A.1.a.R, Conduct of Operations – RO ONLY

A.1.a.R
TITLE: Calculate Required Turbine Load Reduction.
PROGRAM APPLICABLE: SOT ___ SOCT _____ OLT __X__ LOCT_____
ACCEPTABLE EVALUATION METHOD: __X__ PERFORM ___ SIMULATE ___ DISCUSS
EVALUATION LOCATION: ____ SIMULATOR ___ CONTROL ROOM __X__ CLASSROOM
PROJECTED TIME: __15 MIN__ SIMULATOR IC NUMBER: __N/A
ALTERNATE PATH ___ TIME CRITICAL ___ PRA_____

JPM DIRECTIONS:

1. Initiation of task may be in group setting; evaluation performed individually upon completion of the task by reviewing the completed form.
2. Provide the examinee with the required materials to perform this JPM.

TASK STANDARD:

- Calculate the required load reduction due to the loss of a 500kV Line.
- Determine the minimum required ramp rate to achieve the necessary load reduction.

Examinee:	
Overall JPM Performance:	**Satisfactory** ☐ **Unsatisfactory** ☐
Evaluator Comments (attach additional sheets if necessary)	

EXAMINER: _____

CONDITIONS

When I tell you to begin, you are to: **Calculate Required Turbine Load Reduction**. The conditions under which this task is to be performed are:

a. At 0800, Plant Farley received information that the Farley-Snowdoun 500kV line had been removed from service.
b. The Shift Manager directed to initiate a load reduction on Unit 1 ONLY.
c. The ramp was started at 0810.
d. The following information was given:
   i. Unit 1 – 913 mWe.
   ii. Unit 2 – 922 mWe.
   iii. Control Area System Load Level – 23.2 GW.
   iv. The Shunt Reactor was out of service.
   v. The Capacitor Bank was in service.
   vi. The Unit 1 PSS was out of service.
   vii. The Unit 2 PSS was in service.
e. You are required to perform Steps 4.1 through 4.5 of FNP-1-UOP-3.1, Appendix 5 and determine:
   i. The MINIMUM load reduction required.
   ii. The MINIMUM ramp rate which was used to achieve the desired load reduction using 0810 as the starting time.

INITIATING CUE: "You may begin."

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
____ START TIME		
1. Step 4.1: **Contact** the ACC to determine the control area system load level, shunt reactor status, and capacitor bank status.	1) Fills in the following data: a. Control Area System Load Level – 23.2 GW b. Shunt Reactor in service / out of service c. Capacitor Bank in service / out of service	S / U
2. Step 4.2: **Determine** the total plant gross MW output from each unit's DEH display:	2) Fills in the following data: a. Unit 1 MW – 913 b. Unit 2 MW – 922	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
3. Step 4.3: **Determine** the PSS status for each unit.	3) Fills in the following data: a. Unit 1 PSS in service / out of service b. Unit 2 PSS in service / out of service	S / U
4. **Determine** the total plant MW limitation from Table 1 (Farley – Raccoon Creek), or Table 2 (Farley – Snowdoun) based on the total plant gross MW, and the PSSs status.	4) Using Table 2: a. 1325 MW	S / U

NOTE: There are several ways to mathematically calculate the MINIMUM required load reduction. The evaluator should only determine whether or not the amount of load reduction is correct.

* 5. Determines MINIMUM required load reduction:	5) Calculates: X + 922MW = 1325MW X = 403MW 913MW – 403MW = **510MW**	S / U

NOTE: There are several ways to mathematically calculate the MINIMUM required ramp rate. The evaluator should only determine whether or not the ramp rate is correct to achieve required load reduction in stated ramp time.

Step 4.5 states that the load reduction required by Appendix 5 must be completed within 30 minutes of the initiating condition. Since, the initiating condition occurred at 0800 and the ramp began at 0810 then there are 20 minutes left to achieve the required load reduction.

* 6. Determines MINIMUM ramp rate required:	6) Calculates: 510MW ÷ 20min = 25.5**MW/min** (Range 25.5 – 26 MW/min)	S / U

TERMINATE After calculations are completed.

____ STOP TIME

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (*) before the element number.

GENERAL REFERENCES:

1. FNP-1-UOP-3.1, Appendix 5, v117
2. KA: G2.1.20 – 4.6 / 4.6
   G2.1.25 – 3.9 / 4.2

GENERAL TOOLS AND EQUIPMENT:

1. FNP-1-UOP-3.1, Appendix 5, v117
2. Pen/Pencil/Calculator

Critical ELEMENT justification:

STEP	Evaluation
1 – 4.	NOT Critical – Required for calculation of required load reduction and ramp rate but if Elements 5 and 6 are correct then these are not critical.
5.	Critical – Task Objective. Per AI2004204794, FNP has committed to complying with Appendix 5 load limits.
6.	Critical – Task Objective. Per AI2004204794, FNP has committed to complying with Appendix 5 load limits within the required time of 30 minutes.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to: **Calculate Required Turbine Load Reduction**. The conditions under which this task is to be performed are:

a. At 0800, Plant Farley received information that the Farley-Snowdoun 500kV line had been removed from service.
b. The Shift Manager directed to initiate a load reduction on Unit 1 ONLY.
c. The ramp was started at 0810.
d. The following information was given:
    i. Unit 1 – 913 mWe.
    ii. Unit 2 – 922 mWe.
    iii. Control Area System Load Level – 23.2 GW.
    iv. The Shunt Reactor was out of service.
    v. The Capacitor Bank was in service.
    vi. The Unit 1 PSS was out of service.
    vii. The Unit 2 PSS was in service.
e. You are required to perform Steps 4.1 through 4.5 of FNP-1-UOP-3.1, Appendix 5 and determine:
    i. The MINIMUM load reduction required.
    ii. The MINIMUM ramp rate which was used to achieve the desired load reduction using 0810 as the starting time.

MINIMUM LOAD REDUCTION REQUIRED	
MINIMUM RAMP RATE	

APPENDIX 5
LOAD LIMITATIONS WITH A 500 kV
TRANSMISSION LINE OUT OF SERVICE
Page 1 of 4

1.0 Purpose

This procedure provides the load limits to be followed with a 500 kV transmission line out of service, and both units on line. Limits are given for having both units Power System Stabilizers (PSS) in, or out of service, and for having either PSS out of service.

2.0 Initial Conditions

2.1 Unit 1 and Unit 2 are tied to the grid. ☐

2.2 One of the following 500kV transmission lines is out of service.

- Farley – Raccoon Creek ☐
- Farley – Snowdoun ☐

3.0 Precautions and Limitations

3.1 The Alabama Control Center (ACC) should be notified the times a PSS is removed from service, and when it is returned to service.

3.2 The control area system load level is the value used in the tables. This is defined as the total system load within the Southern Company footprint and not just the load associated with the Southern Company plants.

3.3 All transmission lines and both PSSs (power system stabilizers) are normally in service at Farley, and the maximum generation capability is 1910 MW gross. Tables 1 and 2 provide the recommended maximum total plant generation for abnormal operating conditions with a 500 kV transmission line out of service to ensure that power oscillations are properly damped and that transient stability will be maintained. The results assume that the shunt reactor is off for the system load levels studied. Having the shunt reactor on would improve system stability. The results also assume that the capacitor bank is not in service for system load levels equal to or below 25 GW. If the system load level is less than 25 GW and the capacitor is on, the Alabama Control Center (ACC) could be contacted to see if the capacitor could be turned off. If it cannot be turned off, then consult Note 1 at the end of the appropriate table. These tables provide recommended total gross generation levels which are independent of the generation amount of each unit.

3.4 The load levels in the tables are based upon bounding system conditions used in stability studies. Exceptions to this guidance are permissible provided that expected system conditions, including generation dispatch, shunt reactor status, capacitor bank status, and Farley MW output, are evaluated on a case-by-case basis and the evaluation demonstrates that adequate damping of oscillations would occur and that transient stability will be maintained under those conditions for the next contingency.

3.5 There are no load limitations for any of the following conditions:

- One of the 230kV transmission lines are out of service
- One of the 500/230kV Auto Bank Transformers is out of service

CAUTION

The tables included in this figure are only valid when the Pulse Wheel Input is selected as the input source for the Unit 2 PSS. ☐

3.6 The two tables provide limitations based on the following PSS settings:

- Unit 1 PSS gain of 7.8
- Unit 2 set for the pulse wheel input (speed) with a gain of 4.4 pu (gain dial setting 5.3)

3.7 Limits with a 500 kV line out and with one or both Farley PSS off are highly dependent on system conditions including the dispatch of other units on the system. Due to these sensitivities, limits involving one or both PSS off at Farley should be studied on a case-by-case basis. Limits are provided in Note 2 of the tables below with worst case assumptions of system conditions. These limits should provide a “safe” operating point until further studies can be performed with the expected system load levels, system topology, and generation dispatch.

3.8 A special stability study can be requested to be performed by SCS Transmission Planning by contacting the PCC Reliability Desk operator, if conditions are met in this appendix, and the condition may last for several days. The special stability study may raise the total plant MW limitation based on actual system conditions. It takes approximately four (4) hours to perform and obtain the results from the special stability study.

4.0 Instructions

4.1 **Contact** the ACC to determine the control area system load level, shunt reactor status, and capacitor bank status. ☐

- Control Area System Load Level _____ GW ☐
- Shunt Reactor in service / out of service ☐
- Capacitor Bank in service / out of service ☐

4.2 **Determine** the total plant gross MW output from each unit's DEH display:

- Unit 1 _____ MW ☐
- Unit 2 _____ MW ☐

4.3 **Determine** the PSS status for each unit.

- Unit 1 PSS in service / out of service ☐
- Unit 2 PSS in service / out of service ☐

4.4 **Determine** the total plant MW limitation from Table 1 (Farley – Raccoon Creek), or Table 2 (Farley – Snowdoun) based on the total plant gross MW, and the PSSs status. ☐

- Total plant MW limitation _____ MW

NOTE

Entry into FNP-1-AOP-17.1, RAPID TURBINE POWER REDUCTION may be required. ☐

4.5 IF plant gross MW output (as determined in Step 4.2) exceeds the total plant MW limitation (as determined in Step 4.4) conditions are met, THEN the total plant MW limitation value has to be met within 30 minutes from the initiating condition(s). (AI 2004204794) ☐

4.6 IF the unit is operated with the PSS out of service, THEN **notify** the ACC within thirty (30) minutes. (NERC Requirement) ☐

4.7 IF the control area system load level is less than or equal to 16 GW, AND the shunt reactor is off service, THEN **contact** the ACC to see if the shunt reactor could be placed in service. ☐

4.8 IF the control area system load level is less than 25 GW, AND the capacitor bank is on service, THEN **contact** the ACC to see if the capacitor bank can be removed from service. ☐

4.9 IF the shunt reactor cannot be placed in service, OR the capacitor bank cannot be removed from service, THEN **ensure** Note 1 is applied at the end of the appropriate table. ☐

4.10 IF the transmission line will be out of service for several days, AND the plant gross MW output has been de-rated per Step 4.5, THEN **contact** the PCC Reliability Desk operator, AND **have** them request SCS Transmission Planning to perform a special stability study to determine if the total plant MW limitation can be raised in Step 4.4. (CR 2007112628, CR 2009113189) ☐

4.11 **Contact** the ACC to determine when the control area system load level is projected to change, which would result in an additional total plant MW limitation. ☐

- Projected Control Area System Load Level _____ GW
- Time for the Projected Control Area System Load Level change

4.12 IF plant gross MW output exceeds the total plant MW limitation conditions are met, THEN the total plant MW limitation value has to be met within 30 minutes from the initiating condition(s). (AI 2004204794) ☐

4.13 **Continue** the communications with the ACC to evaluate the control area system load, and the total plant MW limitation. ☐

4.14 WHEN the transmission line in Step 2.2 has been returned to service, THEN the units can return to normal, full power operation. ☐

TABLE 1
Farley-Raccoon Creek 500 kV Out

Control Area System Load Level	PSS Unit 1 (NOTE 2)	PSS Unit 2 (NOTE 2)	Column A Total Plant MW	Column B Total Plant MW with shunt reactor OFF	Column C Total Plant MW with capacitor bank ON (NOTE 1)
≥ 14 to < 16 GW	Out	Out	1350 MW	1350 MW	1350 MW
	In	Out	1350 MW	1350 MW	1350 MW
	Out	In	1350 MW	1350 MW	1350 MW
	In	In	1910 MW	1910 MW	1910 MW
16 to < 18 GW	Out	Out	1350 MW	1350 MW	1350 MW
	In	Out	1350 MW	1350 MW	1350 MW
	Out	In	1350 MW	1350 MW	1350 MW
	In	In	1910 MW	1910 MW	1910 MW
18 to < 20 GW	Out	Out	1350 MW	1350 MW	1350 MW
	In	Out	1350 MW	1350 MW	1350 MW
	Out	In	1350 MW	1350 MW	1350 MW
	In	In	1910 MW	1910 MW	1910 MW
20 to < 22 GW	Out	Out	1350 MW	1350 MW	1350 MW
	In	Out	1350 MW	1350 MW	1350 MW
	Out	In	1350 MW	1350 MW	1350 MW
	In	In	1910 MW	1910 MW	1910 MW
22 to < 24 GW	Out	Out	1350 MW	1350 MW	1350 MW
	In	Out	1350 MW	1350 MW	1350 MW
	Out	In	1350 MW	1350 MW	1350 MW
	In	In	1910 MW	1910 MW	1910 MW
≥ 24 GW	Out	Out	1350 MW	1350 MW	1350 MW
	In	Out	1350 MW	1350 MW	1350 MW
	Out	In	1350 MW	1350 MW	1350 MW
	In	In	1910 MW	1910 MW	1910 MW

NOTES

(1) If the capacitor bank is on for load levels of less than or equal to 25 GW, the plant generation does not need to be reduced. These limits have been calculated and provided in Column C. ☐

(2) If a PSS is out of service for one of the Farley units, the recommended generation limit is 1350 MW until further study of the actual system conditions can be made. The additional reduction based on shunt reactor / capacitor bank status does not apply with a PSS out of service. The PSS out of service limits were calculated very conservatively, and no further reduction factors are needed. ☐

TABLE 2
Farley-Snowdoun 500 kV Out

Control Area System Load Level	PSS Unit 1 (Note 4)	PSS Unit 2 (Note 4)	Column A Total Plant MW	Column B Total Plant MW with shunt reactor OFF	Column C Total Plant MW with capacitor bank ON (Note 3)
≥ 14 to < 16 GW	Out	Out	1325 MW	1325 MW	1325 MW
	In	Out	1325 MW	1325 MW	1325 MW
	Out	In	1325 MW	1325 MW	1325 MW
	In	In	1910 MW	1910 MW	1900 MW
16 to < 18 GW	Out	Out	1325 MW	1325 MW	1325 MW
	In	Out	1325 MW	1325 MW	1325 MW
	Out	In	1325 MW	1325 MW	1325 MW
	In	In	1910 MW	1910 MW	1900 MW
18 to < 20 GW	Out	Out	1325 MW	1325 MW	1325 MW
	In	Out	1325 MW	1325 MW	1325 MW
	Out	In	1325 MW	1325 MW	1325 MW
	In	In	1910 MW	1910 MW	1900 MW
20 to < 22 GW	Out	Out	1325 MW	1325 MW	1325 MW
	In	Out	1325 MW	1325 MW	1325 MW
	Out	In	1325 MW	1325 MW	1325 MW
	In	In	1910 MW	1910 MW	1900 MW
22 to < 24 GW	Out	Out	1325 MW	1325 MW	1325 MW
	In	Out	1325 MW	1325 MW	1325 MW
	Out	In	1325 MW	1325 MW	1325 MW
	In	In	1910 MW	1910 MW	1900 MW
≥ 24 GW	Out	Out	1325 MW	1325 MW	1325 MW
	In	Out	1325 MW	1325 MW	1325 MW
	Out	In	1325 MW	1325 MW	1325 MW
	In	In	1910 MW	1910 MW	1900 MW

NOTES

(3) If the capacitor bank is on for load levels of less than or equal to 25 GW and both PSSs are in service, then the plant generation should be reduced an additional 10 MW below the numbers given in Column A of this table. These limits have been calculated and provided in Column C. ☐

(4) If a PSS is out of service for one of the Farley units, the recommended generation limit is 1325 MW until further study of the actual system conditions can be made. The additional reduction based on shunt reactor / capacitor bank status does not apply with a PSS out of service. The PSS out of service limits were calculated very conservatively, and no further reduction factors are needed. ☐

A.1.a.S, Conduct of Operations – SRO ONLY

A.1.a.S

TITLE: Calculate Diesel Generator Fuel Levels.

PROGRAM APPLICABLE: SOT ___ SOCT _____ OLT __X__ LOCT_____

ACCEPTABLE EVALUATION METHOD: __X__ PERFORM ___ SIMULATE ___ DISCUSS

EVALUATION LOCATION: ____ SIMULATOR ___ CONTROL ROOM __X__ CLASSROOM

PROJECTED TIME: __30 MIN__ SIMULATOR IC NUMBER: __N/A

ALTERNATE PATH ___ TIME CRITICAL ___ PRA_____

JPM DIRECTIONS:

1. Initiation of task may be in group setting; evaluation performed individually upon completion of the task by reviewing the completed form.
2. Provide the examinee with the required materials to perform this JPM.

TASK STANDARD:

- Calculate the final fuel level for two running Diesel Generators.
- Determine the required Technical Specification actions if any. If none are required then determine how long until Technical Specification limits will be met.

Examinee:	
Overall JPM Performance:	**Satisfactory** ☐ **Unsatisfactory** ☐
Evaluator Comments (attach additional sheets if necessary)	

EXAMINER: _____

Developer	S. Jackson	05/09/14
NRC Approval	SEE NUREG 1021 FORM ES-301-3	

CONDITIONS

When I tell you to begin, you are to: **Calculate Diesel Generator Fuel Levels**. The conditions under which this task is to be performed are:

a. Unit 2 has had a Loss of Offsite Power and is in MODE 3.
b. Power has been restored and the DGs are shut down.
c. The following conditions exist:
   i. 1C DG.
      - The initial fuel oil level was 104" by local dipstick measurement.
      - The DG had been running for 40 hours at FULL load.
   ii. 2B DG
      - The initial fuel oil level was 130" by local dipstick measurement.
      - The DG had been running for 28 hours at FULL load.
d. No additions have been made to the respective FOSTs.
e. Assume all fuel consumption comes from the FOSTs and day tank levels remain constant.
f. The EPB fuel oil level indication is INOPERABLE and reads 0%.

1. You are required to determine the **final** fuel oil level in the FOST for the 1C and 2B DGs after the stated run times.

AND

2. List any Technical Specification **REQUIRED ACTION(S).**

INITIATING CUE: "You may begin."

EVALUATION CHECKLIST

ELEMENTS:	**STANDARDS:**	**RESULTS: (CIRCLE)**
_____ START TIME		
NOTE: Calculations may be performed in any order. This guide assumes the 1C DG is performed first.		
* 1. Determines fuel used by 1C DG using Plant Curves and Fuel Consumption rate.	1) Calculates: (40hrs x 213gph) = 8520gal	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)

NOTE: If using the curve, may calculate INITIAL level as low as 27,500gal useable which results in 18980gal final.

If using ACTUAL level, they must recognize they are below 21,000 useable. If they used most conservative level on the table they would use 22984gal Actual for the FINAL level which is 19100gal useable and is less than Tech Spec minimum.

* 2. Determines final DG fuel level

2) Calculates: S / U

27788 gal - 8520gal =
19268gal (Useable)

31672gal – 8520gal =
23152gal (Actual)

NOTE: Critical Task annotated by a * on substeps.

*3. Determines that Tech Spec conditions exists:

3) Determine from Tech Specs:

a) *3.8.3 Cond F S / U

b) *3.8.1 Cond B S / U

* 4. Determines fuel used by 2B DG using Plant Curves and Fuel Consumption rate.

4) Calculates: S / U

(28hrs x 297gph) = 8316gal

NOTE: If using curve may calculate 35,000gal to 34,800 gal useable which results in 26684gal – 26484gal) final.

If using ACTUAL level, they may use most conservative level on the table they would use 30359gal actual which is 26475gal useable and is greater than Tech Spec minimum.

* 5. Determines final DG fuel level

5) Calculates: S / U

34883gal – 8316 gal =
26567gal (Useable)

38767gal – 8316gal =
30451gal (Actual)

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
6. Determines if any Tech Spec conditions exists:	6) No Tech Spec Conditions Exist.	S / U

TERMINATE After calculations and Tech Spec evaluations are completed.

_____ STOP TIME

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (∗) before the element number.

GENERAL REFERENCES:

1. FNP-0-SOP-38, v123
2. Technical Specifications, v193
3. Plant Curves: PCB-2-VOL2-CRV018A/B, v4
2. KA: G2.1.25 – 3.9 / 4.2

GENERAL TOOLS AND EQUIPMENT:

1. FNP-0-SOP-38, v123
2. Technical Specifications, v193 or access to Training Reference Disk.
3. Plant Curves: PCB-2-VOL2-CRV018A/B, v4
4. Pen/Pencil/Calculator

Critical ELEMENT justification:

STEP	Evaluation
1.	Critical – Task Objective. Required for determining final fuel level.
2.	Critical - Task Objective. Additionally, improper calculation could result in not entering Tech Spec Required Action Statement.
3.	Critical (2 Components) – Proper evaluation of Technical Specifications is required to operate within the facility's license.
4.	Critical - Task Objective.
5.	Critical - Task Objective.
6.	NOT Critical. No Tech Spec entry condition exists.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to: **Calculate Diesel Generator Fuel Levels**. The conditions under which this task is to be performed are:

g. Unit 2 has had a Loss of Offsite Power and is in MODE 3.
h. Power has been restored and the DGs are shut down.
i. The following conditions exist:
   i. 1C DG.
      - The initial fuel oil level was 104" by local dipstick measurement.
      - The DG had been running for 40 hours at FULL load.
   ii. 2B DG
      - The initial fuel oil level was 130" by local dipstick measurement.
      - The DG had been running for 28 hours at FULL load.
j. No additions have been made to the respective FOSTs.
k. Assume all fuel consumption comes from the FOSTs and day tank levels remain constant.
l. The EPB fuel oil level indication is INOPERABLE and reads 0%.

1. You are required to determine the **final** fuel oil level in the FOST for the 1C and 2B DGs after the stated run times.

AND

2. List any Technical Specification(s) that are required to be entered (if any).

1C DG FOST Final Level	gal

2B DG FOST Final Level	gal

Technical Specification(s) (if any):

SAFETY RELATED

DIESEL GENERATORS

PROCEDURE LEVEL OF USE CLASSIFICATION PER NMP-AP-003	
CATEGORY	**SECTIONS**
Continuous:	**ALL**
Reference:	**NONE**
Information:	**NONE**

Approved By: David L Reed for)
Operations Manager

Effective Date: 10/10/2013

Version Number	Version Description
112.0	New Procedure format per NMP-OS-008 and split out of the diesels into separate procedures.
113.0	Added requirement to have ACC place or verify the Capacitor Bank in manual prior to synchronizing a diesel to the grid.
114.0	Revised appendix 1 & 2 to add additional monitoring for DG 2B and 2C due to fuel rack stop adjustment from 112% to 120%.
115.0	Revised appendix 2 to add additional monitoring for DG 1-2A due to fuel rack stop adjustment from 112% to 120%.
116.0	Revised appendix 1 to add additional monitoring for DG 1C due to fuel rack stop adjustment from 112% to 120%.
117.0	Minor Editorial change to correct referenced step in Step 2.2.3 and added note in Attachment B at step 6.0 to filter new oil from 55 gal drums. CR#2010101367 Revised to change DG JW capacity listed for the 1C and 2C DG.
118.0	Implemented CR 2011103710 change, repaired cover sheet, headers, titles of appendices and attachments.
119.0	CR 344065 Correct numerical reference errors in Appendix 1 Step 2.1.3 & corrected procedure reference Attachment B Step 7.0. CR 329293: FNP-0-SOP-0.0 has reference section that no longer exists, Step 2.2.11.
119.1	Added Appendix 4, CR 395712
119.2	P&L 2.1.15, corrected to better state 1-2A D/G response. CR 433674.
119.3	Added P&L 2.1.12. CR 491547
120.0	Appendix 1 & 2, consolidated redundant information. Appendix 3, restructured and added Data Sheet 1 for recording additional data as mandated by TE 504888.
120.1	Step 2.2.10, corrected typo. CR 556933 Step 2.2.11, corrected contained information regarding operability. CR 565327
121.0	Updated procedure to reflect changes due to implementation of DCP C050889101.
122.0	Added steps to address operation of the Webb Capacitor Bank.
123.0	Added step 2.1.23 to address the EPA requirement per 40CFR63.6640(f). Appendix 3, page 2 of 9, Added new steps 4.0 and 7.0 and note proceeding.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides Initial Conditions, Precautions, Limitations and Instructions for the operation of the Diesel Generators and auxiliaries.

2.0 PRECAUTION AND LIMITATIONS

2.1 PRECAUTIONS

2.1.1 Diesel generator automatic start capability is defeated in Modes 3 and 4. ☐

2.1.2 If a diesel generator is removed from automatic standby operation, Limiting Conditions for Operation of Technical Specifications Section 3.8.1 and 3.8.2 apply. ☐

2.1.3 Diesel generator parallel operation with offsite sources should be limited to surveillance testing and maintenance activities only. **{CMT 0000603}** ☐

2.1.4 Parallel operation of diesel generators with offsite sources will be limited to one train at a time per unit and one diesel per unit. 2C Diesel is considered a B Train diesel for the purpose of this requirement. **{CMT 0000603}** ☐

2.1.5 Diesel generators should NOT be started and loaded in anticipation of a potential loss of offsite power. **{CMT 0007846}** ☐

2.1.6 Do NOT manually load diesel generators above continuous load limit or above load limits of Figures 1 and 2. **{CMT 0003632}** ☐

2.1.7 When operating a diesel continuously at less than synchronous speed, the exciter should be manually tripped to prevent possible generator damage. ☐

2.1.8 UNIT SELECTOR SWITCHES may be placed in the UNIT 1 or UNIT 2 position only if the effect of this action has been analyzed and it has been determined that it will NOT reduce overall safety of the units. ☐

2.1.9 One diesel at a time should be unloaded and returned to standby. ☐

2.1.10 1-2A, 1B and 2B Diesels have a potential vibration harmonic at ~350 RPM and shall NOT be allowed to remain at this speed. ☐

2.1.11 At low speed, all diesel automatic trips are disabled, with the exception of the Engine Start Failure trip. ☐

2.1.12 IF the diesel is started following an event from which the diesel was secured, that was NOT in accordance with the normal shutdown process, i.e., unloaded, 60 HZ, 4160V, THEN, the as left configuration of the electronic governor may NOT allow the governor to respond as expected when energized as part of the slow start section. **CR 491547** ☐

2.1.13 Diesel generators 1-2A, 1C and 2C are each connectable to both Units 1 and 2. In all design basis events, diesel generators 1-2A and 1C are assigned to only one unit, depending on the type of event. MCC 1S is dedicated to the diesel generator 1-2A auxiliaries. This MCC can be connected to either Unit 1 dedicated 600 V LC 1D through 600 V LC breaker ED13-1 or Unit 2 dedicated 600 V LC 2D through 600 V LC breaker ED13-2. The 600 V LC breakers ED13-1 and ED13-2 are electrically interlocked so that only one can be closed at any one time. This prevents paralleling of the two plant units through 600 V MCC 1S. The logic for the automatic scheme relies on the position of the Unit 1 and Unit 2 diesel generator 1-2A breakers (DF08-1 and DF08-2). If DF08-1 closes, ED13-2 opens (if it is closed at the time of the event) and ED13-1 closes (if it is open at the time of the event), and vice versa if DF08-2 closes. If load center 1D or 2D are being powered by the alternate source off the 1F or 2F load centers this transfer will not occur. If 1-2A diesel is started and aligned to Unit 1 and 2D load center is on the alternate source, the transfer of 1S MCC will not occur if subsequently 1-2A diesel is place on Unit 2. If 1-2A diesel is started and aligned to Unit 2 and 1D load center is on the alternate source the transfer of 1S MCC will not occur if subsequently 1-2A diesel is place on Unit 1. (CR2007112287) ☐

2.1.14 MCC 1N is dedicated to the diesel generator 1C auxiliaries. This MCC is connected to shared LC 1R through the normally closed breaker ER03. Load center 1R can be connected to either Unit 1 4.16 kV bus 1H through 600 V LC breaker ER02, station service transformer 1R and the Unit 1 4.16 kV breaker DH08-1 or Unit 2 4.16 kV bus 2H through 600 V LC breaker ER05, station service transformer 2R and the Unit 2 4.16 kV breaker DH08-2. The 4.16 kV breakers DH08-1 and DH08-2 are normally closed. The 600 V LC breakers ER02 and ER05 are electrically interlocked so that only one can be closed at any one time. This prevents paralleling of the two plant units through 600 V LC 1R. ☐

2.1.15 MCC 1P is dedicated to the diesel generator 2C auxiliaries. This MCC is connected to shared LC 1S through the normally closed breaker ES03. Load center 1S can be connected to either Unit 1 4.16 kV bus 1J through 600 V LC breaker ES02, station service transformer 1S and the Unit 1 4.16 kV breaker DJ07-1 or Unit 2 4.16 kV bus 2J through 600 V LC breaker ES05, station service transformer 2S and the Unit 2 4.16 kV breaker DJ07-2. The 600 V LC breakers ES02 and ES05 are electrically interlocked so that only one breaker can be closed at any one time. This prevents paralleling of the two plant units through the 600 V LC 1S. ☐

2.1.16 1-2A Diesel will transfer to isochronous control if an auto start signal is present (an SI in either unit or UV condition on 1F or 2F bus). In most cases, 1-2A Diesel would NOT remain paralleled to the bus. If the transfer to isochronous control is due to an SI without LOSP or LOSP on Unit 1(2) while paralleled to Unit 2(1), 1 2A Diesel will remain paralleled to the bus, requiring prompt operator action to minimize potential for DG damage. ☐

2.1.17 1C Diesel will transfer to isochronous control if an auto start signal is present (an SI in either unit or UV condition on 1H or 2H bus). In most cases, 1C Diesel would NOT remain paralleled to the bus. If the transfer to isochronous control is due to 1H (2H) bus undervoltage while paralleled to 2H(1H) bus, 1C Diesel will remain paralleled to the bus, requiring prompt operator action to minimize potential for DG damage. ☐

2.1.18 Minimum lube oil temperature for diesel generator operability is 90 °F. ☐

2.1.19 The minimum jacket water temperature for diesel generator operability is 80 °F. ☐

2.1.20 At no time shall the nitrite solution in the diesel generator coolant system be discharged into floor drains or any other receptacles without prior authorization from Chemistry Supervision. ☐

2.1.21 The pH of the Jacket Water is slightly caustic and contact with the skin should be avoided. If contact with the skin does occur flush with plain water immediately. ☐

2.1.22 ACC has placed, or verified, the following capacitor banks in MANUAL prior to synchronizing a diesel generator to the grid.

- Webb Sub Station Capacitor Bank ☐
- Farley 230 KV Switchyard Capacitor Bank ☐

2.1.23 The Environmental Protection Agency (40CFR63.6640(f)) has established annual runtime limits on emergency diesels. Annual runtimes shall be tracked by SNC Environmental Services. Prior to starting an emergency diesel for any purpose other than those specifically listed below, the Site Environmental Specialist shall be contacted during normal working hours or the SNC Environmental Services (on-call) shall be contacted (205-288-2064) to ensure compliance with EPA Guidelines. ☐

- Surveillance testing.
- Functional testing.
- Maintenance runs.
- An actual emergency / auto start to perform its intended function.

