, a running AHU trips, THEN depress the LOCKOUT and then the RESET Pushbutton on the tripped AHU to automatically restart the AHU.

NOTE

Steps 5.4.10 & 5.4.11 Resets the Chilled Water Pump start logic.

5.4.10. Verify HVK-P1A(B)(C)(D), CHILLED WATER PUMP A(B)(C)(D) Switch for the previously running pump is in STOP.

5.4.11. Place HVK-P1A(B)(C)(D), CHILLED WATER PUMP A(B)(C)(D) Switch for the previously running pump to AUTO.

5.4.12. Perform the following for the previously running chiller:

1. Depress STOP on HVK-CHL1A(B)(C)(D), CONT BLDG CHILLER A(B)(C)(D) Start/Stop/Reset Pushbutton.

2. Depress RESET on HVK-CHL1A(B)(C)(D) Start/Stop/Reset Pushbutton.

5.4.13. Verify the following:

1. Standby Chiller starts.

2. Standby Chiller Recirc Service Water Pump suction valve opens.

3. Standby Chiller Recirc Service Water Pump starts.

5.4.14. Check the following:

1. Chiller oil differential pressure indicates greater than or equal to 17 psid and less than or equal to 23 psid.

NOTE

Upon initial start the oil level may drop out of the lower sightglass and a low oil level pre-trip could occur. After the chiller loads, temperatures and pressures stabilize the pre-trip should clear. When running, the level may go up and down due to sloshing of the oil by moving parts. After 20 minutes of loaded operation and the upper sightglass remains full the System Engineer should be contacted for guidance.

2. Lube oil level is greater than ½ of lower sight glass and less than ¾ of upper sight glass.

NOTE

Foaming and low chiller oil level typically occur during cold weather conditions.

5.4.15. IF chiller oil level is lowering AND excessive oil foaming is present, THEN perform the following to manually load the chiller:

1. Place LOAD CONTROL Switch to HOLD.

NOTE

Placing LOAD CONTROL Switch in INC raises chiller load and placing it in DEC lowers chiller load.

2. Cycle LOAD CONTROL Switch from HOLD to INC or DEC and back to HOLD to stabilize chiller oil level and chiller operation.

3. Maintain oil differential pressure greater than or equal to 17 psid and less than or equal to 23 psid.

5.4.16. WHEN oil pressure AND chiller operation stabilize, THEN place LOAD CONTROL Switch to AUTO.

5.4.17. Locally depress PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton and check that PRETRIP ANNUNCIATOR Light goes out.

5.4.18. Lineup the previously running division as follows:

1. Locally depress PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton and check that PRETRIP ANNUNCIATOR Light goes out.

NOTE

Area temperatures should be closely monitored because of the reduced cooling capacity of service water.

5.5 Cooling Control Building Chilled Water Loops with Service Water

5.5.1. Shutdown the system per Section 6.1.

5.5.2. Unlock and close HVK-V14(V63), HVK COMPRESSION TANK TK1A(B) LOOP ISOLATION.

5.5.3. Verify closed HVK-MOV11A(B), CHW SURGE TK A(B) ALT MKUP WTR.

5.5.4. Verify closed HVK-MOV10A(B), CHW SURGE TK A(B) NORM MKUP.

5.5.5. Unlock and close HVK-V44(V93), HVK-CHL1C(D) OUTLET ISOL.

5.5.6. Unlock and close HVK-V45(V94), HVK-CHL1A(B) OUTLET ISOL.

CAUTION

Normal Service Water Pumps can trip on low suction pressure if SWP-TK3, SWP SURGE TANK level is lost. Do not remove water from the system without closely monitoring SWP-TK3 level.

NOTE

Makeup to Normal Service Water SWP-TK3 is limited to 100 gpm.

5.5.7. Open HVK-V47(V96), SERVICE WATER SUPPLY TO CHILLER WATER LOOP HEADER ISOL.

5.5.8. Open HVK-V21(V70), HVK RETURN TO SERVICE WATER.

5.6 Control Building Compression Tank Makeup from Service Water

CAUTION

Normal Service Water Pumps can trip on low suction pressure if SWP-TK3, SWP SURGE TANK level is lost. Do not remove water from the system without closely monitoring SWP-TK3 Level.

NOTE

Service Water is used as makeup to the compression tanks only when Makeup Water System is unavailable and Normal Service Water SWP-TK3 level is sufficient.

5.6.1. Monitor compression tank level on HVK-LI1A(B), CHW SURGE TK A/C(B/D) LEVEL.

5.6.2. Cycle HVK-MOV11A(B), CHW SURGE TK A(B) ALT MKUP to maintain level within band of sight glass.

5.7 Removing Control Building Chilled Water Loops from Cooling by Service Water

5.7.1. Isolate Service Water from the Control Building Chilled Water Loop by performing the following:

1. Close HVK-V21(V70), HVK RETURN TO SERVICE WATER.

2. Close HVK-V47(V96), SERVICE WATER SUPPLY TO CHILLED WATER LOOP HEADER ISOLATION.

5.7.2. Open and lock HVK-V14(V63), HVK COMPRESSION TANK TK1A(B) LOOP ISOLATION.

5.7.3. At H13-P863, verify HVK-MOV10A(B), CHW SURGE TK A(B) NORM MKUP is in AUTO.

5.7.4. Open the following to flush the Chilled Water Header:

- HVK-V212(V214), LP A(B) CB AHU HVC-ACU2A(B) OUTLET HEADER DRAIN

- HVK-V141(V187), LP A(B) CB AHU HVC-ACU1A(B) OUTLET HEADER DRAIN

- HVK-V132(V178), LP A(B) CB AHU HVC-ACU3A(B) OUTLET HEADER DRAIN

5.7.5. Maintain Compression Tank TK1A(B) level during flush using HVK-MOV10A(B), CHW SURGE TK A(B) NORM MKUP.

5.7.6. WHEN chemical control is re-established in the Chilled Water Header, THEN close the drain valves opened in Step 5.7.4.

5.7.7. Perform the following:

1. Open and lock HVK-V44(V93), HVK-CHL1C(D) OUTLET ISOL.

2. Open and lock HVK-V45(V94), HVK-CHL1A(B) OUTLET ISOL.

5.7.8. Start the desired loop per Section 4.1 of this procedure.

5.8 Pressurizing HVK-TK1A(1B)

5.8.1. Obtain tubing and fittings for pressurization from the Operations storage cabinet.

5.8.2. Verify closed HVK-PI31A(B)-V3, COMPRESSION TK TK1A(B) PRESSURE INSTRUMENT TEST CONN and remove cap.

5.8.3. Install tubing between pressurized air supply and HVK-PI31A(B)-V3.

5.8.4. Open pressurized air supply.

5.8.5. Throttle HVK-PI31A(B)-V3 open to pressurize tank.

5.8.6. WHEN compression tank pressure is 16 psig to 32 psig, THEN close HVK-PI31A(B)-V3.

5.8.7. Close pressurized air supply and remove tubing.

5.8.8. Disconnect tubing from HVK-PI31A(B)-V3 and replace cap.

5.8.9. Check connections for leakage.

5.8.10. Return tubing and fittings to storage locker.

5.8.11. Have second individual verify valve lineup for HVK-PI31A(B).

5.9 Transferring Refrigerant to or from Division I Chillers; HVK-CHL1A/C, CONT BLDG CHILLER A/C

NOTE

Division I Control Building Chilled Water, HVK/HVC is inoperable during performance of this section. Technical Specifications Section 3.7.3 provides guidance/requirements for having one division of HVK/HVC inoperable.

The steps in this section are performed at H13-P863, unless otherwise stated.

This section is written to transfer HVK-CHL1A refrigerant, with HVK-CHL1C transfer steps in parentheses.

5.9.1. IF a Division I chiller is running, THEN alternate Control Building Chilled Water division per Section 5.4.

5.9.2. Depress LOCKOUT on HVC-ACU1A, CR AHU A Lockout/Reset Pushbutton.

5.9.3. Depress LOCKOUT on HVC-ACU2A, CONTROL BLDG AHU A Lockout/Reset Pushbutton.

5.9.4. Place HVC-ACU3A, EQPT RM AHU A Switch to STOP.

5.9.5. Place HVC-FN2A, STBY SWGR RTN FAN A Switch to STOP.

5.9.6. Depress STOP on HVK-CHL1A, CONT BLDG CHILLER A Start/Stop/Reset Pushbutton.

5.9.7. Depress LOCKOUT on HVK-CHL1A, CONT BLDG CHILLER A Lockout/Reset Pushbutton.

5.9.8. Depress STOP on HVK-CHL1C, CONT BLDG CHILLER C Start/Stop/Reset Pushbutton.

5.9.9. Depress LOCKOUT on HVK-CHL1C, CONT BLDG CHILLER C Lockout/Reset Pushbutton.

5.9.10. Verify HVK-P1A, CHILLED WATER PUMP A in STOP.

5.9.11. Verify HVK-P1C, CHILLED WATER PUMP C in STOP.

5.9.12. At Control Building, 98 ft el, Division I Switchgear Room, on the back of EHS-MCC8A, place S1-HVKA03(S2-HVKA04), HVK-P1A(C) TIMER DEFEAT Keylock Switch to TEST.

5.9.13. Place the CHILLED WATER PUMP SELECTOR to P1A(C).

5.9.14. Place the CHILLER SUPPLY FLOW ELEMENT SELECTOR to CHL1A(C).

5.9.15. Verify HVK-V35(V39), HVK-CHL1A(C) INLET ISOL is locked open.

5.9.16. Verify HVK-V39(V35), HVK-CHL1C(A) INLET ISOL is closed.

5.9.17. Start HVK-P1A(C), CHILLED WATER PUMP A(C) and check HVK-MOV20A(C), CHW PUMP A(C) DISCH VLV opens.

5.9.18. Start SWP-P3A(C), CHILLER A(C) RECIRC SWP.

5.9.19. <u>WHEN</u> refrigerant transfer is complete, <u>THEN</u> perform the following:

1. Stop SWP-P3A(C).

2. Stop HVK-P1A(C) and check HVK-MOV20A(C) closes.

5.9.20. Place SWP-P3A(C), CHILLER A(C) RECIRC SWP Switch to AUTO.

5.9.21. At Control Building, 98 ft el, Division I Switchgear Room, on the back of EHS-MCC8A, place S1-HVKA03(S2-HVKA04), HVK-P1A(C) TIMER DEFEAT Keylock Switch to NORMAL and remove the key.

5.9.22. Depress RESET on HVC-ACU1A, CR AHU A Lockout/Reset Pushbutton.

5.9.23. Depress RESET on HVC-ACU2A, CONTROL BLDG AHU A Lockout/Reset Pushbutton.

5.9.24. Place HVC-ACU3A, EQPT RM AHU A Switch to AUTO.

5.9.25. Place HVC-FN2A, STBY SWGR RTN FAN A Switch to AUTO.

NOTE

Steps 5.9.26 through 5.9.36 place one chiller and one chilled water pump in standby lineup. Any combination of chiller and chilled water pump can be used. These steps are written for A components with C components in parentheses.

5.9.26. Verify HVK-V35(V39), HVK-CHL1A(C) INLET ISOL is locked open.

5.9.27. Verify HVK-V39(V35), HVK-CHL1C(A) INLET ISOL is closed.

5.9.28. Locally at the chiller to be placed in standby, check the following:

NOTE

Oil level can be lower than normal if service water temperature is low, greater than or equal to 65°F and less than or equal to 75°F.

For a non-operating chiller an oil level in or above the upper sightglass is acceptable. When idle, the level may be higher due to the absorption of refrigerant by the oil.

1. Lube oil level greater than ¾ of lower sight glass.
2. Lube oil temperature is greater than or equal to 120°F and less than or equal to 155°F.
3. IF the READY Light is off, THEN depress the PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton.
4. READY Light is on.

5. SAFETY CIRCUIT Light is on.

6. LOAD RECYCLE Light is on.

7. Refrigerant visible in evaporator sight glass.

5.9.29. Perform the following for the chiller to be placed in standby:

1. Verify SWP-P3A(C), CHILLER A(C) RECIRC SWP in AUTO.

2. Verify HVK-CHL1A(C)PL, CHLD CPRSR LUBO in AUTO.

5.9.30. Select the desired Chilled Water Pump on the CHILLED WATER PUMP SELECTOR for the standby division.

5.9.31. Place HVK-P1A(C), CHILLED WATER PUMP A(C) selected in Step 5.9.30 to AUTO.

5.9.32. Select the chiller now in standby on the CHILLER SUPPLY FLOW ELEMENT SELECTOR Switch.

5.9.33. Depress RESET on HVK-CHL1A(C), CONT BLDG CHILLER A(C) Lockout/Reset Pushbutton for the chiller now in standby.

5.9.34. Depress STOP then RESET on HVK-CHL1A(C) Start/Stop/Reset Pushbutton for the chiller now in standby.

5.9.35. Depress STOP then RESET on HVK-CHLIC(A) Start/Stop/Reset Pushbutton for the out of service chiller.

5.9.36. On the back of EHS-MCC8A, perform the following:

1. Place HVK-CHL1APL(CPL), CHLD CPRSR LUBO for the standby chiller to ON.

2. Place HVK-CHL1CPL(APL) for the out of service chiller to OFF.

5.10 Transferring Refrigerant to or from Division II Chillers; HVK-CHL1B/D, CONT BLDG CHILLER B/D

NOTE

Division II Control Building Chilled Water, HVK/HVC is inoperable during performance of this section. Technical Specifications Section 3.7.3 provides guidance/requirements for having one division of HVK/HVC inoperable.

The steps in this section are performed at H13-P863, unless otherwise stated.

This section is written to transfer HVK-CHL1B refrigerant, with HVK-CHL1D transfer steps in parentheses.

5.10.1. IF a Division II chiller is running, THEN alternate Control Building Chilled Water division per Section 5.4.

5.10.2. Depress LOCKOUT on HVC-ACU1B, CR AHU B Lockout/Reset Pushbutton.

5.10.3. Depress LOCKOUT on HVC-ACU2B, CONTROL BLDG AHU B Lockout/Reset Pushbutton.

5.10.4. Place HVC-ACU3B, EQPT RM AHU B Switch to STOP.

5.10.5. Place HVC-FN2B, STBY SWGR RTN FAN B Switch to STOP.

5.10.6. Depress STOP on HVK-CHL1B, CONT BLDG CHILLER B Start/Stop/Reset Pushbutton.

5.10.7. Depress LOCKOUT on HVK-CHL1B, CONT BLDG CHILLER B Lockout/Reset Pushbutton.

5.10.8. Depress STOP on HVK-CHL1D, CONT BLDG CHILLER D Start/Stop/Reset Pushbutton.

5.10.9. Depress LOCKOUT on HVK-CHL1D, CONT BLDG CHILLER D Lockout/Reset Pushbutton.

5.10.10. Verify HVK-P1B, CHILLED WATER PUMP B in STOP.

5.10.11. Verify HVK-P1D, CHILLED WATER PUMP D in STOP.

5.10.12. At Control Building, 98 ft el, Division II Switchgear Room, on the back of EHS-MCC8B, place S1-HVKB03(S2-HVKB04), HVK-P1B(D) TIMER DEFEAT Keylock Switch to TEST.

5.10.13. Place the CHILLED WATER PUMP SELECTOR to P1B(D).

5.10.14. Place the CHILLER SUPPLY FLOW ELEMENT SELECTOR to CHL1B(D).

5.10.15. Verify HVK-V84(V88), HVK-CHL1B(D) INLET ISOL is locked open.

5.10.16. Verify HVK- V88(V84), HVK-CHL1D(B) INLET ISOL is closed.

5.10.17. Start HVK-P1B(D), CHILLED WATER PUMP B(D) and check HVK-MOV20B(D), CHW PUMP B(D) DISCH VLV opens.

5.10.18. Start SWP-P3B(D), CHILLER B(D) RECIRC SWP.

5.10.19. <u>WHEN</u> refrigerant transfer is complete, <u>THEN</u> perform the following:

1. Stop SWP-P3B(D).

2. Stop HVK-P1B(D) and check HVK-MOV20B(D) closes.

5.10.20. Place SWP-P3B(D), CHILLER B(D) RECIRC SWP Switch to AUTO.

5.10.21. At Control Building, 98 ft el, Division II Switchgear Room, on the back of EHS-MCC8B, place S1-HVKB03(S2-HVKB04), HVK-P1B(D) TIMER DEFEAT Keylock Switch to NORMAL and remove the key.

5.10.22. Depress RESET on HVC-ACU1B, CR AHU B Lockout/Reset Pushbutton.

5.10.23. Depress RESET on HVC-ACU2B, CONTROL BLDG AHU B Lockout/Reset Pushbutton.

5.10.24. Place HVC-ACU3B, EQPT RM AHU B Switch to AUTO.

5.10.25. Place HVC-FN2B, STBY SWGR RTN FAN B Switch to AUTO.

<u>NOTE</u>

Steps 5.10.26 through 5.10.34 place one chiller and one chilled water pump in standby lineup. Any combination of chiller and chilled water pump can be used. These steps are written for B components with D components in parentheses.

5.10.26. Verify HVK-V84(V88), HVK-CHL1B(D) INLET ISOL is locked open.

5.10.27. Verify HVK-V88(V84), HVK-CHL1D(B) INLET ISOL is closed.

5.10.28. Locally at the chiller to be placed in standby, check the following:

NOTE

Oil level can be lower than normal if service water temperature is low, greater than or equal to 65°F and less than or equal to 75°F.

For a non-operating chiller an oil level in or above the upper sightglass is normal. When idle, the level may be higher due to the absorption of refrigerant by the oil.

1. Lube oil level greater than ¾ of lower sight glass.
2. Lube oil temperature is greater than or equal to 120°F and less than or equal to 155°F.
3. IF the READY Light is off, THEN depress the PUSH TO RESET PRETRIP ANNUNCIATOR Pushbutton.
4. READY Light is on.
5. SAFETY CIRCUIT Light is on.
6. LOAD RECYCLE Light is on.
7. Refrigerant visible in evaporator sight glass.

5.10.29. Perform the following for the chiller to be placed in standby:

1. Verify SWP-P3B(D), CHILLER B(D) RECIRC SWP in AUTO.
2. Verify HVK-CHL1B(D)PL, CHLD CPRSR LUBO in AUTO.

5.10.30. Select the desired Chilled Water Pump on the CHILLED WATER PUMP SELECTOR for the standby division.

5.10.31. Place HVK-P1B(D), CHILLED WATER PUMP B(D) selected in Step 5.10.30 in AUTO.

5.10.32. Select the chiller now in standby on the CHILLER SUPPLY FLOW ELEMENT SELECTOR Switch.

5.10.33. Depress RESET on HVK-CHL1B(D), CONT BLDG CHILLER B(D) Lockout/Reset Pushbutton for the chiller now in standby.

5.10.34. Depress STOP then RESET on HVK-CHL1B(D) Start/Stop/Reset Pushbutton for the chiller now in standby.

5.10.35. Depress STOP then RESET on HVK-CHLID(B) Start/Stop/Reset Pushbutton for the out of service chiller.

5.11 Manual Overriding SWP-PVY32A,B,C,D

NOTE

Refer To Attachment 7, Metrex Valve Diagram for location of the valve components.

The valve can only be manually overridden open. There is no method for overriding or gagging the valve closed.

5.11.1. Manual opening of SWP-PVY32A(B,C,D)

1. Remove the Manual Override cap.

2. Manually open the valve by rotating the Manual Override screw in the clockwise direction (viewed from the end of the screw) until the desired position is obtained as viewed on the Stem Position Indicator.

3. IF necessary, THEN make adjustments by turning the Manual Override screw.

4. IF desired, THEN reinstall the cap.

5.11.2. Restoring SWP-PVY32A(B,C,D) to automatic operation.

1. Remove the Manual Override Cap.

2. Turn the Manual Override screw in the counter-clockwise direction until it is backseated.

3. Verify the Bypass Stem is closed for normal automatic valve operation.

4. Reinstall the cap.

5.12 Division I Control Building Chilled Water System Feed and Bleed

5.12.1. Verify Division I Control Building Chilled Water loop is in service.

5.12.2. Obtain the following equipment:

- Approximately 25 ft of drain hose
- 5 gallon bucket
- Stop watch

5.12.3. Declare Division I Control Building Chilled Water System inoperable and enter the appropriate LCO s until the feed and bleed has been completed.

5.12.4. Begin the feed and bleed as follows:

1. Verify HVK-V141, LP A CB AHU HVC-ACU1A OUTLET HEADER DRAIN is closed

2. Remove the cap from HVK-V141, LP A CB AHU HVC-ACU1A OUTLET HEADER DRAIN.

3. Install the hose at HVK-V141, and route to the bucket.

CAUTION

Rapid operation or excessive flow rate from HVK-V141, LP A CB AHU HVC-ACU1A OUTLET HEADER DRAIN, could lead to a trip of the operating Control Building Chiller. Use caution while setting the flow rate for the feed and bleed.

4. Establish less than 1 gallon per minute flow as follows:

   1) Slowly Throttle Open HVK-V141, AND time how long it takes to fill the 5 gal bucket.

   2) Reperform Step 5.12.4.4.1) as necessary until it takes between 5 and 20 minutes to fill the bucket.

5. Route hose to a floor drain.

6. Notify the Main Control Room to make a Control Room Log entry when the feed and bleed was started.

5.12.5. WHEN desired, THEN secure the feed and bleed as follows:

1. Close HVK-V141, LP A CB AHU HVC-ACU1A OUTLET HEADER DRAIN.

2. Remove the hose.

3. Install the cap at HVK-V141, LP A CB AHU HVC-ACU1A OUTLET HEADER DRAIN.

4. Notify the Main Control Room to make a Control Room Log entry when the feed and bleed was secured with independent verification of HVK-V141, LP A CB AHU HVC-ACU1A OUTLET HEADER DRAIN closed and capped.

5.12.6. Division I Control Building Chilled Water System may be declared operable.

5.13 Division II Control Building Chilled Water System Feed and Bleed

5.13.1. Verify Division II Control Building Chilled Water loop is in service.

5.13.2. Obtain the following equipment:

- Approximately 25 ft of drain hose
- 5 gallon bucket
- Stop watch

5.13.3. Declare Division II Control Building Chilled Water System inoperable and enter the appropriate LCO s until the feed and bleed has been completed.

5.13.4. Begin the feed and bleed as follows:

1. Verify HVK-V187, LP B CB AHU HVC-ACU1B OUTLET HEADER DRAIN is closed
2. Remove the cap from HVK-V187, LP B CB AHU HVC-ACU1B OUTLET HEADER DRAIN.
3. Install the hose at HVK-V187, and route to the bucket.

CAUTION

Rapid operation or excessive flow rate from HVK-V187, LP B CB AHU HVC-ACU1B OUTLET HEADER DRAIN, could lead to a trip of the operating Control Building Chiller. Use caution while setting the flow rate for the feed and bleed.

4. Establish less than 1 gallon per minute flow as follows:
   1) Slowly Throttle open HVK-V187, AND time how long it takes to fill the 5 gal bucket.
   2) Reperform Step 5.13.4.4.1) as necessary until it takes between 5 and 20 minutes to fill the bucket.
5. Route hose to a floor drain.
6. Notify the Main Control Room to make a Control Room Log entry when the feed and bleed was started.

5.13.5. WHEN desired, THEN secure the feed and bleed as follows:

1. Close HVK-V187, LP B CB AHU HVC-ACU1B OUTLET HEADER DRAIN.

2. Remove the hose.

3. Install the cap at HVK-V187, LP B CB AHU HVC-ACU1B OUTLET HEADER DRAIN.

4. Notify the Main Control Room to make a Control Room Log entry when the feed and bleed was secured with independent verification of HVK-V187, LP B CB AHU HVC-ACU1B OUTLET HEADER DRAIN closed and capped.

5.13.6. Division II Control Building Chilled Water System may be declared operable.

6 **SYSTEM SHUTDOWN**

6.1 Control Building Chilled Water Loop Shutdown

6.1.1. LOCKOUT the standby chiller.

6.1.2. Place the standby chilled water pump to STOP.

6.1.3. Perform the following:

1. Lockout and stop the running chiller.

2. Verify the Chiller Recirc SWP stops and its suction MOV closes.

NOTE

The chilled water pump trips automatically after 120 second time delay.

6.1.4. WHEN the running chiller is stopped for 30 seconds, THEN stop the running chilled water pump and verify the following:

1. Chilled water pump discharge valve closes.

2. Running AHUs and fans stop.

6.1.5. Reset any trips on the AHUs and fans.

7 REFERENCES

7.1 Control System Descriptions:

- 22-12
- 22-14
- 22-14.3

7.2 Control Loop Diagrams:

- 1HVK-1
- 1HVK-5
- 1HVK-44
- 1HVK-PDI
- 1HVK-PI
- 1HVK-TI

7.3 Vendor Manuals

- Trane Co., Model NOX-TJ2-WV2, S&W #3215.300-031-003B.
- Trane Co., Model HOX-MV2-HF2, S&W #3215.300-031-004A.
- Carrier Air Condition, Model 17FA443-B-114-14-10-S, S&W #3216.210-085-001C.
- Metrex Valve Technical Manual D214A, Metrex Model ERB-3130

7.4 Elementary Diagrams, ESKs

- 4HVK01 and 4HVK02
- 6HVK01 through 6HVK17
- 7HVK01 through 7HVK03
- 11HVK01 and 11HVK02

7.5 Logic System Diagrams, LSKs

- 22-12A through 22-12H
- 22-12J and 22-12R
- 22-14.03A through 3D

7.6 PMR-91-003

7.7 QAFR P-91-07-005

7.8 Commitment No. 13233

7.9 CR 88-0641

7.10 CR 93-0161

7.11 CR 95-0284

7.12 MR 94-0023

7.13 EEAR 93-0052

7.14 MR 96-0027

7.15 3247.933-000-002, Metrex Valve Technical Manual

8 RECORDS

8.1 Record disposition shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
THE FOLLOWING ITEMS ARE LOCATED ON CONTROL BUILDING 70 FT EL					
HVK-V211	LP A CB AHU HVC-ACU2A INLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V113	LP A CB AHU HVC-ACU2A INLET ISOLATION	LOCKED OPEN			
HVK-V208	LP A CB AHU HVC-ACU2A INLET HEADER VENT	CLOSED/ CAPPED			
HVK-V134	LP A CB AHU HVC-ACU2A INLET DRAIN	CLOSED/ CAPPED			
HVK-V117	LP A CB AHU HVC-ACU2A UPPER COIL INLET	LOCKED OPEN			
HVK-V118	LP A CB AHU HVC-ACU2A LOWER COIL INLET	LOCKED OPEN			
HVK-V147	LP A CB AHU HVC-ACU2A UPPER INLET PE CONN	CLOSED/ CAPPED			
HVK-V210	LP A CB AHU HVC-ACU2A LOWER INLET PE CONN	CLOSED/ CAPPED			
HVK-V148	LP A CB AHU HVC-ACU2A UPPER COIL VENT	CLOSED/ CAPPED			
HVK-V149	LP A CB AHU HVC-ACU2A LOWER COIL VENT	CLOSED/ CAPPED			
HVK-V146	LP A CB AHU HVC-ACU2A UPPER OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V209	LP A CB AHU HVC-ACU2A LOWER OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V126	LP A CB AHU HVC-ACU2A UPPER COIL OUTLET	LOCKED THROTTLED			
HVK-V125	LP A CB AHU HVC-ACU2A LOWER COIL OUTLET	LOCKED THROTTLED			
HVK-V136	LP A CB AHU HVC-ACU2A OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V212	LP A CB AHU HVC-ACU2A OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V207	LP A CB AHU HVC-ACU2A OUTLET HEADER VENT	CLOSED/ CAPPED			
HVK-V114	LP A CB AHU HVC-ACU2A OUTLET ISOLATION	LOCKED OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-V155	HVK-V3007 LINE VENT	CLOSED/ CAPPED			
HVK-V156	HVK-V3007 LINE VENT	CLOSED/ CAPPED			
HVK-V122	HVK-V3007 UPSTREAM ISOLATION	OPEN			
HVK-V142	LOOP A CB HVK DRAIN AT HVK-V3007	CLOSED/ CAPPED			
HVK-V266	PRESSURE TEST CONNECTION	CLOSED/ CAPPED			
HVK-V267	PRESSURE TEST CONNECTION	CLOSED/ CAPPED			
HVK-V123	HVK-V3007 DOWNSTREAM ISOLATION	OPEN			
HVK-V3007	MECHANICALLY POSITIONED FLOW CONTROL VALVE	DOUBLENUT ON STEM			
HVK-V213	LP B CB AHU HVC-ACU2B INLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V159	LP B CB AHU HVC-ACU2B INLET ISOLATION	LOCKED OPEN			
HVK-V203	LP B CB AHU HVC-ACU2B INLET HEADER VENT	CLOSED/ CAPPED			
HVK-V180	LP B CB AHU HVC-ACU2B INLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V163	LP B CB AHU HVC-ACU2B UPPER COIL INLET	LOCKED OPEN			
HVK-V164	LP B CB AHU HVC-ACU2B LOWER COIL INLET	LOCKED OPEN			
HVK-V192	LP B CB AHU HVC-ACU2B UPPER INLET PE CONN	CLOSED/ CAPPED			
HVK-V205	LP B AHU HVC-ACU2B LOWER INLET PE CONN	CLOSED/ CAPPED			
HVK-V194	LP B CB AHU HVC-ACU2B UPPER COIL VENT	CLOSED/ CAPPED			
HVK-V195	LP B CB AHU HVC-ACU2B LOWER COIL VENT	CLOSED/ CAPPED			
HVK-V193	LP B CB AHU HVC-ACU2B UPPER OUTLET PE CONN	CLOSED/ CAPPED			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-V206	LP B CB AHU HVC-ACU2B LOWER OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V172	LP B CB AHU HVC-ACU2B UPPER COIL OUTLET	LOCKED THROTTLED			
HVK-V171	LP B CB AHU HVC-ACU2B LOWER COIL OUTLET	LOCKED THROTTLED			
HVK-V182	LP B CB AHU HVC-ACU2B OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V204	LP B CB AHU HVC-ACU2B OUTLET HEADER VENT	CLOSED/ CAPPED			
HVK-V214	LP B CB AHU HVC-ACU2B OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V160	LP B CB AHU HVC-ACU2B OUTLET ISOLATION	LOCKED OPEN			
HVK-V201	PRESSURE TAP ISOLATION (HVK-V3008)	CLOSED/ CAPPED			
HVK-V202	PRESSURE TAP ISOLATION (HVK-V3008)	CLOSED/ CAPPED			
HVK-V168	HVK-V3008 UPSTREAM ISOLATION	OPEN			
HVK-V188	LOOP B CB HVK DRAIN AT HVK-V3008	CLOSED/ CAPPED			
HVK-V268	PRESSURE TEST CONNECTION	CLOSED/ CAPPED			
HVK-V269	PRESSURE TEST CONNECTION	CLOSED/ CAPPED			
HVK-V169	HVK-V3008 DOWNSTREAM ISOLATION	OPEN			
HVK-V3008	MECHANICALLY POSITIONED FLOW CONTROL VALVE	DOUBLENUT ON STEM			
THE FOLLOWING ITEMS ARE LOCATED ON CONTROL BUILDING 98 FT EL					
HVK-V3	HVK COMPRESSION TANK TK1A PI31A ISOLATION	OPEN			
HVK-V4	HVK COMPRESSION TANK TK1A LT1A UPPER ISOL	OPEN			
HVK-V13	HVK COMPRESSION TANK TK1A LT1A LOWER ISOL	OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVK-V230	HVK COMPRESSION TANK TK1A MAKEUP HEADER VENT	CLOSED/ CAPPED			
HVK-V243	SERVICE WATER BACKUP SUPPLY HEADER VENT	CLOSED/ CAPPED			
HVK-V47	SERVICE WATER SUPPLY TO CHILLED WATER LOOP HEADER ISOL	CLOSED			
HVK-V15	HVK COMPRESSION TANK TK1A DRAIN	CLOSED			
HVK-V14	HVK COMPRESSION TANK TK1A LOOP ISOLATION	LOCKED OPEN			
HVK-V240	HVK RETURN HEADER VENT	CLOSED/ CAPPED			
HVK-V21	HVK RETURN TO SERVICE WATER	CLOSED			
HVK-V242	HVK RETURN TO SERVICE WATER VENT	CLOSED/ CAPPED			
HVK-V22	HVK-P1A AND P1C SUCTION PI7A ISOL	CLOSED			
HVK-V232	HVK-P1A AND P1C SUCTION HEADER VENT	CLOSED/ CAPPED			
HVK-V23	HVK-P1A SUCTION ISOLATION	LOCKED OPEN			
HVK-V25	HVK-1A SUCTION STRAINER STR1A DRAIN	CLOSED/ CAPPED			
HVK-V104	HVK-P1A SUCTION PE CONN	CLOSED/ CAPPED			
HVK-V27	HVK-P1A PDI38A LOW SIDE ISOL	OPEN			
HVK-V29	HVK-P1A PDI38A HIGH SIDE ISOL	OPEN			
HVK-V106	HVK-P1A DISCHARGE PI8A ISOL	OPEN			
HVK-V24	HVK-P1C SUCTION ISOLATION	LOCKED OPEN			
HVK-V26	HVK-P1C SUCTION STRAINER STR1C DRAIN	CLOSED/ CAPPED			
HVK-V107	HVK-P1C SUCTION PE CONN	CLOSED/ CAPPED			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-V28	HVK-P1C PDI38C LOW SIDE ISOL	OPEN			
HVK-V31	HVK-P1C PDI38C HIGH SIDE ISOL	OPEN			
HVK-V108	HVK-P1C DISCHARGE PI8C ISOL	OPEN			
HVK-V231	HVK-P1A, P1C DISCHARGE HEADER VENT	CLOSED/ CAPPED			
HVK-V52	HVK COMPRESSION TANK TK1B PI31B ISOLATION	OPEN			
HVK-V54	HVK COMPRESSION TANK TK1B LT1B UPPER ISOL	OPEN			
HVK-V62	HVK COMPRESSION TANK TK1B LT1B LOWER ISOL	OPEN			
HVK-V215	HVK COMPRESSION TANK TK1B MAKEUP HEADER VENT	CLOSED/ CAPPED			
HVK-V225	SERVICE WTR BACKUP SUPPLY HEADER VENT	CLOSED/ CAPPED			
HVK-V96	SERVICE WATER SUPPLY TO HVK HEADER ISOL	CLOSED			
HVK-V64	HVK COMPRESSION TANK TK1B DRAIN	CLOSED			
HVK-V63	HVK COMPRESSION TANK TK1B LOOP ISOLATION	LOCKED OPEN			
HVK-V216	HVK-P1B P1D SUCTION HEADER VENT	CLOSED/ CAPPED			
HVK-V70	HVK RETURN TO SERVICE WATER	CLOSED			
HVK-V224	HVK RETURN TO SERVICE WATER VENT	CLOSED/ CAPPED			
HVK-V270	HVK COMPRESSION TANK TK1A M/U WTR MAN ISOL	LOCKED OPEN			
HVK-V71	HVK-P1B P1D SUCTION PI7B ISOL	CLOSED			
HVK-V72	HVK-P1B SUCTION ISOLATION	LOCKED OPEN			
HVK-V74	HVK-P1B SUCTION STRAINER STR1B DRAIN	CLOSED/ CAPPED			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVK-V110	HVK-P1B SUCTION PE CONN	CLOSED/ CAPPED			
HVK-V76	HVK-P1B PDI38B LOW SIDE ISOL	OPEN			
HVK-V78	HVK-P1B PDI38B HIGH SIDE ISOL	OPEN			
HVK-V109	HVK-P1B DISCHARGE PI8B ISOL	OPEN			
HVK-V73	HVK-P1D SUCTION ISOLATION	LOCKED OPEN			
HVK-V75	HVK-P1D SUCTION STRAINER STR1D DRAIN	CLOSED/ CAPPED			
HVK-V100	HVK-P1D SUCTION PE CONN	CLOSED/ CAPPED			
HVK-V77	HVK-P1D PDI38D LOW SIDE ISOL	OPEN			
HVK-V80	HVK-P1D PDI38D HIGH SIDE ISOL	OPEN			
HVK-V3000	HVK COMPRESSION TANK TK1A SVCE WTR VENT	CLOSED/ CAPPED			
HVK-V102	HVK-P1D DISCHARGE PI8D ISOL	OPEN			
HVK-V217	HVK-P1B AND P1D DISCHARGE HEADER VENT	CLOSED/ CAPPED			
HVK-V237	HVK LOOP A SUPPLY HEADER DRAIN	CLOSED/ CAPPED			
HVK-V130	LP A CB AHU HVC-ACU3A INLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V144	LP A CB AHU HVC-ACU3A INLET PE CONN	CLOSED/ CAPPED			
HVK-V145	LP A CB AHU HVC-ACU3A VENT	CLOSED/ CAPPED			
HVK-V143	LP A CB AHU HVC-ACU3A OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V132	LP A CB AHU HVC-ACU3A OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V124	LP A CB AHU HVC-ACU3A OUTLET	LOCKED THROTTLED			
HVK-V116	LP A CB AHU HVC-ACU3A OUTLET ISOLATION	LOCKED OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-V226	HVK LOOP B SUPPLY HEADER VENT	CLOSED/ CAPPED			
HVK-V271	HVK COMPRESSION TANK TK1B M/U WTR MAN ISOL	LOCKED OPEN			
HVK-V227	HVK LOOP B RETURN HEADER VENT	CLOSED/ CAPPED			
HVK-V161	LP B CB AHU HVC-ACU3B INLET ISOLATION	LOCKED OPEN			
HVK-V176	LP B CB AHU HVC-ACU3B INLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V189	LP B CB AHU HVC-ACU3B INLET PE CONN	CLOSED/ CAPPED			
HVK-V191	LP B CB AHU HVC-ACU3B COIL VENT	CLOSED/ CAPPED			
HVK-V190	LP B CB AHU HVC-ACU3B OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V178	LP B CB AHU HVC-ACU3B OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V170	LP B CB AHU HVC-ACU3B OUTLET	LOCKED THROTTLED			
HVK-V162	LP B CB AHU HVC-ACU3B OUTLET ISOLATION	LOCKED OPEN			
HVK-V35	HVK-CHL1A INLET ISOL	LOCKED OPEN/ CLOSED			
HVK-V36	HVK-CHL1A FE5A TRANSMITTER ISOL	OPEN			
HVK-V37	HVK-CHL1A FE5A TRANSMITTER ISOL	OPEN			
HVK-V261	HVK-CHL1A FE5A TRANSMITTER ISOL	OPEN			
HVK-V260	HVK-CHL1A FE5A TRANSMITTER ISOL	OPEN			
HVK-V238	HVK-CHL1A INLET VENT	CLOSED/ CAPPED			
HVK-V245	HVK-CHL1A EVAPORATOR DRAIN	CLOSED/ CAPPED			
HVK-V244	HVK-CHL1A EVAPORATOR VENT	CLOSED/ CAPPED			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVK-V38	HVK-CHL1A EVAPORATOR DRAIN	CLOSED/ CAPPED			
HVK-V46	HVK-CHL1A EVAPORATOR VENT	CLOSED/ CAPPED			
HVK-V239	HVK-CHL1A OUTLET VENT	CLOSED/ CAPPED			
HVK-V45	HVK-CHL1A OUTLET ISOL	LOCKED OPEN			
HVK-V39	HVK-CHL1C INLET ISOL	LOCKED OPEN/ CLOSED			
HVK-V40	HVK-CHL1C FE5C TRANSMITTER ISOL	OPEN			
HVK-V41	HVK-CHL1C FE5C TRANSMITTER ISOL	OPEN			
HVK-V259	HVK-CHL1C FE5C TRANSMITTER ISOL	OPEN			
HVK-V258	HVK-CHL1A FE5C TRANSMITTER ISOL	OPEN			
HVK-V234	HVK-CHL1C INLET VENT	CLOSED/ CAPPED			
HVK-V236	HVK-CHL1C EVAPORATOR DRAIN	CLOSED/ CAPPED			
HVK-V235	HVK-CHL1C EVAPORATOR VENT	CLOSED/ CAPPED			
HVK-V42	HVK-CHL1C EVAPORATOR DRAIN	CLOSED/ CAPPED			
HVK-V43	HVK-CHL1C EVAPORATOR VENT	CLOSED/ CAPPED			
HVK-V233	HVK-CHL1C OUTLET VENT	CLOSED/ CAPPED			
HVK-V44	HVK-CHL1C OUTLET ISOL	LOCKED OPEN			
HVK-V84	HVK-CHL1B INLET ISOL	LOCKED OPEN/ CLOSED			
HVK-V85	HVK-CHL1B FE5B TRANSMITTER ISOL	OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-V86	HVK-CHL1B FE5B TRANSMITTER ISOL	OPEN			
HVK-V265	HVK-CHL 1B FE5B TRANSMITTER ISOL	OPEN			
HVK-V264	HVK-CHL1B FE5B TRANSMITTER ISOL	OPEN			
HVK-V228	HVK-CHL1B INLET VENT	CLOSED/ CAPPED			
HVK-V223	HVK-CHL1B EVAPORATOR VENT	CLOSED/ CAPPED			
HVK-V222	HVK-CHL1B EVAPORATOR VENT	CLOSED/ CAPPED			
HVK-V87	HVK-CHL1B EVAPORATOR DRAIN	CLOSED/ CAPPED			
HVK-V95	HVK-CHL1B EVAPORATOR VENT	CLOSED/ CAPPED			
HVK-V229	HVK-CHL1B OUTLET VENT	CLOSED/ CAPPED			
HVK-V94	HVK-CHL1B OUTLET ISOL	LOCKED OPEN			
HVK-V88	HVK-CHL1D INLET ISOL	LOCKED OPEN/ CLOSED			
HVK-V89	HVK-CHL1D FE5D TRANSMITTER ISOL	OPEN			
HVK-V90	HVK-CHL1D FE5D TRANSMITTER ISOL	OPEN			
HVK-V263	HVK-CHL1D FE5D TRANSMITTER ISOL	OPEN			
HVK-V262	HVK-CHL1D FE5D TRANSMITTER ISOL	OPEN			
HVK-V219	HVK-CHL1D INLET VENT	CLOSED/ CAPPED			
HVK-V220	HVK-CHL1D EVAPORATOR DRAIN	CLOSED/ CAPPED			
HVK-V221	HVK-CHL1D EVAPORATOR VENT	CLOSED/ CAPPED			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVK-V91	HVK-CHL1D EVAPORATOR DRAIN	CLOSED/ CAPPED			
HVK-V92	HVK-CHL1D EVAPORATOR VENT	CLOSED/ CAPPED			
HVK-V218	HVK-CHL1D OUTLET VENT	CLOSED/ CAPPED			
HVK-V93	HVK-CHL1D OUTLET ISOL	LOCKED OPEN			
THE FOLLOWING ITEMS ARE LOCATED ON CONTROL BUILDING 116 FT EL					
HVK-V111	LP A CB AHU HVC-ACU1A INLET ISOLATION	LOCKED OPEN			
HVK-V247	LP A CB AHU HVC-ACU1A INLET HEADER VENT	CLOSED/ CAPPED			
HVK-V139	LP A CB AHU HVC-ACU1A INLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V119	LP A CB AHU HVC-ACU1A UPPER COIL INLET	LOCKED OPEN			
HVK-V120	LP A CB AHU HVC-ACU1A MID COIL INLET	LOCKED OPEN			
HVK-V121	LP A CB AHU HVC-ACU1A LOWER COIL INLET	LOCKED OPEN			
HVK-V151	LP A CB AHU HVC-ACU1A UPPER INLET PE CONN	CLOSED/ CAPPED			
HVK-V249	LP A CB AHU HVC-ACU1A MID INLET PE CONN	CLOSED/ CAPPED			
HVK-V251	LP A CB AHU HVC-ACU1A LOWER INLET PE CONN	CLOSED/ CAPPED			
HVK-V152	LP A CB AHU HVC-ACU1A UPPER COIL VENT	CLOSED/ CAPPED			
HVK-V153	LP A CB AHU HVC-ACU1A MID COIL VENT	CLOSED/ CAPPED			
HVK-V154	LP A CB AHU HVC-ACU1A LOWER COIL VENT	CLOSED/ CAPPED			
HVK-V150	LP A CB AHU HVC-ACU1A UPPER OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V248	LP A CB AHU HVC-ACU1A MID OUTLET PE CONN	CLOSED/ CAPPED			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-V250	LP A CB AHU HVC-ACU1A LOWER OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V129	LP A CB AHU HVC-ACU1A UPPER COIL OUTLET	LOCKED THROTTLED			
HVK-V128	LP A CB AHU HVC-ACU1A MID COIL OUTLET	LOCKED THROTTLED			
HVK-V127	LP A CB AHU HVC-ACU1A LOWER COIL OUTLET	LOCKED THROTTLED			
HVK-V141	LP A CB AHU HVC-ACU1A OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V246	LP A CB AHU HVC-ACU1A OUTLET HEADER VENT	CLOSED/ CAPPED			
HVK-V112	LP A CB AHU HVC-ACU1A OUTLET ISOLATION	LOCKED OPEN			
HVK-V241	HVK LOOP A RETURN HEADER DRAIN	CLOSED/ CAPPED			
HVK-V115	LP A CB AHU HVC-ACU3A INLET ISOLATION	LOCKED OPEN			
HVK-V157	LP B CB AHU HVC-ACU1B INLET ISOLATION	LOCKED OPEN			
HVK-V252	LP B CB AHU HVC-ACU1B INLET HEADER VENT	CLOSED/ CAPPED			
HVK-V185	LP B CB AHU HVC-ACU1B INLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V165	LP B CB AHU HVC-ACU1B UPPER COIL INLET	LOCKED OPEN			
HVK-V166	LP B CB AHU HVC-ACU1B MID COIL INLET	LOCKED OPEN			
HVK-V167	LP B CB AHU HVC-ACU1B LOWER COIL INLET	LOCKED OPEN			
HVK-V196	LP B CB AHU HVC-ACU1B UPPER INLET PE CONN	CLOSED/ CAPPED			
HVK-V255	LP B CB AHU HVC-ACU1B MID INLET PE CONN	CLOSED/ CAPPED			
HVK-V257	LP B CB AHU HVC-ACU1B LOWER INLET PE CONN	CLOSED/ CAPPED			
HVK-V198	LP B CB AHU HVC-ACU1B UPPER COIL VENT	CLOSED/ CAPPED			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVK-V199	LP B CB AHU HVC-ACU1B MID COIL VENT	CLOSED/ CAPPED			
HVK-V200	LP B CB AHU HVC-ACU1B LOWER COIL VENT	CLOSED/ CAPPED			
HVK-V197	LP B CB AHU HVC-ACU1B UPPER OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V254	LP B CB AHU HVC-ACU1B MID OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V256	LP B CB AHU HVC-ACU1B LOWER OUTLET PE CONN	CLOSED/ CAPPED			
HVK-V175	LP B CB AHU HVC-ACU1B UPPER COIL OUTLET	LOCKED THROTTLED			
HVK-V174	LP B CB AHU HVC-ACU1B MED COIL OUTLET	LOCKED THROTTLED			
HVK-V173	LP B CB AHU HVC-ACU1B LOWER COIL OUTLET	LOCKED THROTTLED			
HVK-V187	LP B CB AHU HVC-ACU1B OUTLET HEADER DRAIN	CLOSED/ CAPPED			
HVK-V253	LP B CB AHU HVC-ACU1B OUTLET HEADER VENT	CLOSED/ CAPPED			
HVK-V158	LP B CB AHU HVC-ACU1B OUTLET ISOLATION	LOCKED OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

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VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHL1A (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-CHL1A-V1	PUMP OUT VAPOR COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1A-V2	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1A-V3	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1A-V4	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1A-V5	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1A-V6	BLOCK VALVE FOR REFRIG STORAGE TANK	CLOSED			
HVK-CHL1A-V7	PUMP OUT DRAIN AND COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1A-V8	OIL SEPARATOR VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1A-V9	STORAGE TANK VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1A-V10	REFRIG CHANGE/DRAIN VALVE	CLOSED/ PLUGGED			
HVK-CHL1A-V11	PUMPOUT COMPRESSOR SUCTION VALVE	OPEN			
HVK-CHL1A-V12	PUMPOUT COMPRESSOR DISCHARGE VALVE	OPEN			
HVK-CHL1A-V13	BLOCK VALVE FOR PUMPOUT CONDENSER	OPEN			
HVK-CHL1A-V14	OIL FILTER TRANSFER VALVE	LEFT/ RIGHT			
HVK-CHL1A-V15	OIL DRAIN FILL CONNECTION	CLOSED/ CAPPED			
HVK-CHL1A-V17	STORAGE TANK LEVEL UPPER ISOLATION VALVE	OPEN			
HVK-CHL1A-V18	STORAGE TANK LEVEL LOWER ISOLATION VALVE	OPEN			
HVK-CHL1A-V19	LUBE OIL COOLER COOLING WATER/INLET VALVE	LOCKED OPEN			
HVK-CHL1A-V20	LUBE OIL COOLER COOLING WATER/OUTLET VALVE	LOCKED OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHL1A (SAFETY RELATED)

HVK-CHL1A-V3300	LUBE OIL COOLER COOLING WATER/THROTTLE VALVE	LOCKED THROTTLED			
HVK-CHL1A-V21	PURGE UNIT GAS SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1A-V22	PURGE UNIT LIQUID SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1A-V23	PURGE UNIT LIQUID RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1A-V24	PURGE UNIT WATER DRAIN VALVE	CLOSED			
HVK-CHL1A-V25	FLT/DRYER EJECTOR SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1A-V26	FILTER/DRYER RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1A-V27	FILTER/DRYER VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1A-V29	FLT/DRYER EJECTOR SUPPLY FROM COOLER	LOCKED OPEN			

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VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHL1B (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVK-CHL1B-V1	PUMP OUT VAPOR COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1B-V2	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1B-V3	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1B-V4	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1B-V5	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1B-V6	BLOCK VALVE FOR REFRIG STORAGE TANK	CLOSED			
HVK-CHL1B-V7	PUMP OUT DRAIN AND COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1B-V8	OIL SEPARATOR VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1B-V9	STORAGE TANK VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1B-V10	REFRIG CHANGE/DRAIN VALVE	CLOSED/ PLUGGED			
HVK-CHL1B-V11	PUMPOUT COMPRESSOR SUCTION VALVE	OPEN			
HVK-CHL1B-V12	PUMPOUT COMPRESSOR DISCHARGE VALVE	OPEN			
HVK-CHL1B-V13	BLOCK VALVE FOR PUMPOUT CONDENSER	OPEN			
HVK-CHL1B-V14	OIL FILTER TRANSFER VALVE	LEFT/ RIGHT			
HVK-CHL1B-V15	OIL DRAIN FILL CONNECTION	CLOSED/ CAPPED			
HVK-CHL1B-V17	STORAGE TANK LEVEL UPPER ISOLATION VALVE	OPEN			
HVK-CHL1B-V18	STORAGE TANK LEVEL LOWER ISOLATION VALVE	OPEN			
HVK-CHL1B-V19	LUBE OIL COOLER COOLING WATER/INLET VALVE	LOCKED OPEN			
HVK-CHL1B-V20	LUBE OIL COOLER COOLING WATER/OUTLET VALVE	LOCKED OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHL1B (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-CHL1B-V3300	LUBE OIL COOLER COOLING WATER/THROTTLE VALVE	LOCKED THROTTLED			
HVK-CHL1B-V21	PURGE UNIT GAS SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1B-V22	PURGE UNIT LIQUID SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1B-V23	PURGE UNIT LIQUID RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1B-V24	PURGE UNIT WATER DRAIN VALVE	CLOSED			
HVK-CHL1B-V25	FLT/DRYER EJECTOR SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1B-V26	FILTER/DRYER RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1B-V27	FILTER/DRYER VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1B-V29	FLT/DRYER EJECTOR SUPPLY FROM COOLER	LOCKED OPEN			

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VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHIL1C (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-CHL1C-V1	PUMP OUT VAPOR COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1C-V2	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1C-V3	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1C-V4	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1C-V5	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1C-V6	BLOCK VALVE FOR REFRIG STORAGE TANK	CLOSED			
HVK-CHL1C-V7	PUMP OUT DRAIN AND COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1C-V8	OIL SEPARATOR VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1C-V9	STORAGE TANK VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1C-V10	REFRIG CHANGE/DRAIN VALVE	CLOSED/ PLUGGED			
HVK-CHL1C-V11	PUMPOUT COMPRESSOR SUCTION VALVE	OPEN			
HVK-CHL1C-V12	PUMPOUT COMPRESSOR DISCHARGE VALVE	OPEN			
HVK-CHL1C-V13	BLOCK VALVE FOR PUMPOUT CONDENSER	OPEN			
HVK-CHL1C-V14	OIL FILTER TRANSFER VALVE	LEFT/ RIGHT			
HVK-CHL1C-V15	OIL DRAIN FILL CONNECTION	CLOSED/ CAPPED			
HVK-CHL1C-V17	STORAGE TANK LEVEL UPPER ISOLATION VALVE	OPEN			
HVK-CHL1C-V18	STORAGE TANK LEVEL LOWER ISOLATION VALVE	OPEN			
HVK-CHL1C-V19	LUBE OIL COOLER COOLING WATER/INLET VALVE	LOCKED OPEN			
HVK-CHL1C-V20	LUBE OIL COOLER COOLING WATER/OUTLET VALVE	LOCKED OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHIL1C (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-CHL1C-V3300	LUBE OIL COOLER COOLING WATER/THROTTLE VALVE	LOCKED THROTTLED			
HVK-CHL1C-V21	PURGE UNIT GAS SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1C-V22	PURGE UNIT LIQUID SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1C-V23	PURGE UNIT LIQUID RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1C-V24	PURGE UNIT WATER DRAIN VALVE	CLOSED			
HVK-CHL1C-V25	FLT/DRYER EJECTOR SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1C-V26	FILTER/DRYER RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1C-V27	FILTER/DRYER VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1C-V29	FLT/DRYER EJECTOR SUPPLY FROM COOLER	LOCKED OPEN			

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VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHL1D (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
HVK-CHL1D-V1	PUMP OUT VAPOR COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1D-V2	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1D-V3	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1D-V4	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1D-V5	PUMP OUT VAPOR SELECTOR VALVE	CLOSED			
HVK-CHL1D-V6	BLOCK VALVE FOR REFRIG STORAGE TANK	CLOSED			
HVK-CHL1D-V7	PUMP OUT DRAIN AND COOLER ISOLATION VALVE	CLOSED			
HVK-CHL1D-V8	OIL SEPARATOR VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1D-V9	STORAGE TANK VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1D-V10	REFRIG CHANGE/DRAIN VALVE	CLOSED/ PLUGGED			
HVK-CHL1D-V11	PUMPOUT COMPRESSOR SUCTION VALVE	OPEN			
HVK-CHL1D-V12	PUMPOUT COMPRESSOR DISCHARGE VALVE	OPEN			
HVK-CHL1D-V13	BLOCK VALVE FOR PUMPOUT CONDENSER	OPEN			
HVK-CHL1D-V14	OIL FILTER TRANSFER VALVE	LEFT/ RIGHT			
HVK-CHL1D-V15	OIL DRAIN FILL CONNECTION	CLOSED/ CAPPED			
HVK-CHL1D-V17	STORAGE TANK LEVEL UPPER ISOLATION VALVE	OPEN			
HVK-CHL1D-V18	STORAGE TANK LEVEL LOWER ISOLATION VALVE	OPEN			
HVK-CHL1D-V19	LUBE OIL COOLER COOLING WATER/INLET VALVE	LOCKED OPEN			
HVK-CHL1D-V20	LUBE OIL COOLER COOLING WATER/OUTLET VALVE	LOCKED OPEN			

VALVE LINEUP - CONTROL BUILDING CHILLER, HVK-CHL1D (SAFETY RELATED)

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQ D POSITION	INITIALS 1ST	2ND	VALVE LABELED
HVK-CHL1D-V3300	LUBE OIL COOLER COOLING WATER/THROTTLE VALVE	LOCKED THROTTLED			
HVK-CHL1D-V21	PURGE UNIT GAS SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1D-V22	PURGE UNIT LIQUID SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1D-V23	PURGE UNIT LIQUID RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1D-V24	PURGE UNIT WATER DRAIN VALVE	CLOSED			
HVK-CHL1D-V25	FLT/DRYER EJECTOR SPLY FROM CONDENSER	LOCKED OPEN			
HVK-CHL1D-V26	FILTER/DRYER RETURN TO COOLER	LOCKED OPEN			
HVK-CHL1D-V27	FILTER/DRYER VENT VALVE	CLOSED/ CAPPED			
HVK-CHL1D-V29	FLT/DRYER EJECTOR SUPPLY FROM COOLER	LOCKED OPEN			

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Operations Management KCN Date/Time

