WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN TASK: Perform an RCS Inventory Balance

TASK #: EPE009002

K/A #s: 2.1.23

References: STS BB-004, Rev. 22

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time:__20__ min.

Actual Performance Time: _____min.

Location of Performance: Classroom

Method of Performance: Perform

Evaluators Signature: _____ Date _____

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Notes: **ADMIN JPM**

The exam group shall verify that the procedure revision for this JPM is current and that any change against the referenced procedure does not invalidate this JPM.

Provide an "Information Only" copy of STS BB-004 with cover sheet. Ensure initial conditions are signed off. Ensure the procedure signed off up through step 9.5 and Attachment A has initial and final data filled in.

Initial Conditions:
You are a Relief Crew Licensed Operator; the plant is stable at 100% power. The operating crew has indications of a leak in Containment.

Initiating Cues:
The Control Room Supervisor had the RO perform a 4 hour STS BB-004 for RCS leakage and has completed the data collection. The CRS directs you to complete STS BB-004 calculations, beginning at Step 9.6, to determine if there is an RCS leak. The CRS provides you with the following information.

Chemistry performed no sampling or chemical additions.
STN CH-020 results are < 0.815 gallons per day.
STS PE-019, RCS Pressure Isolation valve Leakage, is 0.145 gpm.

READ TO EXAMINEE:

If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

TASK STANDARD:

Upon completion of this JPM the operator will have calculated the leak rate on the RCS per STS BB-004.Final Value for unidentified leakage is 0.485 gpm $\pm$ .05 gpm, and Identified T.S. Leakage of 0.164 gpm $\pm$ .05 gpm.

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Element #	Step #	Element	Standard	Score
1.*	9.7	Calculate RCS leakage using Attachment B and log the results in the Control Room Log.	Complete calculations.	S U

Cue:

Comments: Logging the results in the Control Room Log is not required for this JPM.

2.	9.8	If individual component leakage is to be determined then perform Attachment C. If not mark this step N/A.	Ask CRS if individual component leakage needs to be determined.	S U

Cue: Reply as CRS that individual component leakage will not be determined.

Comments:

Termination: Calculation of RCS leakage completes this JPM.

Stop Time _____

NOTE: Calculated values should be as follow:

Step B.1.2 = 6.142 gallons
Step B.2.2 = -295.8 gallons
Step B.3.3 = -19.25 gallons
Step B.4.3 = 430 gallons
Step B.4.6 = 0 gallons
Step B.5 = 121.092 gallons
Step B.6.2 = 0.5045 gpm
Step B.7.3.2 = 4.508 gallons
Step B.7.5 = .0188 gpm
Step B.7.8 = Total Identified Leakage ≈0.0188 gpm.
Step B.8.1 = Unidentified Leakage Rate ≈0.4852 gpm.
Step B.9.1 = Total Identified T.S. Leakage 0.1643 gpm.

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JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:
You are a Relief Crew Licensed Operator; the plant is stable at 100% power. The operating crew has indications of a leak in Containment.

Initiating Cues:
The Control Room Supervisor had the RO perform a 4 hour STS BB-004 for RCS leakage and has completed the data collection. The CRS directs you to complete STS BB-004 calculations, Step 9.7, to determine if there is an RCS leak. The CRS provides you with the following information.

Chemistry performed no sampling or chemical additions.
STN CH-020 results are 0.815 gallons per day.
STS PE-019, RCS Pressure Isolation valve Leakage, is 0.145 gpm.

Notes:

If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN TASK: Manually Determine Quadrant Power Tilt Ratio (QPTR).

TASK: 01500032.

K/A #s: 2.1.20

References: STS RE-012, Rev. 7

Examinee's Name _____ SS No. _____-____-_____ SRO___ RO___

The examinee's performance was evaluated against the standards in this JPM and determined to be:

SATISFACTORY ____ UNSATISFACTORY ____

Reason, if UNSATISFACTORY:

Estimated JPM Completion Time: 20 min.

Actual Performance Time: _____min.

Location of Performance: Classroom

Method of Performance: Perform

Tools and Equipment: None

Evaluators Signature:_____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The examiner shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

The Examiner must verify that the Normalization Factors listed in the Curves and Tables book will work with the current values in Attch. A

Ensure an information only copy of STS RE-012, "QPTR Determination," with cover sheet and prerequisites is available.
Ensure a copy of the Curves and Tables book is available.

Ensure a completed copy of STS RE-012, "QPTR Determination," is available as an answer key.

Initial Conditions:

You are the Reactor Operator, the plant has been stable at 100% power for the last 24 hours. The NPIS computer is out of service.

Initiating Cues:

The Control Room Supervisor directs you to determine Quadrant Power Tilt Ratio using section 8.5 of STS RE-012.

Provide the information only copy of STS RE-012 to the examinee and the table of the present NIS detector currents, Attachment A to this JPM.

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JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.*	8.5.1	Start Time _____ Record the Normalization factor for each of the upper (detector A) and lower (detector B) detectors from page 7.5 of the Curve Book.	Locate the Wolf Creek Generating Station Control Room Operating Curves and Tables Reference Manual. Record the normalization factors for the upper and lower detectors for step 8.5.1. in the space provided in the procedure.	S U

Comments: Tables will not be provided in the element boxes.

2.*	8.5.2	Record the present values of the NIS detector currents.	Record the values provided by the examiner in the procedure.	S U

Cue: **Provide Attachment A to the examinee.**

Comments:

3.*	8.5.3	Normalize each of the detector currents recorded in 8.5.2 by dividing each current by the corresponding normalization factor recorded in 8.5.1.	Normalize each of the detector currents by dividing each current by the corresponding normalization factor. Record the values in the space provided in the procedure.	S U

Comments: All recorded values should be within ± .005 of the values in the Answer Key.

3.a.*	8.5.3.1.	Calculate the average of the upper normalized currents.	Calculate the average of the upper normalized currents (N41 Upper + N42 Upper + N43 Upper + N44 Upper) divided by 4. Record the values in the space provided in the procedure. (See Answer Key)	S U

Comments: All recorded values should be within ± .005 of the values in the Answer Key.

3.b.*	8.5.3.2.	Calculate the average of the lower normalized currents.	Calculate the average of the lower normalized currents (N41 Lower + N42 Lower + N43 Lower + N44 Lower) divided by 4. Record the values in the space provided in the procedure. (See Answer Key)	S U

Comments: All recorded values should be within ± .005 of the values in the Answer Key.

* Critical Step

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JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
4.*	8.5.4	Calculate the upper tilts by dividing each of the upper normalized currents in step 8.5.3 by the average of the upper normalized currents in 8.5.3.1.	Calculate the upper tilts by dividing each upper normalized current by the average upper normalized current from step 8.5.3.1. Record the values in the space provided in the procedure. (See Answer Key)	S U

Comments: All recorded values should be within ± .005 of the values in the Answer Key.

5.*	8.5.5	Calculate the lower tilts by dividing each of the lower normalized currents in 8.5.3 by the average of the lower normalized currents in 8.5.3.2.	Calculate the lower tilts by dividing each lower normalized current by the average lower normalized current from step 8.5.3.2. Record the values in the space provided in the procedure. (See Answer Key)	S U

Comments: All recorded values should be within ± .005 of the values in the Answer Key.

6.*	8.5.6	Record the maximum radial flux tilt.	Record in the space provided in the procedure the highest radial flux tilt indicated from the upper tilt values and the lower tilt values. (See Answer Key)	S U

Comments: All recorded values should be within ± .005 of the values in the Answer Key.

7.	8.5.7	Proceed to Section 8.7	Same as Element	

Comments

8.	8.7	Verification that QPTR is within Limits	Complete section 8.7	

Comments

9.*	8.7.1/2	Recognize QPTR is within Limits	Initial Step 8.7.1 and N/A Step 8.7.2.	

Comments

Termination: Completing Section 8.7 as being within limits completes the JPM.

Stop Time _____

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* Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions: You are the Reactor Operator, the plant has been stable at 100% power for the last 24 hours. The NPIS computer is out of service.
Initiating Cues: The Control Room Supervisor directs you to determine Quadrant Power Tilt Ratio using section 8.5 of STS RE-012.
Notes: If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Attachment A

Training Use Only

	N41	**N42**	**N43**	**N44**
I_{top}	238	237	246	249
I_{bot}	240	234	265	259

*

ADMIN RO-A3
Questions

ID #	RO-A.3.1
NRC KA reference	2.2.22 LCO's and Safety Limits (CFR 43.2/45.2, RO 3.4) Ability to explain and apply all system limits and precautions.
Question Source	NEW
WCGS objective tie	Objective 7, SY 13 002 00, Tech. Specs and Operational Requirements.
WCGS lesson plan reference	SY 13 002 00, Rev. 10, Reactor Coolant System LO17 327 00, Rev. 004 Introduction to Technical Specifications (Contractor provided Class)
WCGS reference	WCGS Technical Specifications, Section 2.0
Question	A plant transient with a loss of load caused a power reduction. From analysis the peak transient conditions occurred at 95 % power when Tavg reached 629 degrees and RCS pressure was at 2235 psig. Determine what actions would be required?
Answer	Restore the condition and be in Mode 3 within 1 hour.
Comment section	OPEN REFERENCE QUESTION

QUESTION: RO-A.3.1

OPEN REFERENCE QUESTION

A plant transient with a loss of load caused a power reduction. The plant is currently stable.

From analysis the peak transient conditions occurred at 95 % power when Tavg reached 629 degrees and RCS pressure was at 2235 psig.

Determine what actions would be required?

OPEN REFERENCE QUESTION

ADMIN RO-A3
Questions

ID #	RO-A.3.2
NRC KA reference	2.2.25 (CFR 43.2, RO 2.5) Bases for LCO's and Safety Limits.
Question Source	NEW
WCGS objective tie	SY 13 006 00, Objective 13, Technical Specifications
WCGS lesson plan reference	SY 13 006 00, Rev. 08, Emergency Core Cooling System. LO17 327 00, Rev. 004 Introduction to Technical Specifications (Contractor provided Class)
WCGS reference	WCGS Technical Specifications and Bases.
Question	During Surveillance Testing it is determined that the motor on BG HV-8357A is shorted and the valve will not open. How does this affect the Operability of "A" CCP?
Answer	Words to the effect of: Per the Bases for T.S. 3.5.2, BG HV-8357A and BG HV-8357B are specifically listed as not affecting the operability of their associated CCP. "A" CCP is still operable.
Comment section	OPEN REFERENCE QUESTION

QUESTION: RO-A.3.2

OPEN REFERENCE QUESTION

During Surveillance Testing it is determined that the motor on BG HV-8357A is shorted and the valve will not open.

How does this affect the Operability of “A” CCP?

OPEN REFERENCE QUESTION

WCGS-SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN TASK: Determine Max Stay Time and Protective Clothing Requirements

TASK #:2.3-1

K/A #s:2.3.2 Facility ALARA practices.

References: Rad Worker II Training

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 15 min.

Actual Performance Time: _____min.

Location of Performance: Plant

Method of Performance: Perform

Evaluators Signature: _____ Date _____

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

PROVIDE Training Only copies of the RWP and the Survey Map to the Examinee.

Initial Conditions:

You are the Auxillary Building Operator, the Control Room request you to manually control BG FCV-121 locally in the Normal Charging Pump Room.

Initiating Cues:

Given a Survey Map of the NCP Room and a copy of the RWP, determine the maximum stay time you would be allowed and the Protective Clothing requirements.

Task Standard: Upon Completion of this JPM, the operator will have determined a maximum stay time of 40 minutes and that a full set of Anti-C's are required to remain in the area.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.	N/A	Using the Survey map determine the highest dose in the contaminated area is 30 mrem per hour. Using the RWP determine that the maximum dose allowed is 20 mrem.	Determine stay time to be 20/30 mrem per hour would equal a 40 minute stay time.	S U

Cue:

Comments:

2	N/A	Using the Survey map determine that there is a contaminated area around BG FCV-121 and the highest contamination level inside the comtaminated area is 45k. Using the RWP determine the protective clothing requirements.	Determine that a full set of PC's is required.	S U

Cue:

Comments: IF asked by Examinee state that the controller can not be reached from outside the boundary and they will have to remain in the area..

Termination: Determining Stay Time and Protective clothing requirements completes this JPM.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Auxillary Building Operator, the Control Room request you to manually control BG FCV-121 locally in the Normal Charging Pump Room.

Initiating Cues:

Given a Survey Map of the NCP Room and a copy of the RWP, determine the maximum stay time you would be allowed and the Protective Clothing requirements.

Notes:

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

ADMIN RO-A5
Questions

ID #	RO-A.5.1
NRC KA reference	2.4.27. (CFR 41.10/43.5/45.13, RO 3.0) Plant Fire Procedures.
Question Source	NEW
WCGS objective tie	Objective 3. Explain the major actions accomplished by this procedure.
WCGS lesson plan reference	LO 17 324 26, Rev. 06. OFN KC-016, Fire Response
WCGS reference	OFN KC-016, Rev. 05. Fire Response, Steps 4, 11, and 15
Question	Given a fire has occurred in the plant, what are the time limits for when the Off Site Fire Department must be called in to assist?
Answer	All Three Required 1. Full Fire Brigade strength not at the seen within 12 minutes of callout.(step 4) 2. Fire <u>not</u> under control within 10 minutes of Fire Brigade arrival. (step 11) 3. Fire Pump Pressure Less than 80 psig at the Circ Water Screen House, Continuous Action. (step 15)
Comment section	OPEN REFERENCE QUESTION

ADMIN RO-A5
Questions

QUESTION: RO-A.5.1

OPEN REFERENCE QUESTION

Given a fire has occurred in the plant, what are the time limits for when the Off Site Fire Department must be called in to assist?

OPEN REFERENCE QUESTION

ADMIN RO-A5
Questions

ID #	RO-A.5.2
NRC KA reference	2.4.49 (CFR 41.10/43.2/45.6, RO 4.0) Perform Immediate Actions.
Question Source	NEW
WCGS objective tie	Objective 3: Explain the mitigation strategies used in OFN RP-017
WCGS lesson plan reference	LO 17324 27, Rev. 06.
WCGS reference	OFN RP-017 Rev. 15, Attachment C, Steps C1-C5.
Question	You are the Reactor Operator. A fire has occurred in the Lower Cable Spreading Room leading to spurious actuations and causing the Shift Manager to evacuate the Control Room. What are the Immediate Actions of the Reactor Operator?
Answer	
Comment section	CLOSED REFERENCE QUESTION

QUESTION: RO-A.5.2

CLOSED REFERENCE QUESTION

You are the Reactor Operator. A fire has occurred in the Lower Cable Spreading Room leading to spurious actuations and causing the Shift Manager to evacuate the Control Room.

What are the Immediate Actions of the Reactor Operator?

CLOSED REFERENCE QUESTION

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN TASK: Perform an RCS Inventory Balance

TASK #: EPE009002

K/A #s: 2.1.23

References: STS BB-004, Rev. 22

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time:__20__ min.

Actual Performance Time: _____min.

Location of Performance: Classroom

Method of Performance: Perform

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes: **ADMIN JPM**

The exam group shall verify that the procedure revision for this JPM is current and that any change against the referenced procedure does not invalidate this JPM.

Provide an "Information Only" copy of STS BB-004 with cover sheet. Ensure initial conditions are signed off. Ensure the procedure signed off up through step 9.5 and Attachment A has initial and final data filled in.

Initial Conditions:
You are a Relief Crew Licensed Operator; the plant is stable at 100% power. The operating crew has indications of a leak in Containment.

Initiating Cues:
The Control Room Supervisor had the RO perform a 4 hour STS BB-004 for RCS leakage and has completed the data collection. The CRS directs you to complete STS BB-004 calculations, beginning at Step 9.6, to determine if there is an RCS leak. The CRS provides you with the following information.

Chemistry performed no sampling or chemical additions.
STN CH-020 results are < 0.815 gallons per day.
STS PE-019, RCS Pressure Isolation valve Leakage, is 0.145 gpm.

READ TO EXAMINEE:

If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

TASK STANDARD:

Upon completion of this JPM the operator will have calculated the leak rate on the RCS per STS BB-004.Final Value for unidentified leakage is 0.485 gpm $\pm$ .05 gpm, and Identified T.S. Leakage of 0.164 gpm $\pm$ .05 gpm.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.*	9.7	Calculate RCS leakage using Attachment B and log the results in the Control Room Log.	Complete calculations.	S U

Cue:

Comments: Logging the results in the Control Room Log is not required for this JPM.

2.	9.8	If individual component leakage is to be determined then perform Attachment C. If not mark this step N/A.	Ask CRS if individual component leakage needs to be determined.	S U

Cue: Reply as CRS that individual component leakage will not be determined.

Comments:

Termination: Calculation of RCS leakage completes this JPM.

Stop Time _____

NOTE: Calculated values should be as follow:

Step B.1.2 = 6.142 gallons
Step B.2.2 = -295.8 gallons
Step B.3.3 = -19.25 gallons
Step B.4.3 = 430 gallons
Step B.4.6 = 0 gallons
Step B.5 = 121.092 gallons
Step B.6.2 = 0.5045 gpm
Step B.7.3.2 = 4.508 gallons
Step B.7.5 = .0188 gpm
Step B.7.8 = Total Identified Leakage ≈0.0188 gpm.
Step B.8.1 = Unidentified Leakage Rate ≈0.4852 gpm.
Step B.9.1 = Total Identified T.S. Leakage 0.1643 gpm.

WCGS -SRO/RO TRAINING PROGRAM
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Initial Conditions:
You are a Relief Crew Licensed Operator; the plant is stable at 100% power. The operating crew has indications of a leak in Containment.

Initiating Cues:
The Control Room Supervisor had the RO perform a 4 hour STS BB-004 for RCS leakage and has completed the data collection. The CRS directs you to complete STS BB-004 calculations, Step 9.7, to determine if there is an RCS leak. The CRS provides you with the following information.

Chemistry performed no sampling or chemical additions.
STN CH-020 results are 0.815 gallons per day.
STS PE-019, RCS Pressure Isolation valve Leakage, is 0.145 gpm.

Notes:

If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN TASK: Determine the estimated time to boiling, estimated time to onset of core uncovery, and estimated time to core uncovery.

TASK: APE025004

K/A #s: 2.1.25

References: OFN EJ-015, Rev. 8

Examinee's Name _____ SS No. _____-____-_____ SRO___ RO___

The examinee's performance was evaluated against the standards in this JPM and determined to be:

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 10 min.

Actual Performance Time: _____min.

Location of Performance: Classroom

Method of Performance Perform

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The examiner shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Ensure a copy of Attachment A of this JPM is available.

Initial Conditions:

You are a spare SRO in the Control Room for Outage Support. The plant is in Mode 5 with water level in the reactor vessel at 3.5 feet below the vessel flange. Train "A" Residual Heat Removal (RHR) is in operation cooling the reactor core. Train "B" RHR System is in Standby. Reactor Coolant System temperature is 180°F. It has been 9 days since the reactor was shutdown.

Initiating Cues:

Train "A" Residual Heat Removal pump tripped. Attempts to start "B" RHR pump are unsuccessful. The Control Room Supervisor directs you to determine the following using Step 30 of OFN EJ-015,"LOSS OF RHR COOLING":

1. the time to boiling
2. the time to start of core uncovery.
3. the time to complete core uncovery.

Provide a copy of Attachment A to the examinee.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.*	30.a.	Start Time _____ Check plant - IN REDUCED INVENTORY CONDITION.	Recognize the initiating cues stated the water level in the reactor vessel is 3.5 feet below the vessel flange. *Answer: YES*	S U

Comments:

2.*	30.b.	Estimate time to boiling using FIGURE 5.	Locate Figure 5 of OFN EJ-015. Recognize it has been 9 days since shutdown and that the vessel is not pressurized. *Answer: 14 minutes ± 1*.	S U

Comments:

3.*	30.c.	Estimate time to onset of core uncovery using FIGURE 6.	Locate Figure 6 of OFN EJ-015. Recognize it has been 9 days since shutdown. Utilize the ONSET OF CORE UNCOVERY graph line. *Answer: 127 minutes ± 5*.	S U

Comments:

4.*	30.d.	Estimate time to complete core uncovery using FIGURE 6.	Locate Figure 6 of OFN EJ-015. Recognize it has been 9 days since shutdown. Utilize the COMPLETE CORE UNCOVERY graph line. *Answer: 268 minutes ± 5*.	S U

Comments:

Termination: Locating the estimated time to complete core uncovery completes the JPM.

Stop Time _____

* Critical Step

WCGS -SRO/RO TRAINING PROGRAM
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Initial Conditions:

You are a spare SRO in the Control Room for Outage Support. The plant is in Mode 5 with water level in the reactor vessel at 3.5 feet below the vessel flange. Train "A" Residual Heat Removal (RHR) is in operation cooling the reactor core. Train "B" RHR System is in Standby. Reactor Coolant System temperature is 180°F. It has been 9 days since the reactor was shutdown.

Initiating Cues:

Train "A" Residual Heat Removal System pump tripped. Attempts to start "B" RHR pump are unsuccessful. The Control Room Supervisor directs you to determine the following using Step 30 of OFN EJ-015,"LOSS OF RHR COOLING":

1. the time to boiling
2. the time to start of core uncovery.
3. the time to complete core uncovery.

Notes:

If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ATTACHMENT A

PARAMETER	VALUE
Estimated time to boiling	
Estimated time to onset of core uncovery	
Estimated time complete core uncovery	

WCGS-SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN TASK: Given a sequence of events determine the end time of an LCO using any extensions that would be allowed by ITS 3.0.4.

TASK #: 2.1-3

K/A #s: 2.2.23, Ability to Track LCO's.

References: WCGS Integrated Technical Specifications and Bases, LCO 3.5.2 and Section 1.3.

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 15 min.

Actual Performance Time: _____min.

Location of Performance: Classroom

Method of Performance: Perform

Tools and Equipment:None

Evaluators Signature: _____ Date _____

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN JPM

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Initial Conditions:

You are the Control Room Supervisor, the plant is stable in Mode 1.

Initiating Cues:

The "A" train SI pump has been declared inoperable. The time of discovery is 1000 on 12/08/2001. The "B" train SI is OPERABLE.

Twelve (12) hours after the "A" train SI is declared inoperable, the "B" train RHR pump is declared inoperable.

At 1000 on 12/09/2001, the "A" train SI pump is restored to OPERABLE status.

When must the "B" train RHR pump be restored to OPERABLE status to avoid a unit shutdown, including any extensions permitted by Technical Specifications?

Task Standard: Upon Completion of this JPM, the operator will have determined that the extensions allowed by section 1.3, "Completion Times", would apply and that LCO 3.5.2 must be exited by 2200 on 12/11/2001.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.	N/A	"A" train SI pump declared inoperable1000 on 12/08/2001. The "B" train SI is OPERABLE. Enter LCO 3.5.2.	Action A. 72 hours to restore. 100% capacity of ECCS is still available. Restore by 1000 12/11/2001.	

Cue:

Comments:

		"B" train RHR pump is declared inoperable2200 12/08/2001.	Still in LCO 3.5.2, Action A. 100% capacity of ECCS is still available. Restoration still 1000 12/11/2001.	S U

Cue:

Comments:

		At 1000 on 12/09/2001, the "A" train SI pump is restored to OPERABLE status.	Since the first component causing entry into LCO 3.5.2 was restored first, an extension to the completion time of 3.5.2 can be applied. Per Section 1.3, Extension is 24 hours from the origional end or the time limit of the second component, whichever is less. Completion time would be extended 12 hours to 2200 12/11/2001.	S U

Cue:

Comments:

Termination: Determining that the "B" RHR must be restored by 2200 on 12/11/2001 completes this JPM.

Stop Time _____

*Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Control Room Supervisor, the plant is stable in Mode 1.

Initiating Cues:

The “A” train SI pump has been declared inoperable. The time of discovery is 1000 on 12/08/2001. The “B” train SI is OPERABLE.

Twelve (12) hours after the “A” train SI is declared inoperable, the “B” train RHR pump is declared inoperable.

At 1000 on 12/09/2001, the “A” train SI pump is restored to OPERABLE status.

When must the “B” train RHR pump be restored to OPERABLE status to avoid a unit shutdown, including any extensions permitted by Technical Specifications?

WCGS-SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Determine Max Stay Time and Protective Clothing Requirements

TASK #:2.3-1

SAFETY FUNCTION #:N/A

K/A #s:2.3.2 Facility ALARA practices.

References: Rad Worker II Training

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 15 min.

Actual Performance Time: _____min.

Location of Performance: Plant

Method of Performance: Perform

Tools and Equipment: None

Evaluators Signature: _____ Date _____

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced
procedure does not invalidate this JPM.

PROVIDE Training Only copies of the RWP and the Survey Map to the Examinee.

Initial Conditions:

You are the Auxillary Building Operator, the Control Room request you to manually control BG FCV-121 locally in the Normal Charging Pump Room.

Initiating Cues:

Given a Survey Map of the NCP Room and a copy of the RWP, determine the maximum stay time you would be allowed and the Protective Clothing requirements.

Task Standard: Upon Completion of this JPM, the operator will have determined a maximum stay time of 40 minutes and that a full set of Anti-C's are required to remain in the area.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.	N/A	Using the Survey map determine the highest dose in the contaminated area is 30 mrem per hour. Using the RWP determine that the maximum dose allowed is 20 mrem.	Determine stay time to be 20/30 mrem per hour would equal a 40 minute stay time.	S U

Cue:

Comments:

2	N/A	Using the Survey map determine that there is a contaminated area around BG FCV-121 and the highest contamination level inside the comtaminated area is 45k. Using the RWP determine the protective clothing requirements.	Determine that a full set of PC's is required.	S U

Cue:

Comments: IF asked by Examinee state that the controller can not be reached from outside the boundary.

Termination: Determining Stay Time and Protective clothing requirements completes this JPM.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Auxillary Building Operator, the Control Room request you to manually control BG FCV-121 locally in the Normal Charging Pump Room.

Initiating Cues:

Given a Survey Map of the NCP Room and a copy of the RWP, determine the maximum stay time you would be allowed and the Protective Clothing requirements.

Notes:

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

ADMIN TASK: Classify an Event using the Emergency Plan

TASK #:OFN060011

K/A #s: 2.4.41

References: APF 06-002-01

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be:

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time:__15__ min.

Actual Performance Time: _____min.

Location of Performance: Simulator

Method of Performance: Perform

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:
The examiner shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

This Classification will take place at the conclusion of the scenario where the applicant fills the SRO position.

Initial Conditions:

1) You have just seen an event(s) take place on the simulator. You are free to look at your notes and look at any reference material.
2) Classify the event per the EALs.
3) To pass the JPM you must classify at the right level on the correct tree and complete the Emergency Notification Form blocks 1 through 8..

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Start Time _____

SCENARIO #	**CLASSIFICATION**	**EAL TREE**
1	ALERT	EAL-4, Main Steam Line Break MSLB-1 –2 –5 –6 - ALERT
2	ALERT	EAL-3, Loss of Reactor Coolant Boundary LRCB-1 –2 –3 –5 –6 -7 -- ALERT
3	ALERT	EAL-6, Loss of Electrical Power LEP/AC 1 –2 –5 - ALERT
4	SITE AREA EMERGENCY	EAL-3, Loss of Reactor Coolant Boundary LRCB 1 –2 –3 –4 -8 – SAE
5	ALERT	EAL-2, Steam Generator Tube Failure SGTF – 1 –2 –9 –10 -12 -- ALERT.
6	NOTIFICATION OF UNUSUAL EVENT	EAL-4, Main Steam Line Break MSLB 1 –2 –5 –7 –NUE.

Comments: The Critical Step is to correctly classify the event, NOT the time limit.

Classifying the event terminates the JPM

Stop Time _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

1) You have just seen an event(s) take place on the simulator. You are free to look at your notes and look at any reference material.
2) Classify the event per the EALs.
3) To pass the JPM you must classify at the right level on the correct tree and complete the Emergency Notification Form blocks 1 through 8..

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Bypass an ESF System.

SAFETY FUNCTION: **#7**

TASK #: 01300004

K/A #s: 013 K5.01, K5.02.

References: N/A

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 5 min.

Actual Performance Time: _____min.

Location of Performance: Control Room **X** Simulator __ Plant_____

Method of Performance: Simulate **X** Perform _____

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Initial Conditions:

You are the Reactor Operator, the plant is stable in Mode 1.

Initiating Cues:

The Control Room Supervisor (CRS) directs you to place GT RE-31 in bypass for a filter change out.

READ TO EXAMINEE

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is c you expect to do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pu red light will light, handwheel will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element Number	Element	Standard	Score
1.	Start Time _____ Obtain the correct key from the holders hanging to the right of the CRS Desk by the E-plan Communicators station.	The Rad Monitor Bypass keys are hanging from magnetic clips on cabinets on the West wall of the Control Room. The Examinee must ensure they obtain the key for GT RE-31/ GT RE-32.	S U

Cue:

Comments: It is sufficient for the examinee to show the evaluator where the key is located and which key is the correct one.

2.*	Locate Bistable Key Switch for GT RE-31.	Locate the switch on panel SA036E, located behind the Control Boards, on the west side, third row of panels. Point out the Bistable Key Switch for GT RE-31.	S U

Cue:

Comments

3.	Remove the placard for GT RE-31.	The placard is removed and is taken to the Control Room after the monitor is bypassed.	S U

Cue: The placard is removed.

Comments: Placards are kept above the computer screen on RL004 or above the CRS Gaitronics as a visual reminder.

4.*	Bypass GT RE-31.	The key is inserted in the switch and is turned to the BYPASS position.	S U

Cue: Switch is in bypass position.

Comments:

5.	Verify the proper annunciators are lit.	Ann. 047F ,"ESFAS NOT NORMAL" and 049F, "B TRAIN ESFAS", will come in.	S U

Cue: Annunciators, 047F, "ESFAS NOT NORMAL" and 049F, "B TRAIN ESFAS", are lit

Comments:

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element Number	Element	Standard	Score
6.	Take the placard for GT RE-31 to the Control Room Supervisor.	The placard is taken to the CRS and then placed on RL004 or the CRS Gaitronics box.	S U

Cue:

Comments: Accept examinee stating he would place plaque on RL004 or give to the CRS.

Termination: Describing key insertion and turning switch to bypass completes the JPM

Stop Time _____.

*Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Reactor Operator, the plant is stable in Mode 1.

Initiating Cues:

The Control Room Supervisor directs you to place GT RE-31 in bypass for filter change out.

Notes:

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is c you expect to do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pu red light will light, handwheel will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

WCGS-SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Isolate ESW Drains

TASK #:00007703

SAFETY FUNCTION #: 4

K/A #s: NEW

References: OFN SG-003 "Natural Events", DCP 07225 "Emergency Makeup Water Requirement For AFW From ESW/UHS."

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time:__15__ min.

Actual Performance Time: _____min.

Location of Performance: Control Room _____ Simulator _____ Plant__**X**

Method of Performance: Simulate _X__ Perform _____

Tools and Equipment: None

Evaluators Signature: _____ Date _____

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

READ TO EXAMINEE

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), w do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pump will start and red light w will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

When recording data on Data Sheets, indicate the instrument used and vocalize the value you will record for each parameter.

Initial Conditions:

You are the Turbine Building Operator, the plant has experienced a Seismic Event which has caused a Cooling Dam failure.
The Control Room has entered OFN SG-003, “Natural Events”.

Initiating Cues:

The Control Room Supervisor directs you to close ESW To Aux Feedwater Pumps Inlet Header Drains:

- AL-V136
- AL-V137
- AL-V138
- AL-V139

Task Standard: Upon Completion of this JPM, the operator will have isolated the leak paths from ESW to the Aux Feedwater System.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Elements 1,2 and 3 of this JPM may be performed in any order

Element #	Step #	Element	Standard	Score
1.		Start Time _____ Isolate ESW to TDAFW pump inlet header drains.	Complete elements 1a through 1c.	N/A

Cue: IF examinee discusses looking for flow at tail pipe drain to floor drain, THEN cue **"water is flowing from pipe to drain."**

Comments: Examinee may not check for flow indication and go straight to valves.

1a. *		Isolate Red Train ESW drain to TDAFW pump suction.	Locate AL-V138 in the TDAFW pump room and close.	S U

Cue: After examinee locates valve and properly discusses closing it cue, **" AL-V138 indicates closed".**

Comments:

1b. *		Isolate Yellow Train ESW drain to TDAFW pump suction.	Locate AL-V139 in the TDAFW pump room and close.	S U

Cue: After examinee locates valve and properly discusses closing it cue, **" AL-V139 indicates closed".**

Comments:

1c.		Check for flow from tell tale drain to floor drain..	Locate tell tale drain to floor drain on west side of TDAFW pump and verify flow has stopped.	S U

Cue: IF examinee discusses looking for flow at tail pipe drain to floor drain AND has discussed properly closing both valves, THEN cue **"no water is seen flowing from pipe to drain."**

Comments: Examinee should check for flow as diverse indication to ensure valves are fully shut.

2.		Isolate Inlet Header drain on Red Train ESW to "A" AFW pump suction.	Complete elements 2a and 2b..	N/A

Cue: IF examinee discusses looking for flow at tail pipe drain to floor drain, THEN cue **"water is flowing from pipe to drain."**

Comments: Examinee may not check for flow indication and go straight to valves.

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
2a. *		Isolate drain on Red Train ESW to "A" AFW pump suction.	Locate AL-V136 in the "A" AFW pump room and close.	S U

Cue: After examinee locates valve and properly discusses closing it cue, **" AL-V136 indicates closed".**

Comments:

2b.		Check for flow from tell tale drain to floor drain..	Locate tell tale drain to floor drain on south side of "A" AFW pump and verify flow has stopped.	S U

Cue: IF examinee discusses looking for flow at tail pipe drain to floor drain AND has discussed properly closing valve, THEN cue **"no water is seen flowing from pipe to drain."**

Comments: Examinee should check for flow as diverse indication to ensure valve is fully shut.

3.		Isolate inlet header drain on Yellow Train ESW to "B" AFW pump suction.	Complete elements 3a and 3b..	

Cue: IF examinee discusses looking for flow at tail pipe drain to floor drain, THEN cue **"water is flowing from pipe to drain."**

Comments: Examinee may not check for flow indication and go straight to valves.

3a. *		Isolate drain on Yellow Train ESW to "B" AFW pump suction.	Locate AL-V137 in the "B" AFW pump room and close	S U

Cue: After examinee locates valve and properly discusses closing it cue, **" AL-V137 indicates closed".**

Comments:

3b.		Check for flow from tell tale drain to floor drain..	Locate tell tale drain to floor drain on south side of "B" AFW pump and verify flow has stopped..	S U

Cue: IF examinee discusses looking for flow at tail pipe drain to floor drain AND has discussed properly closing valve, THEN cue **"no water is seen flowing from pipe to drain."**

Comments: Examinee should check for flow as diverse indication to ensure valve is fully shut.

Termination: Closing of all four valves terminates this JPM.

Stop Time _____

---

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Turbine Building Operator, the plant has experienced a Seismic Event which has caused a Cooling Dam failure.
The Control Room has entered OFN SG-003, “Natural Events”.

Initiating Cues:

The Control Room Supervisor directs you to close ESW To Aux Feedwater Pumps Inlet Header Drains:

- AL-V136
- AL-V137
- AL-V138
- AL-V139

Notes:

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), w
do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pump will start and red light w
will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

When recording data on Data Sheets, indicate the instrument used and vocalize the value you will record for each parameter.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Demonstrate the ability to transfer a vital 120 VAC instrument power supply.

SAFETY FUNCTION: **#6**

TASK #: 05700018

K/A #s: 057 AA1.01; AA2.06, AA2.14

References: OFN NN-021, Rev. 6

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 12 min.

Actual Performance Time: _____min.

Location of Performance: Control Room _____ Simulator _____ Plant **X**

Method of Performance: Simulate **X** Perform _____

Tools and Equipment: Hard Hat
Safety glasses
Hearing Protection

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

For consistency start by the Fire Brigade Lockers.

READ TO EXAMINEE

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), w do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pump will start and red light w will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

When recording data on Data Sheets, indicate the instrument used and vocalize the value you will record for each parameter.

Initial Conditions:

You are the Turbine Bldg. Operator. The plant is in Mode 3 with all checklist items for going into Mode 2 complete. The Control Room received MCB alarms 25A, "NN01 INST BUS UV" and 25B "NN11 INV UV". Subsequently the Reactor Operator verified from OFN NN-021 "Loss of 120 VAC Instrument Bus" that Bus NN01 is de-energized.

Initiating Cues:

The Control Room Supervisor directs you to verify no apparent damage to bus NN01 and Inverter output voltage normal.

Do not operate any equipment in the plant.

TASK STANDARD: Upon completion of this JPM the operator will have placed NN01 on the Sola Transformer per OFN NN-021.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.	N/A	Start Time _____ Check NN01 Bus – No Apparent Damage	Locate NN01, located on the 2016' level of the Control Bldg.	S U

Cue: After examinee locates bus cue "No apparent damage."

Comments:

2.	N/A	Verify inverter output voltage NORMAL.	Locate the inverter output voltmeter on NN11.Voltage should be ~ 120 VAC.	S U

Cue: After examinee describes checking the voltage, ***"Output voltage is 0 VAC".***

Comments:

3.	N/A	Notify the Control Room that NN01bus is intact but that the voltage on NN01 is zero.	Contact the Control Room and make the report.	S U

Cue: Acknowledge the report, give cue ***"align backup power supply to NN01 by closing backup transformer XNN05 supply breaker NG01ACR3 then open normal feeder breaker NN0101 and close alternate feeder breaker NN0102."***

Comments: **Ensure 3-way communication is used.**

4.*	N/A	CLOSE backup transformer XNN05 power supply breaker NG01ACR3.	Locate the breaker on NG01A, north of NG03 in the north Class 1E Switchgear room. Turn NG01ACR3 to the ON position.	S U

Cue: After examinee locates and describes closing the breaker, ***"NG01ACR3 indicates ON."***

Comments:

5.*	N/A	Utilize the Interlock key to operate the interlock mechanism.	Install the key into the lock mechanism and turn.	S U

Cue: After examinee describes operating the key, ***"The pawl is down."***

Comments: Turning the key will withdraw the pawl that locks the slide bar in place.

---

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
6.	N/A	OPEN normal feeder breaker NN0101.	The breaker is opened by pushing the switch to the left towards OFF.	S U

Cue: After examinee describes opening the breaker, ***"The breaker indicates off."***

Comments:

7.*	N/A	CLOSE alternate feeder breaker NN0102	The slide bar is moved to the left and the switch is moved to the left. The White line should be showing on the breaker switch.	S U

Cue: After examinee describes closing the breaker, ***"Breaker indicates on."***

Comments: The white line indicates the breaker is on. Examinee should contact the Control Room prior to closing the alternate breaker.

8.	N/A	Notify the Control Room that NN01 is being supplied from alternate power.	Contact the Control Room and make the report.	S U

Cue: Acknowledge report, provide cue ***" continue your rounds".***

Comments: **Ensure 3-way communications is used.**

Termination: Re-energizing NN01 completes this JPM.

Stop Time _____

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Turbine Bldg. Operator, the plant is in Mode 3 with all checklist items for going into Mode 2 complete. The Control Room received MCB alarms 25A, "NN01 INST BUS UV" and 25B "NN11 INV UV". Subsequently the Reactor Operator verified from OFN NN-021 "Loss of 120 VAC Instrument Bus" that Bus NN01 was de-energized.

Initiating Cues:

The Control Room Supervisor directs you to verify no apparent damage to bus NN01 and Inverter output voltage normal.

Notes:

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), what you expect to do (e.g. turn switch to run, rotate handwheel CCW to open, etc.) and what you expect to happen (e.g. pump will start and red light will light, handwheel will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

When recording data on Data Sheets, indicate the instrument used and vocalize the value you will record for each parameter.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Perform Local Actions for Immediate Boration (ASP)

TASK #: APE024003

K/A #s: APE024 AA1.17, AA1.25

References: OFN BG-009, Rev. 8

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 6 min.

Actual Performance Time: _____min.

Location of Performance: Control Room _____ Simulator _____ Plant **X**

Method of Performance: Simulate **X** Perform _____

Tools and Equipment: Hard Hat
Safety glasses
Ear protection

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any change against the referenced procedure does not invalidate this JPM.

An * Denotes a Critical Step.

READ TO EXAMINEE

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), w do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pump will start and red light w will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

Initial Conditions:

You are the Aux. Bldg. Operator, the plant was in Mode 1. A reactor trip has recently occurred.

Initiating Cues:

The Control Room Supervisor informs you that OFN BG-009, Attachment A, is being performed and that BG FCV-110A, Boric Acid Blending Tee Inlet Isol. Valve, will not open from the Control Room. The CRS directs you to fail open BG FCV-110A by isolating and venting instrument air from the valve operator.

DO NOT operate any components in the plant.

TASK STANDARD: Upon completion of this JPM the operator will have locally established Emergency Boration by opening BG HV-8104.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1. *	A2. RNO a.	Start Time _____ Locally isolate instrument air to valve.	Locate the valve and air isolation on the 1978' level of the Aux. Bldg., in the "A" SI Pump Room. Close the instrument air isolation valves to the positioner and the valve by turning the handles so they are perpendicular to the air lines.	S U

Cue: After examinee describes isolating both air valves report, "***Handles are perpendicular to air lines.***"

Comments: Examinee must isolate <u>both</u> air valves to satisfy this element.

2.*	A2. RNO b.	Locally Vent air pressure from valve.	Vent air off the operator by opening the filter drains located at the bottom of the filters or by any other method that will bleed air off the top of the operator.	S U

Cue: ***BG FCV-110A does not move.***

Comments: Accept any viable method of venting air from the operator.

3.	N/A	Notify Control Room of inability to open valve.	Contact Control Room and inform them the valve will not open with air isolated and vented.	S U

Cue: Acknowledge report, direct examinee to, "***locally open BG HV-8104***."

Comments:

4. *	A8.a	Locally OPEN Emergency Boration Valve. • BG HV-8104.	Locate valve on the 1978' level of the Aux. Bldg., in the "A" SI Pump Room. Engage the manual operator by pulling gently down on the clutch lever and turning the handwheel several turns until the clutch key is engaged. Then pull the clutch lever all the way down and turn the handwheel in the counter-clockwise direction.	S U

Cue: As examinee describes opening the valve, "***Valve stem is moving,--- valve indicates open.***"

Comments:

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
5.	N/A	Report status of valve to Control Room.	Contact Control Room, report BG HV-8104 is open.	S U

Cue: Acknowledge report, respond, *"**immediate boration flow is 37 gpm",** direct examinee to, "**continue your rounds**."*

Comments:

Termination: Opening BG HV-8104 completes the JPM.

Stop Time _____

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Aux. Bldg. Operator, the plant was in Mode 1. A reactor trip has recently occurred.

Initiating Cues:

The Control Room Supervisor informs you that OFN BG-009, Attachment A, is being performed and that BG FCV-110A, Boric Acid Blending Tee Inlet Isol. Valve, will not open from the Control Room. The CRS directs you to fail open BG FCV-110A by isolating and venting instrument air from the valve operator.

DO NOT operate any components in the plant.

Notes:

Plant equipment should not be operated, if you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), what you expect to do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pump will start and red light will light, handwheel will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

WCGS-SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Conduct a Liquid Radwaste Release

TASK #: 06800004, 2.3-3

SAFETY FUNCTION : #9

K/A #s: 068A3.02, 2.3.11

References: SYS SP-121, Rev. 10 ; ALR 61A, Rev. 15; OFN SP-010, Rev. 5.

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time:__20__ min.

Actual Performance Time: _____min.

Location of Performance: Control Room ___**X**_____ Simulator _____ Plant_____

Method of Performance: Simulate ____ Perform __**X**_

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Simulator set-up: **IC 171**.

Ensure Simulator in **RUN**
ENSURE Horns are **ON**
From the EXPERT panel input **BAT JPM158A.TXT**

>Batch File For JPM0158A, Radioactive release
mRMS0326L (1) 5e-3 10

Provide Examinee an Info Only Copy of Liquid Release Permit #01-001, and a copy of SYS SP-121.

Cues with brackets, [Cue]:, are to be given only if the simulator is inoperable.

* Denotes a Critical Step

Initial Conditions:

You are the Reactor Operator, the plant is currently stable in Mode 1.

Initiating Cues:

The Control Room Supervisor directs you to perform the actions to release Waste Monitor Tank "A"(THB07A) to the environs. A new Liquid Release Permit for THB07A has been issued. The source Check has been completed and the Radwaste Operator is standing by..

Task Standard: Upon Completion of this JPM, the operator will have entered new setpoint data for the Liquid Rad Monitor and properly verified the termination of a release.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1. *	6.3.1 Step 1	Start Time _____ To change the value of a Supervisor RM-80 Database Channel Item, perform the following: 1. Select the desired channel per step 6.1.2.	Reference Procedure Step 6.1.2 Ensure Grid 1 Displayed: a. Key in the three digit Channel Identification Number: **(186)** b. Press the SEL key. c. Selected Channel outlined in white.	S U

Cue:

Comments:

2.	6.3.1 Step 2	Place Supervisor Master Key in the key slot and turn it to SUPERVISOR position.	Lower right corner of console, key turned clockwise to the SUPERVISOR position.	S U

Cue:

Comments:

3.	6.3.1 Steps 3,4,5, 6	Display the Supervisor RM-80 Database	At the keyboard: a. Press LIT key. b. Press the Grid 5 key. c. Press the SEL key. d. Verify the Supervisor RM-80 Database Screen is displayed.	S U

Cue:

Comments:

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
4. *	6.3.1 Steps 7,8,9, 10	Enter setpoint data for the ALERT channel.	Select desired Channel Item to be changed. At the keyboard: a. Press the minus (-) key. b. Key in the desired Channel Item number. **(09)**. c. Press the SEL key. d. Check the selected Channel Item is backlit.	S U

Cue:

Comments:

5. *	6.3.1 Steps 11,12	Enter new setpoint data from Release Permit.	At the keyboard: a. Key in the desired channel item value in the correct format. . 9.68 E-3 is keyed in as 9, 6, 8, -, 0, 3. b. Press the ENTER key.	S U

Cue:

Comments:

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
6. *	6.3.1 Steps 13,14	Verify setpoint data is correct.	On the CRT screen: a. A message area will appear at the bottom of the screen b. IF the data in the message area is correct, THEN press the ENTER key and proceed to step 6.3.1.14. c. IF the entry is accepted, THEN the message at the bottom of the CRT will indicate value accepted and the value for that item will be updated in the RM-80 Column and the Master Column.	S U

Cue:

Comments:

7.	N/A	Repeat elements 4 through 6 for the High Channel setpoint...	Examinee must realize that they need to repeat the steps required to also enter new setpoint for Channel Item 10.	S U

Cue:

Comments:

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
8. *	6.3.1 Steps 7,8,9, 10	Enter setpoint data for the HIGH channel.	Select desired Channel Item to be changed. At the keyboard: a. Press the minus (-) key. b. Key in the desired Channel Item number. **(10)**. c. Press the SEL key. d. Check the selected Channel Item is backlit. OR a. Press the SEL key. b. Check the selected Channel Item is backlit. **(10)**	S U

Cue:

Comments: Per the NOTE preceding step 11, the examinee may press the SEL key which will advance the selected channel to channel 010.

9. *	6.3.1 Steps 11,12	Enter new setpoint data from Release Permit.	At the keyboard: a. Key in the desired channel item value in the correct format. 9.68 E-2 is keyed in as 9, 6, 8, -, 0, 2. b. Press the ENTER key.	S U

Cue:

Comments:

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
10. *	6.3.1 Steps 13,14	Verify setpoint data is correct.	On the CRT screen: a. A message area will appear at the bottom of the screen b. IF the data in the message area is correct, THEN press the ENTER key and proceed to step 6.3.1.14. c. IF the entry is accepted, THEN the message at the bottom of the CRT will indicate value accepted and the value for that item will be updated in the RM-80 Column and the Master Column.	S U

Cue:

Comments:

11.	6.3.1 Step 16	Return Supervisor Master key to the NORMAL position.	Lower right corner of console, key turned counter-clockwise to the NORMAL position	S U

Cue:

Comments:

N/A	N/A	Release Permit must be verified and authorized by the Shift Manager prior to initiating the release.	**Sign as Shift Manager on Release Permit for Setpoints Verified and Release Approved**	N/A

Cue: Inform Examinee, **"Liquid Release Permit LRP # 01-001 is approved, phone the Radwaste Operator and inform them they can commence the release. A copy of the permit will be sent over later."**

Comments: Give Permit back to Examinee after signing for release approval.