2.2 LIMITATIONS

2.2.1 FNP-0-SOP-38.0 ATTACHMENT A, GUIDELINES FOR RETURNING A DIESEL TO SERVICE FOLLOWING A MAINTENANCE OUTAGE, should be referenced for guidance on returning a diesel to service following maintenance. ☐

2.2.2 FNP-0-SOP-38.0 APPENDIX 3, DG START/RUN DATA, shall be filled out for any diesel run, i.e., STP, maintenance run, auto start, etc. ☐

2.2.3 Information for each start or attempted start should be provided to the DG system engineer for inclusion in the DG Run Log. ☐

2.2.4 In order to maintain availability of the D/G with the speed setter set at something less than the max setting, an operator must be responsible to raise the speed setter back to the max setting in the event the diesel receives an auto start signal. The designated person must remain in the D/G building the entire time the speed setter is less than the max setting. ☐

2.2.5 It is important to expeditiously raise load to ≈ 50 kW after breaker closure to prevent a reverse power trip. If the switch for the output breaker and the governor motor switch are physically far apart, consideration should be given to utilizing two operators for performing those applicable procedure steps. **{OR 1-2000-282}** ☐

2.2.6 Prior to diesel generator shutdown, the voltage regulator must be set at 4160V and frequency set at 60 Hz to ensure proper voltage and frequency is established when the diesel is aligned for automatic standby operation. **{CMT 0003878}** ☐

2.2.7 During load changes on a diesel, the GOVERNOR MOTOR switch should NOT be bumped more frequently than every 3 seconds, and preferably NOT more than once every 5 seconds. **{OR 1-97-375}** ☐

2.2.8 To minimize possibility of exhaust manifold fires, diesel generators should be loaded to rated load for at least one hour each time they are started, when practicable. This guidance is general in nature and does NOT hold for operation of a diesel generator under any surveillance test procedure (where special test conditions may exist). ☐

2.2.9 When diesels are operated under low load conditions, there is a potential for the accumulation of combustion and lubrication products in the exhaust system. Any time it becomes necessary to operate a diesel at less than 30% of full load for more than twelve hours, action should be taken to run the diesel at greater than 50% of full load for at least one hour in each twelve hour period. ☐

2.2.10 Table 2 of FNP-0-SOP-38.0 provides diesel loading restrictions when service water temperature is > 92°F. ☐

2.2.11 When manipulating Service Water vents and drains, be cognizant of the following: “Pipe internals can be potentially degraded. Proceed with caution. Do not subject vent/drain piping to any undue stress during removal of pipe cap/plug.” **{AI 2009202698}** ☐

2.2.12 The diesel room ventilation fans are credited for long term operation of the diesels during design basis accident conditions, and are considered attendant equipment for Tech Spec and NRC performance indicator purposes. IF the diesel room ventilation fans are placed in "OFF", THEN the LCO RAS MUST be entered for that diesel. However, manual operator action can be credited for maintaining a diesel available if appropriate administrative controls are established. Refer to FNP-0-SOP-43.0, DIESEL GENERATOR BUILDING HVAC for guidance on operation of DG Room Ventilation. ☐

2.2.13 The generator exciter can only be reset at the DLCP. ☐

2.2.14 2C Diesel output breaker will open when 2C Diesel is placed in MODE 2 if DG01 and DG15 for either unit are both open. ☐

2.2.15 The tolerance for calibrating DG watt meters on the control room EPB is ± 120 Kw. ☐

2.2.16 1C and 2C DG's normally should be barred over after each operation. The requirement for barring can be waived with the concurrence of the applicable manager if any of the following are true:

- The diesel will be restarted within the next 24 hours (SM). ☐
- Refueling outages on either unit are in progress (SM). ☐
- Taking the D/G out of service will cause an increased plant risk (OPS Manager). ☐

2.2.17 If 1C or 2C Diesel were started with lube oil temperature ≤ 85°F, engine speed should be reduced as necessary to keep lube oil pressure, as indicated by the gauge on the gauge panel, < 55 psig until lube oil is warmed up. ☐

2.2.18 If starting diesel engine 1C or 2C AND oil temperature decreases to less than 100°F AND the keep warm lube oil system is in service (i.e., the circulating oil pump is running), cylinders shall be blown down and the engine barred over prior to starting. ☐

2.2.19 1C and 2C Diesel circulating oil pump circuitry has a time delay such that the pump will NOT start until 10 minutes after the diesel is shutdown. ☐

2.2.20 Chemistry should be notified to obtain a jacket water sample for analysis anytime a makeup, feed and bleed or in-leakage will dilute the nitrite concentrations in the jacket water system. ☐

2.2.21 The following apply to diesel generator lube oil strainers:

- Lube oil strainers should be shifted when ΔP across the on-service lube oil strainer exceeds 12 psid for 1-2A, 1B and 2B Diesels OR 15 psid for 1C and 2C Diesels**.{CMT 0003869}** ☐
- Lube oil strainer ΔP limits apply when the lube oil temperature is at normal operating steady state conditions. **{AI 2007200776}** ☐
- The Lube Oil Strainer ΔP will go up more rapidly if the crankcase oil has been replaced. This is due to the reaction of the detergents in the new oil and the sludge formations in the engine from carbon deposits. ☐
- Notify the Emergency Diesel Generator Maintenance Engineer or the System Engineer whenever there is a sudden increase in differential pressure during an engine run and whenever strainers are shifted **{AI 2007200776}** ☐

2.2.22 Various DG capacities are provided in the table below. The associated number of drums referenced serves as an estimate only, and should NOT be relied on exclusively during filling or draining operations. Close monitoring is required to prevent overfill and subsequent spilling. **{AI 2003201168, AI 2003202529}** ☐

VARIOUS DG CAPACITIES		
SYSTEM	GALLONS	DRUMS
DGs 1-2A, 1B, & 2B		
Total Lube Oil	1320	24
Engine & Oil Pan Lube Oil	845	~ 15.4
Jacket Water	430	NA
DGs 1C & 2C		
Total Lube Oil	440	8
Engine & Oil Pan Lube Oil	~ 250	~ 4.5
Jacket Water	400	NA
DGs 1-2A, 1B, 2B, 1C, & 2C		
Jacket Water Surge Tank (full)	100	NA

2.2.23 Hoses used to transfer lube oil should have their connections bagged to minimize the potential for a spill in the event the hose connections were to leak. ☐

2.2.24 Anytime the auxiliary jacket water pump on a diesel is run while it is shutdown, the diesel is inoperable and an LCO shall be initiated. Also, the engine shutdown reset pushbutton on the diesel local control panel (DLCP) shall be reset after the auxiliary jacket water pump is secured to clear the emergency shutdown relay. **{CMT 0006909}** ☐

3.0 INITIAL CONDITIONS

3.1 The electrical distribution system is energized and aligned for normal operation per FNP-1-SOP-36.0, PLANT ELECTRICAL DISTRIBUTION LINE-UP, and FNP-2-SOP-36.0, PLANT ELECTRICAL DISTRIBUTION LINE-UP, with exceptions noted.

3.2 The diesel generator system valves and electrical distribution systems are aligned per System Check List FNP-0-SOP-38.0A (B, C, D and E) with exceptions noted.

3.3 The service water system is in service and aligned for normal operation per FNP-1-SOP-24.0, SERVICE WATER SYSTEM, and FNP-2-SOP-24.0, SERVICE WATER SYSTEM, with exceptions noted.

3.4 Diesel building HVAC is in service per FNP-0-SOP-43.0, DIESEL GENERATOR BUILDING HVAC, with exceptions noted.

3.5 The diesel building fire protection system is aligned per FNP-0-SOP-61.3, FIRE PROTECTION - LOW PRESSURE CO_2 SYSTEMS, with exceptions noted.

3.6 Diesel generator fuel oil storage and transfer system is in operation per FNP-0-SOP-42.0, DIESEL GENERATOR FUEL OIL STORAGE AND TRANSFER SYSTEM, with exceptions noted.

3.7 IF a diesel generator start is being performed, THEN SS has determined the type of start required. For the final maintenance start performed at the conclusion of major maintenance on 1-2A, 1B, 2B and 1C DGs a ‘fast speed start’ would typically be used to fully exercise the diesel functions. Guidance for surveillance starts is contained in the appropriate surveillance test procedure. Other routine operational starts would typically be ‘slow speed’ starts to minimize diesel wear.

3.8 IF a diesel generator is to be loaded, THEN ACC has placed the following capacitor banks in manual prior to the generator being synchronized to the grid.

- Webb Sub Station Capacitor Bank ☐
- Farley 230 KV Switchyard Capacitor Bank ☐

4.0 INSTRUCTIONS

4.1 IF the task involves operation of the 1-2A Diesel Generator and auxiliaries, THEN **Go To** FNP-0-SOP-38.0-1-2A**.**

4.2 IF the task involves operation of the 1B Diesel Generator and auxiliaries, THEN **Go To** FNP-0-SOP-0-38.0-1B.

4.3 IF the task involves operation of the 1C Diesel Generator and auxiliaries, THEN **Go To** FNP-0-SOP-0-38.0-1C.

4.4 IF the task involves operation of the 2B Generator Diesel and auxiliaries, THEN **Go To** FNP-0-SOP-0-38.0-2B.

4.5 IF the task involves operation of the 2C Generator Diesel and auxiliaries, THEN **Go To** FNP-0-SOP-0-38.0-2C

5.0 RECORDS

Documents created using this procedure will become QA Records when completed unless otherwise stated. The procedures and documents are considered complete when issued in DMS.

QA Record (X)	Non-QA Record (X)	Record Generated	Retention Time	R-Type
X		FNP-0-SOP-38.0	Life of Plant	HH6.051

6.0 REFERENCES

6.1 PROCEDURES

6.1.1 U-184852 - Service Manual Colt Industries 4075 kW DGs.

6.1.2 U-184804 - Service Manual Colt Industries 2850 kW DGs.

6.1.3 FSAR - Chapter 8 Section 8.3.1.1.7

6.1.4 NDS-90-2003, Diesel Fuel Oil Storage Tank Capacity

6.1.5 A-181001, Service Water System Functional System Description

6.1.6 FNP-0-SOP-0.7, General Instructions for Filling Out DG Test Data Logs and the DG Reliability Program

6.1.7 A-181005, Diesel Generator System Functional System Description

6.1.8 DCP C050889101, 2C Emergency Diesel Generator (EDG) Governor Upgrade.

6.2 DRAWINGS

6.2.1 D-172774 - Elementary Diagram Diesel Generator 1-2A Start, Stop & Shutdown.

6.2.2 D-172772 - Elementary Diagram, Diesel Generator 1C Start, Stop & Shutdown.

6.2.3 D-177033 - Logic Diagram Diesel 1-2A Auto Start & Loading.

6.2.4 D-177036 - Logic Diagram Diesel 1C Auto Start & Loading.

6.2.5 D-172860 - Motor Control Center 1N

6.2.6 D-172861 - Motor Control Center 1P

6.2.7 D-172862 - Motor Control Center 1S

6.2.8 D-172863 - Motor Control Center 1T

6.2.9 D-202539, 40, 41, 42 - MCC 2T

6.2.10 D-177032 - Logic Diagram Diesel 1B Auto Start & Loading.

6.2.11 D-177037 - Logic Diagram Diesel 2C Auto Start & Loading.

6.2.12 D-170119, D-200013, Sheet 3 or 6 - River Water, Service Water and Circulating Water Systems

6.2.13 D-170800 through D-170809, (200209-200213) - Diesel Air Start, Lube Oil, and Cooling Water Systems

6.2.14 D-170849 - P&ID Diesel Coolant Storage System.

6.2.15 D-207032 - Logic Diagram Diesel 2B Auto Start & Loading.

END OF PROCEDURE TEXT

TABLE 1

1-2A, 1B, 2B Jacket Water System Drain Points

Valve Name	1-2A	1B	2B
J. W. HX SHELL SIDE DRN	QSR43V670	Q1R43V547	Q2R43V547
INTER-COOLER HX SHELL SIDE DRN	QSR43V713	Q1R43V560	Q2R43V560
AUX J. W. HDR DISCH DRN ISO	N/A	Q1R43V886	Q2R43V617
J. W. DISCH HDR DRN	QSR43V766	N/A	N/A
AUX J. W. PUMP SUCT DRN ISO	Q1P21V535	Q1P21V537	Q2P21V537
AUX J. W. PUMP DISCH DRN ISO	Q1P21V536	Q1P21V538	Q2P21V538
AUX J. W. PUMP SUCT VENT ISO	Q1P21V541	Q1P21V539	Q2P21V539
AUX J. W. PUMP DISCH VENT	Q1P21V542	Q1P21V540	Q2P21V540

1C, 2C Jacket Water System Drain Points

Valve Name	1C	2C
J. W. HX SHELL SIDE DRN	QSR43V570	QSR43V554
AIR COOLANT HX SHELL SIDE DRN	(Note 1) QSR43V698	(Note 2) QSR43V697
J. W. SUPP HDR DRN	QSR43V735	QSR43V734
AUX J. W. PUMP SUCT HDR DRN	Q1P21V531	Q1P21V533
AUX J. W. PUMP DISCH HDR DRN	Q1P21V532	Q1P21V534
AUX J. W. PUMP SUCT VENT ISO	Q1P21V543	Q1P21V545
AUX J. W. PUMP DISCH VENT ISO	Q1P21V544	Q1P21V546
J. W. HX BYP LINE DRN	QSR43V569	QSR43V553
P512 PUMP SUCT HDR DRN VLV 1C DG	(Note 1) QSR43V889	N/A
P511 PUMP SUCT HDR DRN	N/A	(Note 2) QSR43V891
ENGINE DRIVEN AIR COOLANT PUMP SUCT DRN	(Note 1) QSR43V704	(Note 2) QSR43V703

Note 1 Valve is in series with 1C D/G Coolant Drn Hdr Iso, QSR43V890, which must also be open to allow draining. ☐

Note 2 Valve is in series with 2C D/G Coolant Drn Hdr Iso, QSR43V892, which must also be open to allow draining. ☐

TABLE 2

NOTE
When operating a diesel with service water supply temperature > 92°F, the following loading limits should be observed.

"Continuous Rating"			
Service Water Temperature	**Intercooler Water Temperature**	**Deration Factor**	**Allowable KW without exceeding DG Rating**
1B, 2B Diesel Deration @ 4075 KW			
97.3 °F	120.0 °F	0.0 %	4075 KW
106.2 °F	128.7 °F	1.18 %	4027 KW
1-2A Diesel Deration @ 4075 KW			
97.3 °F	121.5 °F	0.20 %	4067 KW
106.2 °F	130.2 °F	1.38 %	4018 KW
1C, 2C Diesel Deration @ 2850 KW			
97.3 °F	120.0 °F	0.0 %	2850 KW
106.2 °F	128.5 °F	1.15 %	2817 KW

TABLE 2

"2000 Hour Rating"			
Service Water Temperature	**Intercooler Water Temperature**	**Deration Factor**	**Allowable KW without exceeding DG Rating**
1B, 2B Diesel Deration @ 4353 KW			
97.3 °F	123.9 °F	0.53 %	4330 KW
106.2 °F	132.5 °F	1.69%	4279 KW
1-2A Diesel Deration @ 4353 KW			
97.3 °F	125.7 °F	0.77 %	4320 KW
106.2 °F	134.3 °F	1.93%	4269 KW
1C, 2C Diesel Deration @ 3100 KW			
97.3 °F	125.0 °F	0.68 %	3079 KW
106.2 °F	129.0 °F	1.81%	3044 KW

FIGURE 1

FNP Diesel Generator
Units 1-2A, 1B, 2B
Generator Capability

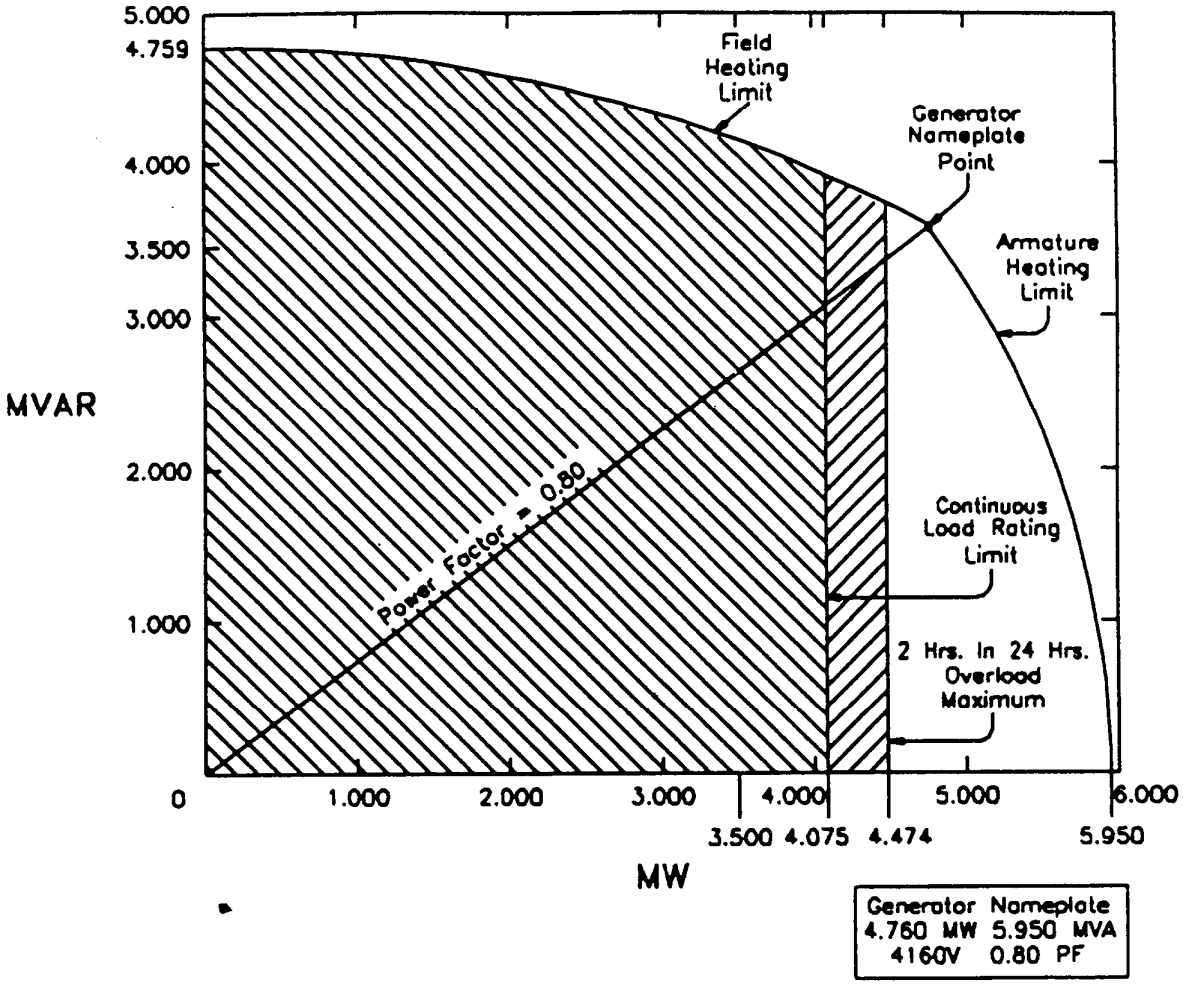
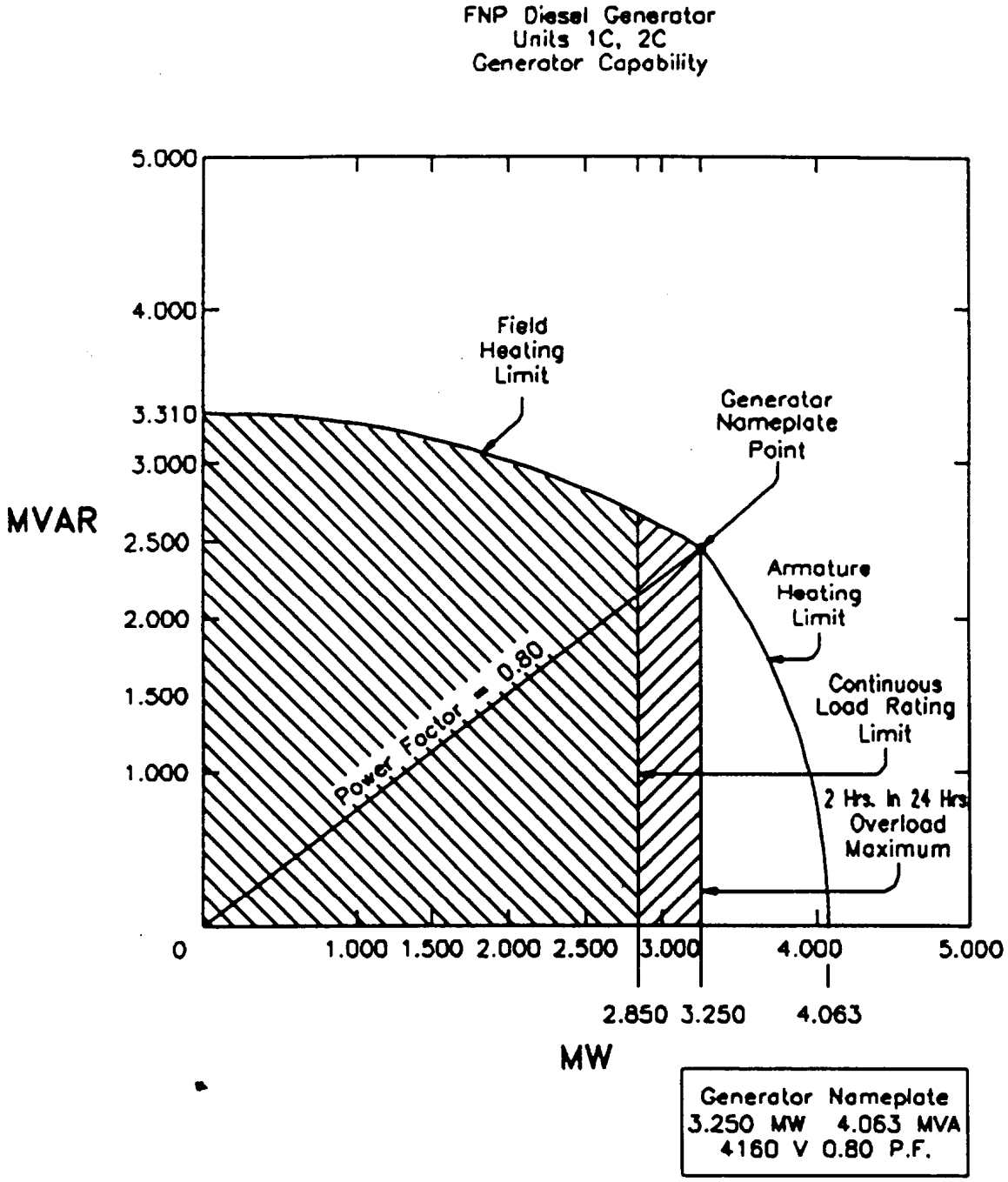


FIGURE 2


FNP Diesel Generator
Units 1C, 2C
Generator Capability
MVAR
5.000
4.000
3.310
3.000
2.500
2.000
1.500
1.000
0
Field Heating Limit
Generator Nameplate Point
Armature Heating Limit
Continuous Load Rating Limit
2 Hrs. in 24 Hrs. Overload Maximum
Power Factor = 0.80
1.000 1.500 2.000 2.500 3.000 4.000 5.000
2.850 3.250 4.063
MW
Generator Nameplate
3.250 MW 4.063 MVA
4160 V 0.80 P.F.

ATTACHMENT A

GUIDELINES FOR RETURNING A DIESEL TO SERVICE FOLLOWING A MAINTENANCE OUTAGE

1.0 Frequently, maintenance activities on Diesels require the performance of diesel generator starting and loading. This operation of the diesels may be necessary to allow running adjustments as part of the maintenance procedure. As such, a maintenance start should be performed following maintenance which requires such checks. Acknowledgment of diesel maintenance starts must be made and properly documented prior to the associated diesel start. Maintenance activities which would invoke maintenance starts include quarterly and 18 month preventive maintenance and any maintenance which works on any control function of the diesel (such as work on governor, fuel rack systems or air start systems). These maintenance starts should normally include the closure of the output breaker and loading of the diesel to allow adjustment of the control systems during loaded operations. The return to service surveillance should be performed upon successful completion of all maintenance activities including required maintenance starts and loading. The on-call Emergency Director should be called if there is any question as to whether a maintenance start or return to service surveillance should be performed.

2.0 All maintenance starts should be performed using SOP-38.0 for guidance. Timing the start should be done for the purpose of gathering information. Normally, the maintenance start is expected to be performed as a dual header start.

3.0 Any time the diesel generator has been tagged out and the generator output breakers have been racked out, the output breakers should be closed to demonstrate diesel operability for the applicable unit. This can be accomplished during the maintenance run provided it is appropriately documented in the operators log book.

4.0 Any time a diesel generator has been tagged out of service for major maintenance a full load maintenance run should be performed. This allows a comprehensive review of diesel generator performance at expected operating conditions to make final adjustments to engine parameters (e.g., governor settings) prior to attempting a surveillance run.

5.0 Any time maintenance has been performed on an air start system during a diesel generator outage, a single header start is required on the applicable header. When no maintenance has been performed on the air systems, the Shift Supervisor should determine if it is necessary to perform single header starts on both air headers. After a satisfactory maintenance run on a diesel generator, justification for not performing two single header starts during the return to service STP must be documented in the applicable STP review sheet.

ATTACHMENT B

DIESEL LUBE OIL REMOVAL AND REPLACEMENT GUIDANCE
{IR # 1-96-143}

WARNING
Transferring lube oil from a diesel is an evolution that requires close monitoring to prevent overfilling of drums and subsequent spilling. ☐

NOTES
- New oil is the normal source of make up to the diesel lube oil sump. ☐
- All new oil in 55 gallon drums must be filtered prior to use. (Ref FNP-0-GMP-30.1 APP F) ☐
- A predetermined amount of oil removed from the diesel during maintenance or lube schedule may be reused in the diesel it came from. ☐
- Satisfactory sample analysis and filtering is required prior to reusing diesel lube oil. ☐
- Reusable or new oil may be added to a shutdown diesel. New oil shall be added to a running diesel. ☐
- 1-2A, 1B and 2B lube oil heat exchangers do NOT drain to the diesel lube oil sump. They must be drained independently. ☐
- Any hoses used to transfer lube oil should have their connections bagged to minimize the potential for a spill in the event the hose connections were to leak. ☐
- Consideration should be given to replacing the oil transfer pump filter prior to draining lube oil. ☐
- Facilities should be contacted ASAP to move full oil drums out of the DB (greater than 30 feet from the building) and to ensure drums are covered to prevent potential contamination from rain water. ☐

6.0 If a complete drain of lube oil is desired, the filter vents and strainer vent will have to be opened.

7.0 Potentially reusable oil should be placed in lined open topped drums, or new drums, and labeled per NMP-SH-012, HAZARD COMMUNICATION PROGRAM.

ATTACHMENT B

DIESEL LUBE OIL REMOVAL AND REPLACEMENT GUIDANCE
{IR # 1-96-143}
Page 2 of 2

8.0 Potentially reusable oil drums shall be caution tagged closed. The caution tags shall have wording to the effect of “Oil on hold, awaiting sampling”.

9.0 Potentially reusable oil shall be sampled and analyzed for acceptability prior to reuse.

10.0 If sample results indicate oil is unacceptable for reuse, non-reusable oil drums should be labeled as “used oil -unacceptable for reuse”.

11.0 FAC should be contacted to remove and properly dispose of oil unacceptable for reuse as soon as possible, preferably the same shift.

12.0 Oil drums that are unacceptable for reuse should be kept separated from oil drums that are acceptable for reuse.

13.0 If sample results indicate oil is acceptable for reuse, reusable oil drums should be caution tagged with wording to the effect of “Acceptable for reuse in [insert the diesel that the oil came from here]”.

14.0 Oil deemed acceptable for reuse must be filtered prior to adding to the diesel lube oil sump.

15.0 Propping open fire doors and temporarily storing combustibles outside a diesel room should be reported to the Fire Protection Administrator.

ATTACHMENT C

DIESEL GENERATOR FUEL OIL CONSUMPTION

NOTE
The information in the table below provides the run time that can be expected under three different diesel operating configurations assuming maximum loading and minimum initial storage tank level. This can be used to assess replenishment requirements. ☐

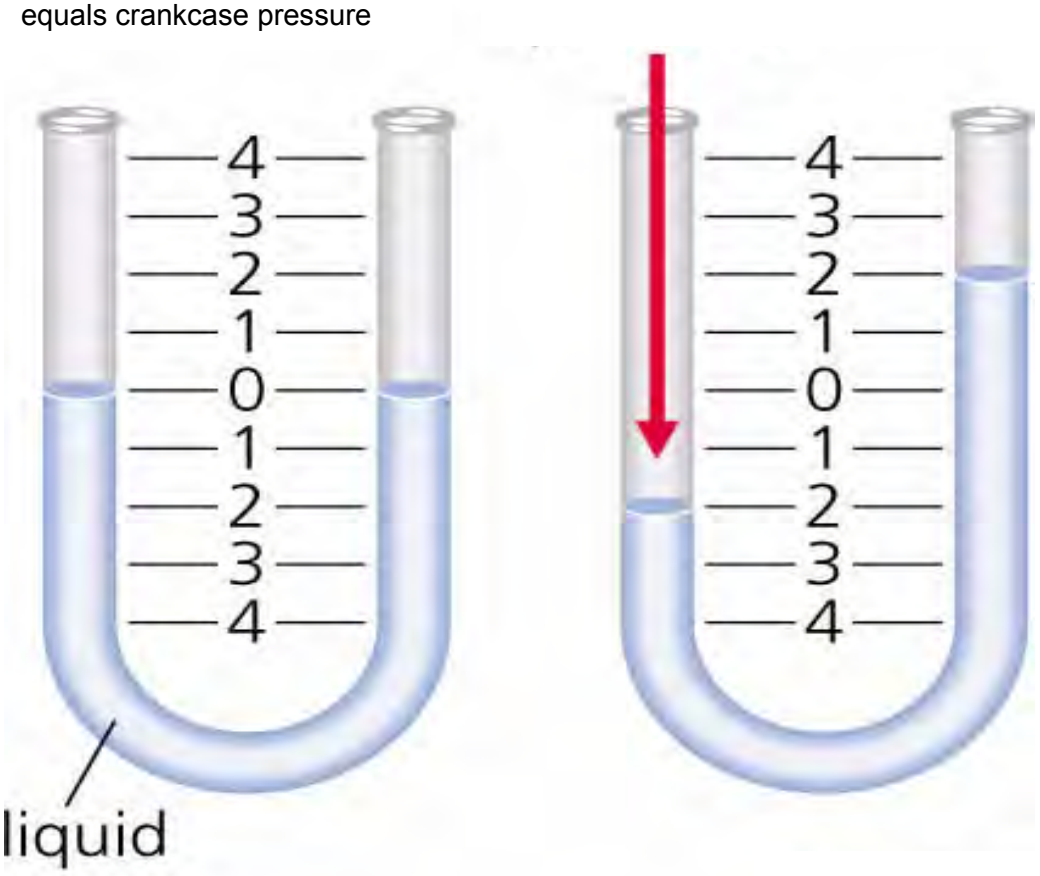
Diesels Running	Storage Tanks Available	Load	Run Time	*Consumption Rate
2 Large, 1 Small	4 (init. level 68%)	Max	5 1/4 days	807 gal/hr
3 Large, 1 Small	4 (init. level 68%)	Max	3 3/4 days	1104 gal/hr
3 Large, 2 Small	5 (init. level 68%)	Max	4 days	1317 gal/hr

* Consumption rates compute to an average per diesel of 297 gal/hr for 1-2A, 1B, and 2B Diesels (Large Diesels) and 213 gal/hr for 1C and 2C Diesels (Small Diesels) under maximum load**. {CR 2000-044 and REA 98-1637}**

ATTACHMENT D

READING DIESEL GENERATOR CRANKCASE VACUUM MANOMETER

The following discussion and examples is intended to remove confusion which may exist concerning how to read the crankcase manometer installed on each of the emergency diesel generators.



In the example illustrated above, to calculate the pressure measured by this application, the readings above and below zero are added; with the result being 4. It is important to note the "At rest" reading of the manometer, in this example, 0.

ATTACHMENT D

READING DIESEL GENERATOR CRANKCASE VACUUM MANOMETER

A recent field trip to the Diesel Building (all EDG's secured) to ascertain the "At rest" manometer readings obtained the following information:

The manometer readings were:

- 1-2A D/G -0.3 -0.3
- 1C D/G -1.7 -1.8
- 2B D/G -2.4 -2.4
- 1B D/G -0.4 -0.4
- 2C D/G 0.0 -0.2

The conclusion to be made from these readings is the manometers are low on operating fluid.

The important fact to realize is the "At rest" manometer reading, because both legs will use this as the point of reference for determining a value for crankcase vacuum when the diesel is in operation. To correctly calculate crankcase vacuum, determine the *ALGEBRAIC DIFFERENCE* between the two readings. The **left** leg (atmosphere) minus the **right** leg (crankcase). The resultant *ALGEBRAIC DIFFERENCE* is the crankcase pressure reading that should be recorded in the logs. Hopefully, this is a negative number, indicating a vacuum.

During routine D/G operations, a trend of the crankcase pressure would be helpful in determining the condition of the cylinders. To obtain a manometer reading, perform the following action: Left leg minus right leg.

Examples of hypothetical readings:

	LEFT	minus	RIGHT	=	Reading	What it means.
1	-1.7	-	-1.4	=	-0.3	Indicates crankcase vacuum.
2	-1.7	-	1.7	=	-3.4	Indicates crankcase vacuum.
3	1.7	-	-1.7	=	3.4	Indicates potential cylinder blow-by.
4	-3.6	-	-1.3	=	-2.3	Indicates crankcase vacuum.
5	1.5	-	0.5	=	1.0	Indicates potential cylinder blow-by.

ATTACHMENT D

READING DIESEL GENERATOR CRANKCASE VACUUM MANOMETER

NOTE
IF this page is revised, THEN ensure operator aid is updated. ☐

READING DIESEL GENERATOR
CRANKCASE VACUUM MANOMETER

- Crankcase vacuum is read by viewing levels in both legs of the manometer and calculating the algebraic difference in fluid level to obtain the value for crankcase vacuum.
- The right-hand side of the manometer is the crankcase side of the gauge. A higher column of fluid on this side indicates a vacuum in the crankcase.
- The left-hand side of the manometer is the atmospheric side. A higher column of fluid on this side indicates the crankcase is pressurized.
- Subtract the right hand side from the left hand side to obtain log reading.