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
HVK-FTX5A	CHILL WTR TO CHL1A JCB-RAK-2, CD-3-102 FT			
	HVK-FTX5A-V1H	OPEN		
	HVK-FTX5A-V2L	OPEN		
	HVK-FTX5A-V3B	CLOSED		
	HVK-FTX5A-V4	CLOSED		
	HVK-FTX5A-V5	CLOSED		
	HVK-FTX5A-V6	CLOSED		
	HVK-FTX5A-V7	CLOSED		
	HVK-FTX5A-V8	OPEN		
	HVK-FTX5A-V9	OPEN		
	HVK-FTX5A-V10	CLOSED		
	HVK-FTX5A-V11	CLOSED		
	HVK-ESX5A, CHLD WTR TO CHL1A, H13-P841, UNIT 1B	LIVE ZERO		
HVK-FTX5B	CHILL WTR TO CHL1B JCB-RAK-1, CD-3-102 FT			
	HVK-FTX5B-V1H	OPEN		
	HVK-FTX5B-V2L	OPEN		
	HVK-FTX5B-V3B	CLOSED		
	HVK-FTX5B-V4	CLOSED		
	HVK-FTX5B-V5	CLOSED		
	HVK-FTX5B-V6	CLOSED		
	HVK-FTX5B-V7	CLOSED		
	HVK-FTX5B-V8	OPEN		
	HVK-FTX5B-V9	OPEN		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
	HVK-FTX5B-V10	CLOSED		
	HVK-FTX5B-V11	CLOSED		
	HVK-ESX5B, CHILLED WTR TO CHL 1B, H13-P842, UNIT 2B	LIVE ZERO		
HVK-FTX5C	CHILL WTR TO CHL1C JCB-RAK-2, CD-3-102 FT			
	HVK-FTX5C-V1H	OPEN		
	HVK-FTX5C-V2L	OPEN		
	HVK-FTX5C-V3B	CLOSED		
	HVK-FTX5C-V4	CLOSED		
	HVK-FTX5C-V5	CLOSED		
	HVK-FTX5C-V6	CLOSED		
	HVK-FTX5C-V7	CLOSED		
	HVK-FTX5C-V8	OPEN		
	HVK-FTX5C-V9	OPEN		
	HVK-FTX5C-V10	CLOSED		
	HVK-FTX5C-V11	CLOSED		
	HVK-ESX5C, CHLD WTR TO CHL 1C, H13-P841, UNIT 1B	LIVE ZERO		
HVK-FTX5D	CHILL WTR TO CHL1D JCB-RAK-1, CD-3-102 FT			
	HVK-FTX5D-V1H	OPEN		
	HVK-FTX5D-V2L	OPEN		
	HVK-FTX5D-V3B	CLOSED		
	HVK-FTX5D-V4	CLOSED		
	HVK-FTX5D-V5	CLOSED		
	HVK-FTX5D-V6	CLOSED		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
	HVK-FTX5D-V7	CLOSED		
	HVK-FTX5D-V8	OPEN		
	HVK-FTX5D-V9	OPEN		
	HVK-FTX5D-V10	CLOSED		
	HVK-FTX5D-V11	CLOSED		
	HVK-ESX5D, CHILLED WTR TO CHL 1D, H13-P842, UNIT 2B	LIVE ZERO		
HVK-FTY5A	CHILL WTR TO CHL1A JCB-RAK-1, CD-3-102 FT			
	HVK-FTY5A-V1H	OPEN		
	HVK-FTY5A-V2L	OPEN		
	HVK-FTY5A-V3B	CLOSED		
	HVK-FTY5A-V4	CLOSED		
	HVK-FTY5A-V5	CLOSED		
	HVK-FTY5A-V6	CLOSED		
	HVK-FTY5A-V7	CLOSED		
	HVK-FTY5A-V8	OPEN		
	HVK-FTY5A-V9	OPEN		
	HVK-FTY5A-V10	CLOSED		
	HVK-FTY5A-V11	CLOSED		
	HVK-ESY5A, CHILLED WTR TO CHL 1A, H13-P842, UNIT 2K	LIVE ZERO		
HVK-FTY5B	CHILL WTR TO CHL1B JCB-RAK-2, CD-3-102 FT			
	HVK-FTY5B-V1H	OPEN		
	HVK-FTY5B-V2L	OPEN		
	HVK-FTY5B-V3B	CLOSED		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
	HVK-FTY5B-V4	CLOSED		
	HVK-FTY5B-V5	CLOSED		
	HVK-FTY5B-V6	CLOSED		
	HVK-FTY5B-V7	CLOSED		
	HVK-FTY5B-V8	OPEN		
	HVK-FTY5B-V9	OPEN		
	HVK-FTY5B-V10	CLOSED		
	HVK-FTY5B-V11	CLOSED		
	HVK-ESY5B, CHILLED WTR TO CHL 1B, H13-P841, UNIT 1K	LIVE ZERO		
HVK-FTY5C	CHILL WTR TO CHL1C JCB-RAK-1, CD-3-102 FT			
	HVK-FTY5C-V1H	OPEN		
	HVK-FTY5C-V2L	OPEN		
	HVK-FTY5C-V3B	CLOSED		
	HVK-FTY5C-V4	CLOSED		
	HVK-FTY5C-V5	CLOSED		
	HVK-FTY5C-V6	CLOSED		
	HVK-FTY5C-V7	CLOSED		
	HVK-FTY5C-V8	OPEN		
	HVK-FTY5C-V9	OPEN		
	HVK-FTY5C-V10	CLOSED		
	HVK-FTY5C-V11	CLOSED		
	HVK-ESY5C, CHILLED WTR TO CHL 1C, H13-P842, UNIT 2K	LIVE ZERO		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
HVK-FTY5D	CHILL WTR TO CHL1D JCB-RAK-2, CD-3-102 FT			
	HVK-FTY5D-V1H	OPEN		
	HVK-FTY5D-V2L	OPEN		
	HVK-FTY5D-V3B	CLOSED		
	HVK-FTY5D-V4	CLOSED		
	HVK-FTY5D-V5	CLOSED		
	HVK-FTY5D-V6	CLOSED		
	HVK-FTY5D-V7	CLOSED		
	HVK-FTY5D-V8	OPEN		
	HVK-FTY5D-V9	OPEN		
	HVK-FTY5D-V10	CLOSED		
	HVK-FTY5D-V11	CLOSED		
	HVK-ESY5D, CHILLED WTR TO CHIL 1D, H13-P841, UNIT 1K	LIVE ZERO		
HVK-LT1A	CHILL WTR COMPRESSION TK 1A, CD-1-102 FT			
	HVK-LT1A-V1H	OPEN		
	HVK-LT1A-V2L	OPEN		
	HVK-LT1A-V3	CLOSED		
	HVK-LT1A-V4	CLOSED		
	HVK-LT1A-V5	CLOSED		
	HVK-LT1A-V6	CLOSED		
	HVK-LT1A-V7	CLOSED		
	HVK-LI1A, CHW SURGE TK A/C LEVEL, H13-P863	LIVE ZERO		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
HVK-LT1B	CHILL WTR COMPRESSION TK1B, CA-1-103 FT			
	HVK-LT1B-V1H	OPEN		
	HVK-LT1B-V2L	OPEN		
	HVK-LT1B-V3B	CLOSED		
	HVK-LT1B-V4	CLOSED		
	HVK-LT1B-V5	CLOSED		
	HVK-LT1B-V6	CLOSED		
	HVK-LT1B-V7	CLOSED		
	HVK-LI1B, CHW SURGE TK B/D LEVEL, H13-P863	LIVE ZERO		
HVK-PDI38A	CHILL WTR PMP P1A, CD-1-103 FT			
	HVK-PDI38A-V1H	OPEN		
	HVK-PDI38A-V2L	OPEN		
	HVK-PDI38A-V3B	CLOSED		
	HVK-PDI38A-V4	CLOSED		
	HVK-PDI38A-V5	CLOSED		
	HVK-PDI38A-V6	CLOSED		
	HVK-PDI38A-V7	CLOSED		
HVK-PDI38B	CHILL WTR PMP P1B, CA-1-103 FT			
	HVK-PDI38B-V1H	OPEN		
	HVK-PDI38B-V2L	OPEN		
	HVK-PDI38B-V3B	CLOSED		
	HVK-PDI38B-V4	CLOSED		
	HVK-PDI38B-V5	CLOSED		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
	HVK-PDI38B-V6	CLOSED		
	HVK-PDI38B-V7	CLOSED		
HVK-PDI38C	CHILL WTR PMP P1C, CD-2-103 FT			
	HVK-PDI38C-V1H	OPEN		
	HVK-PDI38C-V2L	OPEN		
	HVK-PDI38C-V3B	CLOSED		
	HVK-PDI38C-V4	CLOSED		
	HVK-PDI38C-V5	CLOSED		
	HVK-PDI38C-V6	CLOSED		
	HVK-PDI38C-V7	CLOSED		
HVK-PDI38D	CHILL WTR PMP P1D, CA-2-103 FT			
	HVK-PDI38D-V1H	OPEN		
	HVK-PDI38D-V2L	OPEN		
	HVK-PDI38D-V3B	CLOSED		
	HVK-PDI38D-V4	CLOSED		
	HVK-PDI38D-V5	CLOSED		
	HVK-PDI38D-V6	CLOSED		
	HVK-PDI38D-V7	CLOSED		
HVK-PI7A	CHILL WTR PMPS 1A & 1C SUCT, CD-1-108 FT			
	HVK-PI7A-V1	OPEN		
	HVK-PI7A-V2	CLOSED		
	HVK-PI7A-V3	CLOSED		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
HVK-PI7B	CHILL WTR PMPS 1B & 1D SUCT, CA-1-108 FT			
	HVK-PI7B-V1	OPEN		
	HVK-PI7B-V2	CLOSED		
	HVK-PI7B-V3	CLOSED		
HVK-PI8A	CHILL WTR PMP 1A DISCH, CD-1-103 FT			
	HVK-PI8A-V1	OPEN		
	HVK-PI8A-V2	CLOSED		
	HVK-PI8A-V3	CLOSED		
HVK-PI8B	CHILL WTR PMP 1B DISCH, CA-1-103 FT			
	HVK-PI8B-V1	OPEN		
	HVK-PI8B-V2	CLOSED		
	HVK-PI8B-V3	CLOSED		
HVK-PI8C	CHILL WTR PMP 1C DISCH, CD-2-103 FT			
	HVK-PI8C-V1	OPEN		
	HVK-PI8C-V2	CLOSED		
	HVK-PI8C-V3	CLOSED		
HVK-PI8D	CHILL WTR PMP 1D DISCH, CA-2-103 FT			
	HVK-PI8D-V1	OPEN		
	HVK-PI8D-V2	CLOSED		
	HVK-PI8D-V3	CLOSED		

INSTRUMENT & VALVE LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
HVK-PI31A	COMPRESSION TK TK1A, CD-1-105 FT			
	HVK-PI31A-V1	OPEN		
	HVK-PI31A-V2	CLOSED		
	HVK-PI31A-V3	CLOSED		
HVK-PI31B	COMPRESSION TK TK1B, CD-1-105 FT			
	HVK-PI31B-V1	OPEN		
	HVK-PI31B-V2	CLOSED		
	HVK-PI31B-V3	CLOSED		

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Operations Management KCN Date/Time

ELECTRICAL LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ D POSITION	INITIALS 1ST	2ND
HVK-CHL1A	BKR# EJS-ACB002 CKT # HVKA01 CONTROL BLDG CHILLED WATER COMPRESSOR CHL1A	EJS-SWG1A ACB002	RACKED IN OPEN		
HVK-CHL1C	BKR# EJS-ACB003 CKT # 1HVKC01 CONTROL BLDG CHILLED WATER COMPRESSOR CHL1C	EJS-SWG1A ACB003	RACKED IN OPEN		
HVK-CHL1B	BKR# EJS-ACB043 CKT # HVKB01 CONTROL BLDG CHILLED WATER COMPRESSOR CHL1B	EJS-SWG1B ACB043	RACKED IN OPEN		
HVK-CHL1D	BKR# EJS-ACB044 CKT # HVKD01 CONTROL BLDG CHILLED WATER COMPRESSOR CHL1D	EJS-SWG1B ACB044	RACKED IN OPEN		
HVK-CHL1AC	HVK-CHL1AC CHILLER PMP OUT COMPRESSOR	NHS-MCC10A1 BKR 3B	ON		
HVK-CHL1BC	HVK-CHL1BC CHILLER PMP OUT COMPRESSOR	NHS-MCC10B BKR 3C	ON		
HVK-CHL1CC	HVK-CHL1CC CHILLER PMP OUT COMPRESSOR	NHS-MCC10A1 BKR 3C	ON		
HVK-CHL1DC	HVK-CHL1DC CHILLER PMP OUT COMPRESSOR	NHS-MCC10B BKR 2C	ON		
HVK-CHL1APL	HVK-CHL1APL CHILLED COMPRESSOR LUBE OIL PUMP	EHS-MCC8A BKR 4B	ON		
HVK-CHL1CPL	HVK-CHL1CPL CHILLED COMPRESSOR LUBE OIL PUMP	EHS-MCC8A BKR 4C	ON		
HVK-CHL1BPL	HVK-CHL1BPL CHILLED COMPRESSOR LUBE OIL PUMP	EHS-MCC8B BKR 4B	ON		
HVK-CHL1DPL	HVK-CHL1DPL CHILLED COMPRESSOR LUBE OIL PUMP	EHS-MCC8B BKR 4C	ON		
HVK-MOV10A	HVK-MOV10A MAKEUP WATER VALVE	EHS-MCC8A BKR 6C	ON		
HVK-MOV11A	HVK-MOV11A CHLD WTR CPRSN TANK ALTERNATE MAKEUP WTR V	EHS-MCC8A BKR 6D	ON		

ELECTRICAL LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ D POSITION	INITIALS 1ST	2ND
HVK-MOV20A	HVK-MOV20A CHILLED WATER PUMP 1A DISCHARGE VALVE	EHS-MCC8A BKR 5D	ON		
HVK-MOV20C	HVK-MOV20C CHILLED WATER PUMP 1C DISCHARGE VALVE	EHS-MCC8A BKR 4D	ON		
HVK-P1A	HVK-P1A CONTROL BLDG CHILLED WATER PMP	EHS-MCC8A BKR 3C	ON		
HVK-P1C	HVK-P1C CONTROL BLDG BACK-UP CHILLED WATER PMP	EHS-MCC8A BKR 2D	ON		
HVK-MOV10B	HVK-MOV10B MAKEUP WATER VALVE	EHS-MCC8B BKR 6B	ON		
HVK-MOV11B	HVK-MOV11B CHLD WATER CPRSN TANK ALTERNATE MAKEUP WTR V	EHS-MCC8B BKR 6C	ON		
HVK-MOV20B	HVK-MOV20B CHILLED WATER PUMP 1B DISCHARGE VALVE	EHS-MCC8B BKR 5D	ON		
HVK-MOV20D	HVK-MOV20D CHILLED WATER PUMP 1D DISCHARGE VALVE	EHS-MCC8B BKR 4D	ON		
HVK-P1B	HVK-P1B CONTROL BLDG CHILLED WATER PUMP	EHS-MCC8B BKR 3C	ON		
HVK-P1D	HVK-P1D CONTROL BLDG BACK-UP CHILLED WATER PUMP	EHS-MCC8B BKR 2D	ON		
HVK-P1AH	CONT BLDG CHILLED WATER PUMP P1A MOTOR HEATER	SCV-PNL8A1 BKR 10	ON		
HVK-P1CH	CONT BLDG CHILLED WATER PUMP P1C MOTOR HEATER				

ELECTRICAL LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ D POSITION	INITIALS 1ST	2ND
HVK-CHL1AH	CONT BLDG CHILLER CHL1A COMPRESSOR MOTOR HTR	SCV-PNL8A1 BKR 2	ON		
HVK-CHL1CH	CONT BLDG CHILLER CHL1C COMPRESSOR MOTOR HTR				
HVK-TV16A	CONTROL ROOM AHU LOOP A TEMP CONTROL VLV	SCV-PNL8A1 BKR 3	ON		
HVK-TV17A	STBY SWGR ROOM AHU LOOP A TEMP CONTROL VLV				
HVK-TV16B	CONTROL ROOM AHU LOOP B TEMP CONTROL VLV	SCV-PNL8B1 BKR 5	ON		
HVK-TV17B	STBY SWGR ROOM AHU LOOP B TEMP CONTROL VLV				
HVK-CHL1ALH	CONT BLDG CHILLER CHL1A COMP LUBE OIL HTR	SCV-PNL8A1 BKR 7	ON		
HVK-CHL1A-P1	CONT BLDG CHILLER CHL1A COMP SEAL OIL RETURN PUMP				
HVK-CHL1CLH	CONT BLDG CHILLER CHL1C COMP LUBE OIL HTR	SCV-PNL8A1 BKR 8	ON		
HVK-CHL1C-P1	CONT BLDG CHILLER CHL1C COMP SEAL OIL RETURN PUMP				
HVK-CHL1BH	CONT BLDG CHILLER CHL1B COMP MOTOR HEATER	SCV-PNL8B1 BKR 6	ON		
HVK-CHL1DH	CONT BLDG CHILLER CHL1D COMP MOTOR HEATER				
HVK-CHL1BLH	CONT BLDG CHILLER CHL1B COMP LUBE OIL HTR	SCV-PNL8B1 BKR 2	ON		
HVK-CHL1B-P1	CONT BLDG CHILLER CHL1B COMP SEAL OIL RETURN PUMP				

ELECTRICAL LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQ D POSITION	INITIALS 1ST	INITIALS 2ND
HVK-CHL1DLH	CONT BLDG CHILLER CHL1D COMP LUBE OIL HTR	SCV-PNL8B1 BKR 3	ON		
HVK-CHL1D-P1	CONT BLDG CHILLER CHL1D COMP SEAL OIL RETURN PUMP				
HVK-P1BH	CONT BLDG CHILLER WTR PUMP P1B MOTOR HEADER	SCV-PNL8B1 BKR 15	ON		
HVK-P1DH	CONT BLDG CHILLER WTR PUMP P1D MOTOR HEATER				
HVKA02	CHILLER HVK-CHL1A AUX CONTROL	SCV-PNL8A1 BKR 6	ON		
HVKB02	CHILLER HVK-CHL1B AUX CONTROL	SCV-PNL8B1 BKR 1	ON		
HVKD02	CHILLER HVK-CHL1D AUX CONTROL	SCV-PNL8B1 BKR 4	ON		
HVKC02	CHILLER HVK-CHL1C AUX CONTROL	SCV-PNL8A1 BKR 9	ON		
H13-P852	PPC POINTS ANALOG ISOLATOR CKTS	VBS-PNL01B DISC 21	ON		

ELECTRICAL LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

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OSM/CRS KCN Date/Time

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Operations Management KCN Date/Time

CONTROL BOARD LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
THE FOLLOWING ITEMS ARE LOCATED ON PANEL H13-P842				
HVK-CHL1B LO FLOW TRIP LOGIC BYPASS	NORMAL/ KEY REMOVED	AMBER LIGHT OFF		
HVK-CHL1D LO FLOW TRIP LOGIC BYPASS	NORMAL/ KEY REMOVED	AMBER LIGHT OFF		
THE FOLLOWING ITEMS ARE LOCATED ON PANEL H13-P863				
HVK-MOV10A CHW SURGE TK A NORM MKUP	AUTO	GREEN		
HVK-MOV11A CHW SURGE TK A ALT MKUP	MID AFTER CLOSE	GREEN		
HVK-P1A CHILLED WATER PUMP A	STOP/AUTO	GREEN/RED		
HVK-P1C CHILLED WATER PUMP C	STOP/AUTO	GREEN/RED		
HVK-MOV20A CHW PUMP A DISCH VLV	N/A	GREEN/RED		
HVK-MOV20C CHW PUMP C DISCH VLV	N/A	GREEN/RED		
CHILLER SUPPLY FLOW ELEMENT SELECTOR	CHL1A OR CHL1C	N/A		
HVK-CHL1A CONT BLDG CHILLER A	STOP/RESET	GREEN/RED & WHITE		
HVK-CHL1C CONT BLDG CHILLER C	STOP/RESET	GREEN/RED & WHITE		
HVK-CHL1A CONT BLDG CHILLER A	LOCKOUT/RESET	N/A		
HVK-CHL1C CONT BLDG CHILLER C	LOCKOUT/RESET	N/A		
HVK-CHL1APL CHLD CPRSR LUBO	AUTO	GREEN/RED		
HVK-CHL1CPL CHLD CPRSR LUBO	AUTO	GREEN/RED		
SWP-MOV27A RECIRC SWP 3A SPLY VLV	N/A	GREEN/RED		
SWP-MOV27C RECIRC SWP 3C SPLY VLV	N/A	GREEN/RED		

CONTROL BOARD LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
SWP-P3A CHILLER A RECIRC SWP	AUTO	GREEN/RED		
SWP-P3C CHILLER C RECIRC SWP	AUTO	GREEN/RED		
CHILLED WATER PUMP SELECTOR	P1A OR P1C	N/A		
HVK-TV16A ACU 1A CLG WATER VLV CR TEMP CONTROLLER	AS REQUIRED AUTO	N/A		
HVK-TV17A CA VAULT/SWGR RM A TEMP CONTROLLER	AS REQUIRED AUTO	N/A		
HVK-MOV10B CHW SURGE TK B NORM MKUP	AUTO	GREEN		
HVK-MOV11B CHW SURGE TK B ALT MKUP	MID AFTER CLOSE	GREEN		
HVK-P1B CHILLED WATER PUMP B	STOP/AUTO	GREEN/RED		
HVK-P1D CHILLED WATER PUMP D	STOP/AUTO	GREEN/RED		
HVK-MOV20B CHW PUMP B DISCH VLV	N/A	GREEN/RED		
HVK-MOV20D CHW PUMP D DISCH VLV	N/A	GREEN/RED		
CHILLER SUPPLY FLOW ELEMENT SELECTOR	CHL1B OR CHL1D	N/A		
HVK-CHL1B CONT BLDG CHILLER B	STOP/RESET	GREEN/RED & WHITE		
HVK-CHL1D CONT BLDG CHILLER D	STOP/RESET	GREEN/RED & WHITE		
HVK-CHL1B CONT BLDG CHILLER B	LOCKOUT/RESET	N/A		
HVK-CHL1D CONT BLDG CHILLER D	LOCKOUT/RESET	N/A		
HVK-CHL1BPL CHLD CPRSR LUBO	AUTO	GREEN/RED		
HVK-CHL1DPL CHLD CPRSR LUBO	AUTO	GREEN/RED		
SWP-MOV27B RECIRC SWP 3B SPLY VLV	N/A	GREEN/RED		

CONTROL BOARD LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
SWP-MOV27D RECIRC SWP 3D SPLY VLV	N/A	GREEN/RED		
SWP-P3B CHILLER B RECIRC SWP	AUTO	GREEN/RED		
SWP-P3D CHILLER D RECIRC SWP	AUTO	GREEN/RED		
CHILLED WATER PUMP SELECTOR	P1B OR P1D	N/A		
HVK-TV16B ACU 1B CLG WATER VLV CR TEMP CONTROLLER	AS REQUIRED AUTO	N/A		
HVK-TV17B CA VAULT/SWGR RM B TEMP CONTROLLER	AS REQUIRED AUTO	N/A		
THE FOLLOWING ITEMS ARE LOCATED ON CONTROL BUILDING 98 FT EL, AT EHS-MCC8A				
S1-HVKA03 HVK-P1A TIMER DEFEAT	NORMAL/ KEY REMOVED	N/A		
S2-HVKA04 HVK-P1C TIMER DEFEAT	NORMAL/ KEY REMOVED	N/A		
THE FOLLOWING CONTROLS ARE LOCATED ON CONTROL BUILDING 98 FT EL, AT EHS-MCC8B				
S1-HVKB03 HVK-P1B TIMER DEFEAT	NORMAL/ KEY REMOVED	N/A		
S2-HVKB04 HVK-P1D TIMER DEFEAT	NORMAL/ KEY REMOVED	N/A		

CONTROL BOARD LINEUP - CONTROL BUILDING CHILLED WATER (SAFETY RELATED)

Remarks: ____

____

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____

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Performed By:	____________________	__________	__________	________/____
	Signature	KCN	Initials	Date/Time
	____________________	__________	__________	________/____
	Signature	KCN	Initials	Date/Time
	____________________	__________	__________	________/____
	Signature	KCN	Initials	Date/Time

Reviewed By:	____________________	______	__________
	OSM/CRS	KCN	Date/Time
Second Review:	____________________	______	__________
	Operations Management	KCN	Date/Time

NORMAL OPERATING PARAMETERS - CHILLERS

PARAMETER	NOMINAL VALUES	EQUIPMENT CONCERN
Chilled Water Outlet Temperature (HVK-TI13)	52.5 ± 2°F	To low reduces margin to chiller trip on evaporator low temperature. Too high may result in inadequate cooling.
Evaporator Refrigerant Pressure (HVK-PI52)	2 - 5 psig (44 - 52°F)	To low reduces margin to chiller trip on low evaporator temperature (Chilled water outlet temperature low). Temperature may be read for increased readability
Evaporator Refrigerant Level Sightglass (HVK-LG86)	Visible	Visible level in standby or operating chillers provides assurance that refrigerant is not stacking in the condenser.
Condenser Refrigerant Pressure (HVK-PI53)	25 -40 psig (91 110°F)	Excessive condenser pressure reduces margin to chiller trip on high condenser pressure (220 psig). High condenser pressures may also indicate noncondensibles in chiller. Temperature may be read for increased readability.
Thrust Bearing Temp (HVK-TI34)	135 - 175°F	A high bearing temperature reduces margin to chiller trip on high bearing temperature (196-221°F).
Oil Differential Pressure (HVK-PDI51)	17 - 23 psid	Low oil dp reduces margin to chiller trip (13 psid) and may result in bearing damage. Too high may indicate restricted oil flowpath.
Oil Temperature - Lower Sump (HVK-TI33)	120 - 155°F	To high oil temperature could burn oil and reduces the margin to a high bearing oil temperature trip. To low a temperature could cause oil foaming due to excess refrigerant in oil and could cause a low oil pressure trip. Carefully monitor after changing cooling water throttle valve position to lube oil cooler until stable temperature is maintained.
Oil Level Operating Upper and Lower Sightglasses	> ½ of lower sight glass and < ¾ of upper sight glass.	To low a level can cause loss of oil suction to oil pump. Too high a level can cause excessive foaming when oil enters moving parts of oil pump, which could result in a loss of oil suction to oil pump. Both cause a low oil pressure trip. Too high a level can cause high power consumption and/or possible compressor damage. The most accurate oil level is after the chiller has run for 20 minutes loaded. Contact the System Engineer if the upper sightglass remains full after 20 minutes of loaded operation. Once the oil level is set, the minimum level in the lower sightglass should be the only concern for an operating chiller.

NORMAL OPERATING PARAMETERS - CHILLERS

PARAMETER	NOMINAL VALUES	EQUIPMENT CONCERN
Oil Level Shutdown Upper and Lower Sightglasses	> ¾ of lower sight glass	To low a level can cause loss of oil suction to oil pump. To high a level can cause excessive foaming when oil enters moving parts of oil pump, which could result in a loss of oil suction to oil pump. Both cause a low oil pressure trip. Also, the oil level in the compressor decreases from the standby condition to the operating condition. For a non-operating chiller an oil level in or above the upper sightglass is normal. When idle, the level may be higher due to the absorption of refrigerant by the oil.
Chilled Water Compression Tank Pressure (HVK-PI31)	16 - 32 psig	Maintains net positive suction head for chilled water pumps (IA-HVK*1 and calc. G13.18.2.2*04-0)
Thermal Purge Recovery System Water Sightglass	No water visible	No water visible (drain water to sample container if present). Water will float on refrigerant. If water is detected, a leak is indicated and a CR should be generated. Water is the dominant degradation indicator for chiller material condition.
Thermal Purge Recovery System Refrigerant Sightglass	Visible	Visible level indicates that the purge unit float is properly maintaining purge refrigerant level, which is one indication that the purge unit is removing noncondensible gases. If flooded, the purge unit float may be malfunctioning.
Compressor Discharge Temp (HVK-TI37)	104 - 140°F	Provides information that can be used to indicate compressor performance. 24 month capacity STP provides better information.
Compressor Suction Temp (HVK-TI35)	46 - 52°F	Provides information that can be used to indicate compressor performance. 24 month capacity STP provides better information.
Entering Filter-Dryer Refrigerant Sightglass (HVK-LG88)	Yes	Visible flow indicates that refrigerant is being processed through the filter dryer and the dryer is not clogged.
Storage Tank Refrigerant Level Sightglass (HVK-LG87)	None visible	Visible in chillers indicates that the full expected refrigerant charge may not be in the chiller.
Chilled Water Inlet Temp (HVK-TI9)	50.5 - 67.5°F	Indication of heat removed from the Control Building.
Chilled Water Flow (HVK-FTX5)	303 - 450 gpm	From Main Control Room. Too low a flow could cause a chiller trip (152.9 gpm). Too high may indicate instrument problem.
Combined Chilled Water Temp (HVK-TI30)	52.5 ± 2°F	To low reduces margin to chiller trip on evaporator low temperature or pressure. Too high may result in inadequate cooling.
Condenser Refrigerant Outlet Temp (HVK-TI36)	100 - 113°F	Indicates the effectiveness of the condenser cooling water system for maintaining constant condenser pressure and temperature.

NORMAL OPERATING PARAMETERS - CHILLERS

PARAMETER	NOMINAL VALUES	EQUIPMENT CONCERN
Condenser Cooling Water Flow Rate (SWP-FT69)	630 - 1150 gpm	From Main Control Room. Too low a flow could cause a chiller trip (265 gpm). To high may indicate instrument problem.
Condenser Cooling Water Pump Gearbox Oil Level (SWP-P3)	> 1/2 full	To low a level reduces available margin.
Condenser Cooling Water Pump Differential Pressure (SWP-PDI71) (Operating Pump)	17.5 ± 2 psid	Indicates proper pump function.
Chilled Water Pump Suction Pressure (HVK-PI7) (Operating Pump)	18.5 ± 2 psig	Indicates proper pump function.
Chilled Water Pump Discharge Pressure (HVK-PI8) (Operating Pump)	76 ± 5 psig	Indicates proper pump function.
Chilled Water Pump Differential Pressure (HVK-PDI38) (Operating Pump)	60 ± 5 psid	Indicates proper pump function.

CONTROLLER SETTING CORRELATIONS

HVC-TC 44A & 44B
CABLE VAULTS / SWITCHGEAR EXHAUST
TEMPERATURE CONTROLLER

TEMPERATURE SETTING	CONTROLLER SETPOINT
120°F	100%
117°F	95%
114°F	90%
111°F	85%
108°F	80%
105°F	75%
102°F	70%
99°F	65%
96°F	60%
93°F	55%
90°F	50%
87°F	45%
84°F	40%
81°F	35%
78°F	30%
75°F	25%
72°F	20%
69°F	15%
66°F	10%
63°F	5%
60°F	0%

SETPOINT 91.5°F / 52.5%

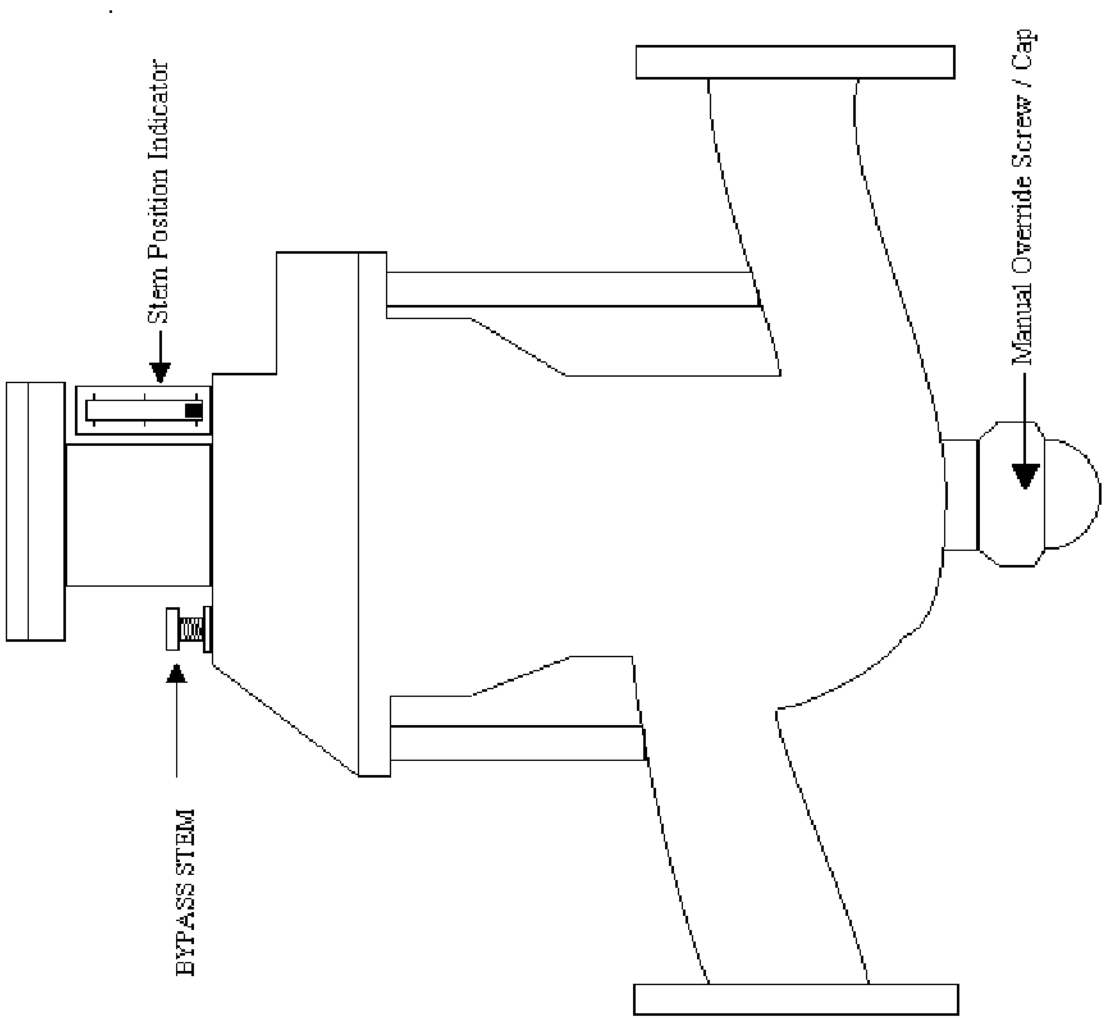
CONTROLLER SETTING CORRELATIONS

HVC-TC 58A & 58B
CONTROL BUILDING CHILLER
EQUIPMENT ROOM TEMPERATURE CONTROLLER

TEMPERATURE SETTING	CONTROLLER SETPOINT
120°F	100%
117°F	95%
114°F	90%
111°F	85%
108°F	80%
105°F	75%
102°F	70%
99°F	65%
96°F	60%
93°F	55%
90°F	50%
87°F	45%
84°F	40%
81°F	35%
78°F	30%
75°F	25%
72°F	20%
69°F	15%
66°F	10%
63°F	5%
60°F	0%

SETPOINT 90°F / 50%

METREX VALVE DIAGRAM



NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE
SRO ☒ RO ☒

ALTERNATE PATH ☐

TITLE: **Cross Connect EDG Air Receivers Within a Single Division**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	13	Actual Time (min):	

JPM RESULTS*: (Circle one) *
Refer to Grading Instructions at end of JPM

SAT UNSAT

EVALUATION METHOD:

	Perform
X	Simulate

EVALUATION LOCATION:

X	Plant
	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	September 11, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: The Rear Air Start System is pressurized.

Synopsis: This task will align the Forward Air Start system compressor to pressurize the Rear Air Start system Air Receivers using SOP-0053, Standby Diesel Generator and Auxiliaries.

NOTE: If in the Plant or the Control Room, **Caution** the operator **NOT** to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:
“I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task.”

2) Initiating Cues:
The CRS has directed you to cross-connect the Division 2 Emergency Diesel Generator air receivers in accordance with Section 5.5 of SOP-0053. Pressurize both air receivers to 220 psig.

3) Initial Conditions:
The Div 2 Emergency Diesel Generator rear air compressor, EGA-C4B, is not operable.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Cross Connect EDG Air Receivers Within a Single Division	400067004001	264000 K1.06 264000 K6.01 295003 AA1.02	3.2 / 3.2 3.8 / 3.9 4.2 / 4.3

REFERENCES:
SOP-0053, Rev 327

APPLICABLE OBJECTIVES
RLP-STM-0309S, Obj 2, 3

REQUIRED MATERIALS:
SOP-0053, Rev 327, Section 5.5

SAFETY FUNCTION:
__6__

SIMULATOR CONDITIONS & SETUP:

1. NA – This is an In Plant JPM.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: The Rear Air Start System is pressurized.

PERFORMANCE:

START TIME: ________________

SOP-0053, Emergency Diesel Generator and Auxiliaries
Section 5.5.2, Division 2 Air System

1.	**Procedure Step:**	5.5.2.1 Close EGA-V3148 (V3140), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.
	Standard	Applicant identified rear air compressor as being inoperable in accordance with the initial conditions. Applicant located/identified and closed the rear air start isolation valve (EGA-V3140) by turning the handwheel fully clockwise.
	Cue	
	Notes	The valve is closed when the handwheel is fully clockwise. Also, this is a rising stem valve. (stem in)
	Results	SAT ☐ UNSAT ☐

2.	***Procedure Step:**	5.5.2.2 Open EGA-V3142, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.
	Standard	Applicant located/identified EGA-V3142, Cross Tie Isolation Valve. Applicant opened EGA-V3142 by turning the handwheel fully counter-clockwise.
	Cue	
	Notes	The valve is open when the handwheel is fully counter-clockwise. Also, this is a rising stem valve. (stem out)
	Results	SAT ☐ UNSAT ☐

3.	***Procedure Step:**	5.5.2.3 Open EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.
	Standard	Applicant located/identified EGA-V3170, Cross Tie Isolation Valve. Applicant opened EGA-V3170 by turning the handwheel fully counter-clockwise.
	Cue	
	Notes	The valve is open when the handwheel is fully counter-clockwise. Also, this is a rising stem valve. (stem out)
	Results	SAT ☐ UNSAT ☐

4.	***Procedure Step:**	5.5.2.4 Start the operable air compressor by placing EGA-C4B(C5B), REAR(FORWARD) START AIR COMPRESSOR to RUN.
	Standard	Applicant identified <u>rear</u> air compressor as being inoperable in accordance with the initial conditions. Applicant located/identified and started the <u>forward</u> air compressor (EGA-C5B) by turning the switch to RUN.
	Cue	After RUN, indicate that the red light is on and the green light is off
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	5.5.2.5 <u>WHEN</u> the desired pressure is reached in the cross tied air receivers, <u>THEN</u> stop the air compressor by placing EGA-C5B, FORWARD START AIR COMPRESSOR to OFF.
	Standard	Applicant observed the air pressure in the Rear Air Receivers. When cued that pressure reads 220 psig, applicant stopped the forward air compressor (EGA-C5B) by turning the switch to STOP.
	Cue	Indicate that the rear and forward air receivers are both reading 220 psig. After STOP, indicate that the green light is on and the red light is off
	Notes	Receiver pressure can be read locally in the Diesel Room or at the control panel outside the Diesel Room.
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	5.5.2.6 Close EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.
	Standard	Applicant located/identified EGA-V3170, Cross Tie Isolation Valve. Applicant closed EGA-V3170 by turning the handwheel fully clockwise.
	Cue	
	Notes	The valve is closed when the handwheel is fully clockwise. Also, this is a rising stem valve.
	Results	SAT ☐ UNSAT ☐

7.	**Procedure Step:**	5.5.2.7 Close EGA-V3142, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.
	Standard	Applicant located/identified EGA-V3142, Cross Tie Isolation Valve. Applicant closed EGA-V3142 by turning the handwheel fully clockwise.
	Cue	
	Notes	The valve is closed when the handwheel is fully clockwise. Also, this is a rising stem valve.
	Results	SAT ☐ UNSAT ☐

8.	**Procedure Step:**	5.5.2.8 Open EGA-V3148 (V3140), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.
	Standard	Applicant identified <u>rear</u> air compressor as being inoperable in accordance with the initial conditions. Applicant located/identified and opened the rear air start isolation valve (EGA-V3140) by turning the handwheel fully counter-clockwise.
	Cue	
	Notes	The valve is open when the handwheel is fully counter-clockwise. Also, this is a rising stem valve.
	Results	SAT ☐ UNSAT ☐

9.	**Procedure Step:**	5.5.2.9 Place the operable air compressor in AUTO.		
	Standard	Applicant identified <u>forward</u> air compressor as being operable. Applicant located/identified and manipulated the forward air compressor (EGA-C5B) switch to AUTO.		
	Cue	After AUTO, indicate the amber and the green lights are ON		
	Notes			
	Results	SAT ☐	UNSAT ☐	

10.	**Procedure Step:**	5.5.2.10 Verify the restorations are independently verified and logged.	
	Standard	Applicant informed the Control Room that the Rear Air Receivers of the Division 2 EDG has been pressurized using the Forward system in accordance with SOP-0053, Section 5.5.2. Applicant requests and independent verifier.	
	Cue	Accept the report as a Control Room Operator. Accept the request for an independent verifier.	
	Notes		
	Results	SAT ☐	UNSAT ☐

Terminating Cue: The Rear Air Start System is pressurized.

This completes this JPM.

STOP TIME: ____________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

The Div 2 Emergency Diesel Generator rear air compressor, EGA-C4B, is not operable.

INITIATING CUE:

The CRS has directed you to cross-connect the Division 2 Emergency Diesel Generator air receivers in accordance with Section 5.5 of SOP-0053. Pressurize both air receivers to 220 psig.

CONTINUOUS USE

*G12.1.6

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
***SYSTEM OPERATING PROCEDURE**

**STANDBY DIESEL GENERATOR AND AUXILIARIES (SYS#309)*

PROCEDURE NUMBER:	***SOP-0053**
REVISION NUMBER:	***329**
Effective Date:	***02/06/2014**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
SOP-0053R328EC-B	Added Precaution and Limitation 2.61 to clarify required actions if the lube oil keep warm pump fails and the jacket water keep warm system is in service - the engine is required to be air rolled every 12 hours in order to maintain operability when the lube oil temperature is above 40°F. Ref CR-RBS-2013-7535.

TABLE OF CONTENTS

SECTION PAGE NO.

1 PURPOSE

1.1 The purpose of this procedure is to outline the steps necessary to startup, operate and shutdown EGS-EG1A(B), STBY DIESEL GENERATOR A(B).

2 PRECAUTIONS AND LIMITATIONS

2.1 All instructions are written for EGS-EG1A, STBY DIESEL GENERATOR A with nomenclature for EGS-EG1B, STBY DIESEL GENERATOR B in parenthesis.

2.2 High crankcase pressure indicates the possible existence of an explosive gas mixture. Allow the engine to cool for 15 minutes to allow fumes and vapors to dissipate before removing any engine covers. With the exhaust fan running the atmospheric pressure in the room will be lower and the manometers will read higher than specified.

2.3 Placing the diesel in MAINTENANCE mode requires simultaneous operation of the STBY DIESEL ENGINE MODE switch on H13-P877 and the MAINT MODE SELECT switch on EGS-PNL3A(B). Similarly, to place the diesel back in OPERATIONAL mode requires simultaneous operation of the STBY DIESEL ENGINE MODE switch and the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B).

2.4 When the diesel is returned to the OPERATIONAL mode the FIELD FLASHING RELAY READY light located on EGE-CAB01A(B) should be lit. If not, the Exciter Shutdown Relay may have failed to reset.

2.5 EGS-EG1A(B), STBY DIESEL GENERATOR A(B) has a continuous rating of 3130 Kw at 0.8 power factor. Do not operate the diesel generator with a power factor of less than 0.8 when operating in parallel with other sources, and do not exceed 3130 Kw load.

2.6 ERIS computer points will be used to ensure voltage and watt limits are not exceeded. Frequency will be recorded using the MCR or the Local control room meter; however voltage and watt readings will be obtained from the ERIS points. Voltage and watt meters can be used for adjustments when not at the control band limits.

2.7 Diesel Generator Governor oil level shall be checked Prior to, During and Following any diesel run. Acceptable oil levels are greater than the fill mark during standby conditions and visible in the sightglass while operating.

2.8 Prior to manually starting the diesel for other than emergency conditions, the engine should be barred over 2 revolutions and air rolled with the cylinder cocks open to insure the cylinders are clear unless the start is within 4 hours of the last engine shutdown. Roll the engine per Section 4.3 if required. The origin of any water detected in a cylinder must be determined and any cylinder head that leaks due to a crack shall be replaced.
(Ref. 7.21, 7.23)

2.8.1. Air rolls do not apply to any engine that has been removed from service after a run. However, the engine shall be rolled over with the airstart system at the time it is returned to service.

2.8.2. The OPERABLE engines are not required to be air-rolled if the plant is already in an Action Statement of Technical Specification 3.8.1 and 3.8.2.

2.9 Ensure that the rear air system is available prior to attempting any Barring / Air Rolling of a Diesel generator. The barring device and Air Roll function is supplied from rear air only.

2.10 Parallel the Diesel Generator to the Standby Bus with the synchroscope rotating slowly in the "fast" (clockwise) direction. Do not attempt to close a diesel generator output breaker with the synchroscope indicator standing still, if there is power available to the bus from another source.

2.11 If the diesel is run for one hour or greater, check and drain from the day tank any accumulated water via EGF-V11(V41), DAY TANK TK2A(2B) DRAIN.

2.12 Lube oil must be added only through the fill connection on the sump. Do not overfill the sump.

2.13 If EGS-EG1A(B), STBY DIESEL GENERATOR A(B) is declared inoperable, refer to Technical Specification 3.8.1 and 3.8.2.

2.14 Never have 2 synchroscopes in the same division on at the same time.

2.15 If the diesel generator is paralleled with the standby bus normal or alternate breaker and a LOCA signal occurs, the diesel generator output breaker will open. The diesel generator breaker can not be closed as long as bus voltage is being supplied by the normal or alternate supply and the LOCA signal still exists.

2.16 Sustained operation of the engine at critical speeds of 190, 285, 350 and 415 RPM should be avoided. (Ref. 7.19)

2.17 If a diesel start signal is activated while the diesel is not available, the signal will remain sealed in. If the diesel is then made available, the diesel engine will auto start. To prevent this, if Control air pressure is greater than 45 psig then Section 6.5.2 must be performed. If pressure is less than 45 psig, then the EMERGENCY START RESET switch on H13-P877 must be depressed before returning the diesel to Operational.

2.18 During a Station Blackout with the Div. 1 or 2 Diesel Generator failing to deliver power to their respective buses due to a malfunction of the Excitation System, (when diesel engine has attained rated speed) the Field Flashing of the failed D/G should be secured to conserve the battery, and to prevent heating the excitation cabinet.

2.19 Short duration runs and light load (less than 40%, or 1200 kW) operation should be avoided. After a period of light load or no-load run, the diesel should be loaded to greater than or equal to 2700 kW, for a time period as specified below:

2.19.1. At least one hour, if the engine was run at less than 1200 kW for greater than 30 minutes but less than one hour, <u>OR</u>

2.19.2. At least two hours, if the engine was run at less than 1200 kW for equal to or greater than one hour but less than 12 hours, <u>OR</u>

2.19.3. At least four hours, if the engine was run at less than 1200 kW for 12 hours or longer. (Ref. 7.22; CR-RBS-2004-3156)

2.20 To minimize crankshaft torsional stresses, continuous engine operation at critical speeds shall <u>not</u> be allowed. Minimize the time the engine is operated between 453 and 457 RPM (60.4 to 60.9 Hz). (Ref. 7.19)

2.21 Engine cylinder exhaust gas temperature should be within 75°F of the average for all cylinders. Any cylinder temperature exceeding this limit should be investigated by maintenance.

2.22 Prelube of the engine should be performed before all non-emergency starts.

2.23 Per System Engineering the following conditions should be used to determine if a 24 hour warm up is required to allow the engine mass and crankshaft temperatures to equalize, prior to any normal Diesel Generator start:

2.23.1. When after re-energizing the Lube Oil or Jacket Water Heaters from a de-energized state, the Lube Oil and Jacket Water outlet temperatures are greater than 140°F and 115°F respectively with less than or equal to a 40°F differential a 24 hour warm up is <u>not</u> required prior to any normal start. This temperature criteria should be used for Diesel Generator outages of 3 days or less.

2.23.2. If the engine block has been allowed to cool to ambient temperature, such as for maintenance with the heaters de-energized for more than 3 days, a 24 hour warm up is required with the Lube Oil Circulating Pump, Jacket Water Circulating Pump, and associated heaters operating prior to any normal start.

2.23.3. If necessary contact the System Engineer for guidance in determination of temperature criteria.

2.23.4. Use of Section 4.4, Warming Up the Diesel Post Maintenance should be minimized. Warming up by slow start and controlled slow loading is intended for situations where insufficient time is available to allow the heater to warm the system, and an expedited return to service is critical due to plant conditions or shutdown LCO status. Although EC 5759 was written for schedule preservation, and the method poses very little risk (maybe slightly more wear and tear on the Diesel over the long term), this method should <u>not</u> be made a matter of routine. Operations management or Duty Manager should approve use of Section 4.4.

2.24 Anytime work is done on the fuel oil day tank level instrumentation, the control switch for the fuel oil transfer pump must be placed in "OFF" to preclude pumping fuel oil to the roof.

2.25 If the forward starting subsystem DC control power is lost, the diesel engine will still be able to start, but there will be <u>NO</u> tripping capability.

2.26 If the diesel is started automatically on a LOCA, all automatic shutdowns are bypassed except overspeed and generator differential. The reinstatement of all trips following an automatic start requires the following:

2.26.1. DIV 2 -Depress the RHR DIV 2 INITIATION RESET pushbutton (H13-P601 INSERT 17B).

DIV 1 - Depress the LPCS/RHR DIV 1 INITIATION RESET pushbutton (H13-P601 INSERT 21B)

2.27 If the diesel is started automatically on a Loss of Power (LOP) or manually started using either of the STBY DIESEL ENGINE EMERGENCY START pushbuttons, all automatic shutdowns are bypassed except overspeed, generator differential, jacket water out high temperature, and lube oil out high temperature. The reinstatement of all trips following an above described start requires the following:

2.27.1. <u>LOP</u> - Depress STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton.

2.27.2. <u>REMOTE MANUAL EMERGENCY START</u>(CR) - Depress STBY DIESEL ENGINE A(B) EMERGENCY START RESET.

2.27.3. <u>LOCAL PANEL MANUAL EMERGENCY PB</u> - Diesel must be shutdown.

2.27.4. <u>(LOCAL, EGS-PNL4A)</u> for LOP

2.28 The EXCITATION SHUTDOWN RESET pushbutton should only be used on a loss of excitation with the engine still running. The excitation shutdown will normally auto-reset when the engine is stopped.

2.29 The FIELD FLASHING RELAY READY white light will be energized when the K1 relay is in the reset (closed) position and the DG is not at voltage. It will deenergize when K1 is in the exciter shutdown position, the voltage relay contacts open (DG at voltage), or when the pressure switches are closed (DG at speed).

2.30 The FIELD FLASHING RELAY READY white light should be verified to be energized after any Exciter Shutdown Reset operation or any time the DG is placed in a Standby lineup.

2.31 Operating data pertaining to all diesel generator start attempts shall be obtained per PEP-0026, Diesel Generator Operating Logs.

2.32 Visual daily inspection between adjacent cylinder heads and the general block top are required during any period of continuous operation following automatic diesel generator startup. (L/C 3.3).

2.33 Whenever the Diesel is being shutdown, adjust Generator frequency to 59.7 Hz after the Generator output breaker has been opened, prior to stopping the engine. (Ref. 7.19)

2.34 Before the 12 hour air roll after an engine run, drain any liquid from the Turbo Charger Casing Drain per PEP-0026.

2.35 When the diesel is running in parallel with the grid, a fault on the grid could cause a loss of the bus associated with the diesel concurrent with a trip/lockout of the diesel. To reduce the chances of this occurring, time spent with the diesel paralleled to the grid should be minimized. (Ref. 7.11)

2.36 Duplex lube oil and fuel oil filters and strainers should be swapped while the engine is running, if at all possible. It may be loaded or unloaded, isochronous or synchronous with the grid. System pressures should be checked after the swap. If it is necessary to swap a duplex filter or strainer while shut down, the engine should be started in test mode (normal start) and run long enough to check that pressures are normal.

2.37 During diesel fuel oil unloading, a fire watch shall be stationed at the unloading area and two (2) 150 pound dry chemical extinguishers placed near unloading area. (Ref. 7.17)

2.38 EGS-EG1A(B), STBY DIESEL GENERATOR A(B) shall not be run in parallel with the Main Generator through STX-XNS1C, NORM STA XFMR. (Ref. 7.15)

2.39 Failing to de-energize control power to the K1 relay prior to depressurizing D/G control air will result in the inability of the K1 relay to auto reset when control air is restored. The K1 relay must be manually reset if this condition occurs. Control air should be restored prior to reenergizing control power to the K1 relay. (Ref. 7.36)

2.40 If desired, EGS-EG1A(B), STBY DIESEL GENERATOR A(B) may be started and run using only one air receiver tank. (Ref. TSI-015)

2.41 EGA-C4A (C5A)(C4B)(C5B) will not operate in AUTO if its associated start air receiver pressure is less than 30 psig. Placing the control switch to RUN will allow the compressor to start. This should only be used for initial startups and repressurizing. DO NOT repressurize the air receiver should pressure fall to less than 25 psig while the diesel generator is loaded, this could cause a trip or uncontrolled loading of the diesel generator.

2.42 When operating in the NORMAL mode, if a TRIP annunciator(s) should come in, and the diesel does not trip, immediately check the amber UNIT TRIPPED light. If the UNIT TRIPPED light is ON, STOP the diesel. If the light is OFF, evaluate the annunciator(s) via other instrumentation. If the trip condition does NOT exist or can not be verified, attempt to RESET the annunciators(s). If the alarm can not be reset and the diesel has run for 2 minutes, manually stop the diesel. (Ref. 7.12)

2.43 The diesel generator will continue to run without control air pressure in emergency conditions. Upon complete loss of Control air pressure, it should not be restored until the diesel is shutdown.

2.44 If the diesel is paralleled with the grid and a Ground Fault Trip/Lockout occurs, the diesel will not Auto start on an Emergency Auto signal. Refer to Section 4.7. (Ref. 7.13)

2.45 When operating the diesel generator at reduced loads, care should be exercised to avoid reverse power trips.

2.46 While in MODES 1, 2 & 3 placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. STP-000-0102, Power Distribution Alignment Check shall be performed within 1 hour unless the diesel is restored to OPERABLE status in less than 1 hour. (Ref. 7.29)

2.47 During movement of recently irradiated fuel assemblies in the Primary Containment or Fuel Building AND while in Modes 4 and 5, placing an operable Diesel Generator into MAINTENANCE mode causes the Diesel Generator to be inoperable. Tech Spec 3.8.2, AC Sources - Shutdown, shall be immediately referred to and the action requirements complied with. (Ref. 7.29)

2.48 Non-essential 125 VDC controls are fed from the BYS batteries. The BYS battery chargers are lost on a LOCA or LOP. Use AOP-0014, Loss of 125 VDC for what is lost if the BYS batteries are not available. Safety-related control functions are not affected.

2.49 Non-essential 120 VAC controls are fed from SCA-PNL15A1(B1). In the event of a LOP, EGS-TI64A(B), multi-point (Doric) temperature indicator will be lost. Therefore upon loss of this indicator the operator should use local thermometer readings. Refer to Attachment 5, Engine Parameters for alternate indications. Safety-related control functions are not affected.

2.50 Loss of FORWARD DC power prevents the following indicator lights from coming on:

- UNIT AVAIL EMERGENCY STATUS
- DC CONTROL POWER ON
- UNIT TRIPPED
- READY TO LOAD

2.51 The electric signal that actuates the Maintenance mode is momentary. MAINTENANCE mode is retained by a self-sealing pilot on pneumatic control valve EGS-PNL3A(B)-P2. There is no electrical seal-in. The RETURN TO OPERATIONAL signal energizes a solenoid valve, which opens a vent path to break this pneumatic seal-in, and P-2 defaults to the OPERATIONAL position. If while in MAINTENANCE mode, the control panel is depressurized, the P-2 self seal-in is lost, and the control system will come up in the OPERATIONAL mode when pressure is restored.

2.52 While running in the test mode, any manual EMERGENCY START signal will activate the governor and voltage regulator pre-position circuits which return the frequency to near 59.7 Hz and voltage to near 4160 v. The output breaker is <u>not</u> signaled to trip. If the DG happens to be synchronous and loaded, the net affect will be a loss of kw and kvar, over a 6 to 10 second period.

2.53 The Diesel Engine oil sump level dip stick indications are as follows:

STANDBY (Diesel Generator <u>not</u> running with keep warm oil pumps running):

- Maintain the oil sump level greater than or equal to the T7 Mark per Tech Spec 3.8.3 and less than or equal to the FULL Mark.
- As long as the oil level is maintained greater than the LOW STBY mark, the Diesel is capable of safely starting and running if required for an emergency.

RUNNING:

- Maintain oil sump level greater than or equal to the LOW RUN Mark.
- The T6 and T7 Marks are <u>not</u> used for oil sump level when the diesel is running.

C 2.54 Special requirements for restoring from Diesel Engine Maintenance/Tagouts:

- If the engine fuel oil system has been tagged out and drained for maintenance, the fuel oil lines shall be refilled by manually operating the DC Fuel Oil Pump for 1 to 2 minutes. This should be done promptly after releasing the tagout to ensure the lines are full before any diesel starts.