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
12.	N/A	Calls Ext. 5810 for Simulator Radwaste and provides LRP information.	May use Gaitronics.	

Cue:

Comments: Booth Operator. Wait approximately 30 seconds after examinee has called then enter **EVENT 1** with **TRIGGER 1**. This will cause the activity level to increase on HB RE-18.

13.	N/A	Annunciator Alarms 061B and 061A.	Recognize and acknowledge alarms. Go to ALR 00-061A or Enter OFN SP-010.	S U

Cue: "Annunciators 61A and 61B are in alarm."

Comments: The "A" tier alarm is a higher priority and should be used even though the "B" tier alarm may come in first.

NOTE: The examinee may recognize this alarm as an entry condition to OFN SP-010. If so N/A JPM elements 14 through 17 and proceed to Element 18.

14.	Step 1	ALR 61A: Determine Affected Process Radiation Monitor: SP056A – Any RED.	Deterrmine HB 186 is RED.	S U N/A

Cue:

Comments:

15	Steps 2 - 5	2. Check For High Reactor Coolant Activity NO – RNO go to Step 3. 3. Check For RCS Leakage To Containment NO – RNO go to Step 4. 4. Check For Steam Generator Tube Leakage NO – RNO go to Step 5. 5. Check For CCW System Leakage NO – RNO go to Step 6.	Examinee should realize all these answers would be NO and continue down the RNO column to Step 6.	S U N/A

Cue:

Comments:

16*	6	Check For High High Radiation On Normal Release Path.	Examinee should answer YES and proceed ot Step 7.	S U N/A

Cue:

Comments:

17*	7	Ensure Associated Controlled Realease Path Isolated.	Contact the Radwaste Watch and direct them to ensure HB RV-18 is closed.	S U N/A

Cue:

Comments: May use telephone or Gaitronics. **Booth Operator**: When contacted report **"I have verified HB RV-18 is closed**".

NOTE: If the Examinee does not use OFN SP-010 but has completed the actions of ALR 061A, then steps 18 and 19 may be N/A'd.

18	Steps 1-14	OFN SP-010 Step 1-14. Step 1 – NO Step 2 – NO RNO Go To Step 6 Step 6 – NO Step 7 – NO Step 8 – YES Step 9 – NO Step 10 – NO Step 11 – NO Step 12 – NO Step 13 – NO Step 14 – YES	Perform OFN SP-010 to step 14. The RNO column will be followed till step	S U N/A

Cue:

Comments:

NOTE:Examinee may recognize that a Red Indication on a Process Rad Monitor is an entry condition for OFN SP-010, "ACCIDENTAL RADIOACTIVE RELEASE", and enter it directly. If so the procedure will work through the RNO column till step 14 where HB RV-18 is verified closed.

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

18*	N/A	OFN SP-010 Step 14	Contact the Radwaste Watch and direct them to ensure HB RV-18 is closed.	S U N/A

Cue:

Comments: May use telephone or Gaitronics. **Booth Operator**: When contacted report **"I have verified HB RV-18 is closed"**.

Termination: Contacting the Radwaste Watch to Ensure HB RV-18 is closed completes this JPM.

Stop Time _____

---

* Denotes Critical Step

WCGS -SRO/RO/NSO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions: You are the Reactor Operator, the plant is currently stable in Mode 1.
Initiating Cues: The Control Room Supervisor directs you to perform the actions to release Waste Monitor Tank “A”(THB07A) to the environs. A new Liquid Release Permit for THB07A has been issued. The source Check has been completed and the Radwaste Operator is standing by.
Notes: Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is c you expect to do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pu red light will light, handwheel will rotate until valve is open, etc.). When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him. When recording data on Data Sheets, indicate the instrument used and vocalize the value you will record for each parameter.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Transfer CCW Service Loop

SAFETY FUNCTION: **#8**

TASK #: 00800004

K/A #s: 008 A1.01 – A1.04; A3.03,06,10; A4.01,03,05,08,09.

References: SYS EG-201, Rev. 22

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 25 min.

Actual Performance Time: _____min.

Location of Performance: Control Room _____ Simulator __**X**__ Plant_____

Method of Performance: Simulate ____ Perform __**X**__

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:
The examiner shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

SIMULATOR SETUP: **IC 171**
Any Mode 3 Init.
RUN
Ensure the NCP is in service.

Cues with brackets, [Cue]:, are to be given only if the simulator is inoperable.

* Denotes a Critical Step

Provide a copy of SYS EG-201 to the examinee.

Initial Conditions:
You are the BOP, the plant is stable at *Mode 3*, the CCW service loop is on the "B" Train CCW. Maintenance is pending on the "B" Train CCW HX. Lake temperature is 65° F.

Initiating Cues:
The Control Room Supervisor directs you to shift the CCW service loop to "A" Train CCW and secure the "B" Train CCW pumps per SYS EG-201 section 6.1 and 6.3. Start the "A" CCW Pump. The Aux Bldg. is performing 6.2. The CRS directs that SFP Cooling will be swapped later. A Reactivity Brief has beeb provided.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.	6.1.1	Start Time _____ Start the desired Train A CCW Pump. N/A if a Train A CCW Pump is already running.	Recognize a CCW pump will have to be started.	N/A

Cue:

Comments:

1a.	6.1.1.1	Turn off motor space heater supply breaker for the pump to be started. N/A the other breaker.	Contact the Aux. Bldg. Operator to OPEN PG19NJF118.	S U

Cue: Acknowledge request and report PG19NJF118 is OFF.

Comments:

1b.*	6.1.1.2	Start the desired CCW Pump.	Locate EG HIS-21 on RL019. Start the pump by turning the switch to the RUN position. Verify the Red light is lit and the Green light is out.	S U

[Cue]: The Red light is lit on EG HIS-21.

Comments: .

1c.	6.1.1.3	Verify operating CCW Pump discharge flow > 1.5E6 lbm/hr (3000 gpm). N/A non-running train.	Dispatch Aux Operator to check the "A" CCW Pump flow > 1.5E6 lbm/hr on EG FI-95 <u>Or</u> observe flow on computer point.	S U

Cue: If paged as Aux Watch report " flow at 1.8E6 lbm/hr."

Comments:

2.	6.1.2	Locally verify CCW Train A Pump room cooler is running. • SGL11A - RUNNING	Contact the Aux. Bldg. Operator to verify the CCW Pump Room Cooler SGL11A running.	S U

Cue: Acknowledge request and report that SGL11A is running.

Comments:

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

• Element #	Step #	Element	Standard	Score
3.	6.1.3	IF CCW Pump A was started THEN verify proper room cooler damper alignment.	Dispatch Aux Watch to verify GL-D156 open and 157 closed.	S U

Cue: Acknowledge direction and report ***GL-D156 is open and 157 is closed.***

Comments:

4.	6.1.5	IF RHR train B is not in service, THEN align SFP HX B CCW Outlet valve is open to provide a flow path for CCW Train B.	Locate EC HIS-12 on RL021. Verify the Red light is lit.	S U

[Cue]: The Red light is lit on EC HIS-12.

Comments:

5.*	6.1.6	Close CCW Surge Tank “A” and "B" Vent Valves. • EG HIS-10 - CLOSED • EG HIS-9 - CLOSED	Locate EG HIS-10 on RL019. Close the valve by pressing the CLOSE P/B. Verify the Green light comes on and the Red light goes out.	S U

[Cue]: The Green light is lit on EG HIS-10 and EG HIS-9.

Comments:

6.*	6.1.7	OPEN CCW Supply/Return valves . • EG HS-15 - OPEN	Locate EG HIS-15 on RL019. Open the valves by pressing the OPEN P/B. Verify the Red lights come on and the Green lights go out. Annunciator 51F should come in and stay in until the "B" Train Service Loop valves are closed.	S U

[Cue]: The Red lights are on for EG ZL-15 and EG ZL-53.

Comments:

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
7.*	6.1.8	Close CCW Train "B" Supply/Return Valves. • EG HS-16 - CLOSED	Locate EG HIS-16 on RL019. Close the valves by pressing the CLOSE P/B. Verify the Green lights come on and the Red lights go out. Verify annunciator 51F clears when both valves indicate closed.	S U

[Cue]: The Green lights are lit on EG ZL-16 and EG ZL-54 and annunciator 51F is clear.

Comments:

8.	6.1.9	Verify CCW to RW and RCS flow indication. • EG FI-55A - Between 1.6E6 and 4.3E6.	Locate EG FI-55A on RL019. Verify flow indicated.	S U

[Cue]: Flow on EG FI-55A is 3.2 x 10^6 lbm/hr.

Comments:

9.*	6.1.10	Open CCW Surge Tank “A” and "B" Vent valves. • EG HIS-10 - OPEN • EG HIS-9 - OPEN	Locate EG HIS-10 on RL019. Open the valve by pressing the OPEN P/B. Verify the Red light comes on and the Green light goes out.	S U

[Cue]: Only the Red light is lit on EG HIS-10 and EG HIS-9.

Comments: IF asked , Inform operator that the Aux Watch is aligning PASS.

10.	6.3.1	Ensure all ECCS Train “B” pumps are stopped.	Verify “B” RHR Pump, “B” SIP and “B” CCP are secured.	S U

Cue:

Comments:

11.	6.3.2	Align SFP Cooling train “A” for operation per SYS EC-120.	Recognize that SFP Cooling lineup is not required for this JPM.	N/A

Cue:

Comments: It is not required to align SFP Cooling for this JPM.

12.*	6.3.3	Stop the Running Train “B” CCW Pump .	Locate EG HIS-22 or EG HIS-24 on RL019. Stop the pump by turning the switch to the STOP position. Verify the Green light comes on and the Red light is out.	S U

[Cue]: Only the Green light is lit on EG HIS 22(24).

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
13.	6.3.4	Energize the space heater for the non-running CCW Pumps.	Contact the Aux. Bldg. Operator to verify breakers, PG20GBR240 or PG20GBR241, are ON.	S U

Cue: Acknowledge request and report breakers PG20GBR240 and PG20GBR241 are ON.

Comments:

Termination: Securing the "B" CCW Pump completes this JPM.

Stop Time _____

---

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions: You are the BOP, the plant is stable, the CCW service loop is on the "B" Train CCW. Maintenance is pending on the "B" Train CCW HX. Lake temperature is 65° F.
Initiating Cues: The Control Room Supervisor directs you to shift the CCW service loop to "A" Train CCW and secure the "B" Train CCW pumps per SYS EG-201 section 6.1 and 6.3. Start the "A" CCW Pump. The Aux Bldg. is performing 6.2. Spent Fuel Pool cooling will be swapped later.
Notes: If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors. When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Start H2 Analyzers Post LOCA

SAFETY FUNCTION: **#5**

TASK #: EPE074008

K/A #s: 028 A4.03

References: EMG FR-C1, Rev. 12, Step 8 RNO

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 10 min.

Actual Performance Time: _____min.

Location of Performance: Control Room _____ Simulator **X** Plant_____

Method of Performance: Simulate ____ Perform **X**

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

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Notes:

The examiner shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Simulator Setup: **IC 177**
NOTE: This JPM may be ran with any other JPM as long as power is available to the valves.
ANY IC can be used for this JPM
RUN
Cues with brackets, [Cue]:, are to be given only if the simulator is inoperable.

* Denotes a Critical Step

Initial Conditions:

You are the Reactor Operator , EMG FR-C1 ,Response to Inadequate Core Cooling , is in effect.

NOTE: The simulator is NOT setup for EMG FR-C1 conditions.(Ignore RCS and CTMT parameters)
The simulator is running to allow you to change switch positions and receive the proper indication response.

Initiating Cues:

The Control Room Supervisor directs you to perform Step 8 RNO of EMG FR-C1 for Train A only.
Provide a "INFO ONLY " copy of page 14 of EMG FR-C1.

TASK STANDARD: Upon completion of this JPM the operator will have aligned the Train A Hydrogen Analyzers per EMG FR-C1, step 8 RNO.

Notes:

JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), what you expect to do (e.g. turn switch to run, rotate handwheel CCW to open, etc.) and what you expect to happen (e.g. pump will start and red light will light, handwheel will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

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JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.*	8. RNO a.	Start Time _____ On RL011, place the power lockout switches for the containment sample valves, in the NON-ISO position. GS HIS-40 GS HIS-42	Locate the switches on RL011. Push down the NON-ISO P/B and ensure the button locks down. Verify the White light is lit.	S U

[Cue]: "White lights are lit", on GS HIS-40 and GS HIS-42.

Comments:

2.*	8. RNO b.	OPEN only one Hydrogen Analyzer Inner Ctmt. Isolation Valve, GS HIS-13 or GS HIS-14.	Locate the switches on RL011. Open the valve by pressing the OPEN P/B. Verify the Red light comes on and the Green light goes out.	S U

[Cue]: "The Red light is lit and the Green light is out", on GS HIS-13 or GS HIS-14.

Comments: Request examinee to locate both switches.

3.	8. RNO c.	Open the remaining Hydrogen Analyzer Ctmt. Isolations for Train A.	Complete elements 3a through 3c.	N/A

Comments:

3a.*	8. RNO c.	OPEN GS HIS-12.	Locate the switch on RL011. Open the valve by pushing the OPEN P/B. Verify the Red light comes on and the Green light goes out.	S U

[Cue]: "The Red light is lit and the Green light is out", on GS HIS-12.

Comments:

* Denotes Critical Step

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Element #	Step #	Element	Standard	Score
3b.*	8. RNO c.	OPEN GS HIS-17.	Locate the switch on RL011. Open the valve by pushing the OPEN P/B. Verify the Red light comes on and the Green light goes out.	S U

[Cue]: "The Red light is lit and the Green light is out", on GS HIS-17.

Comments:

3c*	8. RNO c.	OPEN GS HIS-18.	Locate the switch on RL011. Open the valve by pushing the OPEN P/B. Verify the Red light comes on and the Green light goes out.	S U

[Cue]: "The Red light is lit and the Green light is out", on GS HIS-18.

Comments:

4.*	8. RNO d.	On RL020, place the CTMT Hydrogen Analyzer control switch, GS HIS-16A, to ANALYZE.	Locate the switch on RL020. Rotate the switch until the arrow points to ANALYZE. The Red light should come on.	S U

[Cue]: "The Red light is lit", on GS HIS-16A.

Comments:

4.	8. RNO e.	Monitor CTMT Hydrogen concentration.	Locate GS AI-19 on RL020.	S U

Cue: "Meter indicates 0% Hydrogen."

Comments:

5.	N/A	Return to step in effect.	Notify the CRS that Hydrogen Analyzer A is in service.	S U

Comments:

Termination: Hydrogen analyzer A is aligned to sample CTMT hydrogen.
Stop Time:_____

* Denotes Critical Step

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Initial Conditions:

You are the Reactor Operator , EMG FR-C1, Response to Inadequate Core cooling, is in effect.

NOTE: The simulator is NOT setup for EMG FR-C1 conditions. (Ignore RCS and CTMT parameters)
The simulator is running to allow you to change switch positions and receive the proper indication response.

Initiating Cues:

The Control Room Supervisor directs you to perform Step 8 RNO of EMG FR-C1 for Train A only.

Notes:

JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is determined), what you expect to do (e.g. turn switch to run, rotate handwheel CCW to open, etc.) and what you expect to happen (e.g. pump will start and red light will light, handwheel will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Increase Accumulator Tank Pressure - Modes 1, 2 or 3

TASK #: 00600029

SAFETY FUNCTION #:3

K/A #s: A1.13, A4.02

References: SYS EP-200, Rev. 23

Examinee's Name _____ SS No. _____-____-_____ SRO__ RO__ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time:__10__ min.

Actual Performance Time: _____min.

Location of Performance: Control Room _____ Simulator __**X**__ Plant_____

Method of Performance: Simulate ____ Perform __**X**__

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

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Notes:

The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Simulator set-up: **IC 177**
INIT 30 or any Mode 3, 2 or 1 INIT.
RUN
BAT JPM029.txt

Contents of Bat JPM029.txt: SET ASISAG (3) = 965

Ensure an "Information Only" copy of SYS EP-200 with cover sheet and initial conditions signed off is available.

Cues with brackets, [Cue]:, are to be given only if the simulator is inoperable.

* Denotes a Critical Step

Initial Conditions:

You are the Reactor Operator, the plant is stable in Mode 1. Accumulator "C" pressure is ≈610 psig, annunciator 45B is lit.

*Provide Mode from Init used.

Initiating Cues:

The Control Room Supervisor directs you to raise SI Accumulator "C" pressure to 630 psig using section 6.6 of SYS EP-200. Prerequisites have been completed.

Provide the "Info Only" copy of SYS EP-200 to the examinee.

If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

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JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.	6.6.1	Start Time _____ Ensure N_2 pressure regulator at the N2 skid is set at 700 psig.	Contact Site Operator, verify regulator setting.	S U

Cue: Acknowledge request, report **"N_2 high pressure regulator is set at 700 psig".**

Comments:

2.	6.6.2	Ensure Accumulator N2 Supply Vent Valve Control is closed. • EP HCV-943 - CLOSED.	Locate EP HC-943 on RL018. Verify the pot output meter reads 0%.	S U

Comments:

3.	6.6.5	IF increasing Accumulator Tank "C" pressure, THEN perform the following:	Complete elements 3a through 3d.	N/A

Cue:

Comments: The Examinee may use the NPIS computer points or NPIS Graphic display to monitor accumulator pressure.

3a.*	6.6.5.1	OPEN Accumulator Tank N_2 supply valve . • EP HIS-8875C - OPEN	Locate EP HIS-8875C on RL018. Open the valve by pressing the OPEN P/B. Verify the Red light comes on and the Green light goes out.	S U

[Cue]: "The Red light is lit" on EP HIS-8875C.

Comments: Valves for other accumulators should be marked N/A.

3b.*	6.6.5.2	OPEN Accumulator Tanks N2 supply valve. • EP HV-8880 - OPEN	Locate EP HIS-8880 on RL018. Open the valve by pressing the OPEN P/B. Verify the Red light comes on and the Green light goes out.	S U

[Cue]: "The Red and Green lights are lit", (pause), "the green light is out" on EP HIS-8880, "pressure is increasing on EP PI-964 and EP PI-965."

Comments:

Note: If simulator is inoperable, after a short pause provide [Cue] "pressure is 625 psig and increasing". If examinee does not close EP HV-8880 provide additional [Cue], "pressure is 635 psig and increasing".

* Critical Step

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JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
3c.*	6.6.5.3	WHEN desired pressure is reached, THEN CLOSE Accumulator Tanks N2 supply valve. • EP HV-8880 - CLOSED	Locate EP PI-964 and EP PI-965 on RL018. Verify pressure is ≈ 630 psig. Locate EP HIS-8880 on RL018. Close the valve by pressing the CLOSE P/B. Verify the Green light comes on and the Red light goes out.	S U

[Cue]: "The Green and Red lights are lit", (pause), "the Red light is out" on EP HIS-8880, "EP PI-964 and EP PI-965 indicate 630 psig."

Comments:

3d.	6.6.5.4	CLOSE the Accumulator Tank N_2 supply valve. • EP HIS-8875C - CLOSED	Locate EP HIS-8875C on RL018. Close the valve by pressing the CLOSE P/B. Verify the Green light comes on and the Red light goes out.	S U

[Cue]: "The Green and Red lights are lit", (pause), "the Red light is out" on EP HIS-8875C.

Comments: Valves for other accumulators should be marked N/A.

4.	6.6.7	• Procedure step for section 6.6 complete.	Sign off step.	S U

[Cue]:

Comments: Not a critical step or required to complete the JPM.

Termination: Closing EP HIS-8875C completes the JPM.

Stop Time _____

*Critical Step

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Initial Conditions:

You are the Reactor Operator, the plant is stable in its present Mode. Accumulator "C" pressure is ≈610 psig, annunciator 45B is lit.

Initiating Cues:

The Control Room Supervisor directs you to raise SI Accumulator "C" pressure to 630 psig using section 6.6 of SYS EP-200. The prerequisites have been performed.

Notes:

If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

When you have completed the JPM inform your evaluator that you are done by handing this Initial Conditions/Initiating Cues sheet back to him.

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JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Restore Charging after a loss of CCP(ASP)

SAFETY FUNCTION: **#2**

TASK #: 00400028

K/A #s: 004 A1.04, 06,07,08; A2.02, 07,11,22; A3.02,09,10,11,14; A4.05, 06,08,11.

References: SYS BG-201, Rev. 34, ALR 00-042A, Rev. 10, SYS BG-120, Rev. 27

Examinee's Name _____ SS No. ____-____-____ SRO_RO_ NSO__

The examinee's performance was evaluated against the standards in this JPM and determined to be :

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 30 min.

Actual Performance Time: _____min.

Location of Performance: Control Room ___ Simulator **X** Plant_____

Method of Performance: Simulate ____ Perform **X**

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

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Notes:
The exam group shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Ensure an "Information Only" copy of SYS BG-201 with cover sheet and initial conditions signed off is available.

Simulator setup: **IC 177**
Any Mode 1 Init with “B” CCW train in service and “B” CCP L/U to Normal Charging.
RUN
BAT JPM026.txt

*Ensure NCP is running.
*Ensure a CCW pump is running in B Train and “B” CCP lined up to normal charging.

Cues with brackets, [Cue]:, are to be given only if the simulator is inoperable.
* Denotes a Critical Step

Initial Conditions:

You are the Reactor Operator, the plant is stable in Mode 1.

Initiating Cues:

The Control Room Supervisor directs you to start the "B" CCP and secure the NCP to support maintenance on the NCP next shift. Initial conditions of SYS BG-201 are complete.

Provide the "Info Only" copy of SYS BG-201 to the examinee.

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Element #	Step #	Element	Standard	Score
1.	6.2.1	Start Time _____ Verify CCP Flow Control BG FK-121, is in MANUAL and set at 20%.	Locate BG FK-121 on RL001. Depress the MANUAL P/B. Depress either the INCREASE or DECREASE button until the output reads 20% OPEN.	S U

[Cue]: *BG FK-121 MANUAL P/B is lit, output meter indicates 20%.*

Comments:

2.	6.2.2	Verify CCP B Recirc Valve is OPEN. • BG HV-8111 -- OPEN	Locate BG HIS-8111 on RL001. Verify the Red light is lit.	S U

[Cue]: *Only the Red light is lit on BG HIS-8111.*

Comments:

3.	6.2.3	Verify CCW is being supplied to CCP B.	Locate EG HIS-22 and EG HIS-24 on RL019. START or verify CCW pump B or D running by the Red light lit on the handswitch.	S U

Cue: If Aux. Bldg. Operator is contacted, acknowledge request and report ***"CCW is lined up to CCP "B".***

[Cue]: *Red light is lit on EG HIS-22 or EG HIS-24.*

Comments: **Examinee may contact Aux. Bldg. Operator to verify CCW lined up to CCP B. Ensure three-way communications is used.**

4.	6.2.4	IF RCS temperature is greater than or equal to 200°F, THEN ensure CCP A discharge header FCV-121 inlet isolation valve is locked closed. • BG-V8483A - LOCKED CLOSED	Contact the Aux Watch to verify BG-V8483A is locked closed.	S U

Cue: Report as the Aux Watch that ***"BG-V8483A is locked closed".***

Comments: Ensure 3-way communication is used.

* Denotes Critical Step

Element #	Step #	Element	Standard	Score
5.	6.2.5	Lock open CCP B discharge Header FCV-121 Inlet Isolation valve. • BG V8483C -- OPEN	Contact Aux. Bldg. Operator, verify the status of BG-V8483C.	S U

Cue: Acknowledge direction, report ***BG-V8483C is open***.

Comments: Ensure three-way communications is used**.**

6.	6.2.6	Ensure CCP B Aux. Lube Oil Pump in AUTO. • BG HIS-2AX -- IN AUTO	Locate BG HIS-2AX on RL001. Verify the switch in AUTO and the Red light lit.	S U

[Cue]: *BG HIS-2AX is in AUTO, red light is lit*

Comments:

7.*	6.2.7	Start CCP B (PBG05B). • BG HIS-2A -- STARTED	Locate BG HIS-2A on RL001. Start the pump by turning the switch to RUN. Verify the Red light comes on and the Green light goes out. Verify a flow increase on BG FI-121 (located on RL002).	S U

[Cue]: *Red light is lit on BG HIS-2A and flow increased on BG FI-121.*

Comments: A Gaitronics Announcement should be made prior to starting the CCP (Per AP21-001, section 6.4.3).

8.*	6.2.8	Place NCP Flow Controller in MANUAL. • BG FK-462 -- IN MANUAL	Locate BG FK-462 on RL001. Depress the MANUAL P/B. Verify the MANUAL P/B is lit.	S U

[Cue]: *BG FK-462 MANUAL P/B is lit.*

9.*	6.2.9	Slowly close NCP Discharge Flow Control valve to 20% while maintaining a constant charging header flow by performing the following simultaneously: • Lower NCP Discharge Flow Controller to 20% output using BG FK-462 • Adjust CCP flow control valve as necessary to maintain a constant charging header flow using , BG FK-121.	Push the LOWER P/B on BG FK-462 while pushing the RAISE P/B on BG FCV-121. Try to maintain a constant flow on BG FI-121.	S U

[Cue]: *BG FK-462 indicates 20%, BG FI-121 indicates 120 gpm.*

Comments:

Element #	Step #	Element	Standard	Score
10.*	6.2.10	When the NCP Discharge Flow Controller is at 20%, THEN stop the NCP. • BG HIS-3 -- STOPPED	Monitor BG FK-462, when the output reads 20%, turn BG HIS-3 (located on RL001) to OFF. Verify the Green light comes on and the Red light goes out..	S U

[Cue]: *"Output reads 20%"* , **after examinee describes stopping the NCP**, *"Green light is lit on BG HIS-3".*

Comments: A Gaitronics Announcement should be made prior to securing the NCP.

11.	6.2.11	Verify NCP Discharge Flow Controller in MANUAL with 20% output. • BG FK-462 - MANUAL AT 20%	Same as element.	S U

[Cue]:

Comments:

NOTE: If the CCP trips before steps 6.2.12 through 6.2.16 (elements 12 to 16) are performed, circle N/A for score.

12.	6.2.12	Adjust CCP flow control valve as necessary to maintain PZR level at program value. • BG FK-121 -- ADJUSTED	Locate BG FK-121 on RL001. Adjust the controller as necessary to obtain the desired flow on BG FI-121.	S U N/A

[Cue]:

Comments:

13.	6.2.13	Adjust the charging header backpressure control valve as necessary to maintain RCP Seal Injection Flow between 8 and 13 gpm. N/A if not required.	Locate BG HC-182 on RL001. Adjust the pot to maintain 8 -13 gpm as indicated on BG FR-154, BG FR-155, BG FR-156, BG FR-157 on RL022.	S U N/A

[Cue]: *The recorders indicate 9 gpm.*

Comments:

14.	6.2.14	OPEN CCP B discharge PI-119 isolation valve. • BG V094 -- OPEN	Direct Aux. Bldg. Operator to open BG-V094.	S U N/A

Cue: Report, *"BG-V094 is open"*.

Comments: Ensure three-way communications is used.

---

* Denotes Critical Step

Element #	Step #	Element	Standard	Score
15.	6.2.15	Close NCP Discharge PI-463 Isolation valve. • BG-V803 - CLOSED	Contact the Aux Watch to close BG-V803.	S U N/A

Cue: Report , "*BG-V803 is closed*".

Comments: Ensure three-way communications is used.

16.	6.2.16	Close NCP Discharge PI-117 Isolation valve. • BG-V014 - CLOSED	Contact the Aux Watch to close BG-V014.	S U N/A

Cue: Report , *"BG-V014 is closed"*.

Comments: Ensure three-way communications is used.

* Denotes Critical Step

Element #	Step #	Element	Standard	Score
17.	N/A	Acknowledge alarms.	Depress ANN ACK P/B.	S U N/A

[Cue]: *Alarms are acknowledged.*

Comments: **Since annunciator horns are turned off during JPMs, examinee may not acknowledge alarms.** *Notify examinee that annunciators are alarming.*

18.	N/A	Report CCP trip to CRS.	Report CCP B has tripped.	S U

Cue: **Acknowledge report, direct examinee to** *respond to ALR 042A and report when charging and letdown are balanced.*

Comments:

19.	N/A	Refer to alarm responses.	Refer to ALR 00-38A, ALR 00-042A and/or ALR 00-042E.	S U NA

Comments:

* Denotes Critical Step

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Element #	Step #	Element	Standard	Score
20.	N/A	(ALR 00-042A, CHARGING FLOW HI/LO)	Complete elements 20a through 21h.	N/A

[Cue]:

Comments:

20a.	1.	Check Charging header flow - Greater Than 150 gpm. • BG FI-121A	Locate BG FI-121A on RL001. Check if flow is greater than 150 gpm.	S U N/A

[Cue]: *"BG FI-121A indicates 0 gpm."*

Comments: **Examinee should go to step 5 per the RNO.**

20a.1	1. RNO	GO TO STEP 5.	Same as element.	S U

Comments:

20b.	5.	Check if Charging header flow - Less Than 45 gpm. • BG FI-121A	Check if flow is less than 45 gpm on BG FI-121A. Recognize that in previous step flow was 0 gpm.	S U N/A

[Cue]: *"BG FI-121A indicates 0 gpm"*

* Denotes Critical Step

Element #	Step #	Element	Standard	Score
20c.	6.	Check Charging Pumps - ANY RUNNING. • BG HIS-1A for CCP A • BG HIS-1B for CCP B • BG HIS-3 for NCP	Recognize that since the NCP was secured and the CCP tripped that no charging pumps are running and go to the RNO.	S U N/A

Comment:

20c.1.*	6. RNO a.	Close Letdown Orifice Isolate valves. • BG HIS-8149AA • BG HIS-8149BA • BG HIS-8149CA	Locate BG HIS-8149AA, 8149BA, 8149CA on RL001. Depress the CLOSE P/B(s). Verify the Green lights come on and the Red light(s) go off.	S U NA

[Cue]: **As handswitch(es) are operated** "*the Green and Red lights are lit*", (pause), "*the Red light is out*" on BG HIS-8149AA, 8149BA, 8149CA".

Comments:

20c.2	6. RNOb.	Start any available charging pump. • BG HIS-1A for CCP A • BG HIS-1B for CCP B • Start NCP	Start the NCP.	S U

[Cue]: *BG HIS-3 Red light is lit*.

Comments: A Gaitronics Announcement should be made prior to starting the NCP (Per AP21-001, section 6.4.3).

20d.	7.	Check PZR level - AT PROGRAM VALUE. • BB LR-459	Locate BB LI-459, 460 or 461 on RL002. Verify level is at program level.	S U N/A

[Cue]: *PZR level is below program and slowly increasing*.

Comments: **Examinee should recognize that with no letdown PZR level will slowly increase and go to the RNO for step 6 to establishing letdown.**

* Denotes Critical Step

Element #	Step #	Element	Standard	Score
20d.2	7. RNO a.	Place running charging pump flow controller in manual and adjust charging flow as necessary to establish PZR level at program value.	Place BG FK-462 in manual and control charging flow to establish PZR level at program.	S U

[Cue]: *BG FK-462 manual light is lit and PZR level is returning to program value.*

Comments:

20d.2	7. RNO b.	Establish desired letdown by performing step 6.5 of SYS BG-120.	Complete elements 20d.2(a) through 20d.2(d)	N/A

Comments:

20d.2(a)	6.5.1	Ensure PZR level greater than 17%.	Locate BB LI-459, 460 and 461 on RL002. Verify level greater than 17%.	S U

[Cue]: *Level indicates 57% (if at 100% power).*

Comments:

20d.2(b)	6.5.2	Ensure letdown hx outlet temperature control valve is in AUTO. • BG TK-130 - IN AUTO	Locate BG TK-130 on RL001. Verify controller is automatic.	S U

[Cue]: *AUTO lamp is lit.*

Comments:

20d.2(c)	6.5.3	IF RCS to letdown regen hx valves, BG HIS-459 and BG HIS-460, are open, THEN perform the following:	Recognize that BG HIS-459 and 460 are open. Complete elements 20d.2(c)1 and 20d.2(c)6.	N/A

[Cue]: *BG HIS-459 and 460 red lights are lit.*

Comments:

20d.2(c) 1	6.5.3.1	Place letdown hx outlet pressure controller in manual. • BG PK-131 - IN MANUAL	Locate BG PK-131 on RL001. Depress the Manual P/B.	S U

[Cue]: *Manual lamp is lit.*

Comments:

Element #	Step #	Element	Standard	Score
20d.2(c) 2	6.5.3.2	Adjust letdown hx outlet pressure controller to between 90% and 100%.	Same as element.	S U

[Cue]: *BG FK-131 indicates 95%.*

Comments:

20d.2(c) 3*	6.5.3.3	Open letdown orifice isolation valves as necessary to establish desired letdown.	Open BG HIS-8149AA and 8149BA or CA to establish 120 gpm letdown.	S U

Cue: **If examinee asks**, *Desired letdown is 120 gpm.*

[Cue]: *"Red lamp is lit", "Green lamp is out"* on BG HIS 8149AA and 8149 BA or CA.

Comments:

20d.2(c) 4	6.5.3.4	Adjust letdown hx outlet pressure controller to obtain 350 psig. • BG PK-131 - ADJUSTED TO 350 psig	Using the decrease P/B close BG PV-131 to increase backpressure to 350 psig.	S U

[Cue]: *Letdown hx outlet pressure is 350 psig.*

Comments:

20d.2(c) 5*	6.5.3.5	Place letdown hx outlet pressure controller in AUTO. • BG PK-131 - IN AUTO	Depress the AUTO P/B.	S U

[Cue]: *Auto P/B is lit.*

Comments:

20d.2(c) 6*	6.5.3.6	IF NCP is running, THEN place the NCP discharge flow controller in Automatic as directed by the SM/CRS.	Ask CRS if BG FK-462 should be placed in automatic.	S U

Cue: *"Place BG FK-462 in automatic after Charging and letdown are matched."*

Comments: **Ensure three-way communications is used.**

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
20d.2(d)	6.5.4	IF RCS to letdown regen hx isolation valves, BG HIS-459 and BG HIS-460 are closed, THEN perform the following:	Recognize that BG HIS-459 and BG HIS-460 were open.	S U

Comments:

20e.	8.	Check Letdown Hx Outlet Temperature - LESS THAN 130°F. • BG TI-130	Locate BG TI-130 on RL002. Check temperature less than 130°F.	S U N/A

[Cue]: *Temperature is 110°F.*

Comments:

20f.	9.	Check charging header flow and letdown flow - BALANCED.	Check the flow indicators to see if charging and letdown are balanced. Recognize that letdown is isolated.	S U N/A

[Cue]: **If 120 letdown is in service,** *Charging flow is 132 gpm*, **or if 75 letdown is in service**, *Charging flow is 87 gpm.*

20g.	10.	Verify CCP adequate flow: • Check CCPs - ANY RUNNING.	Recognize there is no CCP running and go to step 10 per the RNO.	S U N/A

Comments:

20h.	11.	Return to procedure and step in effect.	N/A	S U N/A

Comments:

Termination: Balancing charging and letdown completes the JPM.

Stop Time _____

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions: You are the Reactor Operator, the plant is stable in Mode 1.
Initiating Cues: The Control Room Supervisor directs you to start the "B" CCP and secure the NCP to support maintenance on the NCP next shift. Initial conditions of SYS BG-201 are complete.
Notes: If you have a question about the task or need clarification do not hesitate to ask your evaluator. JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

WCGS-SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

TASK: Feed Steam Generators using the Turbine Driven Auxiliary Feedwater Pump.

SAFETY FUNCTION: **#4**

TASK/JTA: 06100043.

K/A #s: 061A1.01, 02,04,05; A3.01, 02,03,04.

References: SYS AL-120, Rev. 25

Examinee's Name _____ SS No. _____-____-_____ SRO___ RO___

The examinee's performance was evaluated against the standards in this JPM and determined to be:

SATISFACTORY ____ MARGINAL ____ UNSATISFACTORY ____

Reason, if MARGINAL or UNSATISFACTORY:

Estimated JPM completion Time: 25 min.

Actual Performance Time: _____min.

Location of Performance: Control Room _____ Simulator **X** Plant_____

Method of Performance: Simulate ____ Perform **X**

Tools and Equipment: Simulator

Evaluators Signature: _____ Date _____

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Notes:

The examiner shall verify that the procedure revision for this JPM is current and that any changes against the referenced procedure does not invalidate this JPM.

Ensure an information only copy of SYS AL-120, "Feeding Steam Generators with a Motor Driven or Turbine Driven AFW Pump," with cover sheet and prerequisites signed off, is available.

Simulator set-up:
IC: 177
HORN: *On*
RUN
PhD. Expert: **BAT jpm022a.txt**

Contents of BAT jpm022a.txt:
>De-energizes FC HIS-312A handswitch and indicating lamps.
IRF rFCH312 1

* Ensure all steam generators are between 40% and 45% narrow range.

Cues with brackets, [Cue]:, are to be given only if the simulator is inoperable.

* Denotes a Critical Step.

Initial Conditions:

You are the Reactor Operator, the plant is stable in Mode 3. Steam Generator narrow range levels are ~ 40% to 45% with control rod shutdown banks withdrawn.

Initiating Cues:

The Control Room Supervisor directs you to start the turbine driven Auxiliary Feedwater (AFW) pump and increase steam generator levels to ≈50% narrow range using section 6.2 of SYS AL-120, "Feeding Steam Generators with a Motor Driven or Turbine Driven AFW Pump." Feed at a rate of 75,000 lbm/hr per steam generator. Return the turbine driven AFW pump back to standby conditions. The prerequisites have been completed.

Provide an information only copy of SYS AL-120 to the examinee.

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
1.	6.2.1	Start Time _____ Verify Auxiliary Feedwater Pump Turbine Mechanical Trip/Throttle Valve is closed. • FC HIS-312A - CLOSED	Locate handswitch FC HIS-312A on panel RL005. Recognize that the Red and Green lamps are extinguished. Check the Red and Green lamps good. Communicate with the Control Room Supervisor that lamps are good and no power available.	S U

[Cue]: *"Green and Red lamp are extinguished on FC HIS-312A."*

BOOTH OPERATOR: **If called as the Turbine Building operator, reply, *"I checked the mechanical overspeed device and it is not tripped."***

Cue: **Acknowledge the information as the Control Room Supervisor and reply, *"Electrical Maintenance has checked the DC disconnect and there is no problem there."* Ask, *"What do you think is the probable cause of the failure?"***

Comments: Utilize three-way communication.

1.a	N/A	Determine the location of the control power fuses for handswitch FC HIS-312A.	Locate electrical schematic diagram E-13FC23. Trace the control power to FC HIS-312A. Fuses are located in panel RP-266. Communicate with the **Control Room Supervisor** the control power fuse panel.	S U

[Cue]: *"Understand the control power fuses for FC HIS-312A are located in panel RP-266. Electrical Maintenance has repaired the circuit."*

Cue: **Acknowledge the information as the Control Room Supervisor and reply, *"Understand the control power fuses for FC HIS-312A are located in panel RP-266. Electrical Maintenance has repaired the circuit."***

BOOTH OPERATOR: **Select "*Action*" for the Action Lists. Choose *Fuse/Brkr (R)* folder, type *RFCH312* and double click on item. Choose *Rack In* from the Remote value and click *Insert*.**

Comments: Utilize three-way communication.

2.	6.2.2	Close the turbine driven AFW pump discharge throttle valves to each steam generator.	Complete elements 2.a. through 2.d.	N/A

Comments:

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* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
2.a.*	6.2.2.1.	S/G A turbine driven AFW pump discharge throttle valve closed. • AL HK-8A - CLOSED	Locate controller AL HK-8A on panel RL006. Move the controller lever to the left and observe the controller meter indicates 0 output and the Close lamp illuminates.	S U

[Cue]: *"Controller AL HK-8A meter indicates 0 output."*

Comments:

2.b.*	6.2.2.2.	S/G B turbine driven AFW pump discharge throttle valve closed. • AL HK-10A - CLOSED	Locate controller AL HK-10A on panel RL006. Move the controller lever to the left and observe the controller meter indicates 0 output and the Close lamp illuminates.	S U

[Cue]: *"Controller AL HK-10A meter indicates 0 output."*

Comments:

2.c.*	6.2.2.3.	S/G C turbine driven AFW pump discharge throttle valve closed. • AL HK-12A - CLOSED	Locate controller AL HK-12A on panel RL006. Move the controller lever to the left and observe the controller meter indicates 0 output and the Close lamp illuminates.	S U

[Cue]: *"Controller AL HK-12A meter indicates 0 output."*

Comments:

2.d.*	6.2.2.4.	S/G D turbine driven AFW pump discharge throttle valve closed. • AL HK-6A - CLOSED	Locate controller AL HK-6A on panel RL006. Move the controller lever to the left and observe the controller meter indicates 0 output and the Close lamp illuminates.	S U

[Cue]: *"Controller AL HK-6A meter indicates 0 output."*

Comments:

3.	6.2.3	Open at least one steam supply valve to turbine driven AFW pump:	Complete element 3.a. or 3.b.	N/A

Comments: Examinee may complete either element 3.a. or 3.b.

---

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
3.a.*	6.2.3.1.	Loop 2 Steam To Auxiliary Feedwater Pump Turbine open. • AB HIS-5A - OPEN	Locate handswitch AB HIS-5A on panel RL005. Depress the Open pushbutton. Verify the Red lamp illuminates and the Green lamp extinguishes.	S U N/A

[Cue]: *If the examinee opens AB HIS-5A, then report, "Red lamp is illuminated and the Green lamp is extinguished on AB HIS-5A."*

Comments:

3.b.*	6.2.3.2.	Loop 3 Steam To Auxiliary Feedwater Pump Turbine open. • AB HIS-6A - OPEN	Locate handswitch AB HIS-6A on panel RL005. Depress the Open pushbutton. Verify the Red lamp illuminates and the Green lamp extinguishes.	S U N/A

[Cue]: *If the examinee opens AB HIS-6A, then report, "Red lamp is illuminated and the Green lamp is extinguished on AB HIS-6A."*

Comments:

4.	6.2.4	Start turbine driven AFW pump:	Complete elements 4.a. through 4.c.	N/A

Comments:

4.a.*	6.2.4.1	Open Auxiliary Feedwater Pump Turbine Mechanical Trip/Throttle valve. • FC HIS-312A - OPEN	Locate handswitch FC HIS-312A on panel RL005. Depress the Open pushbutton. Verify the Red lamp illuminates and the Green lamp extinguishes. Verify the Green lamp (ZL 312AA) extinguishes and the White (ZL 312AB) and Red (ZL 312AC) lamps illuminate on ZL 312.	S U

[Cue]: *"Red lamp illuminates and the Green lamp extinguishes on FC HIS-312A. Green lamp extinguishes and the White and Red lamps illuminate on ZL 312."*

Comments: A plant announcement should be made prior to starting the pump (AP 21-001, 6.4.3).

4.b.	6.2.4.2	Time valve opened: _____	Record the time the valve was opened.	S U

Comments:

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
4.c.*	6.2.4.3	Verify pump discharge pressure greater than 1625 psig. AL PI-21A: _____ psig.	Locate pressure indicator AL PI-21A on panel RL005. Verify and record pressure.	S U

[Cue]: *"Pressure indicator AL PI-21A reads 1700 psig."*

Comments:

5.	6.2.5	Throttle flow to desired steam generator(s):	Complete elements 5.a. through 5.d.	N/A

Comments:

5.a.*	6.2.5.1.	Steam Generator A • AL HK-8A - THROTTLED	Locate controller AL HK-8A and flow indicator AL FI-2A on panel RL006. Move the control lever to the right to increase flow. Recognize initiating cue says to flow 75,000 lbm/hr to each steam generator. Verify flow on AL FI-2A.	S U

[Cue]: *"AL HK-8A meter is moving to the right, flow is increasing, flow indicator AL FI-2A reads 75,000 lbm/hr."*

Comments:

5.b.*	6.2.5.2.	Steam Generator B • AL HK-10A - THROTTLED	Locate controller AL HK-10A and flow indicator AL FI-3A on panel RL006. Move the control lever to the right to increase flow. Recognize initiating cue says to flow 75,000 lbm/hr to each steam generator. Verify flow on AL FI-3A.	S U

[Cue]: *"AL HK-10A meter is moving to the right, flow is increasing, flow indicator AL FI-3A reads 75,000 lbm/hr."*

Comments:

5.c.*	6.2.5.3.	Steam Generator C • AL HK-12A - THROTTLED	Locate controller AL HK-12A and flow indicator AL FI-4A on panel RL006. Move the control lever to the right to increase flow. Recognize initiating cue says to flow 75,000 lbm/hr to each steam generator. Verify flow on AL FI-4A.	S U

[Cue]: *"AL HK-12A meter is moving to the right, flow is increasing, flow indicator AL FI-4A reads 75,000 lbm/hr."*

Comments:

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
5.d.*	6.2.5.4.	Steam Generator D • AL HK-6A - THROTTLED	Locate controller AL HK-6A and flow indicator AL FI-1A on panel RL006. Move the control lever to the right to increase flow. Recognize initiating cue says to flow 75,000 lbm/hr to each steam generator. Verify flow on AL FI-1A.	S U

[Cue]: *"AL HK-6A meter is moving to the right, flow is increasing, flow indicator AL FI-1A reads 75,000 lbm/hr."*

Comments:

6.	6.2.6	Record turbine driven AFW pump total flow:	Complete element 6.a.	N/A

Comments:

6.a.*	6.2.6.1.	Total Flow: _____ lbm/hr. • AL FI-2A for S/G A • AL FI-3A for S/G B • AL FI-4A for S/G C • AL FI-1A for S/G D	Locate flow indicators AL FI-2A, AL FI-3A, AL FI-4A, and AL FI-1A on panel RL006. Add the four readings from the meters and record the result.	S U

[Cue]: *Note that 75,000 lbm/hr was given for each steam generator. Total will be 300,000 lbm/hr.*

Comments:

7.	6.2.7	While feeding steam generators, monitor steam generator narrow range and wide range levels.	Locate level indicators AE LI-517, 518, & 519 for S/G A; AE LI-527, 528, & 529 for S/G B; AE LI-537, 538, & 539 for S/G C; AE LI-547, 548, & 549 for S/G D on panel RL026. Locate level indicators AE LI-551 & 501(A), AE LI-552 & 502(B), AE LI-553 & 503(C), and AE LI-554 & 504(D) on panel RL025. Monitor levels.	S U

[Cue]: *"Narrow range and wide range levels are increasing."*

Comments: Examinee should recognize that step 6.2.7.1. does not apply and should N/A the step.