Ref. SOP-38.0

This Operator Aid is found on the following diesel gauge boards:

1-2A Diesel
1C Diesel
2B Diesel
1B Diesel
2C Diesel

APPENDIX 1

LOADING/UNLOADING GUIDANCE
FOR 1C AND 2C DIESEL GENERATORS

Page 1 of 1

NOTES

- The values in parenthesis following the MW load hold points correspond to approximate EPB ammeter readings for that load. Major deviations from these values should be investigated. {OR 2-97-314 and CMT 0003868} ☐
- When changing loads on a diesel, MVARs must be kept within the limits of Figure 2. ☐
- Fuel rack stop settings for Diesel Generators 1C and 2C have been increased from 112% to 120% in order to restore sufficient margin for EDG response during worst case dynamic loading. Exercise caution when loading and unloading DG 1C or 2C to ensure load on the DG remains within procedural guidance. ☐
- During D/G load changes, at each specified point, the D/G load shall be monitored to check for any drift in monitored parameters. ☐

1.0 Loading:

1.1 **Slowly increase** load to desired load up to 2850 kW (400-450 amps) with the following requirements:

- **Maintain** load at 1000 kW (160-185 amps) for 15 minutes. ☐
- **Maintain** load at 1500 kW (220-275 amps) for 15 minutes. ☐
- **Maintain** load at 2000 kW (300-330 amps) for 15 minutes. ☐
- **Maintain** load at 2500 kW (360-390 amps) for 15 minutes. ☐

2.0 Unloading:

2.1 **Slowly decrease** load with the following requirements:

2.1.1 IF load is > 1500 kW, THEN **Slowly decrease** load to 1500 kW and **maintain** load for 15 minutes. ☐

2.1.2 **Slowly decrease** load below 1500 kW. ☐

2.1.3 **Perform** the following:

2.1.3.1 **Go To** Step 4.5.11 in FNP-0-SOP-38.0-1C if unloading 1C DG. ☐

2.1.3.2 **Go To** Step 4.5.12 in FNP-0-SOP-38.0-2C if unloading 2C DG. ☐

APPENDIX 2

LOADING/UNLOADING GUIDANCE FOR 1-2A, 1B AND 2B DIESEL GENERATORS

Page 1 of 1

NOTES

- The values in parenthesis following the MW load hold points correspond to approximate EPB ammeter readings for that load. Major deviations from these values should be investigated. {OR 2-97-314 and CMT 0003868} ☐
- When changing loads on a diesel, MVARs must be kept within the limits of Figure 1. ☐
- Fuel rack stop settings for Diesel Generator 1-2A and 2B have been increased from 112% to 120% in order to restore sufficient margin for EDG response during worst case dynamic loading. Exercise caution when loading and unloading DG 1-2A and 2B to ensure load on the DG remains within procedural guidance. ☐
- During D/G load changes, at each specified point, the D/G load shall be monitored to check for any drift in monitored parameters. ☐

1.0 Loading:

1.1 IF loading 1-2A, 1B or 2B Diesel Generator, PERFORM the following:

Slowly increase load to desired load up to 4075 kW (570-630 amps) with the following requirements:

- **Maintain** load at 1000 kW (150-200 amps) for 15 minutes. ☐
- **Maintain** load at 2000 kW (300-350 amps) for 15 minutes. ☐
- **Maintain** load at 3000 kW (425-475 amps) for 15 minutes. ☐
- **Maintain** load at 3500 kW (480-530 amps) for 15 minutes. ☐

2.0 Unloading:

2.1 IF unloading 1-2A, 1B or 2B Diesel Generator, PERFORM the following:

2.1.1 IF load is > 2000 kW, THEN **Slowly decrease** load to 2000 kW and **maintain** load for 15 minutes. ☐

2.1.2 **Slowly decrease** load below 2000 kW. ☐

2.1.3 **Perform** the following:

2.1.3.1 **Go To** Step 4.5.12 of FNP-0-SOP-38.0-1-2A if unloading 1-2A DG. ☐

2.1.3.2 **Go To** Step 4.5.12 of FNP-0-SOP-38.0-1B if unloading 1B DG. ☐

2.1.3.3 **Go To** Step 4.5.12 of FNP-0-SOP-38.0-2B if unloading 2B DG. ☐

APPENDIX 3

DG START/RUN DATA

DG STARTED _____.

DATE/TIME STARTED _____

Performed by:_____

Shift Supervisor Review (EPB Logs Reviewed):

_____ (SS)

Shift Support Supervisor Review (Diesel Bldg Diesel Run Logs Reviewed):

_____ (SSS)

Copy of this Attachment sent to Diesel System Engineer or the System Engineer Supervisor for DGs:

_____(SSS)

Data Recorded in appropriate Unit's Control Room log using the Diesel Start Data (SOP-38) stamp:

_____(SSS)

This appendix consists of 9 pages.

1.0 **Verify** the version of this procedure is the current version**. {OR 1-98-498}** _____

2.0 **Identify** the reason for starting the Diesel Generator. (Check the appropriate box)

- **Scheduled surveillance** ☐

  FNP-___-STP-_____ Cover Page Date/Time stamp: _____

- **STP performed after maintenance to verify operability.** ☐

  FNP-___-STP-_____ Cover Page Date/Time stamp: _____

- **STP performed to verify operability when other train is inoperable.** ☐

  FNP-___-STP-_____ Cover Page Date/Time stamp: _____

- **Maintenance start.** ☐

  Record document used for guidance._____

  (**Document** reason in comments section.)

- **Diesel started due to actual undervoltage not associated with testing.** ☐

  Record bus that experienced undervoltage. _____

- **Diesel started due to actual Safety Injection signal not associated with testing.** ☐

INDICATE AFFECTED UNIT		INDICATE AFFECTED TRAIN		
UNIT 1	UNIT 2	A TRAIN	B TRAIN	BOTH TRAINS

- **An FNP-0-SOP-38 Start.** ☐

  (**Document** Reason in Comments section.)

- **2C DG is started due to an actual station blackout condition.** ☐

INDICATE AFFECTED UNIT	
UNIT 1	UNIT 2

3.0 Have the Diesel Building SO **begin** Attachment 1 of this appendix. _____

NOTE
Ensure the correct information obtained by using the same IPC as the unit the DG will be tied to. ☐

4.0 **Check** the selected DG Output breaker (pre-start) IPC status OPEN. _____

5.0 **Obtain** DG START/RUN DATA as follows:

- **DG started**:(circle one) 1-2A 1C 2B 1B 2C
- **Unit DG aligned to**: (circle one) Unit 1 Unit 2 None
- **Diesel start attempt:** (circle one) Successful / Unsuccessful
- **Date / time started:** _____/_____
- **Type of Start** (circle one) SLOW FAST
- **Seconds to start:** (if timed) (N/A for slow start)

Freq	Speed	Volts	SST

- **Air Header started on:** (circle one) #1 #2 Both
- **DG Loaded:** (circle one) Yes No
- **Time Loaded above 50% Load**: _____ HH/mm

6.0 **Record** Service Water supply temperature:_____°F

NOTE
The intent of the following step is to differentiate between an IPC problem and a failure of the DG output breaker MOC switch. ☐

7.0 IF loaded, THEN **check** the selected DG Output breaker IPC status CLOSED. _____

7.1 IF the selected DG Output breaker IPC status did not change state (refer to step 4.0), THEN **dispatch** personnel to check the position of the MOC switch. _____

7.1.1 **Submit** a CR for evaluation of the problem, including all indications that may be beneficial. _____

8.0 **Record** date and time diesel loaded to at least 50% of continuous load rating (2100 Kw on 1-2A, 1B and 2B Diesels and 1500 Kw on 1C and 2C Diesels)

Date and Time _____/_____.

9.0 **Record** date and time diesel load reduced to less than 50% of continuous load rating.

Date and Time _____/_____.

NOTE
Step 10.0 is NOT applicable to maintenance starts. ☐

10.0 **Circle** either **Y** or **N**:

Y	**N**	Start resulted from automatic real signal-actual bus undervoltage (not caused by preplanned test or maintenance sequence) or actual safety injection (caused by plant parameters reaching setpoints, manually initiated safety injection, inadvertent - not preplanned - safety injection).
Y	**N**	Start resulted from manual real signal - purposefully started due to need for emergency power to a bus.
Y	**N**	Start resulted from preplanned test (STP) or maintenance sequence.
Y	**N**	Diesel loaded to at least 50% of continuous load rating for at least one hour.
Y	**N**	Diesel run terminated due to preplanned test or maintenance sequence (STP was completed as written).
Y	**N**	Diesel run terminated due to operator error that does not or would not prevent the diesel from being restarted and brought to load in a few minutes without corrective action.
Y	**N**	Diesel run terminated due to inadvertent or spurious trip signal that is not operative in the emergency mode. Spurious trips refer to false or illegitimate signals such as a shorted contact or other faulty equipment that results in automatic trip. Valid trip signals due to actual condition (such as actual high crankcase pressure) are not considered inadvertent or spurious.
Y	**N**	Diesel run terminated due to malfunction of equipment not operative in the emergency mode (examples: synchronizing circuits, SST, pre-lube pump, non-shutdown alarm devices, non-essential generator protection devices).
Y	**N**	Diesel run terminated due to minor water leaks and oil leaks (fuel or lube) that would not preclude operation of the DG in an emergency.

COMMENTS: (Explanation of all abnormal occurrences, indications and alarms observed during this DG start/run or any other pertinent information.)

_____

_____

_____

_____

11.0 **Attach** the completed Attachment 1 to Appendix 3. _____

ATTACHMENT 1
INCREASED DG MONITORING DURING
MAINTENANCE AND SURVEILLANCE RUNS.

1.0 Purpose

This attachment has been developed to provide the minimum requirements for diesel generator monitoring during maintenance and surveillance runs. (S-2012-20)

2.0 Instructions

2.1 When performing DG monitoring, the following field observations shall be performed, at a minimum. ☐

- Monitor gage board parameters to include crankcase vacuum.
- Inspect for unusual operating characteristics, such as fluid leaks (fuel, JW, or oil), exhaust leaks, excessive vibrations, abnormal sounds, etc.
- Monitor temperature indications for proper response to current engine conditions.
- Monitor filter and strainer performance.
- Monitor pump performance. (discharge pressure, abnormal noise, seal leaks, etc.)
- Monitor oil levels. (engine sump, governor, turbochargers and generator)
- Monitor room ventilation. (fans, intake screens and louvers)
- Breakers and alarm panels and should be inspected for abnormal or unusual conditions.
- JW expansion tank level.

2.2 Any abnormal indications shall be brought to the attention of the Shift Supervisor for investigation and resolution. ☐

2.3 IF the DG is started following maintenance, THEN maintenance personnel shall directly observe the DG start. ☐

2.4 Operations personnel shall directly observe the DG start. ☐

2.5 Diesel operation shall be monitored locally AND at the EPB for approximately fifteen (15) minutes following DG start. ☐

2.6 Diesel operation shall be monitored locally AND at the EPB for approximately fifteen (15) minutes following each load increase (during load ascension, normally at fifteen minute intervals). This observation should be of sufficient duration to allow parameters monitored to stabilize. ☐

2.7 IF delays occur in loading the DG, THEN the DG shall be monitored locally and at the EPB at approximately thirty (30) minute intervals. ☐

2.8 At least one set of DG run logs shall be taken with the DG at full load. DG run logs shall be taken hourly for periods of extended operation. ☐

2.9 In addition to the logs normally taken, Attachment 1, Data Sheet 1 will be completed for each start/run of any DG. ☐

2.10 Mark any Data Sheet N/A for D/G not covered by this Appendix 3. ☐

2.11 For extended periods of operation, additional Data Sheets should be printed and attached as necessary. ☐

DATA SHEET 1, page 1

NOTES

Using a thermal gun, take the following temperatures at the designated/marked locations each time load is added to the DG. ☐

If any of the water temperatures exceeds 110°F, contact Engineering for guidance. ☐

If any of the water temperatures reaches 120°F, the DG should be immediately shutdown. ☐

The taking of these logs may be secured by the Shift Supervisor with engineering concurrence once the DG has reached full load and at least three sets of stable[1] temperature readings have been taken. ☐

1-2A Diesel Generator West Side	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
West Air Intercooler Water Temperature In	N/A	120°F							
West Air Intercooler Water Temperature Out	N/A	120°F							
Intercooler West Bank Air Inlet Temperature	N/A	N/A							
Intercooler West Bank Air Outlet Temperature	N/A	N/A							

1-2A Diesel Generator East Side	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
East Air Intercooler Water Temperature In	N/A	120°F							
East Air Intercooler Water Temperature Out	N/A	120°F							
Intercooler East Bank Air Inlet Temperature	N/A	N/A							
Intercooler East Bank Air Outlet Temperature	N/A	N/A							

Note 1: Stable is defined as no change greater than 3°F in temperature after two minutes of operation.

DATA SHEET 1, page 2

NOTES

Using a thermal gun, take the following temperatures at the designated/marked locations each time load is added to the DG. ☐

If any of the water temperatures exceeds 110°F, contact Engineering for guidance. ☐

If any of the water temperatures reaches 120°F, the DG should be immediately shutdown. ☐

The taking of these logs may be secured by the Shift Supervisor with engineering concurrence once the DG has reached full load and at least three sets of stable[1] temperature readings have been taken. ☐

1B Diesel Generator West Side	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
West Air Intercooler Water Temperature In	N/A	120°F							
West Air Intercooler Water Temperature Out	N/A	120°F							
Intercooler West Bank Air Inlet Temperature	N/A	N/A							
Intercooler West Bank Air Outlet Temperature	N/A	N/A							

1B Diesel Generator East Side	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
East Air Intercooler Water Temperature In	N/A	120°F							
East Air Intercooler Water Temperature Out	N/A	120°F							
Intercooler East Bank Air Inlet Temperature	N/A	N/A							
Intercooler East Bank Air Outlet Temperature	N/A	N/A							

Note 1: Stable is defined as no change greater than 3°F in temperature after two minutes of operation.

DATA SHEET 1, page 3

NOTES

Using a thermal gun, take the following temperatures at the designated/marked locations each time load is added to the DG. ☐

If any of the water temperatures exceeds 110°F, contact Engineering for guidance. ☐

If any of the water temperatures reaches 120°F, the DG should be immediately shutdown. ☐

The taking of these logs may be secured by the Shift Supervisor with engineering concurrence once the DG has reached full load and at least three sets of stable[1] temperature readings have been taken. ☐

2B Diesel Generator West Side	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
West Air Intercooler Water Temperature In	N/A	120°F							
West Air Intercooler Water Temperature Out	N/A	120°F							
Intercooler West Bank Air Inlet Temperature	N/A	N/A							
Intercooler West Bank Air Outlet Temperature	N/A	N/A							

2B Diesel Generator East Side	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
East Air Intercooler Water Temperature In	N/A	120°F							
East Air Intercooler Water Temperature Out	N/A	120°F							
Intercooler East Bank Air Inlet Temperature	N/A	N/A							
Intercooler East Bank Air Outlet Temperature	N/A	N/A							

Note 1: Stable is defined as no change greater than 3°F in temperature after two minutes of operation.

DATA SHEET 1, page 4

NOTES

Using a thermal gun, take the following temperatures at the designated/marked locations each time load is added to the DG. ☐

If any of the water temperatures exceeds 110°F, contact Engineering for guidance. ☐

If any of the water temperatures reaches 120°F, the DG should be immediately shutdown. ☐

The taking of these logs may be secured by the Shift Supervisor with engineering concurrence once the DG has reached full load and at least three sets of stable[1] temperature readings have been taken. ☐

1C Diesel Generator	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
Intercooler Water Into Air Cooler	N/A	N/A							
Scavenging Air Into Cylinders	N/A	N/A							

Note 1: Stable is defined as no change greater than 3°F in temperature after two minutes of operation.

NOTES

Using a thermal gun, take the following temperatures at the designated/marked locations each time load is added to the DG. ☐

If any of the water temperatures exceeds 110°F, contact Engineering for guidance. ☐

If any of the water temperatures reaches 120°F, the DG should be immediately shutdown. ☐

The taking of these logs may be secured by the Shift Supervisor with engineering concurrence once the DG has reached full load and at least three sets of stable[1] temperature readings have been taken. ☐

2C Diesel Generator	MIN	MAX	TIME	TIME	TIME	TIME	TIME	TIME	TIME
Description									
Intercooler Water Into Air Cooler	N/A	N/A							
Scavenging Air Into Cylinders	N/A	N/A							

Note 1: Stable is defined as no change greater than 3°F in temperature after two minutes of operation.

APPENDIX 4

SURVEILLANCE TESTS CONTAINING GOVERNOR SETTINGS

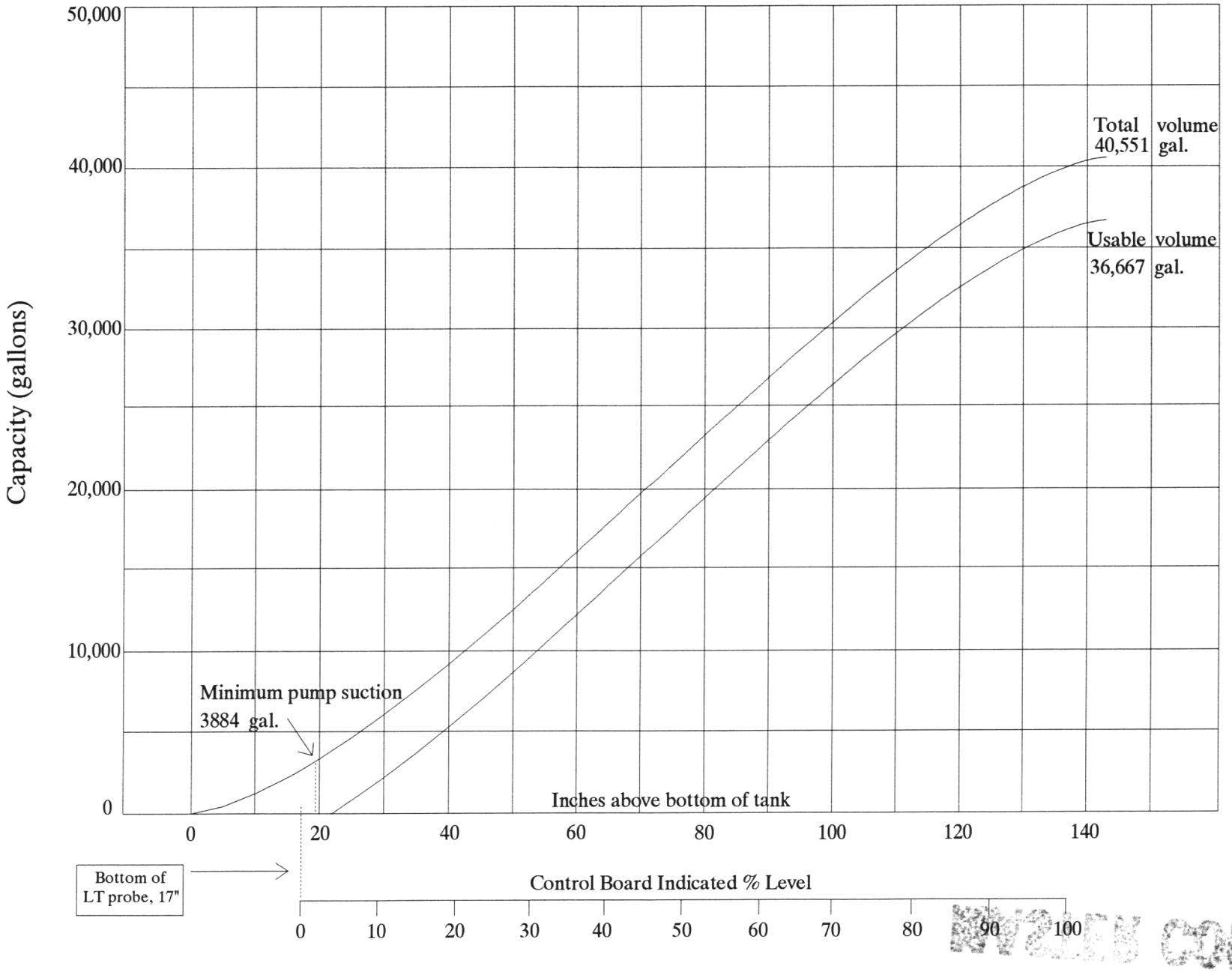
Diesel Generator	Affected Surveillance Test		
	Shared	Unit 1	Unit 2
1-2A D/G	FNP-0-STP-80.1	FNP-1-STP-80.14	FNP-2-STP-80.14
	FNP-0-STP-80.5	FNP-1-STP-80.20	FNP-2-STP-80.20
	FNP-0-STP-80.6	FNP-1-STP-80.21	FNP-2-STP-80.21
	FNP-0-STP-80.11	FNP-1-STP-80.25	FNP-2-STP-80.25
1C D/G	FNP-0-STP-80.2	FNP-1-STP-80.14	FNP-2-STP-80.14
	FNP-0-STP-80.5	FNP-1-STP-80.18	FNP-2-STP-80.18
	FNP-0-STP-80.7	FNP-1-STP-80.23	FNP-2-STP-80.23
	FNP-0-STP-80.11	FNP-1-STP-80.25	FNP-2-STP-80.25
	FNP-0-STP-80.12		
2C D/G			
1B D/G		FNP-1-STP-80.1	
		FNP-1-STP-80.5	
		FNP-1-STP-80.6	
		FNP-1-STP-80.8	
		FNP-1-STP-80.11	
		FNP-1-STP-80.22	
		FNP-1-STP-80.25	
2B D/G			FNP-2-STP-80.1
			FNP-2-STP-80.5
			FNP-2-STP-80.6
			FNP-2-STP-80.8
			FNP-2-STP-80.11
			FNP-2-STP-80.22
			FNP-2-STP-80.25

UNIT 2 VOLUME II CURVE 18A – REVISION 2

PCB-2-VOL2-CRV 18A

Diesel Generator Fuel Oil Storage Tanks Capacity
Capacity (gallons) vs. Level (inches) and Level (percent)
QSY52T501, Q1Y52T502, QSY52T503
Q2Y52T503, QSY52T504

Approved: _____ 7-16-93
Technical Manager Date



PCB-2-VOL2-CRV18B

UNIT 2 VOLUME II CURVE 18B
Diesel Generator Fuel Oil Storage
Tank Capacity (Level vs. Gallons)
Rev. 4 July 16, 1993
QSY52T501, Q1Y52T502, QSY52T503
Q2Y52T503, QSY52T504

Approved:
[signature] 7-16-93
Technical Manager Date

LEVEL (for EPB Level calibration)		ACTUAL GALLONS	USEABLE GALLONS (For Tech Spec compliance)
Inches	EPB, %	(Note 1)	(Notes 1 and 2)
143"		40551	36667
142"		40513	36629
141"		40443	36559
140"		40352	36468
139"		40245	36361
138"		40123	36239
137"		39989	36105
136"	100.0%	39843	35959
135"	99.2%	39686	35802
134"	98.3%	39519	35635
133"	97.5%	39344	35460
132"	96.7%	39159	35275
131"	95.8%	38967	35083
130"	95.0%	38767	34883
129"	94.2%	38559	34675
128"	93.3%	38345	34461
127"	92.5%	38123	34239
126"	91.7%	37896	34012
125"	90.8%	37662	33778
124"	90.0%	37422	33538
123"	89.2%	37177	33293
122"	88.3%	36926	33042
121"	87.5%	36670	32786
120"	86.7%	36409	32525
119"	85.8%	36143	32259
118"	85.0%	35872	31988
117"	84.2%	35597	31713
116"	83.3%	35318	31434
115"	82.5%	35034	31150
114"	81.7%	34746	30862
113"	80.8%	34454	30570
112"	80.0%	34159	30275
111"	79.2%	33859	29975
110"	78.3%	33557	29673
109"	77.5%	33250	29366
108"	76.7%	32941	29057
107"	75.8%	32628	28744
106"	75.0%	32312	28428

Note 1: Instrument inaccuracies are not reflected.

Note 2: Definition of Useable: gauranteed available fuel oil for supply to the diesel.

Note 3: WHEN using EPB indication, THEN Tech Spec minimum is 71%, which includes 25,000 useable gallons plus 4.5% instrument inaccuracies, rounded to the whole number. (reference letter NDS-92-1024)

Note 4: IF using dipstick measurements, THEN instrument inaccuracies do not apply, and the Tech. Spec minimum is 25,000 useable gallons.

UNIT 2 VOLUME II CURVE 18B
Diesel Generator Fuel Oil Storage
Tank Capacity (Level vs. Gallons)
Rev. 4 July 16, 1993
QSY52T501, Q1Y52T502, QSY52T503
Q2Y52T503, QSY52T504

LEVEL (for EPB Level calibration)		ACTUAL GALLONS	USEABLE GALLONS (For Tech Spec compliance)	
Inches	EPB, %	(Note 1)	(Notes 1 and 2)	
105"	74.2%	31994	28110	
104"	73.3%	31672	27788	
103"	72.5%	31348	27464	
102"	71.7%	31021	27137	
101.2"	**71.0%**	**30786**	**26902**	– EPB Tech Spec minimum, Note 3
101"	70.8%	30691	26807	
100"	70.0%	30359	26475	
99"	69.2%	30025	26141	
98"	68.3%	29688	25804	
97"	67.5%	29350	25466	
96"	**66.7%**	**29009**	**25125**	(Note 4)
95"	65.8%	28666	24782	
94"	65.0%	28321	24437	
93"	64.2%	27975	24091	
92"	63.3%	27627	23743	
91"	62.5%	27277	23393	
90"	61.7%	26926	23042	
89"	60.8%	26573	22689	
88"	60.0%	26219	22335	
87"	59.2%	25864	21980	
86"	58.3%	25507	21623	
85"	57.5%	25149	21265	
84"	56.7%	24790	20906	
83"	55.8%	24431	20547	
82"	55.0%	24070	20186	
81"	54.2%	23709	19825	
80"	53.3%	23346	19462	
79"	52.5%	22984	19100	
78"	51.7%	22620	18736	
77"	50.8%	22256	18372	
76"	50.0%	21892	18008	
75"	49.2%	21527	17643	
74"	48.3%	21163	17279	
73"	47.5%	20797	16913	
72"	46.7%	20432	16548	
71"	45.8%	20119	16235	
70"	45.0%	19754	15870	

Note 1: Instrument inaccuracies are not reflected.

Note 2: Definition of Useable: gauranteed available fuel oil for supply to the diesel.

Note 3: WHEN using EPB indication, THEN Tech Spec minimum is 71%, which includes 25,000 useable gallons plus 4.5% instrument inaccuracies, rounded to the whole number. (reference letter NDS–92–1024)

Note 4: IF using dipstick measurements, THEN instrument inaccuracies do not apply, and the Tech. Spec minimum is 25,000 useable gallons.

UNIT 2 VOLUME II CURVE 18B
Diesel Generator Fuel Oil Storage
Tank Capacity (Level vs. Gallons)
Rev. 4 July 16, 1993
QSY52T501, Q1Y52T502, QSY52T503
Q2Y52T503, QSY52T504

LEVEL (for EPB Level calibration)		ACTUAL GALLONS	USEABLE GALLONS (For Tech Spec compliance)
Inches	EPB, %	(Note 1)	(Notes 1 and 2)
69"	44.2%	19389	15505
68"	43.3%	19024	15140
67"	42.5%	18659	14775
66"	41.7%	18295	14411
65"	40.8%	17931	14047
64"	40.0%	17568	13684
63"	39.2%	17205	13321
62"	38.3%	16843	12959
61"	37.5%	16481	12597
60"	36.7%	16121	12237
59"	35.8%	15761	11877
58"	35.0%	15402	11518
57"	34.2%	15044	11160
56"	33.3%	14688	10804
55"	32.5%	14332	10448
54"	31.7%	13978	10094
53"	30.8%	13625	9741
52"	30.0%	13274	9390
51"	29.2%	12924	9040
50"	28.3%	12576	8692
45"	24.2%	10863	6979
40"	20.0%	9204	5320
35"	15.8%	7610	3726
30"	11.7%	6097	2213
25"	7.5%	4679	795
20"	2.5%	3374	0
17"	0.0%	2656	0
15"		2207	0
10"		1208	0
5"		428	0

Note 1: Instrument inaccuracies are not reflected.

Note 2: Definition of Useable: gauranteed available fuel oil for supply to the diesel.

Note 3: WHEN using EPB indication, THEN Tech Spec minimum is 71%, which includes 25,000 useable gallons plus 4.5% instrument inaccuracies, rounded to the whole number. (reference letter NDS−92−1024)

Note 4: IF using dipstick measurements, THEN instrument inaccuracies do not apply, and the Tech. Spec minimum is 25,000 useable gallons.

A.1.b, Conduct of Operations - RO & SRO

A.1.b
TITLE: Perform A Shutdown Margin Calculation in modes 1 & 2.
PROGRAM APPLICABLE: SOT ___ SOCT _____ OLT __X__ LOCT_____
ACCEPTABLE EVALUATION METHOD: __X__ PERFORM ___ SIMULATE ___ DISCUSS
EVALUATION LOCATION: ____ SIMULATOR ___ CONTROL ROOM __X__ CLASSROOM
PROJECTED TIME: __30 MIN__ SIMULATOR IC NUMBER: __N/A
ALTERNATE PATH ___ TIME CRITICAL ___ PRA_____

JPM DIRECTIONS:

1. Initiation of task may be in group setting; evaluation performed individually upon completion of the task by reviewing the completed form.
2. Provide the examinee with the required materials to perform this JPM.

TASK STANDARD:

- Perform a Shutdown Margin calculation while in Mode 1, using STP-29.5 accurately to within the acceptable ranges identified within each critical element's standard.
- Identify the need to emergency borate.

Examinee:	
Overall JPM Performance:	**Satisfactory** ☐ **Unsatisfactory** ☐
Evaluator Comments (attach additional sheets if necessary)	

EXAMINER: _____

CONDITIONS

When I tell you to begin, you are to **Determine the excess Shutdown Margin using STP-29.5, SHUTDOWN MARGIN CALCULATION IN MODES 1 AND 2 (TAVG ≥ 547°F),** for Unit 1. The conditions under which this task is to be performed are:

a. Unit 1 is stable at 90% with the ramp on hold
b. Bank D indicates 192 by Group Demand.
c. Seven of the Bank D rods (H2, B8, H14, F6, F10, K10, K6) are at 192 steps by DRPI.
d. Rod P8, in the D bank, has been determined to be stuck.
e. Rod P8 is at 174 steps by DRPI.
f. All other rods are at 228 steps.
g. Core burnup is 9,800 MWD/MTU burnup.
h. FNP-1-STP-29.5, SHUTDOWN MARGIN CALCULATION IN MODES 1 AND 2 (TAVG ≥ 547°F), initial conditions are satisfied.
i. The Shift Supervisor has directed you to complete FNP-1-STP-29.5 starting at step 5.1 and identify whether or not emergency boration is required.

INITIATING CUE: "You may begin."

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
_____ START TIME		
NOTE: Elements 1 through 13 are evaluated by comparing the completed Calculation page to the values and ranges of each element. The acceptable responses are ALSO listed on the calculation KEY.		
1. Step A.1: Document Core Burnup	1) Value entered: **9,800 MWD**	S / U
2. Step A.2: Document Power Level	2) Value entered: **90% entered**	S / U

EVALUATION CHECKLIST

	ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
	3. Step A.3: Determine penalty steps for Banks below RIL.	3) Value entered: **ZERO (0)** (range: NONE)	S / U
	a) Using COLR figure 1 determines RIL for 90% power level.	a) Determines RIL from COLR • CB D/ RIL = **167** (range: 165-170) from COLR. • CBC / RIL = **FULL OUT** (or 228).	
	b) Gathers data from Conditions page	b) Documents given Demand positions • CB D/ Demand **192** • All others: **FULL OUT (or 228)**	
	c) Determines penalty steps per bank.	c) Calculates difference • All values: **ZERO (0)** (range: NONE)	
	4. Step A.4: Determine number of penalty steps for RODS below RIL.	4) Value entered: **ZERO (0)**	S / U
*	5. Step B.1: Determine Rod Worth for all control and shutdown bands at Zero steps using given power and burnup: a) Uses Curve 77 pg 1 for 90% power and > 9000 - ≤ 10000MWD	5) Value entered: **6043**. (range: NONE)	S / U
	6. Step B.2: Calculate penalty value of rod banks.	6) Value entered of **ZERO (0)**	S / U
*	7. Step B.3: Calculate penalty value of individual rods.	7) Value entered of **ZERO (0)**	S / U
*	8. Step B.4.a; Determine most reactive Rod worth.	8) Value entered of **1389** (range: NONE) a) From Curve 77 pg 2 for > 9000 - ≤ 10000MWD	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
* 9. Step B.4.b; Calculate rod worth of stuck/untrippable rod	9) Value entered of **3472.5** (range: 3471- 3473 for various rounding technique effects) a) # of stuck: 1 rod b) B.4.a: 1389 Calculate using equation.	S / U
* 10. Step B.5; Calculate penalized rod worth	**10)** Value entered of **(-) 2313.5** *NOTE: NEG (-) SIGN IS IMPORTANT FOR THIS CALCULATION/Evaluation* (range: (-)2313 to (-) 2315) Transfer data from other steps: **a) B.1: 6043** **b) B.2: 0** **c) B.3: 0** **d) B.4.b: 3472.5 (+.5, -1.5)** Calculate using equation.	S / U
* 11. Step B.6; Determine power defect for given conditions	11) Value entered of **1701** (range: NONE) a) From Curve 78 for > 9000 - ≤ 10000MWD	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
* 12. Step B.8; Calculate available Shutdown Reactivity	12) Value entered of **(-) 562.5 pcm** (range: -562 to -564) NOTE: *NEG (-) SIGN IS IMPORTANT FOR THIS CALCULATION/Evaluation* a) Transfer data: i. B.5: **(-) 2313.5** (range: (-)2313 to (-)2315) ii. B.6: **1701** Calculate using equation.	S / U
* 13. Step B.9; Calculate Excess Shutdown Margin	13) Value entered of **(+) 1207.5** (range: +1206 to +1208) *NOTE: POS (+) SIGN IS IMPORTANT FOR THIS CALCULATION/Evaluation* a) Transpose data: i. B.8: (-) 562.5 (-562 to -564) ii. Calculate	S / U

NOTE: Element 15 is not required to be completed but is likely to be completed/initialed if initiated as a group/classroom setting.

* 14. Step B.10: Identifies Need to Emergency Borate	14) Notifies Shift Supervisor of need to Emergency Borate.	S / U
15. completes task:	15) Completes sign off.	S / U
a) Signs and dates Calculation Sheet	a) Signs and dates form	
b) Initials step 5.1	b) Initials step 5.1 of procedure.	
c) Asks for verification of calculation		

TERMINATE After calculation of Excess Shutdown Margin AND element 14 completed.

____ STOP TIME

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (∗) before the element number.