2.55 When ENS-SWG1A or B is deenergized such as during a bus outage, the undervoltage relays generate a Loss of Power (LOP) signal to start the associated Standby Diesel Generator. If the diesel is tagged out, the LOP signal will seal in and can go undetected until the tagout is cleared. Therefore, to prevent an auto start of the diesel upon diesel restoration, prior to restoring the diesel, relays R3A and R3B in the side panels at EGS-PNL3A(B) should be checked to ensure that the LOP start is not present. The relay is tripped if the red button in the middle of the relay is not flush (recessed) with the case. Refer to Section 6.5 of this procedure to reset the relays. (Ref. 7.37)

2.56 When reviewing this procedure for pending operations or system configuration realignments, ensure vulnerabilities to common cause and common mode failures are evaluated for current plant conditions to protect safety sources and safety trains. (SOER 03-1 Recommendation 2 Emergency Power Reliability)(Ref. 7.41)

2.57 When the Diesel is operating synchronized to the grid, the diesel generator shall be declared inoperable. This is because if a Loss Offsite Power were to occur during operations when synchronized to the grid the resultant operations with the diesel powering the Div I(II) bus will cause the diesel frequency to be outside TS 3.8.1.2 and 3.8.1.7 frequency limits. (Ref 7.39)

2.58 Starting 4.16kV and certain 480VAC loads while the DG is parallel to off-site power can result in the diesel output breaker tripping on overload condition (Ref. 7.42).

2.58.1. To prevent exceeding the maximum load rating of 3130kW when EGS-EG1A is paralleled to the off-site power supply, manual start of equipment on the following switchgears should not be permitted:

- ENS-SWG1A
- EJS-SWG1A
- EJS-SWG2A

Additionally if NNS-SWG1A is being powered from RTX-XSR1C, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1A
- NNS-SWG4A (and NNS-SWG4B if cross-tied)

Additionally if NNS-SWG1C is being powered from NNS-SWG1A AND NNS-SWG1A is being powered from RTX-XSR1C, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1C
- E22-S004

Auto start of 4.16kV loads during parallel load testing may result in overload of EGS-EG1A or trip of ENS-ACB07, STBY D/G A OUTPUT BRKR.

2.58.2. To prevent exceeding the maximum load rating of 3130kW when EGS-EG1B is paralleled to the off-site power supply, manual start of equipment on the following switchgears should not be permitted:

- ENS-SWG1B
- EJS-SWG1B
- EJS-SWG2B

Additionally if NNS-SWG1B is being powered from RTX-XSR1D, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1B
- NNS-SWG4B (and NNS-SWG4A if cross-tied)

Additionally if NNS-SWG1C is being powered from NNS-SWG1B AND NNS-SWG1B is being powered from RTX-XSR1D, manual start of equipment on the following switchgears should not be permitted:

- NNS-SWG1C
- E22-S004

Auto start of 4.16kV loads during parallel load testing may result in overload of EGS-EG1B or trip of ENS-ACB27, STBY D/G B OUTPUT BRKR.

2.59 The GERB viscous damper is not required for operability of the Div I or Div II Diesel Generator. Issues with the GERB should be identified and reported via the Condition Report process. (Ref. 7.43)

2.60 Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.

2.61 If the lube oil keep warm pump fails and the jacket water keep warm system is in service, the engine is required to be air rolled every 12 hours in order to maintain operability when the lube oil temperature is above 40°F. (Reference CR-RBS-2013-7535)

3 **PREREQUISITES**

3.1 The Fire Protection Water System to the Standby Diesel Generator EGS-EG1A(B) Room is in service per SOP-0037, Fire Protection Water System Operating Procedure.

3.2 The Makeup Water System is available for makeup to the Jacket Water Standpipe per SOP-0099, Makeup Water System.

3.3 The Normal Service Water System is operating per SOP-0018, Normal Service Water.

3.4 The Standby Service Water System is operable per SOP-0042, Standby Service Water System.

3.5 The following electrical systems are operable:

3.5.1. 4160VAC per SOP-0046, 4.16 KV System (except on loss of power start)

3.5.2. 480VAC per SOP-0047, 480 VAC System

3.5.3. 120VAC per SOP-0048, 120 VAC System

3.5.4. 125VDC per SOP-0049, 125 VDC System

3.6 Diesel Generator Building HVAC in operation per SOP-0061, Diesel Generator Building Ventilation.

3.7 Obtain copy of PEP-0026, Diesel Generator Operating Logs for use in all start attempts.

3.8 The Instrument Air System is operable per SOP-0022, Instrument Air System.

4 SYSTEM STARTUP

4.1 Placing EGS-EG1A(B), STBY DIESEL GENERATOR A(B) in Standby

4.1.1. On Panel EGS-PNL3A(B), ENGINE CONTROL PANEL OR EHS-MCC15A(B), position the following switches in OFF:

1. GENERATOR SPACE HEATER EGS-EG1A(B)H
2. EGA-C4A(B) REAR START AIR COMPRESSOR
3. EGA-C5A(B) FORWARD START AIR COMPRESSOR
4. LUBE OIL CIRC. PUMP AND HEATER EGO-P1A(B), H1A(B)
5. JACKET WATER CIRC. PUMP & HEATER EGT-P1A(B), H1A(B)
6. FUEL OIL TRANSFER PUMP EGF-P1A(B)
7. DC FUEL OIL BOOSTER PUMP EGF-P2A(B)

4.1.2. Perform Attachment 1A(B) Valve Lineup.

4.1.3. Perform Attachment 2A(B) Instrument and Valve Lineup.

4.1.4. Perform Attachment 3A(B) Electrical Lineup.

4.1.5. Perform Attachment 4A(B) Control Board Lineup.

4.1.6. Verify that the Lube Oil Sump level is greater than T7 Mark as indicated on the engine dipstick. Add oil as needed.

4.1.7. Verify Jacket Water Standpipe level is 146 to 170 as indicated on local level indicator EGT-LI24A(B), JACKET WATER STANDPIPE LEVEL.

1. IF jacket water makeup is required, THEN Go To Section 5.15.

NOTE

It is permissible to start warming the jacket water system before warming the lube oil system, provided Maintenance has filled the lube oil cooler with oil. (CR-RBS-2010-0017-001)

4.1.8. Begin warming the diesel by performing the following steps:

- Begin warming lube oil to between 140°F and 170°F by placing the EGO-P1A(B), H1A(B), LUBE OIL CIRC. PUMP AND HEATER switch on EGS-PNL3A(B) to AUTO. Observe lube oil inlet and outlet temperature on the Trendicator. Verify the amber AUTO light comes ON.

- Begin warming jacket water to between 115°F and 160°F by placing the EGT-P1A(B), H1A(B), JACKET WATER CIRC. PUMP & HEATER switch on EGS-PNL3A(B) to AUTO, verifying the amber AUTO light comes ON. Monitor jacket water outlet temperatures on the Trendicator.

4.1.9. Verify proper oil level in EGA-C4A(C4B), REAR START AIR COMPRESSOR and EGA-C5A(C5B), FORWARD START AIR COMPRESSOR.

4.1.10. Start the compressors by placing EGA-C4A(C4B), REAR START AIR COMPRESSOR and EGA-C5A(C5B), FORWARD START AIR COMPRESSOR switches on EHS-MCC15A(B) to AUTO. Verify the compressors start and pressurize the air receivers to 250 psig as indicated on EGA-PIY26A(B), FWD START AIR PRESS and PIX26A(B), REAR START AIR PRESS. The compressors will cycle between 210 psig and 250 psig.

4.1.11. Check EGS-EG1A(B), STBY DIESEL GENERATOR A(B) fuel oil transfer system is in standby:

1. Verify one of the following discharge strainers is aligned for EGF-P1A(B):

   - For EGF-P1A, verify opened and locked for EGF-STR2A(D):

     - EGF-V122(V121)

     - EGF-V124(V123)

   - For EGF-P1B, verify opened and locked for EGF-STR2B(E):

     - EGF-V126(V125)

     - EGF-V128(V127)

2. On Panel EGS-PNL3A(B), fill the Fuel Oil Day Tank by placing EGF-P1A(B), FUEL OIL TRANSFER PUMP handswitch in AUTO. Monitor tank level on EGF-LIX16A(B), FUEL DAY TANK LEVEL Indicator.

4.1.12. At Panel EGS-PNL3A(B) perform the following:

1. Start EGF-P2A(B), DC FUEL OIL BOOSTER PUMP.

2. Verify fuel oil pressure indicates 30 to 40 psig on indicator EGF-PI27A(B).

3. WHEN the pump has run for 1 to 2 minutes, THEN place EGF-P2A(B), DC FUEL OIL BOOSTER PUMP handswitch to AUTO AND verify the amber AUTO light comes on.

4.1.13. Check EGS-EG1A(B), STBY DIESEL GENERATOR A(B) barring device disengaged and locked out.

4.1.14. At EGS-PNL2A(B), EGS-EG1A(B) PROTECTION, perform the following:

1. Reset the Gen Diff Trip Primary Protection 87G Relay.

2. Reset the PRIMARY TRIP CUTOFF and the BACK-UP TRIP CUTOFF switches. Verify the white lights above both are ON.

4.1.15. On the Engine Driven Fuel Oil Booster Pump, reset the Diesel Engine Overspeed Device by pressing the levers and verify they latch down.

4.1.16. On the engine governor, check the following:

- Governor oil level in spec per OSP-0028, LOG REPORT - NORMAL SWITCHGEAR, CONTROL, AND DIESEL GENERATOR BUILDINGS.
- Governor control settings set per OSP-0028, LOG REPORT - NORMAL SWITCHGEAR, CONTROL, AND DIESEL GENERATOR BUILDINGS unless otherwise directed.

4.1.17. On Panel H13-P877, depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton, and the STBY DIESEL ENGINE A(B) STOP RESET pushbutton.

NOTE

Steps 4.1.18 and 4.1.19 are performed to reset the DRU.

4.1.18. On EGS-PNL3A(B), depress both STOP pushbuttons.

4.1.19. WHEN at least 2 minutes has elapsed, THEN on EGS-PNL3A(B), depress the STOP RESET pushbutton.

4.1.20. Simultaneously depress the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and place the STBY DIESEL ENGINE A(B) MODE switch to OPER on H13-P877.

4.1.21. Verify the UNIT TRIPPED light on EGS-PNL3A(B) and the STBY DIESEL GENERATOR A(B) TRIPPED light on H13-P877 are OFF.

4.1.22. At EGS-PNL3A(B), verify the following lights are ON:

1. UNIT AVAIL EMERGENCY STATUS - White
2. AC CONTROL POWER ON - White
3. DC CONTROL POWER ON White
4. FORWARD START DC POWER White
5. REAR START DC POWER - White

4.1.23. At H13-P877, verify the STBY DIESEL GENERATOR A(B) AVAILABLE light is ON.

4.1.24. At Panel EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB. verify the FIELD FLASHING RELAY READY white light is on.

4.1.25. IF the FIELD FLASHING RELAY READY light is not on, THEN manually reset K1 relay EGE-CAB01A(B).

4.1.26. On the corner of the auxiliary skid near the Jacket Water Standpipe, verify the EGS-STOP/RUN VALVE is in the PULL-TO-RUN position.

4.1.27. At H13-P877, verify the following annunciators and status lights are reset:

1. DIESEL GENERATOR EGS-EG1A(B) SYSTEM TROUBLE (E-1)
2. DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE (E-2)
3. MAINT MODE LO SOL ENERGIZED (Status light)
4. TRIP UNIT IN CAL OR GR FAIL (Status light)

4.1.28. At panel EGS-PNL3A(B), verify all alarms required for diesel operation are reset.

4.1.29. Blowdown Rear and Forward Starting Air System as follows:

1. Unlock and open EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.

2. WHEN all condensate is removed, THEN close and lock EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.

3. Unlock and open EGA-V121(V143), FORWARD SUPPLY LINE DRIP LEG.

4. WHEN all condensate is removed, THEN close and lock EGA-V121(V143), FORWARD SUPPLY LINE DRIP LEG.

4.1.30. Drain turbocharger casing.

4.2 Placing EGS-EG1A(B), STBY DIESEL GENERATOR A(B) in Maintenance Mode

CAUTION

While in MODES 1, 2 & 3, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. STP-000-0102 shall be performed within 1 hour unless the diesel is restored to OPERABLE status in less than 1 hour. (Ref. 7.29)

During movement of recently irradiated fuel assemblies in the primary containment or fuel building AND while in Modes 4 and 5, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. Tech. Spec. 3.8.2 "AC SOURCES - SHUTDOWN" shall be immediately referred to and applicable ACTION requirements complied with. (Ref. 7.29)

NOTE

Sections 4.2.1 and 4.2.2 may be performed separately as required to place the diesel in MAINTENANCE and to return it to OPERATIONAL.

4.2.1. Place the diesel in MAINTENANCE mode by performing the following:

1. Establish communications between the control room and the local panel EGS-PNL3A(B), ENGINE CONTROL PANEL.

2. Place the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to MAINT, while simultaneously turning the keylock MAINT MODE SELECT switch on EGS-PNL3A(B) to the right.

3. Verify the Annunciator, P877-31A(B)-E02, DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE is in alarm.

4. Check Status Light P877-31A(B) MAINT MODE LO SOL ENRGZ is on.

4.2.2. WHEN the condition that required the diesel to be placed in the Maintenance Mode is no longer required, THEN perform the following:

1. Establish communications between the control room and the local panel EGS-PNL3A(B), ENGINE CONTROL PANEL.

2. Reset the DRU by performing the following:

   1) On EGS-PNL3A(B), depress both STOP pushbuttons.

   2) WHEN at least 2 minutes has elapsed, THEN on EGS-PNL3A(B), depress the STOP RESET pushbutton.

3. Return the diesel to Operational Mode by depressing the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) while simultaneously placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to the OPER position.

4. At H13-P877, verify the following:

   - The DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE alarm resets.

   - The MAINT MODE LO SOL ENRGZ status light goes off.

5. At Panel EGE-CAB01A(B), verify the FIELD FLASHING RELAY READY white light is lit.

4.3 Barring/Air Rolling Standby Diesel

4.3.1. Establish communications between the control room and the local panel EGS-PNL3A(B), ENGINE CONTROL PANEL.

CAUTION

Ensure that the rear air system is available prior to attempting any Barring / Air Rolling of a Diesel generator. The barring device and Air Roll function is supplied from rear air only.

4.3.2. Verify the diesel is in Maintenance Mode per Section 4.2.1.

4.3.3. Open the EGS-EG1A(B), STBY DIESEL GENERATOR A(B) cylinder cocks.

NOTE

If the Diesel Generator is being air rolled for the post run air roll of PEP-0026, Diesel Generator Operating Logs barring the engine with the barring device (Step 4.3.4) is not required.

4.3.4. Bar over the engine as follows:

1. Verify the barring device air hose is connected at EGA-V110(V132), REAR SUPPLY LINE DRIP LEG and barring device inlet valve.
2. Open DIV 1(2) DIESEL GENERATOR barring device inlet valve.

NOTE

The following step causes Annunciator EGS-PNL3A(B)-E03, BARRING DEVICE ENGAGED to alarm.

3. Unlock and engage the barring device.
4. Unlock and open EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.
5. Bar over the engine two revolutions and verify no liquid is expelled from the cylinder cocks.
6. Close the DIV 1(2) DIESEL GENERATOR barring device inlet valve.
7. Close and lock EGA-V110(V132), REAR SUPPLY LINE DRIP LEG.
8. Disengage and lockout the barring device.
9. Check Annunciator EGS-PNL3A(B) E03, BARRING DEVICE ENGAGED is clear.

NOTE

Before an air roll, after an engine run, drain any liquid from the turbine casing drain per PEP-0026.

4.3.5. Air roll the engine as follows:

1. Drain turbocharger casing if <u>not</u> performed per Step 4.1.30.

NOTE

When the engine is rolled, annunciators LUBE OIL TANK LEVEL LOW, LUBE OIL INLET TEMP LOW, LUBE OIL OUTLET TEMP LOW, JACKET WATER IN TEMP LOW, and JACKET WATER OUT TEMP LOW. These annunciators do <u>not</u> require immediate action.

2. At EGS-PNL3A(3B), depress and hold the ENGINE ROLL pushbutton until Tachometer EGS-SIY43A(B) on EGS-PNL1A(B) <u>OR</u> EGS-SIX43A(B) on EGS-PNL3A(B) reaches 50 RPM for approximately 5 seconds, then release the pushbutton. (Ref. 7.20)

3. Check the cylinder head test valves for fluid discharge. If any fluid is discharged, record an estimate of the quantity and cylinder number in the comments section of the PEP-0026, Diesel Generator Operating Logs for the diesel run.

4.3.6. Close the diesel cylinder cocks.

4.3.7. Return the diesel to Operational Mode per Section 4.2.2.

CAUTION

The warmup method in the following section poses the risk of slightly more wear and tear on the Diesel over the long term. This method should not be made a matter of routine. Operations management or Duty Manager approval is required to use this Section.

4.4 Warming Up the Diesel Post Maintenance

4.4.1. Verify that the Lube Oil Sump level is greater than T7 Mark as indicated on the engine dipstick. Add oil as needed.

4.4.2. Begin warming lube oil to between 140°F and 170°F by placing the EGO-P1A(B), H1A(B), LUBE OIL CIRC. PUMP AND HEATER switch on EGS-PNL3A(B) to AUTO. Observe lube oil inlet and outlet temperature on the Trendicator. Verify the amber AUTO light comes ON.

4.4.3. Verify Jacket Water Standpipe level is 146 to 170 as indicated on local level indicator EGT-LI24A(B), JACKET WATER STANDPIPE LEVEL.

4.4.4. IF jacket water makeup is required, THEN Go To Section 5.15.

4.4.5. Begin warming jacket water to between 115°F and 160°F by placing the EGT-P1A(B), H1A(B), JACKET WATER CIRC. PUMP & HEATER switch on EGS-PNL3A(B) to AUTO, verifying the amber AUTO light comes ON. Monitor jacket water outlet temperatures on the Trendicator.

NOTE

The following step is to distribute clean oil over the main bearing/crankshaft and wrist pin interfaces, helping to flush out any minute traces of water that were retained in the clearances due to capillary action.

4.4.6. Bar the Diesel at least one revolution per section 4.3 steps 4.3.1 through 4.3.4.

4.4.7. Allow the engine to warm to ALL of the following minimum temperature criteria:

- Jacket Water exiting the engine block is greater than or equal to 100°F, per EGS-TI64B Position 13

AND

- Lube Oil exiting the engine block is is greater than or equal to 100°F, per EGS-TI64B Position 11

AND

- The difference between these two parameters is less than 40°F

4.4.8. Prep engine for starting including Barring and Air Roll per Section 4.3.

NOTE

After synchronizing to the grid, the diesel should be loaded to 1000 kw for 15 minutes. After 15 minutes, the load should be increased to 2500 kw.

4.4.9. Slow start, load, and parallel the Standby Diesel per one of the following:

- IF operating diesel from the Control Room, THEN slow start, load and parallel the Standby Diesel per Steps 4.5.6 through 4.5.21.
- IF operating diesel from the Local Control Panel, THEN slow start, load and parallel the Standby Diesel per Steps 4.6.6 through 4.6.23.

4.4.10. Run the diesel for a total operating time under load of at least one hour.

4.4.11. Verify the lube oil outlet temperature exceeds 155°F.

4.4.12. Shut down the Standby Diesel per one of the following:

- IF operating diesel from the Control Room, THEN shut down the Standby Diesel per Section 6.1.
- IF operating diesel from the Control Room, THEN shut down the Standby Diesel per Section 6.2.

4.5 Non-Emergency Starting, Loading and Paralleling the Standby Diesel from the Control Room

NOTE

All controls and indications are on Panel H13-P877 unless otherwise stated.

4.5.1. Start the Diesel Generator Building Ventilation per SOP-0061, Diesel Generator Building Ventilation.

4.5.2. Verify the diesel is in STANDBY per Section 4.1 of this procedure, as required.

4.5.3. Bar or air roll the engine per Section 4.3 of this procedure, if required per Precaution 2.8.

NOTE

Normally both air banks will be used. Selecting only the forward OR rear air banks is acceptable to minimize diesel starts post maintenance.

4.5.4. IF starting the Div I diesel AND it is desired to only use one starting air supply, THEN perform one of the following steps to use the desired air system:

- IF desired to only use the forward starting air supply, THEN unlock and close EGA-V150, ENGINE REAR AIR START SUPPLY.
- IF desired to only use the rear starting air supply, THEN unlock and close EGA-V149, ENGINE FWD AIR START SUPPLY

4.5.5. IF starting the Div II diesel AND it is desired to only use one starting air supply, THEN perform one of the following steps to use the desired air system:

- IF desired to only use the forward starting air supply, THEN unlock and close EGA-V154, ENGINE REAR AIR START SUPPLY.
- IF desired to only use the rear starting air supply, THEN unlock and close EGA-V153, FWD AIR START SUPPLY VALVE

4.5.6. Open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF and wait 2 minutes before proceeding.

4.5.7. At EGS-PNL1A(B), select a phase to monitor the generator voltage by placing the GENERATOR VOLTS voltmeter switch in 1-2, 2-3, or 3-1.

CRITICAL STEP

4.5.8. At EGS-PNL3A(B), start the engine by depressing the NORMAL START pushbutton and check the following:

1) On EGS-PNL-1A(B) using EGS-SIY43A(B), ENGINE SPEED OR on EGS-PNL3A(B) using EGS-SIX43A(B), observe the engine ramp to 450 rpm.

2) At approximately 450 rpm, check GENERATOR VOLTS increase to a steady state value $\geq$ 3740 volts and $\leq$ 4368 volts, as indicated on ERIS point EGSEY001(EGSEY002).

3) Check GENERATOR FREQUENCY is $\geq$ 58.8 Hz and $\leq$ 60.2 Hz.

4.5.9. Verify the following parameters are in the indicated range:

NOTE

It may take several minutes for all parameters to stabilize. It is acceptable for Turbo Oil pressure and Fuel Oil pressure to be as high as 45 psig on initial start.

1. EGO-PI5A(B), LUBE OIL PRESS 50-65 psig.
2. EGO-PI10A(B), TURBO OIL PRESS 25-40 psig.
3. EGF-PI27A(B), FUEL OIL PRESSURE 25-40 psig.
4. EGF-PDI29A(B), FUEL OIL FILTER DIFF PRESS less than 5 psid.
5. EGO-PDI7A(B), LUBE OIL FILTER DIFF PRESS less than 20 psid.
6. EGT-PI4A(B), JACKET WATER PRESS 12-30 psig.

NOTE

Crankcase pressure will increase with load. Should not exceed 1" WC with exhaust fan running.

7. EGS-PI6A(B), CRANKCASE PRESS 0 - +3 in. WC.

4.5.10. Close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

4.5.11. Verify air start valves are fully closed by insuring the air start lines upstream of the valves are not hot to touch.

4.5.12. Perform the requirements of PEP-0026, Diesel Generator Operating Logs.

4.5.13. Verify the blue REMOTE SYNC SW OFF status light is on.

CAUTION

To avoid diesel engine crankshaft critical speed, continuous operation between 453 and 457 RPM (60.4 to 60.9 HZ) shall not be permitted. (Ref. 7.19)

4.5.14. Place the SYNCHRONIZING Control Switch to GEN.

4.5.15. Adjust Standby Diesel 1A(B) INCOMING VOLTAGE V-1IN-1SYDA(B)01 to about 1-2 volts above RUNNING VOLTAGE V-1RUN-1SYDA(B)01 using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT.

4.5.16. Adjust the STANDBY DIESEL EG1A(B) speed, using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL, so that the synchroscope is rotating slowly in the FAST, or clockwise, direction at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not attempt to close the ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR with the synchroscope standing still if power is available to the bus from another source.

After the diesel output breaker is closed, apply load to generator as soon as practical to prevent reverse power trip. (Ref. 7.24)

NOTE

Sync check instrumentation requires the output breaker switch to be held in the closed position until breaker closure or synchroscope needle passes through 12 o'clock.

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.*

CRITICAL STEP

4.5.17. WHEN the synchroscope indicator is moving slowly in the FAST direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR. Verify the red breaker closed light is on.

4.5.18. Raise generator load to approximately 175 KW using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL.

4.5.19. As soon as diesel generator minimum load has stabilized, place the SYNCHRONIZING Control Switch to OFF.

4.5.20. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		TIME
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

4.5.21. IF desired to load the diesel generator, THEN raise diesel generator LOAD with the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL and adjust VARS using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

4.5.22. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

NOTE

Perform Steps 4.5.23, 4.5.24, and 4.5.25 only if it is desired to separate ENS-SWG1A(B,) 4.16 KV STANDBY BUS from the grid.

4.5.23. Adjust diesel generator load while monitoring incoming feeder breaker amps. IF the normal supply breaker is closed, THEN on H13-P877 monitor A-1ENSA(B)07, NORM SUPPLY AMPS. IF the alternate supply breaker is closed, THEN on H13-P808, monitor A-1NNSJ(H)09, NNS-ACB13(05) SPLY AMPS.

NOTE

Since the diesel generator may be supplying load to the grid, it may be necessary to lower diesel generator load to cause the feeder breaker current to lower to 100 amps.

4.5.24. WHEN the bus incoming feeder breaker current is approximately 100 amps, THEN open the incoming feeder breaker.

4.5.25. Monitor and maintain Generator Frequency between 59.5 and 59.9 Hz and Generator Volts between 4110V and 4210V.

4.6 Non-Emergency Starting, Loading and Paralleling the Standby Diesel from the Local Control Panel

NOTE

All controls and indications are on Panels EGS-PNL3A(B) and EGS-PNL1A(B) unless otherwise stated.

4.6.1. Start the Diesel Generator Building Ventilation per SOP-0061, Diesel Generator Building Ventilation.

4.6.2. Verify the diesel is in STANDBY per Section 4.1 of this procedure, as required.

4.6.3. Bar or air roll the engine per Section 4.3 of this procedure, if required per Precaution 2.8.

NOTE

Normally both air banks will be used. Selecting only the forward OR rear air banks is acceptable to minimize diesel starts post maintenance.

4.6.4. IF starting the Div I diesel AND it is desired to only use one starting air supply, THEN perform one of the following steps to use the desired air system:

- IF desired to only use the forward starting air supply, THEN unlock and close EGA-V150, ENGINE REAR AIR START SUPPLY.
- IF desired to only use the rear starting air supply, THEN unlock and close EGA-V149, ENGINE FWD AIR START SUPPLY

4.6.5. IF starting the Div II diesel AND it is desired to only use one starting air supply, THEN perform one of the following steps to use the desired air system:

- IF desired to only use the forward starting air supply, THEN unlock and close EGA-V154, ENGINE REAR AIR START SUPPLY.
- IF desired to only use the rear starting air supply, THEN unlock and close EGA-V153, FWD AIR START SUPPLY VALVE

4.6.6. Open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF and wait 2 minutes before proceeding.

4.6.7. At EGS-PNL1A(B), select a phase to monitor the generator voltage by placing the GENERATOR VOLTS voltmeter switch in 1-2, 2-3, or 3-1.

CRITICAL STEP

4.6.8. At EGS-PNL3A(B), start the engine by depressing the NORMAL START pushbutton and check the following:

1) On EGS-PNL-1A(B) using EGS-SIY43A(B), ENGINE SPEED OR on EGS-PNL3A(B) using EGS-SIX43A(B), observe the engine ramp to 450 rpm.

2) At approximately 450 rpm, check GENERATOR VOLTS increase to a steady state value ≥ 3740 volts and ≤ 4368volts, as indicated on ERIS point EGSEY001(EGSEY002).

3) Check GENERATOR FREQUENCY is ≥ 58.8 Hz and ≤ 60.2 Hz.

4.6.9. Verify the following parameters are in the indicated range:

NOTE

It may take several minutes for all parameters to stabilize. It is acceptable for Turbo Oil pressure and Fuel Oil pressure to be as high as 45 psig on initial start.

1. EGO-PI5A(B), LUBE OIL PRESS 50-65 psig.
2. EGO-PI10A(B), TURBO OIL PRESS 25-40 psig.
3. EGF-PI27A(B), FUEL OIL PRESSURE 25-40 psig.
4. EGF-PDI29A(B), FUEL OIL FILTER DIFF PRESS less than 5 psid.
5. EGO-PDI7A(B), LUBE OIL FILTER DIFF PRESS less than 20 psid.
6. EGT-PI4A(B), JACKET WATER PRESS 12-30 psig.

NOTE

Crankcase pressure will increase with load. Should not exceed 1" WC with exhaust fan running.

7. EGS-PI6A(B), CRANKCASE PRESS 0 - +3 in. WC.

4.6.10. Close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

4.6.11. Verify air start valves are fully closed by insuring the air start lines upstream of the valves are not hot to touch.

4.6.12. Perform the requirements of PEP-0026, Diesel Generator Operating Logs.

4.6.13. IF an unloaded run is being performed AND the unloaded run will be less than 30 minutes, THEN Go To Section 6.2 Step 6.2.3 to shutdown the Diesel Generator.

4.6.14. Select the phase of bus and generator voltage to be monitored on the BUS VOLTS and GENERATOR VOLTS voltmeters.

4.6.15. Verify the blue REMOTE SYNCHRONIZING SELECTOR SWITCH OFF light is ON.

CAUTION

To avoid diesel engine crankshaft critical speed, continuous operation between 453 and 457 RPM (60.4 to 60.9 HZ) shall not be permitted. (Ref. 7.19)

4.6.16. Place the SYNCHRONIZING CONTROL to GEN.

4.6.17. Adjust STANDBY DIESEL EG1A(B) INCOMING VOLTS to about 1-2 volts above RUNNING VOLTS using the VOLTAGE REGULATOR CONTROL.

4.6.18. Adjust the STANDBY DIESEL EG1A(B) speed, using the GOVERNOR CONTROL, so that the synchroscope is rotating slowly in the FAST, or clockwise, direction at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not attempt to close the GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) with the synchroscope standing still if power is available to the bus from another source.

After the diesel output breaker is closed, apply load to generator as soon as practical to prevent reverse power trip. (Ref. 7.24)

NOTE

Sync check instrumentation requires the output breaker switch to be held in the closed position until breaker closure or synchroscope needle passes through 12 o'clock.

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) Breaker is manipulated.*

CRITICAL STEP

4.6.19. WHEN the synchroscope indicator is moving slowly in the FAST direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close the GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B). Verify the red breaker closed light is on.

4.6.20. Raise generator load to approximately 175 KW using the GOVERNOR CONTROL.

4.6.21. As soon as diesel generator minimum load has stabilized, place the SYNCHRONIZING CONTROL to OFF.

4.6.22. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		TIME
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

4.6.23. IF desired to load the diesel generator, THEN raise diesel generator load with the GOVERNOR CONTROL and adjust VARS using the VOLTAGE REGULATOR CONTROL. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

4.6.24. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

NOTE

Perform Steps 4.6.25, 4.6.26, and 4.6.27 only if it is desired to separate ENS-SWG1A(B,) 4.16 KV STANDBY BUS from the grid.

4.6.25. Adjust diesel generator load while monitoring incoming feeder breaker amps. IF the normal supply breaker is closed, THEN on H13-P877 monitor A-1ENSA(B)07, NORM SUPPLY AMPS. IF the alternate supply breaker is closed, THEN on H13-P808, monitor A-1NNSJ(H)09, NNS-ACB13(05) SPLY AMPS.

NOTE

Since the diesel generator may be supplying load to the grid, it may be necessary to lower diesel generator load to cause the feeder breaker current to lower to 100 amps.

4.6.26. WHEN the bus incoming feeder breaker current is approximately 100 amps, THEN open the incoming feeder breaker.

4.6.27. Monitor and maintain Generator Frequency between 59.5 and 59.9 Hz and Generator Volts between 4110V and 4210V.

4.7 Manual Start of Standby Diesel with an Automatic Start Signal Present

4.7.1. Verify a valid LOCA or Undervoltage start signal exists.

4.7.2. IF the diesel generator tripped and locked out on ground fault while running parallel to the grid AND it is determined that the tripped diesel is required to mitigate the consequences of a loss of power accident, THEN the following steps should be taken in the order listed:

CAUTION

If an emergency start signal (such as LOCA or LOP) is sealed in, performance of these steps will cause the affected diesel generator to automatically start.

1. On EGS-PNL2A(B), EGS-EG1A(B) PROTECTION, RESET the GROUND FAULT relay.

2. On EGS-PNL2A(B), RESET the BACK-UP PROTECTION TRIP AND LOCKOUT relay.

3. Close GENERATOR EGS-EG1A(B) NEUTRAL BREAKER from EGS-PNL1A(B), STBY DIESEL GEN PNL or locally.

4. On Panel EGS-PNL3A(B), ENGINE CONTROL PANEL depress the STOP RESET pushbutton.

5. On EGS-PNL1A(B),STBY DSL GEN PNL depress the EXCITATION SHUTDOWN RESET pushbutton.

6. At Panel EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB. verify the FIELD FLASHING RELAY READY white light is on.

   1) IF the FIELD FLASHING RELAY READY light is not on, THEN manually reset K1 relay EGE-CAB01A(B).

4.7.3. Attempt to manually start EGS-EG1A(B), STBY DIESEL GENERATOR A(B) by depressing the EMERGENCY START pushbutton on EGS-PNL3A(B), or the STBY DIESEL ENGINE A(B) EMERGENCY START pushbutton on H13-P877.

4.7.4. IF EGS-EG1A(B), STBY DIESEL GENERATOR A(B) will not start, THEN observe any annunciators on H13-P877 or EGS-PNL3A(B) which might indicate the cause.

1. Verify starting air pressure is greater than 120 psig, and that the diesel is in the OPERATIONAL mode.

2. If necessary, Refer To Section 4.1 and verify the diesel generator is in STANDBY.

CAUTION

While in MODES 1, 2 & 3, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. STP-000-0102 shall be performed within 1 hour unless the diesel is restored to OPERABLE status in less than 1 hour. (Ref. 7.29)

During movement of recently irradiated fuel assemblies in the primary containment or fuel building AND while in Modes 4 and 5, placing an OPERABLE Emergency Diesel Generator into 'MAINTENANCE' mode causes the diesel to be INOPERABLE. Tech. Spec. 3.8.2 "AC SOURCES - SHUTDOWN" shall be immediately referred to and applicable ACTION requirements complied with. (Ref. 7.29)

4.7.5. IF the diesel will not immediately start, THEN place the diesel in MAINTENANCE mode by simultaneously placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to MAINT, while turning the keylock MAINT MODE SELECT switch on EGS-PNL3A(B) to the right.

4.7.6. At H13-P877, verify the following:

- The DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE annunciator alarms.
- The MAINT MODE LO SOL ENRGZ status light comes on.

4.7.7. Attempt to determine the cause for the fail to start.

4.7.8. IF power has been lost to EGO-P1A(B), LUBE OIL CIRC PUMP for over 12 hours AND the diesel generator has not been run in 12 hours, THEN air roll or bar the engine per Section 4.3 of this procedure.

4.7.9. IF ENS-SWG1A(B), STANDBY BUS is deenergized, OR if a LOCA exists, but not both, THEN perform the following steps:

1. Allow the diesel to automatically start by simultaneously depressing the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to the OPER position.
2. Verify all diesel parameters are normal during the start and initial operation.
3. Verify ENS-SWG1A(B), STANDBY BUS is energized by the diesel generator, normal, or alternate supply.
4. IF the Diesel Generator is the only supply to the bus, THEN Go To Section 5.16, while continuing with this section.

5. Perform fill and vent operations on the affected ECCS systems as needed.

4.7.10. IF ENS-SWG1A(B), STANDBY BUS is de-energized AND a LOCA signal is present, THEN perform the following steps:

1. Defeat the automatic start of the ECCS pumps supplied by the affected diesel by opening the following appropriate breakers:

   - LPCS Pump ENB-PNL02A - CB14, (H13-P629 LPCS PWR SUPPLY RELAYS & ISOLATORS)
   - RHR A Pump ENB-PNL02A - CB13, (H13-P629 RHR ISOLATOR CIRCUIT)
   - RHR B & C Pump ENB-PNL02B - CB10, (H13-P618 RHR PANEL ISOLATOR CKT)

2. Allow the diesel generator to auto start by simultaneously depressing the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and placing the STBY DIESEL ENGINE A(B) MODE switch on H13-P877 to the OPER position.

3. Verify ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR closes to energize ENS-SWG1A(B), STANDBY BUS.

4. Verify all diesel parameters are normal.

5. Perform fill and vent operations on the affected ECCS Systems as needed.

CRITICAL STEP

6. Close the appropriate DC breakers that were opened in Step 4.7.10.1 above. If a LOCA signal is still present, the ECCS System will initiate:

   - LPCS Pump ENB-PNL02A - CB14
   - RHR A Pump ENB-PNL02A - CB13
   - RHR B & C Pump ENB-PNL02B - CB10

7. Verify the affected ECCS Systems initiate. Refer To SOP-0031, Residual Heat Removal for RHR and/or SOP-0032, Low Pressure Core Spray for LPCS.

8. IF the Diesel Generator is the only supply to the bus, THEN Go To Section 5.16.

5 **SYSTEM OPERATION**

5.1 Paralleling an Offsite Power Source to the Standby Diesel from the Control Room

NOTE

The following controls and indications are located on Panel H13-P877 unless otherwise stated.

5.1.1. IF ENS-ACB06(26), NORMAL SUPPLY BRKR is to be closed, THEN place the REMOTE SYNC SW to NORM.

5.1.2. IF ENS-ACB04(24), ALTERNATE SUPPLY BRKR is to be closed, THEN place the REMOTE SYNC SW to ALTN.

5.1.3. Adjust diesel voltage, as observed on V-1RUN-1SYDA(B)01, RUNNING VOLTAGE to approximately 1- 2 volts above V-1IN-1SYDA(B)01, INCOMING VOLTAGE using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT.

5.1.4. Adjust diesel speed, using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL, to bring the frequency within the range of grid frequency. Adjust speed so the SY-1-SYDA(B)01, STBY BUS A(B) SYNCHROSCOPE indicator is rotating slowly in the SLOW direction (counterclockwise) at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not close the Normal or Alternate bus feeder breaker with the synchroscope indicator standing still if the bus is being supplied by the EGS-EG1A(B), STANDBY DIESEL GENERATOR.

When synchronizing the D/G and its connected loads back to offsite power, it is possible for the D/G to unload at a rapid rate as soon as the preferred source breaker is closed. This is due to the governor changing to the droop mode. If this occurs, immediately raise the load back to the desired value using the governor control switch.

CRITICAL STEP

5.1.5. WHEN the synchroscope indicator is moving slowly in the SLOW direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close the desired feeder breaker, ENS-ACB06(26), NORMAL SUPPLY BRKR or ENS-ACB04(24), ALTERNATE SUPPLY BRKR. Verify the red breaker closed light comes ON. If not, return the breaker handswitch to TRIP.

5.1.6. As soon as diesel load has stabilized, return the REMOTE SYNC SW to OFF.

5.1.7. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

5.1.8. IF desired to load the Diesel Generator, THEN perform the following:

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		**TIME**
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

1. Raise diesel generator load with the GOVERNOR CONTROL and adjust VARS using the VOLTAGE REGULATOR CONTROL. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

2. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

5.1.9. WHEN desired, THEN shutdown the Standby Diesel Generator per Section 6.1 or 6.2 of this procedure.

5.2 Paralleling an Offsite Power Source to the Standby Diesel from the Local Control Panel

NOTE

The following controls and indications are on Panels EGS-PNL01A(B) and EGS-PNL03A(B) unless otherwise stated.

5.2.1. Verify the blue REMOTE SYNCHRONIZING SELECTOR SWITCH OFF light is on.

5.2.2. IF the NORMAL SPLY TO STBY BUS ENS-SWG1A(B) is to be closed, THEN place the SYNCHRONIZING CONTROL to NORM.

5.2.3. IF the ALTERNATE SPLY TO STBY BUS ENS-SWG1A(B) is to be closed, THEN place the SYNCHRONIZING CONTROL to ALTN.

5.2.4. Select the phase of bus voltage to be monitor on the BUS VOLT voltmeter.

5.2.5. Adjust diesel generator voltage, as observed on RUNNING VOLTS, to approximately 1-2 volts above INCOMING VOLTS using the VOLTAGE REGULATOR CONTROL.

5.2.6. Adjust diesel generator speed to bring the frequency within the range of grid frequency using the GOVERNOR CONTROL. Adjust speed so the SYNCHROSCOPE indicator is rotating slowly in the SLOW direction (counterclockwise) at a rate of one revolution in greater than or equal to 4 seconds and less than or equal to 6 seconds.

CAUTION

Do not close either a normal or alternate power source breaker with the synchroscope indicator standing still, if the bus is being powered from the diesel generator.

When synchronizing the D/G and its connected loads back to offsite power, it is possible for the D/G to unload at a rapid rate as soon as the preferred source breaker is closed. This is due to the governor changing to the droop mode. If this occurs, immediately raise the load back to the desired value using the governor control switch.

NOTE

Sync check instrumentation requires the output breaker switch to be held in the closed position until breaker closure or synchroscope needle passes through 12 o'clock.

CRITICAL STEP

5.2.7. WHEN the synchroscope indicator is moving slowly in the SLOW direction AND the synchroscope indicator is 5 minutes to 2 minutes before the 12 o'clock position, THEN close the appropriate breaker, with the NORMAL SPLY TO STBY BUS ENS-SWG1A(B) or the ALTERNATE SPLY TO STBY BUS ENS-SWG1A(B). Verify the red breaker closed lights comes on. If not, return the breaker handswitch to TRIP.

5.2.8. As soon as diesel generator minimum load has stabilized, return the SYNCHRONIZING CONTROL to OFF.

5.2.9. WHEN the diesel is operating synchronized to the grid, THEN declare the Diesel Generator inoperable. (Ref 7.39)

5.2.10. IF desired to load the Diesel Generator, THEN perform the following:

NOTES

When raising load, lead with load and follow with VARS.

Generator loading should be done in greater than 150 seconds to minimize mechanical stress and wear on the diesel generator.

The following table is provided as a recommendation for loading limitation. KW and KVAR values listed are approximate values only.

While D/G load is at 2000 KW, PEP-0026 data collection is required.

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrument calibration.

ERIS point EGSEY007(EGSEY005) should be used to verify 3100 KW is not exceeded.

LOADING		**TIME**
0 KW to 1000 KW	*in*	*60 to 90 Seconds*
Then ≤ 600 KVAR		
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
1000 KW to 2000 KW	*in*	*60 to 90 Seconds*
Then ≤ 1200 KVAR		
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds or until required PEP-0026 data is collected*
2000 KW to 3100 KW	*in*	*60 to 90 Seconds*
Then ≤ 1800 KVAR		

1. Raise diesel generator load with the GOVERNOR CONTROL and adjust VARS using the VOLTAGE REGULATOR CONTROL. Use Attachment 6, KW vs KVAR (.8PF) as a guide to verify the generator is not operated at less than a 0.8 power factor.

2. WHEN diesel generator load is 2000 KW, THEN record required PEP-0026 data.

5.2.11. When desired, shutdown the Standby Diesel Generator per Section 6.1 or 6.2 of this procedure.

5.3 Operation from Automatic Start

CAUTION

During an emergency start, only the overspeed and generator differential trips are in effect.

5.3.1. Determine if cause for start is valid.

5.3.2. Dispatch an operator to the local diesel control panels to monitor diesel parameters.

5.3.3. IF the Diesel Generator is the only supply to the bus AND the LOCA and/or Undervoltage conditions have not cleared, THEN Go To Section 5.16.

CAUTION

ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR can not be closed as long as bus voltage is being supplied by the normal or alternate supply and the LOCA signal is still sealed in.

NOTE

Short duration runs and light load (less than 40%, or 1200 kW) operation should be avoided. After a period of light load or no-load run, the diesel should be loaded to greater than or equal 2700 kW in accordance with Precautions and Limitations 2.19.

5.3.4. IF the LOCA and/or Undervoltage conditions have cleared AND it is desired to load the diesel for some time period, THEN perform the following steps:

1. IF the diesel generator is supplying ENS-SWG1A(B), STANDBY BUS, THEN parallel an offsite source to the diesel per Section 5.1 of this procedure.
2. Reset the LOCA by depressing the following appropriate Divisional reset pushbutton:
   - DIV 1 On H13-P601, Insert 21B, LPCS/RHR DIV I INITIATION RESET
   - DIV II On H13-P601, Insert 17B, RHR DIV 2 INITIATION RESET
3. On H13-P877, depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton.
4. Raise diesel generator load to the desired value using the GOVERNOR CONTROL.

5.3.5. Shut down the diesel per Section 6.1 of this procedure when no longer needed.

5.4 Unloading Diesel Fuel Oil

CAUTION

Section 5.4, Unloading Diesel Fuel Oil is mainly written to refuel the diesels during normal operation. However, when the diesels have been running continuously the following requirements are to be followed to prevent the loss of all diesels due to material being stirred up in the fuel oil storage tanks which in turn could clog the diesel fuel oil filters:

- **Refilling one standby diesel storage tank will begin after 72 hours of continuous operation and refilling the second will begin after 96 hours of continuous operation.**
- **The Day Tank is verified full prior to filling the associated Fuel Oil Storage Tank.**
- **That refill is at a controlled rate to minimize turbulence in the storage tank and is initiated in sufficient time to allow sufficient settlement prior to refilling the next tank. (Ref. 7.16)**
- **Day Tank fill capability without the Fuel Oil Filter clogging before the next tank is refilled is required.**
- **Storage Tanks for Div I and Div II DG are filled before the HPCS DG. (Ref. 7.16)**

5.4.1. IF the Day Tank level is less than 78%, THEN prior to filling Fuel Oil Storage Tank, fill associated Day Tank as follows: (Ref. 7.16)

NOTE

Placing the Fuel Oil Transfer Pump in RUN or OFF will cause a local panel alarm and a trouble alarm in the main control room.

Filling the Day Tank higher than 78% may cause the High Day Tank Level alarm to come in. The tank will continue to fill as the piping drains into the tank after the pump turns off.

1. Place EGF-P1A(B), FUEL OIL TRANSFER PUMP to RUN.
2. WHEN Day Tank Level reaches 78%, THEN place EGF-P1A(B), FUEL OIL TRANSFER PUMP in AUTO.

5.4.2. Verify the following steps have been completed prior to bringing the diesel fuel oil tank truck into the Protected Area:

- Two (2) 150 pound wheeled dry chemical fire extinguishers are in place near the transfer station, but not in an area potentially affected by a fuel fire.
- A fire watch with no other concurrent duties is stationed at the transfer station to remain present until the tank truck leaves the Protected Area. (Ref. 7.18)
- All personnel required for the transfer (Operations, Security) are standing by at the transfer station.
- Notify Chemistry for biocide addition.

NOTE

The following step provides spill protection.

5.4.3. WHEN the tank truck is parked at the transfer station, THEN perform the following:

- Direct the tank truck driver to remain in the area.
- Place danger flagging around the tank truck in accordance with EN-IS-111 Section for Barriers and Exclusion Boundaries Flagging and follow NO SMOKING, sparks or open flames rules less than or equal to 50 feet from the trailer. (Ref. 7.17)
- Obtain a bucket or other suitable container for hose drainage.

5.4.4. Verify the following with Chemistry:

- Fuel oil properties have been tested per Technical Specifications.
- Chemistry Management has performed a visual inspection of the vendor fuel pump and lines. IF fuel is being offloaded from an Entergy owned truck, THEN N/A this step.
- Biocide has been added.

5.4.5. WHEN Steps 5.4.2 through 5.4.4 have been completed, THEN notify the OSM/CRS.

5.4.6. WHEN the OSM/CRS grants permission to unload the tank truck, THEN continue with the next step.

5.4.7. Verify EGF-V1 and EGF-V2 (V31 and V32), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN STRAINER DRAINS are closed and capped.

5.4.8. IF offloading from the company owned tanker truck, THEN drain off any accumulated water or sediment from all compartments of the storage trailer prior to hooking up the pump and filters for transferring fuel oil to the permanent storage tanks.

NOTE

Normal alignment of the Berme Drain System is with the drains aligned to the Storm Drain System for continuous draining. During fuel offload, the Berme Drain System will be isolated.

5.4.9. Close/verify closed the following valves to isolate the Berme Drain System:

1. SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE
2. SRW-V3002, D/G BLDG DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION
3. SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM

5.4.10. Hook up the fill hose to the tank fill connection.

5.4.11. Unlock and open EGF-V24(V54), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN.

CAUTION

There is no high level alarm. Monitor the storage tank indication frequently. Storage tank level rises rapidly when the tank level is above 90% and filling operations are in progress. If using air driven pump, reduce fill rate above 90% level. If using electric positive displacement pump, flow must be secured to prevent overfilling tank.

NOTE

Maximum FUEL OIL STORAGE TANK level is 96% to accommodate the performance of the fuel oil transfer pump IST STP s.

Refill is to be at a controlled rate to minimize turbulence in storage tank. (Ref. 7.16)

5.4.12. Begin fuel oil offload while periodically monitoring the following:

- At Panel EGS-PNL3A(B) on EGF-LI15A(B), FUEL STORAGE TANK LVL verify storage tank level. Monitor level during fuel addition and do not fill above 96%.
- EGF-PDI20A(B), FUEL TK1A(B) INLET STR differential during addition. IF differential pressure pegs high, THEN switch to the redundant strainer and initiate a Work Request to clean the dirty strainer.

5.4.13. WHEN fuel oil addition is complete, THEN secure the fuel oil fill line up as follows:

1. Remove fill hose connection at the tanker truck and drain as much of the fill hose as possible into the storage tank.
2. Remove fill hose from fill connection.
3. Recap the fill connection and hose.
4. Close and lock EGF-V24(V54), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN.

5.4.14. WHEN the unloading is completed, THEN move the trailer outside the Protected Area.

5.4.15. Verify the independent verification for EGF-V24(V54), DIESEL FUEL OIL STORAGE TK TK1A(1B) FILL CONN has been completed prior to closing and locking the security gate leading to the fill valve room.

5.4.16. IF fuel oil spillage has occurred in the berme, THEN drain per Section 5.7 of this procedure.

5.4.17. IF fuel oil spillage did not occur AND Section 5.7 was not performed, THEN realign the Berme Drain System to the Storm Drain System as follows:

1. Open SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE.

2. Open SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM.

5.4.18. Log completion of the fuel oil offload and manipulated device line up along with independent verification in the MCR log.

5.4.19. After offloading diesel fuel oil, notify the Control Room/Work Management Center to order another load of diesel fuel oil if required.

5.5 Cross-Connecting Air Receivers Within a Single Division

5.5.1. Division 1 Air System

1. Close EGA-V3130(V3122), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.

2. Open EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

3. Open EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.

4. Start the operable air compressor by placing EGA-C4A(C5A), REAR(FORWARD) START AIR COMPRESSOR to RUN.

5. WHEN the desired pressure is reached in the cross tied air receivers, THEN stop the air compressor by placing EGA-C4A(C5A), REAR(FORWARD) START AIR COMPRESSOR to OFF.

6. Close EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.

7. Close EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

8. Open EGA-V3130(V3122), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.

9. Place the operable air compressor in AUTO.

10. Verify the restorations are independently verified and logged.

5.5.2. Division 2 Air System

1. Close EGA-V3148(V3140), FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.

2. Open EGA-V3142, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

3. Open EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

4. Start the operable air compressor by placing EGA-C4B(C5B), REAR(FORWARD) START AIR COMPRESSOR to RUN.

5. <u>WHEN</u> the desired pressure is reached in the cross tied air receivers, <u>THEN</u> stop the air compressor by placing EGA-C4B(C5B), REAR(FORWARD) START AIR COMPRESSOR to OFF.

6. Close EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

7. Close EGA-V3142, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

8. Open EGA-V3148(V3140) FORWARD (REAR) AIR START SUPPLY ISOLATION VALVE for the inoperable compressor.

9. Place the operable air compressor in AUTO.

10. Verify the restorations are independently verified and logged.

5.6 Cross Connecting Air Receivers Across Divisions

NOTE

The operable air compressor(s) should be operated manually when pressurizing two air receiver trains. Continuous monitoring of the hose condition is recommended, until they are isolated and removed.

Controls are located at EHS-MCC15A(15B).

5.6.1. Place the control switch for the operable compressor to OFF.

5.6.2. Install one end of an air hose to the Operable air receiver at:

- Div I Forward or Rear EGA-V3131, DIV 1 HOSE CONNECTION ISOLATION VALVE
- Div II Forward or Rear EGA-V3149, DIV 2 HOSE CONNECTION ISOLATION VALVE

5.6.3. Attach the other end of the hose to the Inoperable Air Receiver at:

- For DIV I Forward or Rear EGA-V3131
- For DIV II Forward or Rear EGA-V3149

5.6.4. IF pressurizing the Div I Rear air receiver train, THEN Close EGA-V3122, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.5. IF pressurizing the Div I Forward air receiver train, THEN Close EGA-V3130, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.6. IF pressurizing the Div II Rear air receiver train, THEN Close EGA-V3140, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.7. IF pressurizing the Div II Forward air receiver train, THEN Close EGA-V3148, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.8. Open the selected dryer outlet connection valves (from Steps 5.6.2 and 5.6.3).

5.6.9. IF pressurizing to or from Div I Rear air, THEN Open EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.

5.6.10. IF pressurizing to or from Div I Forward air, THEN Open EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.

5.6.11. IF pressurizing to or from Div II Rear air, THEN Open EGA-V3142, REAR AIR START SYSTEM CROSS TIE ISOLATION VALVE.

5.6.12. IF pressurizing to or from Div II Forward air, THEN Open EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

NOTE

The operator should remain in the vicinity of the hose and compressor until the evolution is complete.

The operable air compressor(s) should be operated manually when pressurizing two air receiver trains.

5.6.13. Operate the Operable air compressor manually by placing the control switch in RUN until the air receiver train is at the desired pressure.

5.6.14. Place the control switch for the Operable compressor to OFF.

5.6.15. At the Operable air receiver, close the valve selected in Step 5.6.2:

- For DIV I Forward or Rear EGA-V3131
- For Div II Forward or Rear EGA-V3149

5.6.16. Depressurize the hose by opening the appropriate vent valve as follows:

1. Remove cap as necessary and open:
   - Div I Rear EGA-V3121, REAR AIR START SUPPLY DRAIN VALVE.
   - Div I Forward EGA-V3133, FORWARD AIR START SUPPLY DRAIN VALVE.
   - Div II Rear EGA-V3139, REAR AIR START SUPPLY DRAIN VALVE.
   - Div II Forward EGA-V3151, FORWARD AIR START SUPPLY DRAIN VALVE.
2. Monitor Air Receiver Tank pressure to assure check valve is closed.
3. When hose is depressurized, remove hose.
4. Close and replace cap as necessary on valve opened in Step 5.6.16.1.

5.6.17. At the Inoperable air receiver, close the valve selected in Step 5.6.3.

5.6.18. IF pressurizing the Div I Rear air receiver train, THEN perform the following:

1. Close EGA-V3124, REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE.
2. Open EGA-V3122, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.19. IF pressurizing the Div I Forward air receiver train, THEN perform the following:

1. Close EGA-V3169, FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE.

2. Open EGA-V3130, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.20. IF pressurizing the Div II Rear air receiver train, THEN perform the following:

1. Close EGA-V3142, REAR AIR START SYSTEM CROSS TIE ISOLATION VALVE.

2. Open EGA-V3140, REAR AIR START SUPPLY ISOLATION VALVE.

5.6.21. IF pressurizing the Div II Forward air receiver train, THEN perform the following:

1. Close EGA-V3170, FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE.

2. Open EGA-V3148, FORWARD AIR START SUPPLY ISOLATION VALVE.

5.6.22. Place the control switch for the Operable compressor to AUTO.

5.6.23. Verify the valve/control restorations are independently verified and logged.

5.7 Operation of Diesel Fuel Offload Berme Drain System Following Oily Contamination of Berme

5.7.1. Verify the following Berme Drain System Valves are closed:

1. SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE
2. SRW-V3002, D/G BLDG BERME DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION
3. SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM

CAUTION

Anytime fluid is drained to D/G Bldg Oil Phase Separator, Environmental shall be present to sample oil separator outflow. (Ref 7.14)

5.7.2. Request Environmental presence to sample oil separator outflow.

5.7.3. Drain berme area by opening the following valves:

1. SRW-V3001, D/G BLDG FUEL OIL OFFLOAD TRUCK BERME ISOLATION VALVE
2. SRW-V3002, D/G BLDG BERME DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION

5.7.4. WHEN the berme is drained, THEN flush the line, using any suitable DWS hose connection, for 15 minutes.

5.7.5. WHEN flushing is complete, THEN close SRW-V3002, D/G BLDG BERME DRAIN TO D/G OIL PHASE SEPARATOR ISOLATION.

5.7.6. Open SRW-V3003, D/G BLDG BERME DRAIN TO STORM DRAIN SYSTEM.

5.8 Verifying Proper Operation of EGF-P1A(B), FUEL OIL TRANSFER PUMP

5.8.1. At EGS-PNL3A(B), verify EGF-P1A(B), FUEL OIL TRANSFER PUMP control switch is in the AUTO position.

5.8.2. Unlock and open valve EGF-V104(V102), DAY TANK DRAIN TO FUEL OIL STORAGE TANK.

NOTE

The Tech. Spec. minimum fuel oil day tank level is 45%.

