Draft Submittal

CATAWBA OCTOBER 2004

EXAM 50-413, 414/2004-301
OCTOBER 4 - 8, 2004 &
OCTOBER 13, 2004 (WRITTEN)

1. Administrative Topics Outline (ES-301-1)
2. Control Room Systems & Facility Walk-Through Test Outline (ES-301-2)
3. Administrative JPMs
4. In-plant JPMs
5. Control Room JPMs (simulator JPMs)

Facility: Catawba	Date of Examination: October 04, 2004 – October 15, 2004
Examination Level: RO	Operating Test Number: 1
Administrative Topic (see Note)	Describe activity to be performed
Conduct of Operations	Perform a shutdown margin calculation. (Gen: 2.1.25 (2.8/3.1)
Conduct of Operations	Calculate reactor coolant system subcooling during a loss of operator aid computer. (Gen: 2.1.23 (3.9/4.0)
Equipment Control	
Radiation Control	**Calculate Low Pressure Service Water Flow for liquid radioactive release** (Gen: 2.3.11 (2.7/3.2)
Emergency Plan	Perform emergency plan requirements for a site fire emergency (Gen: 2.4.43 (2.8/3.5)

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

Bold item is the repeat from 2003.

Facility: Catawba	Date of Examination: October 04, 2004 – October 15, 2004
Examination Level: SRO	Operating Test Number: 1
Administrative Topic (see Note)	Describe activity to be performed
Conduct of Operations	Verify unit shutdown margin status and evaluate the results. GEN: 2.1.25 (2.8/3.1)
Conduct of Operations	Determine the availability of operators to meet proper staffing levels. Gen: 2.1.4 (2.3/3.4)
Equipment Control	Evaluate a request to perform maintenance during an outage period. Gen: 2.2.18 (2.3/3.6)
Radiation Control	**Calculate Low Pressure Service Water Flow for liquid radioactive release.** Gen: 2.3.11 (2.7/3.2)
Emergency Plan	Classify an event and complete a notification form. Gen: 2.4.30 (2.2/3.6)

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

Bold item is the repeat from 2003.

Facility: Catawba Date of Examination: Oct 04 – Oct 15, 2004

Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: 1

Control Room Systems (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)		
System / JPM Title	Type Code*	Safety Function
a. Perform Enclosure 6 of ES-3.2 (SGTR Cooldown Using Blowdown)	D, S	3
b. Align NS system for Cold Leg Recirculation	**D, A, S**	**5**
c. Restore power to blackout buss 1FTA from 1ETA	N, A, S, L	6
d. Place standby Component Cooling train in service	M, S	8
e. Increase Cold Leg Accumulator 1D Level	N, S	2
f. Restore adequate Nuclear Service Water flow	D, S	4(PRI)
g. Respond to a loss of normal feedwater	N, A, S, L	4(Sec)
h. Realign a control rod	M, A, S	1
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i. Restore power to 2ERPB using swing inverter 2EIF	N	6
j. Borate the reactor coolant system from outside the control room.	D, R	8
k. Restore Auxiliary Building ventilation (VA) following a an inadvertent safety injection	**D, R**	**2**

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Bold items are from the 2003 NRC exam at Catawba.

Facility: Catawba Date of Examination: Oct 04 – Oct 15, 2004

Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: 1

Control Room Systems (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a.		
b. Align NS system for Cold Leg Recirculation	**D, A, S**	**5**
c. Restore power to blackout buss 1FTA from 1ETA	N, A, S, L	6
d. Place standby Component Cooling train in service	M, S	8
e. Increase Cold Leg Accumulator 1D Level	N, S	2
f. Restore adequate Nuclear Service Water flow	D, S	4(PRI)
g. Respond to a loss of normal feedwater	N, A, S, L	4(Sec)
h. Realign a control rod	M, A, S	1
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i. Restore power to 2ERPB using swing inverter 2EIF	N	6
j. Borate the reactor coolant system from outside the control room.	D, R	8
k. Restore Auxiliary Building ventilation (VA) following a an inadvertent safety injection	**D, R**	**2**

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Bold items are from the 2003 NRC exam at Catawba.

Facility: Catawba Date of Examination: Oct 04 – Oct 15, 2004

Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: 1

Control Room Systems (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a.		
b.		
c.		
d.		
e.		
f. Restore adequate Nuclear Service Water flow	D, S	4(PRI)
g. Respond to a loss of normal feedwater	N, A, S, L	4(Sec)
h. Realign a control rod	M, A, S	1
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i. Restore power to 2ERPB using swing inverter 2EIF	N	6
j. Borate the reactor coolant system from outside the control room.	D, R	8
k.		