GENERAL REFERENCES:

1. FNP-1-STP-29.5, VER 5.0
2. KA: G2.1.20 – 4.6 / 4.6
   G2.1.23 – 4.3 / 4.4

GENERAL TOOLS AND EQUIPMENT:

1. FNP-1-STP-29.5, ver 5.0
2. PCB-VOL1-CRV77, Cycle 26 rev 11
3. PCB-VOL1-CRV78, Cycle 26 rev 11
4. Unit 1, COLR for FNP Unit1 Cycle 26, Rev 1, Figure 1.
5. Pen/Pencil
6. calculator

Critical ELEMENT justification:

STEP	Evaluation
1-4, 6, 15	Not critical – These steps have no impact on the SDM calculation.
5, 7-13	Critical - Calculation completion; each step is critical in accurately determining available SDM and Excess SDM.
14	Critical - Task Objective; Identification that Acceptance Criteria NOT met and Emergency boration IS required to ensure corrective action is initiated and compliance with T.S. is restored.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to **Determine if Shutdown Margin is adequate using STP-29.5, SHUTDOWN MARGIN CALCULATION IN MODES 1 AND 2 (TAVG ≥ 547°F),** for Unit 1. The conditions under which this task is to be performed are:

a. Unit 1 is stable at 90% with the ramp on hold
b. Bank D indicates 192 by Group Demand.
c. Seven of the Bank D rods (H2, B8, H14, F6, F10, K10, K6) are at 192 steps by DRPI.
d. Rod P8, in the D bank, has been determined to be Stuck.
e. Rod P8 is at 174 steps by DRPI.
f. All other rods are at 228 steps.
g. Core burnup is 9,800 MWD/MTU burnup.
h. FNP-1-STP-29.5, SHUTDOWN MARGIN CALCULATION IN MODES 1 AND 2 (TAVG ≥ 547°F), initial conditions are satisfied.
i. The Shift Supervisor has directed you to complete FNP-1-STP-29.5 starting at step 5.1 and identify whether or not emergency boration is required.

KEY

A. **PRESENT CONDITIONS**

A.1 Core Burnup 9800 MWD/MTU

A.2 Power Level. 90 %

A.3 Determine number of penalty steps for ROD BANKS below RIL.
(Use COLR or convert the RIL computer reading from % to steps)

A.3.a Record data in table

ROD BANKS	BANK RIL HEIGHT	BANK DEMAND	STEPS BELOW RIL
CBA	FULL OUT	Full Out (228)	0
CBB	FULL OUT	Full Out (228)	0
CBC	Full Out(228)	Full Out (228)	0
CBD	167 (165-170)	192	0
SDA	FULL OUT	Full Out (228)	0
SDB	FULL OUT	Full Out (228)	0

TOTAL STEPS BELOW RIL 0

RANGE for CBD RIL:
LO: Readability of COLR RIL curve may allow as low as 165 steps; although this is < than the curve limit of 166.9, if calculated. The assumptions within the curve development provides for this readability error.
HI: conservatism allowed by P&L 4.1 may be instituted and a value of up to 170 steps may be selected since the specific value between the Y-axis increments may not be calculated.

KEY

A.4 Determine number of penalty steps for RODS below RIL which were not counted in A.3
(Rods below RIL on DRPI when the BANK demand is above RIL)
(Use COLR or convert the RIL computer reading from % to steps)

A.4.a Record data in table

ROD NUMBER	RIL POSITION	DRPI POSITION	DIFFERENCE
N/A			

TOTAL STEPS BELOW RIL 0

B. **SHUTDOWN MARGIN**

NOTE: Write the values from Curves 77 & 78 directly into the surveillance test. The correct sign convention has been entered in the STP.

B.1 Rod worth for all control and shutdown banks at zero steps at

Present Burnup (A.1) and Power Level (A.2) . (–) 6043 pcm (Curve 77 Page 1)

B.2 Penalty value of rod banks below insertion limit:

0 steps × 75 pcm/step = (+) 0 pcm
(A.3.a)

B.3 Penalty value of individual rods below RIL which were not counted in A.3
(Rods below RIL on DRPI when the BANK demand is above RIL)

0 steps × 10 pcm/step = (+) 0 pcm
(A.4.a)

KEY

B.4 Stuck / Untrippable Rod penalty:

(B.4.a is N/A and B.4.b is zero if there are no stuck/untrippable rods)

B.4.a Worth of most reactive rod worth at present burnup (A.1) (–) 1389 pcm
from Curve 77 pg. 2

B.4.b Calculate worth of Stuck/untrippable rods

[1 (# Stuck/untrippable) × (–) 1389 (B.4.a) 1.75] + [(–) 1389 (B.4.a) × 0.75] = (–) 3472.5 range: 3471 to 3473

Range considers rounding up or rounding down

B.5 Penalized rod worth considering stuck/untrippable rods, misaligned rods, rods below the insertion limit, and uncertainty:

[(–) 6043 (B.1) + 0 (B.2) + 0 (B.3) – (–) 3472.5 (+.5, -1.5) × 0.9 = ( ) (-) 2313.5 range: (-)2313 to (-)2315

[-6043+3472.5]*0.9 = -2313.45 (rounded to -2313.5)
[-6043+3471]*0.9 = -2314.8 (rounded to -2315)
[-6043+3473] *0.9 = -2313

B.6 Power Defect at Power Level (A.2) and Burnup (A.1) (Curve 78). (–) 1701 pcm

B.7 Void Collapse Defect. (+) 50 pcm

B.8 (-) 2313.5 range: (-)2313 to (-)2315 (B.5) – (–) 1701 (B.6) + 50 (B.7) = (-) 562.5 range: (-) 562 to (-) 564 pcm

B.9 Shutdown Margin in excess of required Shutdown Margin
(-) 562.5 range: (-) 562 to (-) 564 (B.8) pcm – (–) 1770 pcm (Required SDM from the COLR) = (+) 1207.5 range: (+)1206 to (+)1208 pcm (SDM_{Excess})

B.10 If B.9 is positive, THEN emergency borate per FNP-1-AOP-27.0, EMERGENCY BORATION, to establish the required shutdown margin otherwise Shutdown Margin is adequate for the Present plant condition.

Emergency Boration IS required

May also state that a Rx trip may be warranted (P&L 4.3).

Performed by: _____ Signed-- element 15- if assumes/states Emerg Boration completed

DATE-- Element 15-if assumes/states emergency boration completed

Verified by: _____

FARLEY NUCLEAR PLANT

SURVEILLANCE TEST PROCEDURE

FNP-1-STP-29.5

SAFETY RELATED

SHUTDOWN MARGIN CALCULATION IN MODES 1 AND 2 (TAVG ≥ 547°F)

PROCEDURE USAGE REQUIREMENTS		SECTIONS
Continuous Use:	Procedure must be open and readily available at the work location. Follow procedure step by step unless otherwise directed by the procedure**.**	**ALL**
Reference Use:	Procedure or applicable section(s) available at the work location for ready reference by person performing steps.	**NONE**
Information Use:	Available on plant site for reference needed.	**NONE**

Approved:

David L Reed (for)
Operations Manager

Date Issued: May 5, 2011

FARLEY NUCLEAR PLANT
SURVEILLANCE TEST REVIEW SHEET

SURVEILLANCE TEST NO. FNP-1-STP-29.5	TECHNICAL SPECIFICATION REFERENCE TR 13.1.1; LCO 3.1.4; LCO 3.1.5; LCO 3.1.6
TITLE SHUTDOWN MARGIN CALCULATION IN MODES 1 AND 2 (TAVG ≥ 547°F)	MODE(S) REQUIRING TEST: 1*,2* *See special test exceptions of above specifications

TEST RESULTS (TO BE COMPLETED BY TEST PERFORMER)

PERFORMED BY _____ DATE/TIME _____

COMPONENT OR TRAIN TESTED (if applicable) _____

[ ] ENTIRE STP PERFORMED [ ] FOR SURVEILLANCE CREDIT

[ ] PARTIAL STP PERFORMED: [ ] NOT FOR SURVEILLANCE CREDIT

REASON FOR PARTIAL: _____

TEST COMPLETED: [ ] Satisfactory [ ] Unsatisfactory

[ ] The following deficiencies occurred:

_____

_____

[ ] Corrective action taken or initiated:

_____

_____

SHIFT SUPERVISOR / SHIFT SUPPORT SUPERVISOR

[ ] PROCEDURE PROPERLY COMPLETED AND SATISFACTORY PER STEP 9.1 OF FNP-0-AP-5

[ ] COMMENTS: _____

_____

REVIEWED BY** _____ / _____ DATE _____
(Print) (Signature)

**Reviewer must be AP-31 Level II certified & cannot be the Performing Individual

TECHNICAL GROUP-
REACTOR ENG REVIEW REVIEWED BY _____ DATE _____

[ ] Satisfactory and Approved
[ ] Comments: _____

_____

TABLE OF CONTENTS

FARLEY NUCLEAR PLANT
UNIT 1
SURVEILLANCE TEST PROCEDURE STP-29.5

SHUTDOWN MARGIN CALCULATION IN MODES 1 AND 2 (TAVG ≥ 547°F)

1.0 Purpose

1.1 The purpose of this procedure is to verify that the SHUTDOWN MARGIN is greater than the limits of the Technical Requirements Manual TR 13.1.1 as directed by Technical Specifications in Modes 1 or 2:

1.1.1 One or more rod(s) untrippable (LCO 3.1.4),

1.1.2 One or more rod(s) not aligned within 12 steps of their group step counter demand position (LCO 3.1.4),

1.1.3 One or more shutdown banks not within insertion limits specified in the COLR (LCO 3.1.5),

1.1.4 Control bank insertion, sequence, or overlap not within limits specified in the COLR (LCO 3.1.6). (This condition does not affect shutdown margin unless control banks are below insertion limits)

2.0 Acceptance Criteria

2.1 The Shutdown Margin shall be greater than or equal to the value specified in the COLR.

3.0 Initial Conditions

SJJ 3.1 The revision of this procedure has been verified to be the current revision and correct unit for the task. (OR 1-98-498)

SJJ 3.2 $T_{AVG} \geq 547°F$.

SJJ 3.3 $T_{AVG} \pm 1°F$ of programmed value. (Needed for Power Defect to be accurate)

SJJ 3.4 The plant is in Mode 1 or 2 with Keff ≥ 1.

SJJ 3.5 Technical Specifications required action entered to verify SDM to be within the limits provided in the COLR OR Shift Supervisor desires to perform.

4.0 Precautions and Limitations

4.1 Read all curves as accurately as possible OR most conservatively.

4.2 Observe proper algebraic sign notation throughout the calculation.

4.3 IF necessary to emergency borate due to inadequate shutdown margin, THEN consideration should be given to tripping the reactor and entering FNP-1-EEP-0, REACTOR TRIP OR SAFETY INJECTION concurrent with the emergency boration.

5.0 Instructions

NOTE:
- **For calculating shutdown margin at power, the amount of reactivity by which the reactor would be subcritical from its present condition must be determined. If the reactor were to shutdown instantaneously, the changes in reactivity would be from control rod position and power defect. In the instant that the reactor shut down, reactivity changes from xenon, samarium and boron concentration would be zero.**

____ 5.1 Enter the information required on the attached calculation sheets and calculate the shutdown margin.

NOTE:
- **Verification of shutdown margin calculation by a licensed individual other than the test performer, should take place as soon as practical, and any differences resolved immediately.**
- **A Shift Foreman that serves as verifier of the calculation may also serve as reviewer on the Surveillance Test Review Sheet.**

____ 5.2 Verify shutdown margin calculated in step 5.1.

6.0 References

6.1 Technical Specifications: LCOs 3.1.4, 3.1.5, & 3.1.6.

6.2 Technical Requirement Manual TR 13.1.1

6.3 Core Operating Limits Report (COLR).

SHUTDOWN MARGIN IN MODES 1 AND 2

A. **PRESENT CONDITIONS**

A.1 Core Burnup _____ MWD/MTU

A.2 Power Level. _____ %

A.3 Determine number of penalty steps for ROD BANKS below RIL.
(Use COLR or convert the RIL computer reading from % to steps)

A.3.a Record data in table

ROD BANKS	BANK RIL HEIGHT	BANK DEMAND	STEPS BELOW RIL
CBA	FULL OUT		
CBB	FULL OUT		
CBC			
CBD			
SDA	FULL OUT		
SDB	FULL OUT		

TOTAL STEPS BELOW RIL _____

A.4 Determine number of penalty steps for RODS below RIL which were not counted in A.3
(Rods below RIL on DRPI when the BANK demand is above RIL)
(Use COLR or convert the RIL computer reading from % to steps)

A.4.a Record data in table

ROD NUMBER	RIL POSITION	DRPI POSITION	DIFFERENCE

TOTAL STEPS BELOW RIL _____

B. **SHUTDOWN MARGIN**

NOTE: Write the values from Curves 77 & 78 directly into the surveillance test. The correct sign convention has been entered in the STP.

B.1 Rod worth for all control and shutdown banks at zero steps at

Present Burnup (A.1) and Power Level (A.2) . (–) _____pcm
(Curve 77 Page 1)

B.2 Penalty value of rod banks below insertion limit:

_____steps × 75 pcm/step = (+)_____pcm
(A.3.a)

B.3 Penalty value of individual rods below RIL which were not counted in A.3
(Rods below RIL on DRPI when the BANK demand is above RIL)

_____steps × 10 pcm/step = (+)_____pcm
(A.4.a)

B.4 Stuck / Untrippable Rod penalty:
(B.4.a is N/A and B.4.b is zero if there are no stuck/untrippable rods)

B.4.a Worth of most reactive rod worth at present burnup (A.1) (–)_____pcm
from Curve 77 pg. 2

B.4.b Calculate worth of Stuck/untrippable rods

[_____ × (–)_____× 1.75] + [(–)_____× 0.75] = (–) _____pcm
(# Stuck/ untrippable rods) (B.4.a) (Most reactive rod worth) (B.4.a) (Most reactive rod worth)

B.5 Penalized rod worth considering stuck/untrippable rods, misaligned rods, rods below the insertion limit, and uncertainty:

[(–)_____+ _____ + _____ – (–)_____] × 0.9 = ( ) _____pcm
(B.1) (B.2) (B.3) (B.4.b)

B.6 Power Defect at Power Level (A.2) and Burnup (A.1) (Curve 78). (–) _____pcm

B.7 Void Collapse Defect. (+) 50 pcm

B.8 Available Shutdown Reactivity:

( )_____ – (–)_____ + 50 _____ pcm
(B.5) (B.6) (B.7)

B.9 Shutdown Margin in excess of required Shutdown Margin (B.8 – Required SDM from the COLR):

( )_____ pcm – (–) 1770 pcm = ( ) _____pcm
(B.8) Required SDM from the COLR (SDM_{Excess})

B.10 If B.9 is positive, THEN emergency borate per FNP-1-AOP-27.0, EMERGENCY BORATION, to establish the required shutdown margin otherwise Shutdown Margin is adequate for the Present plant condition.

Date:_____ Performed by: _____

Date:_____ Verified by: _____

A.2, Equipment Control - RO

A.2 – RO (mod)

TITLE: Complete selected sections of STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS.

PROGRAM APPLICABLE: SOT ___ SOCT _____ OLT __X__ LOCT_____

ACCEPTABLE EVALUATION METHOD: __X__ PERFORM ___ SIMULATE ___ DISCUSS

EVALUATION LOCATION: ____ SIMULATOR ___ CONTROL ROOM __X__ CLASSROOM

PROJECTED TIME: __20 MIN__ SIMULATOR IC NUMBER: __N/A__

ALTERNATE PATH ___ TIME CRITICAL ___ PRA_____

JPM DIRECTIONS:

1. Initiation of task may be in group setting; evaluation performed individually upon completion of the task by reviewing the completed form.
2. Provide the examinee with the required materials to perform this JPM.

TASK STANDARD:

- Complete selected sections of STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS, Appendix 1.
- Identify conditions that do not meet acceptance criteria.

Examinee:	
Overall JPM Performance:	**Satisfactory** ☐ **Unsatisfactory** ☐
Evaluator Comments (attach additional sheets if necessary)	

EXAMINER: _____

Developer	S. Jackson	05/07/14
NRC Approval	SEE NUREG 1021 FORM ES-301-3	

CONDITIONS

When I tell you to begin, you are to complete pages 12-14 & 27 of FNP-1-STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS, Appendix 1. The conditions under which this task is to be performed are:

a. Unit 1 is at 60% power and stable following a load rejection.
b. The UO has completed taking the data for STP-1.0, Appendix 1, for night shift with the exception of pages 12-14 & 27.
c. You are the extra plant operator and have been directed by the Shift Supervisor to:
    1. Complete pages 12-14 & 27 of FNP-1-STP-1.0, Appendix 1 for night shift using the pictures provided.
    2. Identify any condition that does not meet acceptance criteria.

EVALUATION CHECKLIST

ELEMENTS:	**STANDARDS:**	**RESULTS: (CIRCLE)**
_____ START TIME		
NOTE: ● This is a classroom setting ADMIN JPM task. ● Meters must be read accurately enough to ensure the proper identification of "out of tolerance" instruments and properly identify "in tolerance" instruments.		
1. Records all data not previously recorded.	1) Records all data on pages 12-14 & 27 not previously recorded.	S / U
*2. Determines #4, LI-496 for C SG, does not meet acceptance criteria.	2) Determines #4, LI-496 for C SG, does not meet acceptance criteria.	S / U
(**NOT CRITICAL: May record in the comments section of the STRS).**	**(May record in the comments section of the STRS).**	
3. Informs SS that LI-496 for C SG does not meet acceptance criteria.	3) Informs SS that LI-496 for C SG does not meet acceptance criteria, writes CR, & records CR number in the comments section. **(CUE: SS acknowledges & CR 123456 has been written).**	S / U
*4. Determines #23, Axial Flux Difference (AFD), does not meet acceptance criteria.	4) Determines #23, Axial Flux Difference, does not meet acceptance criteria.	S / U
(NOT CRITICAL: May record in the comments section of the STRS).	**(May record in the comments section of the STRS).**	

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
5. Informs SS that AFD does not meet acceptance criteria, writes CR, & records CR number in the comments section.	5) Informs SS that AFD does not meet acceptance criteria, writes CR, & records CR number in the comments section. **(CUE: SS acknowledges & CR 234567 has been written).**	S / U
*6. Determines #25, CH A RVLIS, has less than 4 sensors operable per channel & does not meet acceptance criteria.	6) Determines #25, CH A RVLIS, has less than 4 sensors operable per channel does not meet acceptance criteria.	S / U
(NOT CRITICAL: May record in the comments section of the STRS).	**(May record in the comments section of the STRS).**	
7. Informs SS that CH A RVLIS does not meet acceptance criteria, writes CR, & records CR number in the comments section.	7) Informs SS that CH A RVLIS does not meet acceptance criteria, writes CR, & records CR number in the comments section. **(CUE: SS acknowledges & CR 345678 has been written).**	S / U

_____ STOP TIME

Terminate when all elements of the task have been completed.

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (*) before the element number.

GENERAL REFERENCES:

1. FNP-1-STP-1.0 Ver 112
2. COLR, Cycle 26 Ver 1
3. K/A: G2.2.12 - 3.7 / 4.1
   G2.2.42 – 3.9 / 4.6

GENERAL TOOLS AND EQUIPMENT:

Provide:

1. Partially filled out copy of FNP-1-STP-1.0, Attachment 1.
2. Pictures of parts of MCB.

Critical ELEMENT justification:

STEP	Evaluation
1.	NOT Critical – As long as the proper indications are identified, then Tech Spec requirements can be met.
2.	Critical – Task Objective. Recognizing that out of tolerance indications exists ensures the plant is operated per its License.
3.	NOT Critical – Administrative function.
4.	Critical – Task Objective. Recognizing that out of tolerance indications ensures the plant is operated per its License.
5.	NOT Critical - Administrative function.
6.	Critical – Task Objective. Recognizing that out of tolerance indications exists ensures the plant is operated per its License.
7.	NOT Critical - Administrative function.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to complete pages 12-14 & 27 of FNP-1-STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS, Appendix 1. The conditions under which this task is to be performed are:

a. Unit 1 is at 60% power and stable following a load rejection.
b. The UO has completed taking the data for STP-1.0, Appendix 1, for night shift with the exception of pages 12-14 & 27.
c. You are the extra plant operator and have been directed by the Shift Supervisor to:
    1. Complete pages 12-14 & 27 of FNP-1-STP-1.0, Appendix 1 for night shift using the pictures provided.
    2. Identify any condition that does not meet acceptance criteria.

OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS

PROCEDURE LEVEL OF USE CLASSIFICATION PER NMP-AP-003	
CATEGORY	**SECTIONS**
Continuous:	**ALL**
Reference:	**NONE**
Information:	**NONE**

Approved By: David L. Reed
Operations Manager

Effective Date: 07/12/14

Version Number	Version Description
105.0	Revised step 58 of Appendix 1 by deleting PDI-3317 reference. Changed acceptance criteria for Appendix 1, item 1 from 150K to 160K gallons. (CR355457). Added guidance to acceptance criteria for item 14 of appendix 1 per ES request.
105.1	Appendix 1, Changed ARO rod height for Fuel Cycle 25.
105.2	Added note below containment temperature page referencing FNP-0-SOP-0.16.
105.3	Added place keeping blocks to item 38 to signify which CTMT cooler fan is selected at the time STP-1.0 is performed..
105.4	Revised note in Item 1 to read 13.0 ft for CST level. CR 465834
105.5	Deleted Item 58 and combined requirements with Item 34. Renumbered.
105.6	Appendix 1, item 11, changed EOL Coastdown variance information. CR 482797
106.0	App 1 Item 52, App 2 Item 16, App 3 Item 17; Incorporated new Met Tower instruments per DCP C072201201
106.1	App 1 Item 52, App 2 Item 16, App 3 Item 17; Added units for data and changed IPC group reference
107.0	Implemented changes to LTOP items per LDCR 2012011.
107.1	Corrected missing border in item 53 of Appendix 1.
108.0	Deleted requirement to check PAHA's every Sunday night. CR 778297
108.1	Corrected typo in TS reference for Appendix 1, item 90. CR 787702
109.0	Added item 70.0. CR 804136
110.0	Added expected variation for N35&36
111.0	Revised Item 37 to include guidance to Contact ES to evaluate UHS operability if recorded SW Pond temperature reaches or exceeds 90 deg. F.
112.0	Major revision to the instructions and acceptance criteria. CR 818977, CR 788318, deleted fig. 1

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides a means for recording data required on a shift and daily basis.

2.0 PRECAUTION AND LIMITATIONS

Each Appendix contains applicable Precaution and Limitation statements.

3.0 INITIAL CONDITIONS

None

4.0 ACCEPTANCE CRITERIA

Each Appendix contains applicable Acceptance Criteria statement.

5.0 INSTRUCTIONS

NOTE

The Shift or Daily Logs shall be considered complete when all items have been completed, with the following exceptions: (1) items that have been designated as being performed anytime during the shift, and (2) 1600 SFP readings. These items shall be completed prior to the final review. ☐ ☐

5.1 A Daily and Shift Surveillance for applicable modes shall be completed every day. ☐ ☐

5.2 Utilize one of the methods given below to verify each parameter, condition, component or system as specified by the LCO.

5.2.1 Verification of a Measured Parameter. ☐ ☐

Confirm the measured parameter is within the limits specified in the Acceptance Criteria column.

5.2.2 Verification of a Specified Condition.

Confirm the component, instrument, or system listed satisfies that specified in the Acceptance Criteria column. ☐ ☐

5.2.3 Channel Check

Observe the instrument response. The operability of instrument channels, which have indication available, shall be verified by one or more of the following:

- Comparing readings on channels which monitor the same variable recognizing any differences in the actual process variable between sensor locations (for example, compare Power Channel N41 with redundant Power Channels N42 and N43), ☐ ☐
- Comparing readings between channels that monitor the same variable and bear a known relationship to one another (for example, comparing intermediate range and source range neutron monitoring during startup or shutdown when both channels indicate on scale), ☐ ☐
- Comparing readings between channels which monitor different variables and bear a known relationship to one another (for example, at a given power level the primary coolant outlet temperature is a certain value). ☐ ☐

5.3 Complete the appropriate Appendix for the applicable mode(s) per the following:

5.3.1 The operator completing the surveillance shall enter the mode, time, and his/her name in the appropriate space on the review sheet. ☐ ☐

5.3.2 Except where specified in the Appendix, the data for each item should be taken AND logged in the column provided between the times given below to ensure that 12 hour surveillance requirements are met:

- 1100 and 1230 on Day Shift ☐
- 2300 and 0030 on Night shift ☐

5.3.3 List shift data under the appropriate shift column. ☐ ☐

5.3.4 Data need not be recorded in sequence. ☐ ☐

5.3.5 Recording a numerical value for an item when not in a Mode that requires an entry is permissible. ☐ ☐

5.3.6 IF data can NOT be logged for any of the following conditions, enter "N/A" (OR "IN TEST" as applicable) in the appropriate space. ☐ ☐

- The equipment or instrument is NONFUNCTIONAL (broken, or in maintenance) AND the applicable LCO action statement has been entered.
- The plant is in a mode or condition such that the surveillance does not apply. {AI2008200006}
- The channel is in test.
- Condition makes logging impractical.

5.3.7 Where no value is required to be logged for an item, the operator will initial the appropriate space. ☐ ☐

5.3.8 WHEN a channel check is performed on an instrument that has a numerical readout, the actual value will be recorded, unless otherwise noted. Initials must be used to document performance of other channel checks and verifications. ☐ ☐

5.3.9 IF a daily OR shift surveillance item can NOT be taken from the listed indicator, BUT is available by some other indication, THEN that value will be listed in the appropriate space and the indicator actually used for the surveillance noted. ☐ ☐

5.3.10 Some data has been assigned an eight hour commitment and will be logged in the appropriate time slot. ☐ ☐

5.3.11 The operator completing the miscellaneous section shall enter the title, time, value, acceptance criteria comments, and technical specification requirement in the appropriate columns. ☐ ☐

5.3.12 Surveillance required due to special or abnormal plant conditions which are not normally taken on a shift or daily basis shall be entered in the miscellaneous section of the appropriate Appendix. ☐ ☐

5.3.13 The Shift or Daily Logs shall be submitted to the Shift Supervisor for his/her review by the following times:

- 1300 for Day Shift ☐
- 0100 for Night Shift ☐

5.3.14 The Shift Supervisor or Shift Support Supervisor shall enter any discrepancies and/or comments in the review section of the appropriate Appendix. ☐ ☐

5.4 The body of this procedure shall be printed out and attached to the appropriate Appendix. **{AI2008200007}** ☐ ☐

5.5 The modes for which surveillance on an item is required are listed in the Acceptance Criteria column. ☐ ☐

5.6 The acceptance criteria for the logged data is also listed in the Acceptance Criteria column. ☐ ☐

5.7 The technical specification reference is listed for each item in the Tech. Spec. column. ☐ ☐

5.8 The operator shall inform the Shift Supervisor promptly of any new discrepancies in the Shift or Daily Logs. ☐ ☐

5.9 Upon notification of a new discrepancy, and during review of existing discrepancies, the Shift Supervisor is responsible for evaluating the discrepancy and ensuring that all appropriate actions are initiated including any that are required to meet any applicable Technical Specification action statements. ☐ ☐

5.10 Comments regarding all discrepancies shall be included in the comments section of the Surveillance Test Review Sheet. ☐ ☐

5.11 Compare data taken to the expected variations between instrumentation channels. This information, where applicable, along with the maximum allowable deviation is provided in the appropriate Appendix at the step where data is being taken and in Table 1 of Appendix 1. ☐ ☐

5.11.1 IF the variance is greater than expected, submit a Condition Report to the Shift Supervisor to correct the out of tolerance instrument. ☐ ☐

5.12 Marking the STRS as “Acceptable” means that all data points are within their applicable tolerances, meeting the acceptance criteria, or identified and justified by a reason in the comments section (or Appendix). ☐ ☐

6.0 RECORDS

Documents created using this procedure will become QA Records when completed unless otherwise stated. The procedures and documents are considered complete when issued in DMS.

QA Record (X)	Non-QA Record (X)	Record Generated	Retention Time	R-Type
X		FNP-1-STP-1.0	Life of Plant	H06.045

7.0 REFERENCES

7.1 Technical Specifications.

7.2 FNP-0-M-011, Offsite Dose Calculation Manual.

7.3 FSAR Chapter 16

7.4 Technical Requirements Manual

END OF PROCEDURE TEXT

APPENDIX 1, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS, MODES 1, 2, 3, 4

This appendix consists of 47 pages.

SURVEILLANCE TEST REVIEW SHEET

SURVEILLANCE TEST NO. FNP-1-STP-1.0		**TECHNICAL SPECIFICATION REFERENCE** Various		
TITLE: Operations Daily and Shift Surveillance Requirements		**MODE(S) REQUIRING TEST:** 1, 2, 3, 4		
NIGHT SHIFT OPERATOR	_____/_____ (PRINT) (SIGNATURE)	**DATE/TIME** _____/_____	**MODE**	**ACCEPTABLE** ☐YES ☐ NO
NIGHT SHIFT SUPERVISOR REVIEW	_____/_____ (PRINT) (SIGNATURE)			
DAY SHIFT OPERATOR	_____/_____ (PRINT) (SIGNATURE)	**DATE/TIME** _____/_____	**MODE**	**ACCEPTABLE** ☐YES ☐ NO
DAY SHIFT SUPERVISOR REVIEW	_____/_____ (PRINT) (SIGNATURE)			

COMMENTS:

_____

_____

_____

FINAL SHIFT SUPERVISOR/SHIFT SUPPORT SUPERVISOR REVIEW

PROCEDURE PROPERLY COMPLETED SATISFACTORY PER FNP-0-AP-5 ☐

0800 AND 1600 SFP READINGS HAVE BEEN REVIEWED ☐

COMMENTS:_____

_____

_____

_____

_____

_____

REVIEWED BY:	_____/_____ (PRINT)	(SIGNATURE)	_____ (DATE)
ENGINEERING SUPPORT GROUP SCREENING (IF APPLICABLE)			
SCREENED BY:	_____/_____ (PRINT)	(SIGNATURE)	_____ (DATE)

1.0 PURPOSE

This procedure provides a means for recording data required on a shift and daily basis. ☐ ☐

2.0 PRECAUTION AND LIMITATIONS

2.1 Each parameter should be logged as accurately as possible. ☐ ☐

2.2 It is permissible to use N/A for any parameter under the following conditions**:** **{AI2008200006}**

- The equipment or instrument is INOPERABLE (broken, or in maintenance) and the applicable LCO action statement has been entered. ☐ ☐
- The plant is in a mode or condition such that the surveillance does not apply. ☐ ☐

2.3 The SS/SM will be notified immediately if the “As Found” condition is out of tolerance when the “As Found” condition is evaluated against the acceptance / functional criteria. ☐ ☐

3.0 INITIAL CONDITIONS

3.1 **Verify** the version of this procedure has been verified to be the current version. **{OR 1-98-498}** ☐ ☐

3.2 **Verify** this procedure to be for the correct unit for the task. **{OR 1-98-498}** ☐ ☐

3.3 **Verify** the Body of FNP-1-STP-1.0 is attached to this Appendix. **{AI2008200007}** ☐ ☐

4.0 ACCEPTANCE CRITERIA

Logged data shall be within the acceptance criteria listed in the appropriate Appendix. ☐ ☐

	TITLE		NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
4.	SG Level (%)					
	SG 1A	LI 474			Channel Check	
		LI 475			Mode 1, 2;	3.3.1-1(14):SR 3.3.1.1
					Mode 1, 2;	3.3.2-1(5.b):SR 3.3.2.1
		LI 476			Mode 1, 2, 3;	3.3.2-1(6.b):SR 3.3.2.1
		LR 477 (WR) PEN 1			Mode 1, 2, 3;	3.3.3-1(4):SR 3.3.3.1
	SG 1B	LI 484			Mode 3;	
		LI 485			NR Level ≥ 30% for at least 2 SGs	SR 3.4.5.2
		LI 486			Mode 4;	
		LR 477 (WR) PEN 2			WR Level ≥ 75% for SG in operating Reactor Coolant Loop	SR 3.4.6.2
	SG 1C	LI 494			Expected variation: ± 4%	
		LI 495			Maximum deviation between channels: 8%	
		LI 496				
		LR 477 (WR) PEN 3				

	TITLE		NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
5.	SG Feed Flow (lbm/hr)				Mode 1, 2; Channel Check	N/A
	SG 1A	FI 477	x 10^6	x 10^6		
		FI 476	x 10^6	x 10^6		
	SG 1B	FI 487	x 10^6	x 10^6		
		FI 486	x 10^6	x 10^6		
	SG 1C	FI 497	x 10^6	x 10^6		
		FI 496	x 10^6	x 10^6		

NOTE

IF any channel III or IV pressure transmitter is out of service for surveillance testing or otherwise inoperable, THEN the corresponding steam flows may be channel checked using the appropriate points off the plant computer (in units of KBH) or by I&C direct readout. Since the MCB FI's are compensated for steam pressure but the computer points are not, compare only FI data to FI data, or computer point to computer point. Note on the Surveillance Test Review Sheet comments section whenever the alternate method of channel check is used. ☐ ☐

6.	SG Steam Flow (lbm/hr)				Mode 1, 2[d], 3[d]; d) Except when one MSIV is closed in each steam line. Channel Check	3.3.2-1(4.e): SR 3.3.2.1
	SG 1A	FI 474 (FE0474B)	x 10^6	x 10^6		
		FI 475 (FE0475B)	x 10^6	x 10^6		
	SG 1B	FI 484 (FE0484B)	x 10^6	x 10^6		
		FI 485 (FE0485B)	x 10^6	x 10^6		
	SG 1C	FI 494 (FE0494B)	x 10^6	x 10^6		
		FI 495 (FE0495B)	x 10^6	x 10^6		