---

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
8.*	6.2.8	WHEN desired steam generator level is obtained, THEN at panel RL006, adjust the associated valve controllers to 25% demand position: • AL HK-8A, SG A Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control. • AL HK-10A, SG B Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control. • AL HK-12A, SG C Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control. • AL HK-6A, SG D Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control.	Locate controllers AL HK-8A, AL HK-10A, AL HK-12A, and AL HK-6A on panel RL006. Move the controller lever right or left until the demand is 25% as read on the controller meter.	S U

[Cue]: *"Narrow range level indicators are reading 50%, controllers AL HK-8A, AL HK-10A, AL HK-12A, and AL HK-6A are set at 25% demand as read on the meters."*

Comments:

9.	6.2.9	Stop the turbine driven AFW pump:	Complete elements 9.a. through 9.d.	N/A

Comments:

9.a.	6.2.9.1	IF the turbine driven AFW pump is running as a result of an auto start, THEN ensure all auto activation signals are reset or blocked by verifying the alarm window 00-128B TD AFP START is clear. • 00-128B TD AFP START is clear	Recognize the turbine driven AFW pump was started manually and N/A this step.	S U

Comments:

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
9.b.*	6.2.9.2	Close Auxiliary Feedwater Pump Turbine Mechanical Trip/Throttle Valve. • FC HIS-312A - CLOSED	Locate handswitch FC HIS-312A on panel RL005. Depress the Close pushbutton. Verify the Red lamp extinguishes and the Green lamp illuminates.	S U

[Cue]: *"Green lamp illuminates and the Red lamp extinguishes on FC HIS-312A. Red and white lamps extinguish and the Green lamp illuminates on ZL 312."*

Comments:

9.c.	6.2.9.3	Time valve closed: _____	Record the time valve was closed.	S U

Comments:

9d.*	6.2.9.4	Close steam supply valves to turbine driven AFW pump: a. Loop 2 Steam To Auxiliary Feedwater Pump Turbine closed. • AB HIS-5A - CLOSED b. Loop 3 Steam To Auxiliary Feedwater Pump Turbine closed. • AB HIS-6A - CLOSED	Locate handswitches AB HIS-5A and AB HIS-6A on panel RL005. Depress the Close pushbutton for the valve that was opened initially to start the turbine driven auxiliary feedwater pump. Verify <u>both</u> handswitch Green lamps are illuminated and the Red lamps are extinguished.	S U

[Cue]: *"Green lamps are illuminated and the Red lamps are extinguished on AB HIS-5A and AB HIS-6A."*

Cue: **If examinee states that the handswitch manipulations need second verified, reply as SO, *"I will have a spare Reactor Operator perform the task."***

Comments:

10.	6.2.10	Return the turbine driven AFW pump discharge throttle valves to safeguards lineup:	Complete element 10.a.	N/A

Comments:

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Element #	Step #	Element	Standard	Score
10.a.*	6.2.10.1	Place the turbine driven AFW pump discharge throttle valves to each steam generator in latched detent open. • AL HK-8A for S/G A - LATCHED DETENT OPEN • AL HK-10A for S/G B - LATCHED DETENT OPEN • AL HK-12A for S/G C - LATCHED DETENT OPEN • AL HK-6A for S/G D - LATCHED DETENT OPEN	Locate controllers AL HK-8A, AL HK-10A, AL HK-12A, and AL HK-6A on panel RL006. Move the control lever to the right and Latch down the lever in the Detent Open position for all four controllers.	S U

Cue: **If examinee states that the controller manipulations need second verified, reply as SO**, ***"I will have a spare Reactor Operator perform the task."***

Comments:

Termination: Placing the turbine driven AFW pump discharge throttle valves in the safeguards lineup completes this JPM.

Stop Time _____

* Denotes Critical Step

WCGS -SRO/RO TRAINING PROGRAM
JOB PERFORMANCE MEASURE EVALUATION FORM

Initial Conditions:

You are the Reactor Operator, the plant is stable in Mode 3. Steam Generator narrow range levels are ~ 43% with control rod shutdown banks withdrawn.

Initiating Cues:

The Control Room Supervisor directs you to start the turbine driven Auxiliary Feedwater (TDAFW) pump and increase steam generator levels to ≈50% narrow range using section 6.2 of SYS AL-120, "FEEDING STEAM GENERATORS WITH A MOTOR DRIVEN OR TURBINE DRIVEN AFW PUMP." Feed at a rate of 75,000 lbm/hr per steam generator. Return the turbine driven AFW pump back to standby conditions. The prerequisites have been completed.

Notes:

JPM's are considered "open reference", therefore reference material that is normally available to you in the plant (including the Control Room) is available during this JPM. If you desire to use a reference, ask your evaluator if it is acceptable to do so for the task under consideration. You **may not** solicit technical information from other operators, engineers or technical advisors.

Upon arriving at a component, describe to your evaluator what you expect to see (e.g. how valve, breaker, etc. position is c you expect to do (e.g. turn switch to run, rotate handwheel clockwise to open, etc.) and what you expect to happen (e.g. pu red light will light, handwheel will rotate until valve is open, etc.).

When you have completed the JPM inform your evaluator that you are done by handing the Initial Conditions/Initiating Cues sheet back to him.

When recording data on Data Sheets, indicate the instrument used and vocalize the value you will record for each parameter.

WOLF CREEK
NUCLEAR OPERATING CORPORATION

INITIAL LICENSE EXAM

DECEMBER 2001

DYNAMIC SCENARIO #1

Revision 0, 10/08/2001

Scenario Objectives:

1. Evaluate the ability to perform normal operations by reducing power quickly due to a loss of a 345 KV Switchyard power line.
2. Abnormal actions and Technical Specifications usage are evaluated by diagnosing and correcting:
   - T-Ref Channel failure affecting rod control
   - Steam Pressure Channel failure affecting Steam Generator Level control.
   - Steam Leak in the Turbine Building
3. Emergency actions are evaluated for:
   - A Main Steam Line Break, outside of Containment.
   - Failure of Safety Injection to Automatically actuate.
4. Contingency actions are evaluated for a failure of the Main Steam Line Isolation valves to close with a Main Steam Line Break, outside of Containment, using EMG C-21, "UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS".

GENERAL REFERENCES

NUREG 1021, Rev. 8, Supplement 1, “OPERATOR LICENSING EXAMINATION STANDARDS FOR POWER REACTORS”
OFN SB-008, Rev. 11, “INSTRUMENT MALFUNCTIONS”
OFN MA-038, Rev. 4, “RAPID PLANT SHUTDOWN”
EMG E-0, Rev. 14, “REACTOR TRIP OR SAFETY INJECTION”
EMG C-21, Rev. 12, “UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS”.
ALR 00-111C, Rev. 6, “SG D FLOW MISMATCH”

RESET TO **IC 171** AND PLACE SIMULATOR IN **RUN** PRIOR TO LOADING BATCH FILE. Ensure simulator is in run or file will not load properly. You may freeze after file is loaded.

Insert Floppy disk and save the batch file **LO01_001** to **OPENSIM/BATCH**, then open Ph.D. Expert and type "**BAT LO01_001.txt**"

NOTE: FILE **LO01_001.txt** preloads all LOAs and/or malfunctions required for this scenario. Simulator commands and other functions to be performed by the booth operator are shown in **BOLD**. Trigger commands are used to initiate events and commands.

HANG DNO tag on "A" CCW pump Handswitch, **PLACE** Handswitch in PTL.

ENSURE THE HORNS ARE ON

ENSURE CONTROL RODS ARE AT 229 STEPS

ENSURE placard is on the 'A' CCP.

Reset RM-11 alarms from previous Scenarios

Have the above verified by a second person as being correctly performed.

Core age is Middle of Life

Power is 100%. Xenon equilibrium.

Facility: ____WCGS_____ Scenario No.: __1_____ Op-Test No.: _____

Examiners: _____ Operators: _____

See Examiner/Operator assignment sheet. This Scenario will be seen by multiple crews.

Initial Conditions: 100% Power, MOL, ''A" CCW pump OOS for PM's.

Turnover: Continue plant operations, make preps to return "A" CCW pump to service. System Ops reports Grid Stability problems. Weekday Nightshift.

Event No.	Malf. No.	Event Type*	Event Description
1	mPCS 02A	I (All)	AB PT-505 (T-Ref) fails low, Rods begin Inserting, BOP verifies no Turbine Runback in progress.
2	mMSS 01D2	I -BOP I-CRS	AB PT-545 fails low, affects Steam Flow Channel AB FT-543. BOP take manual Control of "D" SG FRV.
3	mEPS 03A	R-RO N-BOP N-CRS	La Cygne Line in the switchyard opens, System Ops request expedite load reduction due to Grid problems. Load reduction commences to less than 968 Mwe per OFN AF-15. Using OFN MA-038.
4	mMSS 11	C-All	Steam Leak commences in Turbine Building large enough to affect downpower.
5	mMSS 11	M-All	CRS should direct a Reactor Trip, Upon the trip the leak becomes a MSLB. MSIV's will not close.
6		C-RO C-CRS	SI fails to actuate in Automatic. Manual Available. RO/CRS must recognize that an SI will be required or the setpoint has already been reached and SI did not actuate.
7			Uncontrolled de-pressurization of all SG's will require entry into EMG C-21. Scenario terminates after crew establishes 30K Aux Feedwater flow to each SG or at Lead Examiner discretion.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Time (min)	Simulator Instructions	Events and Procedures	Applicant Actions or Behaviors	Notes
	Malfunction clock starts when the crew has assumed the watch (T=0) Insert Event 1 with **Trigger 1** at time T+1.0 When called as Work Week Manager (WWM), state you will get a	**<u>Event #1</u>** T AB PT-505 fails low P Rods begin inserting P Turbine Runback NOT in progress. P Ann. 065E Alarms P Ann. 079C Alarms A Recognize Instrument Failure **OFN SB-008 steps (rev 11)** 1. Check if secondary system instrument channel is malfunctioning *Yes go to Attachment D* D1. Identify failed instrument channel *AC PT-505* D2 Place rod control in manual D3. Check failed Turbine Impulse Pressure channel selected D4. Select alternate channel D5. (ρ) Adjust rods to return T_{avg} to T_{ref} for existing plant power D6. Check T_{avg} within 1°F of T_{ref} D7. Place rod control in auto D8. Place steam dump actuation interlock to OFF D9. Monitor rod control response to ensure proper control D10. Check C-7 not lit D11. Select Steam Pressure Mode D12. Place steam dump interlock selector switches to ON D13. Place the trip/safeguards B/S in tripped mode	**<u>Event 1</u>** **RO:** Report control rods stepping in. **BOP:** Reports no turbine runback. **CRS/RO:** Place Rods in Manual. **CRITICAL TASK:** <u>Take manual control of rod control system to prevent a reactor trip.</u> **STANDARD:** <u>This action must be taken in time to prevent a reactor trip.</u> **RO/BOP:** Recognize AB PT-505 has failed low. **CRS:** Enters and directs OFN SB-008 Attch. D. **CRS:** Conduct Reactivity Brief **RO:** Withdraw Control Rods to restore Tavg to within 1°F of Tref. **BOP:** Place Steam Dumps in Steam Pressure Mode. CRS: Contact WWM for	

	team together. For AMSAC Channel enter **Event 6.**	D14. Check C-16 Not Lit D15. Check Load 'HOLD' light Not Lit D16. Place turbine impulse pressure channel in proper condition for AMSAC **NOTE:** AMSAC Panel is not simulated. Inform Crew that the Shift Engineer will take care of AMSAC. D17. Request I&C to repair D18. Go to T/S 3.3.1 and comply with action statement D19. Return to procedure in effect	Assistance. **CRS:** Comply with T.S. T.S. 3.3.1, Table 3.3.1, Function 18f, - verifying P-13 in its proper state within 1 hour.	

	Insert Event 2 with **Trigger 2** at time T+15.	**<u>Event 2</u>** T S/G 'D' AB PT-545 fails low P 'D' S/G Feed flow will decrease P 'D' S/G Level will decrease P ANN 111C Alarms A Recognize FRV failure & Take manual control of AE FCV-540 **Annunciator Response 00-111C** 1. Check difference between steam generator D steam flow and feed flow - Greater than 0.7 MPPH 2. Check for instrument failure. **OFN SB-008 steps: (Rev. 11)** 1. Check if secondary system instrument channel is malfunctioning a. Determine appropriate attachment for malfunctioning channel b. Go to Attachment C C1. Compare S/G Pressure indications to confirm S/G pressure channel failure. C2. Check if failed S/G pressure channel used for feedwater control.	**<u>Event 2</u>** **BOP:** Report feedflow decreasing on 'D' S/G. **BOP:** Place FRV in manual. **<u>OR</u>** **CRS:** Direct manual control of 'D' S/G FRV. **CRITICAL TASK:** <u>Take manual control of FRV as necessary to prevent reactor trip.</u> **STANDARD:** <u>This action must be taken in time to prevent a reactor trip.</u> **CRS:** May direct use of ALR 111C or enter OFN SB-008 directly. ALR contains guidance for Manual control of FRV. **CRS:** Enters and directs OFN SB-008 **BOP:** Confirms steam flow/feed flow mismatch. **BOP/RO:** Identify failed Steam Pressure Channel Failed and NOT the Steam Flow Channel.	

	When called as Work Week Manager (WWM), state you will get a team together.	C3. Select the alternate steam flow channel. C4. Monitor S/G level response to ensure proper control. Take manual control, if necessary. C5. Place the reactor trip/safeguards bistables for the failed channel in the TRIPPED mode. C6. Request I&C to repair failed channel. C7. Monitor the following Technical Specifications and comply with Action Statements: 3.3.2 3.3.3 Table 3.3.3-1, Function #8 3.3.4 Table 3.3.4-1, Function #7 3.3.6 3.3.7 C8. Review Attach. S for PAMS & Remote SD inst. C9. Return to procedure and step in effect	**BOP:** Select Alternate Channel **CRS:** Contact WWM for assistance. **CRS:** Address T.S. issues. 3.3.2 Trip bistables in 6 hours 3.3.3 Attachment S 3.3.4 Attachment S 3.3.6 Verify CTMT Purge closed. 3.3.7 CREVS in 7 Days **CRS:** Review Attach. S.	

	Insert Event #3 with **Trigger 3** at time T+22 IF crew does not notice breakers opening in switchyard, after 30 seconds: **Call** as System Ops and report "LaCygne Line has a failure. Request reduce load within 25 minutes due to grid stability concerns."	**<u>Event 3</u>** Downpower maneuver due to loss of LaCygne Line using OFN MA-038, "RAPID PLANT S/D" Per OFN AF-025, "UNIT LIMITATIONS", Generator output is limited to 995 Gross Mwe. This would require a load reduction ≥ 1% per minute. OFN MA-038 Steps 1. Reduce Turbine Load: a. Check desired unloading rate-less than or equal to 5%/minute b. Set Loading/Unloading Rate Limit to desired value c. Select Decrease Loading Rate - ON d. Decrease Load Set MW toward desired load e. Continue with this procedure while reducing turbine load 2. Adjust Control Rods as necessary to establish a target Tavg/Tref Temperature Error between 0°f and +5°F 3. Energize PZR Backup Heaters BB HIS-51A & BB HIS-52A 4. Borate RCS and adjust Control Rods as necessary to establish the following conditions: Maintain delta flux within target band Maintain control rods above rod insertion limits 5. Check PZR PORVs. 6. Check PZR Pressure - Stable at or trending to	**<u>Event 3</u>** **CRS:** Direct Crew to reduce power to 80%. Give a rate ≥ 1% per minute to the crew for the power reduction. **BOP:** Reduce Turbine load at designated rate **RO:** Maintain Tavg/Tref using rods **RO:** Energize backup heaters **RO:** Maintain Delta I & RIL using boron and rods.	

		2235 Psig 7. Check PZR level - Stable at or trending to program level. 8. Check S/G Levels - Controlling between 45% and 55%. 9. Check AE HV-38 – Open 10. Check Reactor Power – less than 60%	**BOP**: Close AE HV-38	
	Insert Event #4 with **Trigger 4** after power reduction starts If crew pages building watches to look for leaks, wait 30 seconds then page back as Turbine Bldg watch and report " there is steam on the 2033' level of the Turbine Bldg." Insert Event #5 with **Trigger 5**	**<u>Event 4</u>** T Steam Leak commences in the Turbine Building. P Reactor Power increases P Steam Flow increases P Tavg decreases P Pressurizer Press and Level decrease A Determine that a steam leak has occurred in the power block. **EMG E-0 STEPS (REV 14)** 1. Verify Rx trip. a. Check all rod bottom lights lit b. Ensure reactor trip breakers and bypass breakers open c. Check neutron flux decreasing d. Transfer NR-45 recorder to intermediate range 2. Verify turbine trip. a. Check the following: Main stop valves all closed	**<u>Event 4</u>** **RO/BOP:** Note that parameters are changing in a larger magnitude than expected. **CRS:** Recognize a trip is required and direct the RO to manually trip the reactor. **RO:** Manually trip the reactor. **CRS:** Enter and direct E-0. **RO/BOP:** Perform Immediate Actions of E-0, Steps 1 through 4. **RO:** Verify Reactor Trip **BOP:** Verify Turbine Trip	

	at time of reactor trip.	OR Turbine auto stop bistable lights at least two lit b. Check main generator breakers and exciter breaker open 3. Check AC emergency busses at least one energized. 4. Check if SI is actuated • Annunciator 00-030A LIT • OR • Annunciator 00-031A LIT • OR • ESFAS Status Panel -- ANY WHITE LIGHT LIT • OR • Trip Status Panel -- SI RED LIGHT LIT 5. Check if SI is required: • SI manually initiated • RCS press ≤ 1830 psig • S/G press ≤ 615 psig • CTMT press ≥ 3.5 psig • RCS subcooling < 30°F • PZR level < 6%	**RO:** Check AC Buses **RO/BOP:** Check if SI is required. At completion of Immediate actions BOP should request to Fast Close MSIV's. **CRS:** Direct Fast Closure of MSIV's. **BOP:** Recognize MSIV's would not close and attempt a slow close. **CREW:** May realize SI is inevitable due to steam break and initiate Safety Injection. **RO:** RCS Press < 1400 psig,	

	Event #5 inserted at time of reactor trip.	**Event 5** T Steam Leak becomes a Main Steam Line Break. P Pressurizer Pressure will decrease. P Main Steam Line Pressures will decrease. P Steam Flow is indicated with all Steam Dumps and Atmospheric Relief Valves closed A Determine setpoints for SI have been exceeded and initiate a Safety Injection 6. Verify automatic actions per Attachment F. ATTACHMENT F F1. Verify feedwater isolation a. Main feedwater pumps tripped b. Main feedwater reg valves closed c. Main feedwater reg bypass valves closed d. Main feedwater isolation valves closed	RCP Trip Criteria met at approximately two minutes after the steam break. While not a Critical Task, the RO should recognize that a trip criterion has been met. **Event 5** **RO/BOP:** Determine SI is required **RO:** Determine SI did not actuate and initiate a Manual Safety Injection. PZR Press < 1830 psig OR Steam Line Press < 615 psig OR Fold Out Page EMG E-0 - PZR Level < 6% **CRS:** Direct RO/BOP to perform Attch.F of EMG E-0. **RO/BOP:** Perform Attachment F.	

		e. Main feedwater chemical injection valves closed f. Check ESFAS status panel SGBSIS section all white lights lit F2. Verify CISA a. Check ESFAS status panel CISA section all white lights lit F3. Verify AFW pumps running a. Check motor driven AFW pumps both running b. Check turbine driven AFW pump running F4. Verify ECCS pumps running a. Check CCPs both running b. Check SI pumps both running c. Check RHR pumps Both Running F5.Verify CCW alignment a. Check CCW pumps one running in each train b. Check one pair of CCW service loop supply and return valves for an operating CCW pump open F6. Check ESW pumps both running F7. Verify CTMT fan coolers running in slow speed F8. Verify CPIS a. Check ESFAS status panel CPIS section all white lights lit F9. Verify both trains of CRVIS a. Check ESFAS status panel CRVIS section all white lights lit b. Ensure control room outer door closed F10. Verify main steamline isolation not required a. Check CTMT pressure has remained < 17 psig b. Check either conditions below - satisfied Low steamline pressure SI - NOT BLOCKED <u>AND</u> steamline pressure has remained > 615 psig		

		OR Low steamline pressure SI - BLOCKED AND steamline pressure rate has remained < 100 psi/50 sec F11. Verify CTMT spray not required a. CTMT pressure has remained < 27 psig F12. Verify ECCS flow F13. Verify AFW valves - properly aligned. F14. Verify SI valves - properly aligned. 7. Verify AFW flow > 270,000 lbm/hr. 8. Check RCS cold leg temperature stable. • Less than or equal to 557°F for steam dumps. • Less than or equal to 561°F for S/G ARV's. 9. Establish S/G pressure control: a. Check condenser - AVAILABLE b. Place AB PK-507 in MANUAL c. Manually set AB PK-507 output to Zero d. Place Steam Dump Select Switch in STEAM PRESS position e. Place Steam Header Pressure Control in Automatic and adjust to maintain existing steam header pressure. o AB PK-507 10. Check PZR PORVs - closed 11. Check normal PZR spray valves closed 12. Check PZR safety valves - closed 13. Check if RCPs should be stopped. 14. Direct operator to monitor CSFSTs 15. Check if SGs are not faulted.		

		EMG E-2 steps: (REV 9) 1. Check steamline on All SG isolated a. MSIVs closed b. MSIV bypasses closed c. Main steamline low point drain valves closed 2. Check if fault is inside Area 5 3. Check if any SG is not faulted NO – RNO Go to EMG C-21 **EMG C-21 steps:(Rev. 11)** 1. Check steamline on all SGs isolated *RNO do ATTs A&B* a. Ensure MSIVs closed b. Ensure MSIV bypass valves closed 2. Isolate steam flow from all SGs a. Locally close steam supply to turbine driven AFW pump b. Ensure SG ARV closed c. Ensure main steamline low point drain valves closed 3. Verify feedline isolated on all SGs a. Main feed reg valve closed b. Feed reg bypass valve closed c. MFIV closed d. Chemical injection valve closed 4. Verify Blowdown and sampling isolated on all SG's a. S/G Blowdown Containment Iso Valves closed.	**BOP:** Report ALL SG's faulted. **CRS:** Transition to EMG E-2. **CRS:** Conduct Transition Brief for EMG E-2. **CRS:** Transition to EMG C-21. **CRS:** Conduct Transition Brief for EMG C-21. **BOP:** Contact Aux Bldg Operator to isolate TDAFWP steam supply valves.	
	To locally isolate steam valves AB V-085 and AB V-087, **EVENT 7.** Call back after 2 minutes and report valves closed.			

		b. S/G Upper Sample Isolation valves closed. 5. Control feed flow to minimize RCS cooldown a. Check cooldown rate in RCS cold legs < 100F/hr RNO - Decrease feed flow to 30,000 lbm/hr to each SG, go to step 5c b. Check SG narrow range levels < 50% c. Check RCS hot leg temperatures stable or decreasing **Terminate Scenario** after crew establishes 30 klbm/hr to each SG or at discretion of lead examiner. >Initial License Exam 01-001 >SI FAILS TO AUTO ACT >LOW PZR PRESS IMF BST-JPB455D 1 IMF BST-JPB456D 1 IMF BST-JPB457D 1 IMF BST-JPB458D 1 >LOW STEAM LINE PRESS IMF BST-JPB514A 1 IMF BST-JPB515A 1 IMF BST-JPB516A 1 IMF BST-JPB524A 1 IMF BST-JPB525A 1 IMF BST-JPB526A 1 IMF BST-JPB534A 1 IMF BST-JPB535A 1 IMF BST-JPB536A 1 IMF BST-JPB544A 1 IMF BST-JPB545A 1 IMF BST-JPB546A 1	**SRO/BOP:** Reduce AFW flow E-Plan Classification: **Main Steam Line Break** **MSLB1 – MSLB2 – MSLB5 – MSLB6 -- ALERT**	

		>HI-1 CTMT PRESS IMF BST-JPB934B 1 IMF BST-JPB935B 1 IMF BST-JPB936B 1 >MSIV's will not close Auto/Man IMF mMSS02I IMF mMSS02J IMF mMSS02K IMF mMSS02L >Tag Out "A" CCW pump IRF NEGP01A 1 IRF NEGP01AX 1 >FAILURE OF AC PT-505 LOW IMF mPCS02A (1) 0 30 >Fail AB PT-545 Low >Affects Stm Flow Channel AB FT-543, "D" SG IMF mMSS01D2 (2) 0 10 >LaCygne Line opens in switchyard IMF mEPS03A (3) >Steam Leak in Turb Bldg IMF mMSS11 (4) 4e+005 240 >Steam Break in Turb Bldg IMF mMSS04A (5) 1e+7 120 >Set AMSAC Bistable per OFN SB-008 IRF rAMS06 (6) 0 >Isolate Steam Supplies to TDAFWP IRF rMSS01 (7) 0 60 IRF rMSS01 (7) 0 90 > OVERRIDE ESFAS PANEL LIGHTS - CRVIS TRGSET 8 "JPPLSI(1)" IMF SA066Y_C14W (8) 1 IMF SA066Y_C15W (8 35) 1 IMF SA066Y_C16W (8 35) 1 IMF SA066Y_G15W (8) 1 >End of File		

WOLF CREEK
NUCLEAR OPERATING CORPORATION

INITIAL LICENSE EXAM

DECEMBER 2001

DYNAMIC SCENARIO #2

Revision 0, 10/08/2001

Scenario Objectives:

1. Evaluate the ability to perform normal operations by rapidly shutting down the plant to remove a Main Feed Pump from service.
2. Abnormal actions and Technical Specifications usage are evaluated by diagnosing and correcting

- VCT level channel failure
- Power Range Channel failure
- Steam Generator "C" level controller malfunction
- Loss of CCW to the RCPs

3. Emergency actions are evaluated for a RCS Loop "A" 300 gpm leak
4. Contingency actions are evaluated for a failure of the Reactor to trip using EMG FR-S1 "RESPONSE TO NUCLEAR POWER GENERATION/ATWT"

GENERAL REFERENCES

NUREG 1021, Rev. 8, Supplement 1, OPERATOR LICENSING EXAMINATION STANDARDS FORPOWER REACTORS
OFN SB-008, Rev. 11, INSTRUMENT MALFUNCTIONS
OFN MA-038, Rev. 4, RAPID PLANT SHUTDOWN
EMG E-0, Rev. 14, REACTOR TRIP OR SAFETY INJECTION
EMG E-1, Rev. 13, LOSS OF REACTOR OR SECONDARY COOLANT
FR-S1, Rev. 12, RESPONSE TO NUCLEAR POWER GENERATION/ATWT
OFN BB-007, Rev. 11, RCS LEAKAGE HIGH
ALR 00-110C, Rev. 6, SG C FLOW MISMATCH
ALR 00-042B, Rev7, VCT LEV HILO

RESET TO **IC 172** AND PLACE SIMULATOR IN **RUN** PRIOR TO LOADING BATCH FILE. Ensure simulator is in run or file will not load properly. You may freeze after file is loaded.

Insert Floppy disk and save the batch file **LO01_002** to **OPENSIM/BATCH**, then open Ph.D. Expert and type **"BAT LO01_002.txt"**

NOTE: FILE **LO01_002.txt** preloads all LOAs and/or malfunctions required for this scenario. Simulator commands and other functions to be performed by the booth operator are shown in **BOLD**. Trigger commands are used to initiate events and commands.

HANG DNO tag on DG NE02 KJ HS-108A & NE HIS-26

HANG DNO tag on "B" CCP

HANG Orange DNO Isolated magnetic tag on "D" ARV.

ENSURE Green STS NB-01 Placard is displayed with due time of Today/2045.

ENSURE THE HORNS ARE ON

ENSURE CONTROL RODS ARE AT 229 STEPS

ENSURE placard is on the 'B' CCP.

Reset RM-11 alarms from previous Scenarios

Have the above verified by a second person as being correctly performed.

Core age is Middle of Life

Power is 100%. Xenon equilibrium.

Facility: __WCGS_____ Scenario No.: __2_____ Op-Test No.: _____

Examiners: _____ Operators: _____

See Examiner/Operator assignment sheet. This Scenario will be seen by multiple crews.

Initial Conditions: The core age is Middle of Life (MOL). The plant has been operating at or near 100% power for the last 42 days. The "B" train Emergency Diesel Generator (EDG) and Centrifugal Charging Pump(CCP) are out of service (OOS) for preventative maintenance. The "D" SG atmospheric relief valve is isolated due to seat leakage.

Turnover: Normal Shift Activities , Weekday Night Shift

Event No.	Malf. No.	Event Type*	Event Description
1		N(SRO) R(RO) N(BOP)	Downpower maneuver to remove the MFP from service.
2	mCVL-01	C(SRO) C(RO)	VCT divert valve LCV112A-control failure If the operator has begun to borate it will take 6 minutes to reach the low level alarm(first indication). If boration has not commenced an auto makeup will be his first indication within 1-2 minutes.
3	mNIS-03A	I(SRO) I(RO)	Power Range NI-41 fails high
4	mFWM-03C	I(SRO) I(BOP)	Steam Generator "C" level controller fails in automatic causing the feed reg. valve to begin closing. Manual is available.
5	mRCS-06A	M(SRO) M(RO) M(BOP)	RCS loop A 300 gpm leak
6	mPCS-08A&B	C(SRO) C(RO) C(BOP)	The reactor will not trip in manual or automatic. EMG FR-S1 is used to make the reactor subcritical.
7	P19046 D (8) 1 P19046 C (8) 0	C(SRO) C(RO)	Loss of CCW to the RCPs

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Time (min)	Simulator Instructions	Events and Procedures	Applicant Actions or Behaviors	Notes
	Malfunction clock starts when the crew has assumed the watch (T=0) At time T+1 call the crew and inform them of the following as the Shift Manager. SGFP vibration data indicates imminent bearing failure. You are directed to immediately begin a power reduction and to be below 50% Reactor Power in one hour. Insert Event 2 with **Trigger 2** as soon as down power is commenced..	**Event #1** Downpower maneuver to remove MFP B from service using OFN MA-038 OFN MA-038 Rev 04, Steps: 1. Reduce Turbine Load: a. Check desired unloading rate-less than or equal to 5%/minute b. Set Loading/Unloading Rate Limit to desired value c. Select Decrease Loading Rate - ON d. Decrease Load Set MW toward desired load e. Continue with this procedure while reducing turbine load 2. Adjust Control Rods as necessary to establish a target Tavg/Tref Temperature Error between 0°f and +5°F 3. Energize PZR Backup Heaters BB HIS-51A & BB HIS-52A 4. Borate RCS and adjust Control Rods as necessary to establish the following conditions: Maintain delta flux within target band Maintain control rods above rod insertion limits 5. Check PZR PORVs. 6. Check PZR Pressure - Stable at or trending to 2235 Psig 7. Check PZR level - Stable at or trending to program level. 8. Check S/G Levels - Controlling between 45% and 55%. 9. Check AE HV-38 – Open 10. Check Reactor Power – less than 60%	**Event 1** **SRO:** Direct Crew to reduce power to 50%. Give a rate ≥ 1% to the crew for the power reduction. **SRO:** Conduct Reactivity Brief. **BOP:** Reduce Turbine load at designated rate **RO:** Maintain Tavg/Tref using rods **RO:** Energize backup heaters **RO:** Maintain Delta I & RIL using boron and rods	

	It will take approximately 15 minutes to get ANN. 42B. If the crew has not started to borate an auto makeup will be the first indication of a problem.	**Event 2** T VCT Divert Valve LCV112A-control failure P ALR 00-42B Alarm Window "VCT LEV HILO" is entered when the following occurs P VCT level is less than 22% on BG LB-149D A Place Divert valve in VCT Position ALR 00-42B 1. Check VCT Level -Greater than 97% No - RNO Go to step 10 10. Check VCT level -Less than 22% BG LI-185 BG LI-11211. 11. Check Letdown Divert To VCT & RHT Valve- Full open to VCT position. BG HIS-112A No - RNO Place Divert Valve in VCT position 12. Check Makeup to VCT in Progress 13. Check Charging Header Flow and Letdown Flow - Balanced 14. Check Annunciator 00-42C, VCT Press HILO clear 15. Ensure BG HIS-112A, LTDWN TO VOL CONT TK/HDUP TK is in AUTO IF the Plant is in Modes 1 or 2 OR in VCT IF plant is in modes 3, 4, 5 or 6. 16. Return to procedure and step in effect.	**Event 2** **RO:** Recognize Actual VCT level low and Divert Valve in HUT position **RO:** Place Divert valve in VCT position prior to swap to the VCT **SRO:** Direct ALR 00-42B **RO:** Go to step 10. **RO:** Place divert valve in VCT position **SRO:** Recognize BG HIS-112A cannot be returned to Auto.	

	Insert Event #3 with **Trigger 3** at time T+33.	**Event 3** T Power Range NI-41 fails to 100% P NI-41 indicates 120% Rods step in ANN Power Range Chan. DEV A Determine NI failure Determine no runback Take manual control of rods OFN SB-008 (Rev. 11) 1. Check if Secondary System Instrument is Malfunctioning *NO* 2. Check if Reactor Coolant System Instrument Channel is Malfunctioning. *NO* 3. Check if Containment or RWST Channels is Malfunctioning. *NO* 4. Check if Nuclear Instrumentation System Channels is Malfunctioning. a. Determine appropriate attachment for malfunctioning channel b. Go to Attachment R Attachment R. R1. Identify failed Instrument Channel. R2. Check Load Rejection - Not in Progress R3. Switch rod control bank selector switch to MANUAL. R4. Bypass Failed Power Range Flux Channel BOP or RO should go to NI racks and bypass channel. R5. Check Rod Control Bank Selector Switch in AUTO. R6. Monitor Rod Control System Response to Ensure Proper Control R7. Check Failed Power Range Flux channel Not Used For Recording on NR45 and OPDT and OTDT Recorders	**Event 3** **RO:** Report problem with Power Range Inst. **BOP:** Verify no turbine runback in progress **SRO/RO:** Take rods to manual **CRITICAL TASK:** Take manual control of rods as necessary to prevent reactor trip. **STANDARD:** This action must be taken in time to prevent a reactor trip. **SRO:** Enter & Direct OFN SB-008, Attachment Q **RO:** Identify NI channel is malfunctioning **SRO:** Go to Attachment R **RO:** Identify failed PR Inst. SE NI-41 **RO:** Take rods to manual, previously performed **RO/BOP:** Perform step R4. To bypass failed channel (5 switches on NI panel) **RO:** Restore rod control to auto and monitor rods, as directed. **RO/BOP:** Ensure SE NI-41 not selected on recorders.	

	When called as WWM, state you will get a team together to come to the Control Room.	R8. Pull Control Power Fuses In Power Range Drawer For Failed Power Range Flux Channel. R9. Place Appropriate Reactor Trip/Safeguards Bistables For Failed Power Range Flux Channel in TRIPPED Mode. R10. Request INC Repair failed Channel R11. Monitor Tech Specs: 3.3.1 3.2.4, SR 3.2.4.1 & SR 3.2.4.2 R12. Return to Procedure & step in effect	**RO/BOP:** Pull control power fuses. **SRO:** Contact WWM to trip bistables and repair channel (Note: Tripping of bistables is not required but may be performed) **SRO:** Evaluate & apply Tech Specs. T.S. 3.3.1 – 6 hours to trip bistables T.S. 3.2.4 – Verify QPTR within 12 hours using incore detectors. **SRO:** Return to procedure and step in effect	

	Insert Event #4 with **Trigger 4** at time T+40	**<u>Event 4</u>** T S/G 'C' FRV AE FCV-530 fails closed in auto P 'C' S/G Feed flow will decrease P 'C' S/G Level will decrease P ALR 110C Alarms A Recognize FRV failure & Take manual control of AE FCV-530 Annunciator Response 00-110C 1. Check difference between steam generator C steam flow and feed flow - Greater than 0.7 MPPH 2. Check for instrument failure. 3. Check secondary plant conditions - Stable 4. Restore steam generator C level to program value a. Check feedwater control valve - Inservice to feed S/G C b. Place feedwater control valve in manual c. Adjust feedwater control valve as necessary to maintain program value 5. Check for S/G C tube leakage No - RNO Return to procedure and step in effect	**<u>Event 4</u>** **BOP:** Report feedflow decreasing on 'C' S/G. **SRO:** Direct manual control of 'C' S/G FRV. **SRO:** Direct use of ALR 00-110C **CRITICAL TASK:** <u>Take manual control of FRV as necessary to prevent reactor trip</u>. **STANDARD:** <u>This action must be taken in time to prevent a reactor trip</u>. **BOP:** Confirms steam flow/feed flow mismatch. **BOP:** NO Failure Instrument Failure. **BOP:** Place FRV in manual. **BOP:** Restore 'C' S/G level. **SRO:** Return to procedure and step in effect	

	Insert Event #5 with **TRIGGER 6** at time T+43	**Event 5** T 300 gpm RCS Leak ramped in over 5 minutes P Pressurizer Level will decrease P Pressurizer Pressure will decrease P Charging flow will increase P VCT level will decrease A Determine RCS leak in excess of a CCP and initiate a Safety Injection **OFN BB-007: (Rev. 11)** 1. Check Plant in Mode 1, 2, or 3 with Accumulator Outlet Valves Open 2. Check PZR level > 6% 3. Check PZR level > 17% 4. Check PZR level stable or increasing NO - RNO Maximize Charging Flow Isolate Letdown	**Event 5** **RO:** Report indications of leak. **SRO:** Direct OFN BB-007 **RO:** Maximize flow from the NCP. **RO:** Isolate letdown as necessary. **RO:** Determine leak rate to be in excess of CCP with Letdown isolated **SRO:** Direct manual trip & SI based on fold out page criteria. **RO:** Trip the reactor and initiate Safety Inject	

	When called as Aux Bldg. Watch wait 60 seconds then Open Reactor Trip breakers with **Trigger 7** Call back to report trip breakers open.	**EMG E-0 steps:** 1. Verify Rx trip. a. Check all rod bottom lights lit No - Manually trip reactor and Go to EMG FR-S1. **Event 6** EMG FR-S1 steps: 1. Verify Reactor trip No - RNO 1. Manually trip reactor 2. If reactor will not trip then perform the following a) Insert control rods in auto or manual b) Manually deenergize rod drive motor generators 1) Open the breakers for PG-19 and PG-20 2) Dispatch operator to trip & bypass breakers 3) When reactor trip breakers and bypass are open or all "Rod Bottom Lights" LIT, reclose the breakers for PG-19 & PG-20 4) Continue with step 2 2. Verify Turbine trip 3. Verify AFW pumps running 4. Check SI - NOT in progress RNO - If total ECCS flow from the RWST to the RCS is > 90 gpm then go to step 8.	**SRO:** Enter and direct E-0. **RO:** Recognize Reactor did not trip **SRO:** Enter & direct EMG FR-S1 **Event 6** **RO:** Manually trip the reactor **BOP:** Manually trip the reactor **RO:** Insert control rods in manual or automatic. **CRITICAL STEP:** Insert negative reactivity into the core by at least one of the following methods before the SGs dry out 1) De-energize the control rod drive MG sets 2) Manually insert control rods. **STANDARD:** The reactor must be made subcritical prior to 3 steam generator wide range levels reaching 8%. **BOP:** Open PG HIS-16 and PG HIS-18 breakers that power the rod drive MG sets. **RO:** Dispatch NSO to locally open reactor trip breakers **BOP:** Verify Turbine Trip **RO:** Determine SI is in progress.	

		8. Check PRZR pressure < 2335 psig 9. Verify containment purge isolation. 10. Check SI not actuated No - RNO Perform steps 1-6 of E-0 while continuing with this procedure 11. Check if the following trips have occurred a. Reactor trip b. Turbine trip 12. Check SG levels 13. Verify all dilution paths isolated 14. Check for reactivity insertion from uncontrolled RCS cooldown No - RNO negative MTC Go to step 20 20. Stop any controlled cooldown 21. Check core exit TCs - Less than 1200°F 22. Verify reactor subcritical 23. Check Rx trip breakers open 24. Continue boration until adequate shutdown margin is obtained 25. Check CRDM fans - All available running 26.Return to procedure and step in effect EMG E-0 steps: 1. Verify Rx trip. a. Check all rod bottom lights lit b. Ensure reactor trip breakers and bypass breakers open c .Check IR neutron flux decreasing d. Transfer NR-45 recorder to intermediate range 2. Verify turbine trip. a. Check the following: Main stop valves all closed OR Turbine auto stop bistable lights at least two lit b. Check main generator breakers and exciter breaker	Should have initiated per CRS. **RO:** Verify ECCS flow is > 90 gpm. **SRO:** Direct performance of E-0, Steps 1-6. **RO/BOP:** Performs E-0 steps 1-6 **RO:** Dispatch NSO to verify dilution paths closed **BOP:** Stop any uncontrolled cooldown. **RO:** Verify CETs < 1200°F on NPIS. **CREW:** Continue boration until SDM is obtained **RO:** Start all available CRDM fans. **SRO:** Enters EMG E-0 at Step 1. Will perform steps 1-6.	

		open 3. Check AC emergency busses at least one energized 4. Check if SI is actuated Annunciator 00-030A LIT OR Annunciator 00-031A LIT OR ESFAS Status Panel ANY WHITE LIGHT LIT OR Trip Status Panel SI RED LIGHT LIT 5. Check if SI is required: SI manually actuated RCS pressure less than or equal to 1830 psig S/G Pressure less than or equal to 615 psig Containment pressure greater than or equal to 3.5 psig RCS subcooling less than 30°F PZR level less than 6% 6. Verify Automatic Actions Using Attachment F, Automatic Signal Verification ATTACHMENT F F1. Verify feedwater isolation a. Main feedwater pumps tripped b. Main feedwater reg valves closed c. Main feedwater reg bypass valves closed d. Main feedwater isolation valves closed e. Main feedwater chemical injection valves closed f. Check ESFAS status panel SGBSIS section all white lights lit F2. Verify CISA a. Check ESFAS status panel CISA section all white lights lit F3. Verify AFW pumps running	**RO/BOP:** Determine SI is required **SRO:** Direct performance of ATT. F in parallel with E-0/FR S.1 **RO/BOP:** Perform Att. F	

		a. Check motor driven AFW pumps both running b. Check turbine driven AFW pump running F4. Verify ECCS pumps running a. Check CCPs both running b. Check SI pumps both running c. Check RHR pumps Both Running F5.Verify CCW alignment a. Check CCW pumps one running in each train b. Check one pair of CCW service loop supply and return valves for an operating CCW pump open F6. Check ESW pumps both running F7. Verify CTMT fan coolers running in slow speed F8. Verify CPIS a. Check ESFAS status panel CPIS section all white lights lit F9. Verify both trains of CRVIS a. Check ESFAS status panel CRVIS section all white lights lit b. Ensure control room outer door closed F10. Verify main steamline isolation not required a. Check CTMT pressure has remained < 17 psig b. Check either conditions below - satisfied * Low steamline pressure SI - NOT BLOCKED <u>AND</u> steamline pressure has remained > 615 psig * Low steamline pressure SI - BLOCKED <u>AND</u> steamline pressure rate has remained < 100 psi/50 sec F11. Verify CTMT spray not required a. CTMT pressure has remained < 27 psig F12. Verify ECCS flow F13. Verify AFW valves - properly aligned. F14. Verify SI valves - properly aligned.	**RO/BOP:** Determine CCP B is tagged out.	

	Insert **EVENT 7** with **TRIGGER 8**, at time T+60. If checked by RO/BOP RCP Frame vibration - 2 mils RCP Shaft vibration - 3 mils	**Event 7** T Loss of CCW to RCPs due to closure of CCW to Containment Isolation valve P Annunciators 00-074A & 00-52A P RCP Motor Temperatures increasing rapidly A Secure RCPs or open the CCW bypass valves OFN BB-005 1. Monitor RCP temperatures 2. Check if RCPs can remain running 3. All RCP seal leakoff < 6 gpm 4. Check #1 seal D/P > 200 PSID 5. Verify CCW to service loop and CTMT No - RNO Open bypass valve EG HIS-126 • Press Non-Iso on EG HIS-126A • Press Open on EG HIS-126 **EMG E-0 Continued** 7. Verify AFW flow > 270,000 lbm/hr. 8. Check RCS cold leg temperature - stable. a. ≤ 557°F For Steam dumps	**Event 7** **SRO:** Direct ALR usage 74A or 52A or OFN BB-005. **RO/BOP:** Identify failed closed CCW isolation valve **RO:** Monitor RCP temperatures on NPIS. **RO:** Identify failed closed CCW isolation valve, EG HIS-71 **SRO:** Direct RO to open the CCW isolation valve bypass EG HIS-126 or secure RCPs. **RO:** Press Non-Iso and Open EG HV-126. **CRITICAL STEP:** Open EG HIS-26 or secure the RCP's. **STANDARD:** Open EG HIS-26 or secure the RCP's within five minutes.	

		b. ≤ 561°F for S/G ARVs. 9. Establish S/G pressure control: a. Check condenser - AVAILABLE b. Place AB PK-507 in MANUAL c. Manually set AB PK-507 output to Zero d. Place Steam Dump Select Switch in STEAM PRESS position e. Place Steam Header Pressure Control in Automatic and adjust to maintain existing steam header pressure. o AB PK-507 10. Check PZR PORVs 11. Check normal PZR spray valves closed 12. Check PZR safety valves - closed 13. Check if RCPs should be stopped. 14. Direct operator to monitor CSFSTs 15. Check if SGs are not faulted. 16. Check if SG tubes are intact. 17. Check SG levels increasing in an uncontrolled manner 18. Check if RCS is intact NO - RNO Ensure BIT Inlet and Outlet valves are open and Go To EMG E-1 **EMG E-1 Steps:** 1. Check if RCPs should be stopped 2. Check if SGs are not faulted 3. Check intact SG Levels 4. Reset SI 5. Reset Containment Isolation Phase A and Phase B **Terminate Scenario** after transition to EMG E1 or at discretion of Lead Examiner.	**BOP:** Establish Steam dump control to prevent heatup. **RO:** Determine RCS not intact **SRO:** Enter and direct EMG E-1 **SRO:** Conduct Transition Brief. **RO:** Reset SI **RO:** Reset CISA/CISB **E-Plan Classification: -EAL-3, LRCB-1,2,3,5,6,7 -- ALERT**	

		>SCENARIO #2 >INITIAL CONDITIONS >OVERRIDE ANN 00-23E IMF ANN-E023 0 >"B" CHARGING PUMP TAGGED IRF NBGP05B 1 >"B" EDG TAGGED IMF MDGS02B IRF N1NB211 1 >"D" SG ARV ISOLATED IRF rMSS06 0 >SGFP VIBRATION PROBLEM SET CFC25(2)=1.4 >VCT LEVEL DIVERT IMF MCVL01(2) 0 >OVERRIDE VCT VALVE ANNUNCIATOR IMF ANN-B058(2) 1 >PR N41 FAILURE IMF MNIS03A (3) 120 30 >SG "C" LEVEL CONTROL FAILURE IMF MFWM03C (4) 50 10 >RCS LOOP A LEAK IMF MRCS06A (5) 300 120 >ATWT Event 6 IMF MPCS08A IMF MPCS08B >OPEN TRIP BREAKERS IRF RCRF05 (7) 1 IRF RCRF06 (7 3) 1 >LOSS OF CCW TO RCP'S IOR P19046D (8) 1 IOR P19046C (8) 0 > OVERRIDE ESFAS PANEL LIGHTS - CRVIS TRGSET 1 "JPPLSI(1)"		

		IMF SA066Y_C14W (1) 1 IMF SA066Y_C15W (1 35) 1 IMF SA066Y_C16W (1 35) 1 IMF SA066Y_G15W (1) 1 >End of File		

WOLF CREEK
NUCLEAR OPERATING CORPORATION

INITIAL LICENSE EXAM

DECEMBER 2001

DYNAMIC SCENARIO #3

Revision 0, 10/08/2001

Scenario Objectives:

1. Evaluate the ability to perform normal operations by controlling the unit during a power decrease.
2. Abnormal actions and Technical Specifications usage are evaluated by diagnosing and correcting:
   - Failed RCS Temperature Instrument
   - Failed S/G Level Instrument
   - Failed Open S/G Atmospheric Relief Valve
   - Failure of a S/G Feedwater Isolation Valve to close.
3. Emergency actions are evaluated for:
   - A Loss of Offsite Power
4. Contingency actions are evaluated for a failure of the Essential Service Water Pump to automatically start and supply cooling water to the Emergency Diesel Generator.

GENERAL REFERENCES

NUREG 1021, Rev. 8, Supplement 1, OPERATOR LICENSING EXAMINATION STANDARDS FOR POWER REACTORS
OFN SB-008, Rev. 11, “INSTRUMENT MALFUNCTIONS”
EMG E-0, Rev. 14, “REACTOR TRIP OR SAFETY INJECTION”
EMG ES-02, REV. 12, “REACTOR TRIP RESPONSE”
GEN00-004, Rev. 42, “POWER OPERATION”

RESET TO **IC 173** AND PLACE SIMULATOR IN **RUN** PRIOR TO LOADING BATCH FILE. Ensure simulator is in run or file will not load properly. You may freeze after file is loaded.

Insert Floppy disk and save the batch file **LO01_003** to **OPENSIM/BATCH**, then open Ph.D. Expert and type **"BAT LO01_003.txt"**

NOTE: FILE **LO01_003.txt** preloads all LOAs and/or malfunctions required for this scenario. Simulator commands and other functions to be performed by the booth operator are shown in **BOLD**. Trigger commands are used to initiate events and commands.

HANG DNO tag on FC HIS-118 'B' MFP Trip/Reset push-button.

ENSURE 'LOAD DECREASE' circuit on.

ENSURE that a Current, signed copy of GEN 00-004 is available for the SRO.

ENSURE the horns are ON

ENSURE Control Rods are at 160 STEPS on Bank D

ENSURE placard is on the 'A' CCP.

ENSURE both sets of Back up Heaters are ON.

ENSURE Rods are in Auto.

Reset RM-11 alarms from previous Scenarios

Have the above verified by a second person as being correctly performed.

Core age is Middle of Life

Power is 48%. Xenon equilibrium.