5.8.3. WHEN EGF-TK2A(B), FUEL OIL DAY TANK TK2A(B) level lowers to 63% as indicated on EGF-LIX16A(B), FUEL DAY TANK LEVEL, OR EGF-P1A(B), FUEL OIL TRANSFER PUMP auto starts, THEN perform the following steps:

1. Close EGF-V104(V102), DAY TANK TK2A(B) DRAIN TO STORAGE TANK, and

2. Verify EGF-P1A(B), FUEL OIL TRANSFER PUMP is running.

5.8.4. Verify EGF-P1A(B), FUEL OIL TRANSFER PUMP auto stops prior to EGF-TK2A(B), FUEL OIL DAY TANK TK2A(B) level reaching 80%.

5.8.5. Lock EGF-V104(V102), DAY TANK TK2A(B) DRAIN TO STORAGE TANK.

5.9 Swapping Fuel Oil Transfer Pump EGF-P1A(B) Discharge Strainers

NOTE

Use Section 5.9.1 removing Fuel Oil Transfer Pump Discharge Strainer STR2A(B) from service or Section 5.9.2 for removing Fuel Oil Transfer Pump Discharge Strainer STR2D(E) from service.

5.9.1. Removing EGF-STRA(B), FUEL OIL TRANSFER PUMP DISCHARGE STRAINER from service.

1. On EGS-PNL3A(B), ENGINE CONTROL PANEL, place EGF-P1A(B), FUEL OIL TRANSFER PUMP control switch in ON.

2. Open and lock EGF-STR2D(E), FUEL OIL TRANSFER STRAINER inlet valve EGF-V121(V125), FUEL OIL TRANSFR PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.

3. Open EGF-V21(V51), STRAINER 2D(E) VENT and vent air from EGF-STR2D(E).

4. Close EGF-V21(V51).

5. Open and lock EGF-V123(V127), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.

6. Unlock and close EGF-V122(V126), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.

7. Unlock and close EGF-V124(V128), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.

8. On EGS-PNL3A(B), place EGF-P1A(B) control switch in AUTO.

5.9.2. Removing EGF-STRD(E), FUEL OIL TRANSFER PUMP DISCHARGE STRAINER from service.

1. On EGS-PNL3A(B), ENGINE CONTROL PANEL, place EGF-P1A(B), FUEL OIL TRANSFER PUMP control switch in ON.

2. Open and lock EGF-V122(V126) FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.

3. Open EGF-V20(V50), STRAINER STR2A(B) VENT and vent air from EGF-STR2A(B).

4. Close EGF-V20(V50).

5. Open and lock EGF-V124(V128), FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2A(B) ISOL.

6. Unlock and close EGF-V121(V125), FUEL OIL TRANSFR PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.

7. Unlock and close EGF-V123(V127) FUEL OIL TRANSFER PUMP P1A(B) DISCHARGE STRAINER STR2D(E) ISOL.

8. On EGS-PNL3A(B), place EGF-P1A(B) control switch in AUTO.

5.10 Swapping the Fuel Oil Duplex Filters.

NOTE

These filters are located on the right front corner of the engine, under the ladder.

5.10.1. Smoothly position the selector valve from the in-service filter to the clean filter.

5.10.2. Check fuel oil system for normal system pressures and that the annunciators clear.

5.11 Swapping EGF-STR3A(B)/ STR3D(E) FUEL OIL STRAINER

NOTE

The fuel oil strainer handle is removable from the center stem, and can easily be mispositioned. When correctly positioned, the handle will be angled at 45° between the inlet pipe and the in-service strainer; or pointing between the scribe marks on top of the square valve stem.

5.11.1. Simultaneously loosen the two diverter valve split collar hold down bolts, until the raised portions on top of the collar just comes into contact with the underside of the turning handle.

5.11.2. Slowly move the strainer handle from the in-service strainer to the clean strainer.

5.11.3. Simultaneously tighten the diverter valve split collar hold down bolts until snug, reseating the diverter valve.

5.11.4. Check for normal system pressures and that any associated annunciator alarms clear.

5.12 Swapping Lube Oil Duplex Filters EGO-FLT1A/1D (1B/1E)

NOTE

Lube Oil Duplex Filters EGO-FLT1A/1D (FLT1B/1E) should be swapped <u>ONLY</u> with the engine running. The diesel may be loaded or unloaded.

5.12.1. Verify EGO-V3008A(B), EGO-FLT 1A/1D(1B/1E) CROSSTIE EQUALIZE VALVE is open.

5.12.2. Verify Filter to be placed in service is pressurized by indication on EGO-PI33A(C)(E)(G).

NOTE

EGO-V1A(B), LUBE OIL FILTER 1A(B) AND 1D(E) INLET SELECTOR and EGO-V2A(B), LUBE OIL FILTER 1A(B) AND 1D(E) OUTLET SELECTOR valves share a common handwheel. Both valves will reposition when turned.

5.12.3. Rotate valve operator for EGO-V1A(B) LUBE OIL FILTER 1A(B) AND 1D(E) INLET SELECTOR and EGO-V2A(B) LUBE OIL FILTER 1A(B) AND 1D(E) OUTLET SELECTOR valves until the clean filter is in service as indicated by alignment pointer.

5.12.4. Verify that lube oil pressure and filter differential pressure is normal.

5.12.5. Initiate Work Request to have dirty filter cleaned.

5.13 Swapping Lube Oil Duplex Strainers

CAUTION

When the diesel engine is running, manipulating strainer valves too quickly may cause a pressure perturbation and subsequent diesel engine trip. Do not manipulate strainer valves too quickly. Reference 7.40

NOTE

The mid-position of the duplex strainer is lined up to both sides of the strainer. Slow operation through the mid-position will ensure proper fill and uninterrupted flow.

5.13.1. Individual manipulation of the following strainer selector valves should be performed over a period of at least 30 seconds each:

1. Position EGO-V3A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) INLET STRAINER (SELECTOR) from the In-Service Strainer to the MID-POSITION.

2. Wait 1 to 2 minutes to allow strainer to fill with oil.

3. Position EGO-V4A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) OUTLET STRAINER (SELECTOR) from the In-Service strainer to the MID-POSITION.

NOTE

Step 5.13.1.4 will cause Annunciator EGS-PNL3A(B)-(A-2) LUBE OIL STRAINER ΔP HIGH to alarm and approximately a 10 psig decrease in lube oil and turbo charger oil pressure. The pressure should recover after Step 5.13.1.5 has been completed.

NOTE

Steps 5.13.1.4 and 5.13.1.5 should be performed in rapid succession. They can also be performed simultaneously.

4. Position EGO-V3A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) INLET STRAINER (SELECTOR) from the MID-POSITION to the Clean Strainer.

5. Position EGO-V4A(B), LUBE OIL STRAINER 1A(B) AND 1D(E) OUTLET STRAINER (SELECTOR) from the MID-POSITION to the Clean Strainer.

5.14 Restoration of the Standby Diesel from a Tripped Condition

5.14.1. Restoration from Overspeed Trip

1. Verify Maintenance and Engineering Departments have completed any required visual inspections.

2. Verify the diesel is in MAINTENANCE Mode.

3. At EGS-PNL2A(B), EGS-EG1A(B) PROTECTION, verify the following:

   1) Reset the GEN DIFF TRIP PRIMARY PROTECTION 87G Relay.

   2) Reset the PRIMARY TRIP CUTOFF and the BACK-UP TRIP CUTOFF switches. Verify the white lights above both switches are ON.

4. Reset the diesel engine overspeed device by pressing the levers down and verify they latch. (The levers are located on the Engine Driven Fuel Oil Booster Pump.)

5. At Panel EGS-PNL3A(B), ENGINE CONTROL PANEL verify all associated annunciators have reset.

5.14.2. Restoration from loss of Control Air

1. Verify proper air receiver pressure, as indicated on EGA-PIY26A(B), FWD START AIR PRESS and EGA-PIX26A(B), REAR START AIR PRESS.

2. On Panel H13-P877, depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton, and the STBY DIESEL ENGINE A(B) STOP RESET pushbutton.

3. At EGS-PNL3A(B), ENGINE CONTROL PANEL, depress the STOP RESET pushbutton.

4. Simultaneously depress the RETURN TO OPERATIONAL pushbutton on EGS-PNL3A(B) and place the STBY DIESEL ENGINE A(B) MODE switch to OPER on H13-P877.

5. Verify the UNIT TRIPPED light on EGS-PNL3A(B) and the STBY DIESEL GENERATOR A(B) TRIPPED light on H13-P877 are OFF.

6. At EGS-PNL3A(B), verify the following lights are ON:

    1) UNIT AVAIL EMERGENCY STATUS - White

    2) AC CONTROL POWER ON - White

    3) DC CONTROL POWER ON   White

    4) FORWARD START DC POWER   White

    5) REAR START DC POWER - White

7. At H13-P877, verify the STBY DIESEL GENERATOR A(B) AVAILABLE light is ON.

8. At Panel EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB. verify the FIELD FLASHING RELAY READY white light is on.

9. <u>IF</u> the FIELD FLASHING RELAY READY light is <u>not</u> on, <u>THEN</u> manually reset K1 relay EGE-CAB01A(B).

10. On the corner of the auxiliary skid near the Jacket Water Standpipe, verify the EGS-STOP/RUN VALVE is in the PULL-TO-RUN position.

11. At H13-P877, verify the following alarms and status lights are reset:

    1) DIESEL GENERATOR EGS-EG1A(B) SYSTEM TROUBLE (E-1)

    2) DIESEL GENERATOR EGS-EG1A(B) INOPERATIVE (E-2)

    3) MAINT MODE LO SOL ENERGIZED (Status light)

    4) TRIP UNIT IN CAL OR GR FAIL (Status light)

12. At Panel EGS-PNL3A(B), verify all annunciators required for diesel operation are reset.

NOTE

If the diesel has already tripped/stopped due to an overheat trip, initiation of a LOCA signal will not bypass the overheating trips unless the trip has cleared or been manually bypassed, and the STOP RESET depressed.

5.14.3. Restoration from a High Temperature Trip

1. Verify the one of the following:

   - The initiating fault or high temperature condition clears (temperature below setpoint)
   - At EGS-PNL3A(B), HIGH TEMPERATURE TRIP BYPASS switch in BYPASS

NOTE

If a LOCA OR LOP start signal is present, the Diesel Generator will restart when STOP RESET is actuated.

If a LOCA signal is still present after the STOP RESET is actuated, the high temperature trips will be bypassed.

2. Perform one of the following:

   - At H13-P877, depress STBY DIESEL ENGINE A(B) STOP RESET pushbutton.
   - At EGS-PNL3A(B), depress the STOP RESET pushbutton.

<u>NOTE</u>

If makeup water addition is required when the MWS system is unavailable due to loss of offsite power or other abnormal event, then OSP-0066 Section for Emergency Makeup Water Addition to Emergency Diesel Generation Jacket Water in the Miscellaneous Strategies Attachment could be used for Jacket Water makeup.

5.15 Makeup Water Addition to Standby Diesel Jacket Water

5.15.1. Commence water addition by throttling open the following valves:

- MWS-V376(V377), JACKET WATER STANDPIPE FILL ISOLATION VALVE
- MWS-V416(V415), DEMIN WATER TO DG EGS-EG1A(1B) ISOLATION VAVLE as needed.

5.15.2. <u>WHEN</u> the desired level is reached, <u>THEN</u> close the following valves:

- MWS-V376(V377), JACKET WATER STANDPIPE FILL ISOLATION VALVE
- MWS-V416(V415), DEMIN WATER TO DG EGS-EG1A(1B) ISOLATION VAVLE

5.15.3. Notify Chemistry of jacket water addition.

5.15.4. Log in the Main Control Room log the amount of level change in the Jacket Water Standpipe.

5.16 Operation of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) as the only power supply to the bus

CAUTION

Excessive loading can damage the Diesel Generator. Do not exceed 3130 KW on the Div I(II) DG.

NOTE

Attachment 6, KW vs KVAR (.8PF) is only applicable when the Diesel Generator is running in parallel with the grid. Adjustments to the generator power factor are normally effected by varying generator output voltage.

VOLTAGE REGULATOR CONTROL adjustment with the Diesel Generator the only supply to the bus will vary generator output voltage only.

GOVERNOR CONTROL adjustment with the Diesel Generator the only supply to the bus will vary generator frequency only by changing generator speed (RPM).

5.16.1. IF the diesel generator is the only supply to the bus, THEN perform the following:

1. Adjust volts to maintain voltage 3740 Vac to 4368Vac using the VOLTAGE REGULATOR CONTROL, as indicated on ERIS point EGSEY001(EGSEY002).

2. Adjust the STANDBY DIESEL EG1A(B) speed/frequency, using the GOVERNOR CONTROL to maintain frequency 58.8 Hz to 60.2 Hz.

NOTE

STBY DIESEL GEN OUTPUT HIGH may alarm briefly while maintaining KW in the proper band due to differences in meter and instrumentation calibration.

3. Maintain generator load, as indicated on W-1EGSA(B)07, less than 3130 KW as indicated on ERIS point EGSEY007(005).

NOTE

Short duration runs and light load (less than 40%, or 1200 kW) operation should be avoided. After a period of light load or no-load run, the diesel should be loaded to greater than or equal 2700 kW in accordance with Precautions and Limitations 2.19.

5.16.2. IF the Diesel Generator Engine was run at less than 1200 kW for greater than 30 minutes, THEN load the Diesel Generator to greater than or equal to 2700 kW per Section 5.1 or 5.2 AND operate under load for at least the applicable time in accordance with Precautions and Limitations 2.19.

5.17 Manual Air Compressor Operation

NOTE

This section is normally used to raise air receiver pressure in preparation for component tagouts.

5.17.1. Verify proper oil level in the air compressor(s) to be started.

5.17.2. Start the desired air compressor(s) by placing the associated Control Switch to RUN:

- EGA-C4A, REAR START AIR COMPRESSOR
- EGA-C4B, REAR START AIR COMPRESSOR
- EGA-C5A, FORWARD START AIR COMPRESSOR
- EGA-C5B, FORWARD START AIR COMPRESSOR

5.17.3. WHEN the desired pressure is reached in the air receiver(s) as indicated on EGA-PIY26A(B), FWD START AIR PRESS and/or EGA-PIX26A(B), REAR START AIR PRESS, THEN stop the air compressor(s) started in Step 5.17.2 by placing the associated Control Switch to OFF.

5.17.4. WHEN desired to return to automatic air compressor operation, THEN verify the following Control Switches are in AUTO:

- EGA-C4A, REAR START AIR COMPRESSOR
- EGA-C4B, REAR START AIR COMPRESSOR
- EGA-C5A, FORWARD START AIR COMPRESSOR
- EGA-C5B, FORWARD START AIR COMPRESSOR

5.18 Draining Division I(II) Jacket Water Standpipe for Level Control

5.18.1. Obtain OSM/CRS permission to drain Jacket Water Standpipe.

5.18.2. Station a dedicated operator to close EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE if Division I(II) EDG auto-starts.

5.18.3. Attach a hose to drain pipe downstream of EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE and route to floor drain.

5.18.4. Throttle open EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE slowly and monitor level change on EGT-LI24A(B) JACKET WATER STANDPIPE LEVEL.

5.18.5. When desired level is reached in the JACKET WATER STANDPIPE as indicated on EGT-LI24A(B) JACKET WATER STANDPIPE LEVEL, close EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE.

5.18.6. Secure dedicated operator.

5.18.7. Remove hose from drain pipe.

5.18.8. Notify Chemistry of approximate amount of water drained.

5.18.9. Have EGT-V1A(B) JACKET WATER STANDPIPE DRAIN VALVE independently verified closed.

5.18.10. Log amount drained/final level in Main Control Room Log.

6 SYSTEM SHUTDOWN

6.1 Shutdown of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) from the Control Room

NOTES

When reducing load, lead VARS and follow with load.

The following table is provided as a recommendation for unloading limitation. KW and KVAR values listed are approximate values only.

LOADING		TIME
≤ 1200 KVAR		
3100 KW to 2000 KW	*in*	*60 to 90 Seconds*
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds*
≤ 600 KVAR		
Then 2000 KW to 1000 KW	*in*	*60 to 90 Seconds*
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
0 KVAR		
Then 1000 KW to 200 KW	*in*	*60 to 90 Seconds*

6.1.1. Reduce load with the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL to approximately 175 Kw, and reactive load to no less than 0 KVAR using the STBY DIESEL GENERATOR A(B) VOLTAGE REGULATOR CONT. Allow diesel cylinder temperatures to stabilize.

NOTE

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.*

6.1.2. Trip ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR.

6.1.3. Adjust the EGS-EG1A(B), STBY DIESEL GENERATOR A(B), frequency to 59.7 Hz on F-1EGSA(B)07, STBY D/G A(B) FREQUENCY using the STBY DIESEL GENERATOR A(B) GOVERNOR CONTROL. (Ref. 7.19)

6.1.4. Depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton on H13-P877.

NOTE

The Turbocharger Prelube Valve EGO-V3006A(B) should be opened immediately (within one minute) after depressing the STOP pushbuttons.

6.1.5. Allow the diesel to run unloaded for approximately 2 minutes, then depress both STBY DIESEL ENGINE A(B) STOP pushbuttons simultaneously.

6.1.6. Immediately open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF valve.

6.1.7. WHEN the engine has stopped, THEN depress STBY DIESEL ENGINE A(B) STOP RESET pushbutton.

6.1.8. At EGS-PNL3A(B), depress the STOP pushbutton for HVP-FN2A(B), STBY VENT FAN.

6.1.9. WHEN the Turbocharger has coasted to a stop, THEN close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

6.1.10. IF only the forward starting air supply was used during diesel startup, THEN restore the rear starting air system as follows:

- For Div I DG, open and lock EGA-V150, ENGINE REAR AIR START SUPPLY.
- For Div II DG, open and lock EGA-V154, ENGINE REAR AIR START SUPPLY.

6.1.11. IF only the rear starting air supply was used during diesel startup, THEN restore the forward starting air system as follows:

- For Div I DG, open and lock EGA-V149, ENGINE FWD AIR START SUPPLY
- For Div II DG, open and lock EGA-V153, FWD AIR START SUPPLY VALVE

6.1.12. WHEN at least 10 minutes have elapsed after Diesel Engine shutdown, THEN verify lube oil sump level is greater than the T7 mark indicated on the sump dipstick.

CAUTION
Diesel fuel oil is a flammable liquid. Promptly wipe up any spilled oil and dispose of the rags properly.
Avoid coming in contact with fuel oil. Diesel fuel oil is a skin irritant.

NOTE

Water accumulation check of both storage and day tank shall be performed after each operation of the diesel when the period of operation is one hour or longer.

6.1.13. Check for water accumulation in the day tank and storage tank by performing the following:

1. Place a clear container under the Division I(II) Diesel Fuel Oil Day Tank drain connection. Uncap, unlock, and slowly open EGF-V11(V41), DAY TANK TK2A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V11(V41).

2. Place a clear container under the Division I(II) Diesel Fuel Oil Storage Tank drain connection. Uncap, unlock, and slowly open EGF-V25(V55), DIESEL FUEL OIL STORAGE TANK TK1A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V25(V55).

6.1.14. Return the Standby Service Water System to standby per SOP-0042, Standby Service Water System.

6.1.15. Return Diesel Generator Building HVAC to normal operation per SOP-0061, Diesel Generator Building Ventilation.

6.1.16. Verify EGS-EG1A(B), STBY DIESEL GENERATOR A(B) is in STANDBY per Attachment 4a(Attachment 4b) of this procedure.

NOTE

In the event the engine is removed from service for any reason other than the rolling over procedure prior to expiration of the 12-hr period, that engine need not be rolled over while it is out of service. The engine shall then be rolled with air once, when it is returned to service.

6.2 Shutdown of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) from the Local Control Panel

NOTES

When reducing load, lead VARS and follow with load.

The following table is provided as a recommendation for unloading limitation. KW and KVAR values listed are approximate values only.

LOADING		TIME
≤ 1200 KVAR		
3100 KW to 2000 KW	*in*	*60 to 90 Seconds*
Operate at 2000 KW and ≤ 1200 KVAR	*for*	*60 to 90 Seconds*
≤ 600 KVAR		
Then 2000 KW to 1000 KW	*in*	*60 to 90 Seconds*
Operate at 1000 KW and ≤ 600 KVAR	*for*	*60 to 90 Seconds*
0 KVAR		
Then 1000 KW to 200 KW	*in*	*60 to 90 Seconds*

6.2.1. Reduce load with the GOVERNOR CONTROL to approximately 175 KW, and reactive load to 0 KVAR using the VOLTAGE REGULATOR CONTROL. Allow diesel cylinder temperatures to stabilize.

NOTE

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) is manipulated.*

6.2.2. Trip ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B).

6.2.3. Adjust the EGS-EG1A(B), STBY DIESEL GENERATOR A(B), frequency to 59.7 Hz using the GOVERNOR CONTROL.

6.2.4. Depress the STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton on H13-P877.

NOTE

The Turbocharger Prelube Valve EGO-V3006A(B) should be opened immediately (within one minute) after depressing the STOP pushbuttons.

6.2.5. Allow the diesel to run unloaded for approximately 2 minutes, then depress both STOP pushbuttons simultaneously.

6.2.6. Immediately open EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

6.2.7. <u>WHEN</u> the engine has stopped, <u>THEN</u> depress the STOP RESET pushbutton on EGS-PNL3A(B), ENGINE CONTROL PANEL.

6.2.8. At EGS-PNL3A(B), depress the STOP pushbutton for HVP-FN2A(B), STBY VENT FAN.

6.2.9. <u>WHEN</u> the Turbocharger has coasted to a stop, <u>THEN</u> close EGO-V3006A(B), TURBO MANUAL PRELUBE SHUTOFF.

6.2.10. <u>IF</u> only the forward starting air supply was used during diesel startup, <u>THEN</u> restore the rear starting air system as follows:

- For Div I DG, open and lock EGA-V150, ENGINE REAR AIR START SUPPLY.
- For Div II DG, open and lock EGA-V154, ENGINE REAR AIR START SUPPLY.

6.2.11. <u>IF</u> only the rear starting air supply was used during diesel startup, <u>THEN</u> restore the forward starting air system as follows:

- For Div I DG, open and lock EGA-V149, ENGINE FWD AIR START SUPPLY
- For Div II DG, open and lock EGA-V153, FWD AIR START SUPPLY VALVE

6.2.12. <u>WHEN</u> at least 10 minutes have elapsed after Diesel Engine shutdown, <u>THEN</u> verify lube oil sump level is greater than the T7 mark indicated on the sump dipstick.

CAUTION

Diesel fuel oil is a flammable liquid. Promptly wipe up any spilled oil and dispose of the rags properly.

Avoid coming in contact with fuel oil. Diesel fuel oil is a skin irritant.

NOTE

Water accumulation check of both storage and day tank shall be performed after each operation of the diesel when the period of operation is one hour or longer.

6.2.13. Check for water accumulation in the day tank and storage tank by performing the following:

1. Place a clear container under the Division I(II) Diesel Fuel Oil Day Tank drain connection. Uncap, unlock, and slowly open EGF-V11(V41), DAY TANK TK2A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V11(V41).

2. Place a clear container under the Division I(II) Diesel Fuel Oil Storage Tank drain connection. Uncap, unlock, and slowly open EGF-V25(V55), DIESEL FUEL OIL STORAGE TANK TK1A(B) DRAIN. WHEN there is no water visible in the fuel oil, THEN close, cap, and lock EGF-V25(V55).

6.2.14. Return the Standby Service Water to standby per SOP-0042, Standby Service Water System.

6.2.15. Return Diesel Generator Building HVAC to normal operation per SOP-0061, Diesel Generator Building Ventilation.

6.2.16. Verify EGS-EG1A(B), STBY DIESEL GENERATOR A(B) is in STANDBY per Attachment 4a(Attachment 4b) of this procedure.

NOTE

In the event the engine is removed from service for any reason other than the rolling over procedure prior to expiration of the 12-hr period, that engine need not be rolled over while it is out of service. The engine shall then be rolled with air once, when it is returned to service.

6.3 Emergency Shutdown of the Diesel - Loss of Control Air

6.3.1. Do not attempt to restore the air system if complete loss of control air has occurred until the diesel generator has been shutdown.

6.3.2. IF the diesel is running AND loaded, THEN perform the following steps:

1. Attempt to reduce load using the GOVERNOR CONTROL.
2. IF not successful, THEN reduce load by lowering the Load Setting Control on the engine governor towards the MIN FUEL setting.
3. If necessary, load may be reduced by pushing the Fuel rack lever towards the engine.
4. WHEN load has been reduced to approximately 175 KW, THEN trip EGS-EG1A(B) GENERATOR TO ENS-SWG1A(B) STBY BUS.
5. If possible, adjust EGS-EG1A(B) STBY DIESEL GENERATOR A(B) frequency to 59.7 Hz, using the GOVERNOR CONTROL.

6.3.3. With the diesel generator unloaded, simultaneously depress both EXCITATION SHUTDOWN pushbuttons on EGS-PNL1A(B).

6.3.4. Adjust the Load Setting Control on the engine governor to the MIN FUEL position.

6.3.5. If necessary, manually force the Fuel rack lever towards the engine to shutdown the diesel.

6.3.6. WHEN control air is restored, THEN return the diesel to STANDBY per Section 4.1 of this procedure.

6.3.7. IF frequency (unloaded) was not adjusted to 59.7 Hz prior to engine shutdown, THEN start the Diesel per Section 4.6, and then secure the diesel per Section 6.2. Loading the diesel is not required. This step resets the governor.

NOTE

In the event the engine is removed from service for any reason other than the rolling over procedure prior to expiration of the 12-hr period, that engine need not be rolled over while it is out of service. The engine shall then be rolled with air once, when it is returned to service.

6.4 Emergency Shutdown of the Diesel - Loss of DC Control Power

6.4.1. Attempt to restore DC control power if possible.

6.4.2. IF not able to restore DC power AND the diesel generator is loaded, THEN manually trip the EGS-EG1A(B) GEN TO ENS-SWG1A(B) STBY BUS breaker locally at the breaker.

6.4.3. Inside the front of EGE-CAB01A(B), STBY. DSL. GEN. EXCITATION CAB., de-excite the generator by depressing the tabs in on relay EGS-A(B)12K1 until they latch.

6.4.4. On diesel generator skid, stop the diesel by depressing the EGS-STOP/RUN VALVE pneumatic pushbutton.

6.4.5. WHEN DC control power is restored, THEN return the diesel to STANDBY per Section 4.1 of this procedure.

6.4.6. Start the diesel per Section 4.6, then secure the diesel per Section 6.2. Loading the diesel is not required. This step resets the governor.

6.5 Shutdown and Resetting of EGS-EG1A(B), STBY DIESEL GENERATOR A(B) with LOCA/LOP Signal Present

6.5.1. Shutting Down the Diesel Generator

1. Secure as many loads as possible from ENS-SWG1A(B), STANDBY BUS.

NOTE

*Annunciator, P877-31A(32A)-C03, ENS*SWG1A(B) SPLY OR DIST BRKR INOPERATIVE may alarm momentarily whenever ENS-ACB07(27), STBY D/G A(B) OUTPUT BREAKER is manipulated.*

2. Depending on the desired location shut down the diesel by simultaneously depressing and holding one of the following sets of pushbuttons until the white UNIT AVAIL EMERGENCY STATUS and STBY DIESEL GENERATOR A(B) AVAILABLE lights go out:

   - At EGS-PNL3A(B), both STOP pushbuttons

     OR

   - At H13-P877, both STBY DIESEL ENGINE A(B) STOP pushbuttons

3. Verify ENS-ACB07(27), STBY D/G A(B) OUTPUT BRKR trips.

4. Verify EGS-EG1A(B), STBY DIESEL GENERATOR A(B) trips.

NOTE

The following section must be performed to prevent auto restart of the diesel generator from an unreset LOP signal upon returning the Diesel Generator to OPERATIONAL.

6.5.2. Resetting the LOP/LOCA start signals and returning the diesel generator to Standby following the shutdown per Section 6.5.1.

NOTE

Forward Start DC power and Control Air must be available.

1. Verify the LOP/LOCA signals are clear.

2. Unlock and close the following valves:

   - EGA-V161A(B), FORWARD AIR START BLOCK VALVE

   - EGA-V162A(B), REAR AIR START BLOCK VALVE

3. At EGS-PNL3A(B), ENGINE CONTROL PANEL open the following breakers in the following sequence:
   - First CB-1 CB-2, and then CB-3 CB-4.
4. Completely depressurize EGS-PNL3A(B) Control Air using one of the following methods:
   - Crack open the test fitting adjacent to EGA-PI27A(B), see Attachment 9, Fitting Location For Section 6.5.2.
   - Just inside EGS-PNL3A(B) on the right side, thigh level, crack open the black handled 3/8 service air bleed valve.
5. WHEN control air has been depressurized, THEN replace/tighten the fitting or close the 3/8 service air bleed valve.
6. At EGS-PNL3A(B), close the following breakers in the following sequence:
   - First CB-3 CB-4, and then CB-1 CB-2.
7. Verify the following lights are on:
   - FORWARD START DC POWER White
   - REAR START DC POWER - White
8. At H13-P877, depress STBY DIESEL ENGINE A(B) EMERGENCY START RESET pushbutton.
9. At EGS-PNL3A(B) north side enclosure, verify relay R3A is reset, red indicator is flush with relay case.
10. At EGS-PNL3A(B) south side enclosure, verify relay R3B is reset, red indicator is flush with relay case.
11. Slowly open and lock open the following valves:
    - EGA V161A(B), FORWARD AIR START BLOCK VALVE
    - EGA-V162A(B), REAR AIR START BLOCK VALVE
12. WHEN Control air is restored, THEN using Snoop, check the fitting for air leaks.
13. Return the diesel to standby per Section 4.1 of this procedure.

7 REFERENCES

7.1 PIDs 8-9A through 8-9D

7.2 ESKs:

7.2.1. 6EGA01 through 04

7.2.2. 7EGA01 and 02

7.2.3. 11EGA01 and 06

7.2.4. 6EGF01 through 03

7.2.5. 7EGF01

7.2.6. 11EGF01 through 04

7.2.7. 6EGO01 and 02

7.2.8. 7EGO02

7.2.9. 6EGS01

7.2.10. 8EGS01 through 16

7.2.11. 7EGS03 and 04

7.2.12. 11EGS02, 03, 06, and 07

7.2.13. 6EGT01 and 02

7.2.14. 8SYD01

7.3 Delaval Drawing 09-694-74039, #0244.700-041-077.

7.4 Delaval Drawing 09-500-74039:

7.4.1. Sheet 1, #0244.700-041-081

7.4.2. Sheet 2, #0244.700-041-082

7.4.3. Sheet 3, #0244.700-041-083

7.4.4. Sheet 4, #0244.700-041-084

7.4.5. Sheet 5, #0244.700-041-085

7.4.6. Sheet 6, #0244.700-041-086

7.4.7. Sheet 7, #0244.700-041-087

7.4.8. Sheet 8, #0244.700-041-088

7.4.9. Sheet 9, #0244.700-041-089

7.5 Control System Descriptions:

7.5.1. 8-9.1

7.5.2. 8-9.2

7.5.3. 12-4

7.5.4. 24-9.3

7.5.5. 24-9.4

7.5.6. 24-9.5

7.5.7. 24-9.6

7.6 Transamerica Delaval, Inc. Instruction Manual, #3244.700-041-002

7.7 Transamerica Delaval Jacket Water Piping Schematic 09-810-74039, #0244.700-041-010

7.8 Transamerica Delaval Lube Oil Piping Schematic 09-820-74039, #0244.700-041-007

7.9 File 244.700.9, NDC File 244.700, Ray to Deddens, TDI Owners Group Recommendation for Detection of Cylinder Head Leakage

7.10 PEP-0026, Diesel Generator Operating Logs

7.11 IEIN 84-69, Supp. 1

7.12 Commitment No. 15500

7.13 Condition Report 90-0353 (NRC INFO NOTICE 89-87)

7.14 Federal NPDES Discharge Permit #LA 0042731.

7.15 CR 90-0555

7.16 Commitment No. 12824

7.17 Commitment No. 12937

7.18 Commitment No. 12938

7.19 Commitment No. 15557

7.20 Commitment No. 13361

7.21 Commitment No. 06254

7.22 Commitment No. 12866

7.23 Commitment No. 06253

7.24 CR 92-0066

7.25 CR 91-0546

7.26 MR 91-0023

7.27 MR 89-0237

7.28 MR 90-0112

7.29 CR 92-0833

7.30 MM 94-0061

7.31 MR 90-0061

7.32 MM 94-0154

7.33 CR 97-1178

7.34 CR 96-1644

7.35 ER 98-0585

7.36 CR 97-1051

7.37 CR2004-003499

7.38 ER-RB-2000-0081 (Governor replacement)

7.39 CR-RBS-2006-03776

7.40 CR-RBS-2007-2594

7.41 SOER 03-1 Recommendation 2 Emergency Power Reliability

7.42 CR-RBS-2010-00910 / EC 21835

7.43 CR-RBS-2011-06800 / ECs 24645 and 24245

8 RECORDS

8.1 Record disposition shall be in accordance with OSP-0022, Operations General Administrative Guidelines and EN-AD-103, Document Control and Records Management Activities.

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V112	AIR RECEIVER TK2A DRAIN	CLOSED			
EGA-V113	AIR RECEIVER TK2A PI18A ISOL	OPEN			
EGA-V120	AIR RECEIVER TK2C DRAIN	CLOSED			
EGA-V119	AIR RECEIVER TK2C PI18C ISOL	OPEN			
EGA-V121	FORWARD SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V149	ENGINE FWD AIR START SUPPLY	LOCKED OPEN			
EGA-V101	AIR RECEIVER TK1A DRAIN	CLOSED			
EGA-V105	AIR RECEIVER TK1A PI17A ISOL	OPEN			
EGA-V103	AIR RECEIVER TK1C DRAIN	CLOSED			
EGA-V107	AIR RECEIVER TK1C PI17C ISOL	OPEN			
EGA-V110	REAR SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V150	ENGINE REAR AIR START SUPPLY	LOCKED OPEN			
EGA-V161A	FORWARD AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGA-V162A	REAR AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGT-V1A	JACKET WATER STANDPIPE DRAIN VALVE	CLOSED			
MWS-V376	JACKET WATER STANDPIPE FILL ISOLATION VALVE	CLOSED			
EGF-V24	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN	LOCKED CLOSED			
EGF-V14	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER PDI-20A ISOL	OPEN			
EGF-V15	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER PDI-20A ISOL	OPEN			
EGF-V1	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V2	DIESEL FUEL OIL STORAGE TK TK1A FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			
EGF-V25	DIESEL FUEL OIL STORAGE TANK TK1A DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V16	FUEL OIL TRANSFER PUMP P1A DISCH PRESSURE PI-22A ISOL	OPEN			
EGF-V122	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2A ISOL	*OPEN/ CLOSED			
EGF-V124	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2A ISOL	*OPEN/ CLOSED			
* LOCKED OPEN IF DIV I STR 2A IN SERVICE					
EGF-V123	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2D ISOL	**OPEN/ CLOSED			
EGF-V121	FUEL OIL TRANSFER PUMP P1A DISCHARGE STRAINER STR2D ISOL	**OPEN/ CLOSED			
**LOCKED OPEN IF DIV I STR 2D IN SERVICE					
EGF-V12	STRAINER STR2D DRAIN	CLOSED/ CAPPED			
EGF-V21	STRAINER STR2D VENT	CLOSED/ CAPPED			
EGF-V20	STRAINER STR2A VENT	CLOSED/ CAPPED			
EGF-V26	STRAINER STR2A DRAIN	CLOSED/ CAPPED			
EGF-V17	STRAINER STR2A/D DIFF PRESS PDIS-21A ISOL	OPEN			
EGF-V18	STRAINER STR2A/D DIFF PRESS PDIS-21A ISOL	OPEN			
EGF-V7	FUEL OIL TRANSFER PUMP P1A DISCH CONN	CLOSED/ CAPPED			
EGF-V5	FUEL OIL TRANSFER PUMP P1A MAN DISCH ISOL	LOCKED OPEN			
EGF-V11	DAY TANK TK2A DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V104	DAY TANK TK2A DRAIN TO STORAGE TANK	LOCKED CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V105	ENGINE FUEL OIL RETURN TO DAY TANK PCV-25A MAN ISOL	LOCKED OPEN			
EGF-V106	ENGINE FUEL OIL RETURN TO DAY TANK PCV-25A MAN ISOL	LOCKED OPEN			
EGF-V201	ENGINE RETURN TO DAY TANK LINE DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V3000	FUEL OIL DAY TANK RETURN PCV25A BYPASS	CLOSED			
EGF-V3001	FUEL OIL DAY TANK RETURN PCV25A BYPASS LINE VENT	CLOSED/ CAPPED			
EGF-V3002	FUEL OIL DAY TANK RETURN LINE DR.	CLOSED/ CAPPED			
EGF-V27	DAY TANK SUPPLY TO ENGINE	LOCKED OPEN			
EGF-V97	FUEL OIL WASTE TANK TK3A DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V23	DAY TANK LT16A ROOT VALVE	OPEN			
EGF-V153A	INSTRUMENT ROOT VALVE FOR EGF-PDI29A LOW SIDE	OPEN			
EGF-V154A	INSTRUMENT ROOT VALVE FOR EGF-PDI29A HIGH SIDE	OPEN			
EGF-V152A	INSTRUMENT ROOT VALVE FOR EGF-PI27A	OPEN			
EGO-V1A	LUBE OIL FILTER 1A AND 1D INLET SELECTOR	1A(D) FILTER SELECTED			
EGF-V205	EGF-TK1A SAMPLE ISOLATION	CLOSED/ COVER INSTALLED			
EGO-V2A	LUBE OIL FILTER 1A AND 1D OUTLET SELECTOR	1A(D) FILTER SELECTED			
EGO-V3A	LUBE OIL STRAINER 1A AND 1D INLET STRAINER	1A(D) STRAINER SELECTED			
EGO-V4A	LUBE OIL STRAINER 1A AND 1D OUTLET STRAINER	1A(D) STRAINER SELECTED			
DTM-V65	LUBE OIL SUMP DR VALVE	LOCKED CLOSED/ CAPPED			
EGA-V3134	EGA-C5A LUBE OIL DRAIN VALVE	CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	2ND	VALVE LABELED
EGA-V3132	EGA-C5A OUTLET DRAIN VALVE	CLOSED			
EGA-V3126	EGA-FLT12A INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3159	EGA-FLT12A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3157	EGA-FLT12A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3127	EGA-FLT14A INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3125	EGA-C4A LUBE OIL DRAIN VALVE	CLOSED			
EGA-V3123	EGA-C4A OUTLET DRAIN VALVE	CLOSED			
EGA-V3117	EGA-FLT11A INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3118	EGA-FLT13A INLET PRESS TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3153	EGA-FLT11A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3155	EGA-FLT11A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3154	EGA-FLT13A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3158	EGA-FLT14A AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3156	EGA-FLT13A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3160	EGA-FLT14A MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3119	EGA-DRY4A INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3128	EGA-DRY5A INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3120	EGA-DRY4A OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3129	EGA-DRY5A OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3122	REAR AIR START SUPPLY ISOLATION VALVE	OPEN			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V3130	FORWARD AIR START SUPPLY ISOLATION VALVE	OPEN			
EGA-V3121	REAR AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3133	FORWARD AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3124	REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE	CLOSED			
EGA-V3169	FORWARD AIR START SYSTEM CROSS TIE ISOLATION VALVE	CLOSED			
EGA-V3131	DIV I HOSE CONNECTION ISOLATION VALVE	CLOSED/ CAPPED			
EGA-V3171	EGA-TRP14A ISOLATION FOR EGA-SOV82A	OPEN			
EGA-V3172	EGA-TRP15A ISOLATION FOR EGA-SOV83A	OPEN			
EGT-TCV20A	JACKET WATER COOLER BYPASS TEMPERATURE CONTROL VALVE	THROTTLED			
DTM-V63	CRANKCASE OIL DRAIN TO MAIN RESERVOIR DRAIN VLV.	CLOSED/ CAPPED			
DTM-V68	LUBE OIL COOLER SHELL SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3007	EGO-FLT1A SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3008	EGO-FLT1D SIDE DRAIN VALVE	CLOSED/ CAPPED			
EGO-V3008A	EGO-FLT1A/1D CROSSTIE/EQUALIZER VALVE	OPEN			
DTM-V3019	EGO-STR1A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3020	EGO-STR1D DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3017	EGO-FLT2A SIDE VENT/DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3015	EGO-FLT2A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3023	EGO-STR2A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3025	JACKET WTR STANDPIPE SAMPLE/CHEM CONN. VLV.	OPEN			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
DTM-V3031	EGT-LI24A DRAIN VALVE AND JACKET WTR STANDPIPE SAMPLE VALVE	CLOSED/ CAPPED			
EGT-V3005	EGT-E1A JACKET WATER DRAIN VLV	CLOSED/ CAPPED			
EGT-V3007	EGT-E1A JACKET WATER VENT VLV	CLOSED/ CAPPED			
DTM-V3011	EGO-FLT1A DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3012	EGO-FLT1D DRAIN VALVE	CLOSED/ CAPPED			
EGO-V3006A	TURBO MANUAL PRELUBE SHUTOFF	CLOSED			
EGO-V3007A	TURBO DRIP PRELUBE THROTTLE VALVE	THROTTLED			

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VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V134	AIR RECEIVER TK2B DRAIN	CLOSED			
EGA-V135	AIR RECEIVER TK2B PI18B ISOL	OPEN			
EGA-V142	AIR RECEIVER TK2D DRAIN	CLOSED			
EGA-V156	AIR RECEIVER TK2D PS32B ISOL	OPEN			
EGA-V143	FORWARD SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V123	AIR RECEIVER TK1B DRAIN	CLOSED			
EGA-V124	AIR RECEIVER TK1B PI17B ISOL	OPEN			
EGA-V131	AIR RECEIVER TK1D DRAIN	CLOSED			
EGA-V130	AIR RECEIVER TK1D PI17D ISOL	OPEN			
EGA-V132	REAR SUPPLY LINE DRIP LEG	LOCKED CLOSED			
EGA-V154	ENGINE REAR AIR START SUPPLY	LOCKED OPEN			
EGA-V161B	FORWARD AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGA-V162B	REAR AIR START BLOCK VALVE	LOCKED OPEN HANDLE REMOVED			
EGT-V1B	JACKET WATER STANDPIPE DRAIN VALVE	CLOSED			
MWS-V377	JACKET WATER STANDPIPE FILL ISOL	CLOSED			
EGA-V153	FWD AIR START SUPPLY VALVE	LOCKED OPEN			
EGF-V54	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN	LOCKED CLOSED			
EGF-V44	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER PDI-20B ISOL	OPEN			
EGF-V45	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER PDI-20B ISOL	OPEN			
EGF-V31	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V32	DIESEL FUEL OIL STORAGE TK TK1B FILL CONN STRAINER DRAIN	CLOSED/ CAPPED			
EGF-V55	DIESEL FUEL OIL STORAGE TANK TK1B DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V46	FUEL OIL TRANSFER PUMP P1B DISCH PRESSURE PI-22B ISOL	OPEN			
EGF-V126	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2B ISOL	*OPEN/ CLOSED			
EGF-V128	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2B ISOL	*OPEN/ CLOSED			
* LOCKED OPEN IF DIV II STR 2B IN SERVICE					
EGF-V125	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2E ISOL	**OPEN/ CLOSED			
EGF-V127	FUEL OIL TRANSFER PUMP P1B DISCHARGE STRAINER STR2E ISOL	**OPEN/ CLOSED			
** LOCKED OPEN IF DIV II STR 2E IN SERVICE					
EGF-V56	STRAINER STR2B DRAIN	CLOSED/ CAPPED			
EGF-V50	STRAINER STR2B VENT	CLOSED/ CAPPED			
EGF-V42	STRAINER STR2E DRAIN	CLOSED/ CAPPED			
EGF-V51	STRAINER STR2E VENT	CLOSED/ CAPPED			
EGF-V47	STRAINER STR2B/E DIFF PRESS PDIS-21B ISOL	OPEN			
EGF-V48	STRAINER STR2B/E DIFF PRESS PDIS-21B ISOL	OPEN			
EGF-V37	FUEL OIL TRANSFER PUMP P1B DISCH CONN	CLOSED/ CAPPED			
EGF-V35	FUEL OIL TRANSFER PUMP P1B MAN DISCH ISOL	LOCKED OPEN			
EGF-V41	DAY TANK TK2B DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V102	DAY TANK TK2B DRAIN TO STORAGE TANK	LOCKED CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V107	ENGINE OIL RETURN TO DAY TANK PCV-25B MAN ISOL	LOCKED OPEN			
EGF-V108	ENGINE FUEL OIL RETURN TO DAY TANK PCV-25B MAN ISOL	LOCKED OPEN			
EGF-V200	ENGINE RETURN TO DAY TANK LINE DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V3004	FUEL OIL DAY TANK RETURN PCV25B BYPASS	CLOSED			
EGF-V3003	FUEL OIL DAY TANK RETURN PCV25B BYPASS LINE VENT	CLOSED/ CAPPED			
EGF-V3005	FUEL OIL DAY TANK RETURN LINE DRAIN	CLOSED/ CAPPED			
EGF-V57	DAY TANK SUPPLY TO ENGINE	LOCKED OPEN			
EGF-V96	FUEL OIL WASTE TANK TK3B DRAIN	LOCKED CLOSED/ CAPPED			
EGF-V53	DAY TANK LT16B ROOT VALVE	OPEN			
EGF-V152B	INSTRUMENT ROOT VALVE FOR EGF-PI27B	OPEN			
EGF-V153B	INSTRUMENT ROOT VALVE FOR EGF-PDI29B LOW SIDE	OPEN			
EGF-V154B	INSTRUMENT ROOT VALVE FOR EGF-PDI29B HIGH SIDE	OPEN			
EGO-V1B	LUBE OIL FILTER 1B AND 1E INLET SELECTOR	1B (E) FILTER SELECTED			
EGA-V3135	EGA-FLT 11B INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3144	EGA-FLT 12B INLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3136	EGA-FLT 13B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3137	EGA-DRY4B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3146	EGA-DRY5B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3145	EGA-FLT 14B INLET PRESSURE TEST CONN VALVE	CLOSED/ CAPPED			
EGA-V3138	EGA-DRY4B OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	2ND	VALVE LABELED
EGA-V3147	EGA-DRY5B OUTLET PRESSURE TEST CONNECTION VALVE	CLOSED/ CAPPED			
EGA-V3139	REAR AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3151	FORWARD AIR START SUPPLY DRAIN VALVE	CLOSED			
EGA-V3152	EGA-C4B LUBE OIL DRAIN VALVE	CLOSED			
EGA-V3150	EGA-C5B OUTLET DRAIN VALVE	CLOSED			
EGA-V3140	REAR AIR START SUPPLY ISOLATION VALVE	OPEN			
EGA-V3148	FORWARD AIR START SUPPLY ISOLATION VALVE	OPEN			
EGA-V3141	EGA-C4B OUTLET DRAIN VALVE	CLOSED			
EGA-V3143	EGA-C5B LUBE OIL DRAIN VALVE	CLOSED			
EGA-V3142	REAR AIR START SUPPLY CROSS TIE ISOLATION VALVE	CLOSED			
EGA-V3170	FORWARD AIR START SYSTEM CROSS-TIE ISOLATION VALVE	CLOSED			
EGA-V3161	EGA-FLT11B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3162	EGA-FLT13B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3165	EGA-FLT12B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3166	EGA-FLT14B AUTOMATIC DRAIN ISOLATION VALVE	OPEN			
EGA-V3173	EGA-TRP15B MANUAL DRAIN ISOLATION VALVE	OPEN			
EGA-V3174	EGA-TRP14B MANUAL DRAIN ISOLATION VALVE	OPEN			
EGA-V3163	EGA-FLT11B MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3167	EGA-FLT12B MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGA-V3168	EGA-FLT14B MANUAL DRAIN ISOLATION VALVE	CLOSED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGA-V3149	DIV 2 HOSE CONNECTION ISOLATION VALVE	CLOSED/ CAPPED			
EGA-V3164	EGA-FLT13B MANUAL DRAIN ISOLATION VALVE	CLOSED			
EGT-TCV20B	JACKET WATER COOLER BYPASS TEMPERATURE CONTROL VLV	THROTTLED			
DTM-V64	CRANKCASE OIL DRAIN TO MAIN RESERVOIR DRAIN VALVE	CLOSED/ CAPPED			
DTM-V69	MAIN LUBE OIL COOLER SHELL SIDE DRAIN	CLOSED/ CAPPED			
DTM-V3009	EGO-FLT1B SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3010	EGO-FLT1E SIDE DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3013	EGO-FLT1B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3014	EGO-FLT1E DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3021	EGO-STR1B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3022	EGO-STR1E DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3018	EGO-FLT2B SIDE DRAIN VLV	CLOSED/ CAPPED			
DTM-V3016	EGO-FLT2B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3024	EGO-STR2B DRAIN VALVE	CLOSED/ CAPPED			
DTM-V3026	JACKET WATER STANDPIPE SAMPLE/CHEM CONN	OPEN			
DTM-V3032	EGT-LI24B DRAIN VALVE AND JACKET WTR STANDPIPE SAMPLE VALVE	CLOSED/ CAPPED			
EGO-V3008B	EGO-FLT 1B/1E CROSSTIE/EQUALIZER VLVE	OPEN			
EGT-V3006	EGT-E1B JACKET WATER DRAIN VLV	CLOSED/ CAPPED			
EGT-V3008	EGT-E1B JACKET WATER VENT VLV	CLOSED/ CAPPED			

VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

VALVE NUMBER	VALVE NAME (OR DESCRIPTION)	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND	VALVE LABELED
EGF-V206	EGF-TK1B SAMPLE ISOLATION	CLOSED/ CAPPED			
EGO-V2B	LUBE OIL FILTER 1B AND 1E OUTLET SELECTOR	1B(E) FILTER SELECTED			
EGO-V3B	LUBE OIL STRAINER 1B AND 1E INLET SELECTOR	1B(E) STRAINER SELECTED			
EGO-V4B	LUBE OIL STRAINER 1B AND 1E OUTLET SELECTOR	1B(E) STRAINER SELECTED			
DTM-V66	LUBE OIL SUMP DRAIN VALVE	LOCKED CLOSED			
EGO-V3006B	TURBO MANUAL PRELUBE SHUTOFF	CLOSED			
EGO-V3007B	TURBO DRIP PRELUBE THROTTLE VALVE	THROTTLED			

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INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
EGF-LT16A	STBY DSL FUEL TK2A LVL (DE-4-103')			
	EGF-LT16A-V1	OPEN		
	EGF-LT16A-V2	CLOSED		
	EGF-LT16A-V3	CLOSED		
	EGF-LIX16A EGS-PNL3A (DG-4-98')	LIVE ZERO		
EGF-PI22A	FUEL TRANSFER PUMP P1A DISCHARGE PRESSURE (DC-3-103')			
	EGF-PI22A-V1	CLOSED		
	EGF-PI22A-V2	CLOSED		
	EGF-PI22A-V3	CLOSED		
	EGF-PI22A-V4	CLOSED		
EGF-PDIS21A	STBY DSL FO XFER PMP DISCH ST (DC-3-103')			
	EGF-PDIS21A-V1H	OPEN		
	EGF-PDIS21A-V2L	OPEN		
	EGF-PDIS21A-V3B	CLOSED		
	EGF-PDIS21A-V4	CLOSED		
	EGF-PDIS21A-V5	CLOSED		
	EGF-PDIS21A-V6	CLOSED		
	EGF-PDIS21A-V7	CLOSED		
EGF-LT15A	STBY DSL FUEL STOR TK1A LVL (DC-3-103')			
	EGF-LY15A-V1	OPEN		
	EGF-LI15A EGS-PNL3A (DG-4-98')	LIVE ZERO		
EGA-PS19A	AIR RCVR TK1A & TK1C (DC-3-103')			
	EGA-PS19A-V1	OPEN		
	EGA-PS19A-V2	CLOSED		
EGT-LI24A	JACKET WATER STANDPIPE LEVEL			
	EGT-LI24A-V1	OPEN		
	EGT-LI24A-V2	CLOSED/ CAPPED		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
EGF-PDI20A	FUEL TK1A INLET STR (DA-3-102')			
	EGF-PDI20A-V1H	OPEN		
	EGF-PDI20A-V2L	OPEN		
	EGF-PDI20A-V3B	CLOSED		
	EGF-PDI20A-V4	CLOSED		
	EGF-PDI20A-V5	CLOSED		
	EGF-PDI20A-V6	CLOSED		
	EGF-PDI20A-V7	CLOSED		
EGO-PI10A	EGS-PNL3A TURBO OIL PRESS (DG-4-98')			
	EGO-PI10A-V1	OPEN		
EGO-PI5A	EGS-PNL3A LUBE OIL PRESS (DG-4-98')			
	EGO-PI5A-V1	OPEN		
EGO-PDI7A	EGS-PNL3A LUBE OIL FILTER DIFF PRESS (DG-4-98')			
	EGO-PDI7A-V1H	OPEN		
	EGO-PDI7A-V2L	OPEN		
EGT-PI4A	JACKET WATER PRESS EGS-PNL3A (DG-4-98')			
	EGT-PI4A-V1	OPEN		
EGA-PS32A	AIR RCVR TK 2A & 2C (DE-4-103')			
	EGA-PS32A-V1	OPEN		
	EGA-PS32A-V2	CLOSED		
EGA-PS31A	AIR RCVR TK 1A & 1C (DE-3-103')			
	EGA-PS31A-V1	OPEN		
	EGA-PS31A-V2	CLOSED		
EGA-PS20A	AIR RCVR TK 2A & 2C (DE-3-103')			
	EGA-PS20A-V1	OPEN		
	EGA-PS20A-V2	CLOSED		
EGA-PIY26A	EGS-PNL3A FWD START AIR PRESS (DG-4-98')			
	EGA-PIY26A-V1	OPEN		
EGA-PIX26A	EGS-PNL3A REAR START AIR PRESS (DG-4-98')			
	EGA-PIX26A-V1	OPEN		
EGA-PI18A	STBY DSL GEN. AIR RCVR TK2A (DE-3-103')			
	EGA-PI18A-V1	OPEN		
	EGA-PI18A-V2	CLOSED		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
EGA-PI18C	STBY DSL GEN AIR RCVR TK2C (DE-3-103')			
	EGA-PI18C-V1	OPEN		
	EGA-PI18C-V2	CLOSED		
EGA-PI17A	STBY DSL GEN. AIR RCVR TK1A (DE-3-103')			
	EGA-PI17A-VI	OPEN		
	EGA-PI17A-V2	CLOSED		
EGA-PI17C	STBY DSL GEN. AIR RCVR TK1C (DC-3-103')			
	EGA-PI17C-V1	OPEN		
	EGA-PI17C-V2	CLOSED		
EGS-PNL3A	ENGINE CONTROL PANEL (DG-4-98') (VALVES INSIDE PANEL)			
	EGA-PSY21A-E-31F	OPEN		
	EGA-PSX-21A-E31R	OPEN		
EGA-PI27A	EGS-PNL3A CONTROL AIR PRESS (DG-4-98')			
	EGA-PI27A-V1	OPEN		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1A

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INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
EGF-PI22B	FUEL XFER PUMP P1B DISCH (DC-1-103')			
	EGF-PI22B-V1	CLOSED		
	EGF-PI22B-V2	CLOSED		
	EGF-PI22B-V3	CLOSED		
	EGF-PI22B-V4	CLOSED		
EGF-PDIS21B	STBY DSL FO XFER PMP DISCH ST (DC-1-103')			
	EGF-PDIS21B-V1H	OPEN		
	EGF-PDIS21B-V2L	OPEN		
	EGF-PDIS21B-V3B	CLOSED		
	EGF-PDIS21B-V4	CLOSED		
	EGF-PDIS21B-V5	CLOSED		
	EGF-PDIS21B-V6	CLOSED		
	EGF-PDIS21B-V7	CLOSED		
EGF-PDI20B	FUEL TK1B INLET STR (DA-1-102')			
	EGF-PDI20B-V1H	OPEN		
	EGF-PDI20B-V2L	OPEN		
	EGF-PDI20B-V3B	CLOSED		
	EGF-PDI20B-V4	CLOSED		
	EGF-PDI20B-V5	CLOSED		
	EGF-PDI20B-V6	CLOSED		
	EGF-PDI20B-V7	CLOSED		
EGF-LT15B	STBY DSL FUEL STOR TK1B LVL (DC-1-103')			
	EGF-LY15B-V1	OPEN		
	EGF-LI15B EGS-PNL3B (DG-2-98')	LIVE ZERO		
EGO-PI10B	EGS-PNL3B TURBO OIL PRESS (DG-2-98')			
	EGO-PI10B-V1	OPEN		
EGO-PI5B	EGS-PNL3B LUBE OIL PRESS (DG-2-98')			
	EGO-PI5B-V1	OPEN		
EGO-PDI7B	EGS-PNL3B LUBE OIL FILTER DIFF PRESS (DG-2-98')			
	EGO-PDI7B-V1H	OPEN		
	EGO-PDI7B-V2L	OPEN		
EGT-PI4B	JACKET WATER PRESS EGS-PNL3B (DG-2-98')			
	EGT-PI4B-V1	OPEN		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	2ND
EGA-PS32B	AIR RCVR TK 2B & 2D (DE-1-103')			
	EGA-PS32B-V1	OPEN		
	EGA-PS32B-V2	CLOSED		
EGA-PS31B	AIR RCVR TK 1B & 1D (DE-1-103')			
	EGA-PS31B-V1	OPEN		
	EGA-PS31B-V2	CLOSED		
EGA-PS20B	AIR RCVR TK 2B & 2D (DE-1-103')			
	EGA-PS20B-V1	OPEN		
	EGA-PS20B-V2	CLOSED		
EGA-PS19B	AIR RCVR TK1B & TK1D (DE-1-103')			
	EGA-PS19B-V1	OPEN		
	EGA-PS19B-V2	CLOSED		
EGA-PIY26B	EGS-PNL3B FWD START AIR PRESS (DG-2-98')			
	EGA-PIY26B-V1	OPEN		
EGA-PIX26B	EGS-PNL3B REAR START AIR PRESS (DG-2-98')			
	EGA-PIX26B-V1	OPEN		
EGA-PI18B	STBY DSL GEN. AIR RCVR TK2B (DE-1-103')			
	EGA-PI18B-V1	OPEN		
	EGA-PI18B-V2	CLOSED		
EGA-PI18D	STBY DSL GEN AIR RCVR TK2D (DE-1-103')			
	EGA-PI18D-V1	OPEN		
	EGA-PI18D-V2	CLOSED		
EGA-PI17B	STBY DSL GEN. AIR RCVR TK1B (DE-1-103')			
	EGA-PI17B-VI	OPEN		
	EGA-PI17B-V2	CLOSED		
EGA-PI17D	STBY DSL GEN. AIR RCVR TK1D (DE-1-103')			
	EGA-PI17D-V1	OPEN		
	EGA-PI17D-V2	CLOSED		
EGF-LT16B	STBY DSL FUEL DAY TK2B LVL (DE-2-103')			
	EGF-LT16B-V1	OPEN		
	EGF-LT16B-V2	CLOSED		
	EGF-LT16B-V3	CLOSED		
	EGF-LIX16B EGS-PNL3B (DG-2-98')	LIVE ZERO		