Appendix 1 Modes 1, 2, 3, 4 Page 7 of 47

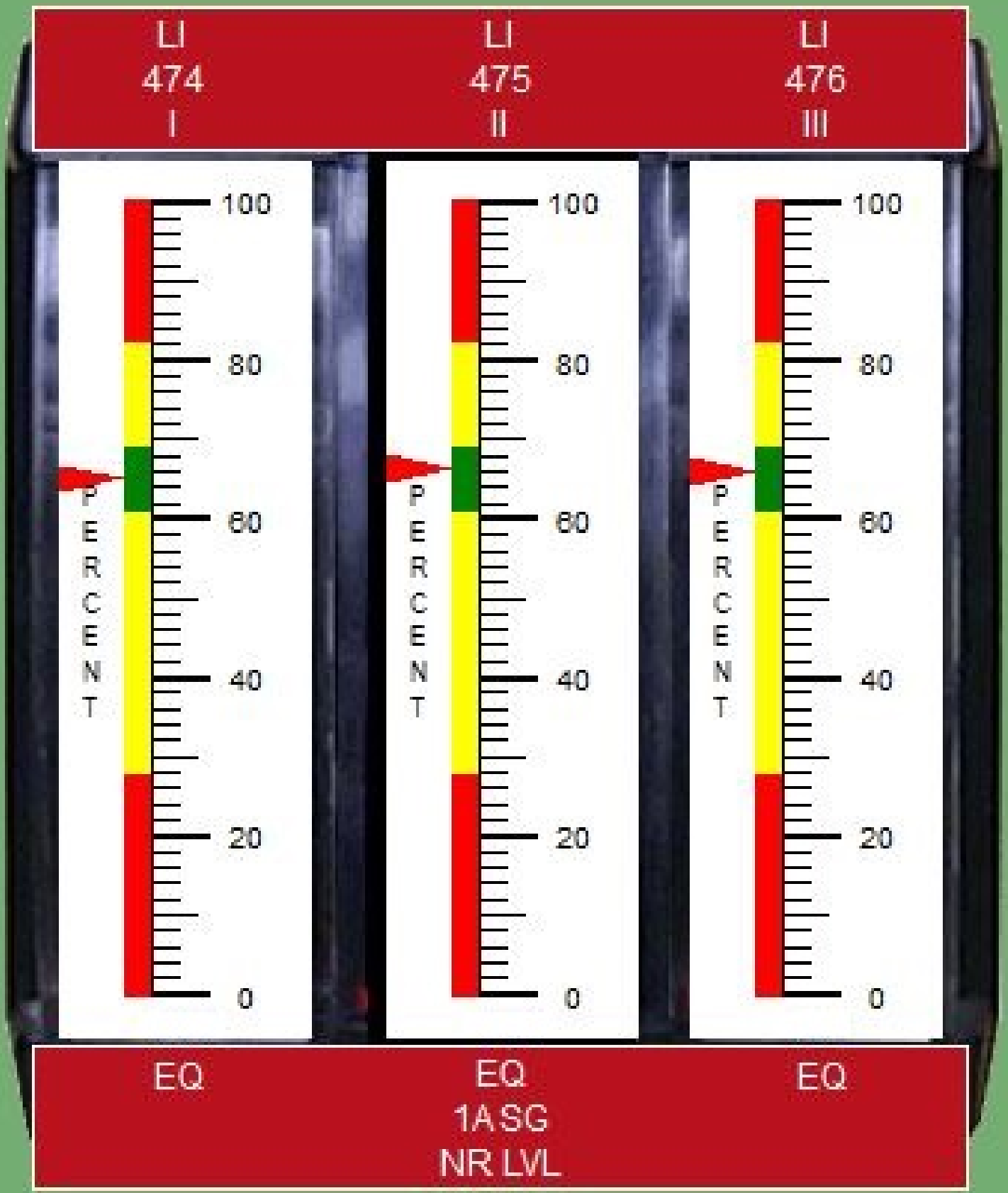
	TITLE		NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
7.	SG Pressure (psig)					
	SG 1A	PI 474			Channel Check	
		PI 475			Mode 1, 2, 3;	3.2-1(1.e.2):SR 3.3.2.1
		PI 476			Mode 1, 2[d], 3[b,d];	3.3.2-1(4.d):SR 3.3.2.1
					Mode 1, 2, 3[b];	3.3.2-1(1.e.1):SR 3.3.2.1
					Mode 1, 2, 3;	3.3.3-1(8):SR 3.3.3.1
	SG 1B	PI 484			(b) Above the P-12 interlock.	
		PI 485			(d) Except when one MSIV closed in each steam line.	
		PI 486			Expected variation: ± 40 psi	
					Maximum deviation between channels: 50 psi	
	SG 1C	PI 494				
		PI 495				
		PI 496				
8.	RCS Temperature (°F)					
	T_{HOT}	(TR 413)				
		Loop 1			Mode 1, 2, 3;	3.3.3-1(1):SR 3.3.3.1
		Loop 2			Channel Check	3.3.3-1(2):SR 3.3.3.1
		Loop 3				
	T_{COLD}	(TR 410)				
		Loop 1				
		Loop 2			Expected variation: ± 17°F	
		Loop 3			Maximum deviation between channels: 23°F	

	TITLE	NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
23.	Axial Flux Difference (%)				
	N-41			Mode 1, Power ≥ 50% RTP; Within limits of COLR	SR 3.2.3.1
	N-42				
	N-43				
	N-44				
	AFD Target Point for Present Power Level		(Curve 64)		
24.	Sub Cooled Margin Monitor (°F)				
		RTD / CETC		Mode 1, 2, 3;	3.3.3-1(10): SR 3.3.3.1
	Q1B14TI2354-A	84.4 / 70.6		Channel Check Record subcooling margin and TMAX	
	Q1B14TI2355-B	84.1 / 66.8			
		TMAX			
	Q1B14TI2301-A	583			
	Q1B14TI2302-B	587			
25.	Reactor Vessel Level Indicating System (MCB Mimic)				3.3.3-1(16): SR 3.3.3.1
		Initial		Mode 1, 2, 3; Perform Channel Check. Verify at least 4 sensors operable per channel by comparing each valid sensor with its corresponding sensor in the opposite train to verify they display the same state. IF one train is inoperable, THEN verify that at least 4 sensors indicate properly in the opposite train.	
	Channel A				
	Channel B				

TABLE 1
Expected Variations Between Instrumentation Channels During Normal Operation

NOTE
If recorded data is greater than the expected variation, a CR should be submitted to correct the out of tolerance instrument and so note in the deficiency section of the Surveillance Test Review Sheet. ☐ ☐

Parameter	Expected Variation	Maximum Deviation Between Channels
Reactor coolant average temperature indicators	± 3°F	6°F
Delta-T indicators	± 3.7%	7.4%
Reactor coolant flow indicators	± 5%	9%
Pressurizer pressure indicators	± 30 psi	48 psi
Pressurizer level indicators	± 4%	8%
Steam generator level indicators (narrow range)	± 4%	8%
Steam line pressure indicators	± 40 psi	50 psi
Turbine impulse chamber pressure indicators	± 20 psi	40 psi
The overpower ΔT reactor trip setpoints	± 3.5%	6%
The overtemperature ΔT reactor trip setpoints	+ 7.5%	18.8%
Top nuclear flux indicators	± 2%	3.6%
Bottom nuclear flux indicators	± 2%	3.6%
RCS temperature recorders	± 17°F	23°F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474
I
LI
475
II
LI
476
III
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80
60
40
20
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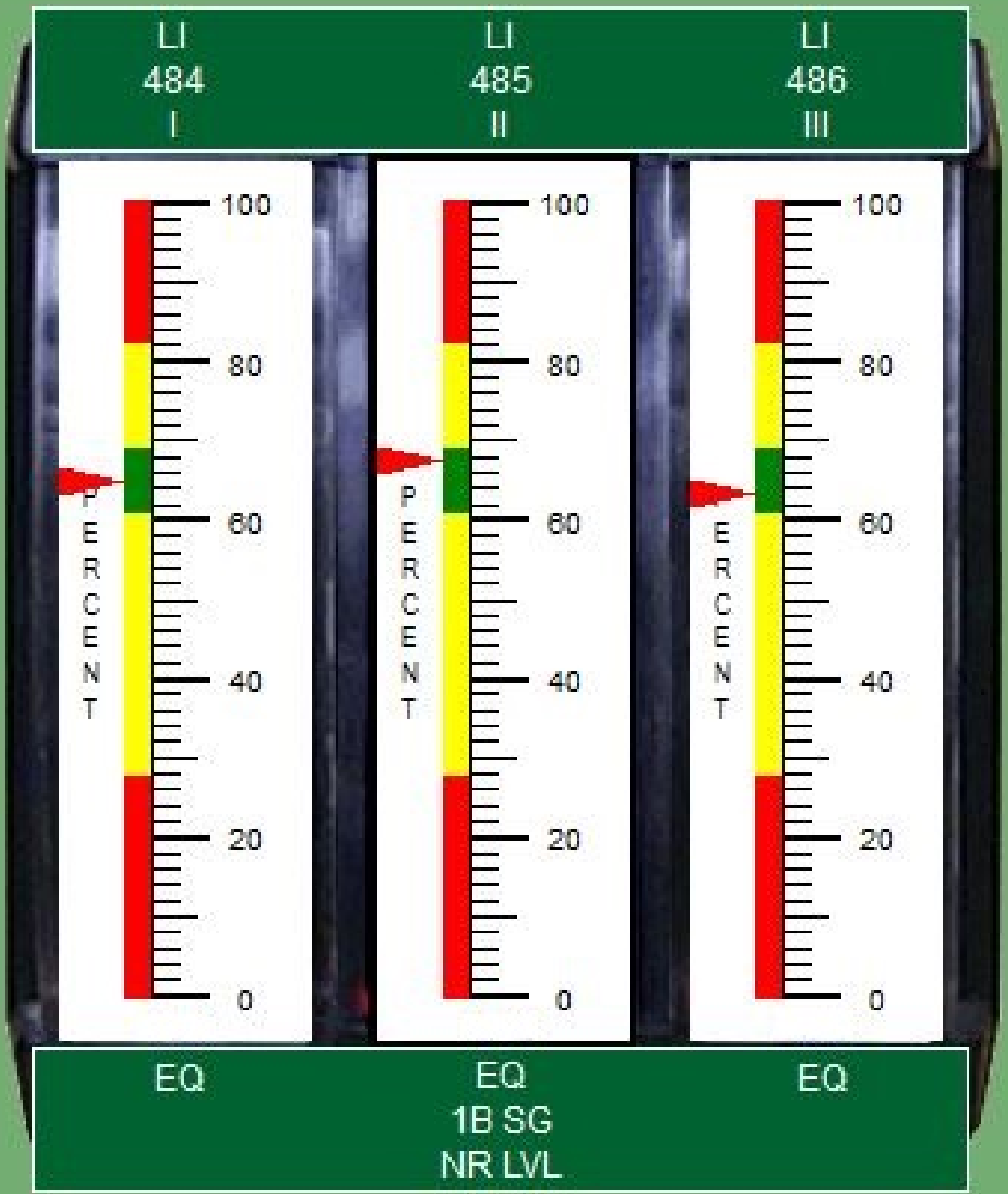
PERCENT
EQ
EQ
1A SG
NR LVL
EQ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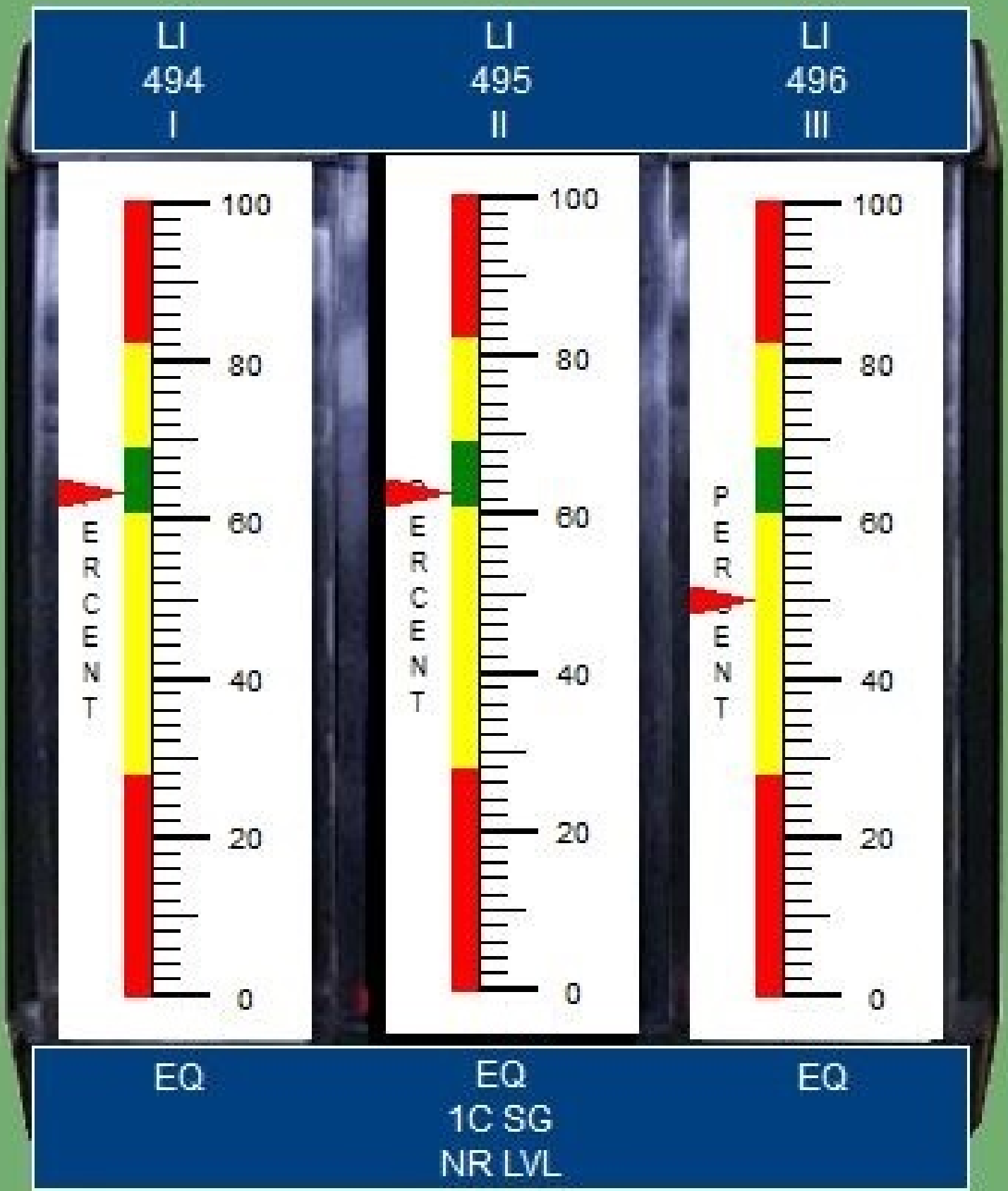
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PERCENT
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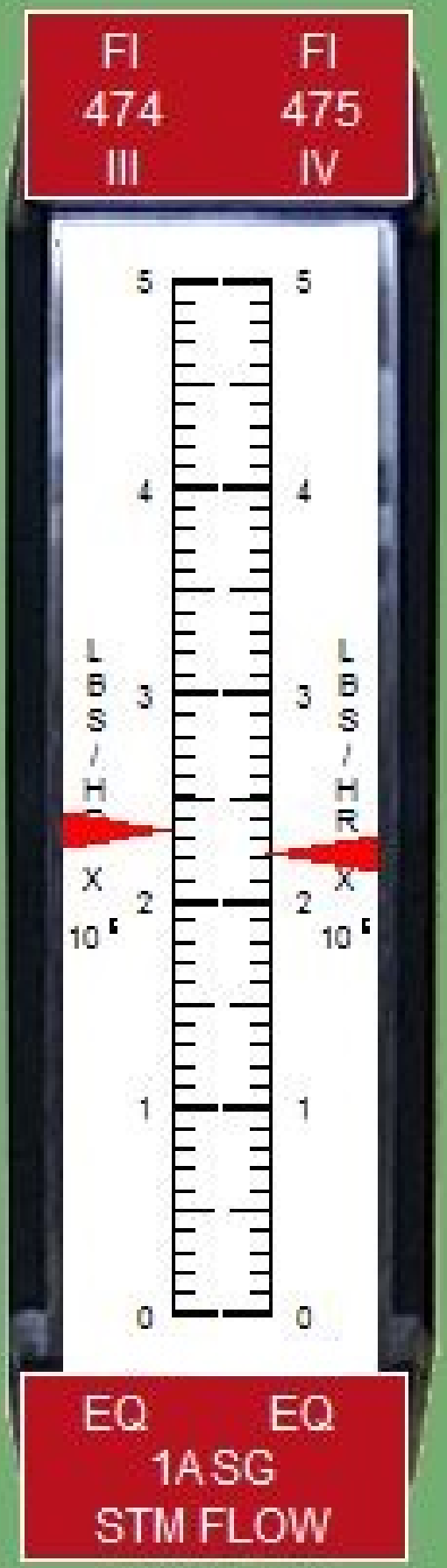
NR LVL
EQ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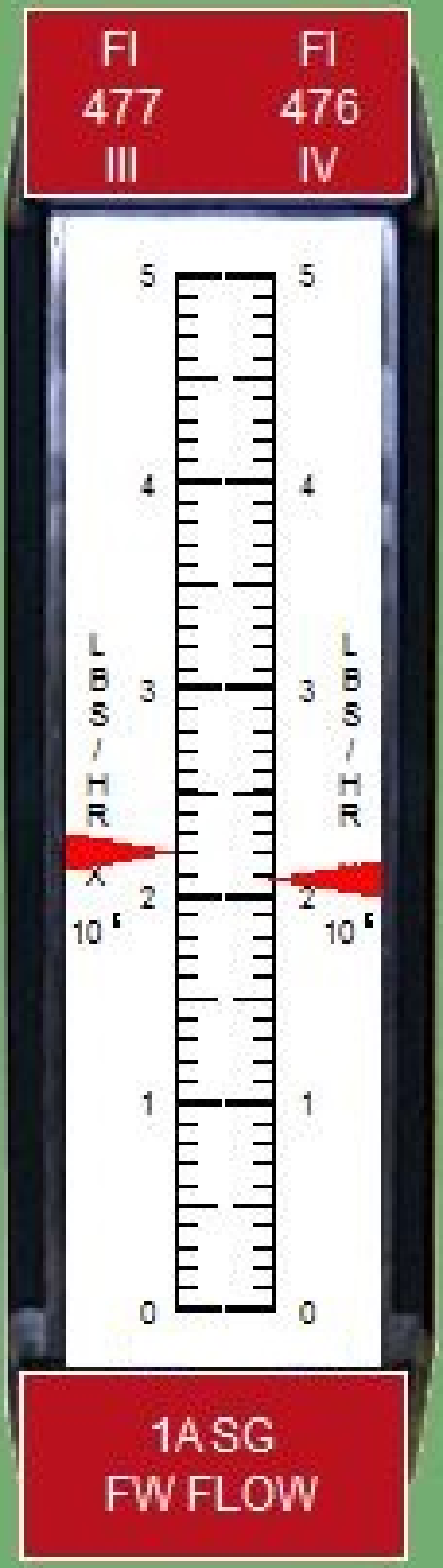
III
FI
475
IV
LBS/HR
X
10
EQ
1A SG
STM FLOW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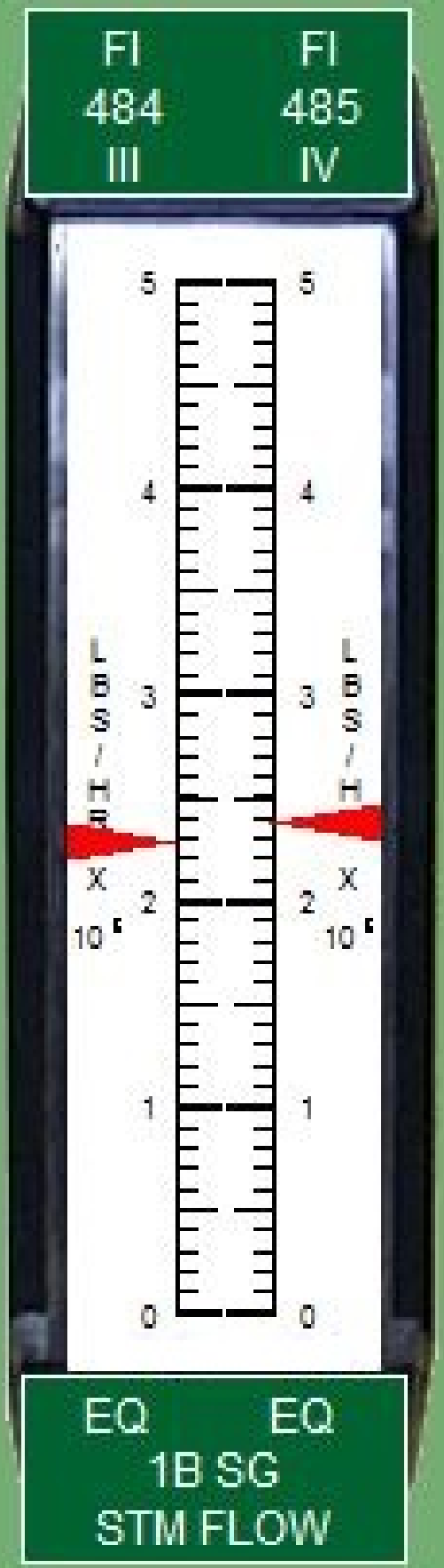
1A SG
FW FLOW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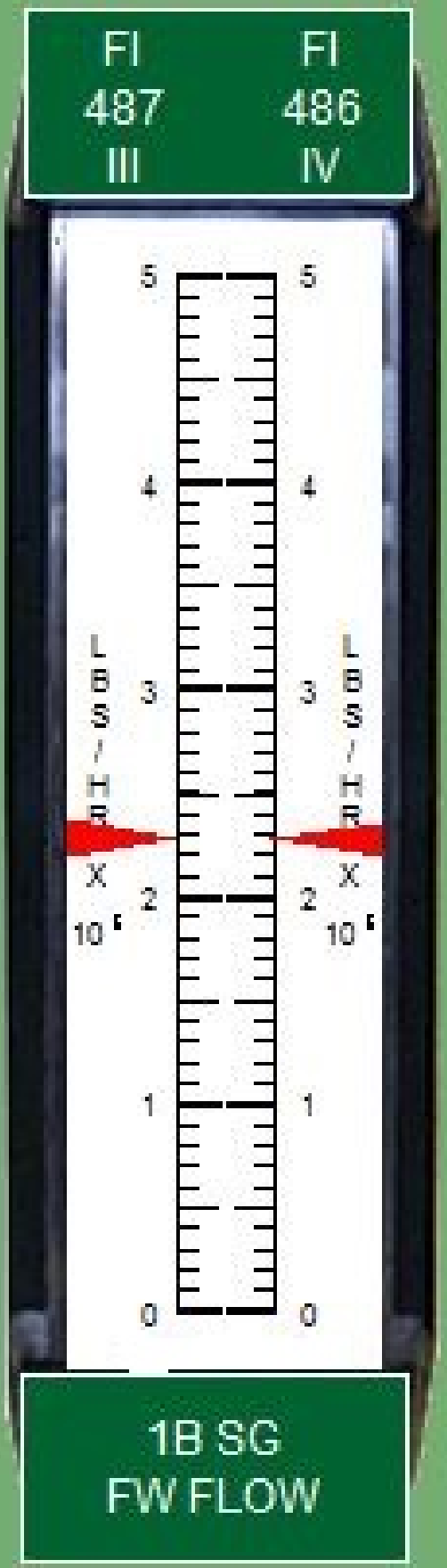
STM FLOW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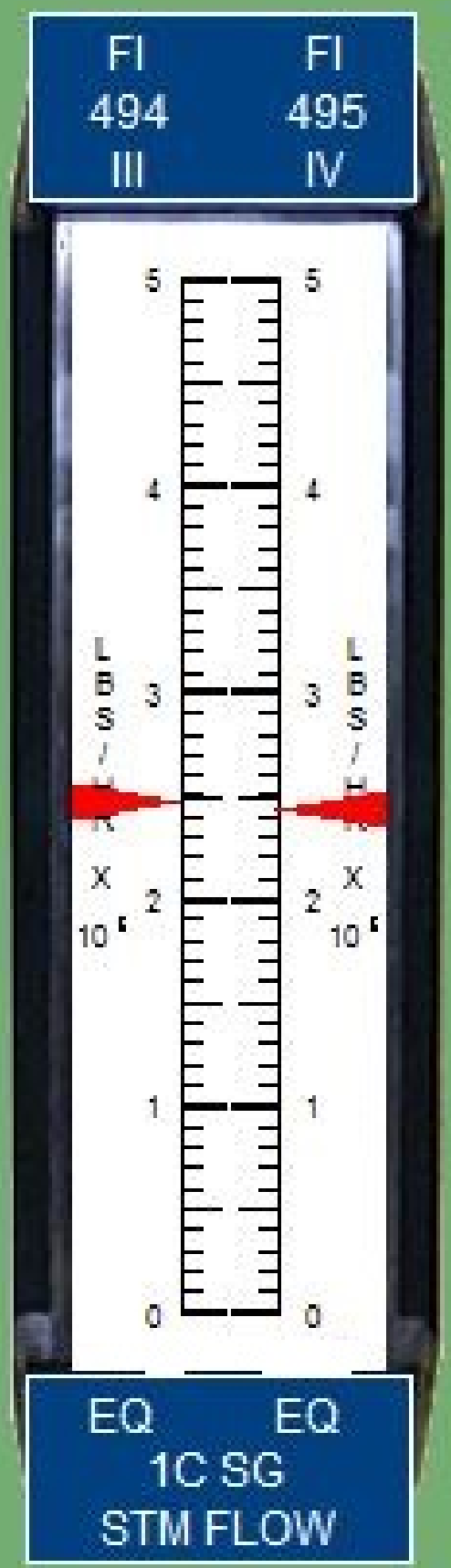
FW FLOW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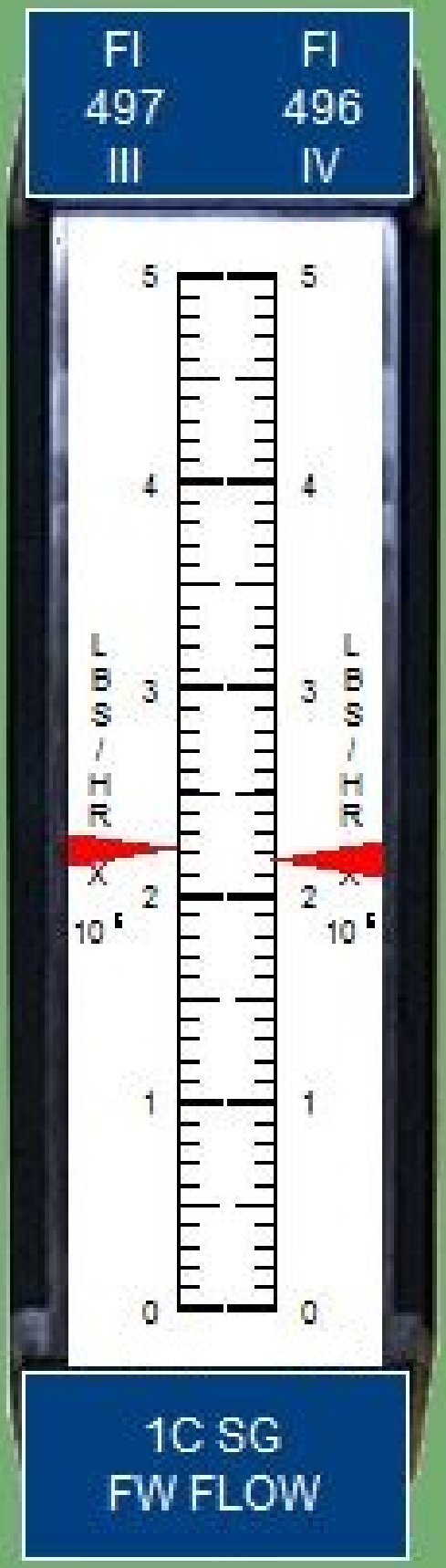
IV
LBS/HR
X
10
EQ
1C SG
STM FLOW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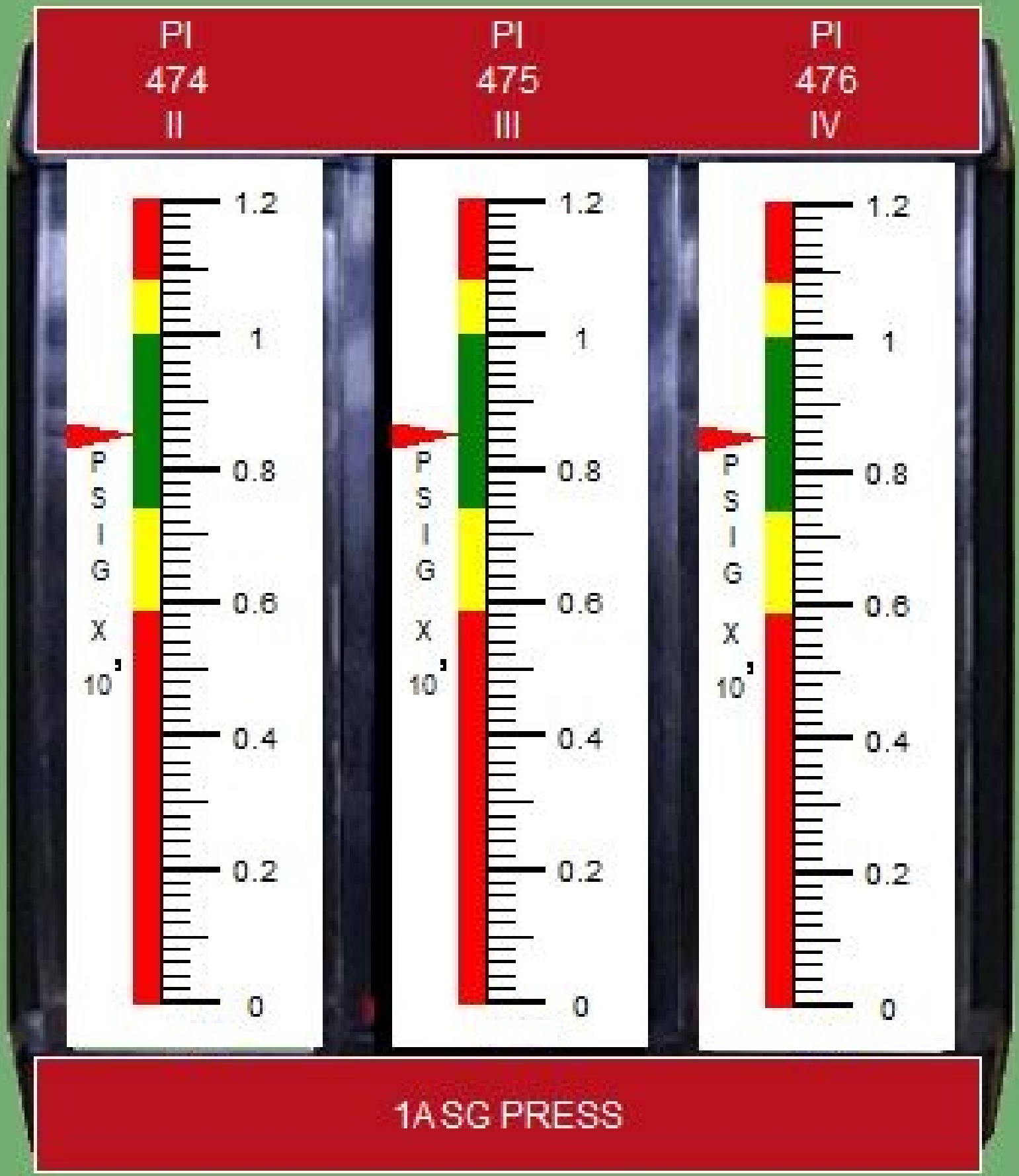
III
FI
496
IV
LBS/HR
X
10
1C SG
FW FLOW

N1N11LR477

EQ
SG WR LVL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II
PI
475
III
PI
476
IV
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0.8
0.6
0.4
0.2
0
PSIG X 10³
1.2
1
0.8
0.6
0.4
0.2
0
PSIG X 10³
1.2
1
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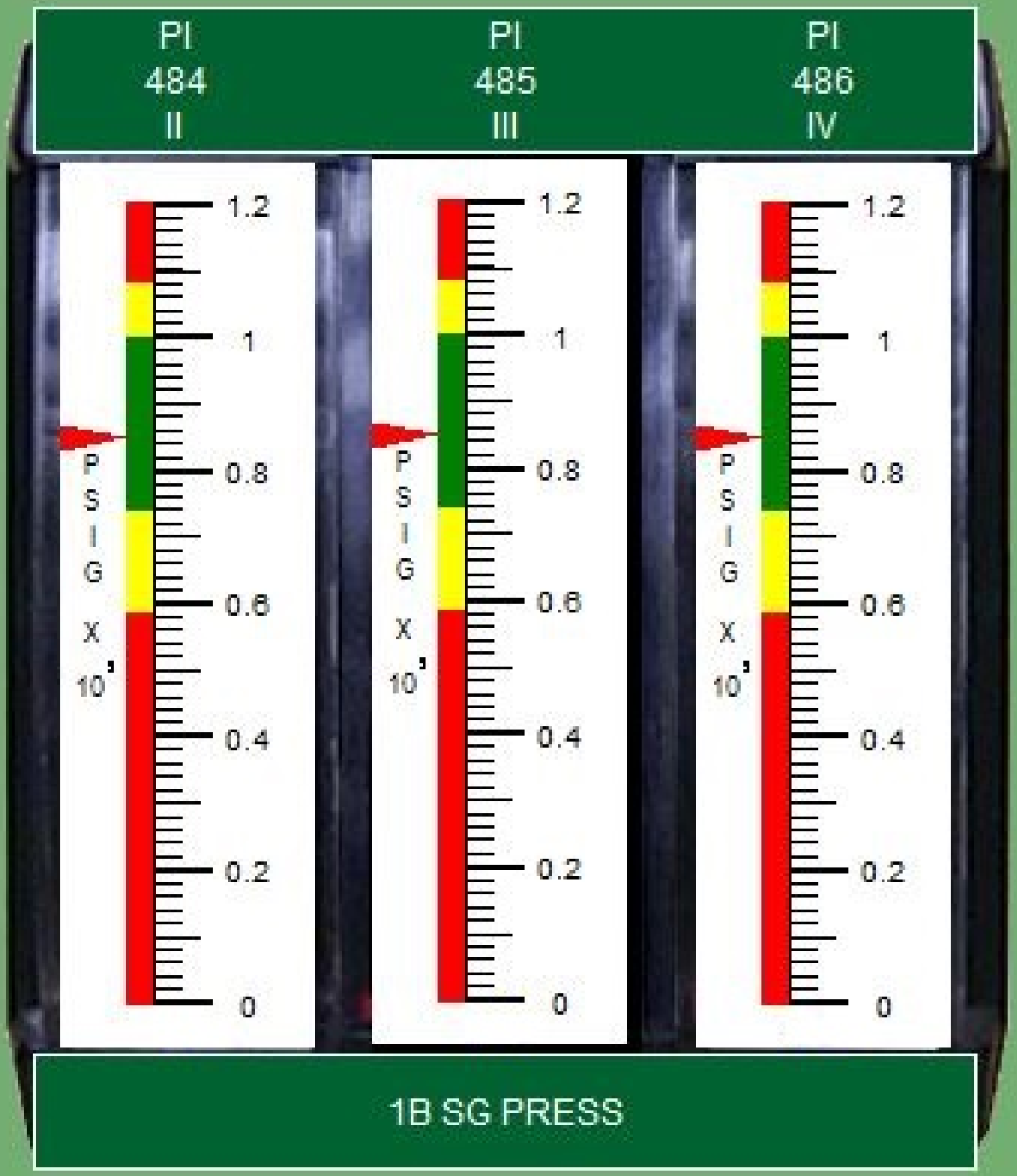
PSIG X 10³
1A SG PRESS