Coffey County is in a Severe Thunderstorm Watch.

Facility: ____WCGS_____ Scenario No.: ____3___ Op-Test No.: _____

See Crew Assignments. Multiple Crews will be tested on this Scenario.

Initial Conditions: ___48% Power. "B" Main Feed Pump Tagged out for maintenance on control valve linkage. Severe Thunderstorm Watch in effect for Coffey County._____

Turnover: ___Continue power reduction to 33% (400MWe) to remove all heater strings. OFN AF-025 is in effect_____

Event No.	Malf. No.	Event Type*	Event Description
1		R-RO N-BOP N-CRS	Continue Power reduction to 33% at ½ % per minute.
2	mRCS 01I	I-RO I-CRS	Loop 1 Thot fails high causing a rod insertion.
3	mFWM 02B3	I-BOP I-CRS	"B" SG Level AE LT-529 fails high.
4	mEPS 01A and 1B	M-All	Sequential Loss of Offsite Power, Reactor Trips due to low RCS flow.
5	mWAT 03A	C-RO C-CRS	"A" ESW pump Trips, "B" ESW pump fails to start. RO/CRS must get "B" ESW pump started prior to the EDG overheating causing entry into EMG C-0.
6	mFWM 12C	C-BOP C-CRS	"D" SG FWIV fails to Auto Close
7	mMSS 07E	C-BOP C-CRS	"A" SG ARV fails open.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Time (min)	Simulator Instructions	Events and Procedures	Applicant Actions or Behaviors	Notes
	Malfunction clock starts when the crew has assumed the watch (T=0)	**Event #1** T Decrease Power to 40% @ ½ % per minute. P Reactor power & turbine load decrease. A Perform GEN 00-004 **GEN 00-004: steps** 6.2.2.2 Reduce turbine Load using Load limit or Load Set *Turnover directs use 'Load Set'* 6.2.3 Decrease turbine load 6.2.4 Ensure AE HV-38 is closed. 6.2.5 Maintain ΔI & RIL 6.2.10 When Rx power < 48% verify P-8 bistables clear. 6.2.11 When Rx power <40% S/D one Heater drain pump. 6.2.12 When turbine power < 35% for > 6 minutes ensure AMSAC NOT armed.	**Event 1** Crew will review previous steps during pre-brief, crew enters Gen 00-004 at step 6.2.10. **SRO:** Direct a power decrease per GEN 00-004 **SRO:** Conduct a Reactivity Brief. **RO/BOP:** Coordinate power reduction. **BOP:** Decrease turbine load **RO:** Adjust rods & boron as necessary **RO:** Maintain Tavg/Tref using rods	

	Insert Event 2 with **Trigger 2** at T+17.	**Event 2** T Loop 1 T_{HOT} Fails to 630°F P Loop 1 Tavg fails high, causing rods to step in ANN 067 thru 069B & D will alarm A Stop Rod Motion **OFN SB-008 REV 11** **ACTIONS**: 1. Check if Sec Sys Inst Channel is malfunctioning. *NO* 2. Check if RCS Inst Channel is malfunctioning. *YES, go to ATT L.* **ATT L**: L1. Check Load Rejection. *NONE* L2. Switch Rod Control to MAN. L3. Check Stm Dumps. *CLOSED* L4. Identify Failed Channel. L5. Remove failed channel from ΔT and Tavg. L6. Check temp error W/I 1°F.	**Event 2** **RO:** Report Inward Rod Motion **BOP:** Report NO load rejection **SRO/RO:** Place rods in manual. **SRO:** Direct RO to place rods in manual **OR** **RO:** Place rods in manual and inform SRO. **CRITICAL TASK:** Take manual control of rods as necessary to prevent reactor trip. **STANDARD:** This action must be taken in time to prevent a reactor trip. **RO:** Report Loop 1 Tavg & ΔT failed. **SRO:** Enter & direct OFN SB-008 Attachment L **BOP:** Report STM DMPS closed. **RO:** Identify Loop 1 Temp. Inst. failed. **RO:** Defeat failed channel. **SRO/RO:** Restore Tavg. **SRO:** Conduct Reactivity Brief **RO:** Withdraw control rods as directed by SRO. (Crew may not restore Tavg and choose to	

			reduce Turbine load instead.	
		L7. Check rod control in AUTO. L8. Monitor Rod Control for proper response. L9. Check C-7 INTLK not lit. *NOT LIT* L10. Check Steam Dumps BYP-INTLK switches on. L11. Monitor stm dumps L12. Check failed inst not used for OPΔT and OTΔT recorders.	**RO:** Place rods in mode directed by SRO. **BOP:** Report C-7 not lit & dumps functioning correctly RO/BOP: Select Alternate Channel.	
	When called as Work Week Manager (WWM) state you will get a team together.	L13. Place B/S in the tripped condition. L14. Request INC to repair failed channel. L15. Check C-16 Hold Circuit - CLEAR L16. Monitor T.S. 3.3.1 L17. Return to procedure and step in effect	**SRO:** Contact WWM for assistance. **SRO:** Evaluate & Apply Tech Specs. T.S. 3.3.1, Table 3.3.3, Functions 6 & 7 Trip Bi-stables within 6 hours. **SRO:** Return to GEN 00-004.	

	Insert Event #3 with **Trigger 3** at time T+25. When called as WWM state you will get a team together.	**Event 3** T 'B' S/G Level Channel Fails High AE LI-529 P Annunciator 110B SG B Level DEV P 'B' FRV Throttle Shut to Maintain Level A Restore 'B' S/G Level **OFN SB-008 (Rev. 11)** **Actions:** 1. Check if secondary system instrument channel is malfunctioning a. Determine appropriate attachment for malfunctioning channel b. Go to Attachment F F1. Identify failed level channel F2. Check if failed S/G level channel used for feedwater control. F3. Select the alternate S/G level channel. F4. Monitor S/G level response to ensure proper control. F5. Trip bistables F6. Place AMSAC in TRIP condition F7. Request I&C to repair failed channel.	**Event 3** **BOP:** Report 'B' S/G level problem. **SRO/BOP:** Take manual control of SG "B" FRV. **SRO:** Direct BOP to take Manual Control. **OR** **BOP:** Take manual control and inform SRO. **CRITICAL TASK:** Take manual control of "B" FRV or select out failed channel. **STANDARD:** This action must be taken in time to prevent a reactor trip. **SRO:** Enter & direct OFN SB-008 **RO/BOP:** Identify AE LI-529 as failed Instrument. **BOP:** Select Alternate Instrument. **SRO/BOP:** Restore 'B' S/G level. **SRO:** Contact WWM for assistance. **SRO:** This channel does not require tripping for AMSAC	

		F8. Monitor Tech. Specs. 3.3.1 3.3.2 3.3.4, Table 3.3.4-1, Function 8 3.3.3 Table 3.3.3-1, Function 13 F9. Review Att. S F10. Return to procedure and step in effect	**SRO:** Evaluate & Apply Tech Specs. 3.3.1 – 6 hours to trip bi-stables 3.3.2 – 6 hours to trip bi-stables 3.3.4 – N/A 3.3.3 – N/A **SRO:** Review attachment 'S' & apply 3.3.4, 2of 3 channels required. **SRO:** Return to GEN 00-004.	

	Insert Event #4 with **Trigger 4** at time T+31 **NOTE:** May have to call as System Ops & inform control room of loss of Benton line.	**<u>Event 4</u>** T Sequential Loss of Off-Site Power P Loss of Power from Benton P Lightning Strike in Switchyard P Rx trip due low RCS flow A Enter EMG E-0 **EMG E-0 STEPS (REV 14)** **ACTIONS:** 1. Verify Rx trip. a. Check all rod bottom lights lit b. Ensure reactor trip breakers and bypass breakers open c. Check neutron flux decreasing d. Transfer NR-45 recorder to intermediate range 2. Verify turbine trip. a. Check the following: * Main stop valves all closed <u>OR</u> * Turbine auto stop bistable lights at least two lit b. Check main generator breakers and exciter breaker open	**<u>Event 4</u>** When the crew is made aware of loss of Benton line the SRO may review OFN AF-025. Maintain gen. load < 995 MWe. (Gross) **SRO:** Enter and direct EMG E-0 **RO/BOP:** Perform Immediate Actions **RO:** Verify Reactor Trip **BOP:** Verify Turbine Trip.	

	"B" ESW pump failed to auto start. "A" ESW pump trips.	**Event 5** T "B" ESW pump fails start to supply cooling water to the "B" EDG P Green light lit on Handswitch A Start the "B" ESW pump 3. Check AC emergency busses at least one energized	**Event 5** **RO:** Recognize AC bus energized by the EDG, the RO should check that cooling water is supplied. **SRO/RO:** Start 'B' ESW pump. **CRITICAL TASK:** Establish Cooling Water to the Emergency Diesel Generator. **STANDARD:** Manually start at least one ESW pump in an operating safeguards train before required diesel generator(s). **RO/BOP:** Report loss of 'A' ESW **SRO:** Direct 'A' diesel shutdown. **RO/BOP**: Shutdown 'A' diesel.	
	'D' MFIV did not auto close.	**Event 6** T MFIV for "D" SG does not auto close P Red light lit on Handswitch A Close AE HV-42 4. Check if SI is actuated – NO perform RNO RNO – Check if SI is required PZR Pressure < 1830 psig Steam Line Pressure < 615 psig CTMT Pressure > 3.5 psig PZR Level < 6%	**Event 6** **BOP:** Report "D" MFIV still open. **SRO/BOP:** Close AE HIS-42 **RO/BOP:** Check SI parameters.	

		Subcooling < 30 degrees Go to EMG ES-02	**SRO:** Enter & direct EMG ES-02	
	Insert **EVENT 7** with **TRIGGER 7**, during transition brief.	**EMG ES-02** T "A" SG ARV fails open P RCS temperature decreases P Steam Flow indication increases A Recognize cooldown and close "A" ARV.	**Event 7** **SRO/BOP:** Take manual control of 'A' ARV & close **CRITICAL TASK:** Close t"A" ARV **STANDARD:** This action must be taken in time to prevent an unnecessary 'MSLIS'. **BOP:** Stabilize RCS Temp. using remaining ARVs.	
	At Step 4 of EMG ES-02: **CALL** as System Ops and inform SRO that the estimate is 30 minutes to restore power to the Switchyard.	**EMG ES-02 steps:** 1. Check RCS cold leg temperatures stable at 557ºF or < 557ºF 2. Establish SG pressure control 3. Check feedwater status a. Tavg< 564ºF b. Check main feedwater pumps tripped c. Check MFIVs closed d. Check total feed flow to SGs > 270,000 lbm/hr 4. Verify instrument air to containment a. Check ESW to air compressor valves - open b. Check air compressor breaker reset switches - closed c. Check instrument air pressure > 105 psig d. Check KA HIS-29 open 5. Check charging pumps - at least one running 6. Verify charging system aligned for normal injection	Time required to restore power to the switchyard is required to allow the SRO to Classify the event.	

		7. Check charging flow established 8. Check all control rods fully inserted 9. Check PZR level > 17% **Terminate Scenario** after transition to EMG ES-02 or at discretion of Lead Examiner. >INITIAL SIM EXAM 01-03 > >SET-UP RTD FAILURE IMF mRCS01I (2) 650 15 > >SET-UP S/G LEVEL FAILURE IMF mFWM02B3 (3) 100 20 > >SET-UP LOSS OF POWER IMF mEPS01A (4) IMF mEPS01B (4 90) > >SET-UP 'A' ESW PUMP TRIP IMF mWAT03A > >SET-UP 'B' ESW PUMP FAILURE TO AUTO START IOR p19019B 0 > >SET-UP 'A' ARV FAILURE IMF mMSS07A (7) 100 25 > >SET-UP 'D' MFIV FAILURE TO AUTO CLOSE IMF mFWM12H > >End of File	**E-Plan Classification:** **6-LEP/AC 1,2,5 - ALERT**	

WOLF CREEK
NUCLEAR OPERATING CORPORATION

INITIAL LICENSE EXAM

DECEMBER 2001

DYNAMIC SCENARIO #4

Revision 0, 10/08/2001

Scenario Objective

Evaluate the ability to perform normal operations for restoration of letdown and a power reduction.
Diagnosing and correcting the following evaluate abnormal actions and Technical Specifications usage:

- PZR Level Channel failure
- Feedwater Flow channel failure
- RCS Leak
- Loss of NB02 Vital 4160V Bus

Emergency actions are evaluated for a RCS Loop “A” 10000 gpm leak
Contingency actions are evaluated for an Inadequate Core Cooling situation due to loss of all injection flow. (Safety Injection Pump “A” and the Normal Charging Pump trip)

GENERAL REFERENCES

NUREG 1021, Rev. 8, Supplement 1, OPERATOR LICENSING EXAMINATION STANDARDS FOR POWER REACTORS
EMG FR-C1, Rev. 12, RESPONSE TO INADEQUATE CORE COOLING
EMG E-0, Rev. 14, REACTOR TRIP OR SAFETY INJECTION
EMG E-1, Rev. 13, LOSS OF REACTOR OR SECONDARY COOLANT
OFN MA-038, Rev. 4, RAPID PLANT SHUTDOWN
OFN BB-007, Rev. 11, RCS LEAKAGE HIGH
OFN SB-008, Rev. 11, INSTRUMENT MALFUNCTION

RESET TO **IC 151** AND PLACE SIMULATOR IN **RUN** PRIOR TO LOADING BATCH FILE. Ensure simulator is in run or file will not load properly. You may freeze after file is loaded.

Insert and save the batch file **LO01_004.txt** to **OPENSIM/BATCH,** then open Ph.D. Expert and type **"BAT LO01_004.txt"**

NOTE: FILE **LO01_004**.txt preloads all LOAs and/or malfunctions required for this scenario. Simulator commands and other functions to be performed by the booth operator are shown in **BOLD**. Trigger commands are used to initiate events and commands.

HANG DNO tag on "A" MDAFWP
HANG DNO tag on "A" CCP
CLOSE PORV Block Valve BB HV-8000A due to seat leakage of BB PCV-455A. Place a follow-up button on BB HV-8000A.

ENSURE THE HORNS ARE ON

ENSURE CONTROL RODS ARE AT 229 STEPS

ENSURE placard is on the 'A' CCP.

Check RM-11 Clear from Last Scenario

Have the above verified by a second person as being correctly performed.

Core age is Middle of Life

Power is 100%. Weekday Nightshift with normal crew manning.

Establish a Monitor Screen and **enter regh16**

Facility: ___WCGS_____ Scenario No.: ___4___ Op-Test No.: _____

Examiners: _____ Operators: _____

See Examiner/Operator assignment sheet. This Scenario will be seen by multiple crews.

Initial Conditions: The plant is at 100% power, MOL. The unit has been at power for the last 217 days. "A" MDAFW pump is out of service for preventive maintenance. "A" CCP out of service for a bearing replacement. PORV BB PCV-455A seat leaks and block valve BB HV-8000A is closed. "A" Train H2 Analyzer out of service for PM's.

Turnover: No other maintenance or testing is in progress. Weekday Nightshift, normal crew manning.

Event No.	Malf. No.	Event Type*	Event Description
1	mPRS 02	I (SRO) I (RO)	PZR level instrument BB LT-459 fails low
2		N (RO) N(SRO)	Restore normal letdown
3	mFM W04	I (BOP) I (SRO)	Feed water flow transmitter AE FT-510 fails low
4	mRCS 06A	C (ALL)	RCS leak of 50 gpm
5		N (SRO) N(BOP) R (RO)	Plant shutdown due to RCS leak
6	mRCS 06a	M (ALL)	Earthquake(>SSE) causes 10,000gpm LOCA inserted after observable reactivity change
7	mEPS 06B	C (ALL)	Loss of NB02 Vital Bus at trip
8	mECC 02A	C (SRO) C (RO)	SI pump "A" trips after RCPs are tripped..

Scenario will be terminated in EMG FR-C1 after S/G depressurization is established and CETs start to decrease.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Time (Mins)	Simulator Instructions	Events and Procedures	Applicant Actions or Behaviors	Notes
	Insert **TRIGGER 1** one minute after the Watch has been assumed. (T+01)	**<u>Event 1</u>** T Pressurizer Level Channel BB LI-459 fails low P PZR level alarms P Letdown isolates P Actual PZR level increases A Take Manual Control of PZR Level control. **OFN SB-008 Steps:** 1. Check if Secondary system instrument channel is malfunctioning. - No - Go to step 2 2. Check if RCS instrument channel is malfunctioning - BB LT-459 Go To Attachment J J1. Identify failed Instrument channel - BB LT-459 J2. Check failed PZR level channel used to control PZR level. J3. Select alternate PZR level channel for level control.	**<u>Event 1</u>** **RO:** Report problem with PZR level **SRO/RO:** Take manual control of the Master PZR Level Control. **SRO:** Direct RO to take manual control OR **RO:** Take manual control and inform SRO. **CRITICAL TASK:** <u>Select alternate PZR level channel or take manual control.</u> **STANDARD:** <u>This action must be taken in time to prevent a reactor trip</u>. **SRO:** Enter and direct OFN SB-008 **RO:** Identify failed Instrument BB LT-459 failed low. **RO:** Select Alternate Channel.	

		Event 2 T Letdown isolated due to low PZR level. A Restore letdown J4. Check Letdown flow - established NO - Perform RNO J5. Manually control Charging and Letdown to stabilize PZR level. J6. Ensure Pzr Ctrl heaters - on J7. Place Charging/Letdown flow control in automatic. J8. Monitor PZR level response to ensure proper control. J9. Check failed PZR level channel - not used for recorder J10. Place appropriate bistables in tripped mode. J11. Request I & C repair channel. J12.Monitor the following Technical Specifications: • 3.3.1 • 3.3.4 • 3.3.3 J13. Review Attachment S J14. Return to procedure and step in effect	**Event 2** **RO:** Establish letdown **RO:** Restore PZR level. **RO:** Place charging/letdown control in automatic. **RO:** Select alternate recorder channel. **SRO:** Contact WWM for assistance. **SRO:** Evaluate and apply Tech Specs. 3.3.1 Trip Bistables in 6 hours 3.3.4 Repair in 30 Days 3.3.3 Repair in 30 Days **SRO:** Review attachment S. **SRO:** Return to procedure and step in effect.	
	If called as Work Week Manager (WWM) state you will get a team together.			

	Insert **TRIGGER 3** at time T+ 08 minutes WWM called state you will get a team together.	**Event 3** T Feed Flow Instrument AE FT-510 Fails to 0 P Indicated Feed Flow decreases P S/G 'A' Level Increases P FRV AE FK-510 opens P Ann. 108C alarms A Take Manual Control of "A" FRV **ALR 108C** – directs manual control of FRV AE FK-510. **OFN SB-008** 1. Check if secondary system instrument channel is malfunctioning - Go to Attachment E E1. Identify failed instrument channel E2. Check if failed feedwater flow channel selected on feedwater flow selector switch. E3. Select alternate feedwater flow channel for feedwater control. E4. Monitor S/G level response to ensure proper control. E5. Request I&C to repair failed channel. E6. Return to procedure and step in effect	**Event 3** **BOP:** Report problem with "A" SG. **SRO/BOP:** Take manual control of the "A" SG FRV. **CRITICAL TASK:** Take manual control of AE FK-510 or select alternate channel. **STANDARD:** This action must be taken in time to prevent a reactor trip. **SRO:** May enter ALR 108C or go directly to OFN SB-008 **SRO:** Enter & direct OFN SB-008 Attachment E **RO/BOP:** Identify AE FT-510 failed. **BOP:** Select Alternate Channel **BOP:** Restore 'B' S/G level. **SRO:** Contact WWM for Assistance. **SRO:** Return to procedure and step in effect.	

	Insert **TRIGGER 4** at time T+12. When called as Call Sup. Or Operations Manager prompt a 1%/minute shutdown.	**Event 4** T RCS Leak at 50 gpm P Pressurizer Level Decreases P Pressurizer Pressure Decreases P Charging/letdown flow mismatch A Perform steps of OFN BB-007 **OFN BB-007: (Rev. 11)** 1. Check Plant in Mode 1, 2, or 3 with Accumulator Outlet Valves Open 2. Check PZR level > 6% 3. Check PZR level > 17% 4. Check PZR level stable or increasing - NO • RNO • Maximize Charging • Isolate Letdown Orifices as required 5. Check charging pump suction aligned to VCT 6. Check PZR pressure 7. Check SG tubes intact. 8. Check CTMT conditions Normal NO • RNO • RNO 1. Isolate Letdown • RNO 2. Isolate Normal Charging, charge to seals only. 9. Refer to T.S. • 3.4.13, RCS Operational Leakage • 3.4.14, RCS Pressure Isolation Valve Leakage 10. Remove BTRS from service	**Event 4** **RO:** Report PZR level decrease or charging/letdown flow mismatch. **SRO:** Enter and directs OFN BB-007 **RO:** Maximize NCP flow and isolate letdown as required to maintain level. **RO:** Reports approximate RCS leak size. **RO:** Isolate Letdown **RO:** Establish charging to Seals only. **SRO:** Determine that leak exceeds that allowed by T.S. 3.4.13 Condition A – Restore in 4 hours. Condition B – Mode 3 in 6 hours.	

		11. Check for leakage to PRT, RNO to Step 15 **Event 5** T Determine S/D required due to RCS leak A Conduct Plant Shutdown. **OFN MA-038 (Rev. 4)** 1. Reduce Turbine Load: a. Check desired unloading rate-less than or equal to 5%/minute b. Set Loading/Unloading Rate Limit to desired value c. Select Decrease Loading Rate - ON d. Decrease Load Set MW toward desired load e. Continue with this procedure while reducing turbine load 2. Adjust Control Rods as necessary to establish a target Tavg/Tref Temperature Error between 0°f and +5°F 3. Energize PZR Backup Heaters BB HIS-51A & BB HIS-52A 4. Borate RCS and adjust Control Rods as necessary to establish the following conditions: Maintain delta flux within target band Maintain control rods above rod insertion limits 5. Check PZR PORVs. 6. Check PZR Pressure - Stable at or trending to 2235 Psig 7. Check PZR level - Stable at or trending to program level. 8. Check S/G levels > 45% and < 55% 9. Check AE HV-38 – Open 10. Check Reactor Power – less than 60%	**Event 5** **SRO:** Enter OFN MA-038 and Direct Crew to reduce power at a rate ≥ 1% per minute. **SRO:** Conduct Reactivity Brief **BOP:** Reduce Turbine load at designated rate **RO:** Maintain Tavg/Tref using rods **RO:** Energize backup heaters **RO:** Maintain Delta I & RIL using boron and rods **RO:** Control charging and letdown as necessary to maintain PZR level **BOP:** Control SG Levels **BOP:** Close AE HV-38	

	Insert **TRIGGER 6** for SSE, LOCA and Loss of NB02 after an observable reactivity change.	**Event 6 & 7** T Earthquake >SSE causes LOCA and Loss of Vital Bus NB02 P Seismic Annunciators Alarm P Rx Trip and SI on Low RCS Press P NB02 Bus Lock Out Alarm A Enter EMG E-0 **EMG E-0 steps:** 1. Verify Rx trip. a. Check all rod bottom lights lit b. Ensure reactor trip breakers and bypass breakers open c .Check IR neutron flux decreasing d. Transfer NR-45 recorder to intermediate range 2. Verify turbine trip. a. Check the following: Main stop valves all closed OR Turbine auto stop bistable lights at least two lit b. Check main generator breakers and exciter breaker open 3. Check AC emergency busses at least one energized 4. Check if SI is actuated 5. Check if SI is required Per Fold Out Page:	**Event 6 & 7** **CREW:** Recognize Reactor Trip and enter EMG E-0 **SRO:** Enter and direct EMG E-0. **RO/BOP:** Perform Immediate Actions **RO:** Verify Reactor Trip. **BOP:** Verify Turbine Trip. **RO:** Check AC emergency busses at least one energized and report NB02 de-energized. **RO:** Determine SI is actuated **SRO/RO:** Determine SI is required. **SRO/RO:** Trip all RCP's.	

		• RCS Press < 1400 psig • CCP or SI pump Running • Trip ALL RCP's 6. Verify Automatic Actions Using Attachment F, Automatic Signal Verification ATTACHMENT F F1. Verify feedwater isolation F2. Verify CISA F3. Verify AFW pumps running a. Check motor driven AFW pumps both running b.Check turbine driven AFW pump running	**Critical Step:** Trip All RCP's when Trip Criteria is met. **Standard:** Complete prior to the end of the scenario. **SRO:** Direct performance of ATT. F **RO/BOP:** Perform Attachment. F and report all B train equipment did not start. **RO/BOP:** Reports MDAFW Pump A is tagged and that MDAFW Pump B has no power.	
	Insert **Trigger 8** at 2 minutes after RCPs are secured. This will trip the remaining SI pump and NCP (Event 8). To Close "B" Train CCW valves, on the monitor screen	**Event 8** T SI pump A trip T NCP trip P ECCS status alarm P ANN 049A SI PMP TROUBLE P EM FI 918 no BIT flow indicated P ANN 042E CHG PMP TROUBLE A Recognize pumps tripped F4. Verify ECCS pumps running a. Check CCPs both running b. Check SI pumps both running c. Check RHR pumps Both Running F5.Verify CCW alignment a. Check CCW pumps one running in each train	**Event 8** **SRO/RO:** Respond to alarms and recognize all High Head and Intermediate Head pumps have been lost. **RO/BOP:** Reports CCP A is tagged out. **RO/BOP:** Reports SI pump A trip. **RO/BOP:** Open "A" Train CCW valves to the service loop. Dispatch operator to locally close "B"	

	Enter ramp regh16 1 0 20.	b. Check one pair of CCW service loop supply and return valves for an operating CCW pump open F6. Check ESW pumps both running F7. Verify CTMT fan coolers - running in slow speed F8. Verify CPIS a. Check ESFAS status panel CPIS section all white lights lit F9. Verify both trains of CRVIS a. Check ESFAS status panel CRVIS section all white lights lit b. Ensure control room outer door closed F10. Verify main steamline isolation not required F11. Verify CTMT spray not required F12. Verify ECCS flow F13. Verify AFW valves - properly aligned. F14. Verify SI valves - properly aligned. **E-0 Steps** 7. Verify AFW flow > 270,000 lbm/hr. 8. Check RCS cold leg temperature - stable. 9. Establish S/G pressure control: 10. Check PZR PORVs 11. Check normal PZR spray valves closed 12. Check PZR safety valves - closed 13. Check if RCPs should be stopped. 14. Direct operator to monitor CSFSTs 15. Check if SGs are not faulted. 16. Check if SG tubes are intact. 17. Check SG levels increasing in an uncontrolled manner 18. Check if RCS is intact - NO RNO Ensure BIT Inlet and Outlet valves are open and Go To EMG E-1	Train to service loop valves. **RO/BOP:** Reports the lack of ECCS flow. **RO/BOP:** Establish Steam dump control to prevent heatup. **RO:** Determine RCS not intact **SRO:** Direct transition to E-1.	

	SI pump trip eventually puts the crew in FR-C1.	**EMG E-1 Steps:** 1. Check if RCPs should be stopped 2. Check if SGs are not faulted 3. Check intact SG Levels 4. Reset SI 5. Reset Containment Isolation Phase A and Phase B 6. Determine Secondary Radiation Levels 7. Check Secondary Radiation - Normal 8. Check PZR PORVs and block valves 9. Establish Instrument Air to Containment 10. Check if ECCS flow should be reduced No - RNO Go to step 11. 11. Check if Containment Spray should stopped 12. Check if RHR should be stopped 13. Check RCS and SG Pressures 14. Check if D/Gs should be stopped NOTE: EMG FR-C1 will eventually be necessary. The crew may first transition to EMG FR-C2, but this will not prevent red path condition from occurring. In this scenario, EMG FR-C2 steps are not critical since insufficient time exists for the operators to take any significant action before entry into EMG FR-C1 will be required.	**SRO:** Enter and direct steps of EMG E-1 **SRO:** Conduct Transition Brief. **RO/BOP:** Reports all RCPs tripped earlier. **RO/BOP:** Reset SI **RO/BOP:** Reset CISA/CISB **RO/BOP:** Establish instrument air to CTMT. **RO/BOP:** Stop RHR pumps and place in standby. **RO/BOP:** Stop NE01/NE02	

	When directed to restore power to accumulator isolation valves: **Trigger 9** Restore Power to A Train Accumulator Isolation Valves IRF rECC01 (9) 1 NOTE: NG02B is not energized.	**EMG FR C1 steps: (Rev. 12)** 1. Verify SI valve alignment 2. Verify ECCS flow in all trains 3. Check RCP support conditions available 4. Check SI Accumulator isolation valve status 5. Check core exit TCs less than 1200°F. 6. Check RVLIS Nat. Circ. > 45% 7. Check core exit TCs less than 712°F. 8. Check H_2 analyzers in service. 9. Check CTMT H_2 concentration 10. Check intact SG levels. 11. Check RCS vent paths. 12. Check if condenser air removal should be returned to service. 13. Check if low steamline pressure should be blocked 14. Depressurize all intact SGs to 160 psig. 15. Reset SI 16. Check if SI accumulators should be isolated 17. Stop all RCPs. 18. Depressurize all intact SGs to atmospheric pressure 19. Verify ECCS flow	**SRO:** Enter and direct steps of EMG FR-C1 **SRO:** Conducts Transition Brief **RO:** Reports B train no power. **RO:** Reports no flow indicated. **RO/BOP:** Dispatch an operator to restore power to accumulator valves. **RO/BOP:** Place H2 analyzers in service. **BOP:** Maintain S/G narrow range level **RO:** Block low steamline pressure SI **SRO/BOP:** Depressurize all intact SGs to 160 psig at maximum rate. **CRITICAL TASK:** Depressurize the SGs to 160 psig in order to initiate ECCS accumulator injection and to establish RHR injection to the RCS. **STANDARD:** commencing a successful S/G depressurization satisfies this action.	

		20. Check core cooling **<u>Terminate Scenario</u>** when S/G depressurization is established and Core Exit Thermocouples start to decrease. >INITIAL LICENSE EXAM SCENARIO #4 >OVERRIDE ANN 00-18F IMF ANN-F018 0 >"A" CCP TAGGED IRF NBGP05A 1 >"A" MDAFW PUMP TAGGED IRF NALP01A 1 IRF NALP01AC 1 >PZR LEVEL INSTRUMENT BB LT-459 FAILS LOW IMF MPRS02A (1) 0 > FEED WATER FLOW TRANSMITTER AE FT 510 FAILS LOW IMF MFWM04A (3) 0 30 >RCS LEAK 50 GPM IMF MRCS06B (4) 50 60 >EARTHQUAKE AND LBLOCA 10,000 GPM AND LOSS OF NB02 IMF ANN-A098 (6) 0 IMF ANN-B098 (6) 0 IMF ANN-C098 (6) 0 IMF ANN-D098 (6) 0 IMF ANN-E098 (6) 0 IMF MRCS06A (6 15) 10000 IMF MEPS06B (6 15) >LOSS OF "A" SI PUMP IMF MECC02A (8) IMF MCVC13C (8) >Restore Power to A Train Accumulator >Isolation Valves IRF rECC01 (9) 2 >End of File	**E-Plan Classification: EAL-3, LRCB.** **LRCB 1 – 2 – 3 – 4 - 8 -- SAE**	

WOLF CREEK
NUCLEAR OPERATING CORPORATION

INITIAL LICENSE EXAM

DECEMBER 2001

DYNAMIC SCENARIO #6

Revision 0, 10/08/2001

Scenario Objectives:

1. Evaluate the ability to perform normal operations by increasing power from 10^{-8} amps to 1%.
2. Abnormal actions and Technical Specifications usage are evaluated by diagnosing and correcting:
   - PZR Pressure Channel failing high
   - SG Level Channel Fails Low
   - Excessive PORV seat leakage requires closure of the associated block valve.
3. Emergency actions are evaluated for a Main Steam Line Break, inside of Containment.
4. Contingency actions are evaluated for a failure of the MSIV's to automatically close and failure of Containment Isolation Phase A.

GENERAL REFERENCES

NUREG 1021, Rev. 8, Supplement 1, “OPERATOR LICENSING EXAMINATION STANDARDS FOR POWER REACTORS”
OFN SB-008, Rev. 11, “INSTRUMENT MALFUNCTIONS”
GEN 00-003, Rev. 52, “HOT STANDBY TO MINIMUM LOAD”
EMG E-0, Rev. 14, “REACTOR TRIP OR SAFETY INJECTION”
EMG E-2, Rev. 9, “FAULTED STEAM GENERATOR ISOLATION”

RESET TO **IC 156** AND PLACE SIMULATOR IN **RUN** PRIOR TO LOADING BATCH FILE. Ensure simulator is in run or file will not load properly. You may freeze after file is loaded.

Insert Floppy disk and save the batch file **LO01_006** to **OPENSIM/BATCH**, then open Ph.D. Expert and type "**BAT LO01_006.txt**"

NOTE: FILE **S LO06_001.txt** preloads all LOAs and/or malfunctions required for this scenario. Simulator commands and other functions to be performed by the booth operator are shown in **BOLD**. Trigger commands are used to initiate events and commands.

ENSURE THE HORNS ARE ON

ENSURE Control Rods are at 98 steps on Control Bank D, 213 steps on Control Bank C and 228 on Control Banks A and B.

ENSURE placard is on the 'A' CCP.

Reset RM-11 alarms from previous Scenarios

Have the above verified by a second person as being correctly performed.

Core age is Middle of Life

Power is 10-8 amps, Critical rod height data is complete.
GEN 00-003 is in progress at step 6.25. Provide signed off copy of GEN 00-003.

Facility: ____WCGS_____ Scenario No.: ___6(Spare) Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: The plant is at MOL. Unit startup is in progress after a 7 day outage to resolve a voltage regulator problem. Reactor power is at E^{-8} Amps, Rod control in manual, Startup Feedpump in service, GEN 00-003 is complete through step 6.24.

Turnover: All systems normal, resume startup at step 6.25 of Gen 00-003.

Event No.	Malf. No.	Event Type*	Event Description
1		N (SRO) R (RO)	Increase reactor power to 1%
2	mPRS 01B	I (SRO) I (RO)	Pzr pressure channel BB PT-457 fails high
3	mCVC 13C	C (SRO) C(BOP)	"B" SG Level Channel Fails (CHANGE) Old malfunction was used as a JPM
4	mPRS 10A	C (SRO) C (RO)	PORV BB PCV-455A excessive seat leakage. Block valve BB HV-8000B is isolated.
5	mMSS 03B	M (SRO) M (RO) M (BOP)	S/G "B" faulted inside containment
6	mMSS 02E-H	C (SRO) C (BOP)	MSIV's Fail to close in Automatic
7	mPCS 10A & 10B	C (SRO) C (RO)	Failure of containment isolation phase A

Terminate after stabilization of RCS after Steam Generator blowdown.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Time (min)	Simulator Instructions	Events and Procedures	Applicant Actions or Behaviors	Notes
	Malfunction clock starts when the crew has assumed the watch (T=0)	**Event #1** T Increase Reactor Power to 1%. A Raise Reactor Power to POAH **Gen 00-003 (rev XX)** 6.22 Stabilize reactor power at 10^{-8} amps 6.23 Record critical data 6.24 Complete a Surveillance Procedure Credit Cross-Reference and Review Sheet for STS SF001 and route to Surveillance Coordinator. *NA* 6.25 Increase reactor power to .5% 6.25.1 Ensure steam dumps or ARVs are adjusted to 557°F, ±5°F 6.25.2 Establish desired SUR (not to exceed 1 dpm SS or 1.5 dpm transient) 6.25.3 Let steam dumps or ARVs open until power is 0.5% 6.25.4 Reduce or stop blowdown as necessary to maintain sufficient feed flow. 6.25.5 Stabilize power between 0.5% and 1.0% 6.25.6 Select highest PR on NR45 and go to LO-0 speed (1”/hr)	**Event #1** **SRO:** Direct power increase. **SRO:** Conduct Reactivity Brief. **RO:** Withdraw Control Rods to establish SUR per CRS directions.. **BOP:** Monitor DRPI indications.	

	Insert Event 2 with **Trigger 2** at time T+13 min. When called WWM state you will get a team together.	**Event 2** T BB PT-457 Fails High, PZR Pressure P PZR Spray valves open P PORV 455A opens P PZR Pressure decreases A Stop the Pressure Transient **OFN SB-008 steps: (Rev 11)** 2. Check if RCS Inst. failure - *YES* Go To ATT. K K1. Identify Failed Inst. K2. Check failed inst used for control K3. Check Failed PZR Pressure Channel Failed High K4. Select Alt. PZR Pressure Channel K5. Stop Pressure Transient K6. Return PZR Pressure Control to AUTO K7. Monitor Pressure K8. Check failed inst. not selected to recorder K9. Check failed inst. not selected to OPΔT/OTΔT recorder K10. Trip bistables K11. Request I&C repair failed inst. K12. Monitor T/S: 3.3.1 3.3.2 3.3.4 table 3.3.4-1 function 3 3.3.6 3.3.7 K13. Review attach. S for Post Accident & Remote S/D Inst.	**Event 2** **RO:** Report RCS pressure decreasing. **SRO/RO:** Take Manual Control of Master Pressure Controller and restore RCS pressure. **CRITICAL STEP:** Place PZR Pressure master controller in manual and close spray valves OR select alternate channel. **STANDARD:** This action must be taken in time to prevent a reactor trip. **SRO:** Enters and directs OFN SB-008 **RO:** Identify BB PT-457 has failed high. **RO:** Select Alternate channel. **SRO:** Evaluate and apply T.S. 3.3.1 Trip Bi-stables in 6 hours 3.3.2 Trip Bi-stables in 6 hours 3.3.4 N/A 3.3.6 Verify Ctmt Purge Vlvs shut 3.3.7 CREVS within 7days	

		K14. Return to Procedure and Step in effect	**SRO:** Return to GEN 00-003.	
	Insert Event #3 with **Trigger 3** at time xxx	**Event 3** T 'B' S/G Level Channel Fails Low AE LI-529 P 'B' FRV Throttle Shut to Maintain Level A Restore 'B' S/G Level Perform OFN SB-008	**Event 3** **BOP:** Report 'B' S/G level problem. **CRITICAL TASK:** Take manual control of "B" FRV or select out failed channel. **STANDARD:** This action must be taken in time to prevent a reactor trip.	
	When called WWM state you will get a team together.	**OFN SB-008 (Rev. 11)** **Actions:** 1. Check if secondary system instrument channel is malfunctioning a. Determine appropriate attachment for malfunctioning channel b. Go to Attachment F F1. Identify failed level channel F2. Check if failed S/G level channel used for feedwater control. F3. Select the alternate S/G level channel. F4. Monitor S/G level response to ensure proper control. F5. Trip bistables F6. Place AMSAC in TRIP condition F7. Request I&C to repair failed channel. F8. Monitor Tech. Specs. 3.3.1 3.3.2 3.3.4, Table 3.3.4-1, Function 8 3.3.3 Table 3.3.3-1, Function 13 F9. Review Att. S F10. Return to procedure and step in effect	**SRO:** Enter & direct OFN SB-008 **BOP:** Identify AE LI-529 as failed Inst. **BOP:** Select alternate Inst. **BOP:** Restore 'B' S/G level. **SRO:** This channel does not require tripping for AMSAC **SRO:** Evaluate & Apply Tech Specs. 3.3.1 Trip Bi-stables in 6 hours 3.3.2 Trip Bi-stables in 6 hours 3.3.4 N/A 3.3.3 N/A **SRO:** Review attachment 'S' & apply **SRO:** Return to GEN 00-003	

	Insert Event #4 with **Trigger 4** at time xxx	**Event 4** T PORV Leakage. P PORV Tail pipe temperature increases P PRT Pressure increases P PRT Temperature increases P RCS Pressure decreases A Determine that PZR PORV has failed to fully seat and is leaking by to the PRT. The Crew will have to monitor the plant and determine that whenever the Block valve goes closed RCS pressure recovers to the point the Block valve re-opens causing RCS pressure to decrease again.	**Event 4** **RO/BOP:** Note that PRT parameters have began increasing when they were decreasing.. **RO/BOP:** Note that RCS Pressure is decreasing. **SRO/RO:** Close Block valve BB HV8000A to isolate POR V **SRO:** Determine T.S. applicability. T.S. 3.4.11 PORV's Condition A: Close the Block valve within 1 hour.	

	Insert Event #5 with **Trigger 5** at time xxx	**Event 5** T S/G "B" faulted in Containment. P RCS Tavg decreases P Pressurizer Pressure will decrease. P Main Steam Line Pressures will decrease. P CTMT Pressures will increase. P CTMT Humidity will increase. A Determine that a S/G has faulted into CTMT. **EMG E-0 STEPS (REV 14)** 1. Verify Rx trip. a. Check all rod bottom lights lit b. Ensure reactor trip breakers and bypass breakers open c. Check neutron flux decreasing d. Transfer NR-45 recorder to intermediate range 2. Verify turbine trip. a. Check the following: * Main stop valves all closed OR * Turbine auto stop bistable lights at least two lit b. Check main generator breakers and exciter breaker open 3. Check AC emergency busses at least one energized 4. Check if SI is actuated 5. Check if SI is required:	**Event 5** **SRO:** Recognize a trip is required and direct the RO to manually trip the reactor. **RO:** Manually trip the reactor. **SRO:** Enter and direct E-0. **RO/BOP:** Perform Immediate Actions of E-0, Steps 1 through 4. **RO:** Verify Reactor Trip. **BOP:** Verify Turbine Trip. **RO:** Verify AC buses energized. **RO:** Check if SI actuated.	

		Event 6 T MSIV's fail to auto close P SG Pressure < 615 psig P CTMT Pressure > 17 psig P SG Pressures decreasing rapidly A "Fast Close" MSIV's	**Event 6** **SRO\BOP:** Determine that MSIV's did not close and FAST CLOSE MSIV's. (This action should be done after completion of Immediate Actions.) **CRITICAL TASK:** Manually actuate main steamline isolation before a severe (orange-path) challenge develops to either the subcriticality or the integrity CSF or before transition to EMG C-21, whichever happens first. **STANDARD:** All 4 MSIV's Closed. **SRO\BOP:** Per Fold Out Page of E-0, isolate AFW to the Faulted S/G **CRITICAL TASK:** Isolate the faulted SG before a severe (orange-path) challenge develops and before the end of the scenario. **STANDARD:** Both AFW valves to the faulted S/G are closed and verify Main Feed is isolated.	

		6. Verify automatic actions per Attachment F. ATTACHMENT F F1. Verify feedwater isolation F2. Verify CISA a. Check ESFAS status panel CISA section all white lights lit F3. Verify AFW pumps running F4. Verify ECCS pumps running F5.Verify CCW alignment F6. Check ESW pumps both running F7. Verify CTMT fan coolers running in slow speed. F8. Verify CPIS a. Check ESFAS status panel CPIS section all white lights lit F9. Verify both trains of CRVIS a. Check ESFAS status panel CRVIS section all white lights lit F10. Verify main steamline isolation not required F11. Verify CTMT spray not required F12. Verify ECCS flow F13. Verify AFW valves - properly aligned. F14. Verify SI valves - properly aligned. 7. Verify AFW flow > 270,000 lbm/hr. 8. Check RCS cold leg temperature stable. 9. Establish S/G pressure control: a. Check condenser – AVAILABLE - NO RNO – Use SG ARV's 10. Check PZR PORVs - closed 11. Check normal PZR spray valves closed 12. Check PZR safety valves - closed 13. Check if RCPs should be stopped. 14. Direct operator to monitor CSFSTs 15. Check if SGs are not faulted. NO - RNO Go	**BOP/RO:** Perform Attachment F. **Event 7** **RO\BOP:** Determine that CIS-A did not actuate on either train and inform CRS. (NOTE: Failure of CIS-A will also cause CPIS\CRVIS to fail to actuate.) **SRO:** Direct actuation of CIS-A. NOTE: CPIS and CRVIS do actuate either with the failure of CIS-A. Once the operator manually actuates CIS-A the rest will actuate normally. **BOP:** Establish SG Pressure control using SG ARV's.	

		To EMG E-2. **EMG E-2 steps: (REV 9)** 1. Check steamline on All SG isolated a. MSIVs closed b. MSIV bypasses closed c. Main steamline low point drain valves closed 2. Check if fault is inside Area 5 3. Check if any SG is not faulted 4. Identify faulted SG(s) 5. Isolate faulted SG(s) a. Close AFW flow control valves to faulted SG b. Locally close steam supply to TD AFW pump c. Ensure SG ARV on faulted SG is closed 6. Verify feedline isolated on faulted SG a. Main feed reg valve closed b. Bypass feed reg valve closed c. MFIV closed d. Chemical injection valve closed **Terminate Scenario** after crew isolates the Faulted S/G in EMG E-2 or at discretion of Lead Examiner.	**BOP:** Determine SG "B" faulted **SRO:** Transition to EMG E-2. **SRO:** Conduct Transition Brief. **SRO:** Enter and Direct EMG E-2. **BOP:** Ensure Steam Lines isolated. (Should already be done) **BOP:** Ensure faulted SG isolated. Dispatch Operator to isolate TDAFW steam supply valve. BOP: Verify feedline isolated. **E-PLAN CLASSIFICATION:** **EAL-4, Main Steam Line Break** **MSLB 1 –2 –5 –7 –NUE.**	

		>Initial License Exam Spare Scenario #6 >LO01_006 (Spare) 10-8 Amps >GEN00-003 step 6.22 complete >Set up MSIV's Fail to Auto Close IMF mMSS02E IMF mMSS02F IMF mMSS02G IMF mMSS02H >Set up Failure of CISA, Both Trains IMF mPCS10C >PZR Press Channel Failure IMF mPRS01b (2) 2505 5 >SET-UP S/G LEVEL FAILURE IMF mFWM02B3 (3) 0 5 >PORV 455A begins leaking IMF mPRS10A (4) 15 >SG "B" Faults inside CTMT IMF mMSS03B (5) 2.0e+6 180 > >End of File		

WOLF CREEK
NUCLEAR OPERATING CORPORATION

ALR 00-042A

CHG LINE FLOW HILO

Responsible Manager

Manager Operations

Revision Number	10
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21A

DC4 10/03/2000

1.0 PURPOSE

1.1 This procedure provides instructions for responding to actuation of alarm window 00-042A, CHG LINE FLOW HILO.

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 This procedure is entered when the following occurs:

* Charging header flow is greater than or equal to 150 gpm.

  o BG FB-121A

  OR

* Charging header flow is less than or equal to 45 gpm.

  o BG FB-121B

3.0 REFERENCES AND COMMITMENTS

3.1 References

a. Total Plant Setpoint Document

b. EN 93-0170

c. CCP 6578, Low Flow Cavitation

d. PMR 4590, PDP Replacement

3.2 Commitments

a. RCMS 1988-157 Response to prevent dead-heading pumps[Step ¤ 10b RNO] ¤

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**Check Charging Header Flow - GREATER THAN 150 GPM** o BG FI-121A	Go to Step 5.
2.	**Verify alarm is NOT due to plant cooldown.**	Return to procedure and step in effect.
3.	**Check PZR Level - AT PROGRAM VALUE** o BB LR-459	Perform the following: a. IF level less than program, THEN go to OFN BB-007, RCS LEAKAGE HIGH, Step 1 OR OFN BB-07A, STEAM GENERATOR TUBE LEAKAGE Step 1. b. IF level greater than program, THEN place running charging pump flow controller in manual and decrease charging flow as necessary to establish PZR level at program value. * BG FK-121 for CCP * BG FK-462 for NCP
4.	**Go To Step 9**	
5.	**Check Charging Header Flow - LESS THAN 45 GPM** o BG FI-121A	Notify I&C to determine cause of alarm AND Return to procedure and step in effect.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	**Check Charging Pumps - ANY RUNNING** * BG HIS-1A for CCP A * BG HIS-2A for CCP B * BG HIS-3 for NCP	Perform the following: a. Close Letdown Orifice Isolation valves. o BG HIS-8149AA o BG HIS-8149BA o BG HIS-8149CA b. Start any available charging pump: * Start either CCP. * BG HIS-1A for CCP A * BG HIS-2A for CCP B <u>OR</u> * Start NCP: o BG HIS-3
7.	**Check PZR Level - AT PROGRAM VALUE** o BB LR-459	Perform the following: a. Place running charging pump flow controller in manual and adjust charging flow as necessary to establish PZR level at program value. * BG FK-121 for CCP * BG FK-462 for NCP b. Establish desired letdown by performing section 6.5 in SYS BG-120 CHEMICAL AND VOLUME CONTROL SYSTEM STARTUP.
8.	**Check Letdown Heat Exchanger Outlet Temperature - LESS THAN 130°F** o BG TI-130	Bypass CVCS demineralizers. o BG HIS-129
9.	**Check Charging Header Flow And Letdown Flow - BALANCED**	Adjust charging and letdown as necessary to maintain PZR level at program value.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Total pump flow should be maintained above 175 gpm to minimize the effects of low flow cavitation.