INSTRUMENT & VALVE LINEUP - STANDBY DIESEL GENERATOR EG1B

INSTRUMENT NUMBER	INSTRUMENT DESCRIPTION	STATUS	INITIALS 1ST	INITIALS 2ND
EGS-PNL3B	ENGINE CONTROL PANEL (DG-2-98') (VALVES INSIDE PANEL)			
	EGS-PNL3B-V1	OPEN		
	EGS-PNL3B-V2	OPEN		
EGA-PI27B	EGS-PNL3B CONTROL AIR PRESS (DG-2-98')			
	EGA-PI27B-V1	OPEN		
EGT-LI24B	JACKET WATER STANDPIPE LEVEL			
	EGT-LI24B-V1	OPEN		
	EGT-LI24B-V2	CLOSED/ CAPPED		

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ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1A

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND
ENS-ACB07	DIESEL GENERATOR	ENS-SWG1A ACB07	RACKED IN OPEN		
EGS-ACB11	DIESEL GEN NEUT	ENS-SWG2A ACB11	RACKED IN CLOSED		
EGE-CAB01A	STBY DIESEL GEN EXC CABINET	ENB-SWG01A BKR 566	RACKED IN CLOSED		
EGF-P1A	DIESEL GENERATOR FUEL TRANSFER PUMP	EHS-MCC15A BKR 1C	ON		
EGS-EG1AH	DIESEL GENERATOR SPACE HEATER	NHS-MCC15A BKR 2A	ON		
EGO-H1A	DIESEL GENERATOR LUBE OIL HEATER	NHS-MCC15A BKR 2B	ON		
EGO-P1A	DIESEL GENERATOR LUBE OIL PUMP	NHS-MCC15A BKR 2C	ON		
EGT-H1A	DIESEL GENERATOR IMMERSION WTR HEATER	NHS-MCC15A BKR 2E	ON		
EGT-P1A	DIESEL GENERATOR COOLING WATER CIRC PUMP	NHS-MCC15A BKR 3A	ON		
EGA-C5A	FORWARD START AIR COMPRESSOR	EHS-MCC15A BKR 2D	ON		
EGA-C4A	REAR START AIR COMPRESSOR	EHS-MCC15A BKR 1A	ON		
EGA-C4A-HTR EGA-C5A-HTR	COMP MOTOR HEATER	SCV-PNL15A1 BKR 17	ON		
EGSN04	EGS-PNL4A HEATER	SCA-PNL15A1 BKR 6	ON		
EGO-P1AH	LUBE OIL CIRC PUMP HTR	SCA-PNL15A1 BKR 10	ON		
EGF-EG1AH	DIESEL TERM BOX SPACE HTR	SCA-PNL15A1 BKR 16	ON		
EGT-CNTOR01	JACKET WATER HEAT TRACE	SCA-PNL15A1 BKR 7	ON		
EGT-CNTOR02	JACKET WATER HEAT TRACE	SCA-PNL15A1 BKR 18	ON		
EGAN05	RSS RELAY CKT	SCV-PNL15A1 BKR 14	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1A

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND
EGS-PNL2A	125 VDC BACKUP PROT EGS-EG1A	ENB-PNL03A DISC 6	ON		
EGE-CAB01A	125 VDC TO D/G A EXCITATION CABINET	ENB-PNL03A DISC 7	ON		
ENS-SWG2A	125 VDC CONTROL BUS	ENB-PNL03A DISC 8	ON		
EGS-PNL2A	125 VDC DIFF PROT EGS-EG1A	ENB-PNL03A DISC 9	ON		
EGS-PNL3A	125 VDC D/G 1A REAR AIR START	ENB-PNL03A DISC 10	ON		
EGS-PNL3A	125 VDC D/G FWD AIR START & ENG STOP	ENB-PNL03A DISC 11	ON		
H13-P851	STBY D/G AUX CONTROL CKT	ENB-PNL02A DISC 18	ON		
H13-P819/H13-P841	DIV I BOP ANALOG INSTRUMENT RACKS	VBS-PNL01A DISC 11	ON		
H13-P854	BOP ANALOG INSTR. POWER SUPPLIES	VBN-PNL01A1 DISC 15	ON		
EGF-P2A	DC FUEL OIL BOOSTER PUMP	BYS-PNL02A1 DISC 19	ON		
H13-P855D	(7EGS03) ANALOG CIRC	SCI-PNL01 BKR 12	ON		
	REAR STARTING CIRCUIT	EGS-PNL3A CB 1/2	ON		
	FORWARD STARTING CIRCUIT	EGS-PNL3A CB 3/4	ON		
	FAIL TO START CIRCUIT	EGS-PNL3A CB 5/6	ON		
	TEMP INDICATOR/ HOURMETER CIRCUIT	EGS-PNL3A CB 7/8	ON		
	ALARM HORN/TEST CIRCUIT	EGS-PNL3A CB 9/10	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1A

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ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1B

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	INITIALS 2ND
ENS-ACB27	DIESEL GENERATOR	ENS-SWG1B ACB 27	RACKED IN OPEN		
EGS-ACB31	DIESEL GEN NEUT	ENS-SWG2B ACB 31	RACKED IN CLOSED		
EGE-CAB01B	STBY DIESEL GEN EXC CAB	ENB-SWG01B ACB 585	RACKED IN CLOSED		
EGF-P1B	DIESEL GENERATOR FUEL TRANSFER PUMP	EHS-MCC15B BKR 1C	ON		
EGT-H1B	DIESEL GENERATOR IMMERSION WTR HEATER	NHS-MCC15B BKR 1C	ON		
EGS-EG1BH	DIESEL GENERATOR SPACE HEATER	NHS-MCC15B BKR 2B	ON		
EGT-P1B	DIESEL GENERATOR COOLING WTR CIRC PUMP	NHS-MCC15B BKR 2C	ON		
EGA-C4B	REAR START AIR COMPRESSOR	EHS-MCC15B BKR1A	ON		
EGA-C5B	FORWARD START AIR COMPRESSOR	EHS-MCC15B BKR 2D	ON		
EGO-P1B	DIESEL GENERATOR LUBE OIL PUMP	NHS-MCC15B BKR 3E	ON		
EGO-H1B	DIESEL GENERATOR LUBE OIL HEATER	NHS-MCC15B BKR 3F	ON		
EGT-CNTOR04	JACKET WATER HEAT TRACE	SCA-PNL15B1 BKR 3	ON		
EGA-C4B-HTR	REAR START AIR COMP HTR	SCV-PNL15B1 BKR 9	ON		
EGA-C5B-HTR	FORWARD START AIR COMP HTR				
EGS-EG1BH	DIESEL TERM BOX SPACE HTR	SCA-PNL15B1 BKR 5	ON		
EGO-P1BH	LUBE OIL CIRC PUMP HTR	SCA-PNL15B1 BKR 8	ON		
EGT-CNTOR05	JACKET WATER HEAT TRACE	SCA-PNL15B1 BKR 10	ON		
ENS-SWG2B	125 VDC CONTROL BUS	ENB-PNL03B DISC 2	ON		
EGS-PNL2B	125 VDC BACKUP PROT EGS-EG1B	ENB-PNL03B DISC 6	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1B

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	POWER SUPPLY	REQUIRED POSITION	INITIALS 1ST	2ND
EGE-CAB01B	125 VDC STBY D/G B EXCITATION CABINET	ENB-PNL03B DISC 7	ON		
EGS-PNL2B	125 VDC DIFF PROT EGS-EG1B	ENB-PNL03B DISC 9	ON		
EGS-PNL3B	125 VDC D/G 1B REAR AIR START	ENB-PNL03B DISC 10	ON		
EGS-PNL3B	125 VDC D/G FWD AIR START & ENG STOP	ENB-PNL03B DISC 13	ON		
H13-P852	STBY D/G AUX CONTROL CKT	ENB-PNL02B DISC 17	ON		
H13-P820/H13-P842	DIV 2 BOP ANALOG INSTRUMENT RACKS	VBS-PNL01B DISC 11	ON		
H13-P854	BOP ANALOG INSTR. POWER SUPPLIES	VBN-PNL01A1 DISC 15	ON		
EGF-P2B	DC FUEL OIL BOOSTER PUMP	BYS-PNL02B1 DISC 20	ON		
H13-P855D	(7EGS03) ANALOG CIRC	SCI-PNL01 BKR 12	ON		
	REAR STARTING CIRCUIT	EGS-PNL3B CB 1/2	ON		
	FORWARD STARTING CIRCUIT	EGS-PNL3B CB 3/4	ON		
	FAIL TO START CIRCUIT	EGS-PNL3B CB 5/6	ON		
	TEMP INDICATOR/ HOURMETER CIRCUIT	EGS-PNL3B CB 7/8	ON		
	ALARM HORN/TEST CIRCUIT	EGS-PNL3B CB 9/10	ON		

ELECTRICAL LINEUP - STANDBY DIESEL GENERATOR EG1B

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CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	2ND
THE FOLLOWING ITEMS ARE LOCATED ON H13-P877				
STBY DIESEL ENGINE A STOP	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A MODE	NEUTRAL	N/A		
STBY DIESEL ENGINE A EMERGENCY START	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A EMERGENCY START RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A STOP RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE A STOP	NOT DEPRESSED	N/A		
STBY DIESEL GENERATOR A READY TO LOAD	N/A	OFF		
STBY DIESEL GENERATOR A TRIPPED	N/A	OFF		
STBY DIESEL GENERATOR A AVAILABLE	N/A	WHITE		
ENS-ACB11 STBY D/G A NEUTRAL BRKR	NEUTRAL AFTER CLOSE	RED/WHITE		
ENS-ACB07 STBY D/G A OUTPUT BRKR	NEUTRAL AFTER TRIP	GREEN/WHITE		
ENS-ACB07 STBY D/G A OUTPUT BRKR	RESET	N/A		
REMOTE SYNC SW OFF	OFF	BLUE		
STBY DIESEL GENERATOR A GOVERNOR CONTROL	NEUTRAL	N/A		
STBY DIESEL GENERATOR A VOLTAGE REGULATOR CONT	NEUTRAL	N/A		
STBY GEN & DISTR MANUAL BYPASS INOP	OFF	N/A		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL3A				
FUEL OIL TRANSFER PUMP EGF-P1A	AUTO	AMBER + GREEN/RED		
EGF-P2A DC FUEL OIL BOOSTER PUMP	AUTO	AMBER + GREEN/RED		
HIGH TEMPERATURE TRIP BYPASS	OPERATE	WHITE		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	2ND
EGS-EG1AH GENERATOR SPACE HEATER	AUTO	AMBER + GREEN/RED		
EGO-P1A, H1A LUBE OIL CIRC. PUMP AND HEATER	AUTO	AMBER + GREEN/RED		
EGT-P1A, H1A JACKET WATER CIRC. PUMP & HEATER	AUTO	AMBER + GREEN/RED		
EMERGENCY START	NOT DEPRESSED	N/A		
ENGINE ROLL	NOT DEPRESSED	N/A		
TEMPERATURE SELECTOR	ANY	N/A		
STOP	NOT DEPRESSED	N/A		
MAINT MODE SELECT	NOT TURNED	N/A		
STOP	NOT DEPRESSED	N/A		
RETURN TO OPERATIONAL	NOT DEPRESSED	N/A		
STOP RESET	NOT DEPRESSED	N/A		
UNIT AVAIL EMERGENCY STATUS	N/A	WHITE		
AC CONTROL POWER ON	N/A	WHITE		
DC CONTROL POWER ON	N/A	WHITE		
READY TO LOAD	N/A	OFF		
UNIT TRIPPED	N/A	OFF		
NORMAL START	NOT DEPRESSED	N/A		
SYNCHRONOUS	N/A	OFF		
STARTING	N/A	OFF		
SHUTDOWN SYSTEM ACTIVE	N/A	OFF		
FORWARD START DC POWER	N/A	WHITE		
REAR START DC POWER	N/A	WHITE		
THE FOLLOWING ITEM IS LOCATED ON EHS-MCC15A				
EGA-C4A REAR START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		
EGA-C5A FORWARD START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL2A				
PRIMARY TRIP CUTOFF	OPERATE	WHITE		
BACK-UP TRIP CUTOFF	OPERATE	WHITE		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	2ND
PRIMARY PROTECTION TRIP AND LOCKOUT	RESET	NONE		
BACK-UP PROTECTION TRIP AND LOCKOUT	RESET	NONE		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL1A				
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN RESET	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
GENERATOR EGS-EG1A NEUTRAL BREAKER	NEUTRAL	RED/WHITE		
GENERATOR EGS-EG1A TO STBY BUS ENS-SWG1A	NEUTRAL AFTER TRIP	GREEN/WHITE		
SYNCHRONIZING CONTROL	OFF	N/A		
ENS-ACB06 NORMAL SUPPLY BRKR TO STBY BUS ENS-SWG1A	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
ENS-ACB04 ALTERNATE SUPPLY BRKR TO STBY BUS ENS-SWG1A	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
BUS VOLTS VOLTMETER	OFF	N/A		
GENERATOR VOLTS VOLTMETER	OFF	N/A		
VOLTAGE REGULATOR CONTROL	NEUTRAL	N/A		
GOVERNOR CONTROL	NEUTRAL	N/A		
REMOTE SYNCHRONIZING SELECTOR SWITCH OFF	N/A	BLUE		
THE FOLLOWING ITEMS ARE LOCATED ON EGE-CAB01A				
FIELD FLASHING RELAY READY	N/A	WHITE LIGHT ENERGIZED		
*Either the NORMAL or ALTERNATE supply breaker may be closed.				

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1A

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CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	2ND
THE FOLLOWING ITEMS ARE LOCATED ON H13-P877				
STBY DIESEL ENGINE B STOP	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B MODE	NEUTRAL	N/A		
STBY DIESEL ENGINE B EMERGENCY START	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B EMERGENCY START RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B STOP RESET	NOT DEPRESSED	N/A		
STBY DIESEL ENGINE B STOP	NOT DEPRESSED	N/A		
STBY DIESEL GENERATOR B READY TO LOAD	N/A	OFF		
STBY DIESEL GENERATOR B TRIPPED	N/A	OFF		
STBY DIESEL GENERATOR B AVAILABLE	N/A	WHITE		
ENS-ACB31 STBY D/G B NEUTRAL BRKR	NEUTRAL AFTER CLOSE	RED/WHITE		
ENS-ACB27 STBY D/G B OUTPUT BRKR	NEUTRAL AFTER TRIP	GREEN/WHITE		
ENS-ACB27 STBY D/G B OUTPUT BRKR	RESET	N/A		
REMOTE SYNC SW OFF	OFF	BLUE		
STBY DIESEL GENERATOR B GOVERNOR CONTROL	NEUTRAL	N/A		
STBY DIESEL GENERATOR B VOLTAGE REGULATOR CONT	NEUTRAL	N/A		
STBY GEN & DISTR MANUAL BYPASS INOP	OFF	N/A		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL3B				
EGF-P1B FUEL OIL TRANSFER PUMP	AUTO	AMBER + GREEN/RED		
EGF-P2B DC FUEL OIL BOOSTER PUMP	AUTO	AMBER + GREEN/RED		
HIGH TEMPERATURE TRIP BYPASS	OPERATE	WHITE		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
GENERATOR SPACE HEATER EGS-EG1BH	AUTO	AMBER + GREEN/RED		
EGO-P1B, H1B LUBE OIL CIRC. PUMP AND HEATER	AUTO	AMBER + GREEN/RED		
EGT-P1B, H1B JACKET WATER CIRC. PUMP & HEATER	AUTO	AMBER + GREEN/RED		
EMERGENCY START	NOT DEPRESSED	N/A		
ENGINE ROLL	NOT DEPRESSED	N/A		
TEMPERATURE SELECTOR	ANY	N/A		
STOP	NOT DEPRESSED	N/A		
MAINT MODE SELECT	NOT TURNED	N/A		
STOP	NOT DEPRESSED	N/A		
RETURN TO OPERATIONAL	NOT DEPRESSED	N/A		
STOP RESET	NOT DEPRESSED	N/A		
UNIT AVAIL EMERGENCY STATUS	N/A	WHITE		
AC CONTROL POWER ON	N/A	WHITE		
DC CONTROL POWER ON	N/A	WHITE		
READY TO LOAD	N/A	OFF		
UNIT TRIPPED	N/A	OFF		
NORMAL START	NOT DEPRESSED	N/A		
SYNCHRONOUS	N/A	OFF		
STARTING	N/A	OFF		
SHUTDOWN SYSTEM ACTIVE	N/A	OFF		
FORWARD START DC POWER	N/A	WHITE		
REAR START DC POWER	N/A	WHITE		
THE FOLLOWING ITEM IS LOCATED ON EHS-MCC15B				
EGA-C4B REAR START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		
EGA-C5B FORWARD START AIR COMPRESSOR	AUTO	AMBER + GREEN/RED		

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

PANEL ITEM	PANEL ITEM POSITION	INDICATION	INITIALS 1ST	INITIALS 2ND
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL2B				
PRIMARY TRIP CUTOFF	OPERATE	WHITE		
BACK-UP TRIP CUTOFF	OPERATE	WHITE		
PRIMARY PROTECTION TRIP AND LOCKOUT	RESET	NONE		
BACK-UP PROTECTION TRIP AND LOCKOUT	RESET	NONE		
THE FOLLOWING ITEMS ARE LOCATED ON EGS-PNL1B				
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN RESET	NOT DEPRESSED	N/A		
EXCITATION SHUTDOWN	NOT DEPRESSED	N/A		
GENERATOR EGS-EG1B NEUTRAL BREAKER	NEUTRAL	RED/WHITE		
GENERATOR EGS-EG1B TO STBY BUS ENS-SWG1B	NEUTRAL AFTER TRIP	GREEN/WHITE		
SYNCHRONIZING CONTROL	OFF	N/A		
ENS-ACB26 NORMAL SPLY BRKR TO STBY BUS ENS-SWG1B	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
ENS-ACB24 ALTERNATE SPLY BRKR TO STBY BUS ENS-SWG1B	*NEUTRAL AFTER TRIP/CLOSE	*RED or GREEN/WHITE		
BUS VOLTS VOLTMETER	OFF	N/A		
GENERATOR VOLTS VOLTMETER	OFF	N/A		
VOLTAGE REGULATOR CONTROL	NEUTRAL	N/A		
GOVERNOR CONTROL	NEUTRAL	N/A		
REMOTE SYNCHRONIZING SELECTOR SWITCH OFF	N/A	BLUE		
THE FOLLOWING ITEMS ARE LOCATED ON EGE-CAB01B				
FIELD FLASHING RELAY READY	N/A	WHITE LIGHT ENERGIZED		
*Either the NORMAL or ALTERNATE supply breaker may be closed.				

CONTROL BOARD LINEUP - STANDBY DIESEL GENERATOR EG1B

Remarks: ____

____

____

____

____

Performed By: ____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

____________________ __________ __________ _____/_____
Signature KCN Initials Date/Time

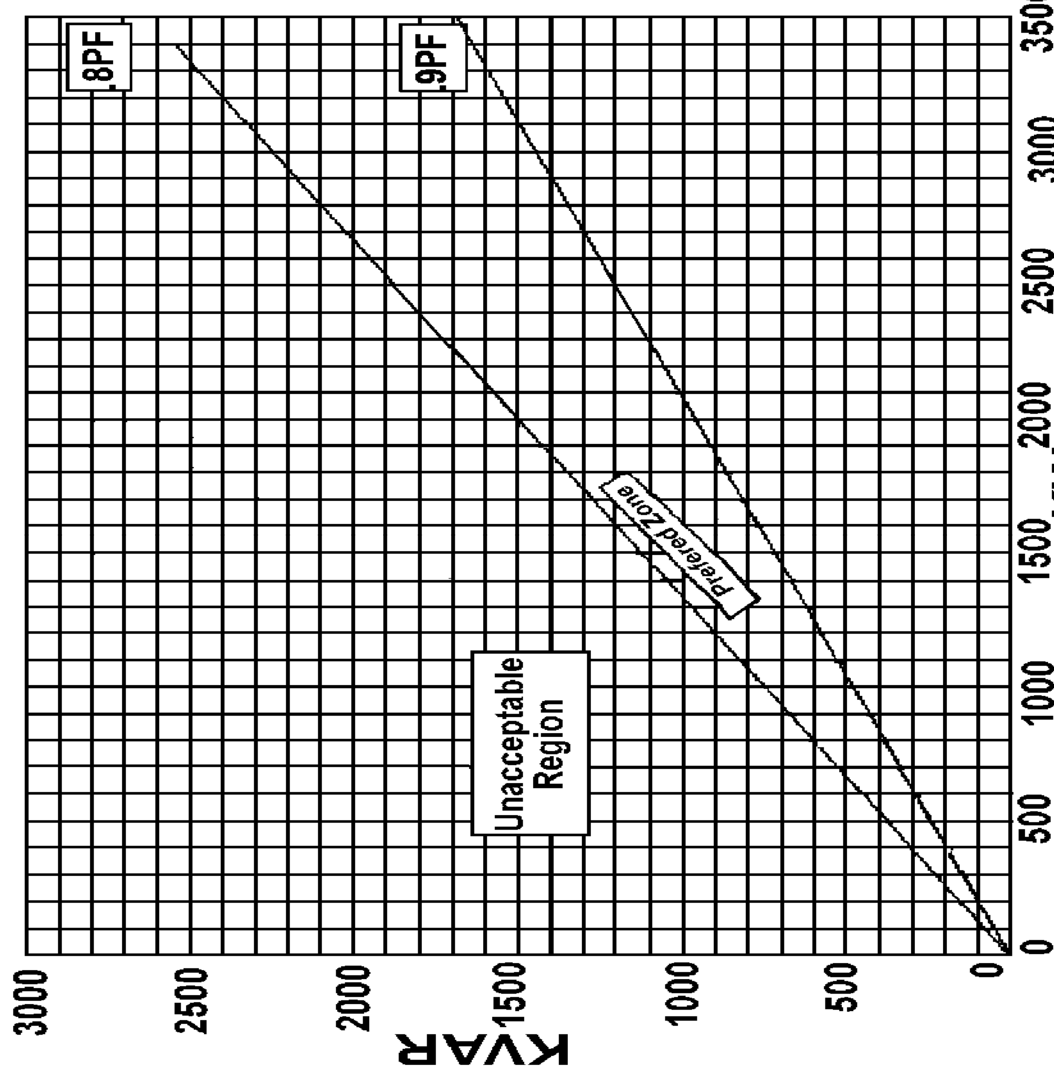
Reviewed By: ____________________ __________ __________
OSM/CRS KCN Date/Time

Second Review: ____________________ __________ __________
Operations Management KCN Date/Time

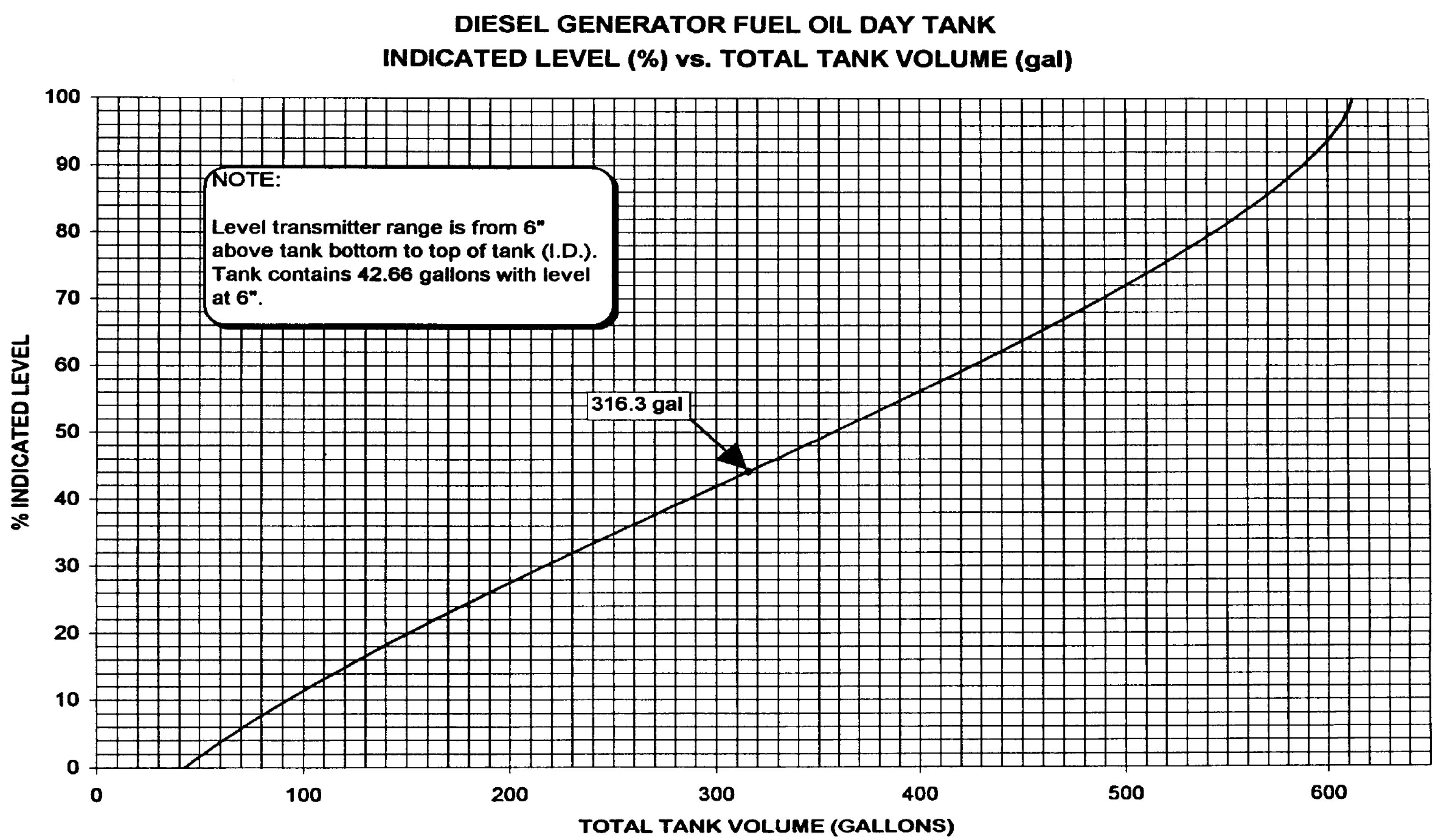
ENGINE PARAMETERS

PARAMETER	NORMAL OPERATING RANGE	NORMAL INDICATION	ALTERNATE INDICATION
Lube Oil Pressure	50-65 Psig	EGO-PI15A(B)	N/A
Turbo Oil Pressure	25-40 Psig	EGO-PI10A(B)	N/A
Fuel Oil Pressure	25-40 Psig	EGF-PI27A(B)	N/A
Fuel Oil Filter Diff Pressure	0-5 Psid	EGF-PI29A(B)	N/A
Lube Oil Filter Diff Pressure	Less Than 20 Psid	EGO-PI7A(B)	N/A
Crankcase Pressure	0-3 in. WC.	EGS-PI6A(B)	N/A
Start Air Pressure	160-250 Psig	EGA-PIY26A(B) EGA-PIX26A(B)	EGA-PI18A(B,C,D) EGA-PI17A(B,C,D)
Control Air Pressure	55-65 Psig	EGA-PI27A(B)	N/A
Governor oil level	Greater Than Fill Mark Standby Visible in sightglass Operating	Sight Glass	N/A
Jacket Water Pressure	12-30 Psig	EGT-PI4A(B)	N/A
Cylinder Temperatures	700-1000°F	EGS-TI64A(B) Positions 1-8	N/A
Jacket Water In	125-160°F	EGS-TI64A(B) Pos. 12	N/A
Jacket Water Out	130-165°F	EGS-TI64A(B) Pos. 13	EGO-TI30A(B)
Lube Oil In	130-165°F	EGS-TI64A(B) Pos. 10	EGO-TI28A(B)
Lube Oil Out	160-180°F	EGS-TI64A(B) Pos. 11	EGO-TI29A(B)
Exhaust Temperatures	600-825°F	EGS-TI64A(B) Pos. 9	N/A
Aftercooler Water In	115-155°F	EGS-TI64A(B) Pos. 14	EGO-TI27A(B)
Aftercooler Water Out	125-160°F	EGS-TI64A(B) Pos. 15	N/A
Service Water In	50-95°F	EGS-TI64A(B) Pos. 16	N/A
Service Water Out	60-105°F	EGS-TI64A(B) Pos. 17	On H13-P877 SWP-TI78A(B)
Oil Cooler Water In	115-155°F	EGS-TI64A(B) Pos. 18	EGO-TI31A(B)
Oil Cooler Water Out	120-160°F	EGS-TI64A(B) Pos.19	EGO-TI27A(B)

KW VS KVAR (.8PF)

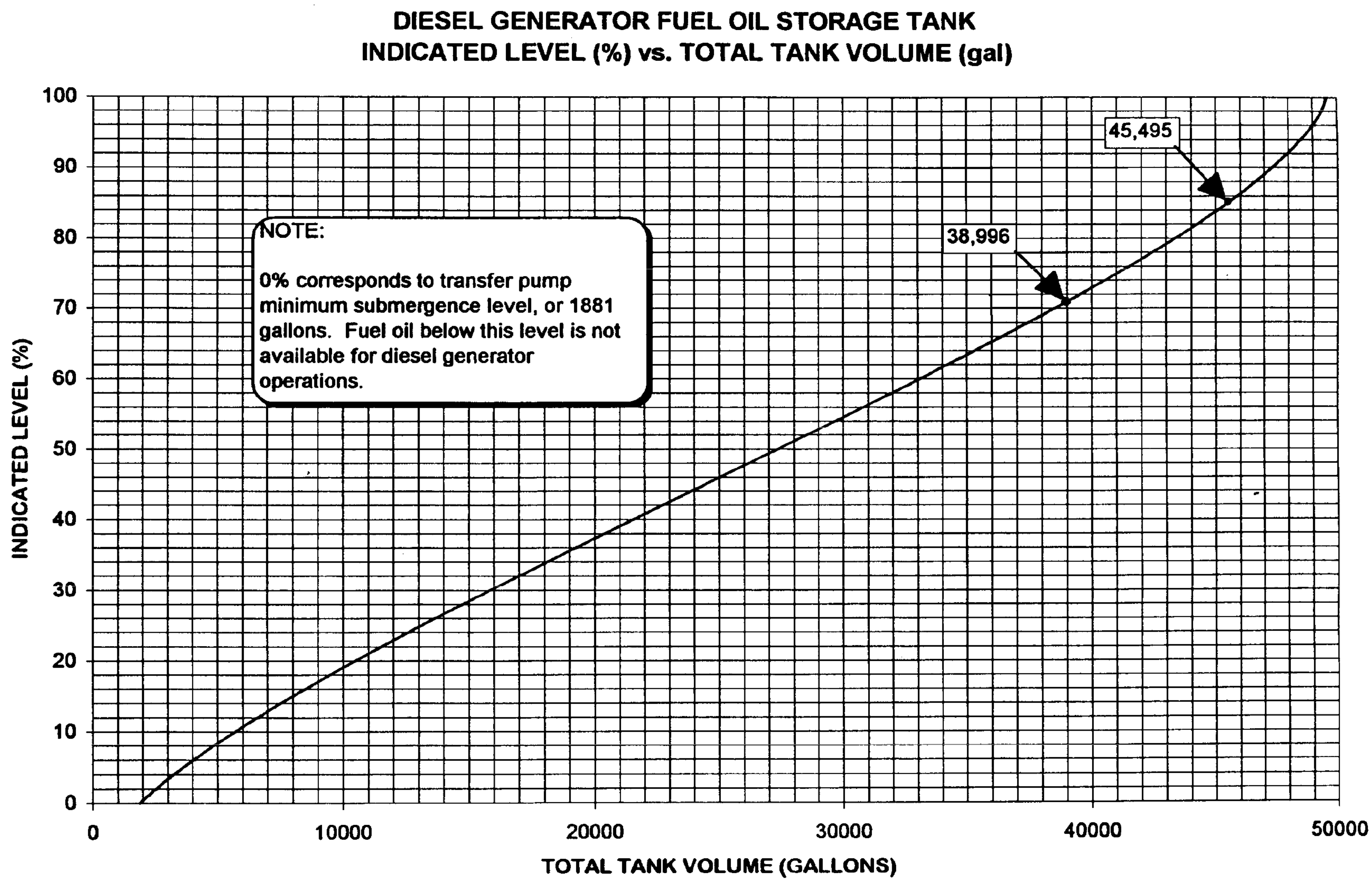


FUEL OIL DAY TANK LEVEL INDICATION

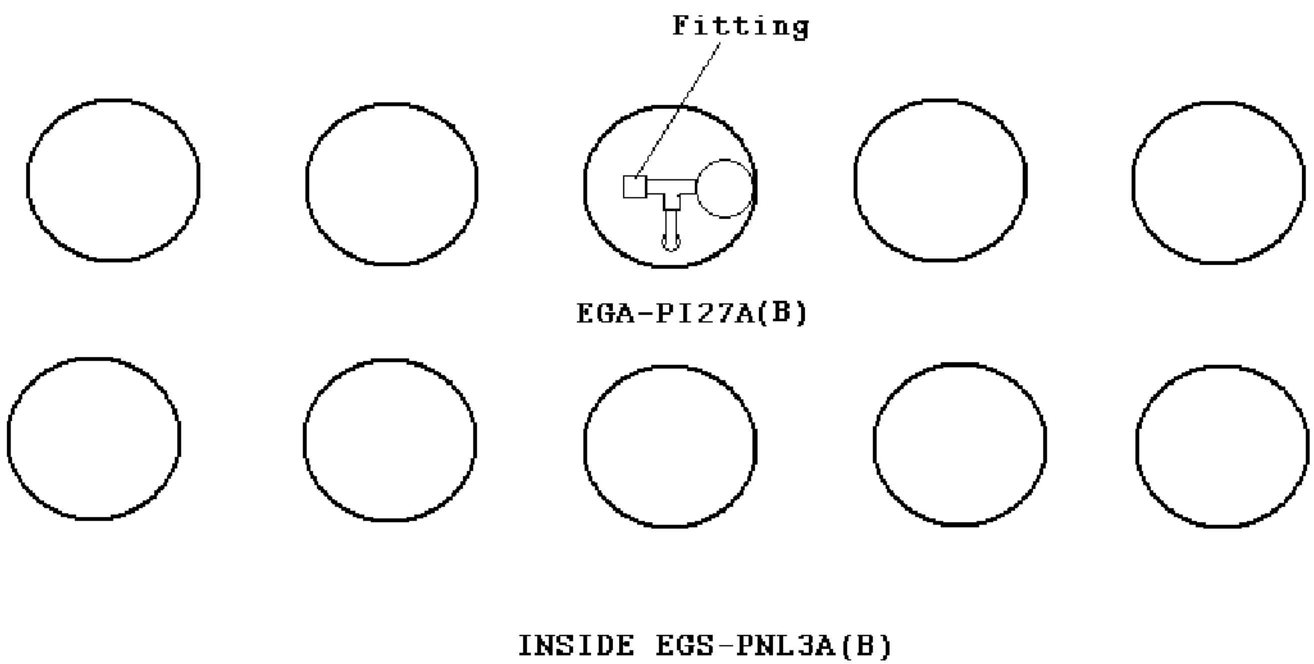


NOTE: *This graph shows the Tech Spec Limit of 316.3 gals as 44%. However, due to indication errors the minimum Tech Spec level will be 45%.*

FUEL OIL STORAGE TANK LEVEL INDICATION



FITTING LOCATION FOR SECTION 6.5.2



NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE

SRO ☒ RO ☒

ALTERNATE PATH ☒

TITLE: **Align Instrument Air System (IAS) to Safety Relief Valve Air System (SVV)**

OPERATOR: ____________________ **DATE:** ____________________

EVALUATOR: ____________________ **EVALUATOR SIGNATURE:** ____________________

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	20	Actual Time (min):	

JPM RESULTS*: (Circle one) * SAT UNSAT
Refer to Grading Instructions at end of JPM

EVALUATION METHOD:

	Perform
X	Simulate

EVALUATION LOCATION:

X	Plant
	Simulator
	Control Room

Prepared:	Dave Bergstrom	**Date:**	September 11, 2013
Reviewed:	Jeff Reynolds (Operations Representative)	**Date:**	January 22, 2014
Approved:	Joey Clark (Facility Reviewer)	**Date:**	January 27, 2014

EXAMINER INFO SHEET

Task Standard: Backup air is lined up to Supply each SRV Division Separately from IAS using AOP-0050, Attachment 6.

Synopsis: During a station blackout event, power is lost to the SVV Compressors. This JPM provides a method for providing a backup source of air to the SRV's. This task will align the Instrument Air System (IAS) to the Safety Relief Valve Air System (SVV) using AOP-0050, Station Blackout. An Alternate Path is taken when the SVV Header fails to pressurize.

NOTE: If in the Plant or the Control Room, **Caution** the operator **NOT** to MANIPULATE the controls, but to make clear what they would do if this were not a simulated situation.

1) **Read to the operator**:

"I will provide the initial conditions and initiating cues to you. I may also provide cues during the performance and ask follow-up questions at the conclusion of this JPM. When you complete the task successfully, the objective for this JPM will be satisfied. Inform me when you have completed the task."

2) Initiating Cues:

The CRS has directed you to provide backup air from the Instrument Air System (IAS) to the SRV's per Attachment 6 of AOP-0050.

3) Initial Conditions:

A station blackout is in progress.

SRVs are required to be cycled to stabilize reactor pressure

The IAS Diesel Air Compressor is operating, lined up to supply air to the Instrument Air System.

4) Solicit and answer any questions the operator may have.

DATA SHEET

TASK Title:	**Task Number**	**K&A SYSTEM:**	**K&A RATING:**
Align the Instrument Air System (IAS) to the Safety Relief Valve Air System (SVV) in accordance with AOP-0050, Attachment 6.	278001004004	218000 A2.03 300000 K4.02 295003 AK1.06	3.4 / 3.6 3.0 / 3.0 3.8 / 4.0

REFERENCES:
AOP-0050, Rev 48

APPLICABLE OBJECTIVES
RLP-HLO-541, Obj 7

REQUIRED MATERIALS:
AOP-0050, Rev 48, Attachment 6

SAFETY FUNCTION:
__**8**__

SIMULATOR CONDITIONS & SETUP:

1. NA – This is an In Plant JPM.

CRITICAL ELEMENTS: Items marked with an "*" are Critical Steps and are required to be performed. Failure to successfully complete a Critical Step requires the JPM to be evaluated as Unsatisfactory.

TASK STANDARD: Backup air is lined up to Supply each SRV Division Separately from IAS using AOP-0050, Attachment 6.

PERFORMANCE:

START TIME: ________________

AOP-0050, Station Blackout
Attachment 6, IAS Diesel Air Compressor Backup to SVV Header

	Procedure Step:	1. Contact the Aux Control Room, verify Diesel Air Compressor is lined up and operating to supply air to the IAS System.
	Standard	NA
	Cue	
	Notes	Applicant has no actions to perform in this step per initial conditions.

1.	**Procedure Step:**	2. Proceed to Turbine Building 95 ft el, northeast corner, next to the Auxiliary Building door, and perform the following:
	Standard	Applicant arrived at the designated location.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	2.1 Open AOP-0050, Station Blackout, IAS Diesel Air Compressor Backup to SVV Header Supply Kit, and verify the kit contains the following equipment:
	Standard	Applicant located and identified the kit and its contents.
	Cue	Do not allow the applicant to open the kit. Notify the applicant that all required equipment is present and that movement of equipment will be simulated.
	Notes	
	Results	SAT ☐ UNSAT ☐

3.	**Procedure Step:**	2.2 Move the needed contents of this kit to the Aux Building 141 ft el.
	Standard	Applicant arrived at the designated location.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

PROCEDURE NOTE

It is preferable to supply the SVV header via the IAS system per Section 3 of this attachment rather than supplying each SRV division separately from IAS per Section 4.

4.	**Procedure Step:**	3.1 On IAS-V345, IAS SUPPLY ROOT, behind HVR-FLT2, next to door to SBGT Train A, install a 90° elbow with tee fitting.
	Standard	Applicant located/identified IAS-V345 and simulated installing the elbow and T-fitting.
	Cue	
	Notes	Valve is located about 7 foot off the floor.
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	3.2 At SVV-V3000, AIR HEADER X-CONNECT DRAIN, located five feet northeast of PVLCS Skid A Accumulator Tank, install a quick connect fitting
	Standard	Applicant located/identified SVV-V3000 and simulated installing the quick connect fitting.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	3.3 Make a hose connection between IAS-V345, IAS SUPPLY ROOT and SVV-V3000, AIR HEADER X-CONNECT DRAIN.
	Standard	Applicant stated/simulated connecting a hose between the IAS-V345 and SVV-V3000.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

7.	**Procedure Step:**	3.4 Close the bleed valve on the tee fitting at IAS-V345, IAS SUPPLY ROOT.
	Standard	Applicant located/identified stated that the bleed valve on the tee fitting has been closed by turning in the clockwise direction until motion stopped.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

8.	**Procedure Step:**	3.5 OPEN IAS-V345, IAS SUPPLY ROOT.
	Standard	Applicant has stated that valve IAS-V345 has been opened by turning the handwheel in the counter-clockwise direction until valve motion stopped.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

9.	**Procedure Step:**	3.6 OPEN SVV-V3000, AIR HEADER X-CONNECT DRAIN
	Standard	Applicant has stated that valve SVV-V3000 has been opened by turning the handwheel in the counter-clockwise direction until valve motion stopped.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

10.	**Procedure Step:**	3.7 At the SVV Dryer Panel, observe SVV header pressure on SVV-PI38A or 38B. IF SVV header pressure can NOT be maintained greater than 101 psig, THEN disconnect the hookup per steps 3.8.1 through 3.8.6 and proceed to section 4 of this attachment.
	Standard	Applicant located/identified SVV-PI38A or 38B. {Cue} Applicant transitions to step 3.8.1
	Cue	Indicate a pressure of 90 psig
	Notes	
	Results	SAT ☐ UNSAT ☐

ALTERNATE PATH:

11.	**Procedure Step:**	3.8.1 Close IAS-V345, IAS SUPPLY ROOT.
	Standard	Applicant has stated that valve IAS-V345 has been closed by turning the handwheel in the clockwise direction until valve motion stopped.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

12.	**Procedure Step:**	3.8.2 Close SVV-V3000, AIR HEADER X-CONNECT DRAIN
	Standard	Applicant has stated that valve SVV-V3000 has been closed by turning the handwheel in the clockwise direction until valve motion stopped.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

13.	**Procedure Step:**	3.8.3 At IAS-V345, IAS SUPPLY ROOT open the bleed valve on the tee fitting.
	Standard	Applicant located/identified stated that the bleed valve on the tee fitting has been opened by turning in the counter-clockwise direction until motion stopped.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

14.	**Procedure Step:**	3.8.4 Disconnect the hose from IAS-V345, IAS SUPPLY ROOT and SVV-V3000, AIR HEADER X-CONNECT DRAIN.
	Standard	Applicant stated/simulated disconnecting a hose between the IAS-V345 and SVV-V3000.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

15.	**Procedure Step:**	3.8.5 Remove the tee fitting from IAS-V345, IAS SUPPLY ROOT.
	Standard	Applicant simulated removing the elbow and T-fitting.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

16.	**Procedure Step:**	3.8.6 At SVV-V3000, AIR HEADER X-CONNECT DRAIN, remove the quick connect fitting.
	Standard	Applicant simulated removing the quick connect fitting.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

Section 4 Supplying each SRV Division Separately from IAS.

17.	***Procedure Step:**	4.1 On IAS-V345, IAS SUPPLY ROOT, behind HVR-FLT2, next to door to SBGT Train A, install a 90° elbow with cross fitting.
	Standard	Applicant located/identified IAS-V345 and simulated installing the elbow and cross fitting.
	Cue	
	Notes	IAW step 10 of this JPM, applicant performed procedure steps 3.8.1 through 3.8.6 then proceeds to step 4.
	Results	SAT ☐ UNSAT ☐

18.	***Procedure Step:**	4.2 At SVV-V48, HDR A OUTBOARD LEAKAGE MONITORING CONNECTION, located 4 feet southeast of LPCS Injection Valve, E21-MOVF005, install a quick connect fitting.
	Standard	Applicant located/identified SVV-V48 and simulated installing the quick connect fitting.
	Cue	Ask student if he can point out the valve without going down the ladder. If able, don't go down ladder.
	Notes	Best access for the valve is using the LPCS pit ladder; can be seen best from the top of the other pit (to the east).
	Results	SAT ☐ UNSAT ☐

19.	***Procedure Step:**	4.3 At SVV-V51, HDR B OUTBOARD LEAKAGE MONITORING CONNECTION, located 2 feet south of HPCS Injection Valve E22-MOVF004, install a quick connect fitting.
	Standard	Applicant located/identified SVV-V51 and simulated installing the quick connect fitting.
	Cue	Ask the applicant to point out the valve without going down the ladder. If able, don't go down ladder. After pointing out the correct valve, inform the applicant that another operator will complete this task.
	Notes	This is a manual valve located below the HPCS injection valve handwheel.
	Results	SAT ☐ UNSAT ☐

Terminating Cue: Backup air is lined up to Supply each SRV Division Separately from IAS using AOP-0050, Attachment 6.

This completes this JPM.

STOP TIME: ______________________

JPM COMMENT SHEET

CRITERIA FOR SATISFACTORY EVALUATION

1. 100% of critical elements/steps identified in the JPM successfully completed.
2. Critical Time Frame is met if applicable.
3. No actual safety violation (radiological or industrial) requiring evaluator intervention.

CRITERIA FOR UNSAT EVALUATION

1. Any critical element/step is graded as "UNSAT"
2. Critical Time Frame is not met if applicable. *
3. Actual safety violation (radiological or industrial) requiring evaluator intervention.
4. Operator's actions would have damaged plant equipment, created a personnel safety hazard, or otherwise reduced the level of safety of the plant

OPERATOR CUE SHEET

INITIAL CONDITIONS:

A station blackout is in progress.

SRVs are required to be cycled to stabilize reactor pressure

The IAS Diesel Air Compressor is operating, lined up to supply air to the Instrument Air System.

INITIATING CUE:

The CRS has directed you to provide backup air from the Instrument Air System (IAS) to the SRV's per Attachment 6 of AOP-0050.

CONTINUOUS USE

*G12.1.7

ENTERGY

RIVER BEND STATION
STATION OPERATING MANUAL
*ABNORMAL OPERATING PROCEDURE

*STATION BLACKOUT

PROCEDURE NUMBER:	***AOP-0050**
REVISION NUMBER:	***049**
Effective Date:	***01/09/2014**

NOTE : SIGNATURES ARE ON FILE.

*INDEXING INFORMATION

TABLE OF CHANGES

LETTER DESIGNATION TRACKING NUMBER	DETAILED DESCRIPTION OF CHANGES
AOP-0050R048EC-A	Added sub-step to the second bullet of Step 5.2.23 to provide the same clarifying procedural information as already provided in Step 5.2.27.2 for bypassing a LOCA isolation signal if present when aligning BYS-CHGR1D.

TABLE OF CONTENTS

1 PURPOSE/DISCUSSION

1.1 This procedure provides instructions in event of a loss of all offsite power combined with a failure of both Division 1 and 2 Diesel Generators to start and/or supply their emergency buses.

1.2 For a listing of instruments which remain in service, refer to AOP-0042, Loss of Instrument Bus.

1.3 Upon restoration of Division 1 or 2 Diesel Generator, refer to AOP-0004, Loss of Offsite Power.

2 SYMPTOMS

2.1 Loss of all equipment except that supplied by the DC buses. Division 3 equipment may or may not be available.

3 AUTOMATIC ACTIONS

3.1 Reactor scram occurs as a result of loss of power to the RPS buses.

3.2 Full MSIV isolation occurs as a result of loss of power to the RPS buses.

3.3 RCIC initiates when RPV level lowers to Level 2.

3.4 SRVs cycle to augment RCIC for RPV pressure control.

3.5 A Diesel Fire Pump starts at 110 psig fire header pressure.

4 IMMEDIATE OPERATOR ACTIONS

4.1 Manually initiate RCIC.

4.1.1. At H13-P632, perform the following:

- Place E31A-S2A, RCIC ISOLATION BYPASS Switch to BYPASS.
- Place E31A-S4A, RHR ISOLATION BYPASS Switch to BYPASS.

4.1.2. At H13-P642, perform the following:

- Place E31A-S2B, RCIC ISOLATION BYPASS Switch to BYPASS.
- Place E31A-S4B, RHR ISOLATION BYPASS Switch to BYPASS.

4.2 IF the CCP Heat Exchangers were aligned to Div I Service Water, THEN verify SWP-MOV501A, RPCCW HX A SUPPLY is closed locally by the dedicated operator stationed at the valve.

WARNING

Radiological and environmental conditions in the areas that must be entered to perform this procedure can pose a threat to personnel health. Do not perform the actions of this procedure without first evaluating the health risk.

Only emergency lighting is available and is inadequate in many areas. Working in inadequately lighted areas poses a threat to personnel health. Do not enter poorly lighted areas without the aid of portable lighting.

NOTE

All MOV operations in procedure are performed manually, unless otherwise stated.

Steps in the following section may be performed concurrently as appropriate.

5 SUBSEQUENT OPERATOR ACTIONS

CAUTION

Prolonged operation of an unloaded DG without cooling water can lead to permanent damage to the DG. Do not allow an unloaded DG to run for more than ten minutes without cooling water.

5.1 IF Division 3 power is available, THEN perform the following:

5.1.1. Verify SWP-P2C, STANDBY SERVICE WATER PUMP running.

5.1.2. Verify SWP-MOV40C, PUMP DISCH VALVE open.

5.1.3. Verify SWP-AOV599, STBY CLG TWR INLET, STATION BLACKOUT RETURN TO STBY COOLING TOWER open.

5.2 Perform the following:

CAUTION

Starting an ECCS Pump with an injection line low pressure condition can cause damage due to water hammer. Until the system has been verified filled and vented, do not re-energize the affected switchgear prior to pulling the associated ECCS Pump breakers control power fuses.

- **For ENS-SWG1A:**

  ACB03, RHR PUMP A

  ACB08, LPCS PUMP

- **For ENS-SWG1B:**

  ACB23, RHR PUMP B

  ACB28, RHR PUMP C

- **For E22-S004:**

  ACB02, HPCS PUMP

NOTE

If the diesel is running and the output breaker has not closed due to output voltage being low (<3814 VAC) or frequency being low (<58.67 Hz) following a LOP, the breaker will not close manually, but will close automatically when voltage or frequency is adjusted to high enough values.

5.2.1. IF the diesel is running and the output breaker has not closed, THEN Refer To OSP-0053, Emergency and Transient Response Support Procedure, Attachment 2A(2B) Initiating Division 1(2) Standby Diesel Generator hard cards.

5.2.2. IF Step 5.2.1 was not successful in closing in the output breaker, THEN dispatch an operator to attempt an emergency start of the Diesel Generators per Attachment 1, Emergency Manual Start Of Diesel Generators.

5.2.3. IF the Div. 1 and/or 2 Diesel Generator fails to deliver power to their respective buses due to a malfunction of the Excitation System (when diesel engine has attained rated speed), THEN secure the failed D/G per SOP-0053, Standby Diesel Generator and Auxiliaries to conserve the battery, and to prevent heating the excitation cabinet.

5.2.4. IF the Div III Diesel Generator was operating in parallel with Offsite power, THEN perform the following:

1. Using the HPCS DIESEL GENERATOR VOLTAGE REGULATOR CONT switch maintain voltage ≥ 3740 volts AND ≤ 4580 volts.

NOTE

The Governor speed droop control is sensitive and must not be adjusted rapidly.

2. At the engine governor, set the speed droop setting to 0 .

3. Using the HPCS DIESEL GENERATOR GOVERNOR CONTROL switch maintain frequency ≥ 58.8 Hz AND ≤ 60.2 Hz.

5.2.5. Refer to Attachment 13, Time Critical Actions.

C 5.2.6. IF the Div 1 and the Div 2 diesel generators fail to start AND all of the following conditions have been met, THEN use either Attachment 9, Using the Div 3 Diesel Generator to Supply Power to ENS-SWG1A or Attachment 10, Using Div 3 Diesel Generator to Supply Power to ENS-SWG1B to supply electrical power to either the Div 1 or Div 2 Standby Bus. (SOER 03-1 Recommendation 2 Emergency Power Reliability)(Ref. 6.13)

1. No known fault exists on the chosen Standby Bus

2. Div 3 Diesel generator and its electrical bus is available

3. Energizing the Div 1 or Div 2 Standby bus is required to:

   - Maintain adequate core cooling

   OR

   - Maintain the plant in a safe shutdown condition

4. The OSM/CRS has authorized these actions

5.2.7. Enter AOP-0051, Loss of Decay Heat Removal and monitor Spent Fuel Pool temperature and level locally.

5.2.8. Notify Radiation Protection of SRV and RCIC operation and any additional plant conditions which have the potential to impact plant radiological conditions.

WARNING

The RCIC room may be at an elevated temperature requiring appropriate safety precautions per EN-IS-108, Working in Hot Environments. Do not allow entry into a high temperature area such as the RCIC room without first reviewing the EN-IS-108 safety precautions.

CAUTION

Failure of RCIC and HPCS injection during a station blackout can lead to core damage within 49 minutes. Do not delay performance of Attachment 2, Injection Into RPV With Fire Water System During Station Blackout if RPV level can not be maintained above top of active fuel.

5.2.9. IF RCIC has failed to start, THEN dispatch an Operator to attempt a local manual start.

1. IF the RCIC Turbine is overspeeding on startup, THEN manually control the RCIC turbine at startup by hand throttling the E51-MOVC002, RCIC TRIP & THROTTLE VALVE or E51-MOVF045, RCIC STEAM SUPPLY TURBINE STOP VALVE.

2. IF RCIC fails to inject, THEN initiate Attachment 2, Injection Into RPV With Fire Water System During Station Blackout.

NOTE

The following step is intended to ensure that the containment penetration for the RCIC steam supply is closed if fuel failure is imminent. The valves closed in the following step can be reopened if the RCIC turbine can be restored to service.

5.2.10. IF RCIC has failed to inject AND fuel failure is imminent, THEN trip the RCIC turbine and verify the following valves indicate closed:

- E51-F045, RCIC STEAM SUPPLY TURBINE STOP VALVE
- E51-MOVC002, RCIC TRIP & THROTTLE VALVE

5.2.11. Perform the following within 30 minutes to prevent control room heatup and loss of control functions:

- Shed DC loads listed on Attachment 3, DC Load Shedding.
- Open control room panel doors per Attachment 4, Control Room Panel Air Circulation.
- Order non-essential personnel out of the control room.

NOTE

10 ft sections of rope for blocking/tying doors open can be found in the OSP-0066 tool box next to CB 98 elevation southwest stairs in the area between the T Tunnel 95 elevation and the CB 98 elevation.

5.2.12. Perform the following within 30 minutes to prevent excessive heatup in Standby DC Equipment Rooms A and B and Battery Rooms A and B:

- Block open the door to Standby DC Equipment Room A, CB116-13.
- Block open the door to Standby DC Equipment Room B, CB116-6.
- Block open the door to Battery Room A, CB 116-12
- Block open the door to Battery Room B, CB 116-14

NOTE

RCIC operation may be affected if RCIC room temperatures exceed 207°F.

5.2.13. Perform the following within one hour to minimize the heatup in the RCIC room:

1. Monitor RHR C Pump Room temperature using RHS-ES50A(B) on H13-P841(P842).

CAUTION

The RCIC/RHR C rooms may be at an elevated temperature requiring appropriate safety precautions per EN-IS-108, Working in Hot Environments. Do not allow entry into a high temperature area such as the RCIC room without first reviewing the EN-IS-108 safety precautions.