PI
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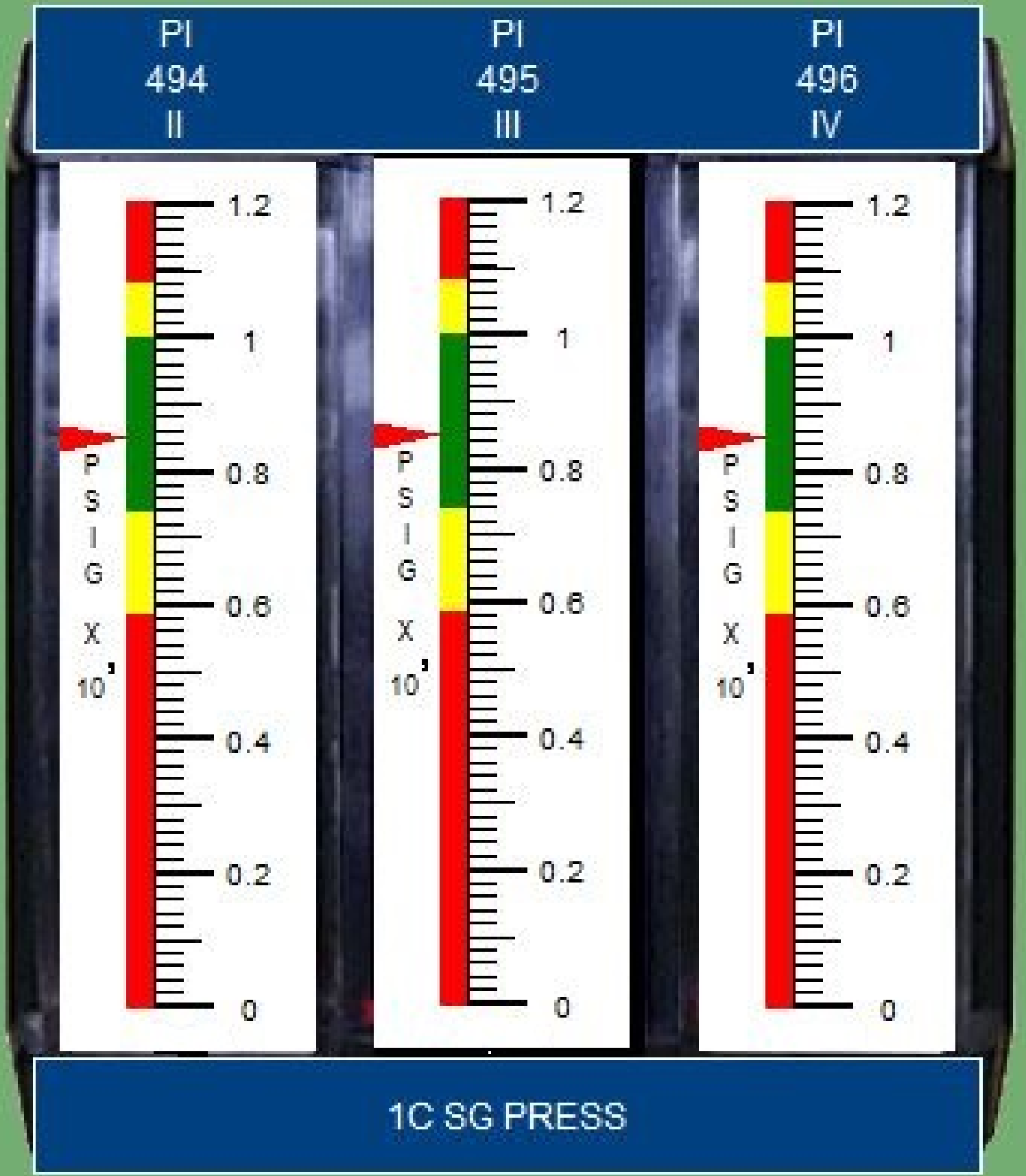
PSIG X 10³
1B SG PRESS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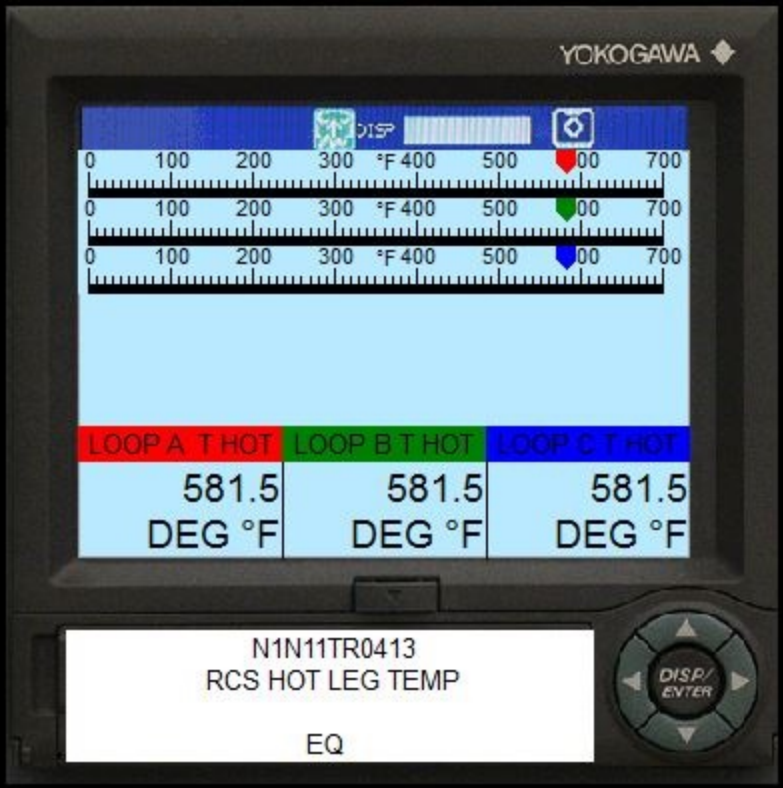
IV
1.2
1
0.8
0.6
0.4
0.2
0
PSIG X 10³
1C SG PRESS

EQ
N1B21TR413



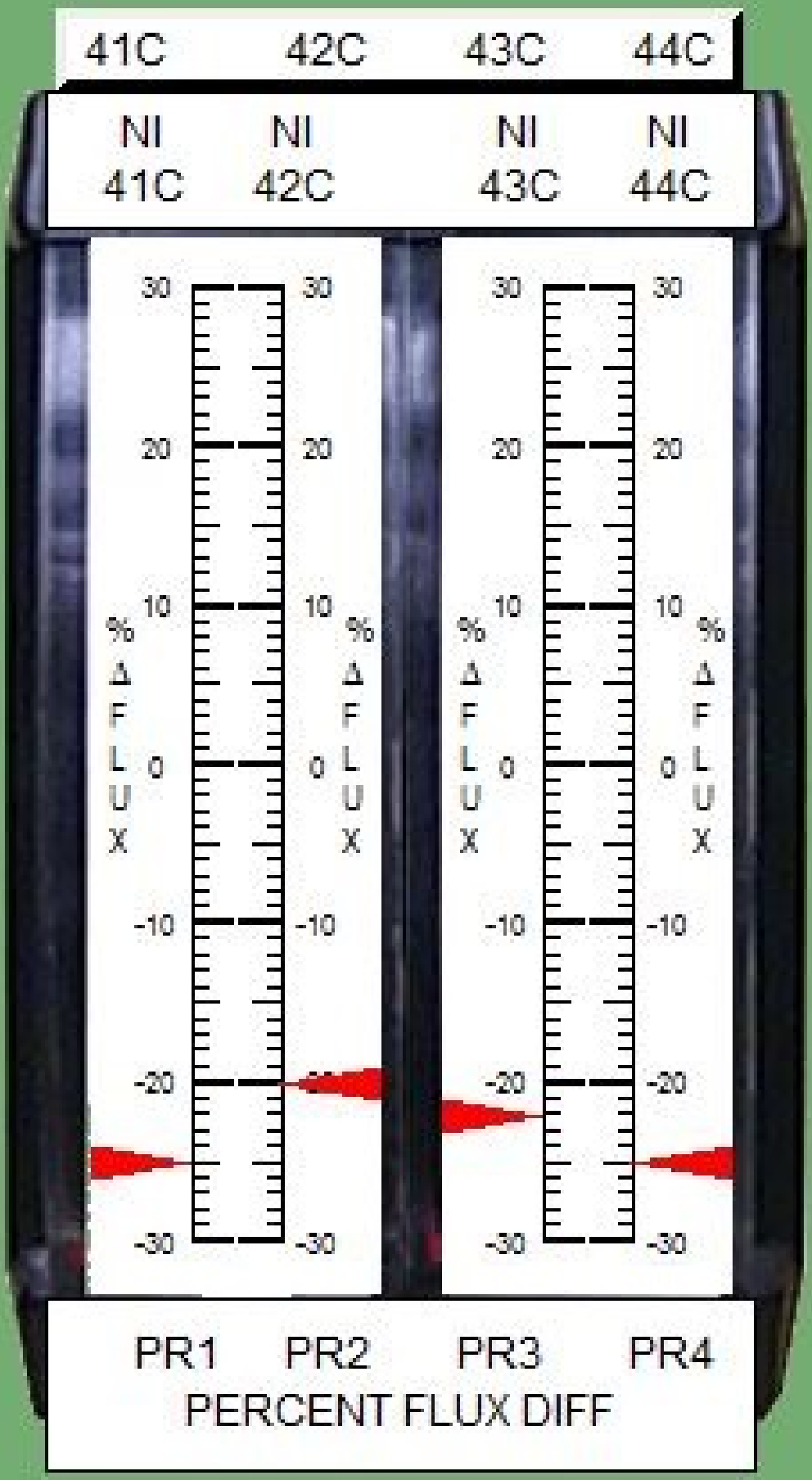
N1N11TR0413
RCS HOT LEG TEMP

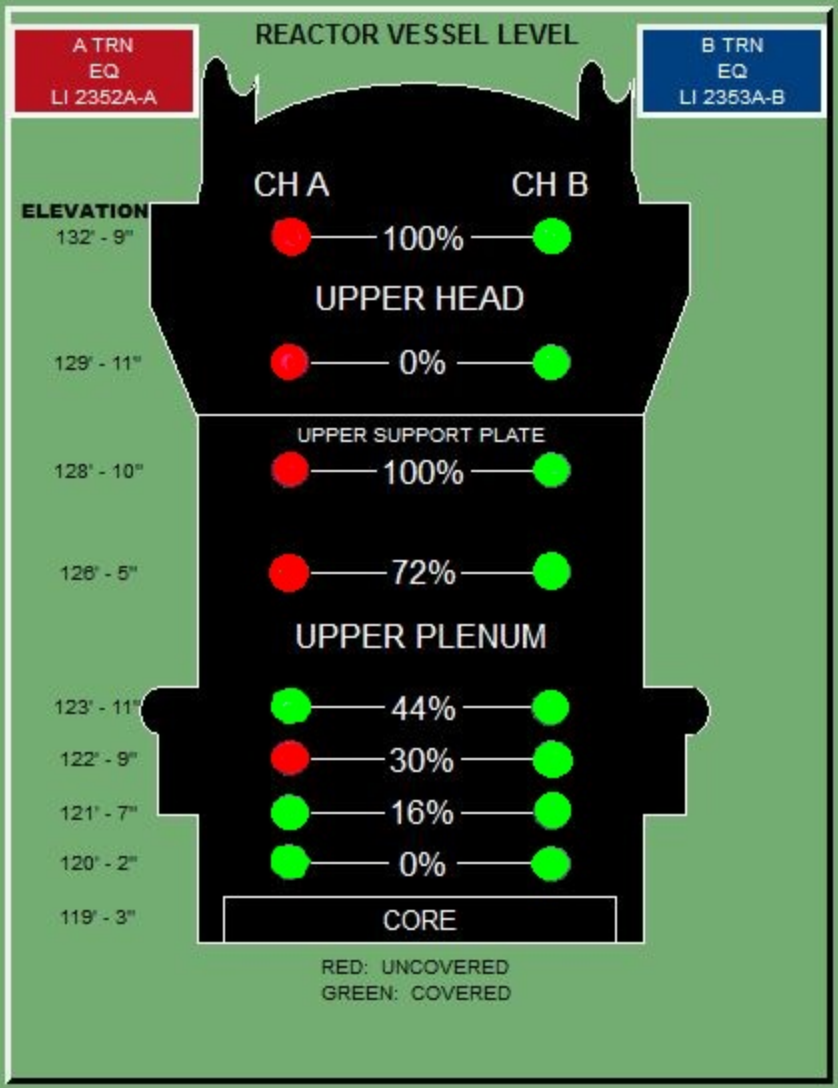
EQ

EQ
N1B21TR410

N1N11TR0410
RCS COLD LEG TEMP

EQ


41C
42C
43C
44C
NI
41C
NI
42C
NI
43C
NI
44C
30
20
10
0
-10
-20
-30
% Δ FLUX
PR1
PR2
PR3
PR4
PERCENT FLUX DIFF


A TRN
EQ
LI 2352A-A
REACTOR VESSEL LEVEL
B TRN
EQ
LI 2353A-B
CH A
CH B
ELEVATION
132' - 9"
100%
UPPER HEAD
129' - 11"
0%
UPPER SUPPORT PLATE
128' - 10"
100%
126' - 5"
72%
UPPER PLENUM
123' - 11"
44%
122' - 9"
30%
121' - 7"
16%
120' - 2"
0%
119' - 3"
CORE
RED: UNCOVERED
GREEN: COVERED

A.2, Equipment Control – SRO

A.2.S
TITLE: Review selected sections of STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS & identify any required actions.
PROGRAM APPLICABLE: SOT ___ SOCT _____ OLT __X__ LOCT_____
ACCEPTABLE EVALUATION METHOD: __X__ PERFORM ___ SIMULATE ___ DISCUSS
EVALUATION LOCATION: ____ SIMULATOR ___ CONTROL ROOM __X__ CLASSROOM
PROJECTED TIME: __20 MIN__ SIMULATOR IC NUMBER: __N/A
ALTERNATE PATH ___ TIME CRITICAL ___ PRA_____

JPM DIRECTIONS:

1. Initiation of task may be in group setting; evaluation performed individually upon completion of the task by reviewing the completed form.
2. Provide the examinee with the required materials to perform this JPM.

TASK STANDARD:

- Review selected sections of STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS & identify any Tech Spec actions required due to inoperable components which do not meet acceptance criteria

Examinee:	
Overall JPM Performance:	**Satisfactory** ☐ **Unsatisfactory** ☐
Evaluator Comments (attach additional sheets if necessary)	

EXAMINER: _____

Developer	S. Jackson	05/07/14
NRC Approval	SEE NUREG 1021 FORM ES-301-3	

CONDITIONS

When I tell you to begin, you are to review pages 10-13 & 26 of FNP-1-STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS. The conditions under which this task is to be performed are:

a. Unit 1 is at 39% power.
b. You are the Shift Supervisor and must:
    1. Review pages 11-14 & 27 of FNP-1-STP-1.0.
    2. IF any component is inoperable, THEN identify ALL required actions for ALL inoperable components.

EVALUATION CHECKLIST

ELEMENTS:		STANDARDS:	RESULTS: (CIRCLE)
_____ START TIME			
1.	Reviews all readings on pages 11-14 & 27 and determines that they are in spec with the exception of the elements below:	1) Reviews all readings and determines that they are in spec with the exception of the following:	S / U
2.	Determines #4, LI-496 for C SG, is out of tolerance low & inoperable.	2) Determines #4, LI-496 for C SG, is out of tolerance low & inop.	S / U
Note: Applicant may also say an ADMIN LCO is required for 3.3.3 (4) Cond A. This is NOT required.			
*3	Determines the required actions from Tech Specs with LI-496 for C SG inoperable.	3) Determines from Tech Specs:	
		a) *3.3.1-1(14): Cond E	S / U
		b) *3.3.2-1(5.b): Cond. I	S / U
		c) *3.3.2-1(6.b): Cond. D	S / U
4.	Determines #8, TR-410 Tcold for Loop 1 & 2, are greater than Maximum deviation between channels & inop, and Loop 3 Tcold is out of commission.	4) Determines #8, TR-410 Tcold for Loop 1 & 2, are greater than Maximum deviation between channels & at least one of the two are inop, and Loop 3 Tcold is out of commission.	S / U
*5.	Determines the required actions from Tech Specs with less than 2 Tcold's operable.	5) Determines from Tech Specs:	
		a) *3.3.3-1(2):Condition A	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
6. Determines #25, CH A RVLIS, has only 3 (<4) sensors operable & Channel A is inop.	6) Determines #25, CH A RVLIS, has less than 4 sensors operable & is inop.	S / U
*7. Determines the required actions from Tech Specs with CH A RVLIS inoperable.	7) Determines from Tech Specs:	
	a) *3.3.3-1(16): Condition A.	S / U

_____ STOP TIME

Terminate when all actions have been identified.

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (*) before the element number.

GENERAL REFERENCES:

1. FNP-1-STP-1.0 Ver 108.0
2. Technical Specifications, Ver 193
3. Technical Specification Bases, Ver 63
4. TRM, Ver 29
5. TRM Bases, Ver 13
6. K/A: G2.2.40 – 3.4 / 3.7
   G2.2.42 – 3.9 / 4.6

GENERAL TOOLS AND EQUIPMENT:

1. Partially marked up version of STP-1.0
2. Technical Specifications, TRM, & Basis (Computer version is available in classroom, book is available in sequester room).

Critical ELEMENT justification:

STEP	**Evaluation**
1.	NOT Critical – Not required as long as applicant recognizes correct Tech Spec issues.
2.	NOT Critical – Evaluation of this element is encompassed by Element 3.
3.	Critical. Task Objective. (3 elements) Proper evaluation of Tech Specs is required to
be able to	operate within the facility license.
4.	NOT Critical – Evaluation of this element is encompassed by Element 5
5.	Critical. Task Objective. Proper evaluation of Tech Specs is required to be able to operate within the facility license.
6.	Not Critical – Evaluation of this element is encompassed by Element 7.
7.	Critical. Task Objective. Proper evaluation of Tech Specs is required to be able to operate within the facility license.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to review pages 10-13 & 26 of FNP-1-STP-1.0, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS. The conditions under which this task is to be performed are:

a. Unit 1 is at 39% power.
b. You are the Shift Supervisor and must:
    1. Review pages 11-14 & 27 of FNP-1-STP-1.0.
    2. IF any component is inoperable, THEN identify ALL required actions for ALL inoperable components.

Table 3.3.1-1 (page 4 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
11.	Not used						
12.	Undervoltage RCPs	1(f)	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 2640 V	≥ 2680 V
13.	Underfrequency RCPs	1(f)	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 56.9 Hz	≥ 57 Hz
14.	Steam Generator (SG) Water Level — Low Low	1,2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.14	≥ 27.6%	≥ 28%

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

Table 3.3.2-1 (page 4 of 4)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
5.	Turbine Trip and Feedwater Isolation						
a.	Automatic Actuation Logic and Actuation Relays	1,2	2 trains	H	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.8	NA	NA
b.	SG Water Level - High High (P-14)	1,2	3 per SG	I	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.9	≤ 82.4%	≤ 82%
c.	Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6.	Auxiliary Feedwater						
a.	Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.8	NA	NA
b.	SG Water Level - Low Low	1,2,3	3 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.9(g)	≥ 27.6%	≥ 28%
c.	Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d.	Undervoltage Reactor Coolant Pump	1,2	3	I	SR 3.3.2.5 SR 3.3.2.7 SR 3.3.2.9	≥ 2640 volts	≥ 2680 volts
e.	Trip of all Main Feedwater Pumps	1	2 per pump	J	SR 3.3.2.10	NA	NA
7.	ESFAS Interlocks						
a.	Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	L	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.8	NA	NA
b.	Reactor Trip, P-4	1,2,3	1 per train, 2 trains	C	SR 3.3.2.6	NA	NA
c.	Pressurizer Pressure, P-11	1,2,3	3	K	SR 3.3.2.4 SR 3.3.2.7	≤ 2003 psig	≤ 2000 psig
d.	T_{avg} - Low Low, P-12 (Decreasing) (Increasing)	1,2,3	1 per loop	K	SR 3.3.2.4 SR 3.3.2.7	≥ 542.6°F ≤ 545.4°F	≥ 543°F ≤ 545°F

(g) Applicable to MDAFW pumps only.

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.8.	Immediately
C. One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1
1. RCS Hot Leg Temperature (Wide Range)	2	E
2. RCS Cold Leg Temperature (Wide Range)	2	E
3. RCS Pressure (Wide Range)	2	E
4. Steam Generator (SG) Water Level (Wide or Narrow Range)	2/SG	E
5. Refueling Water Storage Tank Level	2	E
6. Containment Pressure (Narrow Range)	2	E
7. Pressurizer Water Level	2	E
8. Steam Line Pressure	2/SG	E
9. Auxiliary Feedwater Flow Rate	2	E
10. RCS Subcooling Margin Monitor	2	E
11. Containment Water Level (Wide Range)	2	E
12. Core Exit Temperature - Quadrant 1	2(a)	E
13. Core Exit Temperature - Quadrant 2	2(a)	E
14. Core Exit Temperature - Quadrant 3	2(a)	E
15. Core Exit Temperature - Quadrant 4	2(a)	E
16. Reactor Vessel Level Indicating System	2	F
17. Condensate Storage Tank Level	2	E
18. Deleted		
19. Containment Area Radiation (High Range)	2	F

(a) A channel consists of two core exit thermocouples.

OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS

PROCEDURE LEVEL OF USE CLASSIFICATION PER NMP-AP-003	
CATEGORY	**SECTIONS**
Continuous:	**ALL**
Reference:	**NONE**
Information:	**NONE**

Approved By: David L. Reed
Operations Manager

Effective Date: 07/12/14

Version Number	Version Description
105.0	Revised step 58 of Appendix 1 by deleting PDI-3317 reference. Changed acceptance criteria for Appendix 1, item 1 from 150K to 160K gallons. (CR355457). Added guidance to acceptance criteria for item 14 of appendix 1 per ES request.
105.1	Appendix 1, Changed ARO rod height for Fuel Cycle 25.
105.2	Added note below containment temperature page referencing FNP-0-SOP-0.16.
105.3	Added place keeping blocks to item 38 to signify which CTMT cooler fan is selected at the time STP-1.0 is performed..
105.4	Revised note in Item 1 to read 13.0 ft for CST level. CR 465834
105.5	Deleted Item 58 and combined requirements with Item 34. Renumbered.
105.6	Appendix 1, item 11, changed EOL Coastdown variance information. CR 482797
106.0	App 1 Item 52, App 2 Item 16, App 3 Item 17; Incorporated new Met Tower instruments per DCP C072201201
106.1	App 1 Item 52, App 2 Item 16, App 3 Item 17; Added units for data and changed IPC group reference
107.0	Implemented changes to LTOP items per LDCR 2012011.
107.1	Corrected missing border in item 53 of Appendix 1.
108.0	Deleted requirement to check PAHA's every Sunday night. CR 778297
108.1	Corrected typo in TS reference for Appendix 1, item 90. CR 787702
109.0	Added item 70.0. CR 804136
110.0	Added expected variation for N35&36
111.0	Revised Item 37 to include guidance to Contact ES to evaluate UHS operability if recorded SW Pond temperature reaches or exceeds 90 deg. F.
112.0	Major revision to the instructions and acceptance criteria. CR 818977, CR 788318, deleted fig. 1

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides a means for recording data required on a shift and daily basis.

2.0 PRECAUTION AND LIMITATIONS

Each Appendix contains applicable Precaution and Limitation statements.

3.0 INITIAL CONDITIONS

None

4.0 ACCEPTANCE CRITERIA

Each Appendix contains applicable Acceptance Criteria statement.

5.0 INSTRUCTIONS

NOTE

The Shift or Daily Logs shall be considered complete when all items have been completed, with the following exceptions: (1) items that have been designated as being performed anytime during the shift, and (2) 1600 SFP readings. These items shall be completed prior to the final review. ☐ ☒

5.1 A Daily and Shift Surveillance for applicable modes shall be completed every day. ☐ ☒

5.2 Utilize one of the methods given below to verify each parameter, condition, component or system as specified by the LCO.

5.2.1 Verification of a Measured Parameter. ☐ ☒

Confirm the measured parameter is within the limits specified in the Acceptance Criteria column.

5.2.2 Verification of a Specified Condition.

Confirm the component, instrument, or system listed satisfies that specified in the Acceptance Criteria column. ☐ ☒

5.2.3 Channel Check

Observe the instrument response. The operability of instrument channels, which have indication available, shall be verified by one or more of the following:

- Comparing readings on channels which monitor the same variable recognizing any differences in the actual process variable between sensor locations (for example, compare Power Channel N41 with redundant Power Channels N42 and N43), ☐ ☒
- Comparing readings between channels that monitor the same variable and bear a known relationship to one another (for example, comparing intermediate range and source range neutron monitoring during startup or shutdown when both channels indicate on scale), ☐ ☒
- Comparing readings between channels which monitor different variables and bear a known relationship to one another (for example, at a given power level the primary coolant outlet temperature is a certain value). ☐ ☒

5.3 Complete the appropriate Appendix for the applicable mode(s) per the following:

5.3.1 The operator completing the surveillance shall enter the mode, time, and his/her name in the appropriate space on the review sheet. ☐ ☒

5.3.2 Except where specified in the Appendix, the data for each item should be taken AND logged in the column provided between the times given below to ensure that 12 hour surveillance requirements are met:

- 1100 and 1230 on Day Shift ☒
- 2300 and 0030 on Night shift ☒

5.3.3 List shift data under the appropriate shift column. ☐ ☒

5.3.4 Data need not be recorded in sequence. ☐ ☒

5.3.5 Recording a numerical value for an item when not in a Mode that requires an entry is permissible. ☐ ☒

5.3.6 IF data can NOT be logged for any of the following conditions, enter "N/A" (OR "IN TEST" as applicable) in the appropriate space. ☐ ☒

- The equipment or instrument is NONFUNCTIONAL (broken, or in maintenance) AND the applicable LCO action statement has been entered.
- The plant is in a mode or condition such that the surveillance does not apply. {AI2008200006}
- The channel is in test.
- Condition makes logging impractical.

5.3.7 Where no value is required to be logged for an item, the operator will initial the appropriate space. ☐ ☑

5.3.8 WHEN a channel check is performed on an instrument that has a numerical readout, the actual value will be recorded, unless otherwise noted. Initials must be used to document performance of other channel checks and verifications. ☐ ☑

5.3.9 IF a daily OR shift surveillance item can NOT be taken from the listed indicator, BUT is available by some other indication, THEN that value will be listed in the appropriate space and the indicator actually used for the surveillance noted. ☐ ☑

5.3.10 Some data has been assigned an eight hour commitment and will be logged in the appropriate time slot. ☐ ☑

5.3.11 The operator completing the miscellaneous section shall enter the title, time, value, acceptance criteria comments, and technical specification requirement in the appropriate columns. ☐ ☑

5.3.12 Surveillance required due to special or abnormal plant conditions which are not normally taken on a shift or daily basis shall be entered in the miscellaneous section of the appropriate Appendix. ☐ ☑

5.3.13 The Shift or Daily Logs shall be submitted to the Shift Supervisor for his/her review by the following times:

- 1300 for Day Shift ☐
- 0100 for Night Shift ☑

5.3.14 The Shift Supervisor or Shift Support Supervisor shall enter any discrepancies and/or comments in the review section of the appropriate Appendix. ☐ ☑

5.4 The body of this procedure shall be printed out and attached to the appropriate Appendix. **{AI2008200007}** ☐ ☑

5.5 The modes for which surveillance on an item is required are listed in the Acceptance Criteria column. ☐ ☑

5.6 The acceptance criteria for the logged data is also listed in the Acceptance Criteria column. ☐ ☑

5.7 The technical specification reference is listed for each item in the Tech. Spec. column. ☐ ☑

5.8 The operator shall inform the Shift Supervisor promptly of any new discrepancies in the Shift or Daily Logs. ☐ ☑

5.9 Upon notification of a new discrepancy, and during review of existing discrepancies, the Shift Supervisor is responsible for evaluating the discrepancy and ensuring that all appropriate actions are initiated including any that are required to meet any applicable Technical Specification action statements. ☐ ☑

5.10 Comments regarding all discrepancies shall be included in the comments section of the Surveillance Test Review Sheet. ☐ ☒

5.11 Compare data taken to the expected variations between instrumentation channels. This information, where applicable, along with the maximum allowable deviation is provided in the appropriate Appendix at the step where data is being taken and in Table 1 of Appendix 1. ☐ ☒

5.11.1 IF the variance is greater than expected, submit a Condition Report to the Shift Supervisor to correct the out of tolerance instrument. ☐ ☒

5.12 Marking the STRS as “Acceptable” means that all data points are within their applicable tolerances, meeting the acceptance criteria, or identified and justified by a reason in the comments section (or Appendix). ☐ ☒

6.0 RECORDS

Documents created using this procedure will become QA Records when completed unless otherwise stated. The procedures and documents are considered complete when issued in DMS.

QA Record (X)	Non-QA Record (X)	Record Generated	Retention Time	R-Type
X		FNP-1-STP-1.0	Life of Plant	H06.045

7.0 REFERENCES

7.1 Technical Specifications.

7.2 FNP-0-M-011, Offsite Dose Calculation Manual.

7.3 FSAR Chapter 16

7.4 Technical Requirements Manual

END OF PROCEDURE TEXT

APPENDIX 1, OPERATIONS DAILY AND SHIFT SURVEILLANCE REQUIREMENTS, MODES 1, 2, 3, 4

This appendix consists of 47 pages.

SURVEILLANCE TEST REVIEW SHEET

SURVEILLANCE TEST NO. FNP-1-STP-1.0		**TECHNICAL SPECIFICATION REFERENCE** Various		
TITLE: Operations Daily and Shift Surveillance Requirements		**MODE(S) REQUIRING TEST:** 1, 2, 3, 4		
NIGHT SHIFT OPERATOR	_____/_____ (PRINT) (SIGNATURE)	**DATE/TIME** _____/_____	**MODE**	**ACCEPTABLE** ☐YES ☐ NO
NIGHT SHIFT SUPERVISOR REVIEW	_____/_____ (PRINT) (SIGNATURE)			
DAY SHIFT OPERATOR	_____/_____ (PRINT) (SIGNATURE)	**DATE/TIME** _____/_____	**MODE**	**ACCEPTABLE** ☐YES ☐ NO
DAY SHIFT SUPERVISOR REVIEW	_____/_____ (PRINT) (SIGNATURE)			

COMMENTS:
CR987654 - A train RVLIS - 5 of 8 sensors are not working
CR123456 - TR-410, Loop 3 is OOC

FINAL SHIFT SUPERVISOR/SHIFT SUPPORT SUPERVISOR REVIEW

PROCEDURE PROPERLY COMPLETED SATISFACTORY PER FNP-0-AP-5 ☐
0800 AND 1600 SFP READINGS HAVE BEEN REVIEWED ☐
COMMENTS:_____

REVIEWED BY:	_____/_____ (PRINT)	(SIGNATURE)	_____ (DATE)
ENGINEERING SUPPORT GROUP SCREENING (IF APPLICABLE)			
SCREENED BY:	_____/_____ (PRINT)	(SIGNATURE)	_____ (DATE)

1.0 PURPOSE

This procedure provides a means for recording data required on a shift and daily basis. ☐ ☒

2.0 PRECAUTION AND LIMITATIONS

2.1 Each parameter should be logged as accurately as possible. ☐ ☒

2.2 It is permissible to use N/A for any parameter under the following conditions**:** **{AI2008200006}**

- The equipment or instrument is INOPERABLE (broken, or in maintenance) and the applicable LCO action statement has been entered. ☐ ☒
- The plant is in a mode or condition such that the surveillance does not apply. ☐ ☒

2.3 The SS/SM will be notified immediately if the “As Found” condition is out of tolerance when the “As Found” condition is evaluated against the acceptance / functional criteria. ☐ ☒

3.0 INITIAL CONDITIONS

3.1 **Verify** the version of this procedure has been verified to be the current version. **{OR 1-98-498}** ☐ ☒

3.2 **Verify** this procedure to be for the correct unit for the task. **{OR 1-98-498}** ☐ ☒

3.3 **Verify** the Body of FNP-1-STP-1.0 is attached to this Appendix. **{AI2008200007}** ☐ ☒

4.0 ACCEPTANCE CRITERIA

Logged data shall be within the acceptance criteria listed in the appropriate Appendix. ☐ ☒

	TITLE	NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
1.	Condensate Storage Tank			Mode 1, 2, 3;	SR 3.7.6.1
	*LI4005B	37		≥ 160,000 gallons (13.0 ft.)	