10. Verify CCP Adequate Flow:

a. Check CCPs - ANY RUNNING * BG HIS-1A for CCP A * BG HIS-2A for CCP B	a. Go to Step 11.
b. Check CCP Recirc Valve - OPEN * BG HIS-8110 for CCP A * BG HIS-8111 for CCP B	b. Manually open CCP Recirc valve. * BG HIS-8110 for CCP A * BG HIS-8111 for CCP B

11. Return To Procedure And Step In Effect

-END-

CORRECTED COPY 06/13/2000

WOLF CREEK
NUCLEAR OPERATING CORPORATION

ALR 00-061A

PROCESS RAD HIHI

Responsible Manager

Manager Operations

Revision Number	15
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21A

1.0 PURPOSE

1.1 This procedure provides instructions for responding to actuation of alarm window 00-061A, PROCESS RAD HIHI.

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 This procedure is entered when any process radiation monitor is in high high alarm condition.

2.2 The high high alarm setpoints for liquid and gaseous effluents are set as calculated in AP 07B-003, Offsite Dose Calculation Manual (ODCM).

2.3 IF a controlled release is in progress AND the monitor in the release path is high high, THEN the controlled release will automatically be terminated.

3.0 REFERENCES AND COMMITMENTS

3.1 References

a. AP 07B-003, Offsite Dose Calculation Manual (ODCM)

b. PIR 95-0087

c. PIR 00-0039
¤

3.2 Commitments

a. LER 90-24, RCMS 90-176, PDR 1991-0445, PIR 90-0234,
¤
Unplanned Release Of Waste Gas Decay Tank Without Prior
¤
Sampling Caused By Personnel Error [Commitment - Procedure
¤
Step, Step 8].
¤

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**Determine Affected Process Radiation Monitor:** o Check panel SP056A - ANY PROCESS MONITOR RED	Perform the following: a. IF either gaseous effluent monitor in accident isolation, THEN go to Step 6. * GH RE-10 for Radwaste Building * GT RE-21 for Unit Vent b. IF gaseous effluent monitors NOT in accident isolation, THEN return to procedure and step in effect. o GH RE-10 for Radwaste Building o GT RE-21 for Unit Vent
2.	**Check For High High Reactor Coolant System Activity:** a. Check Auxiliary Building, CVCS Letdown Monitor - RED o SJL016 b. Go to OFN BB-006, HIGH REACTOR COOLANT ACTIVITY, Step 1	a. Go to Step 3.
3.	**Check For RCS Leakage To Containment:** a. Check Containment Atmosphere Monitors - ANY RED * GTP311 * GTI312 * GTG313 * GTP321 * GTI322 * GTG323 b. IF Chemistry cannot verify the signal is a spike THEN go to OFN BB-007, RCS LEAKAGE HIGH, Step 1	a. Go to Step 4.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**Check For Steam Generator Tube Leakage:**	
	a. Check the following monitors - ANY RED: * Condenser air discharge monitor - RED o GEG925 OR * SG blowdown and sample monitors - EITHER RED * BML256 for blowdown * SJL026 for sampling OR * SG steamline monitors - ANY RED * ABS114 for S/G A * ABS113 for S/G B * ABS112 for S/G C * ABS111 for S/G D	a. Go to Step 5.
	b. Go to OFN BB-07A, STEAM GENERATOR TUBE LEAKAGE, Step 1	
5.	**Check For CCW System Leakage:**	
	a. Check CCW monitors - EITHER RED * EGL096 for CCW train A * EGL106 for CCW train B	a. Go to Step 6.
	b. Go to OFN BB-007, RCS LEAKAGE HIGH, Step 1	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	**Check For High High Radiation On Normal Release Path:** o Controlled liquid or gaseous release - IN PROGRESS <u>AND</u> o Release path monitor on controlled release path - RED OR HAS BEEN RED	Return to procedure and step in effect.
7.	**Ensure Associated Controlled Release Path - ISOLATED**	
8.	**Inform Chemistry Of Affected Process Radiation Monitor And Direct Chemistry To Perform Evaluation Of Release**	
9.	**Go To OFN SP-010, ACCIDENTAL RADIOACTIVE RELEASE, Step 1**	

-END-

CORRECTED COPY 06/13/2000

WOLF CREEK
NUCLEAR OPERATING CORPORATION

ALR 00-061B

PROCESS RAD HI

Responsible Manager

Manager Operations

Revision Number	15
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21A

DC12 02/16/2000

1.0 PURPOSE

1.1 This procedure provides instructions for responding to actuation of alarm window 00-061B, PROCESS RAD HI.

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 This procedure is entered when any process radiation monitor is in high alarm (alert) condition.

2.2 The high alarm (alert) setpoints for liquid and gaseous effluents are set as calculated in AP 07B-003, Offsite Dose Calculation Manual (ODCM).

3.0 REFERENCES AND COMMITMENTS

3.1 References

a. AP 07B-003, Offsite Dose Calculation Manual (ODCM)

b. Vendor manuals

- o J-361.00072, GA Tech Airborne Radiological Monitoring System
- o J-361.00109, GA Tech Process / Airborne Rad Monitor System

c. PIR 95-0087

d. PIR 00-0039
¤

3.2 Commitments

a. LER 90-24, RCMS 90-176, PDR 1991-0445, PIR 90-0234,
¤
Unplanned Release Of Waste Gas Decay Tank Without Prior
¤
Sampling Caused By Personnel Error [Procedure Steps, Step 6
¤
and, Step 8]
¤

b. ITIP 02488 (SOER 93-01) [Entire Procedure]

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**Determine Affected Process Radiation Monitor:** o Check panel SP056A - ANY PROCESS MONITOR YELLOW	Perform the following: a. IF either gaseous effluent monitor in accident isolation, THEN go to Step 6. * GH RE-10 for Radwaste Building * GT RE-21 for Unit Vent b. IF gaseous effluent monitors NOT in accident isolation, THEN return to procedure and step in effect. o GH RE-10 for Radwaste Building o GT RE-21 for Unit Vent
2.	**Check For High Reactor Coolant System Activity:** a. Check Auxiliary Building, CVCS Letdown Monitor - YELLOW o SJL016 b. Go to OFN BB-006, HIGH REACTOR COOLANT ACTIVITY, Step 1	a. Go to Step 3.
3.	**Check For RCS Leakage To Containment:** a. Check Containment Atmosphere Monitors - ANY YELLOW * GTP311 * GTI312 * GTG313 * GTP321 * GTI322 * GTG323 b. IF Chemistry cannot verify the signal is a spike THEN go to OFN BB-007, RCS LEAKAGE HIGH, Step 1	a. Go to Step 4.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**Check For Steam Generator Tube Leakage:**	
	a. Check the following monitors - ANY YELLOW: * Condenser air discharge monitor - YELLOW o GEG925 <u>OR</u> * SG blowdown and sample monitors - EITHER YELLOW * BML256 for blowdown * SJL026 for sampling <u>OR</u> * SG steamline monitors - ANY YELLOW * ABS114 for S/G A * ABS113 for S/G B * ABS112 for S/G C * ABS111 for S/G D	a. Go to Step 5.
	b. Go to OFN BB-07A, STEAM GENERATOR TUBE LEAKAGE, Step 1	
5.	**Check For CCW System Leakage:**	
	a. Check CCW monitors - EITHER YELLOW * EGL096 for CCW train A * EGL106 for CCW train B	a. Go to Step 6.
	b. Go to OFN BB-007,RCS LEAKAGE HIGH, Step 1	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	**Check For High Radiation On Normal Release Path:** o Controlled liquid or gaseous release - IN PROGRESS <u>AND</u> o Release path monitor on controlled release path - YELLOW OR HAS BEEN YELLOW	Perform the following: a. Notify Chemistry of affected process radiation monitor. b. Go to OFN SP-010, ACCIDENTAL RADIOACTIVE RELEASE, Step 1.
7.	**Check Affected Process Radiation Monitor Reading - WITHIN LIMITS OF RELEASE PERMIT**	Perform the following: a. Direct Chemistry to perform evaluation of release. b. Go to OFN SP-010, ACCIDENTAL RADIOACTIVE RELEASE, Step 1.
8.	**Check Building Gaseous Effluent Monitors - NONE IN ACCIDENT ISOLATION:** a. Radwaste Building o GHP101 - NOT GRAY o GHI102 - NOT GRAY o At GH RE-10, Accident Isolation red light - NOT LIT b. Unit Vent * GTP211 - NOT GRAY * GTI212 - NOT GRAY * At GT RE-21, Accident Isolation red light - NOT LIT	<u>IF</u> either monitor in accident isolation, <u>THEN</u> perform the following: 1. Notify Chemistry of affected monitor in accident isolation. 2. <u>IF</u> associated rate monitor in alarm or alert, <u>THEN</u> perform the following: * <u>WHEN</u> completed with release, <u>THEN</u> locally reset monitor. <u>OR</u> * Reduce release rate below alarm setpoint and locally reset monitor. 3. <u>IF</u> associated rate monitor <u>NOT</u> in alarm or alert, <u>THEN</u> locally reset monitor.
9.	**Return To Procedure And Step In Effect**	

-END-

WOLF CREEK
NUCLEAR OPERATING CORPORATION

EMG FR-C1

RESPONSE TO INADEQUATE CORE COOLING

Responsible Manager

Manager Operations

Revision Number	12
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21A

DC12 05/01/2001

1.0 PURPOSE

1.1 This procedure provides actions to restore core cooling.

1.2 Major Action Categories

- o Establish safety injection flow to the RCS
- o Rapidly depressurize S/Gs to depressurize the RCS
- o Start RCPs and open all RCS vent paths to containment

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 This procedure is entered from the following procedure on any red path condition:

- o EMG F-0, CRITICAL SAFETY FUNCTION STATUS TREES (CSFST), FIGURE 2, CSF F-02 CORE COOLING

2.2 This procedure is entered from the following procedure if stopping RCPs and depressurizing S/Gs results in a red path condition for core cooling:

- o EMG FR-C2, RESPONSE TO DEGRADED CORE COOLING, Step 18

3.0 REFERENCES AND COMMITMENTS

3.1 References

a. Technical Specifications for Wolf Creek Generating Station

b. Updated Safety Analysis Report for Wolf Creek

c. As-built plant drawings

d. Generic Technical Guidelines developed by the Westinghouse Owners Group (WOG). This consists of the following documents:

1) High pressure version of the WOG Optimal Recovery Guidelines, Status Trees, and Functional Restoration Guidelines

2) Background documents for each high pressure version Optimal Recovery Guideline, Status Tree, and Functional Restoration Guideline

3) WOG Emergency Response Guideline Executive Volume

4) WOG Emergency Response Guideline Maintenance Program Summary

e. CCP 4590, PDP REPLACEMENT

f. USAR Table 10.4-13B (Sheet 2), AFW supply switchover criteria, (Foldout page)

3.2 Commitments

a. None

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

If CCW is not aligned to the RHR heat exchangers, RHR pumps shall not be run on recirculation longer than 2.5 hours.

NOTE

Foldout page shall be monitored throughout this procedure.

	1. Verify SI Valves - PROPERLY ALIGNED: a. Check ESFAS status panel SIS section - ALL WHITE LIGHTS LIT FOR CURRENT ECCS LINEUP * Injection OR * Cold leg recirculation OR * Hot leg recirculation	IF any SIS section component NOT properly aligned, THEN manually align associated component to establish proper SIS lineup.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	2. Verify ECCS Flow In All Trains: a. Check Centrifugal Charging Pumps To Boron Injection Tank Flow meters - FLOW INDICATED o EM FI-917A o EM FI-917B b. Check SI Pump Discharge Flow meters - FLOW INDICATED o EM FI-918 o EM FI-922 c. Check RHR To Accumulator Injection Loop Flow meters - FLOW INDICATED o EJ FI-618 o EJ FI-619	Perform the following: 1. Start pumps and align valves as necessary to establish normal ECCS injection. 2. Ensure CCP Discharge To Charging Header isolation valves - AT LEAST ONE OPEN * BG-8483A for CCP A * BG-8483C for CCP B 3. <u>IF</u> normal ECCS injection can <u>NOT</u> be established, <u>THEN</u> try to establish alternate high head injection using ATTACHMENT A. 4. <u>IF</u> ECCS flow to cold legs can <u>NOT</u> be established, <u>THEN</u> establish ECCS flow to hot legs as directed by Shift Manager or Control Room Supervisor.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	**Check RCP Support Conditions - AVAILABLE:** a. Ensure power to RCP(s)-AVAILABLE * PA01 for RCPs A and B * PA02 for RCPs C and D b. Ensure annunciator 00-052A, CCW TO RCP FLOW LO - CLEAR c. Ensure RCP thermal barrier CCW flow annunciator - CLEAR * 00-070C for RCP A * 00-071C for RCP B * 00-072C for RCP C * 00-073C for RCP D d. Ensure number 1 seal ΔP - GREATER THAN 200 PSID * BB PI-153A for RCP A * BB PI-152A for RCP B * BB PI-151A for RCP C * BB PI-150A for RCP D e. Ensure number 1 seal leakoff flow - GREATER THAN 0.2 GPM * BG FR-157 for RCP A * BG FR-156 for RCP B * BG FR-155 for RCP C * BG FR-154 for RCP D f. Ensure seal injection flow - BETWEEN 8 GPM AND 13 GPM * BG FR-157 for RCP A * BG FR-156 for RCP B * BG FR-155 for RCP C * BG FR-154 for RCP D g. Ensure VCT pressure - GREATER THAN 15 PSIG o BG PI-115	Try to establish support conditions.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**Check SI Accumulator Isolation Valve Status:**	
	a. Locally close breakers for SI accumulator outlet valve(s) o NG01BGF3 for EP HV-8808A o NG02BGF3 for EP HV-8808B o NG01BGF2 for EP HV-8808C o NG02BHF2 for EP HV-8808D	
	b. Check Accumulator Tank Outlet Isolation Valves - OPEN o EP HV-8808A o EP HV-8808B o EP HV-8808C o EP HV-8808D	b. IF accumulator NOT discharged, THEN open SI accumulator outlet valve(s).
5.	**Check Core Exit TCs - LESS THAN 1200°F**	Go to Step 8.
6.	**Check RVLIS Natural Circulation Range Indication:**	
	a. Check RCPs - NONE RUNNING	a. Return to procedure and step in effect.
	b. Check RVLIS natural circulation range indication - AVAILABLE	b. Go to Step 7.
	c. Check RVLIS natural circulation range - GREATER THAN 45%	c. Perform the following: 1) IF RVLIS indication increasing, THEN OBSERVE CAUTION AND NOTE PRIOR TO STEP 1 and return to Step 1. 2) IF RVLIS indication NOT increasing, THEN go to Step 7.
	d. Return to procedure and step in effect	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	**Check Core Exit TCs:**	
	a. Core exit temperature - LESS THAN 712°F	a. Perform the following: 1) IF core exit temperature decreasing, THEN OBSERVE CAUTION AND NOTE PRIOR TO STEP 1 and return to Step 1. 2) IF core exit temperature NOT decreasing, THEN go to Step 8.
	b. Return to procedure and step in effect	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	**Check Hydrogen Analyzers - IN SERVICE**	Place hydrogen analyzers in service: a. On RL011, place power lockout switches for containment sample valves in NON-ISO position. o GS HIS-40 o GS HIS-41 o GS HIS-42 o GS HIS-43 b. On RL011, open one Hydrogen Analyzer Supply Inner Containment Isolation Valve per train. o GS HIS-13 OR GS HIS-14 for red train o GS HIS-4 OR GS HIS-5 for yellow train c. On RL011, open remaining hydrogen analyzer containment isolation valves. o GS HIS-12 o GS HIS-17 o GS HIS-18 o GS HIS-3 o GS HIS-8 o GS HIS-9 d. On RL020, place containment hydrogen analyzer control switches in ANALYZE position. o GS HIS-16A o GS HIS-11A e. On RL020, monitor containment hydrogen concentration. o GS AI-19 o GS AI-10

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

This procedure shall be continued while obtaining containment hydrogen sample.

9.	**Check Containment Hydrogen Concentration:**	
	a. Hydrogen analyzers - IN OPERATION	a. OBSERVE CAUTION PRIOR TO STEP 10 and go to Step 10.
	b. Hydrogen concentration - LESS THAN 3% o GS AI-10 o GS AI-19	b. Perform the following: 1) Notify plant engineering staff of hydrogen concentration inside containment. 2) Periodically obtain a hydrogen concentration measurement. 3) OBSERVE CAUTION PRIOR TO STEP 10 and go to Step 10.
	c. Hydrogen concentration - LESS THAN 0.8% o GS AI-10 o GS AI-19	c. Turn on hydrogen recombiners using SYS GS-120, POST LOCA CONTAINMENT HYDROGEN RECOMBINER OPERATION.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

If an intact S/G is available, DO NOT USE A FAULTED OR RUPTURED S/G in subsequent steps.

10.	**Check Intact S/G Levels:**	
	a. Check narrow range level in at least one S/G - GREATER THAN 6% [29%]	a. Perform the following: 1) Maintain total feed flow greater than 270,000 lbm/hr until narrow range level greater than 6% [29%] in at least one S/G. 2) IF total feed flow greater than 270,000 lbm/hr can NOT be established, THEN perform the following: a) Continue attempts to establish a heat sink in at least one S/G. b) OBSERVE NOTE PRIOR TO STEP 22 and go to Step 22.
	b. Control feed flow to maintain narrow range level in all S/Gs between 6% [29%] and 50%	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	**Check RCS Vent Paths:**	
	a. Power to PZR PORV block valves - AVAILABLE o BB HIS-8000A o BB HIS-8000B	a. Restore power to block valves: o NG01BBR3 for BB HV-8000A o NG02BDF1 for BB HV-8000B
	b. PZR PORVs - CLOSED o BB HIS-455A o BB HIS-456A	b. IF PZR pressure less than 2335 psig, THEN manually close PORV. IF any PORV can NOT be closed, THEN manually close its block valve.
	c. RCS pressure - LESS THAN 2185 PSIG	c. IF PZR PORV is closed, THEN ensure associated block valve is open. * BB HIS-8000A for BB HIS-455A * BB HIS-8000B for BB HIS-456A
	d. Reactor vessel head vents - AT LEAST ONE VALVE CLOSED IN EACH TRAIN o BB HIS-8001A OR BB HIS-8002A for red train o BB HIS-8001B OR BB HIS-8002B for yellow train	d. Manually close valves.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.	**Check If Condenser Air Removal Should Be Returned To Normal:**	
	a. Check the following: o Main steamline isolation valves - AT LEAST ONE OPEN o Condensate pumps - AT LEAST ONE RUNNING o Circulating water pumps - AT LEAST ONE RUNNING o Condenser vacuum - ESTABLISHED	a. OBSERVE NOTE PRIOR TO STEP 13 and go to Step 13.
	b. Open Condenser Air Removal Fan Discharge Dampers o GE HIS-103 o GE HIS-104	b. OBSERVE NOTE PRIOR TO STEP 13 and go to Step 13.
	c. Start desired number of Condenser Vacuum Pumps * CG HIS-1 * CG HIS-2 * CG HIS-3	c. OBSERVE NOTE PRIOR TO STEP 13 and go to Step 13.
	d. Open Condenser Air Removal Filtration System Supply Dampers o GE HIS-101 o GE HIS-102	d. OBSERVE NOTE PRIOR TO STEP 13 and go to Step 13.
	e. Start one Condenser Air Removal Fan * GE HIS-82 * GE HIS-83	e. OBSERVE NOTE PRIOR TO STEP 13 and go to Step 13.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

If high steam pressure rate setpoint (100 psi/50 sec) is exceeded after low steamline pressure SI signal is blocked, main steamline isolation will occur.

13.	**Check If Low Steamline Pressure SI Should Be Blocked:**	
	a. Check RCS pressure - LESS THAN 1970 PSIG o P-11 light - LIT	a. WHEN RCS pressure is less than 1970 psig, THEN block low steamline pressure SI. OBSERVE NOTE PRIOR TO STEP 14 and continue with Step 14.
	b. Block low steamline pressure SI o SB HS-9 o SB HS-10	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Partial uncovery of S/G tubes is acceptable in the following steps.

14.	**Depressurize All Intact S/Gs To 160 PSIG:**	
	a. Dump steam to condenser at maximum rate	a. Dump steam at maximum rate using S/G ARVs.
	b. Check S/G pressures - LESS THAN 160 PSIG	b. Perform the following: 1) IF S/G pressure decreasing, THEN OBSERVE CAUTION PRIOR TO STEP 10 and return to Step 10. 2) IF S/G pressure stable or increasing, THEN OBSERVE NOTE PRIOR TO STEP 22 and go to Step 22.
	c. Check RCS hot leg temperatures - AT LEAST TWO LESS THAN 375°F	c. Perform the following: 1) IF RCS hot leg temperatures decreasing, THEN OBSERVE CAUTION PRIOR TO STEP 10 and return to Step 10. 2) IF RCS hot leg temperatures stable or increasing, THEN OBSERVE NOTE PRIOR TO STEP 22 and go to Step 22.
	d. Stop S/G depressurization	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

If offsite power is lost after SI reset, manual action may be required to restore safeguards equipment to the required configuration.

15. Reset SI

o SB HS-42A
o SB HS-43A

16. Check If SI Accumulators Should Be Isolated:

a. Check at least two RCS hot leg temperatures - LESS THAN 375°F

b. Close Accumulator Tank Outlet Isolation Valves

o EP HIS-8808A
o EP HIS-8808B
o EP HIS-8808C
o EP HIS-8808D

c. Locally open breakers for SI accumulator outlet valves

o NG01BGF3 for EP HV-8808A
o NG02BGF3 for EP HV-8808B
o NG01BGF2 for EP HV-8808C

a. OBSERVE NOTE PRIOR TO STEP 22 and go to Step 22.

b. IF any accumulator can NOT be isolated, THEN perform the following:

1) Open associated accumulator vent valve(s).

* EP HIS-8950A for accumulator A
* EP HIS-8950B or EP HIS-8950C for accumulator B
* EP HIS-8950D or EP HIS-8950E for accumulator C
* EP HIS-8950F for accumulator D

2) DO NOT DEPRESSURIZE RCS BELOW UNISOLATED ACCUMULATOR PRESSURE during subsequent recovery actions.

o NG02BHF2 for EP HV-8808D

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17.	**Stop All RCPs** o BB HIS-37 for RCP A o BB HIS-38 for RCP B o BB HIS-39 for RCP C o BB HIS-40 for RCP D	
18.	**Depressurize All Intact S/Gs To Atmospheric Pressure:**	
	a. Dump steam to condenser at maximum rate	a. Dump steam at maximum rate using S/G ARVs.
19.	**Verify ECCS Flow:**	Perform the following:
	* Check Centrifugal Charging Pumps To Boron Injection Tank Flow meters - FLOW INDICATED o EM FI-917A o EM FI-917B <u>OR</u> * Check SI Pump Discharge Flow meters - FLOW INDICATED o EM FI-918 o EM FI-922 <u>OR</u> * Check RHR To Accumulator Injection Loop Flow meters - FLOW INDICATED o EJ FI-618 o EJ FI-619	a. Start pumps and align valves as necessary to establish normal ECCS injection. b. Ensure CCP Discharge To Charging Header isolation valves - AT LEAST ONE OPEN * BG-8483A for CCP A * BG-8483C for CCP B c. <u>IF</u> normal ECCS injection can <u>NOT</u> be established, <u>THEN</u> try to establish alternate high head injection using ATTACHMENT A. d. <u>IF</u> ECCS flow to cold legs can <u>NOT</u> be established, <u>THEN</u> establish ECCS flow to hot legs as directed by Shift Manager or Control Room Supervisor. e. <u>IF</u> core exit TCs less than 1200°F, <u>THEN</u> return to Step 18. f. <u>IF</u> core exit TCs greater than or equal to 1200°F, <u>THEN</u> OBSERVE NOTE PRIOR TO STEP 22 and go to Step 22.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20.	**Check Core Cooling:**	
	a. Check core exit TCs - LESS THAN 1200°F	a. OBSERVE NOTE PRIOR TO STEP 22 and go to Step 22.
	b. Check RCS hot leg temperatures - AT LEAST TWO LESS THAN 350°F	b. Return to Step 18.
	c. Check RVLIS natural circulation range indication - AVAILABLE	c. Go to Step 21.
	d. Check RVLIS natural circulation range indication - GREATER THAN 69%	d. Return to Step 18.
21.	**Go To EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 15.**	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Normal conditions are desired but not required for starting RCPs.

22.	**Check If RCPs Should Be Started**	
	a. Core exit TCs - GREATER THAN 1200°F	a. Go to Step 23.
	b. Check if an idle RCS cooling loop is available: o Narrow range SG level - GREATER THAN 6% [29%] o RCP in associated loop - AVAILABLE AND NOT OPERATING	b. Perform the following: 1) Open all PRZR PORVs AND Block valves. 2) IF core exit TCs remain greater than 1200°F, THEN open reactor vessel head vent valves. o BB HIS-8001A o BB HIS-8001B o BB HIS-8002A o BB HIS-8002B 3) Go to Step 23.
	c. Start RCP oil lift pumps.	
	d. Start RCP in one idle RCS cooling loop.	
	e. Return to Step 22a.	
23.	**Try To Depressurize All Intact S/Gs To Atmospheric Pressure:** * Use condenser steam dumps OR * Use S/G ARV OR * Operate turbine driven AFW pump at maximum load	Use faulted or ruptured S/Gs.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

If offsite power is lost after SI reset, manual action may be required to restore safeguards equipment to the required configuration.

24.	**Reset SI** o SB HS-42A o SB HS-43A	
25.	**Check Core Exit TCs - LESS THAN 1200°F**	Perform the following: a. IF core exit temperatures are stable or decreasing, THEN OBSERVE NOTE PRIOR TO STEP 22 and return to Step 22. b. IF core exit temperatures are increasing, THEN go to SACRG-1, SEVERE ACCIDENT CONTROL ROOM GUIDELINE INITIAL RESPONSE Step 1.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26.	**Check If SI Accumulators Should Be Isolated:**	
	a. Check RHR To Accumulator Injection Loop Flow meters - AT LEAST INTERMITTENT FLOW INDICATED o EJ FI-618 o EJ FI-619	a. OBSERVE NOTE PRIOR TO STEP 22 and return to Step 22.
	b. Close Accumulator Tank Outlet Isolation Valves o EP HIS-8808A o EP HIS-8808B o EP HIS-8808C o EP HIS-8808D	b. IF any accumulator can NOT be isolated, THEN perform the following: 1) Open associated accumulator vent valve(s). * EP HV-8950A for accumulator A * EP HIS-8950B or EP HIS-8950C for accumulator B * EP HIS-8950D or EP HIS-8950E for accumulator C * EP HIS-8950F for accumulator D 2) DO NOT DEPRESSURIZE RCS BELOW UNISOLATED ACCUMULATOR PRESSURE during subsequent recovery actions.
	c. Locally open breakers for SI accumulator outlet valves o NG01BGF3 for EP HV-8808A o NG02BGF3 for EP HV-8808B o NG01BGF2 for EP HV-8808C o NG02BHF2 for EP HV-8808D	
27.	**Check If RCPs Should Be Stopped:**	
	a. Check at least two RCS hot leg temperatures - LESS THAN 350°F	a. Go to Step 28.
	b. Stop all RCPs	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28.	**Verify ECCS Flow:**	Perform the following:
	* Check Centrifugal Charging Pumps To Boron Injection Tank Flow meters - FLOW INDICATED o EM FI-917A o EM FI-917B OR * Check SI Pump Discharge Flow meters - FLOW INDICATED o EM FI-918 o EM FI-922 OR * Check RHR To Accumulator Injection Loop Flow meters - FLOW INDICATED o EJ FI-618 o EJ FI-619	a. Start pumps and align valves as necessary to establish normal ECCS injection. b. Ensure CCP Discharge To Charging Header isolation valves - AT LEAST ONE OPEN * BG-8483A for CCP A * BG-8483C for CCP B c. IF normal ECCS injection can NOT be established, THEN try to establish alternate high head injection using ATTACHMENT A. d. IF ECCS flow to cold legs can NOT be established, THEN establish ECCS flow to hot legs as directed by Shift Manager or Control Room Supervisor. e. OBSERVE NOTE PRIOR TO STEP 22 and return to Step 22.
29.	**Check Core Cooling:**	
	a. Check RCPs - NONE RUNNING	a. OBSERVE NOTE PRIOR TO STEP 22 and return to Step 22.
	b. Check RCS hot leg temperatures - AT LEAST TWO LESS THAN 350°F	b. OBSERVE NOTE PRIOR TO STEP 22 and return to Step 22.
	c. Check RVLIS natural circulation range indication - AVAILABLE	c. Go to Step 30.
	d. RVLIS natural circulation range indication - GREATER THAN 69%	d. OBSERVE NOTE PRIOR TO STEP 22 and return to Step 22.
30.	**Go To EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 15.**	

-END-

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 1 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A1. Verify Charging Pump Suction:

* Charging Pump Suction From RWST valves - AT LEAST ONE OPEN

  * BN HIS-112D
  * BN HIS-112E

  OR

* VCT Outlet Valves - BOTH OPEN

  o BG HIS-112B
  o BG HIS-112C

Perform the following:

a. Manually or locally align valves as necessary to establish charging pump suction.

b. IF charging pump suction can NOT be established, THEN return to procedure and step in effect.

A2. Check CCPs - ANY RUNNING

Perform the following:

a. Manually start CCPs.

   o BG HIS-1A for CCP A
   o BG HIS-2A for CCP B

b. IF neither CCP can be started, THEN start NCP on recirc:

   1) Start NCP.

      o BG HIS-3

c. IF no charging pump can be started, THEN return to procedure and step in effect.

CAUTION

If offsite power is lost after SI reset, manual action may be required to restore safeguards equipment to the required configuration.

A3. Reset SI

o SB HS-42A

o SB HS-43A

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 2 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A4. Reset Containment Isolation Phase A And Phase B

- o SB HS-56 for phase A
- o SB HS-53 for phase A
- o SB HS-55 for phase B
- o SB HS-52 for phase B

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 3 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A5.	**Establish Instrument Air To Containment:**	
	a. Ensure ESW To Air Compressor Valves - OPEN o EF HIS-43 o EF HIS-44	a. Locally open valve(s). <u>WHEN</u> valves are open, <u>THEN</u> do Steps A5.b, A5.c, A5.d and A5.e. Continue with Step A6.
	b. Reset and close Air Compressor Breaker Reset switches o KA HIS-2C o KA HIS-3C	
	c. Check Instrument Air Pressure - GREATER THAN 105 PSIG o KA PI-40	c. Dispatch operator to perform the following: 1) Reset alarms. 2) Restart compressors.
	d. Check PZR pressure master controller - LESS THAN 50% OUTPUT SIGNAL o BB PK-455A	d. Perform the following: 1) Place PZR pressure master controller in manual. 2) Set PZR pressure master controller to less than 50% output signal. 3) <u>WHEN</u> instrument air has been established to containment, <u>THEN</u> place PZR pressure master controller in automatic.
	e. Open Instrument Air Supply Containment Isolation Valve o KA HIS-29	e. Locally open valve.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 4 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A6.	**Establish Normal Charging Header Flow Path:** a. Open Charging Header Back Pressure Control valve o BG HC-182 b. Open Charging Pumps To Regenerative Heat Exchanger Containment Isolation valves o BG HIS-8105 o BG HIS-8106 c. Align Regenerative Heat Exchanger To Loop Cold Leg valves to establish only one open * BG HIS-8146 for loop 1 * BG HIS-8147 for loop 4	IF flow path through normal charging header can NOT be established, THEN go to Step A11.
A7.	**Check CCPs - ANY RUNNING**	Perform the following: a. Open NCP Discharge Flow Control Valve. o BG FK-462 b. Go to Step A9.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 5 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A8.	**Align CCPs To Normal Charging Header:** a. Ensure CCP Discharge To Charging Header isolation valve for running CCP(s) - OPEN * BG-8483A for CCP A * BG-8483C for CCP B b. Reset CCP Recirc Valves o BG HS-8110 o BG HS-8111 c. Open CCP Recirc Valves o BG HIS-8110 o BG HIS-8111 d. Open CCP Discharge Flow Control valve o BG FK-121	Perform the following: 1. Manually or locally align valves as necessary to establish CCP flow through normal charging header. 2. IF flow from CCPs can NOT be established, THEN establish NCP flow: a) Start NCP. o BG HIS-3 b) IF NCP is running, THEN stop all CCPs. o BG HIS-1A o BG HIS-2A
A9.	**Check Charging Header Flow Meter - FLOW INDICATED** o BG FI-121A	Go to Step A11.
A10.	**Return To Procedure And Step In Effect**	
A11.	**Open BIT Inlet Valves** o EM HIS-8803A o EM HIS-8803B	Perform the following: a. Locally open the BIT inlet valves. o EM HV-8803A o EM HV-8803B b. IF a flow path to the BIT can NOT be established, THEN return to procedure and step in effect.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 6 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A12.	**Open BIT Outlet Valves** o EM HIS-8801A o EM HIS-8801B	Perform the following: a. Locally open the BIT outlet valves. o EM HV-8801A o EM HV-8801B b. IF a flow path from the BIT can NOT be established, THEN return to procedure and step in effect.
A13.	**Check If CCP Flow Through BIT Has Been Established:**	
	a. Check CCPs - ANY RUNNING	a. Go to Step A15.
	b. Check Centrifugal Charging Pumps To Boron Injection Tank Flow Meters - FLOW INDICATED * EM FI-917A * EM FI-917B	b. Perform the following: 1) Close normal charging header isolation valves. o BG HC-182 o BG HIS-8105 o BG HIS-8106 2) IF CCP flow through BIT can NOT be established, THEN go to Step A15.
A14.	**Return To Procedure And Step In Effect**	

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 7 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A15.	**Check NCP - RUNNING**	Start NCP on recirc: a. Start NCP. o BG HIS-3 b. IF NCP is running, THEN ensure all CCPs are stopped. o BG HIS-1A o BG HIS-2A c. IF NCP can NOT be started, THEN return to procedure and step in effect.
A16.	**Establish NCP Flow Path To BIT:**	
	a. Ensure one train of valves from charging header to BIT - OPEN * BG-8483A and EM HIS-8803A for red train * BG-8483C and EM HIS-8803B for yellow train	a. Manually or locally open valves. IF a flow path to the BIT can NOT be established, THEN return to procedure and step in effect.
	b. Open NCP Discharge Flow Control Valve. o BG FK-462	
	c. Open CCP Discharge Flow Control Valve o BG FK-121	c. Return to procedure and step in effect.

FOLDOUT PAGE FOR EMG FR-C1

1. **COLD LEG RECIRCULATION CRITERIA**
   IF RWST level decreases to less than 36%, THEN go to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

2. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST suction pressure decreases to less than 6.9 psig, THEN switch to alternate AFW suction supply.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 8 of 8)
ESTABLISHING ALTERNATE HIGH HEAD INJECTION

A17.	**Check Centrifugal Charging Pumps To Boron Injection Tank Flow Meters - FLOW INDICATED** * EM FI-917A * EM FI-917B	Perform the following: a. Close normal charging header isolation valves. o BG HC-182 o BG HIS-8105 o BG HIS-8106 b. Locally ensure CCP A/B Discharge Header FCV-121 Outlet Isolation - OPEN o BG-8483B c. Locally ensure NCP Discharge Isolation - OPEN o BG-8388
A18.	**Return To Procedure And Step In Effect**	

-END-

EPF 06-007-01 Rev 4 MESSAGE NO.:

WOLF CREEK GENERATING STATION EMERGENCY NOTIFICATION

1. STATUS: ☐ ACTUAL ☐ DRILL

2. CODE WORD (County/State only): _____

3. NOTIFICATION TYPE:

☐ IMMEDIATE (Steps 1-8, & 13) ☐ FOLLOWUP (ALL)

4. EMERGENCY CLASSIFICATION:

TIME: _____ DATE: ___/___/___

☐ UNUSUAL EVENT ☐ ALERT ☐ SITE AREA

☐ GENERAL ☐ RECOVERY ☐ TERMINATION

5. REASON FOR CLASSIFICATION: (EAL)

☐ 1-RER ☐ 2-SGTF ☐ 3-LRCB ☐ 4-MSLB

☐ 5-FEF ☐ 6-LEP/AC ☐ 7-FHA ☐ 8-SSFM

☐ 9-LPC/SC ☐ 10-FR ☐ 11-NP ☐ 12-OH

☐ 13-ADM

EAL Step Numbers _____

6. METEOROLOGICAL DATA:

WIND: AT:___ MPH, FROM:_____ TOWARDS:_____ Degrees

STABILITY CLASS:___ PRECIPITATION: ☐ YES ☐ NO

7. RADIOLOGICAL RELEASE STATUS:

☐ NONE ☐ PLANNED ☐ MONITORED

☐ TERMINATED ☐ UNPLANNED ☐ UNMONITORED

(If NONE, do not complete steps 10, 11, & 12)

8. PROTECTIVE ACTION RECOMMENDATION: ☐ N/A

EVACUATE ____CCL & JRR

0 - 2 MILES

EVACUATE ____CTR_____SHELTER

2 - 5 MILES

EVACUATE ____N-1_____SHELTER

EVACUATE ____NE-1_____SHELTER

EVACUATE ____E-1_____SHELTER

EVACUATE ____SE-1_____SHELTER

EVACUATE ____S-1_____SHELTER

EVACUATE ____SW-1_____SHELTER

EVACUATE ____W-1_____SHELTER

EVACUATE ____NW-1_____SHELTER

5 -10 MILES

EVACUATE _____N-2_____SHELTER

EVACUATE _____NE-2_____SHELTER

EVACUATE _____NE-3_____SHELTER

EVACUATE _____E-2_____SHELTER

EVACUATE _____SE-2_____SHELTER

EVACUATE _____SE-3_____SHELTER

EVACUATE _____SE-4_____SHELTER

EVACUATE _____S-2_____SHELTER

EVACUATE _____SW-2_____SHELTER

EVACUATE _____W-2_____SHELTER

EVACUATE _____NW-2_____SHELTER

9. CURRENT PLANT CONDITION: ☐ IMPROVING ☐ STABILIZED ☐ DEGRADING

TIME REACTOR TRIPPED _____

10. FIELD TEAM DATA: Not Available; Time Collected: _____ At _____ Miles From CTMT =

_____ mR/hr GAMMA, _____ (uCi/cc) IODINE, _____ (uCi/cc) PART.

11. RELEASE RATE: Release Start Time: _____ Estimated Total Release Time In Hours: _____

At (Time) _____ Release Rate = _____ Ci/Sec NOBLE GAS and _____ Ci/Sec RADIOIODINE

12. CENTERLINE DOSES (Based on):

☐ RAD MONITORING SYSTEM ☐ USAR SOURCE TERM ESTIMATE ☐ FIELD TEAM MONITORING DATA

	INTEGRATED DOSES PROJECTED (TIME): RELEASE START RELEASE STOPPED	
	TEDE (REM)	THYROID (REM)
EAB		
2 MI		
5 MI		
10 MI		

COMMENTS: [Commitment Step 3.2.1] _____

13. NOTIFICATION APPROVAL: _____ / _____ / _____

Signature Title Time

(FOR WCNOC USE ONLY)	PRIMARY CONTACT	ALTERNATE CONTACTS	PERSON/TIME

COFFEY COUNTY SHERIFF	620-364-2123	STATION RADIO	KHP 785-827-4437	
KANSAS DIVISION OF EMERGENCY MANAGEMENT	785-296-3176 LEAVE MESSAGE	STATE RADIO	STATE EOC ACTIVATED 785-274-1422	
NRC RESIDENT INSPECTOR	OFFICE EXT. 4574	FRANK BRUSH Cell: 620-343-0577 Home: 620-364-3631 NRC PAGER 816-466-5209		
TOPEKA SYSTEM DISPATCH	785-575-6078			
ANI (ALERT OR HIGHER)	860-561-3433; OFF HOURS LEAVE MESSAGE			
INPO (ALERT OR HIGHER)	800-321-0614			

WOLF CREEK
NUCLEAR OPERATING CORPORATION

OFN BG-009

EMERGENCY BORATION

Responsible Manager

Manager Operations

Revision Number	8	
Use Category		Continuous
Administrative Controls Procedure	No	
Infrequently Performed Procedure	No	
Program Number	21A	

DC12 02/21/2001

1.0 PURPOSE

1.1 To describe the operations necessary to inject boric acid into the RCS whenever conditions exist that require the rapid insertion of negative reactivity without the use of control rods.

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 The following symptoms/entry conditions that require emergency boration:

a. Excessive control rod bank insertion as indicated by:

- o Annunciator 00-081C, ROD BANK LOLO LIMIT, is lit
- o Bank step counters
- o Rod position indicators
- o Core Operating Limits Report, Technical Specification 3.1.6

b. Failure of two or more control rods to fully insert following a reactor trip or shutdown.

c. Uncontrolled cooldown of the reactor coolant following a reactor trip or shutdown as indicated by two out of four loop Tavg less than 530°F.

d. Unexplained or uncontrolled reactivity increase as indicated by:

- * Abnormal control bank insertion
- * Increasing temperature or nuclear power
- * Increasing neutron flux or count rate on source range while shutdown

e. Shutdown margin less than required as indicated by the following:

- * Shutdown margin less than 1.3% Δk/k in Mode 2 with Keff less than 1.0 and Modes 3, 4, or 5. Technical Specification 3.1.1
- * Keff greater than 0.95 K eff or boron concentration of all filled portions of the RCS and refueling canal less than 2300 ppm in Mode 6. Technical Specification 3.9.1

3.0 REFERENCES AND COMMITMENTS

3.1 References

a. OFN BG-009 Supplemental Information

b. ITIP 01969, Reactivity Management Expectations During Plant Shutdown

c. PMR 4590, PDP REPLACEMENT

3.2 Commitments

a. SOER 94-02, Recommendation 4a, Monitoring of RCS boron concentration and verification of adequate shutdown margin [Step 1.1]

b. RCMS 1985-113 and SLNRC 84-0070, Flushing the BIT After Emergency Boration [Step 14]

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	1. Check Charging System Aligned As The Operable Boron Injection Flowpath.	Go to Attachment B, EMERGENCY BORATION USING SI AS BORATION FLOWPATH.
	2. Align Charging Pumps For Emergency Boration:	
	a. Ensure one Charging Pump is running * CCP A * CCP B * NCP	
	b. **(❒)** Align Boration Flow Path: 1) Ensure boric acid transfer pumps - AT LEAST ONE RUNNING 2) Open Emergency Borate To Charging Pump Suction Valve o BG HIS-8104	b. **(❒)** Align RWST to CCP Suction: a) Ensure Charging Pump Suction From RWST Valves - AT LEAST ONE OPEN o BN HIS-112D o BN HIS-112E b) Ensure VCT Outlet Valves - AT LEAST ONE CLOSED: o BG HIS-112B o BG HIS-112C

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	3. Verify Charging Flow Path: a. Ensure Charging Pump to Regenerative Heat Exchanger Isolation valves - OPEN o BG HIS-8105 o BG HIS-8106 b. Ensure one Regenerative Heat Exchanger To RCS Loop Cold Leg Valve - OPEN * BG HIS-8146 for Loop 1 OR * BG HIS-8147 for Loop 4 c. Adjust Charging Pump Flow to maintain pressurizer level * BG FK-121 for CCP OR * BG FK-462 for NCP d. Adjust Charging Header Backpress Control Valve as necessary to establish 8 gpm to 13 gpm seal injection flow o BG HC-182	Establish charging flow through BIT: 1. Open BIT Outlet Valves. o EM HIS-8801A o EM HIS-8801B 2. Open BIT Inlet Isolation Valves. o EM HIS-8803A o EM HIS-8803B 3. IF NCP is running, THEN open Centrifugal Charging Pump Discharge Flow Control Valve. o BG FK-121 4. Check Centrifugal Charging Pumps to Boron Injection Flow meters - FLOW INDICATED o EM FI-917A for red train o EM FI-917B for yellow train

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	4. Verify Emergency Borate Flow - GREATER THAN 30 GPM o BG FI-183A	Perform the following: a. (❒) Align RWST to CCP suction: 1) Ensure Charging Pump Suction From RWST Valves - AT LEAST ONE OPEN o BN HIS-112D o BN HIS-112E 2) Ensure VCT Outlet Valves - AT LEAST ONE CLOSED: o BG HIS-112B o BG HIS-112C b. Check RWST flow through charging system - GREATER THAN 90 GPM * BG FI-121A OR * EM FI-917A OR * EM FI-917B c. IF RWST flow through charging system less than 90 gpm, THEN establish alternate boration flowpath using ATTACHMENT A, ESTABLISHING ALTERNATE BORATION FLOW PATH.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 1 of 4)
ESTABLISHING ALTERNATE BORATION FLOWPATH

A1.	**Align Makeup System For Manual Boration:**	
	a. Place Reactor Coolant Makeup Control Selector Switch in OFF position o BG HS-25	
	b. Manually start at least one boric acid pump * BG HIS-5A * BG HIS-6A	b. IF neither pump can be started, THEN perform the following: 1) Continue attempts to establish boration flow from RWST. 2) Return to procedure, Step 2.
A2.	**Open Boric Acid Blending Tee Inlet Isolation Valve** o BG HIS-110A	Fail open valve: a. Locally isolate instrument air to valve. b. Locally vent air pressure from valve. c. IF valve can NOT be opened, THEN go to step A8.
A3.	**Close Reactor Makeup Water To Boric Acid Blending Tee Isolation** o BG HIS-111A	Perform the following: a. Stop both reactor makeup water transfer pumps o BL HIS-3 o BL HIS-4 b. IF reactor makeup water transfer pump can NOT be stopped, THEN go to Step A8.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 2 of 4)
ESTABLISHING ALTERNATE BORATION FLOWPATH

A4.	**Check VCT Outlet Isolation Valves - BOTH OPEN** o BG HIS-112B o BG HIS-112C	Perform the following: a. Manually open valves. b. IF both valves can NOT be opened, THEN go to Step A7.
A5.	**(❒) Open Makeup To VCT Outlet Isolation Valve** o BG HIS-110B	**(❒)** Open Makeup To VCT Inlet Isolation Valve o BG HIS-111B
A6.	**Verify Boration Flow:**	
	a. Check normal boration flow - GREATER THAN 30 GPM o BG FR-110 red pen o BG FR-110 green pen	a. Go to Step A7.
	b. Return to procedure, Step 2.	
A7.	**Establish Manual Boration:**	
	a. **(❒)** Locally unlock and open Blended Boric Acid To Charging Pump Suction Isolation Valve o BG-V177	a. Go to Step A8.
	b. Check normal boration flow - GREATER THAN 30 GPM o BG FR-110 red pen	b. Go to Step A9.
	c. Return to procedure, Step 2.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 3 of 4)
ESTABLISHING ALTERNATE BORATION FLOWPATH

A8.	**Establish Manual Emergency Boration:**	
	a. **(❒)** Locally open Emergency Boration Valve o BG HV-8104	a. Perform the following: 1) Continue attempts to establish boration flow from RWST. 2) Return to procedure, Step 2.
	b. Check Emergency Boration flow - GREATER THAN 30 GPM	b. Go to Step A9.
	c. Return to procedure, Step 2.	
A9.	**Locally Check Boric Acid Filter ☏ P - LESS THAN 20 PSID** o BG PDI-108	Bypass boric acid filter: a. Open Boric Acid Filter Bypass Upstream Isolation Valve. o BG-V173 b. Open Boric Acid Filter Bypass Downstream Isolation Valve. o BG-V172 c. Close boric acid filter to BAT "A" throttle valve o BG-V319 d. Close Boric Acid Filter Inlet Isolation Valve. o BG-V149 e. Close Boric Acid Filter Outlet Isolation Valve. o BG-V152 f. Direct Maintenance to change filter as soon as possible.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 4 of 4)
ESTABLISHING ALTERNATE BORATION FLOWPATH

A10.	**Check If Alternate Boration Flow Has Been Established:** * Normal boration flow - GREATER THAN 30 GPM o BG FR-110 red pen <u>OR</u> * Emergency Boration flow - GREATER THAN 30 GPM o BG FI-183A	Continue attempts to establish boration flow from RWST.
A11.	**Return To Procedure, Step 2**	

-END-

WOLF CREEK
NUCLEAR OPERATING CORPORATION

OFN NN-021

LOSS OF VITAL 120 VAC INSTRUMENT BUS

Responsible Manager

Manager Operations

Revision Number	6	
Use Category		Continuous
Administrative Controls Procedure	No	
Infrequently Performed Procedure	No	
Program Number	21A	

DC12 09/29/2000

1.0 Purpose

1.1 To provide operator response for loss of vital 120 VAC instrument bus NN01, NN02, NN03, or NN04 when in Modes 1 or 2. This procedure may be used as a reference in other conditions.