NOTE

10 ft sections of rope for blocking/tying doors open can be found in the AOP locker on TB 95 elevation in the northeast corner of the building.

2. IF RHR C room temperature is less than 120°F, THEN perform the following:
   - Block open door AB 078-01 between the RCIC room and RHR C room.
   - Block open door AB 095-03 at the top of the stairs in RHR C room.
3. IF RHR C room temperature approaches 200°F AND AB-078-01 and AB-095-03 are open, THEN perform the following:
   1) Attempt to isolate the cause of the high temperature.
   2) Using Attachment 12, RHR C or RCIC Room entry to close Doors AB-078-01 and AB-095-03 to maintain RCIC room temperature less than 200°F by reclosing AB 078-01 and AB 095-03.
   3) Block open door AB 095-04 to the RCIC room.
   4) Block open door AB 095-08 and AB 095-09 in the hallway outside the RCIC room to provide natural circulation of air to the RCIC room.

5.2.14. Perform the following to further prevent Control Room heatup:

NOTE

The ladder for removing the ceiling panels will be located in the closet behind the OSM desk. Ceiling panels are labeled, but if not accessible due to unanticipated work, remove like sized panel in the same general area.

C 1. Remove 80 ceiling panels, 40 from each end by:

1) Starting to remove 10 ceiling panels within 1 hour after the start of the station blackout event.

2) Continue removing a group of 10 ceiling panels every 10 minutes after the start of ceiling panel removal until all 80 ceiling panels are removed.

NOTE

10 ft sections of rope for blocking/tying doors open can be found in the OSP-0066 tool box next to CB 98 elevation southwest stairs in the area between the T Tunnel 95 elevation and the CB 98 elevation.

2. Block open the Control Room back door, CB-136-10.

5.2.15. IF RPV water level can not be restored and maintained greater than -20 inches, THEN control RPV water level by performing the following actions in conjunction with EOP-0001, RPV Control:

1. Line up for injection with Fire Water per Attachment 2, Injection Into RPV With Fire Water System During Station Blackout, Sections 1 through 4.

2. IF water level can not be maintained above -162 inches, THEN inject Fire Water per Attachment 2.

CAUTION

To preclude piping damage from water hammer, ECCS Pumps are not to be started unless the associated discharge line is filled and vented. Do not allow ECCS Pump starts in an unfilled ECCS System.

NOTE

ECCS System Piping can accumulate air as they sit idle without the associated keep fill pump in operation.

5.2.16. Prior to energizing Division 1, 2, or 3 switchgear, pull the associated ECCS Pump Breakers control power fuses until the system has been filled and vented.

SWITCHGEAR	BREAKER	ECCS PUMP	LOCATION
ENS-SWG1A	ACB03	RHR Pump A	CB 98 FT EL
ENS-SWG1A	ACB08	LPCS Pump	CB 98 FT EL
ENS-SWG1B	ACB23	RHR Pump B	CB 98 FT EL
ENS-SWG1B	ACB28	RHR Pump C	CB 98 FT EL
E22-S004	ACB02	HPCS Pump	CB 116 FT EL

5.2.17. Operate the RCIC System as follows:

WARNING

The RCIC room may be at an elevated temperature requiring appropriate safety precautions per EN-IS-108, Working in Hot Environments. Do not allow entry into a high temperature area such as the RCIC room without first reviewing the EN-IS-108 safety precautions.

1. IF RCIC can maintain RPV level and pressure satisfactorily while manually throttled, THEN manually throttle RCIC flow using either the E51-MOVC002, RCIC TRIP & THROTTLE VALVE or E51-MOVF045, RCIC STEAM SUPPLY TURBINE STOP VALVE to conserve DC power.

CAUTION
The RCIC turbine may be damaged if oil temperature is excessive. Do not allow RCIC lube oil outlet temperature to exceed 180°F.

2. Maintain RCIC suction on the CST for as long as possible.

3. IF RCIC suction shifts to the suppression pool, THEN carefully monitor RCIC lube oil temperature using the thermometers installed in the bearing drains and oil cooler discharge.

4. WHEN allowed by EOP-0001, RPV Control, Section RL, THEN bypass the RCIC High Suppression Pool Water Level Suction Transfer Interlock.

5.2.18. Perform Attachment 5, Containment/Drywell/Steam Tunnel Actions.

M 5.2.19. Shut down BYS-INV03 within 2 hours per SOP-0048, 120 VAC System.

5.2.20. Verify Diesel Air Compressor is running and aligned to plant.

1. IF IAS is not available, THEN locally at Turbine Building 67 ft el, isolate the Hotwell makeup and reject lines to preclude draining the CST to the Hotwell by closing the following valves:

   - CNS-V39, CNS-LCV-105 RETURN ISOL VLV
   - CNS-V31, CNS-LCV-103 SUPPLY ISOL VLV
   - CNS-V33, CNS-LCV-104 SUPPLY ISOL VLV

5.2.21. IF no power is available, THEN provide alternate power to Hydrogen Ignitors within 3 hours per Attachment 14, Alternate Power to Hydrogen Ignitors.

NOTE

The purpose of the following step is to limit the loss of water inventory from the Standby Cooling Tower into the Normal Service Water System.

5.2.22. Perform the following within the first 4 hours of SWP-P2C, STANDBY SERVICE WATER PUMP operation:

- Manually close SWP-MOV96A, NORMAL SVCE WATER RETURN.
- Manually close SWP-MOV96B, NORMAL SVCE WATER RETURN.
- Manually open SWP-MOV55A, DIV I STBY CLG TOWER 1 INLET.

WARNING

The RCIC room may be at an elevated temperature requiring appropriate safety precautions per EN-IS-108, Working in Hot Environments. Do not allow entry into a high temperature area such as the RCIC room without first reviewing the EN-IS-108 safety precautions.

5.2.23. IF remote control of RCIC is threatened by a loss of 125 VDC, THEN perform one of the following in order to continue operating RCIC:

- At the RCIC Turbine, manually control turbine speed by hand throttling E51-MOVC002, RCIC TRIP & THROTTLE VALVE or E51-MOVF045, RCIC STEAM SUPPLY TURBINE STOP VALVE.
- Use the Station Blackout Diesel Generator to supply ENB-SWG01A via the BYS-CHGR1D, 125 VDC BACKUP BATT CHGR. Refer To SOP-0054, Station Blackout Diesel Generator for guidance.

    1) IF a LOCA isolation signal is present, THEN perform the following to bypass the trips on BYS-CHGR1D:

    a) At H13-P851, Bay D; pull relay ISCA04 3A-4

    b) At H13-P852, Bay C; pull relay ISCB04 3B-4

NOTE

If air to the ADS valves is lost and can not be restored, RPV pressure is controlled with continuous SRV opening per EOP-0001, RPV Control.

If power to the SRVs could be lost, OSP-0066, EXTENSIVE DAMAGE MITIGATION PROCEDURE, Attachment 17 has instructions for using the B.5.b battery cart to provide alternate power to the SRVs.

5.2.24. Provide a backup compressed air supply to the SRVs from IAS per Attachment 6, IAS Diesel Air Compressor Backup To SVV Header.

5.2.25. <u>IF</u> backup compressed air can <u>not</u> be supplied from the Diesel Air Compressor, <u>THEN</u> connect a compressed air or nitrogen bottle supply regulated to 150 psig as follows:

<u>NOTE</u>

Tubing and regulators are stored in the AOP-0050 tool box located on TB 95 north wall near the AB 95 door. Bottles are located in storage racks on the east and west side of AB 141 .

SVV-V48 is located 4 feet southeast of LPCS injection valve, E21-MOVF005, AB 134 and SVV-V51 is located 2 feet south of HPCS injection valve, E22-MOVF004, AB 134 .

1. At Auxiliary Building 141 ft el, connect bottle to SVV-V48(V51), HDR A(B) OUTBOARD LEAKAGE MONITORING CONNECTION.

2. Open SVV-MOV1A(B), SRV ACCUM AIR SPLY ISOL periodically to recharge SRV accumulators.

5.2.26. Contact the Load Dispatcher to determine an estimate for restoration of offsite power and/or to provide him with switchyard damage information.

5.2.27. <u>IF</u> AC power restoration is expected to take more than 4 hours, <u>THEN</u> perform the following:

1. Align the Station Blackout Diesel Generator to ENB-SWG01A(B), 125 VDC BACKUP SWGR via BYS-CHGR1D, 125 VDC BACKUP BATT CHGR. Refer To SOP-0054, Station Blackout Diesel Generator, and SOP-0049, 125 VDC System, for guidance.

2. <u>IF</u> a LOCA isolation signal is present, <u>THEN</u> perform the following to bypass the trips on BYS-CHGR1D:

   1) At H13-P851, Bay D; pull relay ISCA04 3A-4.

   2) At H13-P852, Bay C; pull relay ISCB04 3B-4.

WARNING

Electrical sparks in conjunction with H_2 buildup in the battery rooms can result in a fire. Do not use standard portable fans for temporary ventilation. Use only spark free fans for temporary ventilation.

NOTE

10 ft sections of rope for blocking/tying doors open can be found in the OSP-0066 tool box next to CB 98 elevation southwest stairs in the area between the T Tunnel 95 elevation and the CB 98 elevation.

3. Open doors to all battery rooms to allow open air ventilation. IF available, THEN place temporary spark free fans in these rooms to prevent H_2 buildup.

5.2.28. IF AC power restoration is expected to take more than 24 hours, THEN request delivery of diesel fuel oil for the Station Blackout Diesel Generator. IF no fuel oil is available, THEN consider draining fuel oil from DIV 1, 2, or 3 Emergency Diesel Generator Day Tanks.

5.2.29. Establish Suppression Pool Temperature monitoring within 4 hours per Attachment 7, Suppression Pool Temperature Determination, and take the following actions as required:

1. WHEN directed by EOP-0002, Containment Control, THEN perform EOP-0005 Enclosure 21, Emergency Containment Venting to establish a containment vent path.

CAUTION

Raising water level inside Containment can result in exceeding containment pressure capability or covering the highest containment vent capable of rejecting the required decay heat. Do not exceed the EOP Maximum Containment Water Level Limit.

2. Add water to the suppression pool per Attachment 8, Emergency Makeup Of Water To The Suppression Pool to maintain pool temperature below 212°F.

5.2.30. Provide makeup for the Fire Protection Storage Tank using OSP-0066, Extensive Damage Mitigation Procedure, Attachment for Fire Protection System Makeup Strategies.

C 5.2.31. IF the plant is in Modes 1, 2, or 3 AND the IFTS System is in operation, THEN direct the Designated IFTS Drain Valve Operator to close F42-MOVF003 IFTS DRAIN VALVE per FHP-0008, IFTS Operations When in Modes 1, 2, or 3.

C 5.2.32. IF the plant is in Modes 1, 2, or 3 AND the IFTS Blind Flange is not installed AND the IFTS Bottom Valve is open, THEN dispatch the IFTS Teams to close the Bottom Valve per FHP-0008, Fuel Transfer Tube Operations When in Modes 1, 2, or 3, Attachment 12.

5.2.33. Continue using available equipment to maintain adequate core cooling until at least one division of ECCS can be restored.

NOTE

AOP-0004, Loss Of Offsite Power provides guidance on diesel generator loading, system restoration, and restoration of offsite power.

5.2.34. WHEN offsite power is available, THEN restore offsite power to the plant per AOP-0004, Loss of Offsite Power Section 5.16.

5.2.35. WHEN at least one divisional AC power source is restored, THEN maintain adequate core cooling with that division's ECCS and restore containment integrity.

5.2.36. WHEN Division 1 OR 2 Diesel Generator has been restored, THEN exit this procedure and enter AOP-0004, Loss Of Offsite Power.

6 REFERENCES

6.1 EA-RA-92-0001-M

6.2 G13.18.12.4-033, Minimum Temperature During Station Blackout: Battery Rooms A, B, and C

6.3 G13.18.12.4-034, Maximum Temperature During Station Blackout: DC Equipment Rooms A, B, and C

6.4 G13.18.12.4-032, Auxiliary Building Station Blackout Room Heatup

6.5 G13.18.12.4*027, Control Room Heatup During Station Blackout

6.6 G13.18.12.4*028, Containment Conditions During Station Blackout

6.7 NUMARC 87-00

6.8 10CFR50.63

6.9 RBC-49850

6.10 ER-RB-2001-0387

6.11 S-CRB-22, 481 Dated 4/1/95

6.12 USAR Appendix 15C, Station Blackout

6.13 SOER 03-1 Recommendation 2 Emergency Power Reliability

6.14 G13.18.12.4-030, RBS Containment Venting Study

6.15 PRA-RB-01-002S14, RBS Level 1 PRA Success Criteria

EMERGENCY MANUAL START OF DIESEL GENERATORS

DISCUSSION:

A number of possible failures could occur that would prevent the diesel generator from starting either automatically or manually. Initially, the operator should attempt to determine the reason and correct it, if possible. Operations should check the simple things first. More degraded conditions such as shorts, fires or mechanical damage will require assistance from maintenance.

INSTRUCTIONS:

CAUTION

Prolonged operation of an unloaded DG without cooling water can lead to permanent damage to the DG. Do not allow an unloaded DG to run for more than ten minutes without cooling water.

CAUTION

Starting an ECCS Pump with an injection line low pressure condition can cause damage due to water hammer. Until the system has been verified filled and vented, do not re-energize the affected switchgear prior to pulling the associated ECCS Pump breakers control power fuses.

- **For ENS-SWG1A:**
  ACB03, RHR PUMP A
  ACB08, LPCS PUMP
- **For ENS-SWG1B:**
  ACB23, RHR PUMP B
  ACB28, RHR PUMP C
- **For E22-S004:**
  ACB02, HPCS PUMP

EMERGENCY MANUAL START OF DIESEL GENERATORS

1 Div I(II) Diesel Generator

CAUTION

Do not perform the following step for an indicated faulted condition on the diesel engine, output breaker, or electrical bus.

Do not perform the following step if there has been a sufficient time delay to have caused receipt of the associated ECCS low pressure alarm.

1.1 IF the Division I(II) Diesel Generator is running AND not supplying the switchgear, THEN perform the following OSP-0053, Emergency and Transient Response Support Procedure, Attachment 2A(2B) Initiating Division 1(2) Standby Diesel Generator hard cards actions:

1.1.1. IF the Diesel Generator failed to receive a start signal, THEN perform the following:

1. Emergency Start the Div I(II) Diesel Generator.

2. Check ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) Breaker closes.

1.1.2. IF the Diesel Generator Output Breaker failed to close, THEN perform the following:

1. IF there has been a failure of the Normal or Alternate Supply Breaker to open, THEN perform the following:

1) Manually trip the breaker previously supplying the bus:

- ENS-ACB06(26), NORMAL SUPPLY BRKR TO STBY BUS ENS-SWG1A(B)
- ENS-ACB04(24), ALTERNATE SUPPLY BRKR TO STBY BUS ENS-SWG1A(B)

2) Check ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) Breaker auto closes.

NOTE

If the diesel is running and the output breaker has not closed due to output voltage being low (<3814 VAC) or frequency being low (<58.67 Hz) following a LOP, the breaker will not close manually, but will close automatically when voltage or frequency is adjusted to high enough values.

2. IF required, THEN attempt to manually close the Diesel Generator Output Breaker as follows:

   1) Place the SYNCHRONIZING CONTROL Switch to GEN.

   2) Close ENS-ACB07(27), GENERATOR EGS-EG1A(B) TO STBY BUS ENS-SWG1A(B) Breaker.

1.2 IF the Div I(II) Diesel Generator has tripped on high jacket water temperature OR high lube oil temperature, THEN perform the following as appropriate:

NOTE

Valid trip signals can be verified by local indictors near the Jacket Water and Lube Oil coolers. Actual temperature may have drifted down slightly since diesel trip.

NOTE

If jacket water/lube oil temperatures do not lower with SWP and the diesel is running, the temperatures may be allowed to exceed the trip setpoint (JW 186°F, LO 195°F). However, JW/LO temperatures above 200°F may result in damage to the diesel.

1.2.1. At EGS-PNL3A(B), place HIGH TEMPERATURE TRIP BYPASS Switch in BYPASS.

1.2.2. Restart the diesel per SOP-0053.

1.2.3. IF trip signal was confirmed to be caused by high temperature, THEN Restore Service Water flow to the Jacket Water and Lube Oil coolers and verify jacket water/lube oil temperatures are lowering.

EMERGENCY MANUAL START OF DIESEL GENERATORS

NOTE

Electrical protection trips are indicated locally by the 86 device on EGS-PNL2A(B) in trip position (T-handle at 45 degrees, orange or red flag showing).

An overspeed trip is indicated locally by the two trip levers on the overspeed device rotated to point vertically up (located behind the engine-driven fuel pump).

Low pressure trips and vibration trips (bypassed on LOCA and LOP) are indicted by local panel annunciators.

1.3 Reset any trip conditions.

1.4 Recheck control board lineups and attempt to locally start Division 1 and 2 Diesels per SOP-0053, Standby Diesel Generator and Auxiliaries.

CAUTION

Supplying nitrogen for Division I(II) DG starting air causes insufficient oxygen to the cylinders for combustion, impairing engine start. Do not use nitrogen for Division I(II) DG starting air.

1.5 IF starting air is NOT available, THEN provide compressed air bottles for Division I(II) Diesels as follows:

CAUTION

Bottled/compressed air must use a regulator. Do not exceed 250 psig on the starting air system.

NOTE

The bottle rack outside of the south end of the Turbine Bldg has 4 bottles of compressed air staged for AOP-0050 use.

Regulator and tubing are in the Main Control Room Emergency Locker.

1.5.1. Verify regulator is connected to compressed air source.

1.5.2. IF using Division I(II) Forward Air System, THEN perform the following:

1. Connect compressed air source to one of the following:
   - EGA-V121(V143), FORWARD SUPPLY LINE DRIP LEG
   - EGA-V112(V134), AIR RECEIVER TK2A(B) DRAIN
   - EGA-V120(V142), AIR RECEIVER TK2C(D) DRAIN

2. Unlock and open/open the valve connected to the compressed air source in Step 1.5.2.1 above.

1.5.3. IF using Division I(II) Rear Air System, THEN perform the following:

1. Connect compressed air source to one of the following:

- EGA-V110(V132), REAR SUPPLY LINE DRIP LEG
- EGA-V101(V123), AIR RECEIVER TK1A(B) DRAIN
- EGA-V103(V131), AIR RECEIVER TK1C(D) DRAIN

2. Unlock and open/open the valve connected to the compressed air source in Step 1.5.3.1 above.

1.6 WHEN an air receiver in the respective division is pressurized to at least 160 psig, THEN attempt to locally start Division 1 and 2 Diesels per SOP-0053, Standby Diesel Generator and Auxiliaries.

1.7 IF the engine does not crank, THEN recheck the starting air valve lineup and/or starting air solenoid valve operation.

1.8 IF the engine cranks but does not fire, THEN perform the following:

1.8.1. Recheck the fuel oil valve lineup and/or starting air solenoid valve operation.

1.8.2. Check fuel filters for clogging as follows:

- Manually start the DC FO Booster Pump EGF-P2A(B).
- Check for pressure rise on local panel gauge EGF-PI27A(B).
- Check Engine Inlet Strainer EGF-STR3A/D(B/E) by observing pressure rise on local panel gauge EFG-PI27A(B).
- Check Main Fuel Filters EGF- STR4A/D(B/E) by observing local panel dP gauge EGF-PDI29A(B) indicates less than 20 psid.

1.8.3. Sample the fuel oil to assure it is not contaminated with dirt or water.

CAUTION

The sequence for positioning transfer switches must be followed; incorrect sequencing may cause blown fuses. Do not stray from the transfer sequence.

NOTE

On Division I, local transfer switches are provided to divorce the local panel from the Control Room in case of shorts or other control failures.

1.9 On EGS-PNL4A, transfer control to local for the Division 1 Diesel by taking the switches listed below to emergency.

1.9.1. 43-EGAN05

1.9.2. 43-EJSA01

1.9.3. 43-ENSC04

1.10 Attempt a local start per SOP-0053, Standby Diesel Generator and Auxiliaries.

1.11 Make necessary repairs and/or temporary alterations to correct and/or bypass any trip functions that might be preventing the start.

2 HPCS Diesel Generator

NOTE

All trips are indicated locally by the main lockout relay K15 on E22-PNLS001 in the trip position (T-handle at 45 degrees, orange or red flag showing).

Electrical protection trips are also indicated locally by the 86 device on H22-P028 in trip position (T-handle at 45 degrees, orange or red flag showing).

An overspeed trip is indicated locally by the yellow trip lever on the overspeed device rotated to point 45 degrees up (located front right upper camshaft access cover).

Low pressure trips and vibration trips (bypassed on LOCA and LOP) are indicted by local panel annunciators.

2.1 Reset any trip conditions.

2.2 Recheck control board lineups and attempt to locally start the HPCS Diesel per SOP-0052, HPCS Diesel Generator.

2.3 IF starting air is NOT available, THEN provide compressed air or nitrogen bottles for HPCS Diesel as follows:

CAUTION

Bottled/compressed air/nitrogen must use a regulator. Do not exceed 240 psig on the starting air system.

2.3.1. Verify regulator is connected to compressed air/nitrogen source.

2.3.2. IF using Left Bank Air System, THEN performing the following:

1. Close EGA-SKV312, AIR RECEIVER TK 1A CSH-PI229 ROOT VALVE.
2. Remove Air Receiver Tank 1A Gauge CSH-PI229.
3. Connect compressed air/nitrogen source to EGA-SKV312.
4. Open EGA-SKV312.

2.3.3. IF using Right Bank Air System, THEN performing the following:

1. Close EGA-SKV313, AIR RECEIVER TK 1B PRESSURE SWITCH ROOT VALVE.

2. Remove Air Receiver Tank 1B Gauge CSH-PI244.

3. Connect compressed air/nitrogen source to EGA-SKV313.

4. Open EGA-SKV313.

2.4 WHEN the air receiver is pressurized to at least 175 psig, THEN attempt to locally start the HPCS Diesel per SOP-0052, HPCS Diesel Generator.

2.5 IF the engine does not crank, THEN recheck the starting air valve lineup and/or starting air solenoid valve operation.

2.6 IF the engine cranks but does not fire, THEN perform the following:

2.6.1. Recheck the fuel oil valve lineup and/or starting air solenoid valve operation.

2.6.2. Check fuel filters for clogging as follows:

NOTE

Engine must be running or attempting to start to check Main Fuel Filters EGF-STR3C/F.

- With engine attempting to start, check Engine Drive Pump Main Fuel Filters EGF-STR3C/F local indication (in and out gauges) on the RIGHT BANK filters.

- Manually start the DC FO Booster Pump EGF-P2C by pressing and holding the local panel button and check at least 40 psig indicated on LEFT bank fuel filters for Main Fuel Filters EGF-STR4C/F.

2.6.3. Sample the fuel oil to assure it is not contaminated with dirt or water.

EMERGENCY MANUAL START OF DIESEL GENERATORS

CAUTION

The sequence for positioning transfer switches must be followed; incorrect sequencing may cause blown fuses. Do not stray from the transfer sequence.

NOTE

Local transfer switches are provided to divorce the local panel from the Control Room in case of shorts or other control failures.

2.7 On E22-PNLS001, transfer control to local for the Division 3 Diesel by taking the switches listed below to emergency.

2.7.1. S61

2.7.2. S62

2.7.3. S63

2.8 Attempt a local start per SOP-0052, HPCS Diesel Generator.

2.9 Make necessary repairs and/or temporary alterations to correct and/or bypass any trip functions that might be preventing the start.

NOTE

Restoration of either Division 1 or 2 AC power sources is necessary to exit this procedure.

3 Continue all possible efforts to restore at least one division of ESF power; concentrate these efforts on the division that has the highest probability of rapid restoration.

INJECTION INTO RPV WITH FIRE WATER SYSTEM DURING STATION BLACKOUT

DISCUSSION:

C During a station blackout event, RCIC is the only source of water to the RPV that is readily available for use from the Control Room. If RCIC trips or becomes unavailable for RPV injection, core damage can occur within 49 minutes. The Diesel Fire Pumps are available to supply Fire Protection Water. Due to the station blackout, the lineup also requires manual operation of several valves in the Control Building, Fuel Building, Auxiliary Building, D Tunnel and G Tunnel.

INSTRUCTIONS:

CAUTION

Failure of RCIC and HPCS injection during a station blackout can lead to core damage within 49 minutes. Do not delay performance of this attachment if RPV level can not be maintained above top of active fuel.

1 Verify Diesel Fire Pumps running.

2 Close the following Service Water valves:

NOTE

If steps 2.1 through 2.4 can not be performed in a timely manner, steps 2.5 through 2.8 can be used.

The following valves are located in D Tunnel East.

2.1 SWP-MOV96A, DIV I NORM SVCE WTR RETURN

2.2 SWP-MOV96B, DIV II NORM SVCE WTR RETURN

2.3 SWP-MOV57A, DIV I NORM SVCE WTR SUPPLY

2.4 SWP-MOV57B, DIV II NORM SVCE WTR SUPPLY

NOTE

Steps 2.5 through 2.8 can be used for positive leakage control or as required if steps 2.1 through 2.4 were not performed.

The following valves are located in C Tunnel.

2.5 SWP-V1213, A RETURN HEADER ISOLATION

2.6 SWP-V1212, B RETURN HEADER ISOLATION

2.7 SWP-V1210, A SUPPLY HEADER ISOLATION

2.8 SWP-V1211, B SUPPLY HEADER ISOLATION

NOTE

A ladder is required to manually operate SWP-MOV55B.

3 At Pipe Tunnel G 70 ft el, close the following Standby Service Water valves:

3.1 SWP-MOV55A, DIV I STBY CLG TOWER 1 INLET

3.2 SWP-MOV55B, DIV II STBY CLG TOWER 1 INLET

4 Line up Fire Protection/Service Water Cross Connect Valves for injection as follows:

4.1 At Control Building 102 ft el, southwest:

4.1.1. Open FPW-V818, SWP BACKUP TO CB HOSE RACKS ISOLATION.

4.1.2. Unlock and open SWP-V961, SVCE WTR SUPPLY TO FIRE PROTECTION IN CONTROL BLDG ISOL VLV.

4.2 At Fuel Building 74 ft el, southwest:

4.2.1. Open FPW-V396, ISOLATION VALVE FOR SWP BACKUP TO FUEL BLDG HOSE RACKS.

4.2.2. Unlock and open SWP-V971, DIV 2 STBY SWP TO FUEL BLDG FIRE PROT ISOL VLV.

4.3 At Auxiliary Building 100 ft el, northeast crescent area:

4.3.1. Open FPW-V321, SWP BACKUP TO RB AND AUX BLDG HOSE RACKS ISOLATION VALVE.

4.3.2. Unlock and open SWP-V968, SVCE WTR TO FIRE PROTECTION MAN ISOL VLV.

4.4 At Auxiliary Building 80 ft el, RHR Pump Room:

4.4.1. Open E12-MOVF094, UP STREAM SVCE WATER CONTMT FLOOD VALVE.

4.4.2. Open E12-MOVF096, DN STREAM SVCE WATER CONTMT FLOOD VALVE.

CAUTION

RCIC will trip on 60 psig low steam pressure unless EOP-0005 Enclosure 2 has been implemented. If RCIC is injecting, do not lower pressure below 60 psig before completing EOP-0005, Enclosure 2.

NOTE

RPV depressurization below 150 psig is necessary for FPW injection.

Performance of the following step injects Fire Water into the RPV.

5 WHEN RPV pressure is less than 150 psig, THEN at Auxiliary Building 95 ft el, RHR B Pump Room, open E12-MOVF053B, RHR PUMP B SDC INJECTION VLV.

DC LOAD SHEDDING

DISCUSSION:

During a station blackout event, Control Room temperature can exceed 120°F, the operability limit for control functions. If no action is taken, control room temperature can reach 120°F in less than 4 hours, preventing River Bend from meeting the 4 hours station blackout coping duration required by the NRC.

The purpose of this attachment is to reduce control room heatup by shedding unnecessary DC loads.

INSTRUCTIONS:

NOTE

Performance of this procedure disables EHC Turbine Control and the Plant Process Computer.

The following disconnects are located on the Control Room south wall.

1 Open the following disconnects on Panel VBN-PNL01B1:

- Disconnect 01, H13-P821, TURBINE GEN, EHC SYSTEM CABINET
- Disconnect 03, H13-P869/P870, SST-AR40,89,194,195, MSS-FR31,GMC-CR106
- Disconnect 12, H13-P601, SPC MUX &, TEMP RECORDER E12-R601

DC LOAD SHEDDING

CAUTION

Loads necessary for operation during a station blackout are powered from VBN-PNL02, Disconnects 19, 21, 23, 25, and 26. Do not open VBN-PNL02, Disconnect 19, 21, 23, 25, and 26.

2 Open the following disconnects on Panel VBN-PNL02:

- Disconnect 01, H13-P721D, ERIS NETWORK, COMMUNICATION EQUIPMENT
- Disconnect 02, C91-P608, PMS COMPUTER, CMS/PPX
- Disconnect 03, C91-P600, PMS COMPUTER, CENTRAL SYSTEM UNIT
- Disconnect 04, C91-P603, PMS COMPUTER LARGE CORE STORAGE
- Disconnect 05, C91-P612, PMS COMPUTER DISPLAY, GENERATOR CABINET
- Disconnect 06, C91-P620, PMS COMPUTER, BOP/NSSS DIGITAL UNIT
- Disconnect 07, C91-P625, PMS COMPUTER, BOP/NSSS DIGITAL UNIT
- Disconnect 08, C91-P621, PMS COMPUTER BOP, DIGITAL UNIT & SPC-BNK1
- Disconnect 09, C91-P624, PMS COMPUTER, BOP DIGITAL UNIT
- Disconnect 10, C91-P622, PMS COMPUTER, BOP DIGITAL UNIT
- Disconnect 11, C91-P623, PMS COMPUTER, BOP DIGITAL UNIT
- Disconnect 12, C91-P630/P631, PMS COMPUTER, PRINTERS
- Disconnect 13, C91-P613, PMS COMPUTER, NSSS ANALOG UNIT
- Disconnect 14, C95-P604, UNIT OPERATOR TABLE, ERIS TERMINALS
- Disconnect 15, C91-P616, PMS COMPUTER, BOP ANALOG UNIT
- Disconnect 16, C91-P615, PMS COMPUTER, BOP ANALOG UNIT
- Disconnect 17, C91-P614, PMS COMPUTER, BOP ANALOG UNIT
- Disconnect 18, C91-P642, PMS COMPUTER RESULTS, CENTER CONSOLE
- Disconnect 20, C91-P632/P633, PMS COMPUTER, PRINTERS
- Disconnect 22, C91-P650, PMS COMPUTER BOP, DIGITAL UNIT & SWC-BNK4

DC LOAD SHEDDING

- Disconnect 24, H13-P954, LOOSE PARTS MONITOR, & H13-P808/83A/F07,F08

3 Open the following disconnects on Panel VBN-PNL01A1:

- Disconnect 17, H13-P808, SPI-REC102 & SWC, HARRIS PANEL
- Disconnect 21, C91-P642 C91-PM5 & PM5A, CORE MONITOR, SYSTEM RECEPT.
- Disconnect 22, C91-P631 C91-PM6 & PM6A, CORE MONITOR, SYSTEM RECEPT.

CONTROL ROOM PANEL AIR CIRCULATION

DISCUSSION:

During a station blackout event, Control Room temperature can exceed 120°F, the operability limit for control functions. If no action is taken, control room temperature can reach 120°F in less than 4 hours, preventing River Bend from meeting the 4 hours station blackout coping duration required by the NRC.

The purpose of this attachment is to reduce the temperatures within energized control room panels to maintain control circuit operability for at least 4 hours.

INSTRUCTIONS:

1 Open all the doors to the following control room panels:

At the ATC area:

Under the desk where the CRS sits, open the back door to the Fire Control Panel. [ ]

P877 [ ] P601 [ ] P680 [ ] P808 [ ] P863 [ ] P870 [ ]

Starting at the south east corner of the Control Room:

P878 [ ] P637 [ ] P821 [ ] P634 [ ] P619 [ ] P612 [ ]

P618 [ ] P631 [ ] P652 [ ] P610 [ ] P670 [ ] P692 [ ]

P622 [ ] P613 [ ] P642 [ ] P671 [ ] P693 [ ]

Starting at the south west corner of the Control Room:

P879 [ ] P653 [ ] P651 [ ] P628 [ ] P621 [ ] P629 [ ]

P632 [ ] P623 [ ] P691 [ ] P669 [ ] P630 [ ] P694 [ ]

P672 [ ] P614 [ ] P604 [ ]

Starting at the north west corner of the Control Room:

P954 [ ] P849 [ ] P855 [ ] P841 [ ] P819 [ ] P951 [ ]

P851 [ ]

Starting at the north east corner of the Control Room:

P854 [ ] P844 [ ] P820 [ ] P842 [ ] P850 [ ] P869 [ ]

P952 [ ]

CONTAINMENT/DRYWELL/STEAM TUNNEL ACTIONS

DISCUSSION:

During a station blackout, normal ventilation and cooling will be lost in the Drywell, Containment, and Main Steam Tunnel as well as in all other plant areas. The Drywell, Containment, and Steam Tunnel air temperature can rise to levels preventing personnel entry. It is essential that valve positioning is accomplished in these areas before thermal or radiological conditions deteriorate.

INSTRUCTIONS:

NOTE

Drawings starting on page 3 of this attachment along with photo survey books located in the ALARA office and Valve Location binders located at the RCA access control point can be used to assist in locating equipment.

1 At Ctmt 147 ft el, RWCU HX Rm, close the following valves:

- G33-MOVF040, RWCU INBD RETURN VALVE
- G33-MOVF053, RWCU PUMPS INBD DISCH VALVE

2 At Ctmt 130 ft el, Az 180°, close SFC-MOV139, PRFCN RTN INBD ISOL.

3 At MSL Tunnel, 114 ft el, east of centerline, close G33-MOVF039, RWCU OUTBD RETURN VALVE.

4 At MSL Tunnel, 114 ft el, west of centerline, close G33-MOVF004, RWCU PUMPS OUTBD SUCTION VALVE.

5 At MSL Tunnel, 114 ft el, extreme west of centerline, close G33-MOVF054, RWCU PUMPS OUTBD DISSCH VALVE.

6 At Aux Building MSL Tunnel, 114 ft el, close the following valves:

- B21-MOVF085, MSL DRAIN HDR SHUTOFF VALVE
- B21-MOVF086, MSL DRAIN HDR SHUTOFF VALVE

CONTAINMENT/DRYWELL/STEAM TUNNEL ACTIONS

7 At Aux Building, 80 ft el, RHR Pump Rooms, close the following valves:

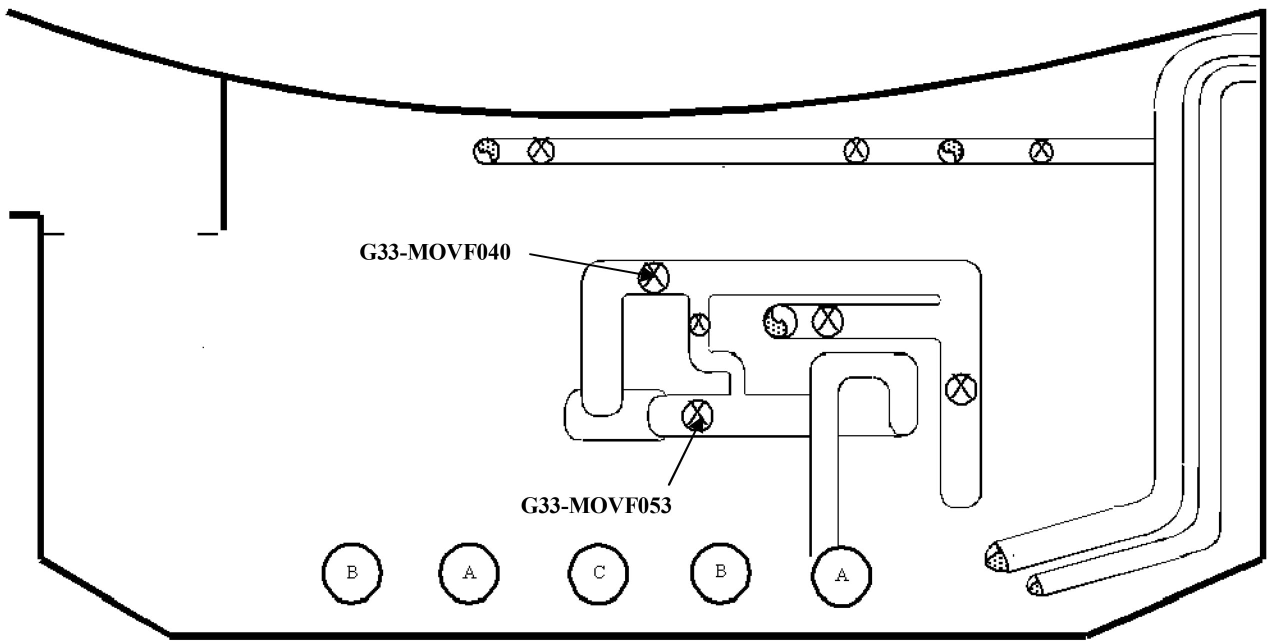
- E12-MOVF064A, RHR PUMP A MIN FLOW TO SUP PL (RHR A Pump Room)
- E12-MOVF064B, RHR PUMP B MIN FLOW TO SUP PL (RHR B Pump Room)
- E12-MOVF064C, RHR PUMP C MIN FLOW TO SUP PL (RHR C Pump Room)

8 At Aux Building, 95 ft el, crescent area, close the following valves:

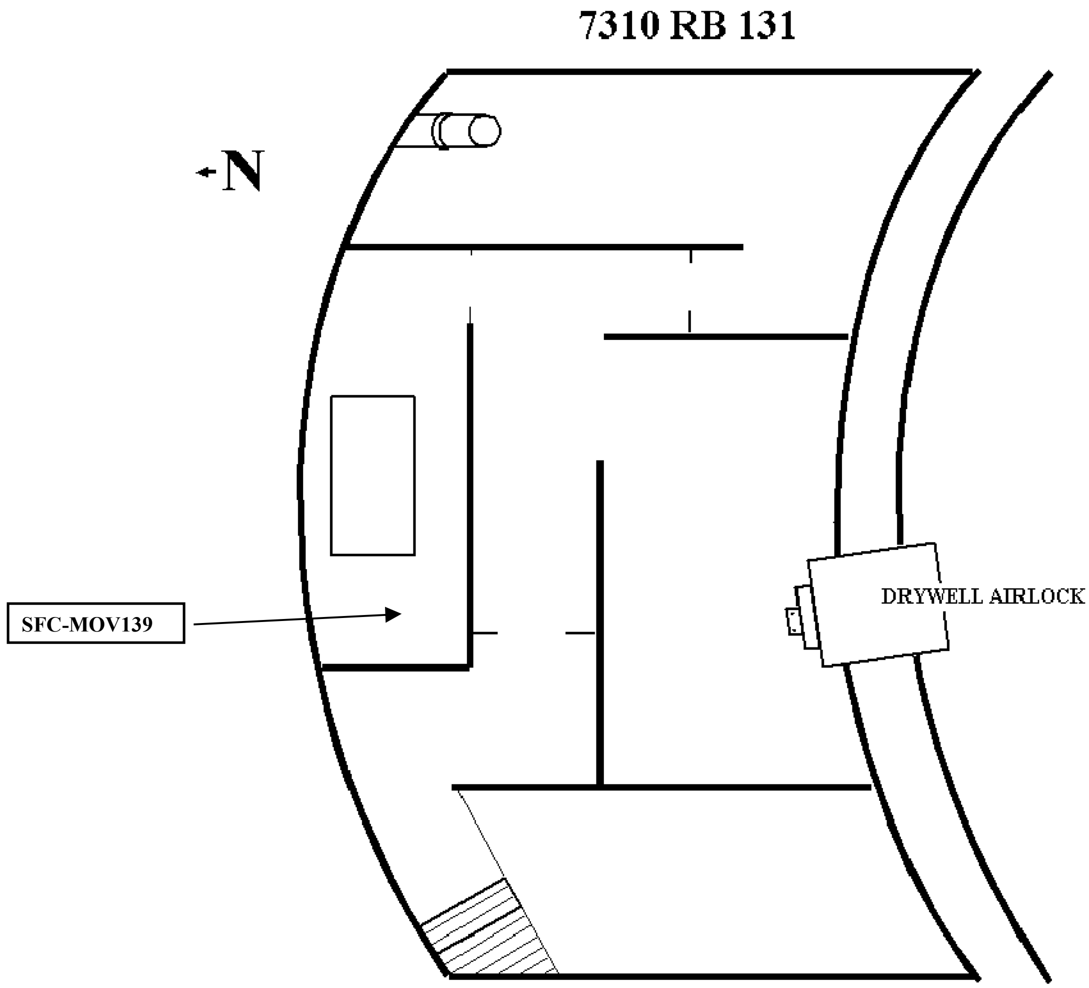
- E12-VF018A, RHR A MIN FLOW LINE MANUAL ISOLATION
- E12-VF018B, RHR B MIN FLOW LINE MANUAL ISOLATION
- E12-VF018C, RHR PUMP C MIN FLOW LINE MANUAL ISOLATION

9 At Fuel Building, 131 ft el, close SFC-MOV121, PRFCN RTN OUTBD ISOL.

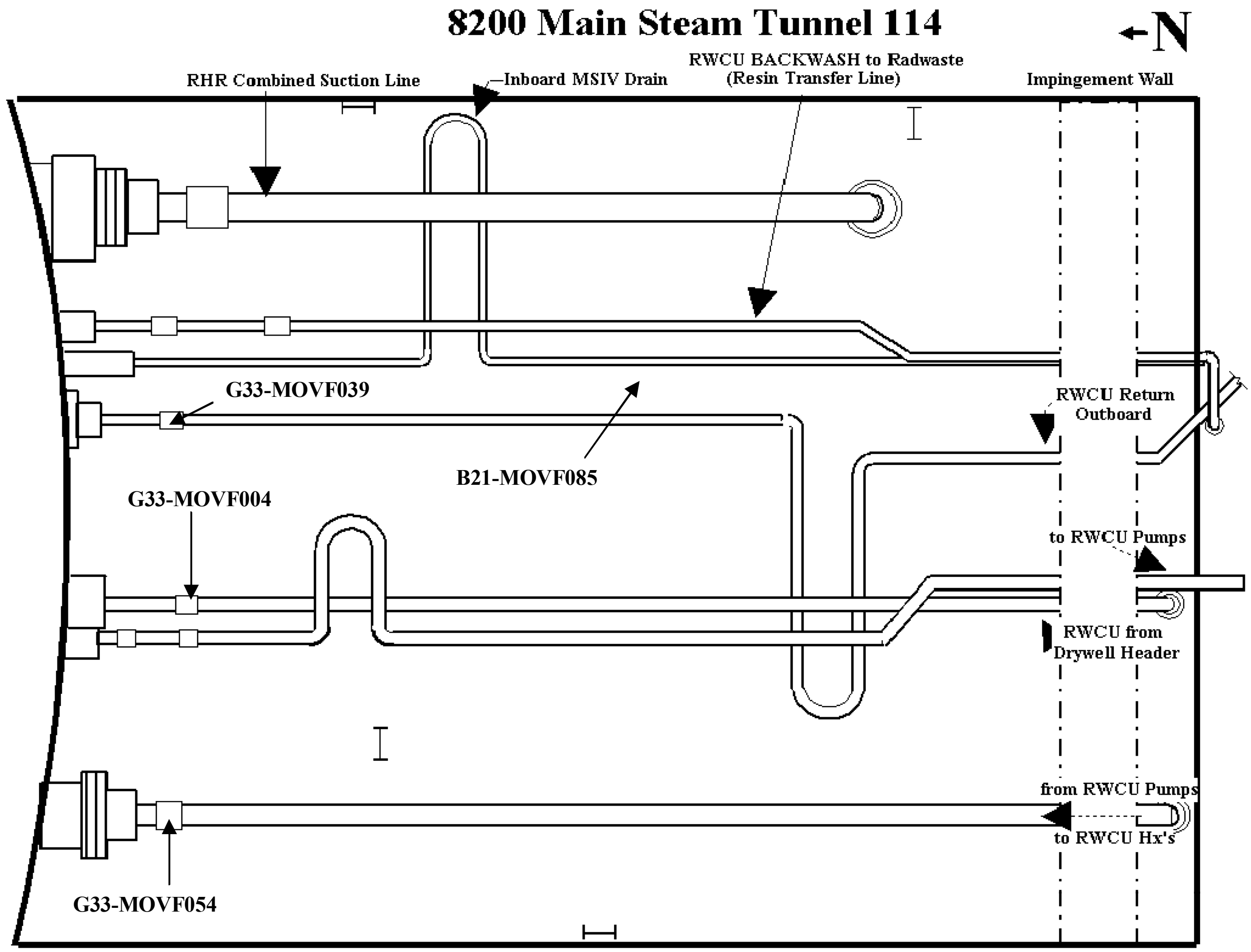
7306 RB 147 RWCU HX Room



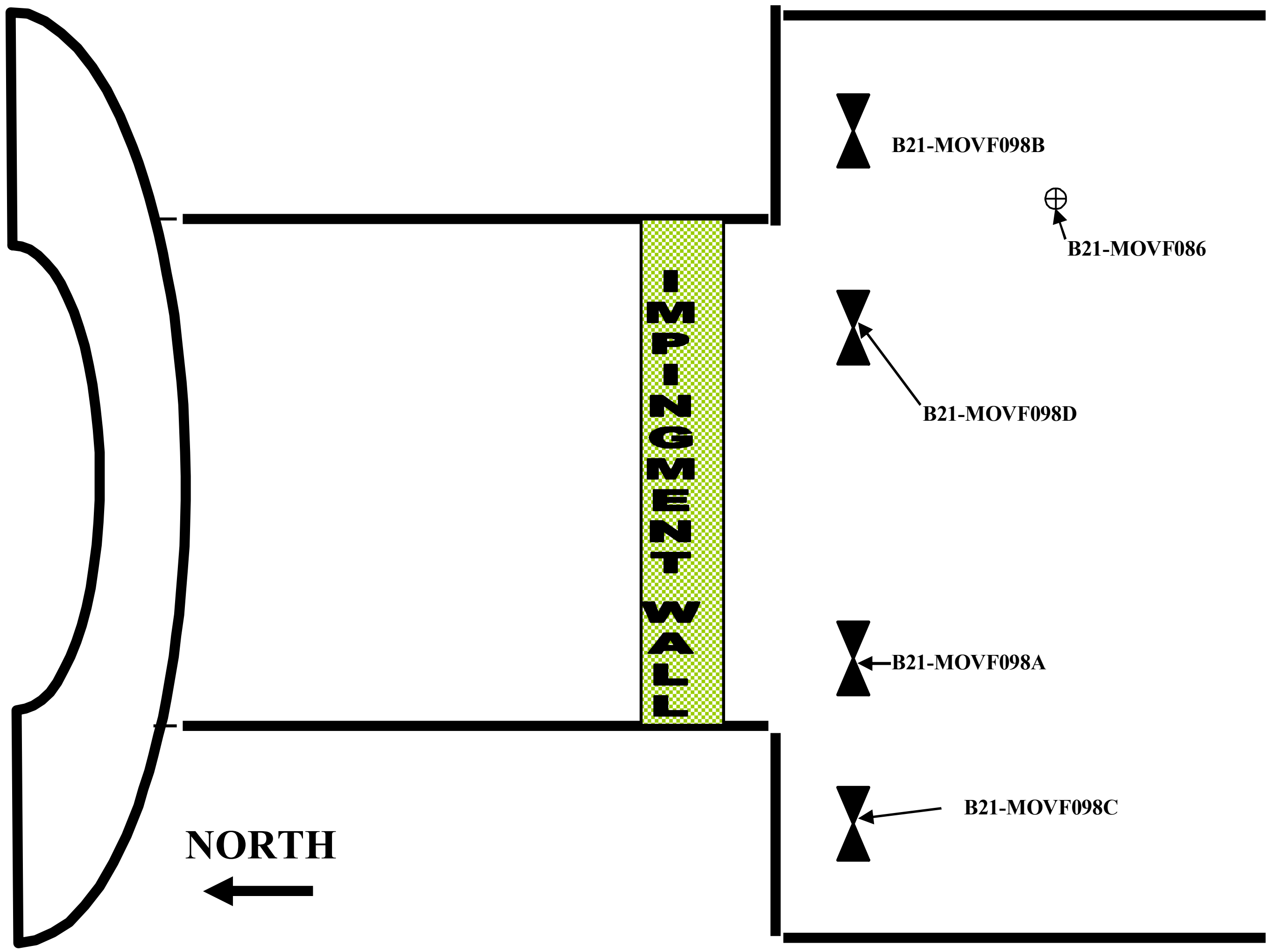
CONTAINMENT/DRYWELL/STEAM TUNNEL ACTIONS



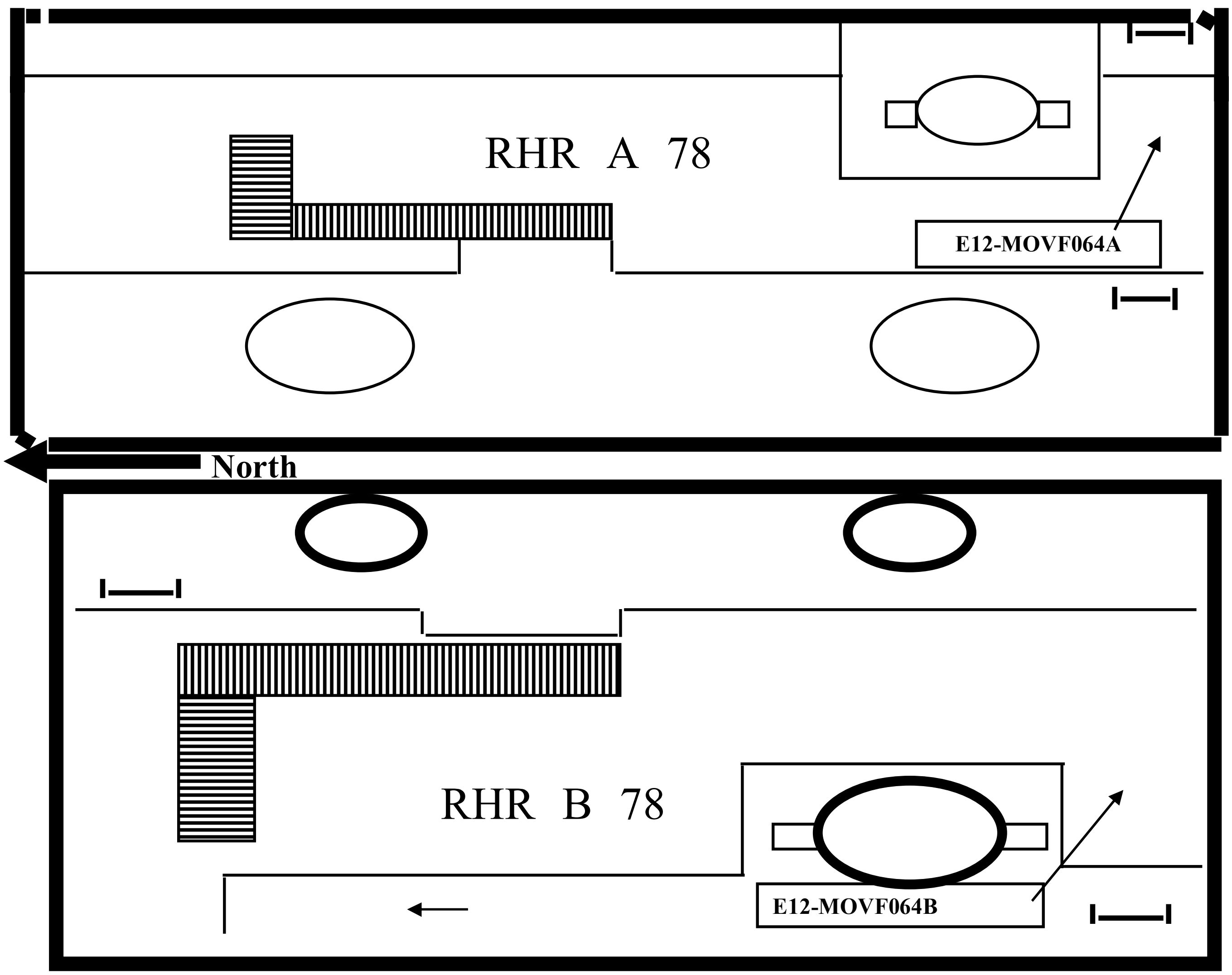
CONTAINMENT/DRYWELL/STEAM TUNNEL ACTIONS



CONTAINMENT/DRYWELL/STEAM TUNNEL ACTIONS



CONTAINMENT/DRYWELL/STEAM TUNNEL ACTIONS



CONTAINMENT/DRYWELL/STEAM TUNNEL ACTIONS

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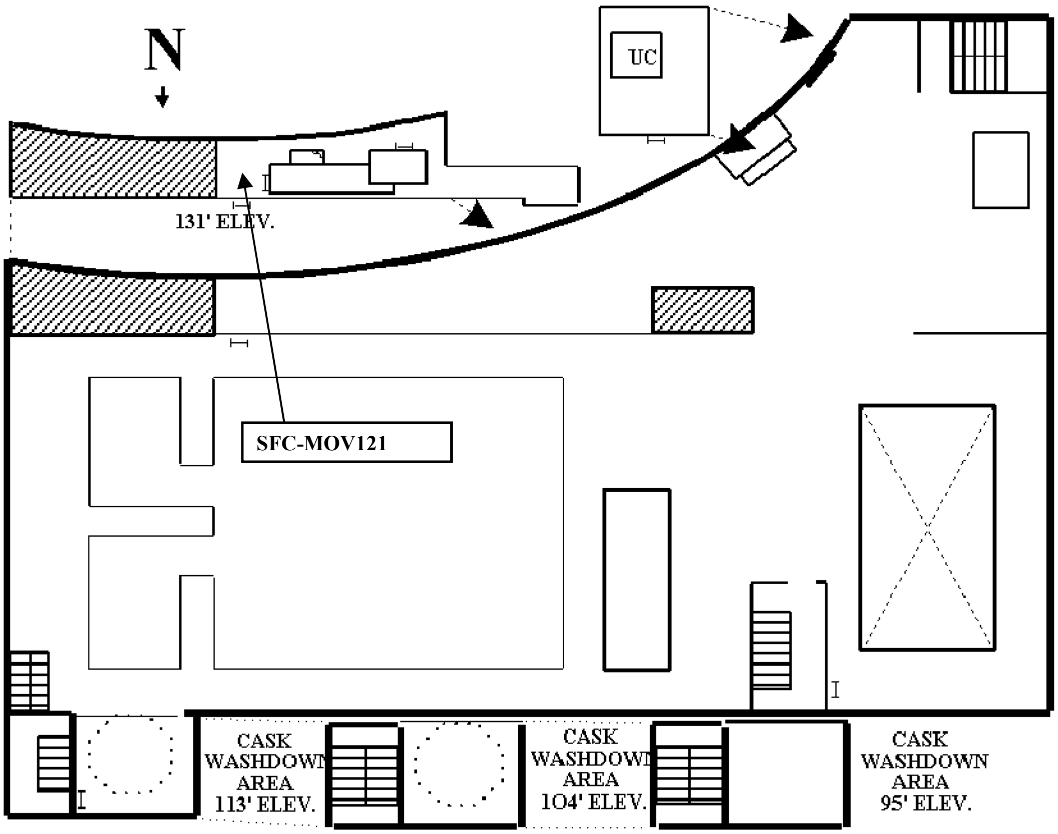


IAS DIESEL AIR COMPRESSOR BACKUP TO SVV HEADER

DISCUSSION

During a station blackout event, power is lost to the SVV Compressors. This attachment provides for a means of providing a backup source of air to the SRVs, allowing continued use of the SRVs for pressure control. This meets the intent of TRM 3.6.1.8 for both PVLCS subsystems inoperable.

INSTRUCTIONS:

1 Contact the Auxiliary Control Room, verify Diesel Air Compressor is lined up and operating to supply air to the IAS system.

2 Proceed to Turbine Building 95 ft el, northeast corner, next to the Auxiliary Building door, and perform the following:

2.1 Open AOP-0050, Station Blackout, IAS Diesel Air Compressor Backup To SVV Header Supply Kit, and verify the kit contains the following equipment:

- 250 feet of air hose, with quick connect fittings & whip restraints
- Two 24 inch pipe wrenches
- Two 3/4 inch quick connect fittings
- One 90° elbow to cross fitting with 2 quick connect fittings and bleed/shutoff valves
- One 90° elbow to tee fitting with 1 quick connect fitting and a bleed valve
- One extra miscellaneous 3/4 inch and 1 inch fittings

2.2 Move the needed contents of this kit to Auxiliary Building 141 ft el.

NOTE

It is preferable to supply the SVV header via the IAS system per Section 3 of this attachment rather than supplying each SRV division separately from IAS per Section 4.

3 Supplying the SVV Supply Header from IAS.

3.1 On IAS-V345, IAS SUPPLY ROOT, behind HVR-FLT2, next to door to SBGT Train A, install a 90° elbow with tee fitting.

3.2 At SVV-V3000, AIR HEADER X-CONNECT DRAIN, located five feet northeast of PVLCS Skid A Accumulator Tank, install a quick connect fitting.