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC –SRO-1/Admin

Verify unit shutdown margin status and evaluate the results.

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Verify unit shutdown margin status and evaluate the results.

Alternate Path: N/A

Facility JPM #: 2003 NRC SRO ADMIN JPM 2S (Modified)

K/A Rating(s): Generic KA 2.1.25 (2.8/3.1)

Task Standard:

Candidate determines the unit does not have adequate shutdown margin and applies Technical Specification 3.1.1.

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

OP/0/A/6100/006 (Reactivity Balance Calculation)
Unit One Reactor Operating Data Book.

Validation Time: 15 min. **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 was shutdown from 100 % power at 25%/hour and entered Mode 3 on 8/6/2004 at 2225. The unit was then cooled down to 500°F and remains there now while needed repairs are completed. Shutdown margin is being maintained with Xenon credit.

Present date and time is 8/8/2004 Time: 0230

INITIATING CUE:

You are reviewing a manual shutdown margin calculation OP/0/A/6100/06 (Reactivity Balance Calculation) Enclosure 4.4 (Shutdown Margin (With or Without Xenon Credit)) done earlier. Determine if the calculated time to loss of Shutdown was correct and if necessary; determine actions for the unit if shutdown margin is not met.

Step 1 SRO candidate reviews the entries and double checks the information on the completed Enclosure 4.4 Standard: No mistakes on the following steps: 2.3, 2.4, 2.5.1, 2.5.2, 2.5.3, 2.6, 2.7, 2.8, 2.8.1, 2.8.2 COMMENTS:	___SAT ___UNSAT
STEP 2 Candidate locates a mistake on the Step 2.8.3 calculation STANDARD: Calculate the xenon worth that is required to ensure SDM at the present NC System Boron. Calculation **(1646.33 PCM – (-)2.57)/ 0.85 = 1648.9 PCM / 0.85 =** Candidate determines that a **mistake** was made: **1401.565 PCM** and **recalculates to a value of 1939.88 pcm** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT

Step 3 Candidate corrects the calculation and determines the new limit STEP 2.8.5 Interpolate the Date/Time from the Xenon predict of step 2.8.4 that equal the xenon worth of step 2.8.3 Existing time limit with the mistake is 8/8/2004 0517 STANDARD: Candidate uses the supplied Xenon Predict program report to figure the new time limit: From the table, interpolation is: **7-AUG-2004 2330 1952.668 PCM** **7-AUG-2004 2340 1934.906 PCM** Based on a required reactivity worth of **1939.88 PCM** Difference between reactivity at 2340 and 2330 = 17.708 Difference between reactivity at 2330 and 1939.88 = 12.788 12.788 / 17.708 = 0.722 or 72.2% to 2330 = 7.22 minutes. 2330 + 7.22 = 2337 **Date/Time when SDM is lost is 8/7/2004 at 2337** Acceptable variance on the time is **2333 to 2340** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
Step 4 Based on this information, candidate determines that shutdown margin is **not** adequate and IAW T.S. 3.1.1, we must initiate boration within 15 minutes. STANDARD: SRO determines T.S. 3.1.1 applies and states the boration requirement.	**CRITICAL STEP** ___SAT ___UNSAT
This JPM is complete	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 was shutdown from 100 % power at 25%/hour and entered Mode 3 on 8/6/2004 at 2225. The unit was then cooled down to 500°F and remains there now while needed repairs are completed. Shutdown margin is being maintained with Xenon credit.

Present date and time is 8/8/2004 Time: 0230

INITIATING CUE:

You are reviewing a manual shutdown margin calculation OP/0/A/6100/06 (Reactivity Balance Calculation) Enclosure 4.4 (Shutdown Margin (With or Without Xenon Credit)) done earlier. Determine if the calculated time to loss of Shutdown was correct and if necessary; determine actions for the unit if shutdown margin is not met.

SRO - 1 ADMIN

KEY

DRAFT

Duke Power Company Catawba Nuclear Station	Procedure No. OP/ 0/A/6100/006
	Revision No. 066
Reactivity Balance Calculation	
Continuous Use	Electronic Reference No. CN0092MR
PERFORMANCE	
* * * * * * * * * * UNCONTROLLED FOR PRINT * * * * * * * * * *	
(ISSUED) - PDF Format	

SRO-1 ADMIN
KEY

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC –SRO-2/Admin

Determine the availability of operators to meet proper staffing levels.