2.0 Symptoms or Entry Conditions

2.1 Any of the following vital 120 VAC bus undervoltage annunciators lit.

* 00-025A, NN01 INST BUS UV
* 00-026A, NN02 INST BUS UV
* 00-027A, NN03 INST BUS UV
* 00-028A, NN04 INST BUS UV
* 00-025B, NN11 INV UV
* 00-026B, NN12 INV UV
* 00-027B, NN13 INV UV
* 00-028B, NN14 INV UV

3.0 References And Commitments

3.1. References

a. OFN NN-021, LOSS OF VITAL 120 VAC INSTRUMENT BUS,
¤
Supplemental Information
¤

b. SLNRC 84-0016 File: 0278, "Safe Shutdown Following Loss of Instrument Bus," February 2, 1984.

c. PMR 4590, PDP Replacement

3.2. Commitments

a. LER 92-002, Reactor Trip on Low-Low S/G Water Level
¤
Following Loss of an Instrument Bus, RCMS #92-069 [Step 2]
¤

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Steps 1 through 3 can be done in any order.

	1. Loss Of NN01 Or NN02 With Control Rods Inserting:	Go To Step 2.
	a. **(❒)** Place Rod Control System In Manual:	
	1) Place bank selector switch in MANUAL o SE HS-9	
	2) Verify rod motion - STOPPED	2) Perform the following: a) Place bank selector switch in AUTO. b) Place bank selector switch in MANUAL. c) IF rod motion continues, THEN trip reactor and stabilize the plant using EMGs while continuing with this procedure.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

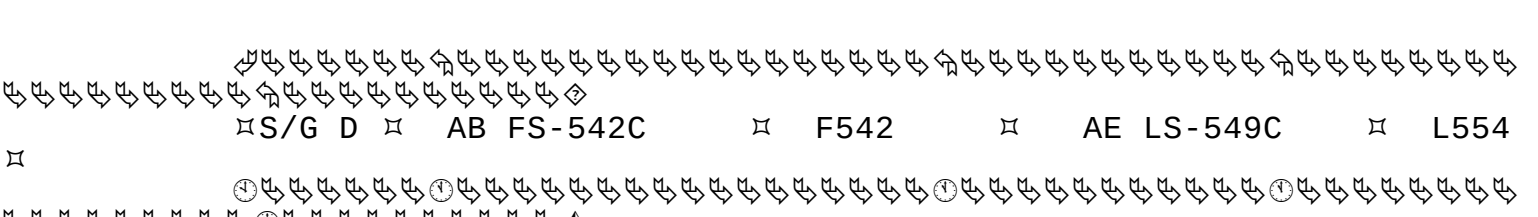
2. Ensure S/G Control Systems Are Using Unaffected Channels:

NN01 RED TRAIN

S/G	STEAM FLOW SELECTOR SWITCH	SELECT CHANNEL	SG LEVEL SELECTOR SWITCH	SELECT CHANNEL
S/G A	AB FS-512C	F513	AE LS-519C	L519
S/G B	AB FS-522C	F523	AE LS-529C	L552
S/G C	AB FS-532C	F533	AE LS-539C	L553
S/G D	AB FS-542C	F543	AE LS-549C	L549

NN02 WHITE TRAIN

S/G	STEAM FLOW SELECTOR SWITCH	SELECT CHANNEL	SG LEVEL SELECTOR SWITCH	SELECT CHANNEL
S/G A	AB FS-512C	F512	AE LS-519C	L551
S/G B	AB FS-522C	F522	AE LS-529C	L529
S/G C	AB FS-532C	F532	AE LS-539C	L539


S/G D
AB FS-542C
F542
AE LS-549C
L554

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

Pressurizer pressure master controller must be placed in manual prior to swapping pressure channels.

3. Ensure PZR Control Signals Are Using Unaffected Channels:

AFFECTED BUS	PZR PRESSURE SWITCH	PZR PRESSURE SELECT CHANNEL	PZR LEVEL SWITCH	PZR LEVEL SELECT CHANNEL
NN01 RED TRAIN	PS-455F	P457/P456	LS-459D	L461/L460
NN02 WHITE TRAIN	PS-455F	P455/P458	LS-459D	L459/L461
NN03 BLUE TRAIN	PS-455F	P455/P456	LS-459D	L459/L460
NN04 YELLOW TRAIN	PS-455F	P455/P456	NOT APPLICABLE	NOT APPLICABLE

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**(❒)** Check RWST Switchover Has **Occurred:**	Go To Step 5.
	a. Close letdown orifice isolation valves. o BG HIS-8149AA o BG HIS-8149BA o BG HIS-8149CA	
	b. Close charging flow control valve. o BG HC-182	
	c. Ensure CCP A, CCP B, or NCP - AT LEAST ONE RUNNING	
	d. Establish 32 gpm seal injection flow. o BG FCV-121 o BG FK-462	
5.	**Stabilize Plant:**	
	a. Stop any plant operations requiring rod motion	
	b. **(❒)** Adjust Turbine load as necessary to maintain Tavg within 3°F of Tref	
6.	**Dispatch Operator To Affected Instrument Bus With Backup Breaker Interlock Key**	
7.	**Go To Appropriate Attachment:** o Loss of NN01 - ATTACHMENT A o Loss of NN02 - ATTACHMENT B o Loss of NN03 - ATTACHMENT C o Loss of NN04 - ATTACHMENT D	

-END-

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 1 of 16)
LOSS OF VITAL INSTRUMENT BUS NN01 (RED TRAIN)

A1. Defeat RCS Temperature Control For Loop 1:

a. Position Loop Tavg Control Signal to - T412

o BB TS-412T

b. Position Loop ΔT Control Signal to - T411

o BB TS-411F

A2. Ensure AC PT-506 Selected

o AC PS-505Z

A3. Lock S/G A Atmospheric Relief Valve Manual Drive Lever In Closed Position

o AB PIC-1A

A4. Locally Restore Power To Bus NN01: — Go To Step A5.

a. Check NN01 buss - NO APPARENT DAMAGE — a. Go to Step A6.

b. Check inverter NN11 output voltage - NORMAL — b. Go to Step A5.

c. Ensure inverter AC output breaker is closed

o Breaker 4CB - CLOSED

d. Ensure normal feeder breaker is closed

o NN0101 - CLOSED

e. Go To Step A6.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A
(Page 2 of 16)
LOSS OF VITAL INSTRUMENT BUS NN01 (RED TRAIN)

A5. Align Backup Power To Bus NN01:

a. Close backup transformer XNN05 power supply breaker.

o NG01ACR3

b. Verify Backup Power Available white light - LIT.

c. Open Normal Feeder Breaker.

o NN0101

d. Close Alternate Feeder Breaker.

o NN0102

e. Refer to applicable Technical Specification:

o 3.8.7, Inverters - Operating
o 3.8.8, Inverters - Shutdown

A6. Check VCT level - GREATER THAN 5%

Perform the following:

a. IF NN01 is energized, THEN initiate makeup using SYS BG-200, REACTOR MAKEUP CONTROL SYSTEM NORMAL OPERATION.

b. IF NN01 is deenergized, THEN initiate makeup using SYS BG-216, REACTOR

MAKE-UP CONTROL SYSTEM
¤
ALTERNATE OPERATION.
¤

c. <u>WHEN</u> VCT level greater than 5%, <u>THEN</u> do Steps A7, A8, A9 and A10.

d. Continue with Step A12.
¤

WOLF CREEK
NUCLEAR OPERATING CORPORATION

OFN SG-003

NATURAL EVENTS

Responsible Manager

Manager Operations

Revision Number	8
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21A

DC12 09/27/2000

1.0 PURPOSE

1.1 This procedure provides instructions for operator response to any of the following naturally occurring events.

* Earthquake
* Tornado
* Flooding
* Loss of cooling lake

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 This procedure is entered after an earthquake based on any of the following symptoms:

* Annunciator 00-098A, R SPCTRM SSE EXCEED - LIT
* Annunciator 00-098B, SSE - LIT
* Annunciator 00-098C, R SPCTRM OBE EXCEED - LIT
* Annunciator 00-098D, OBE - LIT
* Annunciator 00-098E, SEISMIC RECORDER ON - LIT
* The effects of an earthquake are heard, seen, or felt.

2.2 This procedure is entered to respond to a tornado based on any of the following symptoms:

* Tornado warning is in effect for the area.
* A tornado has been sighted near or is traveling toward the plant.

2.3 This procedure is entered to respond to flooding based on the following.

* Reported flooding
* Annunciator 00-097A, COND PIT LEV HI - LIT

2.4 This procedure is entered to respond to loss of cooling lake based on any of the following symptoms:

* Reported cooling dam failure.
* Cooling lake level less than 1080 feet
* Condenser vacuum absolute pressure increasing.
* Condenser temperature greater than 130°F.

3.0 REFERENCES AND COMMITMENTS

3.1 References

a. Bechtel Calculation Number FL-05 Rev. 0, "Control Building Flooding"

b. DCP 07225, Emergency Makeup Water Requirement For AFW From ¤ ESW/UHS [Attachment D, Step D8] ¤

c. CCP 07784, Missile Shield/Hatch Cover Requirement.
¤

[Attachment B, Step B1 NOTE]
¤

3.2 Commitments

a. Letter WO 92-0045 [Attachment A, Step A16]

b. RCMS #99-073, Spent Fuel Pool Rack Inspection Following EarthQuake. [Attachment A, Step A14]

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**Determine Appropriate Attachment For Natural Event From Table Below:**	IF a natural event is NOT in progress, THEN return to procedure and step in effect.

EVENT	ATTACHMENT
EARTHQUAKE	A
TORNADO	B
FLOODING	C
COOLING DAM FAILURE	D

2. **Go To Appropriate Attachment For Natural Event**

3. **Return To Procedure And Step In Effect**

-END-

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT D
(Page 1 of 4)
COOLING DAM FAILURE RESPONSE

NOTE

Cooling lake level of 1980 feet corresponds to 1080 feet on computer point EFL0027.

	D1. Check Cooling Dam Failure - HAS OCCURRED OR IS IMMINENT: * Reports of dam failure or damage OR * Cooling lake level - LESS THAN 1080 FEET OR * Condenser vacuum - ABSOLUTE PRESSURE INCREASING OR * Condenser temperature - GREATER THAN 130°F	Return to procedure and step in effect.
	D2. Begin Plant Shutdown Using The Following Procedures As Directed By SM/CRS * GEN 00-004, POWER OPERATION OR * GEN 00-005, MINIMUM LOAD TO HOT STANDBY OR * OFN MA-038, RAPID PLANT SHUTDOWN	
	D3. Notify Coffey County Sheriff Of Plant Status o Telephone number 364-2123	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT D
(Page 2 of 4)
COOLING DAM FAILURE RESPONSE

D4.	**Place Both ESW Trains In Service**	
	a. Start both ESW pumps	
	b. Ensure ESW to UHS - OPEN o EF HIS-37 for train A o EF HIS-38 for train B	b. Locally open valves.
	c. Ensure ESW to service water isolation - CLOSED o Train A o EF HIS-23 o EF HIS-25 o EF HIS-39 o EF HIS-41 o Train B o EF HIS-24 o EF HIS-26 o EF HIS-40 o EF HIS-42	c. Locally close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT D
(Page 3 of 4)
COOLING DAM FAILURE RESPONSE

NOTE

Cooling lake level of 1975 feet corresponds to 1075 feet on computer point EFL0027.

D5. Check If Reactor Should Be Tripped:

a. Check cooling lake level - GREATER THAN 1075 FEET

b. Consult Shift Manager/Control Room Supervisor for further direction.

Perform the following:

1. Manually trip reactor.

2. Stabilize the plant using EMGs while continuing with this procedure.

3. Stop Circ Water Pumps.

   o 1HS-CW001A
   o 1HS-CW002A
   o 1HS-CW003A

4. At circ water screen house, stop fire pumps.

   a) In diesel fire pump room, in panel 1PL06J place pump controller control switch to OFF.

   b) Open fire pumps breakers.

      o 1SL31 CUB-6 for 1FP001PA
      o SL4A1RB for 1FP002P

5. Break condenser vacuum using SYS CG-320, BREAKING MAIN CONDENSER VACUUM.

6. Shutdown all equipment cooled by Service Water.

7. Place Service Water Pumps in Pull-To-Lock.

   o 1HS-WS001A
   o 1HS-WS002A

- 1HS-WS003A
- 1HS-WS004A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT D
(Page 4 of 4)
COOLING DAM FAILURE RESPONSE

D6. Determine Emergency Action Level Using EPP 06-005, EMERGENCY CLASSIFICATION

D7. Establish Continuous Fire Watches:

o In plant areas

o In areas with operating equipment

D8. Close ESW To Aux Feedwater Pumps Inlet Header Drains

o AL-V136
o AL-V137
o AL-V138
o AL-V139

D9. Inspect The Integrity Of The Piping Associated With A And B Air Compressors

a. At least every 4 hours, inspect all of the non-safety related portions of the service water system associated with air compressors A and B to ensure no pipe breaks have occurred

o CKA01A
o CKA01B

a. Isolate affected air compressor:

1) Close service water inlet isolation valve.

* EF HV-43 for train A
* EF HV-44 for train B

2) Close service water outlet isolation valve.

* EF-V346 for train A
* EF-V345 for train B

D10. Direct Fire Protection Specialist To Make Provisions For Backup Fire Protection Equipment

D11. Consult Shift Manager/Control Room Supervisor For Further Direction

-END-

WOLF CREEK
NUCLEAR OPERATING CORPORATION

OFN SP-010

ACCIDENTAL RADIOACTIVE RELEASE

Responsible Manager

Manager Operations

Revision Number	5
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21A

DC4 03/22/1999

1.0 PURPOSE

1.1 To provide operator actions in response to an accidental release of radioactive gas or liquid.

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 The following symptoms are indicative of a gaseous or liquid release:

a. Increased Radiation Monitor readings:

* AB RE-111 Steam Line D PORV Discharge
* AB RE-112 Steam Line C PORV Discharge
* AB RE-113 Steam Line B PORV Discharge
* AB RE-114 Steam Line A PORV Discharge
* BM RE-25 SG Blowdown
* BM RE-52 SG Blowdown
* EG RE-09 CCW Hx Train A
* EG RE-10 CCW Hx Train B
* FB RE-50 Aux. Steam Condensate X-fer Pump
* FC RE-381 Aux FDWTR Turbin Disch
* GE RE-92 Condenser Air Removal
* GG RE-27 Fuel Bldg. Exhaust
* GG RE-28 Fuel Bldg. Exhaust
* GH RE-10 Radwaste Building
* GH RE-22 Radwaste BLDG EXHST PART
* GH RE-23 Waste Gas
* GK RE-04 Control Bldg. Supply Air
* GK RE-05 Control Bldg. Supply Air
* GK RE-41 Access Control
* GL RE-60 Aux. Bldg. Exhaust Filter
* GT RE-21A Unit Vent
* GT RE-21B Unit Vent
* GT RE-22 Containment Purge
* GT RE-31 Containment Atmosphere
* GT RE-32 Containment Atmosphere
* GT RE-33 Containment Purge
* GT RE-59 CNTMT HI Range Area Mon
* GT RE-60 CNTMT HI Range Area Mon
* HB RE-18 Waste Monitor Tank Pump Disch
* HE RE-16 Boron Recycle Evap. Distillate
* HF RE-45 Secondary Liquid Waste Disch
* HF RE-95 Waste Water Treatment Influent
* LE RE-59 Turbine Bldg. Drains
* SJ RE-01 CVCS Letdown
* SJ RE-02 SG Blowdown

b. Unexplained trends on any of the following recorders:

* RR1
* RR2
* GH RR-10B
* GH RR-51
* GT RR-21B
* GT RR-58

2.2 Any of the following annunciator lit is an indication of a gaseous or liquid release:

* Annunciator 00-061B, PROCESS RAD HI
* Annunciator 00-061A, PROCESS RAD HIHI
* Annunciator 00-107F, GASEOUS RADWASTE TROUBLE
* Annunciator 00-108F, SEC LIQ RADWASTE TROUBLE
* Annunciator 00-109F, LIQUID RADWASTE TROUBLE

3.0 REFERENCES AND COMMITMENTS

3.1 References

a. AP 07B-003, OFFSITE DOSE CALCULATION MANUAL

3.2 Commitments

a. None

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**Check Listed Gaseous Monitors - ANY HI-HI ALARM ACTUATED** * GE RE-92 Condenser Air Removal * GG RE-27 Fuel Bldg. Exhaust * GG RE-28 Fuel Bldg. Exhaust * GH RE-10 Radwaste Building * GK RE-04 Control Bldg. Supply Air * GK RE-05 Control Bldg. Supply Air * GT RE-22 Containment Purge * GT RE-31 Containment Atmosphere * GT RE-32 Containment Atmosphere * GT RE-33 Containment Purge	Go to Step 8.
2.	**Check If Control Room Ventilation Isolation Required:**	
	a. HI-HI alarm on any of the following monitors - ACTUATED * GG RE-27 Fuel Bldg. Exhaust * GG RE-28 Fuel Bldg. Exhaust * GK RE-04 Control Bldg. Supply Air * GK RE-05 Control Bldg. Supply Air * GT RE-22 Containment Purge * GT RE-31 Containment Atmosphere * GT RE-32 Containment Atmosphere * GT RE-33 Containment Purge	a. Go to Step 6.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	**Verify Control Room Ventilation Isolation**	
	a. Check ESFAS status panel CRVIS section - ALL WHITE LIGHT LIT o Red train o Yellow train	a. Perform the following: 1) IF control room ventilation isolation has NOT actuated, THEN manually actuate control room ventilation isolation. o SA HS-9 o SA HS-13 2) IF any CRVIS component NOT properly aligned, THEN manually align component. 3) IF neither train of CRVIS is in service, THEN establish one in service train of CRVIS using SYS GK-122, MANUAL CONTROL ROOM VENTILATION CRVIS LINEUP. 4) IF only one train of CRVIS can be placed in service, THEN within 90 minutes, isolate out of service train using SYS GK-122, MANUAL CONTROL ROOM VENTILATION CRVIS LINEUP.
	b. Ensure Control Room Outer door - CLOSED	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**Check If Containment Purge Should Be Isolated:**	
	a. HI-HI alarm on any of the following monitors - ACTUATED * GT RE-22 Containment Purge * GT RE-31 Containment Atmosphere * GT RE-32 Containment Atmosphere * GT RE-33 Containment Purge	a. Go to Step 5.
	b. Check ESFAS status panel CPIS section - ALL WHITE LIGHT LIT o Red train o Yellow train	b. Perform the following: 1) IF containment purge isolation has NOT actuated, THEN manually actuate containment purge isolation. o SA HS-11 o SA HS-15 2) IF any CPIS component NOT properly aligned, THEN manually align component. IF component(s) can NOT be aligned, THEN manually or locally isolate affected containment penetration. Refer to ATTACHMENT A.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5.	**Check If Fuel Building Isolation Should Be Isolated:**	
	a. HI-HI alarm on any of the following monitors - ACTUATED * GG RE-27 Fuel Bldg. Exhaust * GG RE-28 Fuel Bldg. Exhaust	a. Go to Step 6.
	b. Check ESFAS status panel FBIS section - ALL WHITE LIGHT LIT o Red train o Yellow train	b. Perform the following: 1) <u>IF</u> FBIS has <u>NOT</u> actuated, <u>THEN</u> manually actuate FBIS. o SA HS-10 o SA HS-14 2) <u>IF</u> any FBIS component <u>NOT</u> properly aligned, <u>THEN</u> manually align component.refer to ATTACHMENT B.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	6. Check If Steam Generator Blowdown Should Be Isolated:	
	a. HI-HI alarm on Condenser Air Removal - ACTUATED o GE RE-92	a. Go to Step 7.
	b. Perform the following: 1) Check steam generator blowdown isolation valves - CLOSED o BM HIS-1A o BM HIS-2A o BM HIS-3A o BM HIS-4A 2) On panel SJ-143,locally ensure SG blowdown sample isolation valves - CLOSED o BM HIS-5 o BM HIS-6 o BM HIS-7 o BM HIS-8	b. Manually close valves.
	7. Check If Gas Decay Tank Should Be Isolated:	
	a. HI-HI alarm on Radwaste Building - ACTUATED o GH RE-10	a. Go to Step 8.
	b. Check 2 Inch Gas Decay Tanks Outlet To Radwaste Building HVAC Auto Isolation - CLOSED o HA HCV-14	b. At Panel HA-116, locally close valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	**Check Listed Liquid Monitors - ANY HI-HI ALARM ACTUATED** * BM RE-25 SG Blowdown * BM RE-52 SG Blowdown * EG RE-09 CCW Hx Train A * EG RE-10 CCW Hx Train B * FB RE-50 Aux. Steam Condensate X-fer Pp * HB RE-18 Waste Monitor Tank Pump Disch * HE RE-16 Boron Recycle Evap. Distillate * HF RE-45 Secondary Liquid Waste Disch * LE RE-59 Turbine Bldg. Drains * HF RE-95 Waste Water treatment Influent * SJ RE-02 SG Blowdown	Go to Step 18.
9.	**Check If Steam Generator Blowdown Should Be Isolated:**	
	a. HI-HI alarm on the following monitor - ACTUATED o SJ RE-02, SG Blowdown o BM RE-25, SG Blowdown o BM RE-52, SG Blowdown	a. Go to Step 10.
	b. Perform the following: 1) Check steam generator blowdown isolation valves - CLOSED o BM HIS-1A o BM HIS-2A o BM HIS-3A o BM HIS-4A 2) On panel SJ-143 locally ensure SG blowdown sample isolation valves - CLOSED o BM HIS-5 o BM HIS-6 o BM HIS-7 o BM HIS-8	b. Manually close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	**Check If CCW A Train Should Be Isolated:**	
	a. HI-HI alarm on CCW Heat Exchanger Train A - ACTUATED o EG RE-09	a. Go to Step 11.
	b. Check CCW Surge tank A vent - CLOSED o EG HIS-9	b. Manually close valve.
	c. Check Demineralized water to CCW surge tank A - Closed o EG HIS-1	c. Manually close valve.
11.	**Check If CCW B Train Should Be Isolated:**	
	a. HI-HI alarm on CCW Heat Exchanger Train B - ACTUATED o EG RE-10	a. Go to Step 12.
	b. Check CCW Surge tank B vent - CLOSED o EG HIS-10	b. Manually close valve.
	c. Check Demineralized water to CCW surge tank B - Closed o EG HIS-2	c. Manually close valve.
12.	**Check If Waste Monitor Tank Pump Discharge Should Be Isolated:**	
	a. HI-HI alarm on Waste Monitor Tank Pump Discharge - ACTUATED o HB RE-18	a. Go to Step 13.
	b. Check Waste Monitor Tank Pump Disch - CLOSED o HB RV-18	b. Locally close valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13.	**Check If Boron Recycle Evaporator Distillate Should Be Diverted:**	
	a. HI-HI alarm on Boron Recycle Evaporator distillate - ACTUATED o HE RE-16	a. Go to Step 14.
	b. Check Boron Recycle Evaporator Distillate - DIVERTED TO RECYCLE HOLD UP TANK o HE HS-16	b. Locally divert boron recycle evaporator to recycle hold up tank.
	c. Check Recycle Evaporator Feed Demineralizers - BYPASSED o HE TCV-250	c. Locally bypass recycle evaporator feed demineralizers.
14.	**Check If Secondary Liquid Waste Disch Should Be Isolated:**	
	a. HI-HI alarm on Secondary Liquid Waste Discharge - ACTUATED o HF RE-45	a. Go to Step 15.
	b. Check Secondary Liquid Waste Disch Valve - CLOSED o HF RV-45	b. Locally close valve.
15.	**Check If Turbine Building Drains Should Be Isolated:**	
	a. HI-HI alarm on Turbine Building Drains - ACTUATED o LE RE-59	a. Go to Step 16.
	b. Check Turbine Building Drains - CLOSED o LE RV-59	b. Manually close drain.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	**Check If Waste Water Treatment Influent Should be Isolated:**	
	a. HI-HI alarm on Waste Water Treatment Influent - ACTUATED o HF RE-95	a. Go to Step 17.
	b. Check Waste Water Treatment Influent Valve -CLOSED o HF RV-95	b. Manually close valve.
17.	**Check If Auxiliary Steam Condensate Transfer Pump Should Be Isolated:**	
	a. HI-HI alarm on auxiliary steam - ACTUATED o FB RE-50	a. Go to Step 18.
	b. Check Condensate Transfer Pumps - OFF o PFB01A o PFB01B	b. Turn off pumps.
	c. Check RADWASTE BUILDING AUX STEAM SUPPLY PRESS CONTROL VALVE CLOSED o FBPV029	c. Locally close valve.
18.	**Determine If Release Is Offsite**	
	a. HI-HI alarm on the following monitor - ACTUATED * GH RE-10 Radwaste Bldg. * GT RE-21 Unit Vent	a. Perform the following: 1) Direct Health Physics to evaluate increased radiation levels. 2) Notify Chemistry. 3) Go to Step 20.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

An abnormal release is an unplanned or uncontrolled release of radioactive material from the site boundary.

19. Evaluate Release

a. Direct Chemistry to evaluate for abnormal releases as follows:

1) Sample source of release

2) Perform dose calculations to determine if 10 CFR 20 release limits have been exceeded

b. Direct Health Physics to evaluate increased radiation levels

c. Refer to AP 07B-003, OFFSITE DOSE CALCULATION MANUAL, for release limits and remedial actions

20. Identify Probable Leakage Source Using ATTACHMENT C, RADIATION SOURCE IDENTIFICATION

21. Check Leakage Source - ISOLATED

Check need for local area evacuation.

22. Refer To Emergency Preparedness Procedure EPP 06-005, EMERGENCY CLASSIFICATION

23. Consult Shift Supervisor/ Supervising Operator For Further Direction

24. Return To Procedure And Step In Effect

-END-

ATTACHMENT A
(Page 1 of 1)
VALVES CLOSED BY CONTAINMENT PURGE ISOLATION SIGNAL

NOTE

All of the valves have visible local position indication.

RED TRAIN			YELLOW TRAIN		
GT HZ-5	CTMT Mini-Purge		GT HZ-4	CTMT Mini-Purge	
	Supply Inside			Supply Outside	
	CTMT Iso			CTMT Iso	
GT HZ-12	CTMT Mini-Purge		GT HZ-11	CTMT Mini-Purge	
	Exh Outside			Exh Inside	
	CTMT Iso			CTMT Iso	
GT HZ-7	CTMT S/D Purge		GT HZ-6	CTMT S/D Purge	
	Supply Inside			Supply Outside	
	CTMT Iso			CTMT Iso	
GT HZ-9	CTMT S/D Purge		GT HZ-8	CTMT S/D Purge	
	Exh Outside			Exh Inside	
	CTMT Iso			CTMT Iso	

-END-

ATTACHMENT B
(Page 1 of 1)
FBIS ACTUATION VERIFICATION

B1. Ensure Emergency Exhaust Fans - RUNNING

- o CGG02A
- o CGG02B

B2. Ensure Fuel Bldg. To Emergency Filter Units - OPEN

- o GG HZ-40 dampers GG-D025
- o GG HZ-43 dampers GG-D018

B3. Ensure Fuel Bldg. Air Supply Fans - STOPPED

- o SGG01A
- o SGG01B

B4. Ensure Fuel Bldg. Air Supply Fan Discharge Damper - CLOSED

- o GG HZ-38 dampers GG-D5
- o GG HZ-39 dampers GG-D6

B5. Ensure Fuel Bldg. Air Inlet Dampers - CLOSED

- o GG RZ-36 dampers GG-D3
- o GG RZ-37 dampers GG-D4

B6. Ensure Spent Fuel Pool Discharge To Aux. Bldg. Damper - CLOSED

- o GG HZ-42 damper GG-D32

B7. Ensure Fuel Bldg. Exhaust To Aux. Bldg. Vent Damper - CLOSED

- o GL HZ-62 damper GL-D58

B8. Align Other Ventilation Systems Discharging To Unit Vent:

- o Ensure Access Control Exhaust Fans - STOPPED
  - o GK HIS-47 for CGK02A
  - o GK HIS-49 for CGKO2B
- o Ensure Main Steam Enclosure Exhaust Fans - STOPPED
  - o GF HIS-17 for CGF03A
  - o GF HIS-18 for CGF03B
- o Ensure Aux/Fuel Normal Exhaust Fans - IN SLOW SPEED
  - o GL HIS-30 for CGL03A
  - o GL HIS-31 for CGL03B

-END-

ATTACHMENT C
(Page 1 of 2)
RADIATION SOURCE IDENTIFICATION

NOTE

If the source of radioactivity cannot be identified, the possibility of a failed detector should be considered.

GASEOUS MONITOR ALARM SOURCES

DETECTOR	POSSIBLE SOURCES
GT RE-21A	* Auxiliary Building HVAC
GT RE-21B	* Turbine Buidling HVAC
	* Fuel Building HVAC
	* Miscellaneous Building HVAC
	* Control Building HVAC
	* Containment purge
GT RE-22	* Primary leak inside containment
GT RE-33	* Failed fuel
GT RE-31	* Damaged fuel
GT RE-32	
GT RE-59	
GT RE-60	
GH RE-10	* Gas decay tank release
GH RE-22	* Leaking gas decay tank relief valve
	* Pipe leak associated with Waste Gas System
GH RE-23	* Leak from gas decay tank
	* Pipe leak associated with Waste Gas System
GL RE-60	* Radioactive gas from Auxiliary Building rooms
	* Coolant leak in Auxiliary Building

```
┌──────────────┬──────────────────────────────────────────────────────┐
│ GK RE-04 │ Temperature inversion                                │
│ GK RE-05 │                                                      │

┌──────────────┬──────────────────────────────────────────────────────┐
│ GG RE-27 │ Fuel handling accident inside Fuel Building          │
│ GG RE-28 │                                                      │

┌──────────────┬──────────────────────────────────────────────────────┐
│ GK RE-41 │ * Ventilation from chemical equipment drain sump
│
│          │ * Ventilation from Control Building floor and        │
│          │   equipment drain sump                               │
│          │ * Ventilation from Health Physics Count Room         │
│          │ * Ventilation from Hot Laboratory                    │

┌──────────────┬──────────────────────────────────────────────────────┐
│ GE RE-92 │ Steam generator tube leak                            │

└──────────────┴──────────────────────────────────────────────────────┘
```

ATTACHMENT C
(Page 2 of 2)
RADIATION SOURCE IDENTIFICATION

GASEOUS MONITOR ALARM SOURCES

DETECTOR	POSSIBLE SOURCES
SJ RE-01	* Crud burst in RCS
	* Failed fuel pin cladding
SJ RE-02	Steam generator tube leak
BM RE-25	
BM RE-52	
AB RE-111	
AB RE-112	
AB RE-113	
AB RE-114	
FC RE-381	
EG RE-9	* Leak in RCP thermal barrier
EG RE-10	* Leak in letdown heat exchanger
	* Leak in excess letdown heat exchanger
	* Leak in RHR heat exchanger
	* Leak in sample coolers
FB RE-50	* Liquid radwaste evaporator
	* Boron recycle evaporator
	* Secondary waste evaporator
HB RE-18	* Bad sample of waste monitor tank THB07A
	* Bad sample of waste monitor tank THB07B
HE RE-16	Evaporator malfunction
HF RE-45	* Bad secondary liquid tank sample
	* Release from wrong tank

¤ LE RE-59 ¤ Steam generator tube leak ¤

¤ HF RE-95 ¤ Steam generator tube leak ¤

-END-

WOLF CREEK
NUCLEAR OPERATING CORPORATION

STS RE-012

QPTR DETERMINATION

Responsible Manager

Manager Nuclear Engineering

Revision Number	7
Use Category	Reference
Administrative Controls	No
Infrequently Performed Procedure	No
Program Number	29

DC30 11/27/1997

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1.0 PURPOSE1.0 PURPOSE

1.1 This procedure is used to determine the Quadrant Power Tilt Ratio (QPTR) and to verify QPTR is within acceptable limits.

1.2 This procedure is applicable in Mode 1 above 50% RTP.

1.3 The QPTR shall be determined to be within the limit above 50% RTP by:

NOTE

The QPTR alarm function is met if:

Annunciators 00-078B, PR UPPER DETECTOR FLUX DEV, AND 00-078C, PR LOWER DETECTOR FLUX DEV, are operable;

OR

Annunciator 00-079C, RPI DEV OR PR TILT, is operable.

1.3.1 Calculating the ratio at least once per 7 days when the QPTR alarm is operable.

1.3.2 Calculating the ratio at least once per 12 hours when the QPTR alarm is inoperable.

1.4 With one PR channel inoperable and power level above 75% RTP, the movable incore detectors shall be used to confirm that the normalized symmetric power distribution is consistent with the indicated QPTR at least once per 12 hours.

2.0 SCOPE2.0 SCOPE

2.1 This procedure fulfills the Surveillance Requirements of Technical Specifications 4.2.4.1 and 4.2.4.2 (SR 3.2.4.1 and SR 3.2.4.2).

2.2 This procedure satisfies the requirements of USAR Section 16.3.1.1 (TR 3.3.10) if the QPTR is determined with the Movable Incore Detector System.

3.0 REFERENCES AND COMMITMENTS3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 Control Room Operating Curves and Tables Reference Manual (Curve Book)

3.1.2 SYS SR-200, MOVABLE INCORE DETECTOR OPERATION

3.1.3 RXE-03-001, INCORE DATA REDUCTION AND ANALYSIS

3.1.4 STS IC-932, POWER RANGE NEUTRON HIGH FLUX TRIP SETPOINT REDUCTION

3.2 Commitments

3.2.1 None

4.0 PRECAUTIONS/LIMITATIONS**4.0 PRECAUTIONS/LIMITATIONS**

4.1 If the Incore Movable Detector System is used for QPTR determination, at least 75% of the thimbles (44 thimbles), with a minimum of two thimbles per core quadrant, are to be operable as required by USAR Section 16.3.1.1 (TR 3.3.10).

4.2 With one excore detector inoperable, the remaining three detectors shall be used for computing the average.

4.3 The recorded reactor power must be from the indication being used to control reactor power (i.e., the highest reading NI channel or the calorimetric).

4.4 STS IC-932, POWER RANGE NEUTRON HIGH FLUX TRIP SETPOINT REDUCTION, shall be used for reduction of the Power Range Neutron Flux-High Trip Setpoints as required by Technical Specification 3.2.4 (ITS 3.2.4.A.4).

5.0 TEST EQUIPMENT**5.0 TEST EQUIPMENT**

5.1 None

6.0 ACCEPTANCE CRITERIA**6.0 ACCEPTANCE CRITERIA**

6.1 QPTR shall not exceed 1.02.

7.0 PREREQUISITES**7.0 PREREQUISITES**

7.1 The Reactor is operating at a steady power level above 50% RTP.

8.0 PROCEDURE

8.1 Record the present reactor power level.

RJU157MA _____ MWT/35.65 = _____ % RTP

OR

Highest NI Channel _____ % RTP

8.2 Perform QPTR determination per the method of Section 8.3, 8.4, or 8.5. Indicate method used.

NOTE

With one power range channel inoperable and power level above 75% RTP, the movable incore detectors shall be used to confirm that the normalized symmetric power distribution is consistent with the indicated QPTR at least once per 12 hours. This is done per Section 8.6. Section 8.6 is not a stand-alone method of QPTR monitoring. Section 8.6 may only be used to confirm QPTR determined in Section 8.3, 8.4 or 8.5.

*NSSS Menu Tilting Factors - Section 8.3 o

*NPIS Computer Points - Section 8.4 o

*NIS Current - Section 8.5 o

Movable Incore Detectors - Section 8.6 o

8.3 NSSS MENU - Tilting Factors Determination Of QPTR

8.3.1 Select NSSS Menu on an NPIS terminal. o

8.3.2 Select Tilting Factors. o

8.3.3 Record the following data:

	NIS N-43 (Q1)	NIS N-42 (Q2)	NIS N-44 (Q3)	NIS N-41 (Q4)
Radial Upper Flux Tilt	_____	_____	_____	_____
Radial Lower Flux Tilt	_____	_____	_____	_____

8.3.4 Record the maximum radial flux tilt.

QPTR = _____

8.3.5 Proceed to Section 8.7. O

8.4 NPIS Computer Points Determination Of QPTR

8.4.1 Address the following points on an NPIS terminal and record the data below:

1. SEU1151 (AVG RAD LOWER TILT Q1) _____
2. SEU1152 (AVG RAD LOWER TILT Q2) _____
3. SEU1153 (AVG RAD LOWER TILT Q3) _____
4. SEU1154 (AVG RAD LOWER TILT Q4) _____
5. SEU1159 (AVG RAD UPPER TILT Q1) _____
6. SEU1160 (AVG RAD UPPER TILT Q2) _____
7. SEU1161 (AVG RAD UPPER TILT Q3) _____
8. SEU1162 (AVG RAD UPPER TILT Q4) _____

8.4.2 Record maximum radial flux tilt. QPTR = _____

8.4.3 Proceed to Section 8.7. O

8.5 NIS Current Determination Of QPTR

8.5.1 Record the Normalization factor for each of the upper (detector A) and lower (detector B) detectors from page 7.5 of the Curve Book (Reference 3.1.1).

	N41	N42	N43	N44
Upper (Detector A)	_____	_____	_____	_____
Lower (Detector B)	_____	_____	_____	_____

8.5.2 Record the present values of the NIS detector currents.

Present NIS detector currents (microamps)

	N41	N42	N43	N44
Upper (Detector A)	_____	_____	_____	_____
Lower (Detector B)	_____	_____	_____	_____

8.5.3 Normalize each of the detector currents recorded in 8.5.2 by dividing each current by the corresponding normalizing factor recorded in 8.5.1.

$$\frac{\text{Detector Current}}{\text{Normalization Factor}}$$

Normalized NIS currents (microamps)

	N41	N42	N43	N44
Upper (Detector A)	_____	_____	_____	_____
Lower (Detector B)	_____	_____	_____	_____

1. Calculate the average of the upper normalized currents.

(Upper)

$$\frac{\text{N41} + \text{N42} + \text{N43} + \text{N44}}{4}$$

Average Upper Normalized Current _____

2. Calculate the average of the lower normalized currents.

(Lower)

$$\frac{\text{N41} + \text{N42} + \text{N43} + \text{N44}}{4}$$

Average Lower Normalized Current _____

8.5.4 Calculate the upper tilts by dividing each of the upper normalized currents in 8.5.3 by the average of the upper normalized currents in 8.5.3.1.

$$\frac{\text{Each upper Normalized Current}}{\text{Avg. of upper Normalized Currents}}$$

Upper Tilt Values

N41	N42	N43	N44
_____	_____	_____	_____

8.5.5 Calculate the lower tilts by dividing each of the lower normalized currents in 8.5.3 by the average of the lower normalized currents in 8.5.3.2. INIT/DATE

Each Lower Normalized Current
Avg. Lower Normalized Currents

Lower Tilt Values

N41	N42	N43	N44
_____	_____	_____	_____

8.5.6 Record the maximum radial flux tilt.

QPTR = _____

8.5.7 Proceed to Section 8.7. o

8.6 Movable Incore Detectors

8.6.1 Perform a symmetric or full core flux map per SYS SR-200, MOVABLE INCORE DETECTOR OPERATION. o

8.6.2 Reduce and analyze flux map data per RXE 03-001, INCORE DATA REDUCTION AND ANALYSIS. o

8.6.3 IF a full core flux map was performed, THEN verify that at least 44 thimbles were used with a minimum of two detector thimbles per core quadrant. ____/____

8.6.4 IF a symmetric flux map was performed, THEN verify that only core locations C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8 were used. ____/____

8.6.5 Attach a copy of the detector plateaus. o

8.6.6 Record the following data:

	NIS N-43 (Q1)	NIS N-42 (Q2)	NIS N-44 (Q3)	NIS N-41 (Q4)
Radial Upper Flux Tilt	_____	_____	_____	_____
Radial Lower				

Flux Tilt _____ _____ _____ _____

INIT/DATE

NOTE

Incore tilts at the time of the most recent excore detector QPTR normalization should be taken into account in this evaluation.

8.6.7 Confirm that the tilts recorded in the previous step are consistent with the indicated QPTR determined per this procedure. ____/____

8.7 Verification of QPTR within Limits

8.7.1 IF QPTR is less than or equal to 1.02, THEN restore system per SS direction. ____/____

8.7.2 IF QPTR is greater than 1.02 THEN perform the following:

1. Refer to Technical Specification 3.2.4 (ITS 3.2.4). ____/____
2. Contact Reactor Engineering. ____/____
3. Confirm the out-of-limit condition by verifying the method used and by performing other available methods per this surveillance. ____/____
4. Determine if the out-of-limit condition is sustained by performing this surveillance at least every hour. ____/____

9.0 RESTORATION9.0 RESTORATION

9.1 None

10.0 RECORDS110.0 RECORDS

10.1 The following QA records are generated by this procedure:

- Sections 7.0 and 8.0
- Incore detector plateaus (if Section 8.6 was used)

- Any calculations supporting Step 8.6.7 (if performed)

INIT/DATE

- END -

WOLF CREEK
NUCLEAR OPERATING CORPORATION

SYS SP-121

OPERATION OF THE G.A. MONITOR SYSTEM

Responsible Manager

Manager Operations

Revision Number	10
Use Category	Reference
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21D

DC4 08/17/2000

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1.0 PURPOSE

1.1 This procedure provides instructions for the operation of the General Atomics (GA) Process Monitor Systems RM-11R (SP056A) and RM-23.

2.0 SCOPE

2.1 This procedure provides instructions to take process monitor readings from the RM-11R (SP056A) or RM-23.

2.2 This procedure provides instructions for Monitor Item operations at the RM-11R (SP056A) or RM-23.

2.3 This procedure provides instructions for Channel Item operations at the RM-11R (SP056A) or RM-23.

2.4 This procedure provides instructions for check source operation.

2.5 This procedure provides instructions for process monitor pump operations.

2.6 This procedure provides instructions to acknowledge a multiple communication failure of the RM-11R (SP056A).

2.7 This procedure provides instructions to place the Unit Vent monitor in Accident mode.

2.8 This procedure provides instructions for special operations such as lamp testing RM-23.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 AP 07B-003, Offsite Dose Calculation Manual

3.1.2 PMR 4701

3.1.3 Vendor Manuals:

- o J-316-00072
- o J-361-00075
- o J-361-0078
- o J-361A-00041

3.1.4 PIR 95-2205

3.1.5 CCP 7860

3.1.6 Technical Specifications

3.2 Commitments

3.2.1 None

4.0 PRECAUTIONS/LIMITATIONS

4.1 The system must be in the Supervisor Mode to make data base changes from an RM-23 or RM-11R (SP056A). IF the system is NOT in the Supervisor Mode, THEN the changes will not be accepted.

4.2 Data base entries made from an RM-23 or RM-11R (SP056A) must be performed in the proper format. Steps to which this applies have an example given for the step describing data entry.

4.3 The source check is considered satisfactory when the radiation monitor source check is energized and source activity reaches or exceeds the check source limit. (Channel Item 15)

4.4 Refer to AP 07B-003, OFFSITE DOSE CALCULATION MANUAL for the following monitor operability requirements:

4.4.1 Liquid Effluent Monitors: (Table 2-2)

- o HB RE-18
- o BM RE-52
- o LE RE-59
- o HF RE-45
- o HF RE-95

4.4.2 Gaseous Effluent Monitors: (Table 3-2)

- o GT RE-21A
- o GT RE-21B
- o GT RE-22
- o GT RE-33
- o GH RE-10A
- o GH RE-10B

4.5 Refer to Technical Specifications or Technical Requirements for the following monitor operability requirements:

o GK RE-4 (TS 3.3.7)

o GK RE-5 (TS 3.3.7)

o GG RE-27 (TS 3.3.8) (TR 3.7.13)

o GG RE-28 (TS 3.3.8) (TR 3.7.13)

o GT RE-31 (TS 3.3.6)

o GT RE-32 (TS 3.3.6)

4.6 IF RM-11R (SP056A) is INOPERABLE, THEN GT RE-10A and GT-RE-21A sample flows should be verified at the sample skids. OPERABILITY status of applicable liquid effluent monitors should be evaluated with the Shift Manager.

4.7 All command function operations of the safety-related monitors (GK RE-4, GK RE-5, GG RE-28, GG RE-27, GT RE-31, GT RE-32, GT RE-33 and GT RE-22) must be performed from the RM-23 on panel SP067.

4.8 WHEN monitors GH RE-10B or GT RE-21B go into alert OR high alarm, THEN the associated monitor, GH RE-10A or GT RE-21A, will go into accident isolate.

4.8.1 Accident isolate must be locally reset at the rad monitor.

4.8.2 Chemistry shall be notified when GH RE-10A or GT RE-21A go into accident isolate.

4.9 IF the RM-80 display (LIT, GRID 5, SELECT) is not used, THEN the Master Database will not update.

4.10 Contact I&C if a monitor loses power to ensure the proper data is reloaded into the monitor.

4.11 Changes made at the RM-23 will not update the RM-11R ¤ Supervisor RM-80 Database Screen, Master Column. Manual ¤ action must be taken to modify this column. ¤

4.12 When using the RM-11R to place or remove monitors from poll ¤ (Monitor Item 100), only use the Monitor Items Screen. Do ¤ not use the Supervisor RM-80 Database Screen (LIT, GRID 5, ¤ SELECT) as an unplanned data transfer could occur. ¤

4.13 Monitor Item 100 relay bypass allows I&C to do testing on the ¤
process monitors and receive alarms on the RM-11R. However, ¤
this condition blocks the selected monitor alarm from the ¤
Main Control Board. This condition is indicated on the ¤
RM-11R Grid display by the channel bottom half being white. ¤

5.0 PREREQUISITES

5.1 Process Monitors are energized.

6.0 PROCEDURE

6.1 Process Monitor Readings Using RM-11R (SP056A)

NOTE

Refer to Figure 1 for a visual display of the RM-11R (SP056A) panel key layout.

6.1.1 To select a grid on the CRT, press the corresponding GRID NUMBER KEY.

6.1.2 WHEN desired grid is displayed, THEN select desired channel as follows:

1. Key in the three digit Channel Identification Number displayed on the grid.

2. Press the SEL key.

3. Check the selected channel outlined in White.

6.1.3 To obtain a Process Monitor Activity Reading, perform the following:

1. Select desired channel using Step 6.1.2.

2. Select desired function key. Refer to Attachment C for function key functions.

   o TREND 10 MIN
   o TREND HOURLY
   o TREND DAILY
   o STATUS

6.1.4 To obtain a Process Monitor Sample Pressure and Activity Reading, perform the following:

1. Place Supervisor Master Key in the key slot and turn it to SUPERVISOR position.

2. Select desired channel using Step 6.1.2.

3. Press the LIT key.

4. Press the STOP LOG key.

5. Press the SEL key.

6. WHEN no further sample pressures AND activity readings are desired, THEN return the Supervisor

Master Key to the NORMAL position.

6.2 Monitor Item Operations Using RM-11R (SP056A)

NOTE

The only Monitor item that is normally changed by Operations is Monitor item 100. All other changes must be directed by another procedure or approved by AI 15E-001, COMPUTER DATA BASE CHANGE REQUEST.

6.2.1 To view the Monitor Items list, perform the following:

1. Select desired channel using Step 6.1.2.
2. Press the MON ITEMS Channel Displays key.
3. The CRT will display the first page of the MONITOR ITEMS and associated values.
4. Press the ENTER key to page thru the Monitor Items.