IAS DIESEL AIR COMPRESSOR BACKUP TO SVV HEADER

3.3 Make a hose connection between IAS-V345, IAS SUPPLY ROOT and SVV-V3000, AIR HEADER X-CONNECT DRAIN.

3.4 Close the bleed valve on the tee fitting at IAS-V345, IAS SUPPLY ROOT.

3.5 Open IAS-V345, IAS SUPPLY ROOT.

3.6 Open SVV-V3000, AIR HEADER X-CONNECT DRAIN.

3.7 At the SVV Dryer Panel, observe SVV header pressure on SVV-PI38A or 38B. IF SVV header pressure can NOT be maintained greater than 101 psig, THEN disconnect the hookup per Steps 3.8.1 through 3.8.6 and proceed to Section 4 of this attachment.

3.8 WHEN normal operation of the SVV compressors is restored and/or both PVLCS subsystems are operating, THEN shutdown the backup IAS supply as follows:

3.8.1. Close IAS-V345, IAS SUPPLY ROOT.

3.8.2. Close SVV-V3000, AIR HEADER X-CONNECT DRAIN.

3.8.3. At IAS-V345, IAS SUPPLY ROOT, open the bleed valve on the tee fitting.

3.8.4. Disconnect the hose from IAS-V345, IAS SUPPLY ROOT and SVV-V3000, AIR HEADER X-CONNECT DRAIN.

3.8.5. Remove the tee fitting from IAS-V345, IAS SUPPLY ROOT.

3.8.6. At SVV-V3000, AIR HEADER X-CONNECT DRAIN, remove the quick connect fitting.

3.8.7. Return all items to AOP-0050, Station Blackout, IAS Diesel Air Compressor Backup To SVV Header Supply Kit.

4 Supplying each SRV Division Separately from IAS.

4.1 On IAS-V345, IAS SUPPLY ROOT, behind HVR-FLT2 next to door to SBGT Train A, install a 90° elbow with cross fitting.

4.2 At SVV-V48, HDR A OUTBOARD LEAKAGE MONITORING CONNECTION, located 4 feet southeast of LPCS Injection Valve, E21-MOVF005, install a quick connect fitting.

4.3 At SVV-V51, HDR B OUTBOARD LEAKAGE MONITORING CONNECTION, located 2 feet south of HPCS Injection Valve, E22-MOVF004, install a quick connect fitting.

IAS DIESEL AIR COMPRESSOR BACKUP TO SVV HEADER

4.4 Make a hose connection between IAS-V345, IAS SUPPLY ROOT EL and SVV-V48, HDR A OUTBOARD LEAKAGE MONITORING CONNECTION.

4.5 Make a hose connection between IAS-V345, IAS SUPPLY ROOT and SVV-V51, HDR B OUTBOARD LEAKAGE MONITORING CONNECTION.

4.6 On the cross fitting at IAS-V345, IAS SUPPLY ROOT, close the bleed valve.

4.7 Open IAS-V345, IAS SUPPLY ROOT.

4.8 Verify the shutoff valves on the cross fitting are closed.

4.9 Open SVV-V48, HDR A OUTBOARD LEAKAGE MONITORING CONNECTION.

4.10 Open SVV-V51, HDR B OUTBOARD LEAKAGE MONITORING CONNECTION.

4.11 Slowly open one or both shutoff valves on the cross fitting to supply either or both headers as needed. IF sufficient pressure can not be obtained with both shutoff valves open, THEN open only one shutoff at a time to develop sufficient pressure and flow to maintain the SRV pressure greater then 101 psig.

4.12 WHEN normal operation of the SVV compressors is restored and/or both PVLCS subsystems are operating, THEN shutdown the backup IAS supply as follows:

4.12.1. Close IAS-V345, IAS SUPPLY ROOT.

4.12.2. Close SVV-V48, HDR A OUTBOARD LEAKAGE MONITORING CONNECTION.

4.12.3. Close SVV-V51, HDR B OUTBOARD LEAKAGE MONITORING CONNECTION.

4.12.4. At IAS-V345, IAS SUPPLY ROOT, open both shutoff valves on the cross fitting.

4.12.5. At IAS-V345, IAS SUPPLY ROOT, open the bleed valve on the cross fitting.

4.12.6. Disconnect the hose from between IAS-V345, IAS SUPPLY ROOT and SVV-V48, HDR A OUTBOARD LEAKAGE MONITORING CONNECTION.

4.12.7. Disconnect the hose from between IAS-V345, IAS SUPPLY ROOT and SVV-V51, HDR B OUTBOARD LEAKAGE MONITORING CONNECTION.

4.12.8. Remove the cross fitting from IAS-V345, IAS SUPPLY ROOT.

IAS DIESEL AIR COMPRESSOR BACKUP TO SVV HEADER

4.12.9. At SVV-V48, HDR A OUTBOARD LEAKAGE MONITORING CONNECTION, remove the quick connect fitting.

4.12.10. At SVV-V51, HDR B OUTBOARD LEAKAGE MONITORING CONNECTION, remove the quick connect fitting.

4.12.11. Replace any pipe caps removed while implementing for this procedure.

4.12.12. Return all items to AOP-0050, Station Blackout, IAS Diesel Air Compressor Backup To SVV Header Supply Kit.

SUPPRESSION POOL TEMPERATURE DETERMINATION

DISCUSSION:

During a Station Blackout event, power is lost to the resistance to voltage converters, which provide a signal to the indicators in the Main Control Room and Remote Shutdown Panels. The recorders in the Main Control Room are powered from VBS panels, and would still have power, however would not have a temperature signal to them. Design calculations have shown that the Suppression Pool temperature should not exceed the Head Capacity Temperature Limit for the first 4 hours of the event. Because of the many variables that can come into play during a station blackout, a means to monitor the Suppression Pool temperature would be a prudent course of action to have available to the Operations Staff.

INSTRUCTIONS:

NOTE

A fluke with resistance indication or equivalent M&TE can be obtained from the cold tool room.

1 Obtain the following battery powered device:

- Fluke with resistance indication or equivalent M&TE

2 Obtain key number 26 from the Main Control Room Key Locker.

3 Proceed to the Control Building 116-ft el and enter the HVAC room.

NOTE

***CES-PNL6A and CES-PNL6B** are the gray upright cabinets, located between the HVAC units or next to the charcoal filter train. CES-PNL6B is the preferred cabinet to use, as it already has emergency lights both front and back. The terminal strips are located on the wall side of the cabinet, right side bay. TB-3 is on the back right side, and TB-4 is on the front right side.*

4 Locate CES-PNL6A or CES-PNL6B.

SUPPRESSION POOL TEMPERATURE DETERMINATION

5 Locate the wiring terminals leads per table below:

Panel Number	CES-PNL6A	CES-PNL6A	CES-PNL6B	CES-PNL6B
CMS-RTD-	40A	40C	40B	40D
Terminal Strip	TB-4	TB-3	TB-3	TB-3
White (O) wire lead	Terminal 25	Terminal 73	Terminal 13	Terminal 18
Red (-) wire lead	Terminal 26	Terminal 74	Terminal 14	Terminal 19
Black (+) wire lead	Terminal 27	Terminal 75	Terminal 15	Terminal 20

NOTE

The following step allows the Main Control Room to start receiving indication as soon as power is restored to either division.

6 Lift each set of three leads as needed to read the RTDs in that cabinet. Lift only one set of leads per cabinet.

NOTE

The amount of time that the RTDs are connected to any measuring device should be minimized. These units cause resistive heating of the RTD and can affect the indicated temperature over time.

7 IF using a Fluke, THEN read the RTD as follows:

7.1 Read the resistance between the Black wire and the Red wire. Record on Table 7-1 of this attachment.

7.2 Read the resistance between the White wire and the Red wire. Record on Table 7-1 of this attachment.

7.3 Subtract the resistance reading from Step 7.1 reading from the Step 7.2 reading. Record the result on Table 7-1.

7.4 Compare the absolute resistance from Step 7.3 to Table 7-2 of this attachment to determine temperature. Record this temperature on Table 7-1 of this attachment.

8 WHEN power is restored to a division AND there is reasonable assurance that power will remain available, THEN restore the leads lifted in Step 6 of this attachment.

SUPPRESSION POOL TEMPERATURE DETERMINATION

Suppression Pool Temperature Readings

Table 7-1

	FLUKE METER <u>OR</u> EQUIVALENT M&TE			
Time	Ohms between Black and Red	Ohms between White and Read	Difference between readings	**Temperature from Table 7-2**

SUPPRESSION POOL TEMPERATURE DETERMINATION

Temperature Table for 100 ohm Platinum RTD

Table 7-2

Absolute Ohms	Temperature °F	Absolute Ohms	Temperature °F	Absolute Ohms	Temperature °F
110.380	80	120.036	125	129.620	170
110.595	81	120.258	126	129.832	171
110.810	82	120.464	127	130.044	172
111.026	83	120.677	128	130.256	173
111.241	84	120.891	129	130.469	174
111.496	85	121.105	130	130.681	175
111.671	86	121.318	131	130.895	176
111.887	87	121.532	132	131.104	177
112.102	88	121.745	133	131.316	178
112.317	89	121.959	134	131.528	179
112.532	90	122.172	135	131.740	180
112.747	91	122.386	136	131.952	181
112.962	92	122.599	137	132.164	182
113.117	93	122.812	138	132.375	183
113.392	94	123.026	139	132.587	184
113.687	95	123.239	140	132.799	185
113.821	96	123.452	141	133.010	186
114.036	97	123.665	142	133.222	187
114.251	98	123.878	143	133.433	188
114.466	99	124.091	144	133.645	189
114.680	100	124.305	145	133.856	190
114.895	101	124.518	146	134.068	191
115.118	102	124.731	147	134.279	192
115.324	103	124.944	148	134.491	193
115.539	104	125.157	149	134.702	194
115.753	105	125.369	150	134.913	195
115.968	106	125.582	151	135.125	196
116.182	107	125.795	152	135.336	197
116.397	108	126.008	153	135.547	198
116.611	109	126.221	154	135.758	199
116.825	110	126.433	155	135.969	200
117.848	111	126.646	156	136.188	201
117.254	112	126.859	157	136.391	202
117.468	113	127.071	158	136.602	203
117.682	114	127.284	159	136.813	204
117.896	115	127.497	160	137.024	205
118.111	116	127.709	161	137.235	206
118.325	117	127.922	162	137.446	207
118.539	118	128.134	163	137.657	208
118.753	119	128.346	164	137.868	209
118.967	120	128.539	165	138.079	210
119.181	121	128.771	166	138.289	211
119.395	122	128.983	167	138.500	212
119.608	123	129.196	168	138.711	213
119.822	124	129.488	169	138.921	214

EMERGENCY MAKEUP OF WATER TO THE SUPPRESSION POOL

DISCUSSION:

During a station blackout event, there is no heat removal mechanism for the suppression pool, and if no action is taken, suppression pool temperatures will exceed 185°F in approximately 5.5 hours. Stored water in the Containment Pools, Condensate Storage Tank, Demineralizer Water Storage Tank, and Fire Protection System is at a much lower temperature and functions as a heat sink if added to the existing suppression pool volume.

INSTRUCTIONS:

NOTE

If suppression pool level is raised above the weir wall, flooding of the drywell occurs.

Provide makeup water to the Suppression Pool using any or all of the following methods.

1 Establish a gravity drain from the Condensate Storage Tank to the Suppression Pool via the HPCS Pump as follows:

1.1 Check RCIC suction is transferred to the Suppression Pool. IF RCIC is injecting to the vessel with CST, THEN select a different source of makeup water to the Suppression Pool.

1.2 At Auxiliary Building 78 ft el, HPCS Cubicle, verify open E22-MOVF001, HPCS SUCTION FROM CST.

1.3 At Auxiliary Building 78 ft el, Crescent Area, manually throttle open E22-MOVF023, HPCS FULL FLOW TEST to add water to the Suppression Pool.

1.4 WHEN Suppression Pool Water Level is satisfactory, THEN close E22-MOVF023, HPCS FULL FLOW TEST.

1.5 IF CST inventory is depleted AND additional water is needed, THEN establish a flow path to gravity drain the Demineralizer Water Storage Tank to the CST via temporary hoses.

EMERGENCY MAKEUP OF WATER TO THE SUPPRESSION POOL

2 Establish a gravity drain from the upper containment pools to the suppression pool as follows:

NOTE

An anti-siphoning device limits the amount of water that can be transferred with this lineup. Installation of an anti-siphon blocking device will require containment entry.

2.1 Verify racked out ENS-SWG1B ACB23, RHR B PUMP Breaker.

2.2 At the Auxiliary Building 95 ft el in the crescent area, manually open E12-MOVF024B, RHR PUMP B TEST RTN TO SUP PL.

2.3 At Containment 180 ft el in the SFC Valve Room at the top of the ladder, unlock and open SFC-V107, RHR SUPPLY TO FUEL STORAGE AREA.

2.4 At Containment 118 ft el at Az 330°, in the stairwell, unlock and open E12-VF099B, RHR B RETURN TO FUEL STORAGE AREA.

2.5 <u>WHEN</u> Suppression Pool level is satisfactory, <u>THEN</u> perform the following:

2.5.1. Close E12-MOVF024B, RHR PUMP B TEST RTN TO SUP PL.

2.5.2. Close and lock E12-VF099B, RHR B RETURN TO FUEL STORAGE AREA.

2.5.3. Close and lock SFC-V107, RHR SUPPLY TO FUEL STORAGE AREA.

3 Provide makeup from the Fire Protection Water System as follows:

3.1 <u>IF</u> the Diesel Fire Pumps are <u>not</u> already running, <u>THEN</u> start Diesel Fire Pumps.

3.2 Close the following Service Water valves:

NOTE

If steps 3.2.1 through 3.2.4 can <u>not</u> be performed in a timely manner, steps 3.2.5 through 3.2.8 can be used.

The following valves are located in D Tunnel East.

3.2.1. SWP-MOV96A, DIV I NORM SVCE WTR RETURN

3.2.2. SWP-MOV96B, DIV II NORM SVCE WTR RETURN

3.2.3. SWP-MOV57A, DIV I NORM SVCE WTR SUPPLY

3.2.4. SWP-MOV57B, DIV II NORM SVCE WTR SUPPLY

NOTE

Steps 3.2.5 through 3.2.8 can be used for positive leakage control or as required if steps 3.2.1 through 3.2.4 were not performed.

The following valves are located in C Tunnel.

3.2.5. SWP-V1213, A RETURN HEADER ISOLATION

3.2.6. SWP-V1212, B RETURN HEADER ISOLATION

3.2.7. SWP-V1210, A SUPPLY HEADER ISOLATION

3.2.8. SWP-V1211, B SUPPLY HEADER ISOLATION

NOTE

A ladder is required to manually operated SWP-MOV55B.

3.3 At Pipe Tunnel G 70 ft el, close the following Standby Service Water valves:

3.3.1. SWP-MOV55A, DIV I STBY CLG TOWER 1 INLET

3.3.2. SWP-MOV55B, DIV II STBY CLG TOWER 1 INLET

3.4 Line up Fire Protection/Service Water Cross Connect Valves for injection as follows:

3.4.1. At Control Building 102 ft el, southwest:

1. Open FPW-V818, SWP BACKUP TO CB HOSE RACKS INSULATION.
2. Unlock and open SWP-V961, SVCE WTR SUPPLY TO FIRE PROTECTION IN CONTROL BLDG ISOL VLV.

3.4.2. At Fuel Building 74 ft el, southwest:

1. Open FPW-V396, ISOLATION VALVE FOR SWP BACKUP TO FUEL BLDG HOSE RACKS.
2. Unlock and open SWP-V971, DIV 2 STBY SWP TO FUEL BLDG FIRE PROT ISOL VLV.

3.4.3. At Auxiliary Building 100 ft el, northeast crescent area:

1. Open FPW-V321, SWP BACKUP TO RB AND AUX BLDG HOSE RACKS ISOLATION VALVE.
2. Unlock and open SWP-V968, SVCE WTR TO FIRE PROTECTION MAN ISOL VLV.

EMERGENCY MAKEUP OF WATER TO THE SUPPRESSION POOL

3.5 Verify racked out ENS-SWG1B ACB23, RHR B PUMP Breaker.

3.6 WHEN RHR B loop pressure is less than 100 psig, THEN at Auxiliary Building RHR B Pump Room, 76 ft el, manually open:

3.6.1. E12-MOVF094, SERVICE WATER/RHR INTERTIE VALVE

3.6.2. E12-MOVF096, SERVICE WATER/RHR INTERTIE VALVE

3.7 At Auxiliary Building 95 ft el, crescent area, manually open E12-MOVF024B, RHR PUMP B TEST RTN TO SUP PL.

USING THE DIV 3 DIESEL GENERATOR TO SUPPLY POWER TO ENS-SWG1A

1 Purpose

Provide instructions for using the Div 3 Diesel Generator to supply power to the Div 1 Standby bus when the Div 1 Diesel is not available during a Station Blackout.

C 2 Procedure

2.1 Verify all of the following conditions have been met:

- No known fault exists on the Div 1 Standby Bus which could damage the Div 3 Diesel Generator,

  AND

- The Div 3 Diesel Generator and its electrical bus is available,

  AND

- Energizing the Div 1 Standby Bus is required to maintain adequate core cooling or to maintain the plant in a safe shutdown condition,

  AND

- The OSM/CRS has authorized the performance of this Attachment.

2.2 Dispatch personnel to perform the following while aligning the Control Room Breakers in Steps 2.3 through 2.8:

2.2.1. Obtain AOP-0050, Attachment 10 and 11 kit containing an insulated screw driver and 3 pieces of Tygon tubing from the Control Room Emergency Locker.

2.2.2. On Cont Bldg 116 ft el on E22-S004-ACB01 door, place 25 SYNCH CHECK RELAY in HBDL (Hot Bus-Dead Line).

WARNING

Voltage is present. Because a personnel shock hazard exists, do not touch bare terminals or lifted leads without taking appropriate precautions.

2.2.3. On Control Building 116 ft el, at E22-S004, Auxiliary Compartment, Bottom Row of relays in panel, lift the following leads and cover the lifted leads with Tygon tubing: See Attachment 11, Relay Location and Terminal Identification in E22-S004 Auxiliary Compartment:

- On Relay 27NY(RSF) terminal no. 5
- On Relay 27NX(RSE) terminal no. 5

WARNING

Voltage is present. Because a personnel shock hazard exists, do not touch bare terminals or lifted leads without taking appropriate precautions.

2.2.4. In the HPCS Diesel Generator Control Room 98 el, at H22-P028, HPCS DIESEL GEN PROT DIVISION III, open the back of the panel and on the left side, second terminal block from the top, at TB-0011, lift either lead at terminal 08 and cover the lead with Tygon tubing.

2.2.5. On ENS-SWG1A Control Building 98 ft el, open and rack out the following breakers:

- ENS-ACB03, E12-C002A RESID HT RMV PUMP
- ENS-ACB06, RTX-XSR1C PFD STA SVCE XFMR
- ENS-ACB07, DIESEL GENERATOR
- ENS-ACB08, E21-C001 LP CORE SPRAY PMP

2.2.6. On EJS-SWG1A Control Building 98 ft el, open and rack out the following breakers:

- EJS-ACB09, NORM. BATT. CHARGER CHGR 1A
- EJS-ACB12, DEISEL ROOM A EMER VENTILATING EXHAUST FAN

2.2.7. On EJS-SW2A Auxiliary Bldg 141 ft el, open and rack out the following breakers:

- EJS-ACB025, STANDBY BUS A DISTRIBUTION BREAKER NHS-MCC102A
- EJS-ACB022, MHR-CRN1, RX BLDG POLAR CRANE

2.3 On H13-P601, verify the following:

- HPCS Diesel Generator is running.
- E22-ACB01, HPCS D/G OUTPUT BRKR is closed.
- E22-ACB03, HPCS MCC SUPPLY BRKR is closed.
- E22-ACB04, HPCS BUS SUPPLY BRKR is open.
- Verify SWP-P2C, STBY SERV WTR PUMP is running.
- Verify SWP-MOV40C, PUMP DISCH VALVE open.

2.4 On H13-P870, verify SWP-AOV599, STBY CLG TWR INLET is open.

2.5 On H13-P870, depress the STOP and LOCKOUT push buttons for the following pumps:

- SWP-P2A, STBY SVCE WTR PUMP 2A
- CCS-P1A, TPCCW PUMP 1A
- CCS-P1B, TPCCW PUMP 1B
- CCS-P1C, TPCCW PUMP 1C

2.6 On H13-P808, verify the following breaker alignment:

- NNS-ACB23, NNS SWGR 1C/1A BRKR is open.
- NNS-ACB25, HPCS BUS S004 BRKR is closed.
- NNS-ACB24, NNS SWGR 1C/1B BRKR is closed.
- NNS-ACB28, NNS SWGR 1B/1C BRKR is closed.
- NNS-ACB20, NNS SWGR 4B/1B BRKR is open.
- NNS-ACB14, NORM SUPPLY BRKR is open.
- NNS-ACB15, 4160V PFD SUPPLY BRKR is open.

2.7 On H13-P877, verify ENS-ACB04, ALTERNATE SUPPLY BRKR is open.

2.8 On H13-P808, close NNS-ACB13, STBY BUS A ALTN SUPPLY.

2.9 WHEN Steps 2.2 through 2.8 have been completed, THEN in the Main Control Room, on H13-P601, energize NNS-SWG1C and NNS-SWG1B from Div III Diesel Generator as follows:

2.9.1. Place E22-ACB04, SYNC SWITCH in NRM/BUS.

2.9.2. Close E22-ACB04, HPCS BUS SUPPLY BRKR.

2.9.3. Place E22-ACB04, SYNC SWITCH in OFF.

2.10 Shutdown the HPCS Pump per SOP-0030, High Pressure Core Spray.

NOTE

Energizing ENS-SWG1A will allow the automatic sequencing of loads on the buses. The HPCS Diesel Generator load must be maintained less than 2850 KW.

2.11 On H13-P877, energize ENS-SWG1A, EJS-SWG1A, and EJS-SWG2A as follows:

2.11.1. Place ENS-SWG1A SYNCHRONIZING Switch in ALTN.

2.11.2. Close ENS-ACB04, ALTERNATE SUPPLY BRKR.

2.11.3. On V-1EGSA08, STBY BUS A VOLTS Indication, verify standby bus voltage normal.

2.11.4. Place ENS-SWG1A SYNCHRONIZING Switch in OFF.

NOTE

Step 2.12 may be performed concurrently with Step 2.13.

2.12 Fill and vent RHR Pump 1A.

CAUTION

To prevent excess loading on the HPCS Diesel Generator when starting Standby Service Water Pump A, it may be necessary to reduce HPCS Diesel Generator loads. Do not exceed a HPCS Diesel Generator load of 2850 KW.

2.13 Align Standby Service Water as follows:

2.13.1. Verify Div I SSW is isolated.

2.13.2. Reset and start SWP-P2A, STBY SERV WTR PUMP 2A.

2.13.3. Verify SWP-MOV40A, STBY PUMP 2A Valve opens.

2.13.4. Verify SWP-MOV55A, STBY CLG TOWER 1 INLET is open.

2.13.5. Close SWP-AOV599, STBY CLG TWR INLET.

CAUTION

To prevent excess loading on the HPCS Diesel Generator when starting RHR Pump A, it may be necessary to reduce HPCS Diesel Generator loads. Do not exceed a HPCS Diesel Generator load of 2850 KW.

2.14 WHEN RHR Pump A start is desired, THEN start RHR Pump A in the desired mode per SOP-0031, Residual Heat Removal System.

3 Restoration

NOTE

Because the HPCS Diesel Generator is being paralleled across NNS-ACB15, 4160V PFD SUPPLY BRKR, Section 3.1 will require close coordination between an operator at H13-P601 and H13-P808.

3.1 Paralleling the HPCS Diesel Generator with Off Site Power through NNS-SWG1B

CAUTION

The Governor control speed droop is sensitive and rapid adjustment can cause frequency variations on the switchgear. Do not rapidly adjust the Governor control speed droop.

3.1.1. On the HPCS Diesel Generator, position the Governor speed droop setting to 60.

3.1.2. On H13-P808-88, place NNS-SWG1B SYNC SELECT Switch to PFD.

3.1.3. On H13-P601, using E22B-S3, HPCS DIESEL GENERATOR VOLTAGE REGULATOR CONT, adjust on H13-P808, V-RUN-1SYGN01, RUNNING VOLTAGE indication to greater than V-INC-1SYGN01, INCOMING VOLTAGE indication.

3.1.4. On H13-P601, using E22B-S11 HPCS DIESEL GENERTOR GOVERNOR CONTROL, adjust the Diesel Generator frequency until SYN-1-1SYGN01, SYNCHROSCOPE on H13-P808 rotates in the SLOW, or counterclockwise direction at the rate of one revolution in greater than 4 second and less than or equal to 6 seconds.

3.1.5. Repeat Steps 3.1.3 and 3.1.4 to maintain on H13-P808, V-RUN-1SYGN01, RUNNING VOLTAGE indication to greater than V-INC-1SYGN01, INCOMING VOLTAGE indication and the synchroscope rotating in the SLOW direction.

3.1.6. Allow SYN-1-1SYGN01, SYNCHROSCOPE to make at least 5 revolutions to check frequency reliability and check that the sync lights dim or go out at 12 o clock on the scope.

USING THE DIV 3 DIESEL GENERATOR TO SUPPLY POWER TO ENS-SWG1A

NOTE

When synchronizing the HPCS Diesel Generator and its connected loads back to offsite power, the diesel generator can unload rapidly when the offsite breaker is closed. The Operator must monitor the diesel generator output and be prepared to adjust kW and KVAR loading. Close coordination is required between operators at H13-P601 and H13-P808.

3.1.7. At H13-P808, WHEN SYN-1-1SYGN01, SYNCHROSCOPE needle is less than or equal to 5 minutes and greater than 2 minutes before 12 0 clock, THEN close NNS-ACB15, 4160V PFD SUPPLY BRKR.

1. Check that NNS-ACB15, 4160V PFD SUPPLY BRKR red light is on.
2. On H13-P601, check the HPCS Diesel Generator frequency is greater than or equal to 59.5 Hz and less than 60.5 Hz.

C 3.1.8. Adjust load and KVARS to maintain at least 1950 kW on the diesel generator with greater than or equal to a positive 100 KVARS out, to prevent a reverse power trip.

3.1.9. On H13-P808, check the following:

1. On V-NNSB17, 4160 V SWGR 1B VOLTS indicates normal bus voltage.
2. On A-NNSB12, 4160V NORM SUPPLY AMPS indicates amperage increase.

3.1.10. On H13-P808, place the NNS-SWG1B SYNC Switch in OFF.

3.1.11. WHEN the CRS directs the diesel be unloaded and secured, THEN perform SOP-0052, HPCS Diesel Generator section 6.2 or 6.3 to unload and secure the diesel.

3.1.12. IF ENS-SWG1A preferred supply is available AND it is desired to transfer ENS-SWG1A to its preferred supply, THEN transfer ENS-SWG1A to its Preferred Supply using SOP-0046, 4.16 KV System.

WARNING

Voltage is present. Because a personnel shock hazard exists, do not touch bare terminals or lifted leads without taking appropriate precautions.

3.1.13. WHEN desired to complete restoration, THEN have the following leads reterminated:

- On Control Building 116 ft el, at E22-S004, Auxiliary Compartment. See Attachment 11, Relay Location and Terminal Identification in E22-S004 Auxiliary Compartment.
  - Lead at terminal no. 5 on Relay 27NY(RSF)
  - Lead at terminal no. 5 on Relay 27NX(RSE)
- In the HPCS Diesel Generator Control Room 98 el, at H22-P028, HPCS DIESEL GEN PROT DIVISION III, open the back of the panel and on the left side, second terminal block from the top, at TB-0011, land the lead to terminal 08.

3.1.14. On Cont Bldg 116 ft el on E22-S004-ACB01 door, return 25 SYNCH CHECK RELAY to its original position by placing it in HLDB (Hot Line-Dead Bus).

4 References

4.1 GE Drawing 828E537AA Sheets 2, 5, 6, 7, 8, 11

4.2 0221.418-000-074

4.3 EE-001AC

4.4 ER01-0367

USING DIV 3 DIESEL GENERATOR TO SUPPLY POWER TO ENS-SWG1B

1 Purpose

Provide instructions for using the Div 3 Diesel Generator to supply power to the Div 2 Standby bus when the Div 2 Diesel is not available during a Station Blackout.

C 2 Procedure

2.1 Verify all of the following conditions have been met:

- No known fault exists on the Div 2 Standby Bus which could damage the Div 3 Diesel Generator,

  AND

- The Div 3 Diesel Generator and its electrical bus is available,

  AND

- Energizing the Div 2 Standby Bus is required to maintain adequate core cooling or to maintain the plant in a safe shutdown condition,

  AND

- The OSM/CRS has authorized the performance of this Attachment.

2.2 Dispatch personnel to perform the following while aligning the Control Room Breakers in Steps 2.3 through 2.8:

2.2.1. Obtain AOP-0050, Attachment 10 and 11 kit containing an insulated screw driver and 3 pieces of Tygon tubing from the Control Room Emergency Locker.

2.2.2. On Cont Bldg 116 ft el on E22-S004-ACB01 door, place 25 SYNCH CHECK RELAY in HBDL (Hot Bus-Dead Line).

WARNING

Voltage is present. Because a personnel shock hazard exists, do not touch bare terminals or lifted leads without taking appropriate precautions.

2.2.3. On Cont Building 116 ft el, at E22-S004, Auxiliary Compartment, Bottom Row of relays in panel, lift the following leads and cover the lifted lead with Tygon tubing. See Attachment 11, Relay Location and Terminal Identification in E22-S004 Auxiliary Compartment:

- On Relay 27NY(RSF) at terminal no. 5
- On Relay 27NX(RSE) at terminal no. 5

WARNING

Voltage is present. Because a personnel shock hazard exists, do not touch bare terminals or lifted leads without taking appropriate precautions.

2.2.4. In the HPCS Diesel Generator Control Room 98 el, at H22-P028, HPCS DIESEL GEN PROT DIVISION III, open the back of the panel and on the left side, second terminal block from the top, at TB-0011, lift either lead at terminal 08 and cover the lead with Tygon tubing.

2.2.5. On ENS-SWG1B Control Building 98 ft el, open and rack out the following breakers:

- ENS-ACB23, E12-C002B RESID HT RMV PUMP
- ENS-ACB26, RTX-XSR1D PFD STA SVCE XFMR
- ENS-ACB27, DIESEL GENERATOR
- ENS-ACB28, E12-C002C RESID HT RMV PUMP

2.2.6. On EJS-SWG1B Control Building 98 ft el, open and rack out the following breakers:

- EJS-ACB49, NORM. BATT. CHARGER CHGR 1B
- EJS-ACB54, DIESEL ROOM B EMER VENTILATING EXHAUST FAN
- EJS-ACB050, STANDBY BUS 1B DIST BKR MCC101

USING DIV 3 DIESEL GENERATOR TO SUPPLY POWER TO ENS-SWG1B

2.3 On H13-P601, verify the following:

- HPCS Diesel Generator is running.
- E22-ACB01, HPCS D/G OUTPUT BRKR is closed.
- E22-ACB03, HPCS MCC SUPPLY BRKR is closed.
- E22-ACB04, HPCS BUS SUPPLY BRKR is open.
- Verify SWP-P2C, STBY SERV WTR PUMP is running.
- Verify SWP-MOV40C, PUMP 2C DISCH open.

2.4 On H13-P870, verify SWP-AOV599, STBY CLG TWR INLET is open.

2.5 On H13-P870, depress the STOP and LOCKOUT push buttons for the following pumps:

- SWP-P2B, STBY SVCE WTR PUMP 2B
- SWP-P2D, STBY SVCE WTR PUMP 2D
- CCS-P1A, TPCCW PUMP 1A
- CCS-P1B, TPCCW PUMP 1B
- CCS-P1C, TPCCW PUMP 1C

2.6 On H13-P808, verify the following breaker alignment:

- NNS-ACB06, 4160V NORM SUPPLY BRKR is open.
- NNS-ACB07, 4160V PFD SUPPLY BRKR is open.
- NNS-ACB10, NNS SWGR 1A/4A BRKR is open.
- NNS-ACB29, NNS SWGR 1A/1C BRKR is closed.
- NNS-ACB23, NNS SWGR 1C/1A BRKR is closed.
- NNS-ACB25, HPCS BUS S004 BRKR is closed.
- NNS-ACB24, NNS SWGR 1C/1B BRKR is open.

2.7 On H13-P877, verify ENS-ACB24, ALTERNATE SUPLY BRKR is open.

2.8 On H13-P808, close NNS-ACB05, STBY BUS B ALTN SUPPLY.

2.9 WHEN Steps 2.2 through 2.8 have been completed, THEN in the Main Control Room, on H13-P601, energize NNS-SWG1C and NNS-SWG1A from the Div III Diesel Generator as follows:

2.9.1. Place E22-ACB04, SYNC SWITCH in NRM/BUS.

2.9.2. Close E22-ACB04, HPCS BUS SUPPLY BRKR.

2.9.3. Place E22-ACB04, SYNC SWITCH in OFF.

2.10 Shutdown the HPCS Pump per SOP-0030, High Pressure Core Spray.

NOTE

Energizing ENS-SWG1A will allow the automatic sequencing of loads on the buses. The HPCS Diesel Generator load must be maintained less than 2850 KW.

2.11 On H13-P877, energize ENS-SWG1B, EJS-SWG1B, and EJS-SWG2B as follows:

2.11.1. Place ENS-SWG1B SYNCHRONIZING Switch in ALTN.

2.11.2. Close ENS-ACB24, ALTERNATE SUPPLY BRKR.

2.11.3. On V-1EGSB08, STBY BUS B VOLTS Indication, verify standby bus voltage normal.

2.11.4. Place ENS-SWG1B SYNCHRONIZING Switch in OFF.

NOTE

Step 2.12 may be performed concurrently with Steps 2.13 and 2.14.

2.12 Fill and vent RHR Pump 1B.

CAUTION

To prevent excess loading on the HPCS Diesel Generator when starting Standby Service Water Pump B(D), it may be necessary to reduce HPCS Diesel Generator loads. Do not exceed a HPCS Diesel Generator load of 2850 KW.

2.13 Align Standby Service Water as follows:

2.13.1. Verify Div 2 Standby Service Water is isolated.

2.13.2. Reset and start SWP-P2B(D), STBY SERV WTR PUMP 2B(D).

2.13.3. Verify SWP-MOV40B(D), PUMP 2B(D) DISCH opens.

2.13.4. Reset and start SWP-P2D(B), STBY SERV WTR PUMP 2D(B).

2.13.5. Verify SWP-MOV40D(B) PUMP 2D(B) DISCH opens.

2.14 Align Standby Service Water to the HPCS Diesel as follows:

2.14.1. Verify SWP-MOV55B, STBY CLG TOWER 1 INLET is open.

2.14.2. Close SWP-AOV599, STBY CLG TWR INLET.

2.14.3. Lockout and secure SWP-P2C, STBY SVCE WTR PUMP C.

2.14.4. Close SWP-MOV74A, HVR-UC5 RETURN.

2.14.5. Close SWP-MOV506A, HPCS D/G RETURN.

CAUTION

To prevent excess loading on the HPCS Diesel Generator when starting RHR Pump B, it may be necessary to reduce HPCS Diesel Generator loads. Do not exceed a HPCS Diesel Generator load of 2850 KW.

2.15 WHEN RHR Pump B start is desired, THEN start RHR Pump B in the desired mode per SOP-0031, Residual Heat Removal System.

3 Restoration

NOTE

Because the HPCS Diesel Generator is being paralleled across NNS-ACB07, 4160V PFD SUPPLY BRKR, Section 3.1 will require close coordination between an operator at H13-P601 and H13-P808.

3.1 Paralleling the HPCS Diesel Generator with Off Site Power through NNS-SWG1A

CAUTION
The Governor control speed droop is sensitive and rapid adjustment can cause frequency variations on the switchgear. Do not rapidly adjust the Governor control speed droop.

3.1.1. On the HPCS Diesel Generator, position the Governor speed droop setting to 60.

3.1.2. On H13-P808-88, place NNS-SWG1A SYNC SELECT Switch to PFD.

3.1.3. On H13-P601, using E22B-S3, HPCS DIESEL GENERATOR VOLTAGE REGULATOR CONT, adjust on H13-P808, V-RUN-1SYGN01, RUNNING VOLTAGE indication to greater than V-INC-1SYGN01, INCOMING VOLTAGE indication.

3.1.4. On H13-P601, using E22B-S11 HPCS DIESEL GENERATOR GOVERNOR CONTROL, adjust the Diesel Generator frequency until SYN-1-1SYGN01, SYNCHROSCOPE on H13-P808 rotates in the SLOW, or counterclockwise direction at the rate of one revolution in greater than 4 second and less than or equal to 6 seconds.

3.1.5. Repeat Steps 3.1.3 and 3.1.4 to maintain on H13-P808, V-RUN-1SYGN01, RUNNING VOLTAGE indication to greater than V-INC-1SYGN01, INCOMING VOLTAGE indication and SYN-1-1SYGN01, SYNCHROSCOPE rotating in the SLOW direction.

3.1.6. Allow SYN-1-1SYGN01, SYNCHROSCOPE to make at least 5 revolutions to check frequency reliability and check that the sync lights dim or go out at 12 o clock on the scope.

NOTE

When synchronizing the HPCS Diesel Generator and its connected loads back to offsite power, the diesel generator can unload rapidly when the offsite breaker is closed. The Operator must monitor the diesel generator output and be prepared to adjust kW and KVAR loading. Close coordination is required between operators at H13-P601 and H13-P808.

3.1.7. At H13-P808, WHEN SYN-1-1SYGN01, SYNCHROSCOPE needle is less than or equal to 5 minutes and greater than 2 minutes before 12 0 clock, THEN close NNS-ACB07, 4160V PFD SUPPLY BRKR.

1. Check that NNS-ACB07, 4160V PFD SUPPLY BRKR red light is on.
2. On H13-P601, check the HPCS Diesel Generator frequency is greater than or equal to 59.5 Hz and less than 60.5 Hz.

C 3.1.8. Adjust load and KVARS to maintain at least 1950 kW on the diesel generator with greater than or equal to a positive 100 KVARS out, to prevent a reverse power trip.

3.1.9. On H13-P808, check the following:

1. On V-NNSA17, 4160 V SWGR 1A VOLTS indicates normal bus voltage.
2. On A-NNSA12, 4160V NORM SUPPLY AMPS indicates amperage increase.

3.1.10. On H13-P808, place the NNS-SWG1A SYNC Switch in OFF.

3.1.11. WHEN the CRS directs the diesel be unloaded and secured, THEN perform SOP-0052, HPCS Diesel Generator section 6.2 or 6.3 to unload and secure the diesel.

3.1.12. IF ENS-SWG1B preferred supply is available AND it is desired to transfer ENS-SWG1B to its preferred supply, THEN transfer ENS-SWG1B to its Preferred Supply using SOP-0046, 4.16 KV System.

WARNING

Voltage is present. Because a personnel shock hazard exists, do not touch bare terminals or lifted leads without taking appropriate precautions.

3.1.13. WHEN desired to complete restoration, THEN have the following leads reterminated:

- On Control Building 116 ft el, at E22-S004, Auxiliary Compartment. See Attachment 11, Relay Location and Terminal Identification in E22-S004 Auxiliary Compartment.
  - Lead at terminal no. 5 on Relay 27NY(RSF)
  - Lead at terminal no. 5 on Relay 27NX(RSE)
- In the HPCS Diesel Generator Control Room 98 el, at H22-P028, HPCS DIESEL GEN PROT DIVISION III, open the back of the panel and on the left side, second terminal block from the top, at TB-0011, land the lead to terminal 08.

3.1.14. On Cont Bldg 116 ft el on E22-S004-ACB01 door, return 25 SYNCH CHECK RELAY to its original position by placing it in HLDB (Hot Line-Dead Bus).

4 References

4.1 GE Drawing 828E537AA Sheets 2, 5, 6, 7, 8, 11

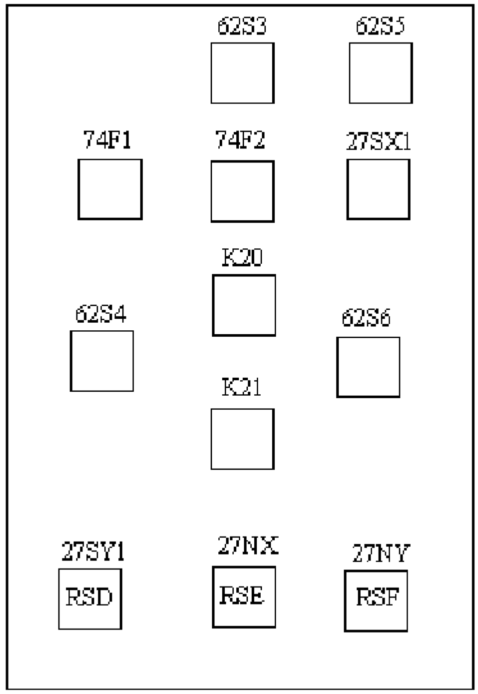
4.2 0221.418-000-074

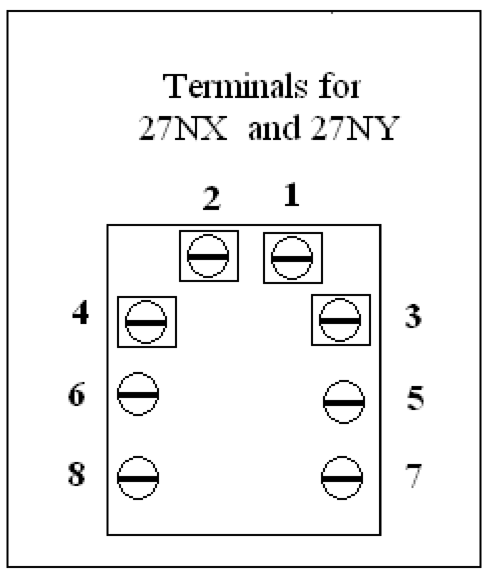
4.3 EE-001AC

4.4 ER01-0367

RELAY LOCATION AND TERMINAL IDENTIFICATION IN E22-S004 AUXILIARY COMPARTMENT

E22-S004 Auxiliary Compartment





RHR C OR RCIC ROOM ENTRY TO CLOSE DOORS AB-078-01 AND AB-095-03

1 Purpose

1.1 Provide instructions for closing doors AB-078-01 and AB-095-03 in the event that the temperature in the RHR C Room approaches 200°F during a Station Blackout.

1.2 The door between the RHR C Pump room and the RCIC Pump Room is opened to provide an additional volume of cool air to prolong RCIC operation during a Station Blackout event. Analysis has shown that in the event that a steam leak occurs in the RHR C Room and temperatures approach 200°F that it is necessary to close AB-078-01 and AB-095-03 to minimize the affect on the RCIC Room. Temperatures above 207° F may affect RCIC Operation.

2 References

2.1 Job Safety Hazard Analysis #200

2.2 CR 95-0327

2.3 EN-IS-108, Working in a Hot Environments

2.4 EN-IS-124, Job Safety Hazard Analysis

3 Precautions and Limitations

3.1 Do not enter the room if temperatures are greater than 200 °F.

NOTE

10 ft sections of rope for blocking/tying doors open can be found in the AOP locker on TB 95 elevation in the northeast corner of the building.

4 Procedure

4.1 Conduct a pre job brief and discuss hazards and the task.

4.2 Obtain Fire Brigade Bunker gear and SCBA for two persons and assemble equipment in the HPCS Hatch Area Aux Bldg 95 ft elevation.

4.3 Don the equipment prior to proceeding into the Aux Bldg 95 Crescent area.

4.4 Establish constant communication with the MCR.

4.5 Stay time no longer than 10 minutes.

4.6 Close AB-078-01, the door between the RHR C Room and the RCIC Room.

4.7 Close AB-095-03, the RHR C Room to the Aux Building 095 el.

4.8 Block open door AB 095-04 to the RCIC room.

RHR C OR RCIC ROOM ENTRY TO CLOSE DOORS AB-078-01 AND AB-095-03

4.9 Block open doors AB 095-08 and AB 095-09 in the hallway outside the RCIC room to provide natural circulation of air to the RCIC room.

4.10 Exit the area.

TIME CRITICAL ACTIONS

30 Minute Actions

5.2.11 Perform the following within 30 minutes to prevent control room heatup and loss of control functions:

- Shed DC loads listed on Attachment 3, DC Load Shedding.
- Open control room panel doors per Attachment 4, Control Room Panel Air Circulation.
- Order non-essential personnel out of the control room.

5.2.12 Perform the following within 30 minutes to prevent excessive heatup in Standby DC Equipment Rooms A and B and Battery Rooms A and B:

- Block open the door to Standby DC Equipment Room A, CB116-13.
- Block open the door to Standby DC Equipment Room B, CB116-6.
- Block open the door to Battery Room A, CB 116-12
- Block open the door to Battery Room B, CB 116-14

49 Minute Actions

5.2.9.2 IF RCIC fails to inject, THEN initiate Attachment 2, Injection Into RPV With Fire Water System During Station Blackout.

TIME CRITICAL ACTIONS

1 Hour Actions

NOTE

RCIC operation may be affected if RCIC room temperatures exceed 207°F.

5.2.13 Perform the following within one hour to minimize the heatup in the RCIC room:

5.2.13.1 Monitor RHR C Pump Room temperature using RHS-ES50A(B) on H13-P841(P842).

CAUTION
The RCIC/RHR C rooms may be at an elevated temperature requiring appropriate safety precautions per EN-IS-108, Working in Hot Environments. Do not allow entry into a high temperature area such as the RCIC room without first reviewing the EN-IS-108 safety precautions.

5.2.13.2 IF RHR C room temperature is less than 120°F, THEN perform the following:

- Block open door AB 078-01 between the RCIC room and RHR C room.
- Block open door AB 095-03 at the top of the stairs in RHR C room.

5.2.13.3 IF RHR C room temperature approaches 200°F AND AB-078-01 and AB-095-03 are open, THEN perform the following:

5.2.13.3.1) Attempt to isolate the cause of the high temperature.

5.2.13.3.2) Using Attachment 12, RHR C or RCIC Room entry to close Doors AB-078-01 and AB-095-03 to maintain RCIC room temperature less than 200°F by reclosing AB 078-01 and AB 095-03.

5.2.13.3.3) Block open door AB 095-04 to the RCIC room.

5.2.13.3.4) Block open door AB 095-08 and AB 095-09 in the hallway outside the RCIC room to provide natural circulation of air to the RCIC room.

TIME CRITICAL ACTIONS

5.2.14 Perform the following to further prevent Control Room heatup:

NOTE

The ladder for removing the ceiling panels will be located in the closet behind the OSM desk. Ceiling panels are labeled, but if not accessible due to unanticipated work, remove like sized panel in the same general area.

C 5.2.14.1 Remove 80 ceiling panels, 40 from each end by:

5.2.14.1.1) Starting to remove 10 ceiling panels within 1 hour after the start of the station blackout event.

5.2.14.1.2) Continue removing a group of 10 ceiling panels every 10 minutes after the start of ceiling panel removal until all 80 ceiling panels are removed.

5.2.14.2 Block open the Control Room back door, CB-136-10.

2 Hour Actions

M 5.2.19 Shut down BYS-INV03 within 2 hours per SOP-0048, 120 VAC System.

3 Hour Actions

5.2.21 IF no power is available, THEN provide alternate power to Hydrogen Ignitors per Attachment 14, Alternate Power to Hydrogen Ignitors

TIME CRITICAL ACTIONS

4 Hour Actions

NOTE

The purpose of the following step is to limit the loss of water inventory from the Standby Cooling Tower into the Normal Service Water System.

5.2.22 Perform the following within the first 4 hours of SWP-P2C, STANDBY SERVICE WATER PUMP operation:

- Manually close SWP-MOV96A, NORMAL SVCE WATER RETURN.
- Manually close SWP-MOV96B, NORMAL SVCE WATER RETURN.
- Manually open SWP-MOV55A, DIV I STBY CLG TOWER 1 INLET.

5.2.27 IF AC power restoration is expected to take more than 4 hours, THEN perform the following:

5.2.27.1 Align the Station Blackout Diesel Generator to ENB-SWG01A(B), 125 VDC BACKUP SWGR via BYS-CHGR1D, 125 VDC BACKUP BATT CHGR. Refer To SOP-0054, Station Blackout Diesel Generator, and SOP-0049, 125 VDC System, for guidance.

5.2.27.2 IF a LOCA isolation signal is present, THEN perform the following to bypass the trips on BYS-CHGR1D:

5.2.27.2.1) At H13-P851, Bay D; pull relay ISCA04 3A-4.

5.2.27.2.2) At H13-P852, Bay C; pull relay ISCB04 3B-4.

TIME CRITICAL ACTIONS

WARNING

Electrical sparks in conjunction with H_2 buildup in the battery rooms can result in a fire. Do not use standard portable fans for temporary ventilation. Use only spark free fans for temporary ventilation.

5.2.27.3 Open doors to all battery rooms to allow open air ventilation. IF available, THEN place temporary spark free fans in these rooms to prevent H_2 buildup.

5.2.29 Establish Suppression Pool Temperature monitoring within 4 hours per Attachment 7, Suppression Pool Temperature Determination, and take the following actions as required:

5.2.29.1 WHEN directed by EOP-0002, Containment Control, THEN perform EOP-0005 Enclosure 21, Emergency Containment Venting to establish a containment vent path.

CAUTION

Raising water level inside Containment can result in exceeding containment pressure capability or covering the highest containment vent capable of rejecting the required decay heat. Do not exceed the EOP Maximum Containment Water Level Limit.

5.2.29.2 Add water to the suppression pool per Attachment 8, Emergency Makeup Of Water To The Suppression Pool to maintain pool temperature below 212°F.

24 Hour Actions

5.2.28 IF AC power restoration is expected to take more than 24 hours, THEN request delivery of diesel fuel oil for the Station Blackout Diesel Generator. IF no fuel oil is available, THEN consider draining fuel oil from DIV 1, 2, or 3 Emergency Diesel Generator Day Tanks.

ALTERNATE POWER TO HYDROGEN IGNITORS

C

ALTERNATE POWER FOR THE HYDROGEN IGNITORS

NOTES

This evolution must be completed within three hours following the declaration of an SBO event per GSI-189.

HCS-ENG1, HYDROGEN IGNITOR GENERATOR is stored at the Outside Maintenance Shop immediately South of Field Admin Bldg., on the south end, under the lean-to.

Key #69 is required to access the HCS panels.

A flat-blade screwdriver is required to remove the HCS panels. (Located in the SRV tool box AB 141 west)

A ladder and fall protection is required to access the Div II HCS panels. (Ladder is located AB 141 west and fall protection is located in the cool tool room)

5 **STAGE HCS-ENG1, HYDROGEN IGNITOR GENERATOR AS FOLLOWS:**

5.1 Notify Security for Sally Port access for HCS-ENG1, HYDROGEN IGNITOR GENERATOR.

5.2 Notify Security for needed support at either Aux Building West side Door AB-98-2 OR Aux Building East side Door AB-98-3.

5.3 Transport HCS-ENG1, HYDROGEN IGNITOR GENERATOR to either of the following locations, depending on Division required:

- For Division I ignitors, in the area on the West side of Auxiliary Building near Aux Building Door AB-98-2

OR

- For Division II ignitors, in the area on the East side of Auxiliary Building near Aux Building Door AB-98-3

ALTERNATE POWER TO HYDROGEN IGNITORS

NOTE

Step 5.4 for generator preps and Step 5.5 for cable staging may be performed concurrently.

5.4 Prepare HCS-ENG1 for start by performing prestart checks as follows:

- Visually check engine for leaks or damage.
- Verify that the battery connections are clean and tight.
- Check engine oil level is in the cross hatched area of the dip stick.
- Check Fuel oil supply to be greater than ½ full (remove cap, visually verify oil level)
- Check air cleaner, seals, hoses, and clamps to be intact.
- Verify the following breakers are Off:
    - In the Engine compartment (port-side):
        - Light 1
        - Light 2
        - Light 3
        - Light 4
        - Winch
    - Rear of trailer
        - 20 amp/250 volt
        - 15 amp/250 volt
        - OUTLET 50 amp/250 volt
        - MAIN 70 amp/250 volt

ALTERNATE POWER TO HYDROGEN IGNITORS

5.5 Perform Section 5.5.1 for Division I OR Section 5.5.2 for Division II.

NOTE

Cable is located at West side of Auxiliary Building El 141 -0 and can be used for either Division.

10 ft sections of rope for blocking/tying doors open can be found in the AOP locker on TB 95 elevation in the northeast corner of the building.

5.5.1. Supplying Div I Hydrogen Ignitors

1. Take cable to West side of Auxiliary Building El 141 -0 .
2. Restrain cable to hand rails and lower cable end with Generator plug down the CCP hoist way on the West side.
3. Block open Aux. Building El. 98 doors to run cable to generator.
4. Open breaker EHS-MCC2A BRKR 3A for HCS-XD01A.
5. Remove both outer and inner panel covers on HCS-PNL01A1 and HCS-PNL01A2.
6. Disconnect the following panel feed cables for HCS-PNL01A1:
   - Red field cable from the main breaker top left lug.
   - Black field cable from the main breaker top right lug.
   - Blue field cable from the neutral bus.
7. Disconnect the following panel feed cables for HCS-PNL01A2:
   - Red field cable from the main breaker top left lug.
   - Black field cable from the main breaker top right lug.
   - Blue field cable from the neutral bus.
8. Connect the following generator cable wires for HCS-PNL01A1:
   - Red generator cable to the main breaker top left lug.
   - Black generator cable to the main breaker top right lug.
   - White generator cable to the neutral bus.
   - Green generator cable to the neutral bus.

9. Connect the following generator cable wires for HCS-PNL01A2:
   - Red generator cable to the main breaker top left lug.
   - Black generator cable to the main breaker top right lug.
   - White generator cable to the neutral bus.
   - Green generator cable to the neutral bus.
10. Verify that the HCS-PNL01A1 and HCS-PNL01A2 Main and Individual Hydrogen Ignitors breakers are closed.
11. Go To Step 5.5.3.

5.5.2. Supplying Div II Hydrogen Ignitors

WARNING

Because of close proximity to the east hoist area, fall protection is required when working off ladder for the Div II panels.

1. Take cable to East side of Auxiliary Building El 141 -0 .
2. Restrain cable to hand rails and lower cable end with Generator plug down the equipment hoist way on the East side.
3. Block open Aux. Building El. 98 doors to run cable to generator.
4. Open breaker EHS-MCC2K, BRKR 6B for HCS-XD01B.
5. Remove both outer and inner panel covers on HCS-PNL01B1 and HCS-PNL01B2
6. Disconnect the following panel feed cables for HCS-PNL01B1:
   - Red field cable from the main breaker top left lug.
   - Black field cable from the main breaker top right lug.
   - Blue field cable from the neutral bus.

7. Disconnect the following panel feed cables for HCS-PNL01B2:
   - Red field cable from the main breaker top left lug.
   - Black field cable from the main breaker top right lug.
   - Blue field cable from the neutral bus.
8. Connect the following generator cable wires for HCS-PNL01B1:
   - Red generator cable to the main breaker top left lug.
   - Black generator cable to the main breaker top right lug.
   - White generator cable to the neutral bus.
   - Green generator cable to the neutral bus.
9. Connect the following generator cable wires for HCS-PNL01B2:
   - Red generator cable to the main breaker top left lug.
   - Black generator cable to the main breaker top right lug.
   - White generator cable to the neutral bus.
   - Green generator cable to the neutral bus.
10. Verify that the HCS-PNL01B1 and HCS-PNL01B2 Main and Individual Hydrogen Ignitors breakers are closed.

5.5.3. Verify the HCS-ENG1 OUTLET breaker is open and attach cable to the receptacle located on the rear of the HCS-ENG1

5.5.4. Start HCS-ENG1 as follows:

1. Verify the Prestart checks have been completed.

NOTE

The resistor coil is slightly above and to the right of the switch.

2. Turn switch to PREHEAT position AND Hold until the resistor coil turns red.

ALTERNATE POWER TO HYDROGEN IGNITORS

CAUTION

To prevent overheating of the starter, do not crank the engine longer than 10 seconds without allowing the starter to cool for at least 30 seconds.

3. WHEN the resistor coil is red, THEN turn the switch to the START position AND hold it there until the engine starts.

4. As soon as the engine starts, release the key.

5. IF the engine fails to start, THEN reperform steps 5.5.4.2 through 5.5.4.4 as necessary to start the diesel.

6. WHEN the diesel is operating AND the cable is attached in step 5.5.3, AND when directed to energize the ignitors, THEN on HCS-ENG1 close the following breakers:

   1) MAIN 70 amp/250 volt

   2) OUTLET 50 amp/250 volt

NOTE

A clamp-on current (amp) meter can be obtained from the cold tool room.

5.5.5. At HCS-PNL01A1/HCS-PNL01A2 OR HCS-PNL01B1/HCS-PNL01B2, use a clamp-on current meter to obtain approximately 23 amps total circuit current per panel in order to ensure proper hydrogen ignitor operation.

5.6 Shutting down HCS-ENG1

5.6.1. WHEN power is no longer required to the Hydrogen Ignitors, THEN on HCS-ENG1 open the following breakers:

1. MAIN 70 amp/250 volt

2. OUTLET 50 amp/250 volt

3. Unplug all external leads.

CAUTION

Failure to turn off all circuit breakers before stopping the engine may result in damage to the generator and void the warranty.