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Determine the availability of operators to meet proper staffing levels.

Alternate Path: N/A

Facility JPM #: NEW

K/A Rating(s): Generic KA 2.1.4 (2.3/3.4)

Task Standard:

Candidate determines that NO Reactor operators have to stay over, the Senior Reactor Operator must stay over but cannot be the Fire Brigade Captain, the NLO must stay over and be the Fire Brigade Captain.

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-Plant _____ Perform __X__ Simulate _____

References:
OMP 1-10 (Shift Manning and Overtime Requirements)
Selected License Commitments 16.13-1 (Fire Brigade)
Selected License Commitments 16.13-4 (Minimum Station staffing Requirements)

Validation Time: 10 min. **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is in Mode 1 at 100% power.
Unit 2 is in Mode 5 at 150 °F.

INITIATING CUE:

Today is October 4, at 1745. Night shift is beginning to conduct turnover from dayshift.

The following is a list of night shift personnel who reported for night shift:

1. Three (3) of four (4) reactor operators scheduled for tonight. All reactor operators who arrived have active licenses.
2. One (1) of two (2) senior reactor operators scheduled for tonight. The SRO who showed up for tonight, DOES NOT have a active license.
3. All fire brigade team members reported for work; however, none are Fire Brigade Captain qualified.

The missing individuals will arrive 4 hours from now.

Using the status of the off going dayshift individuals, determine which personnel will be required to stay beyond their dayshift scheduled time and fill any empty positions for night shift. (See attached personnel status sheet).

add (2) RO's
show up

Step 1 SRO candidate reviews the entries and double checks the information on the completed Enclosure 4.4 Standard: No mistakes on the following steps: 2.3, 2.4, 2.5.1, 2.5.2, 2.5.3, 2.6, 2.7, 2.8, 2.8.1, 2.8.2 COMMENTS:	___SAT ___UNSAT
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Step 3 Candidate corrects the calculation and determines the new limit STEP 2.8.5 Interpolate the Date/Time from the Xenon predict of step 2.8.4 that equal the xenon worth of step 2.8.3 Existing time limit with the mistake is 8/8/2004 0517 STANDARD: Candidate uses the supplied Xenon Predict program report to figure the new time limit: From the table, interpolation is: **7-AUG-2004 2330 1952.668 PCM** **7-AUG-2004 2340 1934.906 PCM** Based on a required reactivity worth of **1939.88 PCM** Difference between reactivity at 2340 and 2330 = 17.708 Difference between reactivity at 2330 and 1939.88 = 12.788 12.788 / 17.708 = 0.722 or 72.2% to 2330 = 7.22 minutes. 2330 + 7.22 = 2337 **Date/Time when SDM is lost is 8/7/2004 at 2337** Acceptable variance on the time is **2333 to 2340** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
Step 4 Based on this information, candidate determines that shutdown margin is **not** adequate and IAW T.S. 3.1.1, we must initiate boration within 15 minutes. STANDARD: SRO determines T.S. 3.1.1 applies and states the boration requirement.	**CRITICAL STEP** ___SAT ___UNSAT
This JPM is complete	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 was shutdown from 100 % power at 25%/hour and entered Mode 3 on 8/6/2004 at 2225. The unit was then cooled down to 500°F and remains there now while needed repairs are completed. Shutdown margin is being maintained with Xenon credit.

Present date and time is 8/8/2004 Time: 0230

INITIATING CUE:

You are reviewing a manual shutdown margin calculation OP/0/A/6100/06 (Reactivity Balance Calculation) Enclosure 4.4 (Shutdown Margin (With or Without Xenon Credit)) done earlier. Determine if the calculated time to loss of Shutdown was correct and if necessary; determine actions for the unit if shutdown margin is not met.

SRO - 1 ADMIN

KEY

DRAFT

Duke Power Company Catawba Nuclear Station	Procedure No. OP/ 0/A/6100/006
	Revision No. 066
Reactivity Balance Calculation	
Continuous Use	Electronic Reference No. CN0092MR

PERFORMANCE

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(ISSUED) - PDF Format

SRO - 1 ADMIN

KEY

Reactivity Balance Calculation

1. Purpose

1.1 To estimate critical NC System boron concentration before criticality based on other assumed core reactivity conditions.