6.2.2 To change the value of a Monitor Item, perform the following:

1. Page to the desired Monitor Item using Step 6.2.1.
2. Place Supervisor Master Key in the key slot and turn it to SUPERVISOR position.
3. Key in the desired Monitor Item number.
4. Press the SEL key.
5. Check the selected Monitor Item is backlit.

NOTE

The Monitor Item number may be advanced by depressing the SEL key.

6. Key in the desired Monitor Item value in the correct format. Example: 5.79×10^{-5} is keyed in as 5, 7, 9, -, 0, 5.

7. Press the ENTER Key.

8. IF the entry is accepted, THEN the message at the bottom of the CRT will indicate value accepted and the value for that item will be updated.

9. IF the entry is NOT accepted, THEN an error message will be displayed at the bottom of the CRT. Press the CLEAR key and return to Step 6.2.2.6.

10. WHEN no further changes are desired, THEN turn the Supervisor Master Key to the NORMAL position.

6.2.3 WHEN all Monitor Item operations are complete, THEN press any grid or trend key to exit.

6.3 Channel Item & Release Setpoint Operations Using RM-11R (SP056A)

NOTE

If entering release setpoints for a safety related monitor, section 6.6, CHANNEL ITEM & RELEASE SETPOINT OPERATIONS USING RM-23 should be used.

6.3.1 To change the value of a Supervisor RM-80 Database Channel Item, perform the following:

1. Select the desired channel per step 6.1.2.
2. Place Supervisor Master Key in the key slot and turn it to SUPERVISOR position.
3. Press the LIT key.
4. Press the Grid 5 key.
5. Press the SEL key.
6. Verify the Supervisor RM-80 Database Screen is displayed.
7. Press the minus (-) key.
8. Key in the desired Channel Item number.
9. Press the SEL key.
10. Check the selected Channel Item is backlit.

NOTE

The Channel Item number may be advanced by depressing the SEL key.

11. Key in the desired channel item value in the correct format. Example: 5.79×10^{-5} is keyed in as 5, 7, 9, -, 0, 5.

12. Press the ENTER key.

13. A message area will appear at the bottom of the screen,

    a. IF the data in the message area is correct, THEN press the ENTER key and proceed to step 6.3.1.14.

    b. IF the data in the message area is incorrect, THEN press the CLEAR key and return to step 6.3.1.11

14. IF the entry is accepted, THEN the message at the bottom of the CRT will indicate value accepted and the value for that item will be updated in the RM-80 Column and the Master Column.

15. IF the entry is NOT accepted, THEN an error message will be displayed at the bottom of the CRT. Press the CLEAR key and return to Step 6.3.1.11.

16. WHEN no further changes are desired, THEN turn the Supervisor Master Key to the NORMAL position.

6.4 Process Monitor Readings Using RM-23

6.4.1 On the selected monitor, press the desired Channel Display key.

* GAS
* PART
* IOD

6.4.2 Check the selected Channel Display key is backlit.

* GAS
* PART
* IOD

6.4.3 Check the selected channel indication display for the current activity value.

6.5 Monitor Item Operations Using RM-23

NOTE

Refer to Attachment A for a list of the commonly used Monitor Items.

6.5.1 To obtain a display of the current value for a Monitor Item, perform the following:

1. Press the desired Channel Display key.
2. Press the MON key
3. Check the MON key is backlit.
4. Enter the three digit monitor item number.
5. Press the ITEM key.
6. Check the ITEM key backlit and the current value for that Monitor Item is displayed.
7. IF desired to read another Monitor Item, THEN enter the three digit number and press the ITEM key or sequentially read each item by pressing the plus (+) key to go forward.

NOTE

The only Monitor item that is normally changed by Operations is Monitor item 100. All other changes must be directed by another procedure or approved by AI 15E-001, COMPUTER DATA BASE CHANGE REQUEST.

6.5.2 To change the value of a Monitor Item, perform the following:

1. Obtain a display of the current value using Step 6.5.1.

NOTE

S/G steamline monitors and turbine driven AFW pump exhaust monitor do not have Supervisor key slots and are always enabled to receive Monitor Item changes.

2. IF changing S/G steamline monitors OR turbine driven AFW pump exhaust monitor, THEN Steps 6.5.2.3 through 6.5.2.5 are not applicable.

   * AB RE-111
   * AB RE-112
   * AB RE-113
   * AB RE-114
   * FC RE-385

3. Obtain the Supervisor Master Key and place it in the proper key slot on SP067 or SP010.

   o Two key slots are on SP067. One is for red train process monitors and one is for yellow train process monitors.

   o SP010 has 2 key slots. One is for GH RE-10B and one is for GT RE-21B.

4. Turn the Supervisor Master Key to the SUPV position.

5. Verify the SUPV mode red light is lit.

6. Key in the desired Monitor Item value in the correct format. Example: 5.79×10^{-5} is keyed in as 5, 7, 9, -, 0, 5.

7. Press the ENTER key.

8. IF the entry is accepted, THEN the display will momentarily go blank followed by a display of the new value.

9. IF the entry is NOT accepted, THEN the ERROR light will illuminate. Press the CLEAR key and return to Step 6.5.2.6.

10. WHEN no further changes are desired, THEN perform the following:

    a. Press any Channel Display key.

       * GAS
       * PART
       * IOD

    b. Return the Supervisor Master Key to the NORM position.

    c. Verify the SUPV mode red light goes out.

    d. Remove the Supervisor Master Key.

6.6 Channel Item & Release Setpoint Operations Using RM-23

6.6.1 To obtain a display of the current value for a Channel Item, perform the following:

1. Press the desired Channel Display key.

   * GAS
   * PART
   * IOD

2. Check the desired channel backlit.

   * GAS
   * PART
   * IOD

NOTE

Refer to Attachment A for a list of the commonly used Channel Items.

3. Enter the desired three digit channel item number.

4. Press the ITEM key.

5. Check the ITEM key backlit and the current value for that Channel Item is displayed.

6. IF desired to read another Channel Item, THEN enter the three digit number and press the ITEM key or sequentially read each item by pressing the plus (+) key to go forward.

6.6.2 To change the value of a Channel Item, perform the following:

1. Obtain a display of the current value for a Channel Item:

   a. Press the desired Channel Display key.

      * GAS
      * PART
      * IOD

   b. Check the desired channel backlit.

      * GAS
      * PART

* IOD

NOTE

Refer to Attachment A for a list of the commonly used Channel Items.

c. Enter the desired three digit channel item number.

d. Press the ITEM key.

e. Check the ITEM key backlit and the current value for that Channel Item is displayed.

f. IF desired to read another Channel Item, THEN enter the three digit number and press the ITEM key or sequentially read each item by pressing the plus (+) key to go forward.

NOTE

S/G steamline monitors and turbine driven AFW pump exhaust monitor do not have Supervisor key slots and are always enabled to receive Channel Item changes.

2. IF changing S/G steamline monitors OR turbine driven AFW pump exhaust monitor, THEN Steps 6.6.2.3 through 6.6.2.5 are not applicable.

   * AB RE-111
   * AB RE-112
   * AB RE-113
   * AB RE-114
   * FC RE-385

3. Obtain the Supervisor Master Key and place it in the proper key slot on SP067 or SP010.

   o Two key slots are on SP067. One is for red train process monitors and one is for yellow train process monitors.

   o SP010 has 2 key slots. One is for GH RE-10B and one is for GT RE-21B.

4. Turn the Supervisor Master Key to the SUPV

position.

5. Verify the SUPV mode red light is lit.

6. Key in the desired Channel Item value in the correct format. Example: 5.79×10^{-5} is keyed in a 5, 7, 9-, 0, 5.

7. Press the ENTER key.

8. IF the entry is accepted, THEN the display will momentarily go blank followed by a display of the new value.

9. IF the entry is NOT accepted, THEN the ERROR light will illuminate. Press the CLEAR key and return to Step 6.6.2.6.

10. WHEN no further changes are desired, THEN perform the following:

    a. Press any Channel Display key.

       * GAS
       * PART
       * IOD

    b. Return the Supervisor Master Key to the NORM position.

    c. Verify the SUPV mode red light goes out.

    d. Remove the Supervisor Master Key.

6.6.3 Verify the RM11R Supervisor RM-80 Database Screen Master and RM-80 columns are the same. IF not, THEN update the Master Column at RM-11R as follows:

1. Perform steps 6.3.1.1 thru 6.3.1.11.

2. Press the ENTER key.

NOTE

On Safety related monitors, when the ENTER key is depressed in the next step, the Master Column will update and the Message area will indicate the message is accepted, followed by a rejected message. The rejected message is normal and can be

ignored.

3. A Message area will appear at the bottom of the screen,

   a. <u>IF</u> the data in the message area is correct <u>THEN</u> press the ENTER key and proceed to step 6.6.3.4

b. IF the data in the message area is incorrect, ¤ THEN press the CLEAR key and re-enter the ¤ correct data and return to step 6.6.3.2. ¤

4. WHEN no further changes are desired, THEN turn ¤ the Supervisor Master key to the NORMAL ¤ position. ¤

6.7 Source Checking Prior To Radioactivity Release

NOTES

- **Safety-related monitors (GK RE-4, GK RE-5, GG RE-28, GG RE-27, GT RE-31, GT RE-32, GT RE-33 and GT RE-22) can not be source checked using RM-11R (SP056A).**
- **Source checks performed using RM-11R (SP056A) shall provide a visual display and a printed message. Channels in the Check Source Mode will not generate isolation signals from a monitor possessing the process system automatic isolation on high alarm feature.**

6.7.1 Check source using the RM-11R (SP056A):

1. Select the desired grid and channel using Step 6.1.2.

2. Press the CHECK SOURCE key and verify the backlight is on.

NOTE

The Check Source backlight will remain illuminated during the entire check source interval.

3. Check the RM-11R (SP056A) display bar color changes from green to half-intensity cyan.

4. In the lower left-hand corner of the CRT, check the displayed message reads CHECK SOURCE ENERGIZED.

5. Check satisfactory check source:

   a. WHEN check source is completed, THEN check that tested channel's green operate light is lit.

   b. IF the display bar color changed to dark blue, THEN the check source is unsatisfactory and the test should be repeated.

c. IF the check source fails repeatedly, THEN a work request should be generated.

6.7.2 Check source using an RM-23:

1. Select desired channel using Step 6.4.1.

2. Press the selected channel C/S pushbutton and check it is backlit.

3. Check satisfactory check source:

   a. WHEN check source is completed, THEN check the C/S backlight is off.

   b. IF the GREEN OPER indicator is off AND the selected channel backlight is blinking, THEN the check source is unsatisfactory and the test should be repeated.

   c. IF the check source fails repeatedly, THEN a work request should be generated.

6.8 Process Monitor Pump Operations

CAUTION

The effects on plant status and operability requirements of Technical Specifications and ODCM should be discussed with SM/CRS prior to securing process monitor pump(s). Securing process monitor pumps may require bypassing bistables associated with the respective process radiation monitor in order to prevent inadvertent actuations.

6.8.1 To operate process monitor pumps from RM-11R (SP056A), perform the following:

1. Select desired channel using Step 6.1.2.

2. Secure or start process monitor pump on selected channel by depressing the FLOW Channel Monitor Control key.

6.8.2 To operate process monitor pumps from an RM-23, perform the following:

1. Secure or start process monitor pump on the desired monitor by depressing the FLOW key.

6.8.3 To locally operate process monitor pumps at the process monitor skid, perform the following:

1. Secure the process monitor pump by placing the skid mounted pump switch to OFF position.

2. Start the process monitor pump by placing the skid mounted pump switch to AUTO position.

   a. IF process monitor pump does NOT start, THEN start the pump using Step 6.8.1 or Step 6.8.2.

6.9 RM-11R (SP056A) Multiple Communication Failure Acknowledgment

6.9.1 Place Supervisor Master Key in the key slot and turn it to SUPERVISOR position.

6.9.2 Press 0 three times.

6.9.3 Press the SEL key.

6.10 Placing Unit Vent Monitor In Accident Mode

NOTE

The Unit Vent Monitor can not be verified in Accident Mode using RM-11R (SP056A).

6.10.1 Placing Unit Vent Monitor GT RE-21B in Accident Mode using RM-11R (SP056A):

1. Press the GRID 1 key.
2. Place Supervisor Master Key in the key slot and turn it to SUPERVISOR position.
3. Key in the three digit channel identification number 213.
4. Press the SEL key and check the selected channel is outlined in white.
5. Press the LIT key.
6. Press the GRID 5 key.
7. Press the SEL key.
8. Press 1.
9. Press the SEL key and check Monitor Item 1 is backlit.
10. Press 4.
11. Press the ENTER key.
12. At GT RIC-21B, verify Unit Vent Monitor in Accident Mode as follows:

    a. Press the MON key.

    b. Press 139.

    c. Press the ITEM key.

    d. Check display reading 000.

6.10.2 Placing Unit Vent Monitor GT RE-21B in Accident Mode using SP010:

1. At GT RIC-21B, press the MON key and check button for GT RIC-21B is backlit.

2. Press 001.

3. Press the ITEM key and check ITEM button is backlit and monitor item 001 current value is displayed.

4. Place Supervisor Master Key in the key slot and turn it to SUPV position.

5. Check SUPV mode red light is lit.

6. Press 004.

7. Press the ENTER key to display the new value of 004.

8. Turn Supervisory Master Key to NORM.

9. At GT RIC-21B, verify Unit Vent Monitor in Accident Mode as follows:

   a. Press the MON key.

   b. Press 139.

   c. Press the ITEM key.

   d. Check display reading 000.

6.11 Special Operations

6.11.1 Lamp testing an RM-23:

1. At the desired RM-23 channel, perform lamp test as follows:

   a. Press 997.

   b. Press the ITEM key.

   c. Check the following lights lit:

      o Top 8 buttons

      o ITEM button

      o MON button

d. IF any lamp NOT lit, THEN contact I&C to change light bulbs.

2. Restore from lamp test as follows:

a. Press the CLEAR key

b. Press the ITEM key

c. Press 7

7.0 RECORDS

7.1 None

-END-

ATTACHMENT A
(Page 1 of 1)
RM-23 MONITOR AND CHANNEL DATA BASE ITEMS

NOTES

- **For a list of only monitor items, such as 033 Sample Pressure, refer to vendor manual J-361-00269.**

MONITOR ITEMS

ITEM	DESCRIPTION
016	Sample Flow Rate 1 Setpoint
020	Data Base Complete
033	Sample Pressure
048	Purge Control Options
062	Sample Flow Rate Number 2 (WRGM) Setpoint
100	Monitor Polling Status

CHANNEL ITEMS

ITEM	DESCRIPTION

009	Hi Alarm Setpoint
010	Alert Alarm Setpoint
013	Channel Background
015	Check Source Reference
016	Channel Service State Request
018	Raw Counts Totalizer

-END-

ATTACHMENT B
(Page 1 of 4)
RM-11R (SP056A) CHANNEL DESCRIPTIONS

LIQUID RADIATION MONITORS

MONITOR	ID NUMBER	TYPE	DESCRIPTION
BM RE-25	256	Gamma	Steam Generator Blowdown Process Monitor
BM RE-52	526	Gamma	Steam Generator Effluent Monitor
EA RE-04A	416	Gamma	Service Water Monitor
EA RE-04B	426	Gamma	Service Water Monitor
EG RE-09	096	Gamma	Component Cooling Water Monitor
EG RE-10	106	Gamma	Component Cooling Water Monitor
FB RE-50	506	Gamma	Auxiliary Steam Condensate Tank Monitor
HB RE-18	186	Gamma	Liquid Radwaste Process System Discharge Monitor
HE RE-16	166	Gamma	Boron Recycle Evaporator Distillate Monitor
HF RE-45	456	Gamma	Secondary Liquid Waste Discharge Monitor
HF RE-95	956	Gamma	Turbine Bldg Discharge to Waste Water Treatment
LE RE-59	596	Gamma	Turbine Bldg Drain Effluent Monitor
SJ RE-01	016	Gamma	CVCS Letdown Monitor
SJ RE-02	026	Gamma	Steam Generator Sampling Monitor

ATTACHMENT B
(Page 2 of 4)
RM-11R (SP056A) CHANNEL DESCRIPTIONS

WIDE RANGE GAS MONITORS

MONITOR	ID NUMBER	TYPE	DESCRIPTION
GH RE-10B	103	NG Activity (Channel #4) Release Rate	Radwaste Building Vent Monitor
	105	Low Range Noble Gas	
	108	Medium Range Noble Gas	
	109	High Range Noble Gas	
GT RE-21B	213	NG Activity (Channel #4) Release Rate	Unit Vent Monitor
	214	Low Range Noble Gas	
	215	Medium Range Noble Gas	
	216	High Range Noble Gas	

ATTACHMENT B
(Page 3 of 4)
RM-11R (SP056A) CHANNEL DESCRIPTIONS

PARTICULATE/IODINE/NOBLE GAS CHANNELS

MONITOR	ID NUMBER	TYPE	DESCRIPTION
GK RE-04	041	Particulate	Control Room Air Supply Monitor
	042	Iodine	
	043	Noble Gas	
GK RE-05	051	Particulate	Control Room Air Supply Monitor
	052	Iodine	
	053	Noble Gas	
GT RE-22	221	Particulate	Containment Purge Monitor
	222	Iodine	
	223	Noble Gas	
GT RE-33	331	Particulate	Containment Purge Monitor
	332	Iodine	
	333	Noble Gas	
GG RE-27	271	Particulate	Fuel Building Exhaust Monitor
	272	Iodine	
	273	Noble Gas	
GG RE-28	281	Particulate	Fuel Building Exhaust Monitor
	282	Iodine	
	283	Noble Gas	
GG RE-31	311	Particulate	Containment Air Monitor
	312	Iodine	
	313	Noble Gas	
GG RE-32	321	Particulate	Containment Air Monitor
	322	Iodine	
	323	Noble Gas	

ATTACHMENT B
(Page 4 of 4)
RM-11R (SP056A) CHANNEL DESCRIPTIONS

PARTICULATE/IODINE CHANNELS

MONITOR	ID NUMBER	TYPE	DESCRIPTION
GH RE-10A	101	Particulate	Radwaste Building Effluent Monitor
	102	Iodine	
GH RE-21A	2111	Particulate	Radwaste Building Effluent Monitor
	212	Iodine	

PARTICULATE CHANNELS

MONITOR	ID NUMBER	TYPE	DESCRIPTION
GH RE-22	224	Particulate	Radwaste Building Exhaust Monitor
GK RE-41	414	Particulate	Access Control Area Ventilation Exhaust Monitor
GL RE-60	604	Particulate	Auxiliary Building Ventilation Exhaust Monitor

NOBLE GAS CHANNELS

MONITOR	ID NUMBER	TYPE	DESCRIPTION
GH RE-23	235	Noble Gas	Waste Gas Radiation Monitor
GH RE-92	925	Noble Gas	Condenser Air Discharge Monitor

-END-

ATTACHMENT C
(Page 1 of 1)
RM-11R (SP056A) COLOR CODES AND DEDICATED KEY FUNCTIONS

COLOR CODES

COLOR	STATUS
WHITE	MONITOR OFF LINE
MAGENTA	COMMUNICATIONS FAILURE
DARK BLUE	SYSTEM FAILURE
LIGHT BLUE (CYAN)	EQUIPMENT FAILURE
HALF INTENSITY CYAN	MONITOR FUNCTIONS
RED	CHANNEL HIGH ALARM
YELLOW	CHANNEL ALERT ALARM
GREEN	NORMAL OPERATIONS
BOTTOM HALF WHITE	RELAY BYPASS (PREVENTS MCB ALARM)

DEDICATED KEY FUNCTIONS

KEY	FUNCTION
TREND 10 MIN	Trend channel activity over the last 4 hours

¤ TREND HOURLY ¤ Trend channel activity over the last 24 hours ¤

¤ TREND DAILY ¤ Trend channel activity over the last 28 days ¤

¤ MON ITEMS ¤ Display of Monitor Data Base Items ¤

¤ CHAN ITEMS ¤ Display of Channel Data Base Items ¤

¤ STATUS ¤ Display of Monitor and Channel Status ¤

-END-

FIGURE 1
RM-11R (SP056A) NORMAL MODE PANEL KEY LAYOUT

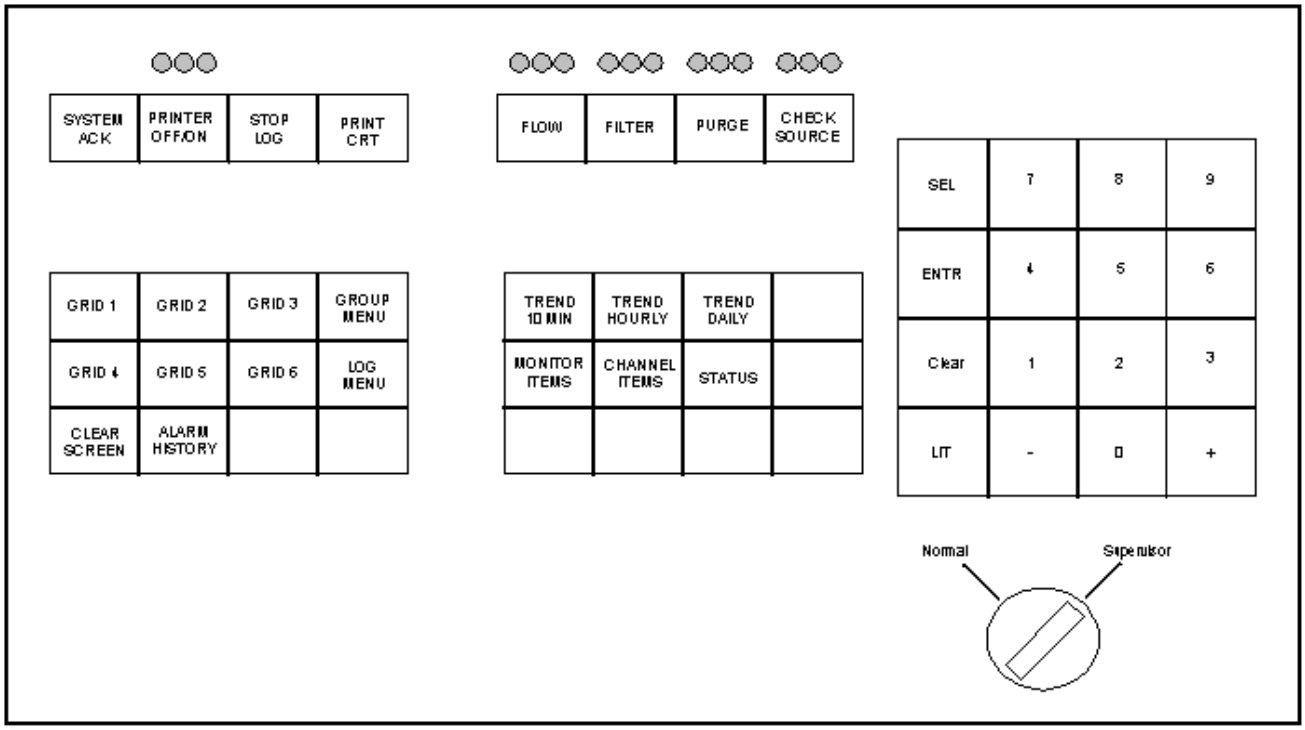
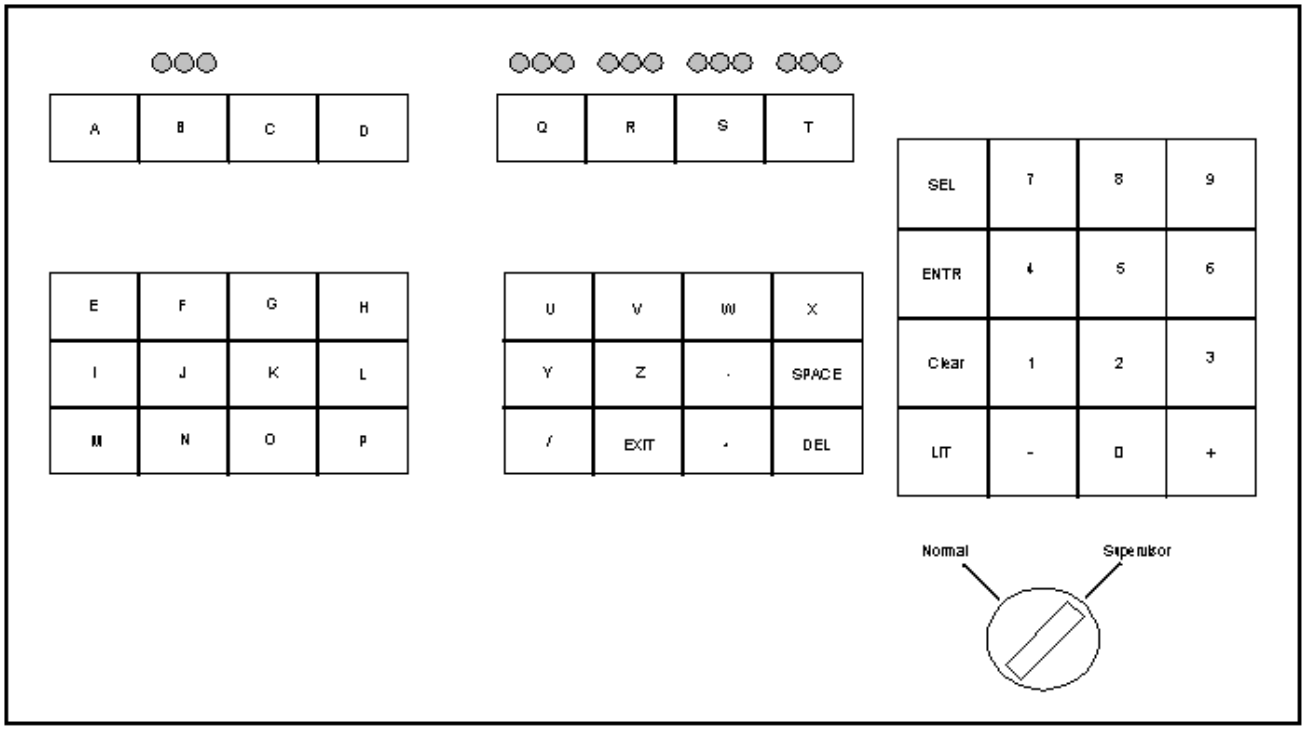


FIGURE 2
RM-11R (SP056A) SUPERVISOR/LIT MODE (LITERAL DATA MODE)



WOLF CREEK
NUCLEAR OPERATING CORPORATION

SYS AL-120

FEEDING STEAM GENERATORS WITH A MOTOR DRIVEN OR TURBINE DRIVEN AFW PUMP

Responsible Manager

Manager Operations

Revision Number	25
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21D

DC12 04/26/2000

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1.0 PURPOSE

1.1 This procedure provides instructions for feeding steam generators using the Auxiliary Feedwater System.

2.0 SCOPE

2.1 Section 6.1 provides instructions to feed steam generators using the motor driven auxiliary feedwater pumps.

2.2 Section 6.2 provides instructions to feed steam generators using the turbine driven auxiliary feedwater pump.

2.3 Applicable portions of this procedure may be used for stopping an AFW pump following an automatic start.

2.4 This procedure is applicable during all Modes of plant operation.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 M-12AL01(Q)

3.1.2 M-02AE02(Q)

3.1.3 WCRE-03

3.1.4 CCP 6578, Low Flow Cavitation in AL, BG and EM Pumps

3.1.5 PIR 97-1302, Turbine Driven Auxiliary Feedwater Pump Controllers Restoration Position of Latched Detent Open

3.1.6 PIR 99-1090, Turbine Driven Auxiliary Feedwater Pump Oil Sampling requirement changed to annual PM.

3.1.7 PIR 97-2126, Lake water intrusion into Condensate Storage Tank

3.2 Commitments

3.2.1 ITIP 1720, Large Motor Space Heaters Control Circuit Design

3.2.2 ITIP 00332, SOER 86-01 Recommendation 5, Reliability of PWR Aux Feedwater Systems

3.2.3 PIR 94-1807
¤

4.0 PRECAUTIONS/LIMITATIONS

4.1 The temperature difference between the feedwater and the steam generator should be less than 250°F when feeding the steam generators.

4.2 Condensate storage tank level must be maintained greater than ¤ 281,000 gallons (62%) in Modes 1, 2 and 3 to satisfy ¤ Technical Specification 3.7.6. ¤

4.3 IF feeding steam generators using AFW pumps in Modes 1, 2, 3 or 4, THEN exercise caution not to exceed RCS cooldown rates or shrinking S/G level below the feed ring.

4.4 The motor driven AFW pump manufacturer has stated that operation of the motor with the heater energized is detrimental to motor life. [Commitment Step 3.2.1]

4.5 Operation of the MDAFWP at flow rates less than 80,000 lbm/hr should be minimized due to Low Flow Cavitation concerns.

4.6 Operation of the TDAFWP at flow rates less than 227,500 lbm/hr should be minimized due to Low Flow Cavitation concerns.

4.7 Any one of the following signals will automatically start the turbine driven AFW pump:

* Undervoltage on bus NB01 or bus NB02
* S/G low-low level on 2/4 steam generators
* AMSAC actuation
* Manual AFAS-T initiation

4.8 Any one of the following signals will automatically start the motor driven AFW pumps:

* Shutdown sequencer actuation following undervoltage on bus NB01 or bus NB02
* Safety injection sequencer actuation
* S/G low-low level on 1/4 steam generators
* Trip of both main feedwater pumps
* AMSAC actuation
* Manual AFAS-M initiation

4.9 When feeding the steam generators using auxiliary feedwater pumps, the main feed water lines may not be filled, therefore flow should be established slowly to the steam generators to prevent water hammer.

INIT/DATE

5.0 PREREQUISITES

5.1 The Auxiliary Feedwater System is filled and vented. ____/____

5.2 Motor driven AFW Pump A is available. N/A if not required. ____/____

5.3 Motor driven AFW Pump B is available. N/A if not required. ____/____

5.4 Turbine driven AFW pump is available. N/A if not required. ____/____

5.5 CKL AL-120, AUXILIARY FEEDWATER NORMAL LINEUP, is complete for desired steam generator. ____/____

5.6 The condensate storage tank has been sampled by Chemistry and water quality is acceptable for filling the steam generators. (Commitment Step 3.2.3) ____/____

NOTE

If the Chemistry limit cannot be satisfied, the suction(s) of the pump(s) will need to be flushed and a WR shall be initiated for the valve(s) suspected of causing lake water intrusion.

5.7 The suction(s) of the AFW Pump(s) to be ran have been sampled by Chemistry and the sample results are less than or equal to 5 micro-mhos/cc. (Reference 3.1.8) ____/____

INIT/DATE

6.0 PROCEDURE

6.1 Feeding S/Gs Using Motor Driven AFW Pumps

CAUTION

If in Modes 1, 2 or 3, the discharge headers of the motor driven AFW pumps may not be cross-tied. Refer to Technical Specification 3.7.5.

6.1.1 IF in Mode 4, 5 or 6, THEN motor driven AFW pump cross-connect valves may be unlocked and opened to allow feeding all steam generators with one motor driven AFW pump. N/A if not required.

1. AL-V076 - UNLOCKED AND OPEN ☐

2. AL-V077 - UNLOCKED AND OPEN ☐

CAUTION

If steam generator(s) are to be filled using one motor driven AFW pump, all four discharge throttle valves in Step 6.1.2 must be closed when starting the AFW pump.

6.1.2 Close the discharge throttle valves on the motor driven AFW pump(s) to be started:(N/A steps not used)

1. For motor driven AFW pump A:

   a. S/G B motor driven AFW pump discharge throttle valve closed.

      o AL HK-9A - CLOSED ☐

   b. S/G C motor driven AFW pump discharge throttle valve closed.

o AL HK-11A - CLOSED ☐

2. For motor driven AFW pump B:

a. S/G A motor driven AFW pump discharge throttle valve closed.

o AL HK-7A - CLOSED ☐

INIT/DATE

b. S/G D motor driven AFW pump discharge throttle valve closed.

o AL HK-5A - CLOSED ☐

CAUTION

If feeding the S/G's in Modes 1, 2, 3 or 4, DO NOT exceed RCS cooldown rates or shrinking S/G level below the feed ring.

NOTE

Temperature difference between feedwater and steam generators should be less than 250°F.

6.1.3 Start the desired motor driven AFW pump(s):(N/A steps not used)

1. For motor driven AFW pump A:

a. Start Motor Driven AFW Pump A

o AL HIS-23A - STARTED ☐

b. Record time started: _____ ____/____

c. Verify pump A discharge pressure greater than 1535 psig.

AL PI-18A _____ psig. ____/____

d. Turn off motor driven AFW pump A motor space heater.

o PG19NJF122 - OFF ____/____

2. For motor driven AFW pump B:

a. Start Motor Driven AFW Pump B

o AL HIS-22A - STARTED ☐

b. Record time started: _____ ____/____

c. Verify pump B discharge pressure greater than 1535 psig.

AL PI-15A _____ psig. ____/____

INIT/DATE

d. Turn off motor driven AFW pump B motor space heater.

o PG20GBR242 - OFF ____/____

CAUTION

If this is the initial run of the auxiliary feedwater pump since it has been filled and vented, flow should be established to the steam generators slowly to prevent water hammer.

6.1.4 Throttle flow to desired steam generator(s). Flow from an individual pump should not exceed 250,000 lbm/hr.(N/A steps not used)

o AL HK-7A for S/G A - THROTTLED ☐

o AL HK-9A for S/G B - THROTTLED ☐

o AL HK-11A for S/G C - THROTTLED ☐

o AL HK-5A for S/G D - THROTTLED ☐

6.1.5 Record the running motor driven AFW pumps total flow:(N/A step not used)

1. Pump A Total Flow: _____lbm/hr. ____/____

   o AL FI-2A for S/G A
   o AL FI-3A for S/G B
   o AL FI-4A for S/G C
   o AL FI-1A for S/G D

2. Pump B Total Flow: _____lbm/hr. ____/____

   o AL FI-2A for S/G A
   o AL FI-3A for S/G B
   o AL FI-4A for S/G C
   o AL FI-1A for S/G D

6.1.6 While feeding steam generators, monitor steam generator narrow range and wide range levels.

1. IF placing S/Gs in wet layup OR adding water to S/Gs in wet layup, THEN monitor S/G level using wet layup indicators.

   o AB LI-513 for S/G A ☐
   o AB LI-523 for S/G B ☐

INIT/DATE

o AB LI-533 for S/G C ☐
o AB LI-543 for S/G D ☐

NOTES

- **When closing any motor driven AFW pump discharge throttle valve from the near-closed throttled position, the force of the flow against the valve plug may be great enough to cause the valve operator torque switch to trip. If this occurs, it will be necessary to either open the affected valve(s) and reclose, or stop the AFW pump(s) to allow the valve(s) to close.**
- **To prolong the life of discharge throttle valve limitorque operators, it is necessary to maintain the valves open as much as possible even in Modes 4, 5 or 6. When the controller is in closed position, the field in the motor remains energized. This causes unnecessary wear on valve actuators.**

6.1.7 WHEN desired steam generator level is obtained, THEN close the associated throttle valves:(N/A steps not used)

1. S/G A motor driven AFW pump discharge throttle valve closed.

   o AL HK-7A - CLOSED ☐

2. S/G B motor driven AFW pump discharge throttle valve closed.

   o AL HK-9A - CLOSED ☐

3. S/G C motor driven AFW pump discharge throttle valve closed.

   o AL HK-11A - CLOSED ☐

4. S/G D motor driven AFW pump discharge throttle valve closed.

   o AL HK-5A - CLOSED ☐

INIT/DATE

CAUTION

If the AFW pumps are running as a result of an auto start, ensure all auto activation signals are reset or blocked before attempting to stop the motor driven AFW pumps.

6.1.8 Stop the running motor driven AFW pump(s):(N/A step not used)

1. For motor driven AFW pump A:

   a. Stop Motor Driven AFW Pump A and return control switch to normal.

      o AL HIS-23A - IN NORMAL AFTER STOP ____/____

      Verified ____/____

   b. Record time stopped: _____ ____/____

   c. Turn on motor driven AFW pump A motor space heater.

      o PG19NJF122 - ON ☐

2. For motor driven AFW pump B:

   a. Stop Motor Driven AFW Pump B and return control switch to normal.

      o AL HIS-22A - IN NORMAL AFTER STOP ____/____

      Verified ____/____

   b. Record Time stopped: _____ ____/____

   c. Turn on motor driven AFW pump B motor space heater.

      o PG20GBR242 - ON ☐

6.1.9 IF feeding in Mode 4, 5 or 6 is complete, THEN close and lock the motor driven AFW pump cross-connect valves.

1. AL-V076 - LOCKED CLOSED ____/____

   Verified /

2. AL-V077 - LOCKED CLOSED ____/____

Verified ____/____

INIT/DATE

6.1.10 Return motor driven AFW pump discharge ¤ throttle valves to safeguards lineup:(N/A ¤ steps not used) ¤

1. Open motor driven AFW pump discharge throttle valves to each steam generator and latch switch detent in open position:

   o AL HK-7A for S/G A - LATCHED DETENT OPEN ____/____

   Verified ____/____

   o AL HK-9A for S/G B - LATCHED DETENT OPEN ____/____

   Verified ____/____

   o AL HK-11A for S/G C - LATCHED DETENT OPEN ____/____

   Verified ____/____

   o AL HK-5A for S/G D - LATCHED DETENT OPEN ____/____

   Verified ____/____

6.1.11 Section 6.1 complete. ____/____

INIT/DATE

6.2 Feeding S/Gs Using Turbine Driven AFW Pump

6.2.1 Verify Auxiliary Feedwater Pump Turbine Mechanical Trip/Throttle Valve is closed.

o FC HIS-312A - CLOSED ☐

6.2.2 Close the turbine driven AFW pump discharge throttle valves to each steam generator.

1. S/G A turbine driven AFW pump discharge throttle valve closed.

   o AL HK-8A - CLOSED ☐

2. S/G B turbine driven AFW pump discharge throttle valve closed.

   o AL HK-10A - CLOSED ☐

3. S/G C turbine driven AFW pump discharge throttle valve closed.

   o AL HK-12A - CLOSED ☐

4. S/G D turbine driven AFW pump discharge throttle valve closed.

   o AL HK-6A - CLOSED ☐

6.2.3 Open at least one steam supply valve to turbine driven AFW pump:(N/A steps not used)

1. Loop 2 Steam To Auxiliary Feedwater Pump Turbine open.

   o AB HIS-5A - OPEN ☐

2. Loop 3 Steam To Auxiliary Feedwater Pump Turbine open.

   o AB HIS-6A - OPEN ☐

INIT/DATE

CAUTION

If feeding the S/G's in Modes 1, 2, 3, or 4 exercise caution not to exceed RCS cooldown rates or shrinking S/G level below the feed ring.

NOTE

Temperature difference between feedwater and steam generators should be less than 250°F.

6.2.4 Start turbine driven AFW pump:

1. Open Auxiliary Feedwater Pump Turbine Mechanical Trip/Throttle Valve.

   o FC HIS-312A - OPEN ☐

2. Time valve opened: _____ ____/____

3. Verify pump discharge pressure greater than 1625 psig.

   AL PI-21A: _____ psig. ____/____

CAUTION

If this is the initial run of the auxiliary feedwater pump since it has been filled and vented, flow should be established to the steam generators slowly to prevent water hammer.

6.2.5 Throttle flow to desired steam generator(s):(N/A steps not used)

1. Steam Generator A

   o AL HK-8A - THROTTLED ☐

2. Steam Generator B

- o AL HK-10A - THROTTLED ☐

3. Steam Generator C

- o AL HK-12A - THROTTLED ☐

INIT/DATE

4. Steam Generator D

   o AL HK-6A - THROTTLED ☐

6.2.6 Record turbine driven AFW pump total flow:

1. Total Flow: _____lbm/hr. ____/____

   o AL FI-2A for S/G A
   o AL FI-3A for S/G B
   o AL FI-4A for S/G C
   o AL FI-1A for S/G D

6.2.7 While feeding steam generators, monitor steam generator narrow range and wide range levels.

1. IF placing S/Gs in wet layup OR adding water to S/Gs in wet layup, THEN monitor S/G level using wet layup indicators. ☐

   o AB LI-513 for S/G A
   o AB LI-523 for S/G B
   o AB LI-533 for S/G C
   o AB LI-543 for S/G D

6.2.8 WHEN desired steam generator level is obtained, THEN at panel RL006, adjust the associated valve controllers to 25% demand position:

o AL HK-8A, SG A Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control. ____/____
o AL HK-10A, SG B Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control. ____/____
o AL HK-12A, SG C Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control. ____/____
o AL HK-6A, SG D Turbine Driven Auxiliary Feedwater Pump AFW Regulating Valve Control. ____/____

INIT/DATE

6.2.9 Stop the turbine driven AFW pump:

1. IF the turbine driven AFW pump is running as a result of an auto start, THEN ensure all auto activation signals are reset or blocked by verifying the alarm window 00-128B TD AFP START is clear.

   o 00-128B TD AFP START is clear ☐

2. Close Auxiliary Feedwater Pump Turbine Mechanical Trip/Throttle Valve. [3.2.2]

   o FC HIS-312A - CLOSED ☐

3. Time valve closed: _____ ____/____

4. Close steam supply valves to turbine driven AFW pump:

   a. Loop 2 Steam To Auxiliary Feedwater Pump Turbine closed.

      o AB HIS-5A - CLOSED ____/____

      Verified ____/____

   b. Loop 3 Steam To Auxiliary Feedwater Pump Turbine closed.

      o AB HIS-6A - CLOSED ____/____

      Verified ____/____

INIT/DATE

6.2.10 Return turbine driven AFW pump discharge throttle valves to safeguards lineup:

1. Place the turbine driven AFW pump discharge throttle valves to each steam generator in latched detent open. (Reference Step 3.1.5)

   o AL HK-8A for S/G A - LATCHED DETENT OPEN ____/____

   Verified ____/____

   o AL HK-10A for S/G B - LATCHED DETENT OPEN ____/____

   Verified ____/____

   o AL HK-12A for S/G C- LATCHED DETENT OPEN ____/____

   Verified ____/____

   o AL HK-6A for S/G D - LATCHED DETENT OPEN ____/____

   Verified ____/____

6.2.11 IF stopping the turbine driven AFW pump after auto start, THEN perform the following.

1. Open Loop 3 Warmup Steam To AFP Turbine.

   o AB HIS-49 - OPEN ____/____

   Verified ____/____

2. Open Loop 2 Warmup Steam To AFP Turbine.

   o AB HIS-48 - OPEN ____/____

   Verified ____/____

6.2.12 Section 6.2 complete. ____/____

7.0 RECORDS

7.1 The following QA records are generated by this procedure:

7.1.1 Section 5.0

7.1.2 Section 6.0

-END-

WOLF CREEK
NUCLEAR OPERATING CORPORATION

SYS EG-201

TRANSFERRING SUPPLY OF CCW SERVICE LOOP AND CCW TRAIN SHUTDOWN

Responsible Manager

Manager Operations

Revision Number	22
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21D

DC12 03/12/2001

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1.0 PURPOSE

1.1 This procedure provides instructions for transferring supply of the component cooling water (CCW) service loop between CCW trains.

2.0 SCOPE

2.1 This procedure transfers the component cooling water non-safety related service loop from one CCW train to the other CCW train.

2.2 This procedure secures the CCW train that was previously supplying the CCW non-safety related service loop at the discretion of the Shift Supervisor.

2.3 This procedure transfers CCW supplies to PASS sample coolers.

2.4 This procedure will partially satisfy the exercise ¤ requirements associated with ASME Code Case OMN-1 for valves ¤ EGHV0015 and EGHV0016 ¤

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 M-12EG01(Q)

3.1.2 M-12EG02(Q)

3.1.3 M-02EG03(Q)

3.1.4 M-12EF02(Q)

3.1.5 ED 95-0059, OPERATION OF THE COMPONENT COOLING WATER SYSTEM BELOW 60°F

3.1.6 PMR 2149

3.1.7 E-03EG01A

3.1.8 E-03EG01B

3.1.9 E-03EG01C

3.1.10 E-03EG01D

3.1.11 E-13EG03

3.1.12 E-13EG05A

3.1.13 E-13EG05B

3.1.14 E-11PG21

3.1.15 SFR 1-EG-43, "Closing Surge Tank Vent Valves During Switch Over"

3.1.16 Calculation EG-24, "CCW Nuclear Auxiliary Component Train Switch Over Single Valve Failure Analysis"

3.1.17 STS VT-001, VERIFICATION OF OMN-1, MOV EXCERCISE ¤ REQUIREMENTS. ¤

3.2 Commitments

3.2.1 WM 90-0013 Updated response to NRC Bulletin 88-04, Engineering Disposition CWR 01404-90, Rev. 1 (Low Flow Cavitation)

3.2.2 PIR 96-0316, INADEQUATE WARMING LINE DESIGN

3.2.3 PIR 97-0958, Unplanned LCO Entry due to CCW Surge Tank Level Indication Concerns During Train Swap

4.0 PRECAUTIONS/LIMITATIONS

4.1 IF CCW to the service loop is lost, THEN it must be restored before reactor coolant pump motor bearing temperatures increase to 195°F or the reactor coolant pumps must be stopped.

4.2 IF a CCW train is being secured, THEN ensure there are no ECCS pumps operating in the train being secured.

4.3 WHEN opening OR closing the service loop supply and return valves for either train AND a valve fails to reposition as desired, THEN a condition could exist where one train could empty and the other train overfill. This situation is prevented by closing the surge tank vent valve for the affected train before starting the evolution and opening the valve after the evolution. (3.1.15, 3.1.16) [3.2.3]

4.4 Component cooling water pump flow must be greater than 1.5 E6 lbs/hr for continuous operation. Refer to Standing Order 17. [3.2.1]

4.5 During Modes 5, 6 or Defueled when lake temperature is below 35°F operation of an ESW pump is prohibited unless an associated CCW pump and the corresponding train CCW heat exchanger are in service. [3.2.2]

INIT/DATE

5.0 PREREQUISITES

5.1 Either CCW train A or CCW train B is supplying the service loop and the associated safety loop. _____ ,

5.2 IF both CCW pumps in a train are to be secured, THEN the following must be met or the ESW pump in that train must be declared inoperable: [3.2.2] N/A if not securing a CCW train.

o The plant is in Mode 1, 2, 3 or 4 or lake temperature is greater than 35°F. _____ ,

INIT/DATE

6.0 PROCEDURE

6.1 Transferring CCW Service Loop To Train A

6.1.1 Start desired Train A CCW pump: N/A if Train A CCW pump already running.

1. Turn off the motor space heater supply breaker for the CCW pump to be started. N/A the other breaker.

   * PG19NJF118 for CCW Pump A - OFF ☐
   * PG19NJF119 for CCW Pump C - OFF ☐

2. Start desired CCW pump. N/A other pump.

   * EG HIS-21 for CCW Pump A - STARTED ☐
   * EG HIS-23 for CCW Pump C - STARTED ☐

3. Verify operating CCW Pump discharge flow is greater than 1.5 E6 lbs/hr (3000 gpm). N/A non-running train. [3.2.1]

   * EG FI-95 or EGF0095 for CCW pump A - GREATER THAN 1.5 E6 LBS/HR (3000 GPM) ☐
   * EG FI-97 or EGF0097 for CCW pump C - GREATER THAN 1.5 E6 LBS/HR (3000 GPM) ☐

4. IF operating CCW pump discharge flow is less than 1.5 E6 lbs/hr, THEN refer to Standing Order 17. ☐

6.1.2 Locally verify CCW Train A Pump Room Cooler running.

o SGL11A - RUNNING ☐

6.1.3 IF CCW pump A was started, THEN verify proper room cooler damper alignment:

1. Locally check CCW Pump A Room Cooler 11A Discharge Isolation Damper open:

   o GL-D156 - OPEN ☐

2. Locally check CCW Pump C Room Cooler 11A Discharge Isolation Damper closed:

   o GL-D157 - CLOSED ☐

INIT/DATE

6.1.4 IF CCW pump C was started, THEN verify proper room cooler damper alignment:

1. Locally check CCW Pump C Room Cooler 11A Discharge Isolation Damper open:

   o GL-D157 - OPEN ☐

2. Locally check CCW Pump A Room Cooler 11A Discharge Isolation Damper closed:

   o GL-D156 - CLOSED ☐

6.1.5 IF RHR train B is NOT in service, THEN ensure Spent Fuel Pool Heat Exchanger B CCW Outlet Valve is open to provide a flow path for CCW train B.

o EC HIS-12 - OPEN ☐

6.1.6 Close CCW Surge Tank A and B Vent Valves. [3.2.3]

o EG HIS-9 - CLOSED ☐

AND

o EG HIS-10 - CLOSED ☐

NOTE

Annunciator 00-051F, CCW SPLY RTN VLVS MISALIGN, will alarm until Step 6.1.8 is completed.