*IF LI4005B is out of service, THEN adequate level (13.0 ft) may be checked using AFW pump suction pressure indication PI-3211A and verifying indicated pressure is ≥ 32 psig **{Ref. FP 98-0553, dated Sept. 30, 1998; NEL-98-0387}**. The use of this alternative means of verifying level should be documented in the miscellaneous section. Administratively, CST minimum level increased to ≥ 160,000 gallons per CR355457.

2.	Auxiliary Feedwater Flow Rate (GPM)			Mode 1, 2, 3;	3.3.3-1(9): SR 3.3.3.1
	FI 3229A	0		Channel Check	
	FI3229B	0			
	FI3229C	0			
3.	Turbine Impulse Pressure (Psig)				3.3.1-1(17.f): SR 3.3.1.1
	PT 446	185		Mode 1;	
	PT 447	195		Channel Check	
				Expected variation: ± 20 psi Maximum deviation between channels: 40 psi	

	TITLE		NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
4.	SG Level (%)					
	SG 1A	LI 474	65		Channel Check	
		LI 475	67		Mode 1, 2;	3.3.1-1(14):SR 3.3.1.1
					Mode 1, 2;	3.3.2-1(5.b):SR 3.3.2.1
		LI 476	64		Mode 1, 2, 3;	3.3.2-1(6.b):SR 3.3.2.1
		LR 477 (WR) PEN 1	62.1		Mode 1, 2, 3;	3.3.3-1(4):SR 3.3.3.1
	SG 1B	LI 484	64		Mode 3;	
		LI 485	64		NR Level ≥ 30% for at least 2 SGs	SR 3.4.5.2
		LI 486	64		Mode 4;	
		LR 477 (WR) PEN 2	62.1		WR Level ≥ 75% for SG in operating Reactor Coolant Loop	SR 3.4.6.2
	SG 1C	LI 494	64		Expected variation: ± 4%	
		LI 495	64		Maximum deviation between channels: 8%	
		LI 496	51			
		LR 477 (WR) PEN 3	62.1			

	TITLE		NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
5.	SG Feed Flow (lbm/hr)				Mode 1, 2; Channel Check	N/A
	SG 1A	FI 477	1.4 x 10^6	x 10^6		
		FI 476	1.35 x 10^6	x 10^6		
	SG 1B	FI 487	1.4 x 10^6	x 10^6		
		FI 486	1.35 x 10^6	x 10^6		
	SG 1C	FI 497	1.4 x 10^6	x 10^6		
		FI 496	1.35 x 10^6	x 10^6		

NOTE

IF any channel III or IV pressure transmitter is out of service for surveillance testing or otherwise inoperable, THEN the corresponding steam flows may be channel checked using the appropriate points off the plant computer (in units of KBH) or by I&C direct readout. Since the MCB FI's are compensated for steam pressure but the computer points are not, compare only FI data to FI data, or computer point to computer point. Note on the Surveillance Test Review Sheet comments section whenever the alternate method of channel check is used. ☐ ☒

6.	SG Steam Flow (lbm/hr)				Mode 1, 2[d], 3[d]; d) Except when one MSIV is closed in each steam line. Channel Check	3.3.2-1(4.e): SR 3.3.2.1
	SG 1A	FI 474 (FE0474B)	1.5 x 10^6	x 10^6		
		FI 475 (FE0475B)	1.4 x 10^6	x 10^6		
	SG 1B	FI 484 (FE0484B)	1.4 x 10^6	x 10^6		
		FI 485 (FE0485B)	1.4 x 10^6	x 10^6		
	SG 1C	FI 494 (FE0494B)	1.4 x 10^6	x 10^6		
		FI 495 (FE0495B)	1.4 x 10^6	x 10^6		

	TITLE		NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
7.	SG Pressure (psig)					
	SG 1A	PI 474	890		Channel Check	
		PI 475	880		Mode 1, 2, 3;	3.2-1(1.e.2):SR 3.3.2.1
		PI 476	870		Mode 1, 2[d], 3[b,d];	3.3.2-1(4.d):SR 3.3.2.1
	SG 1B	PI 484	890		Mode 1, 2, 3[b];	3.3.2-1(1.e.1):SR 3.3.2.1
		PI 485	880		Mode 1, 2, 3;	3.3.3-1(8):SR 3.3.3.1
		PI 486	850		(b) Above the P-12 interlock. (d) Except when one MSIV closed in each steam line.	
	SG 1C	PI 494	880		Expected variation: ± 40 psi	
		PI 495	880		Maximum deviation between channels: 50 psi	
		PI 496	870			
8.	RCS Temperature (°F)					
	T_{HOT}	(TR 413)				
		Loop 1	567.1		Mode 1, 2, 3;	3.3.3-1(1):SR 3.3.3.1
		Loop 2	568.5		Channel Check	3.3.3-1(2):SR 3.3.3.1
		Loop 3	562.4			
	T_{COLD}	(TR 410)				
		Loop 1	541			
		Loop 2	516.2		Expected variation: ± 17°F	
		Loop 3	OOC*		Maximum deviation between channels: 23°F	

* - CR123456 written.

	TITLE	NIGHT	DAY	ACCEPTANCE CRITERIA	TECH SPEC
23.	Axial Flux Difference (%)				
	N-41	-0.15		Mode 1, Power ≥ 50% RTP; Within limits of COLR	SR 3.2.3.1
	N-42	-0.2			
	N-43	-0.2			
	N-44	-0.15			
	AFD Target Point for Present Power Level	-0.1	(Curve 64)		
24.	Sub Cooled Margin Monitor (°F)				

	RTD	CETC
Q1B14TI2354-A	84.4	70.6
Q1B14TI2355-B	84.1	66.8

Mode 1, 2, 3; Channel Check Record subcooling margin and TMAX — 3.3.3-1(10): SR 3.3.3.1

	TMAX
Q1B14TI2301-A	583
Q1B14TI2302-B	587

25.	Reactor Vessel Level Indicating System (MCB Mimic)	Initial	Mode 1, 2, 3; Perform Channel Check. Verify at least 4 sensors operable per channel by comparing each valid sensor with its corresponding sensor in the opposite train to verify they display the same state. IF one train is inoperable, THEN verify that at least 4 sensors indicate properly in the opposite train.	3.3.3-1(16): SR 3.3.3.1
	Channel A	*		
	Channel B	LMN		

* 3 of 8 sensors on 'A' train are working (5 of 8 sensors are not working). CR987654.

TABLE 1
Expected Variations Between Instrumentation Channels During Normal Operation

NOTE
If recorded data is greater than the expected variation, a CR should be submitted to correct the out of tolerance instrument and so note in the deficiency section of the Surveillance Test Review Sheet. ☐ ☐

Parameter	Expected Variation	Maximum Deviation Between Channels
Reactor coolant average temperature indicators	± 3°F	6°F
Delta-T indicators	± 3.7%	7.4%
Reactor coolant flow indicators	± 5%	9%
Pressurizer pressure indicators	± 30 psi	48 psi
Pressurizer level indicators	± 4%	8%
Steam generator level indicators (narrow range)	± 4%	8%
Steam line pressure indicators	± 40 psi	50 psi
Turbine impulse chamber pressure indicators	± 20 psi	40 psi
The overpower ΔT reactor trip setpoints	± 3.5%	6%
The overtemperature ΔT reactor trip setpoints	+ 7.5%	18.8%
Top nuclear flux indicators	± 2%	3.6%
Bottom nuclear flux indicators	± 2%	3.6%
RCS temperature recorders	± 17°F	23°F

A.3, Radiation Control – RO & SRO

A.3
TITLE: Calculate the Maximum Permissible Stay Time within Emergency Dose Limits.
PROGRAM APPLICABLE: SOT ___ SOCT _____ OLT __X__ LOCT_____
ACCEPTABLE EVALUATION METHOD: __X__ PERFORM ___ SIMULATE ___ DISCUSS
EVALUATION LOCATION: ____ SIMULATOR ___ CONTROL ROOM __X__ CLASSROOM
PROJECTED TIME: __20 MIN__ SIMULATOR IC NUMBER: __N/A
ALTERNATE PATH ___ TIME CRITICAL ___ PRA_____

JPM DIRECTIONS:

1. Initiation of task may be in group setting, evaluation performed individually upon completion.
2. The references for this task will be provided as listed or the student may be provided a computer with a generic exam login and access to the EXAM reference disk.
3. Elements 1 through 7 may be evaluated by reviewing the responses on the Handout.

TASK STANDARD: Required for successful completion of this JPM:

- Calculate dose expected for Tasks 1 through 3
- Calculate the maximum allowable stay time for a task; or determine what tasks can be performed, if any, without exceeding limits.

Examinee:
Overall JPM Performance: Satisfactory ☐ **Unsatisfactory** ☐
Evaluator Comments (attach additional sheets if necessary)

EXAMINER: _____

CONDITIONS

When I tell you to begin, you are to **Calculate the Maximum Permissible Stay Time within Emergency Dose Limits**. The conditions under which this task is to be performed are:

a. A General Emergency has been declared on Unit 1.
b. 1A RHR pump is air bound and must be vented per AOP-12, Attachment 1, RHR Pump Venting.
c. The TSC has requested that 1B RHR pump motor bearing oil levels be checked and filled as required after restoring 1A RHR and suggests using the same Repair team. The time required to perform this task is unknown, but is estimated to range between 1 to 20 minutes.
d. You have been selected to perform the task.
e. The tasks are provided in the table below, and estimated times and doses have been provided.
f. Each task must be completed in the order listed.
g. The Emergency Director (ED) directs you to perform the following with the information provided:
   - Calculate the expected dose for tasks 1 through 3 and document in the table.
   - Determine which tasks, if any, for which you could be permitted to complete in the given order without exceeding the equipment protection emergency dose limits of 10 REM.
     - If you will NOT exceed emergency dose limits prior to performing task 4, THEN calculate the maximum allowable stay time to complete task 4, and remain within the dose limits.
     - IF you WILL exceed emergency dose limits prior to performing task 4, THEN identify the last tasks (if any) that you can complete without exceeding dose limits.

Task #	Location/Task description	Time allowed/ req'd (minutes)	Dose Rate (R/hr)	Dose
1	83' 1A RHR Pump and HX rooms/ Vent rig installation and venting	30	5.31	
2	100' piping penetration room/ Vent rig installation and venting	15	19.75	
3	121' piping penetration room/ Vent rig installation and venting	20	8.65	
4	Inspect 1B RHR pump motor bearing oil levels and fill as required		7	

Can you perform all of the tasks? (Circle one) YES / NO

IF yes, then state the maximum permitted stay time for task #4. _____

IF no, then state the highest sequential task # that can be completed, if any. _____

INITIATING CUE: "You may begin."

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
_____ START TIME		
1. Determine the dose received for tasks 1 through 3.	1) Calculates (in REM)	
* a. Task #1 $(30\,\text{min}) \times 5.31 R/hr \times \left(\frac{1 hr}{60\,\text{min}}\right) = 2.66 REM$	a) 2.66 {Range 2.6 to 2.7}	S / U
* b. Task #2 $(15\,\text{min}) \times 19.75 R/hr \times \left(\frac{1 hr}{60\,\text{min}}\right) = 4.938 REM$	b) 4.938 {4.9 to 5.0}	S / U
* c. Task #3 $(20\,\text{min}) \times 8.65 R/hr \times \left(\frac{1 hr}{60\,\text{min}}\right) = 2.88 REM$	c) 2.88 {2.8 to 2.9}	S / U

NOTE: • A Cue may be required to obtain responses for each element if the candidate does not clearly document results. Provide the Cue as stated on the Handout.

* 2. Evaluates exposure NOT within 10 REM for completion of tasks 1 through 4. a. Summation of Task 1 through 3 $10 REM - (2.66 + 4.94 + 2.88) REM =$ $-.48 REM$	2) Circles NO on handout –OR– states that all tasks CANNOT be completed. a) Exceeds 10 R limit	S / U
* 3. Determines task 2 is the highest sequential Task that can be performed.	3) Documents –OR– States: Task #2 is the highest sequential task that can be performed	S / U

_____ STOP TIME

Terminate when all elements of the task have been completed.

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (*) before the element number.

GENERAL REFERENCES:

1. FNP-0-EIP-14.0, ver 29
2. FNP-0-M-1.0, ver 18.0
3. KA: G2.3.4 - 3.2 / 3.7

GENERAL TOOLS AND EQUIPMENT:

Provide/Acquire:

1. Computer with access to Exam Reference Disk, or EIP 14.0, ver 29.0 and M-1.0, version 18.0.
2. Calculator
3. pens/pencils
4. Scrap paper

Critical ELEMENT justification:

STEP	Evaluation
1.a	Critical - Task Objective. Improper calculation may cause personnel to exceed exposure limits.
1.b	Critical - Task Objective. Improper calculation may cause personnel to exceed exposure limits.
1.c	Critical - Task Objective. Improper calculation may cause personnel to exceed exposure limits.
2	Critical - Task Objective. Improper calculation may cause personnel to exceed exposure limits.
3	Critical - Task Objective. Improper evaluation may cause personnel to exceed exposure limits.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to **Calculate the Maximum Permissible Stay Time within Emergency Dose Limits**. The conditions under which this task is to be performed are:

a. A General Emergency has been declared on Unit 1.
b. 1A RHR pump is air bound and must be vented per AOP-12, Attachment 1, RHR Pump Venting.
c. The TSC has requested that 1B RHR pump motor bearing oil levels be checked and filled as required after restoring 1A RHR and suggests using the same Repair team. The time required to perform this task is unknown, but is estimated to range between 1 to 20 minutes.
d. You have been selected to perform the task.
e. The tasks are provided in the table below, and estimated times and doses have been provided.
f. Each task must be completed in the order listed.
g. The Emergency Director (ED) directs you to perform the following with the information provided:
   - Calculate the expected dose for tasks 1 through 3 and document in the table.
   - Determine the tasks, if any, for which you could be permitted to perform without exceeding the equipment protection emergency dose limits of 10 REM.
     - If you will NOT exceed emergency dose limits prior to performing task 4, THEN calculate the maximum allowable stay time to complete task 4, and remain within the dose limits.
     - IF you WILL exceed emergency dose limits prior to performing task 4, THEN identify the last tasks (if any) that you can complete without exceeding dose limits.

Task #	Location/Task description	Time allowed/ req'd (minutes)	Dose Rate (R/hr)	Dose
1	83' 1A RHR Pump and HX rooms/ Vent rig installation and venting	30	5.31	
2	100' piping penetration room/ Vent rig installation and venting	15	19.75	
3	121' piping penetration room/ Vent rig installation and venting	20	8.65	
4	Inspect 1B RHR pump motor bearing oil levels and fill as required		7	

Can you perform all of the tasks? (Circle one) YES / NO

IF yes, then state the maximum permitted stay time for task #4. _____

IF no, then state the highest sequential task # that can be performed, if any. _____

A.4, Emergency Plan – SRO ONLY

A.4
TITLE: Provide a Protective Action Recommendation (PAR).
PROGRAM APPLICABLE: SOT ___ SOCT _____ OLT __X__ LOCT_____
ACCEPTABLE EVALUATION METHOD: __X__ PERFORM ___ SIMULATE ___ DISCUSS
EVALUATION LOCATION: ____ SIMULATOR ____ CONTROL ROOM __X__ CLASSROOM
PROJECTED TIME: __15 MIN__ SIMULATOR IC NUMBER: __N/A
ALTERNATE PATH ____ TIME CRITICAL __X__ PRA___

JPM DIRECTIONS:

1. This task can be conducted individually or in a group setting in which all the necessary references are available.
2. Provide the candidate the HANDOUT page and allow for familiarization with the task for the event in progress. Since this is a Time Critical task, allow the candidate time to review and understand the task.
3. When the candidate understands his task, provide the candidate a copy of the partially prepared Message Number 001 (partially prepared requiring the candidate to complete line 5) and the procedure NMP-EP-112, and allow him to begin. This starts the time critical time.
4. Ensure a clock is in the room in which this task will be conducted.
5. This task is TIME CRITICAL.

CAUTION: A KEY is included and precedes the student handout. CARE must be taken when providing the Student HANDOUT as to not also include the KEY.

TASK STANDARD: Upon successful completion of this JPM, the examinee will:

- Correctly assess the necessary PARs.
- Complete the ENN FORM LINE 5, providing a PAR recommendation to the ED within 15 minutes from beginning of task.

Examinee:	
Overall JPM Performance:	**Satisfactory** ☐ **Unsatisfactory** ☐
Evaluator Comments (attach additional sheets if necessary)	

EXAMINER: _____

Developer	S. Jackson	05/07/14
NRC Approval	SEE NUREG 1021 FORM ES-301-3	

CONDITIONS

When I tell you to begin, you are to **PROVIDE A PROTECTIVE ACTION RECOMMENDATION (PAR).** The conditions under which this task is to be performed are:

a. Unit 1 has declared a General Emergency based on EAL# FG1;
   FG1: Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier.
b. A LOCA has occurred and Containment venting is in progress to reduce Hydrogen.
c. Total Containment vent time will be 50 minutes.
d. Dose Assessment is provided that dose at site boundary will be:
   - 1150 mR TEDE
   - 3500 mR Thyroid CDE
e. The IPC function "EP WEATHER" is not available.
f. The current MET Tower data is as follows:
   - Wind Direction from 045 degrees.
   - Wind Speed 4.5 mph.
   - Precipitation none.
   - ΔT value is -0.25°F.
g. The ENN Form has been manually completed by another operator with the exception of LINE 5.
h. You are required to develop the PARS per NMP-EP-112, Attachment 1, INITIAL ACTIONS, **AND** complete the following documentation:
   - NMP-EP-112, Attachment 5, PAR Worksheet.
   - Line 5 of the Emergency Notification Form message #001.
i. This task has **TIME CRITICAL** elements.

INITIATING **CUE**: "IF you have no questions, you may begin."

EVALUATION CHECKLIST

ELEMENTS:	**STANDARDS:**	**RESULTS (CIRCLE)**
____ CRITICAL TIME START		
1. Attachment 1 step A.1 & A.2, And ATTACHMENT 5 step 1.	1) Attachment1 step A.1 & A.2, And ATTACHMENT 5 step 1.	S / U
a. Review conditions and Attachment 1 Flowchart to determine PAR.	a) Determines PAR 1 is applicable.	
b. Documents on Attachment 5	b) Documents ATTACHMENT 5 PAR 1 Check box.	

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS (CIRCLE)
2. Attachment 5 step 2:	2) Attachment 5 step 2:	S / U
a. Records the 15 minute average "wind direction from" for the selected PAR.	a) Records "045" in the PAR 1 section for Wind direction.	
3. Attachment 1 step A.3: And ATTACHMENT 5 Step 3.	3) Attachment 1 step A.3: And ATTACHMENT 5 Step 3.	S / U
a. Utilizes ATTACHMENT 2 Table 1 to determine affected Zones 045 degrees.	a) Identifies zones A, B5, C5 and D5 are the affected ZONES.	
4. Attachment 1 step A.4: And ATTACHMENT 5 step 3	4) Attachment 1 step A.4: And ATTACHMENT 5 step 3 & CAUTION	S / U
a. Utilizes ATTACHMENT 5 to document affected zones. A B5 C5 D5	a) DOCUMENTS on ATTACHMENT 5 zones A, B5, C5, D5, are the ZONES to shelter.	

NOTE: The three (3) items under 5) a) are the CRITICAL steps and have an * also.

ELEMENTS:	STANDARDS:	RESULTS (CIRCLE)
* 5. Attachment 1 step A.5: And ATTACHMENT 5 step 3	5) Attachment 1 step A.5: And ATTACHMENT 5 step 3	S / U
a. On the ENN Form for the selected PAR: • Select block 5.C and record the "Evacuate" zones OR select block 5.C and record the "Shelter" zones" • Select block 5.D	a) DOCUMENTS ON LINE 5 of ENN Form message #001 • *Select block 5C. • *Records on line 5C: zones A, B5, C5, D5. • *Select block 5.D.	

____ CRITICAL TIME STOP

Terminate when all elements of the task have been completed.

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (∗) before the element number.

GENERAL REFERENCES:

1. NMP-EP-112, Ver 3.0
2. NMP-EP-110, Ver 1.0
3. KA: G2.4.44 – x.x / 4.4

GENERAL TOOLS AND EQUIPMENT:

1. NMP-EP-112, Ver 3.0
2. Partially completed INITIAL NOTIFICATION message #001.
3. Computer with access to Exam Reference Disk

Critical ELEMENT justification:

STEP	Evaluation
1	Not critical: This task will be performed during evaluation of PARs, but student is not required to state that PAR 2 is required.
2	Not critical: this task will be performed to document wind direction on a PAR WORKSHEET, but the critical actions of this task will be to use the information to properly evaluate PARS.
3	Not critical: This task will be performed to properly assess the new PAR evacuation zones, and will be documented on a PAR WORKSHEET, but the critical actions of this task will be to use this information to properly complete the Emergency Notification Form.
4	Not critical: This task will be performed to properly assess and document the new PAR evacuation zones along with the previous evacuation zones, and will be documented on a PAR WORKSHEET, but the critical actions of this task will be to use this information to properly complete the Emergency Notification Form
5	**Critical (3 components):** Task completion: Line 5 C. Critical - Shelter is preferred for a Puff release (P&L 6.1.3) and is required by the procedure. Incorrect selection may result in unnecessary dose to the public. Line 5C (List Proper zones). Critical. Incorrect selection may result in unnecessary dose to the public. Line 5D. Critical. Failure to select this may result in unnecessary dose to the public due to lack of communication or failure to use KI as directed by authorities. This form would be transmitted to the EMA's of Alabama and Georgia, and is the official document. All other documents are worksheets used to determine the information to be provided to the EMA's.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to **PROVIDE A PROTECTIVE ACTION RECOMMENDATION (PAR).** The conditions under which this task is to be performed are:

a. Unit 1 has declared a General Emergency based on EAL# FG1;
   FG1: Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier.
b. A LOCA has occurred and Containment venting is in progress to reduce Hydrogen.
c. Total Containment vent time will be 50 minutes.
d. Dose Assessment is provided that dose at site boundary will be:
   - 1150 mR TEDE
   - 3500 mR Thyroid CDE
e. The IPC function "EP WEATHER" is not available.
f. The current MET Tower data is as follows:
   - Wind Direction from 045 degrees.
   - Wind Speed 4.5 mph.
   - Precipitation none.
   - ΔT value is -0.25°F.
g. The ENN Form has been manually completed by another operator with the exception of LINE 5.
h. You are required to develop the PARS per NMP-EP-112, Attachment 1, INITIAL ACTIONS, **AND** complete the following documentation:
   - NMP-EP-112, Attachment 5, PAR Worksheet.
   - Line 5 of the Emergency Notification Form message #001.
i. This task has **TIME CRITICAL** elements.

KEY

1. [A] DRILL [B] ACTUAL EVENT MESSAGE # 001
2. [A] INITIAL [B] FOLLOW-UP NOTIFICATION: TIME_____DATE____/____/__ AUTHENTICATION #_____
3. SITE: _____ Confirmation Phone # (334) 814-4662

4. EMERGENCY CLASSIFICATION: [A] UNUSUAL EVENT [B] ALERT [C] SITE AREA EMERGENCY [D] GENERAL EMERGENCY
BASED ON EAL# FG1 EAL DESCRIPTION:
Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier

5. PROTECTIVE ACTION RECOMMENDATIONS: [A] NONE
[B] EVACUATE _____
[X] SHELTER A, B5, C5, D5
[X] Advise Remainder of EPZ to Monitor Local Radio/TV Stations/Tone Alert Radios for Additional Information and Consider the use of KI (potassium iodide) in accordance with State plans and policy.
[E] OTHER_____

6. EMERGENCY RELEASE: [A] None [B] Is Occurring [C] Has Occurred

7. RELEASE SIGNIFICANCE: [A] Not applicable [B] Within normal operating limits [C] Above normal operating limits [D] Under evaluation

8. EVENT PROGNOSIS: [A] Improving [B] Stable [C] Degrading

9. METEOROLOGICAL DATA: Wind Direction from 45 degrees* Wind Speed 4.5 mph*

(*May not be available for Initial Notifications)* Precipitation NONE * Stability Class* [A] [B] [C] [D] [E] [F] [G]

10. [A] DECLARATION [B] TERMINATION Time NOW Date 11 /today / 14

11. AFFECTED UNIT(S): [1] [2] [All]

12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)
[A] U1 0 % Power Shutdown at Time 15 min ago Date 11 / today / 14
[B] U2 ____% Power Shutdown at Time _____ Date ___/____/____

13. REMARKS:_____

EMERGENCY RELEASE DATA NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [A] Elevated [B] Mixed [C] Ground UNITS: [A] Ci [B] Ci/sec [C] µCi/sec

MAGNITUDE: Noble Gases:_____ Iodines:_____ Particulates:_____ Other: _____

FORM: [A] Airborne Start Time _____ Date ___/____/____ Stop Time _____ Date ___/____/____
[B] Liquid Start Time _____ Date ___/____/____ Stop Time _____ Date ___/____/____

15. PROJECTION PARAMETERS: Projection period: _____Hours Estimated Release Duration _____Hours
Projection performed: Time _____ Date ___/____/____ Accident Type: _____

16. PROJECTED DOSE:

DISTANCE	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site boundary		
2 Miles		
5 Miles		
10 Miles		

17. APPROVED BY: _____ Title_____ Time _____Date___/____/____

NOTIFIED BY: _____

RECEIVED BY: _____ Time _____Date___/____/____
(To be completed by receiving organization)

KEY

KEY

4.0 DEFINITIONS

4.1 EPA PROTECTIVE ACTION GUIDELINE (PAG) - exposure levels determined by the Environmental Protection Agency for the evacuation of the offsite public following a release of radioactive materials. These levels have been established at one (1) Rem TEDE or five (5) Rem CDE Thyroid.

4.2 PROTECTIVE ACTION RECOMMENDATIONS (PARs) – shelter, evacuation, monitor, and/or KI recommendations made by SNC to appropriate state agencies. PARs are made by SNC personnel based on the Attachment 1 Flowchart whenever a General Emergency is declared. Additionally, if in the opinion of the ED, conditions warrant the issuance of PARs, a General Emergency will be declared (SNC will not issue PARs for any accident classified below a General Emergency).

4.3 UNCONTROLLED RELEASE - is a radiological effluent release that cannot be immediately stopped via positive control action (Example: Vent stack release from a known or unknown Containment leakage pathway which is not under the control of the shift and requires time to terminate.)

4.4 CONTROLLED RELEASE - is a planned radiological effluent release that can be immediately terminated by the licensee (Example: closure of the Post LOCA CTMT vent valves that were manually opened to lower Containment pressure.).

4.5 PUFF RELEASE - A controlled release that is projected to exceed the PAGs and will be terminated in less than an hour or an uncontrolled release that was projected to exceed the PAGs and has been terminated.

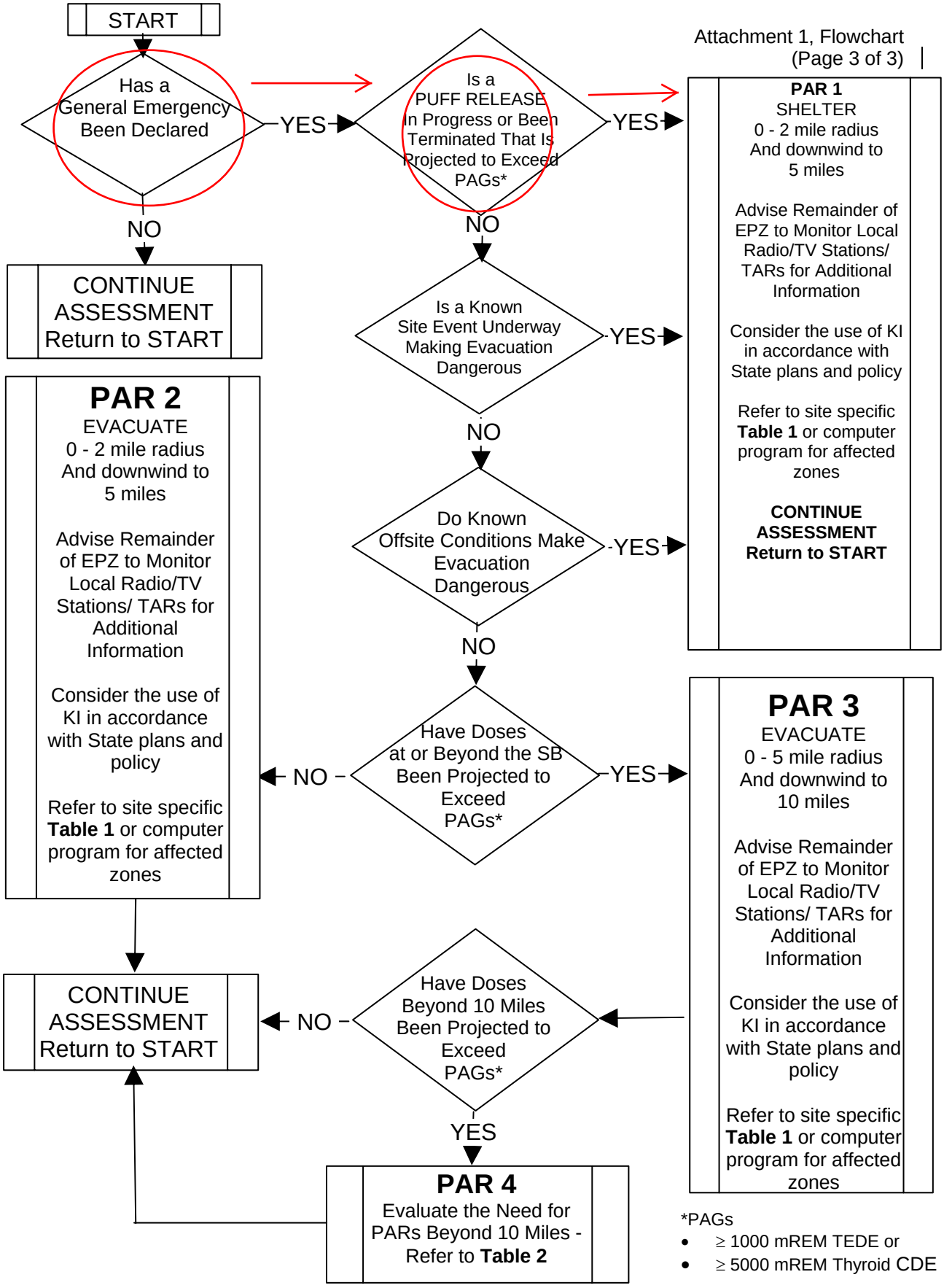
4.6 TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) - The sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

4.7 COMMITTED DOSE EQUIVALENT (CDE) - The dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

4.8 TONE ALERT RADIO (TAR) – Radio used to provide emergency information to the public living in the 10 mile emergency planning zone around the sites.

KEY

Attachment 1, Flowchart (Page 3 of 3)



*PAGs
- ≥ 1000 mREM TEDE or
- ≥ 5000 mREM Thyroid CDE

KEY

Attachment 2
Table 1

PLANT FARLEY
AFFECTED ZONES FOR PROTECTIVE ACTION RECOMMENDATIONS

	PAR 1 and 2	PAR 3
WIND DIRECTION FROM (degrees)	AFFECTED ZONES	AFFECTED ZONES
N, > 349 - 11	A, B5, C5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, C10, K10
NNE, >11 – 34	A, B5, C5, D5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, C10, D10
NE, >34 – 56	A, B5, C5, D5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, C10, D10
ENE, >56 – 79	A, C5, D5, E5	A, B5, C5, D5, E5, F5, I5, J5, K5, C10, D10, E10
E, >79-101	A, D5, E5, F5	A, B5, C5, D5, E5, F5, I5, J5, K5, C10, D10, E10
ESE, >101 – 124	A, D5, E5, F5	A, B5, C5, D5, E5, F5, I5, J5, K5, D10, E10, F10
SE, >124-146	A, E5, F5	A, B5, C5, D5, E5, F5, I5, J5, K5, E10, F10
SSE, >146 - 169	A, E5, F5, I5	A, B5, C5, D5, E5, F5, I5, J5, K5, E10, F10, G10
S, >169 - 191	A, E5, F5, I5	A, B5, C5, D5, E5, F5, I5, J5, K5, F10, G10, H10
SSW, >191 - 214	A, F5, I5	A, B5, C5, D5, E5, F5, I5, J5, K5, F10, G10, H10, I10
SW, >214-236	A, F5, I5, J5	A, B5, C5, D5, E5, F5, I5, J5, K5, F10, G10, H10, I10, J10
WSW, >236-259	A, I5, J5	A, B5, C5, D5, E5, F5, I5, J5, K5, G10, H10, I10, J10
W, >259 – 281	A, I5, J5	A, B5, C5, D5, E5, F5, I5, J5, K5, H10, I10, J10, K10
WNW, >281 – 304	A, I5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, I10, J10, K10
NW, >304 - 326	A, B5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, J10, K10
NNW, >326 - 349	A, B5, C5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, K10

KEY

Attachment 5
Figure 1

PAR WORKSHEET

INSTRUCTIONS:

1. Check the box for the applicable PAR (1, 2, 3, or 4).
2. Record the 15 minute average "wind direction from" for the selected PAR.
   Use met instrumentation corresponding to primary release point(s) (BWR) OR ground level release (PWR).
3. Use the applicable "**Site Specific**" PAR table (Table 1 or 2) to determine the affected zones.

CAUTION:	PAR Revisions must include previous PARs.