1.2 To estimate critical control bank position before criticality based on other assumed core reactivity conditions.

1.3 To calculate shutdown margin in Modes 1 and 2 with untrippable and/or misaligned RCCA's. (TS 3.1.4)

1.4 To calculate the NC System boron concentration at which shutdown margin will **NOT** be met in Modes 2 (with K-eff < 1.0), 3, 4, and 5. (TS 3.1.1)

1.5 To verify K-eff < 0.99 with shutdown banks withdrawn.

1.6 To calculate the NC System boron concentration at which refueling boron concentration will **NOT** be met in Mode 6. (TS 3.9.1)

2. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual.

2.1 Ensure all data used by this procedure are for the correct unit.

2.2 NC System T-AVG should be maintained within ±1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.

2.3 Shutdown margin (SDM) shall be ≥1000 pcm in Mode 5. (Tech Spec 3.1.1 and Enclosure 4.4)

2.4 SDM shall be ≥1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, or 4.4)

2.5 Required refueling boron concentration is obtained from Tech Spec 3.9.1 and Enclosure 4.6.

2.6 **IF** T-AVG <500 °F, credit for only 50% of xenon worth can be taken for verifying SDM.

2.7 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.

2.8 Criticality shall **NOT** be obtained outside the maximum window (±750 pcm) of estimated critical control bank position.

2.9 Desired critical control bank position shall **NOT** be below the control bank insertion limits **OR** above any temporary control bank withdrawal limits.

2.10 Verification of K-eff < 0.99 with shutdown banks withdrawn shall only be performed above 200 °F.

2.11 REACT and manual calculations may **NOT** yield equal results due to minor differences in methods (ie interpolation). Reactor Engineering should be contacted if questions arise.

3. Procedure

3.1 For estimated critical NC System boron concentration (ECB), refer to Enclosure 4.1.

3.2 For estimated critical control bank position (ECP) refer to Enclosure 4.2.

3.3 For SDM calculation with untrippable or misaligned RCCA's, refer to Enclosure 4.3.

3.4 For SDM verification in Modes 5, 4, 3, or 2 (with K-eff < 1.0), (with or without xenon credit), refer to Enclosure 4.4.

3.5 For Verification of K-eff < 0.99 with shutdown banks withdrawn, refer to Enclosure 4.5.

3.6 For refueling boron concentration verification in Mode 6, refer to Enclosure 4.6.

3.7 For instructions on running REACT computer program, refer to Enclosure 4.7.

3.8 For Shutdown Fission Product Correction Factor, refer to Enclosure 4.8.

4. Enclosures

4.1 Estimated Critical Boron Concentration (ECB).

4.2 Estimated Critical Control Bank Position (ECP).

4.3 Shutdown Margin - Untrippable / Misaligned RCCA(s) - Modes 1 and 2.

4.4 Shutdown Margin - (With or Without Xenon Credit).

4.5 Verification of K-eff < 0.99 with Shutdown Banks Withdrawn

4.6 Shutdown Boron Concentration - Mode 6.

4.7 REACT Computer Program Directions.

4.8 Shutdown Fission Product Correction Factor

1. Initial Conditions

1.1 Limits and Precautions have been reviewed.

2. Procedure

2.1 **IF** performing a MANUAL calculation, N/A Step 2.2.

N/A 2.2 Perform the following steps if using the REACT program to complete the calculation:

2.2.1 Access Reactivity Balance Program per Enclosure 4.7.

2.2.2 Select "View" then "Reactivity Balance Calculations" on toolbar.

NOTE: "SDM – Mode 5, 4, or 3" option also applies to Mode 2 with K-eff < 1.0.

2.2.3 Select "SDM – Mode 5, 4, or 3" tab in Reactivity Balance Calculations window.

NOTE:
1. Sign must be provided with Difference from Equilibrium Samarium [i.e., ( ) ___ pcm].
2. In REACT, "Inoperable RCCAs" refers to untrippable RCCAs.
3. Rod locations are put in REACT in a text only format (e.g. B12 or B-12). REACT uses the maximum stuck rod worth for all known untrippable RCCAs.