6.1.7 **(❒)** Open CCW Train A Supply/Return Valves.

o EG HS-15 - OPEN ☐

6.1.8 Close CCW Train B Supply/Return Valves.

o EG HS-16 - CLOSED ☐

6.1.9 Verify CCW To RW and RCS Flow indication.

o EG FI-55A - BETWEEN 1.6×10^6 and 4.3×10^6 lbm/hr ☐

INIT/DATE

6.1.10 Open CCW Surge Tank A and B Vent Valves. [3.2.3]

o EG HIS-9 - OPEN ☐

AND

o EG HIS-10 - OPEN ☐

6.1.11 Section 6.1 complete _____ /

INIT/DATE

6.2 Transfer Of CCW Supply To Post Accident Sampling Station Coolers

6.2.1 Inform Chemistry of a momentary loss of cooling flow to the PASS sample coolers while transfer is taking place. ☐

6.2.2 Locally close and lock CCW Train B Supply To Post Accident Sampling Station Coolers.

o EG-V413 - CLOSED AND LOCKED _____ ,

Verified _____ ,

6.2.3 Locally close and lock CCW Train B Return From Post Accident Sampling Station Coolers.

o EG-V415 - CLOSED AND LOCKED _____ ,

Verified _____ ,

6.2.4 Locally unlock and open CCW Train A Supply To Post Accident Sampling Station Coolers.

o EG-V414 - UNLOCKED AND OPEN _____ ,

Verified _____ ,

6.2.5 Locally unlock and open CCW Train A Return From Post Accident Sampling Station Coolers.

o EG-V416 - UNLOCKED AND OPEN _____ ,

Verified _____ ,

6.2.6 Record the above valve manipulations in the "Log of Locked Component Manipulations" as follows:

1. Complete the "Installing Locking Device" section of the log for the following valves:

   o EG-V413 - CLOSED AND LOCKED ☐
   o EG-V415 - CLOSED AND LOCKED ☐

2. Make an entry in to the "Removing Locking Device" section of the log for the following valves:

   o EG-V414 - UNLOCKED AND OPEN ☐
   o EG-V416 - UNLOCKED AND OPEN ☐

INIT/DATE

6.2.7 Section 6.2 complete. _____ ,

INIT/DATE

6.3 Securing CCW Train B

6.3.1 Ensure all train B ECCS pumps - STOPPED ☐

6.3.2 Align Spent Fuel Pool Cooling Train A for operation using SYS EC-120, FUEL POOL COOLING AND CLEANUP SYSTEM STARTUP. ☐

6.3.3 Stop the running train B CCW pump(s). N/A other pump.

* EG HIS-22 for pump B - STOPPED ☐
* EG HIS-24 for pump D - STOPPED ☐

6.3.4 Ensure the motor space heater breakers for the CCW pumps are turned on.

* PG20GBR240 for CCW pump B - ON ☐
* PG20GBR241 for CCW pump D - ON ☐

6.3.5 Section 6.3 complete. _____ ,

INIT/DATE

6.4 Transferring CCW Service Loop To Train B

6.4.1 Start desired Train B CCW pump: N/A if Train B CCW pump already running.

1. Turn off the motor space heater supply breaker for the CCW pump to be started. N/A the other breaker.

   * PG20GBR240 for CCW Pump B - OFF ☐
   * PG20GBR241 for CCW Pump D - OFF ☐

2. Start desired CCW pump. N/A other pump.

   * EG HIS-22 for CCW Pump B - STARTED ☐
   * EG HIS-24 for CCW Pump D - STARTED ☐

3. Verify operating CCW Pump discharge flow is greater than 1.5 E6 lbs/hr (3000 gpm). N/A non-running train. [3.2.1]

   * EG FI-96 or EGF0096 for CCW pump B - GREATER THAN 1.5 E6 LBS/HR (3000 GPM) ☐
   * EG FI-98 or EGF0098 for CCW pump D - GREATER THAN 1.5 E6 LBS/HR (3000 GPM) ☐

4. IF operating CCW pump discharge flow is less than 1.5 E6 lbs/hr, THEN refer to Standing Order 17. ☐

6.4.2 Locally verify CCW train B Pump Room Cooler running.

o SGL11B - RUNNING ☐

6.4.3 IF RHR train A is NOT in service, THEN ensure Spent Fuel Pool Heat Exchanger A CCW Outlet Valve is open to provide a flow path for CCW train A.

o EC HIS-11 - OPEN ☐

6.4.4 Close CCW Surge Tank A and B Vent Valves. [3.2.3]

o EG HIS-9 - CLOSED ☐

AND

o EG HIS-10 - CLOSED ☐

INIT/DATE

NOTE

Annunciator 00-051F, CCW SPLY RTN VLVS MISALIGN, will alarm until Step 6.4.6 is completed.

6.4.5 **(❒)** Open CCW Train B Supply/Return Valves.

o EG HS-16 - OPEN ☐

6.4.6 Close CCW Train A Supply/Return Valves.

o EG HS-15 - CLOSED ☐

6.4.7 Verify CCW To RW and RCS Flow indication.

o EG FI-55A - BETWEEN 1.6×10^6 and 4.3×10^6 lbm/hr ☐

6.4.8 Open CCW Surge Tank A and B Vent Valves. [3.2.3]

o EG HIS-9 - OPEN ☐

AND

o EG HIS-10 - OPEN ☐

6.4.9 Section 6.4 complete. _____ /

INIT/DATE

6.5 Transfer Of CCW Supply To Post Accident Sampling Station Coolers

6.5.1 Inform Chemistry of a momentary loss of cooling flow to the PASS sample coolers while transfer is taking place. ☐

6.5.2 Locally close and lock CCW Train A Supply To Post Accident Sampling Station Coolers.

o EG-V414 - CLOSED AND LOCKED _____ ,

Verified _____ ,

6.5.3 Locally close and lock CCW Train A Return From Post Accident Sampling Station Coolers.

o EG-V416 - CLOSED AND LOCKED _____ ,

Verified _____ ,

6.5.4 Locally unlock and open CCW Train B Supply To Post Accident Sampling Station Coolers.

o EG-V413 - UNLOCKED AND OPEN _____ ,

Verified _____ ,

6.5.5 Locally unlock and open CCW Train B Return From Post Accident Sampling Station Coolers.

o EG-V415 - UNLOCKED AND OPEN _____ ,

Verified _____ ,

6.5.6 Record the above valve manipulations in the "Log of Locked Component Manipulations" as follows:

1. Complete the "Installing Locking Device" section of the log for the following valves:

   o EG-V414 - CLOSED AND LOCKED ☐
   o EG-V416 - CLOSED AND LOCKED ☐

2. Make an entry in to the "Removing Locking Device" section of the log for the following valves:

   o EG-V413 - UNLOCKED AND OPEN ☐
   o EG-V415 - UNLOCKED AND OPEN ☐

INIT/DATE

6.5.7 Section 6.5 complete. _____ ,

INIT/DATE

6.6 Securing CCW Train A

6.6.1 Ensure all train A ECCS pumps - STOPPED ☐

6.6.2 Align Spent Fuel Pool Cooling Train B for operation using SYS EC-120, FUEL POOL COOLING AND CLEANUP SYSTEM STARTUP. ☐

6.6.3 Stop the running train A CCW pump(s). N/A other pump.

* EG HIS-21 for pump A - STOPPED ☐
* EG HIS-23 for pump C - STOPPED ☐

6.6.4 Ensure the motor space heater breakers for the CCW pumps are turned on.

* PG19NJF118 for CCW pump A - ON ☐
* PG19NJF119 for CCW pump C - ON ☐

6.6.5 Section 6.6 complete. _____ ,

7.0 RECORDS

7.1 The following QA records are generated by this procedure:

7.1.1 Section 5.0

7.1.2 Section 6.0

-END-

WOLF CREEK
NUCLEAR OPERATING CORPORATION

SYS EP-200

SAFETY INJECTION ACCUMULATOR OPERATIONS

Responsible Manager

Manager Operations

Revision Number	23
Use Category	Continuous
Administrative Controls Procedure	No
Infrequently Performed Procedure	No
Program Number	21D

DC4 03/14/2001

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1.0 PURPOSE

1.1 This procedure provides instructions for maintaining SI accumulator tank level and pressure.

2.0 SCOPE

2.1 This procedure provides instructions to increase accumulator level in Modes 1, 2, or 3 above 1700 psig.

2.2 This procedure provides instructions to increase accumulator level in Mode 3 below 1700 psig.

2.3 This procedure provides instructions to increase accumulator level in Modes 4, 5, 6, or Defueled using SI pump A.

2.4 This procedure provides instructions to increase accumulator level in Modes 4, 5, 6, or Defueled using SI pump B.

2.5 This procedure provides instructions to decrease accumulator level.

2.6 This procedure provides instructions to increase accumulator pressure.

2.7 This procedure provides instructions to decrease accumulator pressure.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 M-12EP01 (Q)

3.1.2 M-12EM01 (Q)

3.1.3 M-12HE01

3.1.4 M-12HE02

3.1.5 M-12BN01 (Q)

3.1.6 SER 21-87

3.1.7 PIR 99-0429, During the scheduled safety injection pump surveillance run, it was observed that relief valve (EM8851) in the SIP common cold leg injection line had lifted and was passing flow.

3.1.8 CCP 09289 SI Pump discharge relief valve setpoint increase.

3.2 Commitments

3.2.1 LER 86-025, KMLNRC 86-100, Closure Of Valve EM HV-8835 Renders Both Trains Of Safety Injection Inoperable. (RCMS # 86-249)

3.2.2 PIR 97-0143, Entry Into T.S. Due To Low Accumulator Temperature

4.0 PRECAUTIONS/LIMITATIONS

4.1 Maintain SI accumulators level, pressure and boron ¤ concentration in accordance with Technical ¤ Specification 3.5.1. ¤

4.2 WHEN RCS temperature is less than or equal to 350°F, THEN the ¤ safety injection pump to be used to fill accumulators must be ¤ isolated from the RCS by a closed isolation valve with power ¤ removed, OR by a manual isolation valve secured in the closed ¤ position in accordance with Technical Specification 3.5.3 or ¤ 3.4.12 ¤

4.3 The refueling water storage tank shall be operable in ¤ accordance with TR 3.1.9 or TR 3.1.10 and Technical ¤ Specification 3.5.4. ¤

4.4 IF RCS temperature is greater than or equal to 350°F AND accumulator level must be increased, THEN ensure one of the following conditions is met: [3.2.1]

* Decrease RCS temperature to less than 350°F.

OR

* Increase RCS pressure to greater than 1700 psig.

OR

* Enter Technical Specification 3.5.2. ¤

4.5 IF the accumulators are filled from the RWST AND the RWST has ¤

not been diluted since verifying that its boron concentration
¤
is within the limits of Technical Specification 3.5.4, THEN
¤
Chemistry sample of the accumulators is not required.
¤

4.6 Accumulator level should not be adjusted between accumulators by use of fill lines. The globe valves in the fill lines are not designed for backflow and damage may result. (3.1.6)

4.7 Frequent filling of SI Accumulators may indicate improper check valve seating at RCS pressures below 1800 psig. Refer to SYS EP-201, SEATING ACCUMULATOR SAFETY INJECTION LINE CHECK VALVES, to seat the check valves.

4.8 IF accumulator leakage is present, THEN running the SI pump on recirc for between 5 minutes and 10 minutes after the accumulators have been filled may reseat the leaking check valve and reduce accumulator leakage.

4.9 SI Pump discharge relief valves have been known to lift on ¤ pump start. CCP 09289 installed discharge relief valves with ¤ a higher lift setpoint. IF the discharge relief valves are ¤ still suspected of lifting on pump starts, THEN the pump ¤ discharge valves should be closed. Contact the system ¤ engineer for clarification. ¤

4.10 Closing SI pump A Discharge Valve, EM HV-8821A will cause SI pump A to be inoperable.

4.11 Closing SI pump B Discharge Valve, EM HV-8821B will cause SI pump B to be inoperable.

4.12 IF using SI pump B to increase accumulator level in Mode 4, 5, 6, or Defueled, THEN closing EM HIS-8835, SI Pumps To Cold Leg Injection valve will cause both SI pumps to be inoperable.

4.13 Accumulator operating temperatures must be maintained between 45°F and 120°F per USAR Table 6.3-1. [3.2.2]

INIT/DATE

5.0 PREREQUISITES

5.1 CKL EP-120, ACCUMULATOR SAFETY INJECTION LINEUP, is complete. _____ ,

5.2 CKL EM-120, SAFETY INJECTION SYSTEM LINEUP CHECKLISTS, is complete. _____ ,

5.3 CKL BN-120, REFUELING WATER STORAGE SYSTEM LINEUP, is complete. _____ ,

NOTE

Pressurizing accumulators from atmospheric pressure to minimum technical specification pressure of 585 psig will require at least 65 inches of nitrogen.

5.4 IF increasing accumulator tank pressure, THEN the Nitrogen Supply System is available. _____ ,

5.5 IF required, THEN the Boron Recycle System is available to decrease accumulator tank level. _____ ,

5.6 IF initial level is below indicating range, THEN accumulator vent valves are open prior to filling. _____ ,

5.7 IF SI pump will be run, THEN the proper CCW train for the SI pump to be run is in service: (N/A other train).

5.7.1 CCW train A for SIP A - RUNNING _____ ,

5.7.2 CCW train B for SIP B - RUNNING _____ ,

5.8 IF Section 6.1 or 6.2 is being performed, THEN ensure both SI Train A and B are operable. _____ ,

INIT/DATE

6.0 PROCEDURE

6.1 Increasing Accum Level In Modes 1, 2, Or 3 Above 1700 PSIG

NOTE

Step 6.1.1 is intended to minimize high pressure alarms caused by the pressure increase associated with raising accumulator level. If an alarm is received due to high pressure while filling an accumulator, the alarm should clear after the accumulator cools to ambient temperature.

6.1.1 IF accumulator level is less than 45% AND accumulator pressure is greater than 619 psig, THEN adjust accumulator pressure to less than 619 psig using section 6.7, Decreasing Accum Pressure.

6.1.2 Record RCS pressure read on any of the following indicators:
(N/A indicators not used)

* BB PI-455A - _____ _____
* BB PI-456 - _____ _____
* BB PI-457 - _____ _____
* BB PI-458 - _____ _____

NOTE

Depressurizing the RHR header should reduce back pressure on check valves EP-8818A, B, C and D, allowing the check valves to seat while the SI pump is running. This step should be performed at SM/CRS discretion.

6.1.3 IF desired, THEN depressurize the RHR header as follows:

1. Ensure either RHR To Accumulator Injection Test Line Valve is open.

   (N/A other valve)

   * EJ HIS-8890A - OPEN ☐

   OR

   * EJ HIS-8890B - OPEN ☐

INIT/DATE

2. Ensure SI System Test Line Outer Containment Isolation Valve is open.

   o EM HIS-8964 - OPEN ☐

3. Ensure SI System Test Line Inner Containment Isolation Valve is open.

   o EM HIS-8871 - OPEN ☐

6.1.4 IF using SI pump A to fill accumulators, THEN perform the following:

1. Ensure SI Pump A Recirc To RWST isolation valve is open.

   o EM HIS-8814A - OPEN ☐

2. Ensure SI Pumps Recirc To RWST isolation valve is open.

   o BN HIS-8813 - OPEN ☐

NOTE

Closing EM HIS-8821A, SI PUMP DISCH TO C/L causes the SI Pump A C/L injection path to be inoperable, refer to Tech. Spec. 3.5.2

3. IF SI Pump discharge relief valves are expected to lift on pump start, THEN Close SI Pump A Disch to C/L Inj Iso Valve. (3.1.7)

   o EM HIS-8821A - CLOSED ☐

4. Start SI Pump A.

   o EM HIS-4 - STARTED ☐

5. IF closed to prevent discharge relief valve lift, THEN Open SI Pump A Disch to C/L Inj Iso Valve. (3.1.7)

o EM HIS-8821A - OPEN

INIT/DATE

6.1.5 IF using SI pump B to fill accumulators, THEN perform the following:

1. Ensure SI Pump B Recirc To RWST isolation valve is open.

   o EM HIS-8814B - OPEN ☐

2. Ensure SI Pumps Recirc To RWST isolation valve is open.

   o BN HIS-8813 - OPEN ☐

NOTE

Closing EM HIS-8821B, SI PUMP DISCH TO C/L causes the SI Pump B C/L injection path to be inoperable, refer to Tech. Spec. 3.5.2

3. IF SI Pump discharge relief valves are expected to lift on pump start, THEN Close SI Pump B Disch to C/L Inj Iso Valve. (3.1.7)

   o EM HIS-8821B - CLOSED ☐

4. Start SI Pump B.

   o EM HIS-5 - STARTED ☐

5. IF closed to prevent discharge relief valve lift, THEN Open SI Pump B Disch to C/L Inj Iso Valve. (3.1.7)

   o EM HIS-8821B - OPEN ☐

6.1.6 Open Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - OPEN ☐

INIT/DATE

NOTE

If the RWST boron concentration is within T.S. and TRM limits, Chemistry sample of the accumulators is not required.

6.1.7 IF filling accumulator tank A, THEN perform the following:

1. Record initial Accumulator Tank A Level from the highest reading indicator. (N/A indicator not used)

   * EP LI-950 - _____ _____

   OR

   * EP LI-951 - _____ _____

2. Open Accumulator Tank A Fill Line Valve.

   o EP HIS-8878A - OPEN ☐

3. WHEN Accumulator Tank A Level is between 55% and 58% on the highest reading indicator, THEN close Accumulator Tank A Fill Line Valve. (N/A indicator not used)

   * EP LI-950 - BETWEEN 55% AND 58% ☐

   OR

   * EP LI-951 - BETWEEN 55% AND 58% ☐

   AND

   o EP HIS-8878A - CLOSED ☐

4. Record change in accumulator tank A level.

o Final level - Initial level =____%
level change
_____
/

INIT/DATE

6.1.8 IF filling accumulator tank B, THEN perform the following:

1. Record initial Accumulator Tank B Level ¤ from the highest reading indicator. ¤ (N/A other indicator) ¤

   * EP LI-952 - _____ _____ ,

   OR

   * EP LI-953 - _____ _____ ,

2. Open Accumulator Tank B Fill Line Valve.

   o EP HIS-8878B - OPEN ☐

3. WHEN Accumulator Tank B Level is ¤ between 55% and 58% on the highest ¤ reading indicator, THEN close ¤ Accumulator Tank B Fill Line Valve. ¤ (N/A indicator not used) ¤

   * EP LI-952 - BETWEEN 55% AND 58% ☐

   OR

   * EP LI-953 - BETWEEN 55% AND 58% ☐

   AND

   o EP HIS-8878B - CLOSED ☐

4. Record change in accumulator tank B level.

   o Final level - Initial level =____ % level change _____ ,

6.1.9 IF filling accumulator tank C, THEN perform the following:

1. Record initial Accumulator Tank C Level ¤ from the highest reading indicator. ¤

(N/A indicator not used)
¤

* EP LI-954 - _____ _____
,

OR

* EP LI-955 - _____ _____
,

INIT/DATE

2. Open Accumulator Tank C Fill Line Valve.

   o EP HIS-8878C - OPEN ☐

3. WHEN Accumulator Tank C Level is between 55% and 58% on the highest reading indicator, THEN close Accumulator Tank C Fill Line Valve. (N/A indicator not used)

   o EP LI-954 - BETWEEN 55% AND 58% ☐

   OR

   * EP LI-955 - BETWEEN 55% AND 58% ☐

   AND

   o EP HIS-8878C - CLOSED ☐

4. Record change in accumulator tank C level.

   o Final level - Initial level =____ % level change _____ ,

6.1.10 IF filling accumulator tank D, THEN perform the following:

1. Record initial Accumulator Tank D Level from the highest reading indicator. (N/A indicator not used)

   * EP LI-956 - _____ _____ ,

   OR

   * EP LI-957 - _____ _____ ,

2. Open Accumulator Tank D Fill Line Valve.

   o EP HIS-8878D - OPEN ☐

INIT/DATE

3. WHEN Accumulator Tank D Level is between 55% and 58% on the highest reading indicator, THEN close Accumulator Tank D Fill Line Valve. (N/A indicator not used)

   o EP LI-956 - BETWEEN 55% AND 58% ☐

   OR

   * EP LI-957 - BETWEEN 55% AND 58% ☐

   AND

   o EP HIS-8878D - CLOSED ☐

4. Record change in accumulator tank D level.

   o Final level - Initial level =____ % level change _____

6.1.11 Close Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - CLOSED ☐

NOTE

Running the SI pump on recirc for between 5 minutes and 10 minutes following accumulator fill may reseat a leaking check valve and reduce accumulator leakage.

6.1.12 IF accumulator leakage is present, THEN allow the SI pump to run on recirc for between 5 minutes and 10 minutes. ☐

6.1.13 Stop SI pump being used to fill. (N/A other pump)

* EM HIS-4 for SI pump A - STOPPED ☐

OR

* EM HIS-5 for SI pump B - STOPPED ☐

INIT/DATE

6.1.14 Ensure both RHR To Accumulator Injection Test Line Valves are closed.

o EJ HIS-8890A - CLOSED ☐

AND

o EJ HIS-8890B - CLOSED ☐

CAUTION

Closing EM HIS-8964 and EM HIS-8871, SI System Test Line Inner and Outer Containment Isolation Valves, may cause RHR discharge relief to lift due to leakage past check valves.

6.1.15 IF SI System Test Line Inner And Outer Containment Isolation Valves are NOT being used for a relief path in accordance with SYS EJ-323, RHR SYSTEM DEPRESSURIZATION, THEN close both SI test line containment isolation valves.

o EM HIS-8964 - CLOSED ☐

AND

o EM HIS-8871 - CLOSED ☐

NOTE

If Chemistry sample is required, satisfactory results must be obtained within 6 hours or the affected accumulator must be declared inoperable per Tech. Spec. 3.5.1

6.1.16 IF any of the following conditions are met, THEN direct Chemistry to sample the affected accumulators. _____

* RWST boron concentration can not be verified within USAR limits.

OR

* RWST boron concentration has been diluted since last Chemistry sample.

6.1.17 Section 6.1, Increasing Accum Level In Modes 1, 2, Or 3 Above 1700 PSIG, is complete. _____

INIT/DATE

6.2 Increasing Accum Level In Mode 3 Below 1700 PSIG

6.2.1 IF RCS temperature is greater than or equal to 350°F AND accumulator level must be increased, THEN ensure one of the following conditions is met: [3.2.1]

* Decrease RCS temperature to less than 350°F and fill the accumulator using either of the following sections of this procedure:
  * 6.3, Increasing Accum Level In Mode 4, 5, 6, Or Defueled Using SI Pump A ☐
  * 6.4, Increasing Accum Level In Mode 4, 5, 6, Or Defueled Using SI Pump B ☐

  OR

* Increase RCS pressure to greater than 1700 psig and fill the accumulators using Section 6.1. ☐

  OR

* WHEN SI Pump A Discharge To Cold Leg Injection valve is closed, THEN enter Tech. Spec. 3.5.2. ☐

NOTE

Step 6.2.2 is intended to minimize high pressure alarms caused by the pressure increase associated with raising accumulator level. If an alarm is received due to high pressure while filling an accumulator, the alarm should clear after the accumulator cools to ambient temperature.

6.2.2 IF accumulator level is less than 45%, AND

accumulator pressure is greater than
¤
619 psig THEN adjust accumulator pressure
¤
to less than 619 psig using section 6.7 of
¤
this procedure:
¤

6.2.3 Record RCS pressure read on any of the following indicators:
(N/A indicators not used.)

* BB PI-403 - _____ _____
* BB PI-405 - _____ ´_____
* BB PI-406 - _____ ´_____
´

INIT/DATE

6.2.4 Ensure SI Pump A Recirc To RWST isolation valve is open.

o EM HIS-8814A - OPEN ☐

6.2.5 Ensure SI Pumps Recirc To RWST isolation valve is open.

o BN HIS-8813 - OPEN ☐

NOTE

Closing EM HIS-8821A, SI PUMP DISCH TO C/L causes the SI Pump A C/L injection path to be inoperable, refer to Tech. Spec. 3.5.2

6.2.6 Close SI Pump A Discharge To Cold Leg Injection Valve.

o EM HIS-8821A - CLOSED ☐

6.2.7 Ensure SI Pump A Discharge To Hot Leg Injection valve is closed.

o EM HIS-8802A - CLOSED ☐

6.2.8 Start SI Pump A.

o EM HIS-4 - STARTED ☐

6.2.9 Open Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - OPEN ☐

INIT/DATE

NOTE

If the RWST boron concentration is within T.S. and TRM limits, Chemistry sample of the accumulators is not required.

6.2.10 IF filling accumulator tank A, THEN perform the following:

1. Record initial Accumulator Tank A Level from the highest reading indicator. (N/A indicator not used)

   * EP LI-950 - _____ _____

   OR

   * EP LI-951 - _____ _____

2. Open Accumulator Tank A Fill Line Valve.

   o EP HIS-8878A - OPEN ☐

3. WHEN Accumulator Tank A Level is between 55% and 58% on the highest reading indicator, THEN close Accumulator Tank A Fill Line Valve. (N/A indicator not used)

   o EP LI-950 - BETWEEN 55% AND 58% ☐

   OR

   * EP LI-951 - BETWEEN 55% AND 58% ☐

   AND

   o EP HIS-8878A - CLOSED ☐

4. Record change in accumulator tank A level.

o Final level - Initial level =____%
level change
_____
/

INIT/DATE

6.2.11 IF filling accumulator tank B, THEN perform the following:

1. Record initial Accumulator Tank B Level ¤ from the highest reading indicator. ¤ (N/A indicator not used) ¤

   * EP LI-952 - _____ _____ ,

   OR

   * EP LI-953 - _____ _____ ,

2. Open Accumulator Tank B Fill Line Valve.

   o EP HIS-8878B - OPEN ☐

3. WHEN Accumulator Tank B Level is ¤ between 55% and 58% on the highest ¤ reading indicator, THEN close ¤ Accumulator Tank B Fill Line Valve. ¤ (N/A indicator not used) ¤

   * EP LI-952 - BETWEEN 55% AND 58% ☐

   OR

   * EP LI-953 - BETWEEN 55% AND 58% ☐

   AND

   o EP HIS-8878B - CLOSED ☐

4. Record change in accumulator tank B level.

   o Final level - Initial level =____ % level change _____ ,

6.2.12 IF filling accumulator tank C, THEN perform the following:

1. Record initial Accumulator Tank C Level ¤ from the highest reading indicator. ¤

(N/A indicator not used)
¤

* EP LI-954 - _____ _____
,

OR

* EP LI-955 - _____ _____
,

INIT/DATE

2. Open Accumulator Tank C Fill Line Valve.

   o EP HIS-8878C - OPEN ☐

3. WHEN Accumulator Tank C Level is between 55% and 58% on the highest reading indicator, THEN close Accumulator Tank C Fill Line Valve.
   (N/A indicator not used)

   * EP LI-954 - BETWEEN 55% AND 58% ☐

   OR

   * EP LI-955 - BETWEEN 55% AND 58% ☐

   AND

   o EP HIS-8878C - CLOSED ☐

4. Record change in accumulator tank C level.

   o Final level - Initial level =____ % level change _____ ,

6.2.13 IF filling accumulator tank D, THEN perform the following:

1. Record initial Accumulator Tank D Level from the highest reading indicator.
   (N/A indicator not used)

   * EP LI-956 - _____ _____ ,

   OR

   * EP LI-957 - _____ _____ ,

2. Open Accumulator Tank D Fill Line Valve.

   o EP HIS-8878D - OPEN ☐

INIT/DATE

3. WHEN Accumulator Tank D Level is between 55% and 58% on the highest reading indicator, THEN close Accumulator Tank D Fill Line Valve.
(N/A indicator not used)

* EP LI-956 - BETWEEN 55% AND 58% ☐

OR

* EP LI-957 - BETWEEN 55% AND 58% ☐

AND

o EP HIS-8878D - CLOSED ☐

4. Record change in accumulator tank D level.

o Final level - Initial level =____ % level change _____ ′

6.2.14 Close Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - CLOSED ☐

6.2.15 Stop SI Pump A.

o EM HIS-4 - STOPPED ☐

6.2.16 Open SI Pump A Discharge To Cold Leg Injection Valve.

o EM HIS-8821A - OPEN

Verified _____ ′ _____ ′

6.2.17 Position SI Pump A Discharge To Hot Leg Injection valve as directed by the SM/CRS.
(N/A position not used)

* EM HIS-8802A - OPEN ☐

OR

* EM HIS-8802A - CLOSED ☐

INIT/DATE

NOTE

If Chemistry sample is required and RCS pressure is greater than 1000 psig, satisfactory results must be obtained within 6 hours or the affected accumulator must be declared inoperable per Tech. Spec. 3.5.1.

6.2.18 IF any of the following conditions are met, THEN direct Chemistry to sample the affected accumulators. _____

* RWST boron concentration can not be verified within USAR limits.

OR

* RWST boron concentration has been diluted since last Chemistry sample.

6.2.19 Section 6.2, Increasing Accum Level In Mode 3 Below 1700 PSIG, is complete. _____

INIT/DATE

6.3 Increasing Accum Level In Mode 4, 5, 6, Or Defueled Using SI Pump A

NOTE

When RCS temperature is less than or equal to 350°F, the safety injection pump used to fill accumulators must be isolated from the RCS by a closed isolation valve with power removed, OR by a manual isolation valve secured in the closed position.

6.3.1 Ensure SI Pump A Discharge To Cold Leg Injection Valve is closed.

o EM HIS-8821A - CLOSED ☐

6.3.2 Ensure SI Pump A Discharge Accumulator Injection Isolation Valve EM HV-8821A breaker is off.

o NG01ADR1 - OFF ☐

6.3.3 Ensure SI Pump A Discharge To Hot Leg Injection valve is closed.

o EM HIS-8802A - CLOSED ☐

6.3.4 Ensure Power Lockout For EM HV-8802A is in ISO.

o EM HIS-8802AA - IN ISO ☐

6.3.5 Ensure SI Pump A Recirc To RWST isolation valve is open.

o EM HIS-8814A - OPEN ☐

6.3.6 Ensure SI Pumps Recirc To RWST isolation valve is open.

o BN HIS-8813 - OPEN ☐

6.3.7 Remove Clearance Order on SI pump A. ☐

6.3.8 Rack up SI Pump A breaker.

o NB0103 - RACKED UP ☐

6.3.9 Start SI Pump A.

o EM HIS-4 - STARTED ☐

INIT/DATE

6.3.10 Open Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - OPEN ☐

6.3.11 IF filling accumulator tank A, THEN perform the following:

1. Record initial Accumulator Tank A Level ¤ from the highest reading indicator. ¤ (N/A indicator not used) ¤

   * EP LI-950 - _____ _____ ,

   OR

   * EP LI-951 - _____ _____ ,

2. Open Accumulator Tank A Fill Line Valve.

   o EP HIS-8878A - OPEN ☐

3. WHEN Accumulator Tank A Level is between 55% and 58% on the highest reading indicator OR as directed by SM/CRS THEN close Accumulator Tank A Fill Line Valve. (N/A indicator not used)

   * EP LI-950-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   OR

   * EP LI-951-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   AND

   o EP HIS-8878A - CLOSED ☐

4. Record change in accumulator tank A level.

   o Final level - Initial level =____ % level change _____ ,

INIT/DATE

6.3.12 IF filling accumulator tank B, THEN perform the following:

1. Record initial Accumulator Tank B Level ¤ from the highest reading indicator. ¤ (N/A indicator not used) ¤

   * EP LI-952 - _____ _____ ,

   OR

   * EP LI-953 - _____ _____ ,

2. Open Accumulator Tank B Fill Line Valve.

   o EP HIS-8878B - OPEN ☐

3. WHEN Accumulator Tank B Level is between 55% and 58% on the highest reading indicator OR as directed by SM/CRS THEN close Accumulator Tank B Fill Line Valve. (N/A indicator not used)

   * EP LI-952-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   OR

   * EP LI-953-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   AND

   o EP HIS-8878B - CLOSED ☐

4. Record change in accumulator tank B level.

   o Final level - Initial level =____ % level change _____ ,

INIT/DATE

6.3.13 IF filling accumulator tank C, THEN perform the following:

1. Record initial Accumulator Tank C Level ¤ from the highest reading indicator. ¤ (N/A indicator not used) ¤

   * EP LI-954 - _____ _____ ,

   OR

   * EP LI-955 - _____ _____ ,

2. Open Accumulator Tank C Fill Line Valve.

   o EP HIS-8878C - OPEN ☐

3. WHEN Accumulator Tank C Level is between 55% and 58% on the highest reading indicator OR as directed by SM/CRS THEN close Accumulator Tank C Fill Line Valve. (N/A indicator not used)

   * EP LI-954-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   OR

   * EP LI-955-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   AND

   o EP HIS-8878C - CLOSED ☐

4. Record change in accumulator tank C level.

   o Final level - Initial level =____% level change _____ ,

INIT/DATE

6.3.14 IF filling accumulator tank D, THEN perform the following:

1. Record initial Accumulator Tank D Level ¤ from the highest reading indicator. ¤ (N/A indicator not used) ¤

   * EP LI-956 - _____ _____ ,

   OR

   * EP LI-957 - _____ _____ ,

2. Open Accumulator Tank D Fill Line Valve.

   o EP HIS-8878D - OPEN ☐

3. WHEN Accumulator Tank D Level is between 55% and 58% on the highest reading indicator OR as directed by SM/CRS THEN close Accumulator Tank D Fill Line Valve. (N/A indicator not used)

   * EP LI-956-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   OR

   * EP LI-957-BETWEEN 55% AND 58% OR AS ¤ DIRECTED BY SM/CRS ¤ ☐

   AND

   o EP HIS-8878D - CLOSED ☐

4. Record change in accumulator tank D level.

   o Final level - Initial level =____ % level change _____ ,

6.3.15 Close Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - CLOSED ☐

6.3.16 Stop SI Pump A.

o EM HIS-4 - STOPPED

INIT/DATE

6.3.17 Direct Chemistry to sample accumulator ¤ boron concentration to ensure the ¤ requirements of Tech. Spec.3.5.1 are meet prior to going above 1000 psig. ¤ _____ ´

6.3.18 Rack down SI Pump A breaker.

o NB0103 - RACKED DOWN _____

Verified _____ ´ _____ ´

6.3.19 Place a Clearance Order on SI pump A. ☐

6.3.20 Turn on SI Pump A Discharge Accumulator Injection Isolation Valve EM HV-8821A breaker.

o NG01ADR1 - ON _____

Verified _____ ´ _____ ´

6.3.21 Open SI Pump A Discharge To Cold Leg Injection Valve.

o EM HIS-8821A - OPEN _____

Verified _____ ´ _____ ´

6.3.22 Section 6.3, Increasing Accum Level In Mode 4, 5, 6, Or Defueled Using SI Pump A, is complete. _____ ´

INIT/DATE

6.4 Increasing Accum Level In Mode 4, 5, 6, Or Defueled Using SI Pump B

NOTE

When RCS temperature is less than or equal to 350°F, the safety injection pump used to fill accumulators must be isolated from the RCS by a closed isolation valve with power removed, OR by a manual isolation valve secured in the closed position.

6.4.1 Ensure SI Pump A Discharge To Hot Leg Injection valve is closed.

o EM HIS-8802A - CLOSED ☐

6.4.2 Ensure Power Lockout For EM HV-8802A is in ISO.

o EM HIS-8802AA - IN ISO ☐

6.4.3 Ensure SI Pump B Discharge To Hot Leg Injection valve is closed.

o EM HIS-8802B - CLOSED ☐

6.4.4 Ensure Power Lockout For EM HV-8802B is in ISO.

o EM HIS-8802BA - IN ISO ☐

6.4.5 Ensure SI Pumps To Cold Leg Injection valve is closed.

o EM HIS-8835 - CLOSED ☐

6.4.6 Ensure Power Lockout For EM HV-8835 is in ISO.

o EM HIS-8835A - IN ISO ☐

6.4.7 Ensure SI Pump B Recirc To RWST isolation valve is open.

o EM HIS-8814B - OPEN ☐

6.4.8 Ensure SI Pumps Recirc To RWST isolation valve is open.

o BN HIS-8813 - OPEN ☐

INIT/DATE

6.4.9 IF SI Pump discharge relief valves are expected to lift on pump start, THEN Close SI Pump B Disch to C/L Inj Iso Valve. (3.1.7)

o EM HIS-8821B - CLOSED ☐

6.4.10 Remove Clearance Order on SI pump B. ☐

6.4.11 Rack up SI Pump B breaker.

o NB0202 - RACKED UP ☐

6.4.12 Start SI Pump B.

o EM HIS-5 - STARTED ☐

6.4.13 IF closed to prevent discharge relief valve lift, THEN Open SI Pump A Disch to C/L Inj Iso Valve. (3.1.7)

o EM HIS-8821A - OPEN ☐

6.4.14 Open Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - OPEN ☐

6.4.15 IF filling accumulator tank A, THEN perform the following:

1. Record initial Accumulator Tank A Level from the highest reading indicator. (N/A indicator not used)

   * EP LI-950 - _____ _____

   OR

   * EP LI-951 - _____ _____

2. Open Accumulator Tank A Fill Line Valve.

   o EP HIS-8878A - OPEN ☐

INIT/DATE

3. WHEN Accumulator Tank A Level is between 55% and 58% on the highest reading indicator, OR as directed by SM/CRS, THEN close Accumulator Tank A Fill Line Valve.
(N/A indicator not used)

* EP LI-950-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

OR

* EP LI-951-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

AND

o EP HIS-8878A - CLOSED ☐

4. Record change in accumulator tank A level.

o Final level - Initial level =____ % level change _____ ,

6.4.16 IF filling accumulator tank B, THEN perform the following:

1. Record initial Accumulator Tank B Level ¤
from the highest reading indicator. ¤
(N/A indicator not used) ¤

* EP LI-952 - _____ _____ ,

OR

* EP LI-953 - _____ _____ ,

2. Open Accumulator Tank B Fill Line Valve.

o EP HIS-8878B - OPEN ☐

INIT/DATE

3. WHEN Accumulator Tank B Level is between 55% and 58% on the highest reading indicator, OR as directed by SM/CRS, THEN close Accumulator Tank B Fill Line Valve.
(N/A indicator not used)

* EP LI-952-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

OR

* EP LI-953-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

AND

o EP HIS-8878B - CLOSED ☐

4. Record change in accumulator tank B level.

o Final level - Initial level =____ % level change _____ ,

6.4.17 IF filling accumulator tank C, THEN perform the following:

1. Record initial Accumulator Tank C Level ¤
from the highest reading indicator. ¤
(N/A indicator not used) ¤

* EP LI-954 - _____ _____ ,

OR

* EP LI-955 - _____ _____ ,

2. Open Accumulator Tank C Fill Line Valve.

o EP HIS-8878C - OPEN ☐

INIT/DATE

3. WHEN Accumulator Tank C Level is between 55% and 58% on the highest reading indicator, OR as directed by SM/CRS, THEN close Accumulator Tank C Fill Line Valve.
(N/A indicator not used)

* EP LI-954-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

OR

* EP LI-955-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

AND

o EP HIS-8878C - CLOSED ☐

4. Record change in accumulator tank C level.

o Final level - Initial level =____ % level change _____ ,

6.4.18 IF filling accumulator tank D, THEN perform the following:

1. Record initial Accumulator Tank D Level ¤
from the highest reading indicator. ¤
(N/A indicator not used) ¤

* EP LI-956 - _____ _____ ,

OR

* EP LI-957 - _____ _____ ,

2. Open Accumulator Tank D Fill Line Valve.

o EP HIS-8878D - OPEN ☐

INIT/DATE

3. WHEN Accumulator Tank D Level is between 55% and 58% on the highest reading indicator OR as directed by SM/CRS, THEN close Accumulator Tank D Fill Line Valve.
(N/A indicator not used)

* EP LI-956-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

OR

* EP LI-957-BETWEEN 55% AND 58% OR AS ¤
DIRECTED BY SM/CRS ¤ ☐

AND

o EP HIS-8878D - CLOSED ☐

4. Record change in accumulator tank D level.

o Final level - Initial level =____% level change _____ ′

6.4.19 Close Accumulator Tanks Fill Line Valve.

o EM HIS-8888 - CLOSED ☐

6.4.20 Stop SI Pump B.

o EM HIS-5 - STOPPED ☐

6.4.21 Direct Chemistry to sample accumulator boron concentration to ensure the requirements of Tech. Spec.3.5.1 are meet prior to going above 1000 psig. _____ ′

6.4.22 Rack down SI Pump B breaker.

o NB0202 - RACKED DOWN _____ ′

Verified _____ ′

6.4.23 Place a Clearance Order on SI pump B. ☐

6.4.24 Place Power Lockout For EM HV-8835 in NON ISO.

o EM HV-8835 - IN NON ISO ☐

6.4.25 Open SI Pumps To Cold Leg Injection valve.

o EM HIS-8835 - OPEN

Verified _____
/ _____
/

INIT/DATE

6.4.26 Place Power Lockout For EM HV-8835 in ISO.

o EM HIS-8835A - IN ISO _____

Verified _____ / _____ /

6.4.27 Section 6.4, Increasing Accum Level In Mode 4, 5, 6, Or Defueled Using SI Pump B, is complete. _____ /

INIT/DATE

6.5 Decreasing Accum Level

NOTE

RCS pressure must be 100 psig greater than accumulator pressure prior to draining through the accumulator isolation valves.

6.5.1 Check RCS pressure at least 100 psig greater than accumulator pressure. ☐

6.5.2 IF decreasing level in accumulator tank A, THEN perform the following:

1. Ensure Accumulator Tank A Outlet Valve is open.

   o EP HIS-8808A - OPEN ☐

2. Open SI System Test Line Inner Containment Isolation Valve.

   o EM HIS-8871 - OPEN ☐

3. Open SI System Test Line Outer Containment Isolation Valve.

   o EM HIS-8964 - OPEN ☐

4. Open Accumulator Tank A Upstream Test Valve.

   o EP HIS-8877A - OPEN ☐

5. WHEN desired accumulator tank A level is obtained, THEN close Accumulator Tank A Upstream Test Valve.

   o EP HIS-8808B - CLOSED ☐

6.5.3 IF decreasing level in accumulator tank B, THEN perform the following:

1. Ensure Accumulator Tank B Outlet Valve is open.

   o EP HIS-8808B - OPEN ☐

2. Open SI System Test Line Inner Containment Isolation Valve.

   o EM HIS-8871 - OPEN ☐

INIT/DATE

3. Open SI System Test Line Outer Containment Isolation Valve.

   o EM HIS-8964 - OPEN ☐

4. Open Accumulator Tank B Upstream Test Valve.

   o EP HIS-8877B - OPEN ☐

5. WHEN desired accumulator tank B level is obtained, THEN close Accumulator Tank B Upstream Test Valve.

   o EP HIS-8877B - CLOSED ☐

6.5.4 IF decreasing level in accumulator tank C, THEN perform the following:

1. Ensure Accumulator Tank C Outlet Valve is open.

   o EP HIS-8808C - OPEN ☐

2. Open SI System Test Line Inner Containment Isolation Valve.

   o EM HIS-8871 - OPEN ☐

3. Open SI System Test Line Outer Containment Isolation Valve.

   o EM HIS-8964 - OPEN ☐

4. Open Accumulator Tank C Upstream Test Valve.

   o EP HIS-8877C - OPEN ☐

5. WHEN desired accumulator tank C level is obtained, THEN close Accumulator Tank C Upstream Test Valve.

   o EP HIS-8877C - CLOSED ☐

6.5.5 IF decreasing level in accumulator tank D, THEN perform the following:

1. Ensure Accumulator Tank D Outlet Valve is open.

   o EP HIS-8808D - OPEN ☐

INIT/DATE

2. Open SI System Test Line Inner Containment Isolation Valve.

   o EM HIS-8871 - OPEN ☐

3. Open SI System Test Line Outer Containment Isolation Valve.

   o EM HIS-8964 - OPEN ☐

4. Open Accumulator Tank D Upstream Test Valve.

   o EP HIS-8877D - OPEN ☐

5. WHEN desired accumulator tank D level is obtained, THEN close Accumulator Tank D Upstream Test Valve.

   o EP HIS-8877D - CLOSED ☐

NOTE

Closing the SI Test Line Outside And Inside Containment Isolation Valves may increase RHR System pressure causing the RHR discharge relief valve to lift.

6.5.6 IF desired, THEN close SI System Test Line Outer Containment Isolation Valve.

o EM HIS-8964 - CLOSED ☐

6.5.7 IF desired, THEN close SI System Test Line Inner Containment Isolation Valve.

o EM HIS-8871 - CLOSED ☐

6.5.8 IF accumulator level was lowered due to inleakage, THEN direct Chemistry to sample accumulators for boron concentration. ☐

6.5.9 Section 6.5, Decreasing Accum Level, is complete.

_____ /

INIT/DATE

6.6 Increasing Accum Pressure

6.6.1 Ensure N_2 pressure regulator at N_2 skid is set at 700 psig. ☐

6.6.2 Ensure Accumulator N_2 Supply Vent Valve Control is closed.

o EP HC-943 - CLOSED ☐

6.6.3 IF increasing accumulator tank A pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875A - OPEN ☐

2. Open Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - OPEN ☐

3. WHEN desired pressure is obtained, THEN close Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - CLOSED ☐

4. Close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875A - CLOSED ☐

6.6.4 IF increasing accumulator tank B pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875B - OPEN ☐

2. Open Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - OPEN ☐

3. WHEN desired pressure is obtained, THEN close Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - CLOSED ☐

4. Close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875B - CLOSED ☐

INIT/DATE

6.6.5 IF increasing accumulator tank C pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875C - OPEN ☐

2. Open Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - OPEN ☐

3. WHEN desired pressure is obtained, THEN close Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - CLOSED ☐

4. Close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875C - CLOSED ☐

6.6.6 IF increasing accumulator tank D pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875D - OPEN ☐

2. Open Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - OPEN ☐

3. WHEN desired pressure is obtained, THEN close Accumulator Tanks N_2 Supply Valve.

   o EP HIS-8880 - CLOSED ☐

4. Close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875D - CLOSED ☐

6.6.7 Section 6.6, Increasing Accum Pressure, is complete. _____ ,

INIT/DATE

6.7 Decreasing Accum Pressure

6.7.1 Ensure Accumulator N_2 Supply Vent Valve Control is set at 0%.

o EP HC-943 - SET AT 0% ☐

6.7.2 Ensure Accumulator Tanks N_2 Supply Valve is closed.

o EP HIS-8880 - CLOSED ☐

6.7.3 IF decreasing accumulator tank A pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875A - OPEN ☐

2. Slowly throttle open Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - SLOWLY THROTTLED OPEN ☐

3. WHEN desired accumulator pressure is obtained, THEN close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875A - CLOSED ☐

4. Close Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - CLOSED ☐

6.7.4 IF decreasing accumulator tank B pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875B - OPEN ☐

2. Slowly throttle open Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - SLOWLY THROTTLED OPEN ☐

3. WHEN desired accumulator pressure is obtained, THEN close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875B - CLOSED ☐

INIT/DATE

4. Close Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - CLOSED ☐

6.7.5 IF decreasing accumulator tank C pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875C - OPEN ☐

2. Slowly throttle open Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - SLOWLY THROTTLED OPEN ☐

3. WHEN desired accumulator pressure is obtained, THEN close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875C - CLOSED ☐

4. Close Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - CLOSED ☐

6.7.6 IF decreasing accumulator tank D pressure, THEN perform the following:

1. Open Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875D - OPEN ☐

2. Slowly throttle open Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - SLOWLY THROTTLED OPEN ☐

3. WHEN desired accumulator pressure is obtained, THEN close Accumulator Tank N_2 Supply Valve.

   o EP HIS-8875D - CLOSED ☐

4. Close Accumulator N_2 Supply Vent Valve Control.

   o EP HC-943 - CLOSED ☐

6.7.7 Section 6.7, Decreasing Accum Pressure, is complete. _____ /

7.0 RECORDS

7.1 The following QA records are generated by this procedure:

7.1.1 Section 5.0

7.1.2 Section 6.0

-END-