5.6.2. Place the HCS-ENG1 switch in OFF.

Facility: River Bend Station Scenario No.: 1 IC No.: 210

Examiners: Theresa Buchanan
Steve Garchow
Mike Bloodgood

Operators: ______________________
____
____

Initial Conditions: 100% reactor power.
APRM B is bypassed to support I&C testing

Turnover Shift priorities: 1) Perform STP-257-0201

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N (SRO, BOP)	Perform STP-257-0201, SBGT Operability Test
2	CRDM2045	C (SRO, ATC)	Control Rod Drift Out, rod 20-45 (Tech Spec)
3	NMS011F	I (SRO, ATC)	APRM 'F' fails upscale (Tech Spec)
4	GMC002A GMC001B	I (BOP)	Stator Cooling Water Pump A trips, B fails to auto start
5	MSS005N	C (SRO, BOP) R (ATC)	Safety Relief Valve 51G fails open
6	NA	M (ALL)	Reactor scram with uncontrolled pressure drop
7	FWS004B	C (ATC)	FW master controller output fails high (triggered 1 minute after Mode Switch)
8	MSS018 MSS019 MSS004	C (SRO, BOP)	B21-AOVF022A & B21-F028A fail to close with Steam Leak outside primary containment

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

Total Malfunctions (5-8) (6) Rod Drift, APRM F, Stator Cooling, SRV open, FW Master controller failure, MSIV failure
Malfunctions after EOP entry (1-2) (2) FW Master controller, B21-AOVF022A & B21-AOVF028A
Abnormal Events (2-4) (4) SOP-0061, AOP-0035, AOP-0001, AOP-0003
Major Transients (1-2) (1) Reactor scram with uncontrolled pressure drop
EOPs entered (1-2) (2) EOP-0001, EOP-0002
EOP contingencies (0-2) (1) Enter EOP-0002
Critical Tasks (2-3) (2) Mode switch to Shutdown by 110°F; Close Main Steam Stop Valve, B21-F098A

RIVER BEND STATION SIMULATOR SCENARIO	Number: ***RSMS-NRC14-1** Revision: **02** Page 1 of **14** Approximate Time: 1 Hour(s) Record Type: ***Z01.24**

TRAINING PROGRAM:

SIMULATOR TRAINING

LESSON PLAN:

* Loss of Stator Cooling / Stuck Open SRV / Steam Leak Outside Containment

REASON FOR REVISION:

NRC March 2014 exam

PREPARE / REVIEW:

Angie Orgeron	1538	10-07-2013
Preparer	KCN	Date
Dave Bergstrom	0257	10-28-2013
Technical Review (SME)	KCN	Date
Jeff Reynolds	0358	1-22-2014
Operations Representative	KCN	Date
Joey Clark	0260	1-27-2014
Facility Reviewer	KCN	Date

* Indexing Information

I. DESCRIPTION OF SCENARIO

This scenario begins with the plant at 100% power.
Events for this scenario:

- Perform STP-257-0201, SBGT Monthly Operability
- Rod Drift Out, 20-45 (Tech Spec)
- APRM F Upscale failure (Tech Specs) (with APRM B already bypassed)
- Stator Cooling Water Pump A trips with no auto start for standby pump B
- SRV 51G fails open (Tech Specs); requiring power reduction
- Suppression Pool Temperature rises to the point of requiring a SCRAM; Continued pressure drop.
- Operators close MSIVs but 22A & 28A stuck open.
- FWS Master Controller output fails high 1 minute after Mode Switch to SD.
- Steam Leak Outside Primary Containment requires closing the 98A.

II. TERMINAL OBJECTIVES

1. Establish safe and stable plant conditions following a stuck open SRV and steam leak outside containment per plant procedures.

IV. INITIAL CONDITIONS/SHIFT TURNOVER

INITIAL CONDITION	TRAINING FOCUS	EQUIPMENT STATUS	REQUIRED DOCUMENTS
IC #210		**Power:** 100% **Core:** Xenon equilibrium **Equipment OOS:** None **STPs Due:** 257-0201, SBGT Operability Test Note: this is a 10 hour run and will not be completed during this scenario **LCOs:** TS 3.3.1.1 Condition A for APRM B testing **Evolutions in progress:** I&C testing on APRM B **Problem/Lit annunciators:** None	STP-257-0201

V. GENERAL INSTRUCTIONS

Event Number	MFS-OR-REM-SCH	Expected Operator Actions
Simulator Setup		
Check Boards for Equip Tags Check procedures and hard cards for marks Check Gauges/Meters for marks. Make marked-up copies of STPs available. Check that the Shutdown Plan is appropriate for this scenario. Check power <3090 MWth Bring up Insight – MSTun Temperature APRM B in Bypass	**Malfunctions** **GMC001B,** Stator Cooling Pump B fails to Auto Start **MSS018,** B21-AOVF022A fails to close. **MSS019,** B21-AOVF028A fails to close **EVENT TRIGGERS** **T2 CRDM2045,** Control Rod Drift Out **T3 NMS011F** APRM F Fails Upscale **T4 GMC002A,** Stator Cooling Water Pump A Trip **T5, MSS005N** SRV 51G sticks open **T7 FWS004B** Master Controller output fails high (1 min after Mode Switch to SD). **T8 MSS004** Steam Leak Outside Primary Containment (0.45% triggered to MSIV 22A switch) **T30 MSS004** Steam Leak Outside Primary Containment (0.45%) {new} delete in 2 sec, triggered on zlo5(1186)!=1	**Overrides** **T6 p601_19a:f_11**, fail on (cycling switch at p631) **T9 LO_B21-F051G-R**, off **LO_B21-F051G-G**, off (simulates removing fuses) **LO_B21-AB1-A**, on (Div 1) **p601_19a:b_8**, fail on **T10 LO_B21-BB1-A**, off (simulates) **p601_19a:b_11,** on (removing fuses) **LO_B21-ACF051G-R**, off (Div 2) **Remote Functions** **T12 EOP012A**, Encl 12, RPS **T13 TGS009**, Stator Cooling Alarm Reset **T16 EOP016,** Encl 16, Instrument Air **T18 EOP018**, Encl 18, Level 8 Jumpers
Simulator Setup		

Event Number	MFS-OR-REM-SCH	Expected Operator Actions	
Event 0	**RUN**	CREW:	Board walk down / Turnover.
Event 1 Perform STP-257-0201, SBGT Monthly. *Event initiated by crew from turnover sheet.*	**ROLE PLAY:** As electrical maint., and/or reactor building operator, report standing by with test equipment Accept direction to inspect and take readings IAW steps 7.1.12 and 7.1.13.	SRO	• Direct the UO to perform STP-257-0201.
		UO	• Accept the direction to perform STP-257-0201. • Perform STP-257-0201. • Open dampers, Start GTS-FN1A, • Open Recirc Damper, Calculate run time
Event 2 Control Rod Drift Out. *Event initiated at Lead Evaluator discretion.* **Time Called** ____________ **Time Isolated / T2 Deleted** ____________	**T2 CRDM2045,** Control Rod Drift Out **ROLE PLAY:** As reactor building operator, accept direction to isolate the HCU for CRDM 20-45, (V103 and V105) As WMC, accept request for help from RE (monitor case) Chemistry (sample) FIN team to investigate 5 minutes after being directed to isolate CRDM, delete malfunction CRDM2045, and call back to report that the mech is isolated.	ATC	• Recognize/report the drifting control rod. • Determine which rod is drifting by depressing "ROD DRIFT" and observing red light on display • Select and continuously depress the rod to 00 • Refer to ARP-680-07A-B02 and AOP-0061 • When rod full in, THEN remove insert signal • Reinsert a continuous insert signal and hold it until HCU is isolated. • Reset the rod drift alarm
		SRO	• Direct the ATC to insert the drifting rod, if not already being done. • Direct AOP-0061, Control Rod Mispositioned. • Call Work Control to request help • Enter Tech Spec 3.1.3 Condition C, One or more control rods inoperable for reasons other than condition A or B. • C.1 Fully insert inop control rod within 3 hours AND • C.2 Disarm the associated CRD within 4 hours

Event 3 APRM F fails upscale. *Event trigger T3 initiated at Lead Evaluator discretion.*	**T3 NMS011F** APRM F Fails Upscale **ROLE PLAY:** As work management, maintenance, and/or Reactor Engineering, accept report of failed APRM. As I&C, report that testing on APRM B is complete-OK to take APRM B out of bypass.	ATC	• Recognize and report APRM failure • Verify no individual rod scrams
		SRO	• Accept report from ATC of APRM failure. • Notify maintenance of APRM failure; complete OSP-0046 notifications; notify Reactor Engineering. • Enter LCO 3.3.1.1, Condition A, One or more required channels inoperable. A.1, Place channel in trip within 12 hours OR A.2, Place assoc trip system in trip within 12 hours • Direct ATC to take APRM B out of bypass. • Direct ATC to place APRM F to bypass and reset half-scram.
		UO	• Verify indications of APRM F in Backpanel
		ATC	• When directed, take APRM B out of bypass • When directed, place APRM F to bypass • When directed, reset half scram.

Event 4 Stator Cooling Pump trip with no auto start of standby pump. *Event trigger T4 initiated at Lead Evaluator discretion.*	**GMC001B,** Stator Cooling Pump B fails to Auto Start **T4 GMC002A,** Stator Cooling Water Pump A Trip **ROLE PLAY** As the turbine building operator, accept the direction to investigate the Stator Water Cooling Pump. Call back in 5 minutes to report that the bearing on the pump end of the motor is hot to the touch. Accept direction to reset the Stator Cooling Alarm on panel GMC-PNL101 **T13 TGS009**, Stator Cooling Alarm Reset As WMC, accept request for maintenance	UO	• Recognize and report Stator Cooling Water Pump Auto Trip annunciator. • Recognize Standby Pump (B) failed to auto start and take actions to start the B pump. • Refer to ARP-870-54A-D01. • Dispatch turbine building operator to investigate.
		SRO	• Accept the report of the tripped pump and direct, if necessary, the manual start of the standby pump. • Notify work management or maintenance of pump trip and request OSP-0046 notifications.
		ATC	• Recognize and report Turbine Runback (until the B Stator Water Cooling Pump is started) • If B pump not started promptly, reduce power as necessary to preclude a reactor SCRAM (using Recirc Flow).

<table>
<tr>
<td rowspan="3">Event 5
SRV opens/sticks open.
Event T5 initiated at Lead Evaluator discretion.</td>
<td rowspan="3">T5 MSS005N SRV 51G sticks open

ROLE PLAY
<u>Backpanel</u> – actions to attempt closing SRV 51G:
Accept request to <u>cycle switch</u> at P631 to OPEN and then to OFF. (twice)
T6 p601_19a:f_11, on (B switches)

Accept request to <u>remove fuses</u> from P628, Bay B, B21C-F113A and F114A.
T9 LO_B21-F051G-R, off
LO_B21-F051G-G, off
LO_B21-AB1-A, on
p601_19a:b_8, fail on
(simulates removing Div 1 fuses)

Accept request to remove fuses from P631, Bay B, B21C-F113B and F114B.
T10 LO_B21-BB1-A,
p601_19a:b_11, on
LO_B21-ACF051G-R, off</td>
<td>ATC</td>
<td>• When directed, reduce power to ≤90%</td>
</tr>
<tr>
<td>UO</td>
<td>• Recognize and report the open SRV
• Perform action of AOP-0035:
• Place SRV 51G switch to OPEN.
• When directed, place RHR in Supp Pool Cooling
• Throttle E12-F068 Service water
• Start RHR Pump – Verify closed the inj. Valve
• Open E12-F024, Test Return to Supp Pool
• When power ≤ 90%, take control switch for SRV 51G to OFF; cycle switch to OPEN and back to OFF.
• Go to backpanel (phone) and follow instructions in step 5.5.3 of AOP-0035 to cycle switch twice.
• Monitor Suppression Pool Temperature.
• Remove fuses IAW step 5.7 of AOP-35 Attach. 1.
• Determine that SRV does not close by using steam flows, etc.</td>
</tr>
<tr>
<td>SRO</td>
<td>• Accept report about the SRV.
• Assign AOP-0035, Stuck Open SRV.
• Direct the ATC to reduce reactor power to 90%.
• Refer to EIP-2-001 for possible applicability.
• Enter EOP-0002, on suppression pool level.</td>
</tr>
</table>

Event 6
 	
Reactor SCRAM
 	
Uncontrolled Pressure Drop after Reactor SCRAM
 	
Event 6 initiated as a consequence of Event 5, AOP-35 directions and Tech Specs
	CRITICAL TASK: Mode Switch to shutdown BEFORE Suppression Pool Temperature reaches 110°F.	SRO	• Give Crew Brief in anticipation of manual Reactor SCRAM due to High Supp Pool Temperature.
			• Direct the ATC to insert a manual reactor scram.
			• Accept the SCRAM Report
			• Enter EOP-1 and direct EOP-1 actions:
			  o Verify mode switch in S/D (SCRAM Report)
			  o ATC - restore and maintain RPV water level from -20 to 51 inches with Feed & Condensate.
			  o ATC - stabilize reactor pressure below 1090 psig, then give band of 500-1090 psig.
			• ATC – assigned AOP-0001, Rx Scram and AOP-0002, Turbine Trip.
			• Monitor HCTL.
			• Re-enter EOP-0002 on suppression pool temperature; direct EOP-2 actions:
			  o If not already done, direct the UO to initiate Suppression Pool Cooling.

Event 6 (cont'd)	**T12** Encl 12, RPS **T16** Encl 16, Instrument Air **T18** Encl 18, Level 8 Jumpers	ATC	• When directed, insert a manual SCRAM. • Provide a SCRAM Report. • Restore and maintain RPV water level: -20 to 51 inches with Feed & Condensate. • Recognize and Report an uncontrolled pressure drop in the RPV due to the stuck open SRV. • When below 500 psig, notify the CRS that we are out of pressure band low. • Complete actions of AOP-1, Reactor Scram and AOP-2, Turbine Trip.
		SRO	• Direct UO to CLOSE MSIVs (outboard preferred) by 600 psig.
	MSS018, B21-AOVF022A fails to close. **MSS019,** B21-AOVF028A fails to close **NOTE: When T8 is activated**, then delete the **T5 MSS005N** malfunction. This will close SRV 51G.	UO	• When directed to CLOSE MSIVs, operator placed outboard MSIV switches to CLOSE. • Recognize and report the failure of the A Outboard MSIV to close. • Place switches for Inboard MSIVs to CLOSE. • Recognize and report the failure of the A Inboard MSIV to close. • When available, direct UO to place RHR A or B in Supp Pool Cooling using the Hard Card.

Event 7 FWS Master Controller output fails high. *Event initiated upon Mode Switch operation with a 1 minute delay.*	**T7 FWS004B** Master Controller output fails high. (1 min after mode switch to S/D)	ATC	• Recognize and report the failure of the master controller. • Place Feedwater level control into manual. • Manually control reactor level within the given band of -20 to 51 inches.
		SRO	• Accept report of FWLC failure • Direct ATC to take manual control of the feedwater level control valves to restore and maintain RPV level -20 to 51 inches.
Event 8 Steam Leak outside primary containment. *Event initiated upon switch operation of MSIV.*	**T8 MSS004** Steam Leak Outside Primary Containment. (0.45%) **CRITICAL TASK**: **Close B21-MOV98A, Main Steam Shutoff Valve prior to exceeding safe shutdown limits** **NOTE: When T8 is activated**, then REMOVE the **T5 MSS005N** malfunction. This will close SRV 51G. **Role Play**: Backpanel - MS Tunnel Temperature	ALL	• Recognize and report the steam leak.
		SRO	• Direct UO to close the 98A, Main Steam Stop Valve.
		UO	• Accept direction and close the 98A MSSV.
Termination is at the discretion of the Chief Examiner.	**FREEZE**	**<u>Critical Task Review</u>:** 1. **Mode Switch to S/D before Suppression Pool reaches 110°F.** 2. **Close B21-MOV98A, Main Steam Shutoff Valve prior to exceeding safe shutdown limits (Steam Tunnel Temperature 200°F).**	

VI. TERMINATION CRITERIA:

The exercise should be terminated when the performance objectives have been achieved or the operators are unable to diagnose and respond effectively to the scenario.

The following conditions provide an indication of performance objective achievement for this scenario; Critical Tasks are indicated with an *:

- Completed STP-509-0101, Turbine Bypass Valve Cycle Test
- Started STP-257-0201, SBGT Filter Train A Monthly Test
- APRM F Bypassed; Tech Specs referenced
- ½ Scram reset
- Standby Stator Water Cooling Pump B manually started.
- Actions taken for RPV Pressure Transmitter failure; Tech Specs referenced
- Actions taken for stuck open SRV IAW AOP-0035
- Level control is established
- *Mode Switch to Shutdown before Suppression Pool Temperature reaches 110°F.
- Master FWLC in Manual Control.
- * Close B21-MOV98A, Main Steam Shutoff Valve prior to exceeding safe shutdown limits (Steam Tunnel Temperature 200°F).

VII. REFERENCES

A. Plant Procedures

1. STP-257-0201, SBGT Filter Train A Monthly Test
2. AOP-0061, Control Rod Malfunctions
3. ARP-680-07A-B02
4. ARP-680-06A-C01, A03
5. Tech Specs
6. EN-OP-115, Attachment 9.8
7. AOP-0035, Stuck Open SRV
8. AOP-0001, Reactor Scram
9. AOP-0002, Turbine Trip
10. EOP-1, RPV Control
11. EOP-2, Primary Containment Control
12. OSP-0053, Emergency and Transient Response Support Procedure

Offgoing OSM: Oncoming OSM: ______________________ _____ ___________________ _____ (Print) KCN (Print) KCN		Off-Going Shift N ☐ D ☐ Date
Perform STP-257-0201, Standby Gas Treatment Filter Train A Monthly.		
SIGNIFICANT LCO STATUS	EOOS STATUS	
T.S. 3.1.1 A.1 for APRM B maintenance: Place channel in trip within 12 hours, 6 hours remain	10.0 Green	
EQUIPMENT STATUS	PROTECTED EQUIPMENT	
	Div 2	

Night Orders Standing Orders Board Walkdown Temp Alts

_______________________________________ _______
(Signature: Oncoming OSM Review Completed) KCN

Facility: River Bend Station Scenario No.: 2 IC No.: 207

Examiners: Theresa Buchanan Operators: ____________________
Steve Garchow ____________________
Mike Bloodgood ____________________

Initial Conditions: Reactor power 70%, RCIC tagged out
FWS-P1A tagged out, Feed Reg Valves B & C in service,
CRD-P1A tagged out
Fuel shuffle in Spent Fuel Pool ongoing

Turnover Shift priorities: 1) Place 3rd Feedwater Reg Valve in service.
2) Raise power with control rods.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N (SRO, BOP)	Place 3rd Feedwater Regulating Valve in service.
2	NA	R (ATC)	Raise power with control rods.
3	p601_16a:h-5 LO_E22-D2-A	I (SRO, BOP)	E22-N654C fails upscale (CST High Level) – (Tech Spec) Manual action to align HPCS Suction to Supp Pool
4	RCS002B	C (SRO,ATC)	Trip of Recirc Pump B (Tech Spec)
5	RPS003A	C(ALL)	Loss of RPS A
6	ED002B RPS001A	M (ALL)	Loss of NPS-SWG1B/Loss of Feedwater Failure to Scram-All Signals ARI effective
7	CRD001B	C (SRO)	CRD Pump B trip
8	HPCS005 HPCS001	C (SRO, BOP)	HPCS suction strainer blockage HPCS pump trip (delay 1:10)

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

Total Malfunctions (5-8) (7) CST Level Instrument Failure, Recirc Pump trip, Loss of RPS, Loss of NPS SWG1B, Failure to Scram, CRD, HPCS

Malfunctions after EOP entry (1-2) (2) CRD, HPCS

Abnormal Events (2-4) (4) AOP-0024, AOP-0010, AOP-0001, AOP-0002

Major Transients (1-2) (1) Loss of NPS-SWGR1B/Loss of Feed

EOPs entered (1-2) (1) EOP-0001

EOP contingencies (0-2) (1) Alternate Level Control

Critical Tasks (2-3) (2) Initiate ARI, Emergency Depressurize

RIVER BEND STATION **SIMULATOR SCENARIO**	Number: ***RSMS-NRC14-2** Revision: **02** Page 1 of **13** Approximate Time: 1 Hour(s) Record Type: ***Z01.24**

TRAINING PROGRAM:

SIMULATOR TRAINING

LESSON PLAN:

*** Recirc Pump Trip; Loss of RPS A; Loss of NPS-B/Feed ; ATWS**

REASON FOR REVISION:

NRC March 2014 exam

PREPARE / REVIEW:

Angie Orgeron	1538	10-07-2013
Preparer	KCN	Date
Dave Bergstrom	0257	10-30-2013
Technical Review (SME)	KCN	Date
Jeff Reynolds	0358	1-22-2014
Operations Representative	KCN	Date
Joey Clark	0260	1-27-2014
Facility Reviewer	KCN	Date

* Indexing Information

I. DESCRIPTION OF SCENARIO

This scenario begins with the plant at 70% power.
Events for this scenario:

- Place 3rd Feed Reg Valve in Service.
- Raise Power with Control Rods.
- E22-N654C failure upscale (Tech Spec) (swap HPCS suction from CST to Sup Pool)
- Trip of Recirc Pump B
- Loss of RPS A.
- Loss of NPS-SWG 1B / Loss of Feedwater.
- Failure to Scram – ARI is effective.
- CRD-B trip.
- HPCS suction strainer blockage – pump trip.

II. TERMINAL OBJECTIVES

1. Establish safe and stable plant conditions following a loss of all high pressure feed per plant procedures.

IV. INITIAL CONDITIONS/SHIFT TURNOVER

INITIAL CONDITION	TRAINING FOCUS	EQUIPMENT STATUS	REQUIRED DOCUMENTS
IC #207		**Power:** 70% **Core:** Xenon equilibrium **Equipment OOS:** FWS-P1A tagged out FWRV A not in service RCIC tagged out CRD-P1A tagged out **STPs Due:** None **LCOs:** 3.5.3 Condition A.1 3.5.3 Condition A.2 **Evolutions in progress:** Power ascension in progress. Fuel Shuffle in the Spent Fuel Pool. **Problem/Lit annunciators:** None	STP-000-0102 (potential)

V. GENERAL INSTRUCTIONS

Event Number	MFS-OR-REM-SCH	Expected Operator Actions
Simulator Setup		
Check Boards for Equip Tags Tagout for FWS-P1A Tagout for RCIC Tagout for CRD-A Check procedures and hard cards for marks Check Gauges/Meters for marks. Check that the Reactivity Control Plan is appropriate for this scenario. Ensure FB Ventilation lined up for Fuel movement. Div 2 protected	**Malfunctions** **RPS001A,** Failure to Scram all signals ARI is effective **EVENT TRIGGERS** **T3 p601_16a:h-5** E22-N655C fails upscale **T4 RCS002B,** Trip of Recirc Pump B **T5 RPS003A,** Loss of RPS A **T6 ED002B** Loss of NPS-SWG1B Loss of FW **T8 HPCS005** HPCS suction strainer blockage **T8 HPCS001** HPCS Pump Trip (delay 1 min 10 sec after breaker closed). **T30 RPS001A**, (new) Failure to Scram, delete 1 sec, event trigger zdi4(626) **T30 CRD001B**, Trip CRD on event 30 delay 3 seconds	Tagout for FWS-P1A: • LO_FWS-P1A-A Off • LO_FWS-P1A-G Off • LO_FWS-P1A-R Off • LO_FWS-P1A-W Off • LO_FWSMOV26A-G Off • LO_FWSMOV26A-R Off Tagout for RCIC: LO_E51-F004-G, off also F005, F025, F026, F045, F063, F064, F068, F076 DI_E51-C002A, switch off LO_E51-C002-G, off Tagout for CRD A: LO_CRD-P1A-A Off LO_CRD-P1A-G Off DI_CRD-P1A Off **OVERRIDES** **T3 LO_E22-D2-A**, postage stamp – gross fail **Remote Functions** **T10 NIS001,** Reset NI's **T11 RPS004,** Reset EPA Breakers **T12 EOP012A**, Enclosure 12 - RPS **T16 EOP016,** Enclosure 16 – Instrument Air **T20 EOP020,** Enclosure 20 – DW Cooling

Simulator Setup			
Event 0	**RUN**	CREW:	Board walk down / Turnover.
Event 1 Place third Feed Reg Valve in Service. *Event initiated by crew from turnover sheet.*	**ROLE PLAY** As the turbine building operator take direction to monitor C33-LVF001A IAW step 4.11.5 of SOP-0009. When asked, report smooth operation of FRV-A.	SRO	Direct the ATC to place the third Feed Reg Valve in service in accordance with SOP-0009.
		UO	• Accept direction to place 3rd FRV in service and place FRV-A in service using SOP-0009, Reactor Feedwater System, Section 4.11: • Check that FRV is isolated • Test Stroke the FRV • Unisolate FRV • Match valve position with others • Place FRV in AUTO
Event 2 Raise Reactor Power using Control Rods per RCP. *Event initiated by crew from turnover sheet.*		SRO	• Direct ATC to perform RCP-18-015 to raise Reactor Power. • Act as Reactivity SRO for Control Rod movement.
		ATC	• Accept the direction to perform power ascension. • Perform step 90 of RCP-18-015. • Withdraw 4 rods from position 08 to position 12
		UO	• Act as the peer checker for performing control rod movement.

Event 3 Instrument for Cond Storage Tank Level fails upscale. *Event trigger T3 initiated at Lead Evaluator discretion.*	**T3 p601_16a:h-5,** Annunciator - HPCS System INOP **T3 LO_E22-D2-A,** (postage stamp: hpcs trip unit in cal gr fail) **ROLE PLAY** Backpanel: indicate that E22-N654C for CST level is reading pegged high and has the gross fail light illuminated. (STP-000-0001 step 23) Note: Meter reads from -60 to +65 Operator may attempt to reset gross fail. If prompting is needed: as the Duty Manager – Tell the Control Room that to swap right now.	UO	• Recognize and report HPCS System INOP annunciator. • Refer to ARP-601-16A-H05. • Investigate backpanels for cause. • Report the upscale failure of E22-N654C.
		SRO	• Accept the report of the trip unit failure. • Notify work management/maintenance of instrument failure and request OSP-0046 notifications. • Enter Tech Spec 3.3.5.1 Condition A1, Immediately enter Condition D. • Enter Tech Spec 3.3.5.1 Condition D.1, Declare HPCS INOP within 1 hour • Enter Tech Spec 3.3.5.1 Condition D.2.2, Align HPCS pump suction to the supp pool within 24 hours. • Direct the UO to align the HPCS suction to the Suppression Pool IAW SOP-0030, HPCS System
		UO	• Accept the direction to align HPCS to the Suppression Pool per SOP-0030, section 5.3.1 • Close the CST Suction Valve (E22-F001) • When dual indication, THEN open Supp pool suction valve (E22-F015) • Verify both valves fully stroke

<table>
<tr><td rowspan="3">Event 4
Recirc Pump B Trip.
Event trigger T4 initiated at Lead Evaluator discretion.</td><td rowspan="3">T4 RCS002B, Trip of Recirc Pump B

ROLE PLAY
As RB Operator, accept direction to investigate switchgear

WMC, accept the request for help.

As Reactor Engineering, accept request for help; perform a monitor case

As Chemistry, accept direction to sample

As RE, provide single loop reactivity plans
RCP_B puts rods in for scram margin
RCP_C raises flow to exit the restricted region

Backpanel – place APRMs in single loop
RPS008, Single Loop Scram APRM</td><td>ATC</td><td>• Recognize and report the trip of Recirc Pump B.
• Enter AOP-0024, Thermal Hydraulic Stability
5.4 Determine if in the restricted region – {Yes}
5.5 If entry into restricted region is unexpected, then perform the following:
5.5.2 Immediately exit this region by either/or inserting control rods using shutdown sequence package from RE <u>OR</u> raise recirc flow
• When directed raise recirc flow to 42.5 Mlbm/hr.
• AOP-24 step 5.9 – close Recirc B Disch Valve</td></tr>
<tr><td>SRO</td><td>• Accept the report of the pump trip.
• Assign AOP-0024, Thermal Hydraulic Stability
• Enter GOP-0004, Single Loop Operation
• Enter Tech Spec 3.4.1 Condition C, Requirements of B5 not met
Condition C.1 Satisfy the requirements within 24 hours (LCO 3.3.1.1, RPS Instrum., Function 2b)
• Requirements are met by performing surveillance SR 3.3.1.1.3 (referenced in GOP-0004, step 6)
• Accept RE plan for inserting rods
• Accept RE plan for raising flow
• Notify work management/maintenance of failure and request OSP-0046 notifications.</td></tr>
<tr><td>UO</td><td>• Verify temperatures IAW AOP-24 within fifteen minutes of raising flow</td></tr>
</table>

Event 5 Loss of RPS-A. *Event T5 initiated at Lead Evaluator discretion.*	**T5 RPS003A,** Loss of RPS A **ROLE PLAY** WMC – accept report of entering AOP-10 **T10 NIS001,** Reset NI's	ATC	• Recognize and report Loss of RPS-A. • When directed, reset the half scram IAW AOP-10 subsequent actions (step 6 of attachment 1)
		UO	• Transfer RPS-A power to available power source on Panel 610 (Backpanel). {immediate action} • Report that RPS-A has been transferred • Accept direction to own AOP-0010, Loss of RPS. • Complete the subsequent steps of AOP-0010. • depress isolation reset pushbuttons on p601 • restore instrument air, IAS-MOV106 on p870 • open CCP containment isolation valves (MOV-138, 142, 143, and 159) on p870 • reset the Nis (backpanel phone call) • Reset the half scram (A&C on p680) • Restore DW Unit Coolers: place tripped UC switches to OFF on p863 close breakers EJS-ACB09 and ACB25 on p877 start DW unit coolers on p863 • Restore Turbine Chill Water to containmnt UC Open HVN-MOV127 & 128 on p863 • Open RCS-MOV 61A, 60A, 59A, & 58A on p808 (This restores Flow Control Valves)
		SRO	• Assign AOP-0010, Loss of RPS. • Accept the report about completion of immediate actions of AOP-10. • If necessary, prompt the UO to not delay opening IAS-MOV106.

Event 6 Loss of NPS-B, causing a Loss of Feedwater. *Event T6 initiated at Lead Evaluator discretion.*	**T6 ED002B** Loss of NPS-SWG1B Loss of FeedWater Upon Loss of Feed – RPV level will drop to the Scram setpoint quickly, but will not scram the plant. Operator Actions will not scram the plant until ARI is initiated. **RPS001A,** Failure to Scram all signals **CRITICAL TASK**: Manually Arm & Depress ARI Pushbuttons before RPV level 1 is reached (-143”)	ATC	• Recognize and report loss of feed. • Initiate a manual Scram (ATC may note that Auto Scram did not occur) o Mode Switch to S/D o Arm/Depress Manual Scram P/B o Arm/Depress ARI Pushbuttons • Provide a SCRAM Report • Verify Immediate Actions of AOP-1. • Complete Actions for AOP-1, 2, and 6. • Accept the pressure band of 500-1090 psig
		SRO	• Accept the report about loss of feed. • Accept SCRAM report • Enter EOP-1 and direct EOP-1 actions: • Verify Mode Switch in S/D (Scram Report) • Direct UO to restore and maintain RPV water level from -20 to 51 inches with HPCS. • Direct the ATC to stabilize reactor pressure below 1090 psig, then give band of 500-1090 psig. • Assign the ATC: AOP-0001, Rx Scram, AOP-0002, Turbine Trip, and AOP-0006, Condensate Feedwater Failures.

Event 6 (Continued)		UO	• Maximize CRD, Inhibit ADS, Inject with SLC • Accept direction to restore and maintain RPV water level from -20 to 51 inches with HPCS • Perform EOP-1 actions as directed by SRO • When directed, emergency depressurize by opening 7 SRV's
Event 7 CRD Pump B *Event 7 initiated on event 30, ARI initiated*	**T30 CRD001B**, Pump Trip on ARI Pushbuttons, 2 second delay.	UO	• Recognize and report pump trip.
		SRO	• Accept the report about the CRD pump trip
Event 8 HPCS Suction Strainer Blockage followed by HPCS Pump trip. *Event T8 initiated at HPCS Breaker closure*	**T8 HPCS005** HPCS suction strainer blockage **T8 HPCS001** HPCS Pump Trip (delay 1 min 10 sec after breaker closed). **CRITICAL TASK**: Emergency. Depressurize before RPV level reaches -186"	UO	• Recognize and report clogged HPCS strainer. • Recognize and report HPCS pump trip.
		SRO	• When RPV level drops below -143 (Level 1), then Direct UO/ATC to "inhibit ADS". • When level cannot be restored and maintained above -162", then enter the Alternate Level Control Leg of EOP-0001 • When level cannot be maintained above -186", direct UO to Emergency Depressurize
Termination is at the discretion of the Chief Examiner.	**FREEZE**	<u>**Critical Task Review**</u>: **1. Manually Arm & Depress ARI Pushbuttons before RPV level 1 is reached.** **2. Emergency Depressurize before RPV level reaches -186".**	

VI. TERMINATION CRITERIA:

The exercise should be terminated when the performance objectives have been achieved or the operators are unable to diagnose and respond effectively to the scenario.

The following conditions provide an indication of performance objective achievement for this scenario; Critical Tasks are indicated with an *:

- FRV-A is in service.
- Reactivity Control Plan performed to raise power with rods.
- Tech Specs entered for CST level instrument – HPCS suction transferred to Suppression Pool
- Actions taken for single loop operation after Recirc Pump B trip
- All appropriate actions of AOP-0010 are performed.
- * Manually Arm & Depress ARI Pushbuttons before RPV level 1 is reached.
- Alternate Level Control Leg of EOP-1 entered.
- * Emergency Depressurize before RPV level reaches -186”.

VII. <u>REFERENCES</u>

A. Plant Procedures

1. SOP-0009, Reactor Feedwater System
2. SOP-0071, Rod Control and Information System
3. ARP-601-16A, HPCS System Inoperative
4. SOP-0030, HPCS System
5. ARP-680-04-A07
6. AOP-0024, Thermal Hydraulic Stability Controls
7. AOP-0010, Loss of One RPS Bus
8. AOP-0001, Reactor Scram, AOP-0002, Turbine Trip
9. AOP-0006, Condensate/Feedwater Failures
10. EOP-1, RPV Control
11. OSP-0053, Emergency and Transient Response Support Procedure

Offgoing OSM:	Oncoming OSM:	Off-Going Shift
______________________ _____ (Print) KCN	__________________ _____ (Print) KCN	N ☐ D ☐ Date

PART I - TO BE REVIEWED PRIOR TO ASSUMING THE SHIFT UNIT STATUS MODE 1 RX POWER 70% EVOLUTIONS (COMPLETED / IN PROGRESS / PLANNED); GENERAL INFORMATION Fuel shuffle in progress in the Spent Fuel Pool.	
Place Feedwater Regulating Valve A in service per SOP. (Post maintenance for adding packing)	
Raise power with control rods in accordance with RCP 18-015 for sequence exchange.	
- Reactor Engineering is in the MCR to support.	
SIGNIFICANT LCO STATUS	EOOS STATUS
3.5.3 Condition A.1 was completed 4 days ago	
3.5.3 Condition A.2 has 10 days left of 14 day LCO	
EQUIPMENT STATUS	PROTECTED EQUIPMENT
FWS-P1A is tagged out for Corrective Maintenance	Div 2
RCIC tagged out for Corrective Maintenance	
CRD-P1A is tagged out for motor replacement	

Night Orders Standing Orders Board Walkdown Temp Alts

______________________________________ ______

(Signature: Oncoming OSM Review Completed) KCN

Facility: River Bend Station Scenario No.: 3 IC No.: 208

Examiners: Theresa Buchanan
Steve Garchow
Mike Bloodgood

Operators: ______________________
____
____

Initial Conditions: Reactor power 70%.
CRD-A, HDL-P1B & C, CCP-P1A & B running
Accumulator Fault on Control Rod 28-45 – Maintenance package in progress

Turnover Shift priorities 1) Rotate RPCCW pumps,
2) Lower Reactor Power

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N (SRO, BOP)	Rotate RPCCW pumps.
2	NA	R (ATC)	Lower reactor power with control rods to 65%.
3	CCP001C CCP004B	C (BOP)	CCP-P1C trips; P1B fails to auto start
4	ED003A DG002C	C (ALL)	Loss of NNS-SWGR1A Div 3 EDG fails to start (Tech Spec)
5	CRD016	C (SRO, ATC)	CRD suction filter clogging and pump trip (Tech Spec) trigger initiated on CRD-P1B pump start (ramped to 97% over 2 min, 30sec) {Remove Malfunction after ATWS – role play}
6	CRD014	M (ALL)	Anticipated Transient without Scram (Hydraulic Lock) [83%]
7	TMS003	C (SRO, ATC)	Main Turbine High Vibration requiring a manual Turbine Trip
8	AI_E51-R600-CTW	C (SRO, BOP)	RCIC Flow Controller Fails Low – requires manual operation.

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

Total Malfunctions (5-8) (7) CCP Failure, Loss of NNS-A, Div 3 EDG, CRD suction filter, ATWS, Turbine Vibration, RCIC failure

Malfunctions after EOP entry (1-2) (2) Turbine Vibration, RCIC flow failure

Abnormal Events (2-4) (4) AOP-0011, AOP-0001, AOP-0002, AOP-0003

Major Transients (1-2) (1) ATWS

EOPs entered (1-2) (2) EOP-0001, EOP-0002

EOP contingencies (0-2) (1) EOP-0001A

Critical Tasks (2-3) (2) Terminate and prevent injection", Insert control rods

RIVER BEND STATION **SIMULATOR SCENARIO**	Number: ***RSMS-NRC14-3** Revision: **02** Page 1 of **15** Approximate Time: 1 Hour(s) Record Type: ***Z01.24**

TRAINING PROGRAM:

SIMULATOR TRAINING

LESSON PLAN:

*** Loss of NNS-A ; CRD Pump Trip ; ATWS – High Turbine Vibration**

REASON FOR REVISION:

NRC March 2014 exam

PREPARE / REVIEW:

Angie Orgeron	1538	10-07-2013
Preparer	KCN	Date
Dave Bergstrom	0257	10-31-2013
Technical Review (SME)	KCN	Date
Jeff Reynolds	0358	1-22-2014
Operations Representative	KCN	Date
Joey Clark	0260	1-27-2014
Facility Reviewer	KCN	Date

* Indexing Information

I. DESCRIPTION OF SCENARIO

This scenario begins with the plant at 70% power.
Events for this scenario:

- Rotate RPCCW Pumps
- Lower Power with Control Rods
- Trip of CCP pump with failure of stby to auto start
- Loss of NNS A
- Div 3 EDG fails to start (TS)
- CRD suction filter clogged
- CRD pump trip (TS)
- ATWS
- High Turbine Vibration requiring manual trip
- Failure of the RCIC Flow Controller

II. TERMINAL OBJECTIVES

1. Establish safe and stable plant conditions following a loss of CRD and ATWS per plant procedures.

IV. INITIAL CONDITIONS/SHIFT TURNOVER

INITIAL CONDITION	TRAINING FOCUS	EQUIPMENT STATUS	REQUIRED DOCUMENTS
IC #208		**Power:** 70% **Core:** Xenon equilibrium **Equipment OOS:** HCU for rod 28-45 is isolated and awaiting a maintenance package for piston replacement. **STPs Due:** **LCOs:** 3.1.5, Condition A.2 – 1 Control Rod scram accum inop 3.1.3 Condition C.1 – fully insert inop rod 3.1.3 Condition C.2 – disarm associated rod **Evolutions in progress:** Down Power in progress. **Problem/Lit annunciators:** None	RCP-18-08 step 7

V. GENERAL INSTRUCTIONS

Event Number	MFS-OR-REM-SCH	Expected Operator Actions
Simulator Setup		
Check Boards for Equip Tags Check procedures and hard cards for marks Check Gauges/Meters for marks. Check that the Reactivity Control Plan is appropriate for this scenario. Provide marked up copy of GOP-0002.	**Malfunctions** **CRD014,** ATWS-Hydraulic Lock (83%) **CRDM2845**, Accumulator Fault **DG002C**, Div 3 EDG fails to start **Overrides** **EVENT TRIGGERS** **T3 CCP001C,** CCP-P1C trip (delay 3 sec) **T3 CCP004B,** CCP-P1B fail to Auto Start **T4 ED003A** Loss if NNS-SWGR1A **T5 CRD016,** CRD Suction Filter Clogging tied to pump start (97% over 2 min, 30sec) **T7 TMS003** Turbine High Vibration (15 mils over 5 minutes on mode switch) **T8 AI_E51-R600-CTW,** 0%, ramp 50 sec, on event 8 – RCIC speed > 50%	**EQUIPMENT STATUS** Ensure the following are running: CCP pumps A & B CRD pump A HDL Pumps A & D **Remote Functions** **T13 EOP012A**, Encl 12 RPS **T12 EOP012B**, Encl 12 ARI **T14 EOP014**, Encl 14 RCIS **T16 EOP016**, Encl 16 Instrument Air **T20 EOP020**, Encl 20 DW Cooling **T24 EOP024**, Encl 24 MSIVs

Simulator Setup			
Event 0	**RUN**	CREW:	Board walk down / Turnover.
Event 1 Rotate CCP Pumps. *Event initiated by crew from turnover sheet.*	**ROLE PLAY** As the reactor building operator take direction to perform steps 5.1.1 and 5.1.2 of SOP-0016 for the C Pump. (verify open suct & disch valves then vent the pump) Report back in 2 minutes that steps are complete.	SRO	Direct the UO to alternate CCP Pumps to A & C running in accordance with SOP-0016.
		UO	• Accept direction to alternate CCP Pumps using SOP-0016, Reactor Component Cooling Water System, Section 5.1: • Direct operator to perform steps 5.1.1 & 5.1.2 in SOP-0016 for CCP Pump C. • Start pump C • Stop pump B – verify lights
Event 2 Lower Reactor Power using Control Rods per RCP. *Event 3 initiated by crew from turnover sheet.*		SRO	• Direct ATC to perform RCP-18-008 to lower Reactor Power. • Act as Reactivity SRO for Control Rod movement.
		ATC	• Accept the direction to perform power decrease. • Perform step 07 of RCP-18-008. • inserted four rods from position 24 to 08 • power will change from 70% to 61%
		UO	• Act as the peer checker for performing control rod movement.

Event 3 Trip of CCP-P1C with a failure of B to auto start. *Event 3 initiated at Lead Evaluator discretion.*	**T3 CCP001C,** CCP-P1C trip (delay 3 sec) **T3 CCP004B,** CCP-P1B fail to Auto Start	UO	• Recognize and report the trip. • Recognize and report the failure of the standby pump to auto start. • Start CCP-P1B • Verify actions of AOP-0011 • Direct building operator to investigate
		SRO	• Accept the report. • Verifies that the UO performs the manual start of CCP-P1B • Direct the UO to enter AOP-0011, Loss of CCP • Call WMC to request help troubleshooting

Event 4 Loss of NNS-A Div 3 EDG fails to start. *Event trigger T4 initiated at Lead Evaluator discretion.*	**T4 ED003A** Loss of NNS-SWGR1A **DG002C** Div 3 EDG Fails to Start **ROLE PLAY** Accept phone call to make notifications and for maintenance support. As turbine building operator, accept report to start the available HVN chiller per SOP-116. (A is running; C is available) As CB operator, investigate Div 3 EDG As RB operator, investigate CRD Associated Tech Specs: TS 3.5.1 HPCS Inop – Condition B.1 – Verify (admin) RCIC operable within 1 hour AND Condition B.2 – Restore HPCS to operable within 14 days TS 3.7.1 Condition E - One SSW subsystem with one pump inop - Restore pump to operable within 30 days	UO	• Recognize and report Loss of NNS-A. o Recognize and report loss of CCS-A o Recognize and report loss of CRD-A. o When directed, Start CRD Pump B. • start aux oil pump • when permissive met, start pump • Recognize and report failure of HPCS EDG. • Attempt to start HPCS EDG
		ATC	• Recognize and report Loss of NNS-A. o Recognize loss of HDL Pump A o When directed, Start HDL Pump B
		SRO	• Notify work management/maintenance of electrical failure and request OSP-0046 notifications. • Direct the UO to start CRD Pump B. • Direct ATC to refer to AOP-0006, Condensate/Feedwater Failures and AOP-0007, Loss of Feedwater Heating. • Direct the ATC to start HDL Pump B • Enter Tech Spec 3.8.1 3 EDGs shall be operable • Condition C.1 – Perform SR 3.8.1.1 within 1 hour • Condition C.2 – Declare req'd features supported by the inop DG inop within 4 hours • Condition C.3 – Determine operable DGs not inop for common cause failure within 24 hours • Condition C.4 – Restore DG to operable within 72 hours

Event 5 CRD Suction filter clog CRD pump trip. *Event T5 initiated at the Pump B start.*	**T5 CRD016,** CRD Suction Filter Clogging tied to pump start (97% over 2 min, 30sec) trigger: zlo5(1256)=1 **ROLE PLAY** As Reactor Building Operator, accept direction to inspect CRD. As Reactor Building, accept direction to place CRD suction strainer in service (bypassing around filters) {open C11-VF117 (suct) and 116 (disch) } After 5 minutes, RB Operator, indicate that the strainer discharge valve handwheel broke when attempting to open. After 10 minutes, notify the MCR that mechanical maintenance is on station.	UO	• Recognize and report CRD low suction/clogged strainer. • Recognize and report CRD Pump B trip. • Direct operator to investigate
		ATC	• Monitor for CRD accumulator faults • Perform actions IAW ARP680-07A-C03. • When 2^{nd} fault received, note the time for the 20 minute clock for the LCO.
		SRO	• Accept the report of the CRD pump trip • When second accumulator fault alarms, Enter Tech Spec 3.1.5 Condition B.1, Restore charging water header pressure ≥1540 psig within 20 minutes. • Before the 20 minutes is up, Enter Tech Spec 3.1.5 Condition D.1, Place mode switch in Shutdown immediately. • Perform a control room brief to insert a manual scram while not exceeding the 20 minute LCO. • Notify work management/maintenance of electrical failure and request OSP-0046 notifications. • May recommend placing CRD Strainer in service (bypassing Filters). (RDS-STRD013)

<table>
<tr>
<td rowspan="2">Event 6
ATWS

Event 6 initiated when the ATC inserts a manual scram.</td>
<td rowspan="2">CRD014, ATWS-Hydraulic Lock (83%)

*CRITICAL TASK:

Terminate and prevent all injection into the RPV except boron injection, CRD, and RCIC prior to exceeding the HCTL.

Note:

After the scram is initiated,
<u>delete CRD016</u>, CRD suct filter clogged

Role Play:

As Mechanical Maintenance, report that the CRD filters have been bypassed using the Strainer – CRD B can be restored.</td>
<td>ATC</td>
<td>• When directed, Initiate a manual Scram
  o Mode Switch to S/D
  o Arm/Depress Manual Scram P/B
  o Arm/Depress ARI Pushbuttons
• Provide an ATWS Report.
• When directed, trip both Recirc Pumps.
• When directed, terminate injection with feedwater and lower RPV level to -60 to -140 inches.</td>
</tr>
<tr>
<td>SRO</td>
<td>• Direct the ATC to take the mode switch to S/D.
• Enter EOP-1 and transition to EOP-1A
• Direct EOP-1A actions:
  o ATC verify ARI initiation
  o ATC trip both reactor recirc pumps
  o UO terminate & prevent injection with HPCS
    (Override injection valve while Arming & Depress ; stop the pump)
  o UO inhibit ADS
  o UO install EOP-5 enclosures 16 and 24
  o ATC terminate injection with feedwater and lower reactor water level to -60” to -140”
    Take manual control of FRV – and close
  o UO install EOP-5 enclosures 12 and 14.</td>
</tr>
</table>

Event 6 **(continued)**	**Remotes:** **T12 EOP012B** Encl 12 ARI jumpered **T13 EOP012A** Encl 12 RPS jumpered **T14 EOP014,** Encl 14 RC&IS Interlocks **T16 EOP016,** Encl 16 Containment IAS Isolation Interlocks jumpered **T20 EOP020**, Encl 20 DW Cooling **T24 EOP024,** Encl 24 RPV level 1 MSIV and Drains Isol Intlk jumpered **<u>Critical Task</u>:** **Fully insert all control rods prior to exceeding HCTL.** **Note**: <u>Modify CRD014</u> to reduce hydraulic lock by 10 % for each successive reset and scram.	UO	• When directed, inhibit ADS • When directed, terminate and prevent injection with HPCS. • When directed, install EOP-5 enclosures 16 and 24. • When directed, initiate SLC. • When directed, install EOP-5 enclosures 12 and 14. • When directed re-start CRD pump B.
		SRO	• Accept the report about CRD availability. • Direct the UO to start CRD B per the ARP. • When CRD B restored, direct the ATC to drive control rods per Enclosure 14. • Direct ATC to maintain pressure band of 950-1090 then 800-1090 (after stabilized)
		ATC	• When directed, insert control rods per Encl 14 • When directed, control pressure within band using the Main Turbine then BPV and drains {Turbine will maintain pressure until next event}

Event 7 **Turbine Vibration** *Event trigger T7 initiated automatically at mode switch operation*	**T7 TMS003 Turbine HighVibration** (15 mils over 5 minutes) on event mode switch **Note:** Ramp vibration down after turbine is tripped (2.7 ramped for 12 minutes)	ATC	• Recognize and report rising turbine vibration. • When directed OR when turbine vibration exceeds 12 mils, Trip the main turbine. • Perform the actions of AOP-0002, Turbine Trip. • Perform the actions of AOP-0001, Reactor Scram. • Control Reactor pressure within given band (800-1090 psig).
		SRO	• Accept the report about turbine vibration. • Direct the ATC with a contingency for tripping the main turbine. • Direct the UO to control reactor pressure between 800-1090 psig using bypass valves and drains.
		UO	• Control Reactor pressure within given band (800-1090 psig) using bypass valves and drains.
Event 8 RCIC Flow Controller Fails Low.	**T8 AI_E51-R600-CTW**, 0%, ramp 50 sec, on event 8 (RCIC speed >50%)	UO	• Recognize and report the failure of the RCIC flow controller. • Take manual control of the RCIC flow controller.

Termination is at the discretion of the Chief Examiner.	**FREEZE**	**<u>Critical Task Review</u>:** **1. Terminate and prevent all injection into the RPV except boron injection, CRD, and RCIC prior to exceeding the HCTL.** **2. Fully insert all control rods prior to exceeding HCTL.**

VI. TERMINATION CRITERIA:

The exercise should be terminated when the performance objectives have been achieved or the operators are unable to diagnose and respond effectively to the scenario.

The following conditions provide an indication of performance objective achievement for this scenario; Critical Tasks are indicated with an *:

- CCP Pumps swapped.
- Reactivity Control Plan performed to lower power with rods.
- CCP-P1C trips; CCP-P1B fails to Auto Start.
- Tech Specs entered for Div 3 EDG
- Actions taken to restore CRD.
- Tech Spec entered for CRD accumulator faults
- Reactor Scram inserted per LCO.
- EOP-1A actions taken.
    - * Terminate and prevent all injection into the RPV except boron injection, CRD, and RCIC prior to exceeding the HCTL.
    - * Fully insert all control rods prior to exceeding HCTL.
- Action taken to manually control RCIC.

VII. REFERENCES

A. Plant Procedures

1. SOP-0016, Reactor Plant Component Cooling Water System
2. GOP-0002, Power Decrease/Plant Shutdown
3. AOP-0011, Loss of Component Cooling Water
4. AOP-0001, Reactor Scram
5. AOP-0002, Turbine Trip
6. EOP-1, RPV Control
7. EOP-1A, RPV Control, ATWS
8. EOP-5, Enclosures
9. AOP-0003, Isolations
10. OSP-0053, Emergency and Transient Response Support Procedure
11. Tech Specs

<table>
<tr><td colspan="2">Offgoing OSM: Oncoming OSM:

_______________ _____ _______________ _____
(Print) KCN (Print) KCN</td><td>Off-Going Shift

N D
☐ ☐

Date</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3">PART I - TO BE REVIEWED PRIOR TO ASSUMING THE SHIFT

UNIT STATUS <u>MODE 1 RX POWER 70%</u>

EVOLUTIONS (COMPLETED / IN PROGRESS / PLANNED); GENERAL INFORMATION

In Progress: Shutting Down to Hot Standby.</td></tr>
<tr><td colspan="3">Rotate RCCP Pumps from A,B to A,C.</td></tr>
<tr><td colspan="3">Lower power with control rods in accordance with RCP 18-008 for forced outage 14-01.</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>SIGNIFICANT LCO STATUS</td><td colspan="2">EOOS STATUS</td></tr>
<tr><td>TS 3.1.5.A.2 One control rod scram accumulator inop
- Declare assoc. control rod inop within 8 hours</td><td colspan="2"></td></tr>
<tr><td>TS 3.1.3.C.1 One or more control rods inop
- Fully insert the inop control rod within 4 hours</td><td colspan="2"></td></tr>
<tr><td>TS 3.1.3.C.2 One or more control rods inop
- Disarm the associated rod within 4 hours</td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2">PROTECTED EQUIPMENT</td></tr>
<tr><td>EQUIPMENT STATUS</td><td colspan="2"></td></tr>
<tr><td>Rod 28-45 is at 00 and its accumulator isolated</td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2"></td></tr>
</table>

Night Orders Standing Orders Board Walkdown Temp Alts

_______________________________ _____
(Signature: Oncoming OSM Review Completed) KCN

Facility: Date of Exam: Operating Test No.:

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1 IC #210			2 IC #207			3 IC #208			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
		Surr	I1	R4	I1	R3	R4	I1	R4	R3							
RO ☐ SRO-I ☑ I1 SRO-U ☐	RX		5											1	1	1	0
	NOR				1			1						2	1	1	1
	I/C		2,3,7		3,4,5 7,8			3,4,5 7,8						13	4	4	2
	MAJ		6		6			6						3	2	2	1
	TS				3,4			4,5						4	0	2	2
RO ☑ R3 SRO-I ☐ SRO-U ☐	RX					2								1	1	1	0
	NOR									1				1	1	1	1
	I/C					4,5				3,4,8				5	4	4	2
	MAJ					6				6				2	2	2	1
	TS													0	0	2	2
RO ☑ R4 SRO-I ☐ SRO-U ☐	RX								2					1	1	1	0
	NOR			1			1							2	1	1	1
	I/C			4,5, 8			3,4,5, 8		4,5,7					10	4	4	2
	MAJ			6			6		6					3	2	2	1
	TS													0	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Date of Exam: Operating Test No.:

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1 IC #210			2 IC #207			3 IC #208			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
					Surr	R1	R2	U1	R2	R1							
RO ☐ SRO-I ☐ SRO-U ☑ U1	RX													0	1	1	0
	NOR							1						1	1	1	1
	I/C							3,4,5,7,8						5	4	4	2
	MAJ							6						1	2	2	1
	TS							4,5						2	0	2	2
RO ☑ R1 SRO-I ☐ SRO-U ☐	RX					2								1	1	1	0
	NOR									1				1	1	1	1
	I/C					4,5				3,4,8				5	4	4	2
	MAJ					6				6				2	2	2	1
	TS													0	0	2	2
RO ☑ R2 SRO-I ☐ SRO-U ☐	RX								2					1	1	1	0
	NOR						1							1	1	1	1
	I/C						3,4,5,8		5,7					6	4	4	2
	MAJ						6		6					2	2	2	1
	TS													0	0	2	2

Instructions:

3. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

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3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: River Bend Station Date of Examination: 3/24/14 Operating Test No.:

Competencies	APPLICANTS															
	ATC RO X SRO-I ☐ SRO-U ☐				BOP RO X SRO-I ☐ SRO-U ☐				SRO RO ☐ SRO-I X SRO-U X				RO ☐ SRO-I ☐ SRO-U ☐			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	2,3, 6,7	4,5, 6	4,5, 6,7	1,4, 5	3,4, 5,6, 8	3,6, 7,8	3,4, 5,8	3,6, 7,8	2,3, 5,6, 8	2-8	2,4, 5,6, 8	1, 3-8				
Comply With and Use Procedures (1)	2,3, 5,6, 7	2,4, 6,	2,4, 5,6, 7	1,4, 5,6	1,4, 5,6, 8	1,3, 5,6, 8	1,3, 4,5, 6	2,5, 6,8	2,3, 4,5, 6,8	3-8	3-6	3-8				
Operate Control Boards (2)	2,3, 5,6, 7	2,4, 6	2,4, 5,6, 7	1,4, 5,6	1,3, 4,5, 6,8	1,3, 5,6, 8	1,3, 4,6, 8	2,5, 6,8								
Communicate and Interact	2,3, 4,5, 6,7,	1,2, 4,5, 6	2,4, 5,6, 7	1,4, 5,6	1,4, 5,8	1,3, 5,6, 7,8	1,3, 4,5, 6,8	2,3, 5,6, 7,8	1-8	1-8	1-8	1-8				
Demonstrate Supervisory Ability (3)									2-8	2-6, 8	2-8	3-8				
Comply With and Use Tech. Specs. (3)									2,3, 5	3,4,	4,5	3,4				

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.