On the ENN Form for the selected PAR:

- Select block 5.B and record the "Evacuate" zones OR select block 5.C and record the "Shelter" zones"
- Select block 5.D
- IF PAR 4 is selected, THEN additionally select block 5.E "Other" and provide "Affected Sectors" and "To Miles"

☒ **PAR 1**	**Wind direction from**	045
	ENN Line 5 [C] Shelter Zones	A, B5, C5, D5
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations /Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy

☐ **PAR 2**	**Wind direction from**	
	ENN Line 5 [B] Evacuate Zones	
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations /Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy

☐ **PAR 3**	**Wind direction from**	
	ENN Line 5 [B] Evacuate Zones	
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations /Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy

☐ **PAR 4**	**Wind direction from**	
	ENN Line 5 [B] Evacuate Zones	
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations/ Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy
	ENN Line 5 [E] OTHER	Evacuate Affected Sectors _____ to _____miles

Approval: _____ _____/_____
Emergency Director **Date/Time**

KEY

Southern Nuclear Operating Company			
SOUTHERN COMPANY Energy to Serve Your World®	**Emergency Implementing Procedure**	SNC Emergency Notifications Form (ENF)	NMP-EP-111-F10 Version 1.0 Page 1 of 1

1. [A] DRILL [B] ACTUAL EVENT — MESSAGE # 001
2. [A] INITIAL [B] FOLLOW-UP — NOTIFICATION: TIME_____ DATE____/____/__ — AUTHENTICATION #_____
3. SITE: _____ — Confirmation Phone # (334) 814-4662

4. EMERGENCY CLASSIFICATION: [A] UNUSUAL EVENT [B] ALERT [C] SITE AREA EMERGENCY [D] GENERAL EMERGENCY
   BASED ON EAL# FG1 EAL DESCRIPTION: Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier
5. PROTECTIVE ACTION RECOMMENDATIONS: [A] NONE
   [B] EVACUATE _____
   [C] SHELTER _____
   [D] Advise Remainder of EPZ to Monitor Local Radio/TV Stations/Tone Alert Radios for Additional Information and Consider the use of KI (potassium iodide) in accordance with State plans and policy.
   [E] OTHER _____
6. EMERGENCY RELEASE: [A] None [B] Is Occurring [C] Has Occurred
7. RELEASE SIGNIFICANCE: [A] Not applicable [B] Within normal operating limits [C] Above normal operating limits [D] Under evaluation
8. EVENT PROGNOSIS: [A] Improving [B] Stable [C] Degrading
9. METEOROLOGICAL DATA: Wind Direction from 45 degrees* Wind Speed 4.5 mph*

(*May not be available for Initial Notifications)* Precipitation NONE * Stability Class* [A] [B] [C] [D] [E] [F] [G]

10. [A] DECLARATION [B] TERMINATION Time NOW Date 11 /today / 14
11. AFFECTED UNIT(S): [1] [2] [All]
12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)
    [A] U1 0 % Power Shutdown at Time 15 min ago Date 11 / today / 14
    [B] U2 ____ % Power Shutdown at Time _____ Date ___/____/____
13. REMARKS: _____

EMERGENCY RELEASE DATA NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [A] Elevated [B] Mixed [C] Ground UNITS: [A] Ci [B] Ci/sec [C] µCi/sec
    MAGNITUDE: Noble Gases:_____ Iodines:_____ Particulates:_____ Other: _____
    FORM: [A] Airborne Start Time _____ Date ___/____/____ Stop Time _____ Date ___/____/____
    [B] Liquid Start Time _____ Date ___/____/____ Stop Time _____ Date ___/____/____
15. PROJECTION PARAMETERS: Projection period: _____Hours Estimated Release Duration _____Hours
    Projection performed: Time _____ Date ___/____/____ Accident Type: _____
16. PROJECTED DOSE:

DISTANCE	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site boundary		
2 Miles		
5 Miles		
10 Miles		

17. APPROVED BY: _____ Title_____ Time _____Date___/____/____

NOTIFIED BY: _____

RECEIVED BY: _____ Time _____Date___/____/____
(To be completed by receiving organization)

Procedure Owner: Christopher E. Boone / Fleet Emergency Preparedness Manager /Corporate
(Print: Name / Title / Site)

Approved By: Original signed by Christopher E. Boone / 06/28/2012
(Procedure Owner's Signature) (Approval Date)

Effective Dates:

07/03/2012	07/03/2012	07/03/2012	07/03/2012	NA
Corporate	FNP	HNP	VEGP 1-2	VEGP 3-4

PRB Not Required

The individuals listed below are the members of the Peer Team responsible for writing and maintaining this procedure.

Corporate	J. D. Grant
Plant Farley	S. M. Odom
Plant Hatch	C. R. Coop
Plant Vogtle 1-2	
Plant Vogtle 3-4	J. G. Hall

PROCEDURE LEVEL OF USE CLASSIFICATION PER NMP-AP-003	
CATEGORY	**SECTIONS**
Continuous:	**NONE**
Reference:	**ALL**
Information:	**NONE**

Revision Description

Version Number	Revision Description
1.0	This procedure supersedes NMP-EP-109, Protective Actions Recommendations. This procedure has been developed to facilitate the implementation of a fleet approach for the performance of initial emergency actions (e.g., classifications, notification and PARS). No technical changes have been made to the procedure. The procedure has been re-issued with a different procedure number to be consistent with the fleet approach for the performance of activities in response to an event.
2.0	VTE286802 Changed note to Site Event in Attachment 1
3.0	CTE405748 Added Ref. 3.10 NMP-EP-111, Attachment 1- Changed note after step 4 to strengthen PAR requirement and reworded step 5 clarify role of information from PAR worksheet to (NMP-EP-111) ENN form. General Editorial changes in procedure.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides guidelines for determining Protective Action Recommendations (PARs) which will be communicated to offsite authorities during a General Emergency. PARs are provided as an input to the protective action decision making process for the development of protective action orders. Protective action orders are communicated to the general public by offsite authorities to avoid or reduce the exposure incurred from an accident condition that results in a significant radiological effluent release or has the potential for a release based on degraded plant conditions.

2.0 APPLICABILITY

Protective actions are recommended to offsite authorities to avoid or reduce the radiological exposure that may be incurred by the public from an accident condition that results in a significant radiological effluent release or has the potential for a release based on degraded plant conditions.

This procedure is performed, as required, during drills, exercises, and declared emergencies following declaration of a General Emergency. Attachments 2, 3, and 4 are site–specific. Non-applicable site attachments may be removed and discarded to ensure usage of the correct site-specific attachment.

3.0 REFERENCES

3.1 NRC IN 83-28, Protective Actions Based on Plant Conditions

3.2 EPA-400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, October, 1991

3.3 NRC IN 91-72, “Issuance of a Revision to the EPA Manual of Protective Action Guides and Protective Actions for Nuclear Incidents”

3.4 NRC IN 92-08, “Revised Protective Action Guidance for Nuclear Incidents”

3.5 NRC RIS 2003-12, “Clarification of NRC Guidance for Modifying Protective Actions”

3.6 NUREG-0654/FEMA REP 1, Supplement 3

3.7 NRC RIS 2004-13, “Consideration of Sheltering in Licensee’s Range of Protective Action Recommendations”, August 2, 2004

3.8 NRC RIS 2004-13, Supplement 1, “Consideration of Sheltering in Licensee’s Range of Protective Action Recommendations, Dated Aug. 2004”, March 10, 2005

3.9 NRC RIS 2005-08, Endorsement of NEI Guidance “Range of Protective Actions for Nuclear Power Plant Incidents”, June 6, 2005

3.10 NMP-EP-111 Emergency Notifications

4.0 DEFINITIONS

4.1 EPA PROTECTIVE ACTION GUIDELINE (PAG) - exposure levels determined by the Environmental Protection Agency for the evacuation of the offsite public following a release of radioactive materials. These levels have been established at one (1) Rem TEDE or five (5) Rem CDE Thyroid.

4.2 PROTECTIVE ACTION RECOMMENDATIONS (PARs) – shelter, evacuation, monitor, and/or KI recommendations made by SNC to appropriate state agencies. PARs are made by SNC personnel based on the Attachment 1 Flowchart whenever a General Emergency is declared. Additionally, if in the opinion of the ED, conditions warrant the issuance of PARs, a General Emergency will be declared (SNC will not issue PARs for any accident classified below a General Emergency).

4.3 UNCONTROLLED RELEASE - is a radiological effluent release that cannot be immediately stopped via positive control action (Example: Vent stack release from a known or unknown Containment leakage pathway which is not under the control of the shift and requires time to terminate.)

4.4 CONTROLLED RELEASE - is a planned radiological effluent release that can be immediately terminated by the licensee (Example: closure of the Post LOCA CTMT vent valves that were manually opened to lower Containment pressure.).

4.5 PUFF RELEASE - A controlled release that is projected to exceed the PAGs and will be terminated in less than an hour or an uncontrolled release that was projected to exceed the PAGs and has been terminated.

4.6 TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) - The sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

4.7 COMMITTED DOSE EQUIVALENT (CDE) - The dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

4.8 TONE ALERT RADIO (TAR) – Radio used to provide emergency information to the public living in the 10 mile emergency planning zone around the sites.

5.0 RESPONSIBILITIES

5.1 The Emergency Director (ED) has the non-delegable responsibility for approving PARs .

5.1.1 The EOF Manager may sign approval for the ED after receiving verbal approval from the ED.

5.2 Once the TSC is operational, the TSC has responsibility for developing and communicating offsite PARs until relieved of that responsibility by the EOF.

5.3 Approved PARs may be communicated to applicable offsite authorities by the staff in either the Control Room, TSC or EOF as directed by the ED.

6.0 PRECAUTIONS AND LIMITIATIONS

6.1 Evacuation and Shelter Recommendations

6.1.1 PARs are only applicable when entering a General Emergency.

6.1.2 Evacuation is the preferred action unless conditions impose a greater risk from the evacuation than from the dose received.

6.1.3 Shelter is a preferred action when a ‘Puff’ type release has occurred.

6.1.4 A plant condition based PAR to shelter a 2-mile radius and 5 miles downwind may be issued when a Puff Release has occurred.

6.1.5 If onsite plant events are underway which would make evacuation dangerous (such as known hostile action) then sheltering should be considered over evacuation recommendations.

6.1.6 When prior knowledge of offsite impediments to evacuation exist (such as flooding, bridge/road closings, or other travel restrictions), then sheltering should be considered over evacuation recommendations.

6.1.7 A recommendation to evacuate or shelter a partial zone is not allowed.

6.1.8 Once an evacuation recommendation for an area has been given, it should not be reduced to a shelter recommendation.

6.2 ED Judgment

6.2.1 The ED may elect to modify PARs based on judgment, if conditions warrant.

6.2.2 The ED shall upgrade to a General Emergency if PARs are determined to be needed and not already in a General Emergency.

6.2.3 Protective action guidelines shall not imply an acceptable dose.

6.2.4 PARs are inherently conservative such that expanding the evacuation zone as an added precaution would result in a greater risk from the evacuation than from the radiological consequences of a release. It also would dilute the effectiveness of the offsite resources used to accommodate the evacuation.

6.3 Recommendations Beyond the 10 mile EPZ (PAR 4)

6.3.1 Many assumptions exist in dose assessment calculations, involving both source term and meteorological factors, which make computer predictions over long distances less reliable. The ED should use the recommendation of the dose assessment staff when making recommendations beyond 10 miles.

6.3.2 While evaluating the need to develop PAR 4 recommendations, issuance of appropriate PAR 1, 2, or 3 recommendations should not be delayed.

6.4 Ingestion Pathway and Relocation Responsibilities

6.4.1 Protective actions taken in areas affected by plume deposition following the release are determined and controlled by offsite governmental agencies. SNC is not expected to develop offsite recommendations involving ingestion or relocation issues following plume passage.

6.4.2 SNC may be requested to provide resources to support the determination of post plume protective actions.

6.5 Continuing Assessment

6.5.1 Weather should not normally influence SNC protective action recommendations for the public except for changes in plume trajectory. The States and Counties are the most knowledgeable concerning current weather conditions and weather forecast information. The States and Counties may incorporate existing or forecast weather in their decisions regarding implementation of recommended protective actions.

6.5.2 Only the MUTUALY AGREED UPON protective action recommendations (PARs) specified in Attachment 1 should be recommended unless there are obvious relevant factors (e.g., severe natural phenomena like hurricanes) that probably were not anticipated when the PARs were developed and that would make the standard PAR recommendations impractical or obviously non-conservative. In such events, the ED should use judgment as appropriate.

6.5.3 Actual field readings from Field Monitoring Teams should be compared to dose assessment results and used as a dose projection method to validate calculated PARs and to determine whether the plant or dose based protective actions are adequate.

6.5.4 When available, actual sample data from monitored or unmonitored release points should be utilized in conjunction with other dose assessment and projection methods to validate calculated PARs and to determine whether the plant based protective actions are adequate.

6.5.5 VEGP and FNP off-site dose rates may be significantly higher (up to 10 times) due to volatilization of iodine if a steam generator (SG) water level falls below the break point during a SG tube rupture

7.0 PROCESS DESCRIPTION

Guidance is provided in the form of attachments. Attachment 1, Action Checklist for Off-Site PAR Development", Attachment 2, "Farley Site Specific Data Sheets", Attachment 3, "Hatch Site Specific Data Sheets", Attachment 4 "Vogtle Site Specific Data Sheets", and Attachment 5 "PAR Worksheet" direct the initial and supplemental actions.

8.0 RECORDS

Records generated during actual emergencies will be maintained as QA records in accordance with applicable administrative procedure.

9.0 COMMITMENTS

Farley – None
Hatch - 1989301429, 1990303261, 1990303410
Vogtle – 1985304693, 1985304906, 1986309134

* Continuing Activity

Action Checklist for PAR Development

NOTE: ONLY THE MUTUALY AGREED UPON PROTECTIVE ACTIONS SPECIFIED BELOW SHOULD BE RECOMMENDED UNLESS THERE ARE OBVIOUS RELEVANT FACTORS (E.G., SEVERE NATURAL PHENOMENA LIKE HURICANES) THAT PROBABLY WERE NOT ANTICIPATED WHEN THE PARS WERE DEVELOPED AND THAT WOULD MAKE THE STANDARD PAR RECOMMENDATIONS IMPRACTICAL OR OBVIOUSLY NON-CONSERVATIVE. IN SUCH EVENTS, THE ED SHOULD USE JUDGMENT AS APPROPRIATE.

A. INITIAL ACTIONS — Please Check

1. * Precautions and Limitations are applicable in development of Protective Action Recommendations (PARs) in subsequent steps. Attachment 5, Figure 1, "PAR WORKSHEET", may be used to record affected zones or sectors. ☐

2. * Determine General Emergency PARs using the Attachment 1 Flowchart. ☐
   - PAR 1 – Shelter to 2 miles and 5 mile downwind zones
   - PAR 2 – Evacuate to 2 miles and 5 mile downwind zones
   - PAR 3 – Evacuate to 5 miles and 10 mile downwind zones
   - PAR 4 – Guidance for PARs Beyond the 10 Mile EPZ

CAUTION - PAR Revisions must include previous PARs

3. For PAR 1, 2, and 3, determine the affected zones using Site specific Table 1. An electronic program may also be used. ☐

NOTE: Once conditions requiring a PAR change are available, PARs should be developed as soon as possible. (The expectation for development is 15 minutes after the change in conditions.)

4. Communicate developed PARs to the ED for review and approval. ☐

NOTE: Once PARs are developed and approved they should be communicated to appropriate agencies as soon as possible. (Notification of PARs to applicable agencies is required within 15 minutes following PAR development and approval.)

5. Ensure that the ED approved PARs from the PAR Worksheet Attachment 5, Figure 1 (to be communicated to offsite agencies) are entered on the ENN form (manual or electronic) per NMP-EP-111, Emergency Notifications. ☐

* Continuing Activity

Action Checklist for PAR Development (Cont)

B. SUPPLEMENTAL ACTIONS — Please Check

1. * Continue assessment actions applying applicable Precautions & limitations. ☐

2. * IF a release is in progress THEN it is appropriate to dispatch Field Monitoring Teams (FMT) to downwind and adjacent areas as soon as possible. FMT data should be used to validate calculated exposure rates by comparison with actual field exposure rates to ensure issued PARs remain conservative. ☐

3. * For PAR 4, determine the affected sectors using Site specific Table 2. The following considerations apply when developing PARs beyond 10 miles: ☐
   - IF a release is in progress and dose assessment calculations indicate a possible need to issue PARs beyond 10 miles, THEN it is appropriate to re-perform dose assessment calculations to verify calculation assumptions and accuracy prior to issuing PARs beyond 10 miles.
   - Use any available FMT readings, IF available, to validate accuracy of the projection model prior to issuing PARs beyond 10 miles.
   - IF dose assessment calculations indicate the need to recommend actions beyond 10 miles, THEN consult with affected State agency(s) to compare/ validate model assumptions prior to issuing PARs beyond 10 miles.

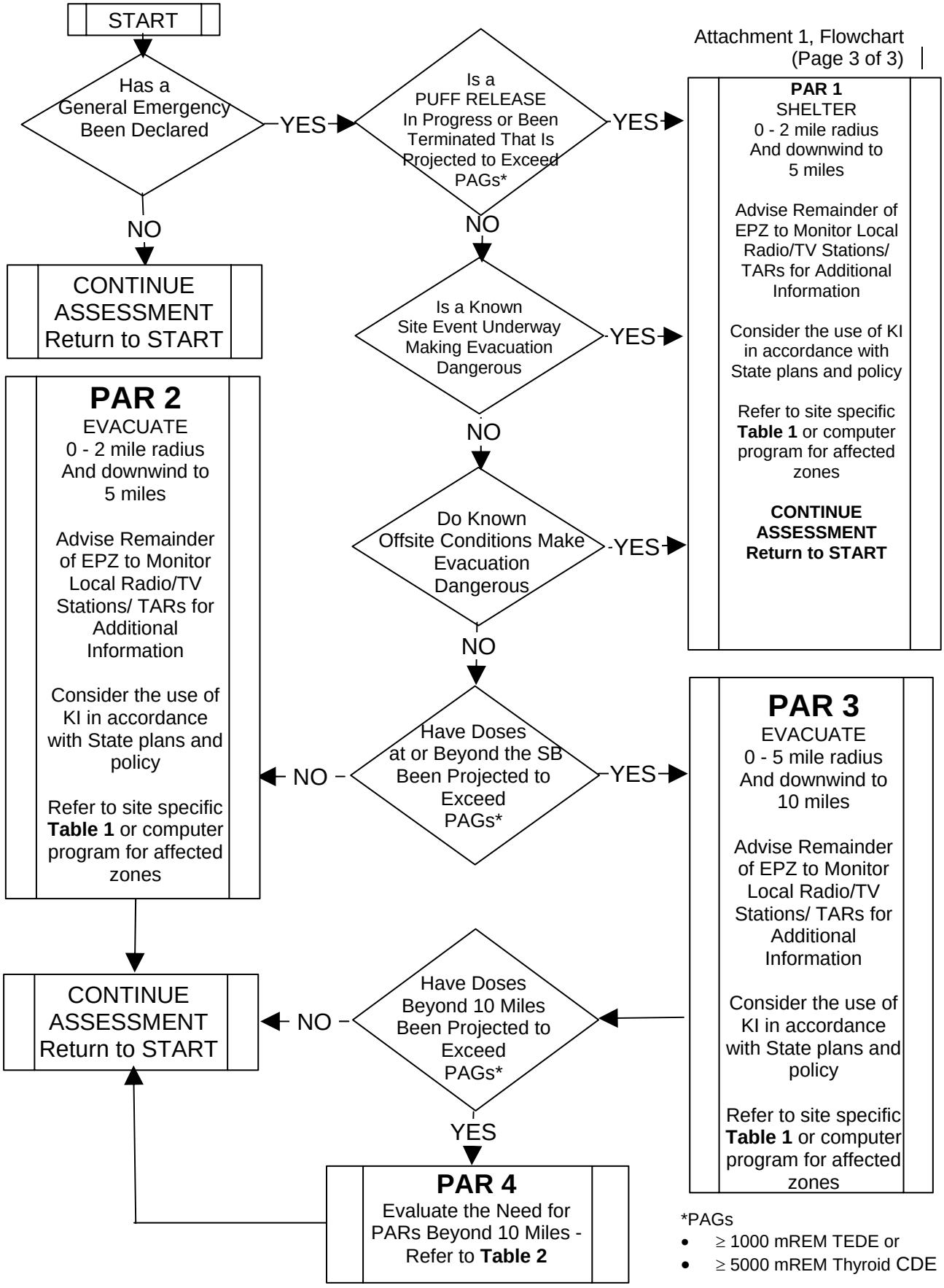
4. * IF conditions requiring PAR 1 entry are eliminated or dose projections change such that additional PARs are required THEN return to the Initial Actions section. Once conditions requiring PAR change are available, PARs should be developed as soon as possible. (The expectation for development is 15 minutes after the change in conditions.) Once PARs are developed they should be communicated to appropriate agencies as soon as possible. (**Notification of PARs to applicable agencies is required within 15 minutes following PAR development and approval.)** ☐

5. * Apply dose projection results in continuing assessment activities. Dose assessment results should be used to refine (but not reduce) protective action recommendations after adequate data becomes available. ☐

6. Utilize real time meteorological and effluent radiation monitor readings in continuing assessment activities. IF radiation monitor readings provide sufficient data for assessment, THEN, it is NOT appropriate to wait for field monitoring data to become available to confirm or expand a PAR within the 10-mile EPZ. ☐

7. Dose projections are NOT required to support the decision process in development of the plant condition based PARs utilizing the PAR flowchart if no release is in progress. It is expected that a dose projection will be performed as soon as practicable at a General Emergency with a release in progress to determine if PAR change is needed. ☐

Attachment 1, Flowchart (Page 3 of 3)



*PAGs
- ≥ 1000 mREM TEDE or
- ≥ 5000 mREM Thyroid CDE

Attachment 2
Table 1

PLANT FARLEY
AFFECTED ZONES FOR PROTECTIVE ACTION RECOMMENDATIONS

	PAR 1 and 2	PAR 3
WIND DIRECTION FROM (degrees)	AFFECTED ZONES	AFFECTED ZONES
N, > 349 - 11	A, B5, C5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, C10, K10
NNE, >11 – 34	A, B5, C5, D5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, C10, D10
NE, >34 – 56	A, B5, C5, D5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, C10, D10
ENE, >56 – 79	A, C5, D5, E5	A, B5, C5, D5, E5, F5, I5, J5, K5, C10, D10, E10
E, >79-101	A, D5, E5, F5	A, B5, C5, D5, E5, F5, I5, J5, K5, C10, D10, E10
ESE, >101 – 124	A, D5, E5, F5	A, B5, C5, D5, E5, F5, I5, J5, K5, D10, E10, F10
SE, >124-146	A, E5, F5	A, B5, C5, D5, E5, F5, I5, J5, K5, E10, F10
SSE, >146 - 169	A, E5, F5, I5	A, B5, C5, D5, E5, F5, I5, J5, K5, E10, F10, G10
S, >169 - 191	A, E5, F5, I5	A, B5, C5, D5, E5, F5, I5, J5, K5, F10, G10, H10
SSW, >191 - 214	A, F5, I5	A, B5, C5, D5, E5, F5, I5, J5, K5, F10, G10, H10, I10
SW, >214-236	A, F5, I5, J5	A, B5, C5, D5, E5, F5, I5, J5, K5, F10, G10, H10, I10, J10
WSW, >236-259	A, I5, J5	A, B5, C5, D5, E5, F5, I5, J5, K5, G10, H10, I10, J10
W, >259 – 281	A, I5, J5	A, B5, C5, D5, E5, F5, I5, J5, K5, H10, I10, J10, K10
WNW, >281 – 304	A, I5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, I10, J10, K10
NW, >304 - 326	A, B5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, J10, K10
NNW, >326 - 349	A, B5, C5, J5, K5	A, B5, C5, D5, E5, F5, I5, J5, K5, B10, K10

Attachment 2
Table 2

PLANT FARLEY
GUIDANCE FOR PARS BEYOND THE 10 MILE EPZ

1. Calculate the Evacuation Distance by determining the maximum Projected Distance where MIDAS dose projections exceed PAGs and adding 5 miles to the projected distance.
   _____ **Projected Distance (miles) + 5 miles =** _____ **Evacuation Distance (miles)**

2. Determine the affected sectors for the current 15 minute average (From) wind direction
   _____ **Affected Sectors**

3. Recommend Evacuation from 10 miles to the Evacuation Distance (calculated in step 1) for the Affected Sectors (determined in step 2).

4. Check Line 5, Item E – Other on the Emergency Notification Form and record the recommended sectors and distance range in miles for Evacuation. (Note: Refer to 50 mile IPZ map as necessary)

PAR 4

WIND DIRECTION FROM (degrees)	AFFECTED SECTORS
N, > 349 - 11	H, J, K
NNE, >11 – 34	J, K, L
NE, >34 – 56	K, L, M
ENE, >56 – 79	L, M, N
E, >79-101	M, N, P
ESE, >101 – 124	N, P, Q
SE, >124-146	P, Q, R
SSE, >146 - 169	Q, R, A
S, >169 - 191	R, A, B
SSW, >191 - 214	A, B, C
SW, >214-236	B, C, D
WSW, >236-259	C, D, E
W, >259 – 281	D, E, F
WNW, >281 – 304	E, F, G
NW, >304 - 326	F, G, H
NNW, >326 - 349	G, H, J

Attachment 3
Table 1

PLANT HATCH
AFFECTED ZONES FOR PROTECTIVE ACTION RECOMMENDATIONS

	PAR 1 and 2	PAR 3
WIND DIRECTION FROM (degrees)	AFFECTED ZONES	AFFECTED ZONES
N, > 349 - 11	A, B5, C5	A, B5, C5, D5, E5, C10, D10, E10
NNE, >11 – 34	A, B5, C5	A, B5, C5, D5, E5, D10, E10, F10
NE, >34 – 56	A, B5, C5	A, B5, C5, D5, E5, E10, F10, G10
ENE, >56 – 79	A, C5	A, B5, C5, D5, E5, E10, F10, G10
E, >79-101	A, C5, D5	A, B5, C5, D5, E5, F10, G10, H10
ESE, >101 – 124	A, C5, D5	A, B5, C5, D5, E5, G10, H10, I10
SE, >124-146	A, C5, D5, E5	A, B5, C5, D5, E5, G10, H10, I10
SSE, >146 - 169	A, C5, D5, E5	A, B5, C5, D5, E5, H10, I10, J10
S, >169 - 191	A, D5, E5	A, B5, C5, D5, E5, I10, J10
SSW, >191 - 214	A, D5, E5	A, B5, C5, D5, E5, I10, J10
SW, >214-236	A, E5	A, B5, C5, D5, E5, J10, K10, L10
WSW, >236-259	A, B5, E5	A, B5, C5, D5, E5, J10, K10, L10
W, >259 – 281	A, B5, E5	A, B5, C5, D5, E5, B10, K10, L10
WNW, >281 – 304	A, B5, E5	A, B5, C5, D5, E5, B10, C10, D10, K10, L10
NW, >304 - 326	A, B5	A, B5, C5, D5, E5, B10, C10, D10
NNW, >326 - 349	A, B5, C5	A, B5, C5, D5, E5, B10, C10, D10, E10

Attachment 3
Table 2

PLANT HATCH
GUIDANCE FOR PARS BEYOND THE 10 MILE EPZ

1. Calculate the Evacuation Distance by determining the maximum Projected Distance where MIDAS dose projections exceed PAGs and adding 5 miles to the projected distance.
   _____ **Projected Distance (miles) + 5 miles =** _____ **Evacuation Distance (miles)**

2. Determine the affected sectors for the current 15 minute average (From) wind direction
   _____ **Affected Sectors**

3. Recommend Evacuation from 10 miles to the Evacuation Distance (calculated in step 1) for the Affected Sectors (determined in step 2).

4. Check Line 5, Item E – Other on the Emergency Notification Form and record the recommended sectors and distance range in miles for Evacuation. (Note: Refer to 50 mile IPZ map as necessary)

PAR 4

WIND DIRECTION FROM (degrees)	AFFECTED SECTORS
N, > 349 - 11	H, J, K
NNE, >11 – 34	J, K, L
NE, >34 – 56	K, L, M
ENE, >56 – 79	L, M, N
E, >79-101	M, N, P
ESE, >101 – 124	N, P, Q
SE, >124-146	P, Q, R
SSE, >146 - 169	Q, R, A
S, >169 - 191	R, A, B
SSW, >191 - 214	A, B, C
SW, >214-236	B, C, D
WSW, >236-259	C, D, E
W, >259 – 281	D, E, F
WNW, >281 – 304	E, F, G
NW, >304 - 326	F, G, H
NNW, >326 - 349	G, H, J

Attachment 4
Table 1

PLANT VOGTLE
AFFECTED ZONES FOR PROTECTIVE ACTION RECOMMENDATIONS

	PAR 1 and 2	PAR 3
WIND DIRECTION FROM (degrees)	**AFFECTED ZONES**	**AFFECTED ZONES**
N, > 349 - 11	A, B5, C5, SRS to 2 Miles	A, B5, C5,D5, E5, F5, B10, C10, D10, SRS to 5 Miles
NNE, >11 – 34	A, B5, C5, SRS to 2 Miles	A, B5, C5, D5, E5, F5, C10, D10, SRS to 5 Miles
NE, >34 – 56	A, B5, C5, D5, SRS to 2 Miles	A, B5, C5, D5, E5, F5, C10, D10, E10, SRS to 5 Miles
ENE, >56 – 79	A, C5, D5, E5, SRS to 2 Miles	A, B5, C5, D5, E5, F5, D10, E10, F10,SRS to 5 Miles
E, >79-101	A, C5, D5, E5, F5, SRS to 2 Miles	A, B5, C5, D5, E5, F5, D10, E10, F10, SRS to 5 Miles
ESE, >101 – 124	A, D5, E5, F5, SRS to 2 Miles	A, B5, C5, D5, E5, F5, E10, F10, G10,SRS to 5 Miles
SE, >124-146	A, D5, E5, F5, SRS to 2 Miles	A, B5, C5, D5, E5, F5, E10, F10, G10,SRS to 10 Miles
SSE, >146 - 169	A, E5, F5, SRS to 5 Miles	A, B5, C5, D5, E5, F5, F10, G10, SRS to 10 Miles
S, >169 - 191	A, F5, SRS to 5 Miles	A, B5, C5, D5, E5, F5, F10, G10, SRS to 10 Miles
SSW, >191 - 214	A, F5, SRS to 5 Miles	A, B5, C5, D5, E5, F5, G10, SRS to 10 Miles
SW, >214-236	A, SRS to 5 Miles	A, B5, C5, D5, E5, F5, SRS to 10 Miles
WSW, >236-259	A, SRS to 5 Miles	A, B5, C5, D5, E5, F5, H10, SRS to 10 Miles
W, >259 – 281	A, B5, SRS to 5 Miles	A, B5, C5, D5, E5, F5, B10, H10, SRS to 10 Miles
WNW, >281 – 304	A, B5, SRS to 5 Miles	A, B5, C5, D5, E5, F5, B10, C10, H10, SRS to 10 Miles
NW, >304 - 326	A, B5, SRS to 5 Miles	A, B5, C5, D5, E5, F5, B10, C10, H10, SRS to 10 Miles
NNW, >326 - 349	A, B5, SRS to 2 Miles	A, B5, C5, D5, E5, F5, B10, C10, D10, SRS to 5 Miles

Attachment 4
Table 2

PLANT VOGTLE
GUIDANCE FOR PARS BEYOND THE 10 MILE EPZ

1. Calculate the Evacuation Distance by determining the maximum Projected Distance where MIDAS dose projections exceed PAGs and adding 5 miles to the projected distance.
   _____**Projected Distance (miles) + 5 miles =** _____ **Evacuation Distance (miles)**

2. Determine the affected sectors for the current 15 minute average (From) wind direction
   _____ **Affected Sectors**

3. Recommend Evacuation from 10 miles to the Evacuation Distance (calculated in step 1) for the Affected Sectors (determined in step 2).

4. Check Line 5, Item E – Other on the Emergency Notification Form and record the recommended sectors and distance range in miles for Evacuation. (Note: Refer to 50 mile IPZ map as necessary)

PAR 4

WIND DIRECTION FROM (degrees)	AFFECTED SECTORS
N, > 349 - 11	H, J, K
NNE, >11 – 34	J, K, L
NE, >34 – 56	K, L, M
ENE, >56 – 79	L, M, N
E, >79-101	M, N, P
ESE, >101 – 124	N, P, Q
SE, >124-146	P, Q, R
SSE, >146 - 169	Q, R, A
S, >169 - 191	R, A, B
SSW, >191 - 214	A, B, C
SW, >214-236	B, C, D
WSW, >236-259	C, D, E
W, >259 – 281	D, E, F
WNW, >281 – 304	E, F, G
NW, >304 - 326	F, G, H
NNW, >326 - 349	G, H, J

Attachment 5
Figure 1

PAR WORKSHEET

INSTRUCTIONS:

1. Check the box for the applicable PAR (1, 2, 3, or 4).
2. Record the 15 minute average "wind direction from" for the selected PAR.
   Use met instrumentation corresponding to primary release point(s) (BWR) OR ground level release (PWR).
3. Use the applicable "**Site Specific**" PAR table (Table 1 or 2) to determine the affected zones.

CAUTION:	PAR Revisions must include previous PARs.

On the ENN Form for the selected PAR:

- Select block 5.B and record the "Evacuate" zones OR select block 5.C and record the "Shelter" zones"
- Select block 5.D
- IF PAR 4 is selected, THEN additionally select block 5.E "Other" and provide "Affected Sectors" and "To Miles"

☐ **PAR 1**	**Wind direction from**	
	ENN Line 5 [C] Shelter Zones	
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations /Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy

☐ **PAR 2**	**Wind direction from**	
	ENN Line 5 [B] Evacuate Zones	
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations /Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy

☐ **PAR 3**	**Wind direction from**	
	ENN Line 5 [B] Evacuate Zones	
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations /Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy

☐ **PAR 4**	**Wind direction from**	
	ENN Line 5 [B] Evacuate Zones	
	ENN Line 5 [D]	Advise remainder of EPZ to Monitor Local Radio/TV Stations/ Tone Alert Radios. Consider the use of KI (Potassium Iodide) in accordance with State Plans and Policy
	ENN Line 5 [E] OTHER	Evacuate Affected Sectors _____ to _____miles

Approval: _____ _____/_____

Emergency Director **Date/Time**