2.2.4 Enter appropriate values as prompted.

2.2.5 Click Calculate, print program results, label appropriately, and attach to this enclosure.

2.2.6 Compare required boron concentration to present boron concentration.

2.2.7 **IF** Xenon Credit was selected **AND** a potential boron deficit is indicated in the calculation results, complete the following steps:

A. Record "Adjusted SDM Deficit" from Reacivity Balance Calculation output: _____pcm

B. Select "View" then "Xenon/Samarium Calculations" on toolbar.

N/A C. Select "Xenon" for Isotope and "Transient Prediction" for Calculation Type.

N/A?

D. Enter initial concentrations. These can be obtained from the OAC or Reactor Engineering. The OAC point id's for these concentrations are C1(2)P0125 and C1(2)P0124.

E. Enter appropriate power history.

F. Print program results, label appropriately, and attach to this enclosure.

CAUTION: SDM is ensured until the Date/Time recorded below at the present NC System boron or higher. After that time, NC System boration will be required to maintain SDM. {PIP C-03-04173}

G. Interpolate the Date/Time from the xenon predict of step 2.2.7.F that equals the xenon worth of step 2.2.7.A

Loss of SDM Date/Time _____/_____

2.2.8 Ensure that a separate, independent calculation has been performed per steps 2.2.1 through 2.2.7.

2.2.9 Verify that both attachments to this enclosure yield the same results.

N/A 2.2.10 N/A the rest of this enclosure (steps 2.3 through 2.9).

Performed By: N/A _____ Date/Time: _____/_____

Verified By: N/A _____ Date/Time: _____/_____

NOTE: Assume all values are positive unless otherwise indicated by parentheses. **IF** parentheses precede the value [i.e. ( )___ _____ pcm], record the sign provided with data. The calculations account for these sign conventions.

2.3 Determine the following information:

Step	Description	Reference	Value
2.3.1	Unit	N/A	1
2.3.2	Date/Time	N/A	8/6/04 2230
2.3.3	Present NC System Boron Conc	N/A	1010 ppm
2.3.4	Present NC System T-AVG	N/A	557 °F
2.3.5	Desired NC System T-AVG	N/A	500 °F
2.3.6	Present cycle burnup	P1457 or Duty Reactor Engineer	250 EFPD
2.3.7	Present Difference from Equilibrium Samarium Worth	P1475 or Duty Reactor Engineer	(-) 2.57 pcm
2.3.8	Date and time of latest valid Iodine and Xenon concentrations. N/A if xenon free.	Duty Reactor Engineer or current time if using OAC	8/6/04 2230
2.3.9	Iodine concentration at time listed in step 2.3.8; 0 if xenon free.	P0124 or Duty Reactor Engineer	7830 atm/cc
2.3.10	Xenon concentration at time listed in step 2.3.8; 0 if xenon free.	P0125 or Duty Reactor Engineer	3290 atm/cc

NOTE: Interpolation is not required for step 2.4. Bounding temperatures and burnups may be used to select the highest boron concentration in Section 5.11 of R.O.D manual.

2.4 Select the highest boron concentration for the T-AVG's between the range of Step 2.3.4 and Step 2.3.5 at current cycle burnup (Step 2.3.6) in Section 5.11 of the R.O.D. manual. {PIP 0-C99-0318} 1213 ppm

2.5 Calculate additional boron concentration penalties:

2.5.1 Calculate untrippable RCCA penalty:

Description	Reference	Value
A. Number of Untrippable RCCA(s) not fully inserted	N/A	0
B. Boron Penalty per Untrippable rod	N/A	160 ppm
Untrippable RCCA Penalty	**(A) X (B)**	0 ppm

2.5.2 Enter Zero Power Physics Testing penalty; 100 ppm if physics testing is not complete, otherwise, enter 0 ppm. 0 ppm

2.5.3 Calculate total additional boron concentration penalty:

Description	Reference	Value
A. Untrippable RCCA Penalty	Step 2.5.1	0 ppm
B. Additional Boron Conc Penalty for ZPPT	Step 2.5.2	0 ppm
Total Boron Penalty	**(A) + (B)**	0 ppm

2.6 Calculate total required boron concentration for SDM:

Description	Reference	Value
A. Required SDM Boron	Step 2.4	1213 ppm
B. Total Boron Penalty	Step 2.5.3	0 ppm
Total Required Boron Concentration for SDM (Xenon Free)	**(A) + (B)**	1213 ppm

2.7 Determine the Boron Difference between Required Boron Concentration for SDM and current NC System boron concentration.

Description	Reference	Value
A. Total Required Boron Concentration for SDM	Step 2.6	1213 ppm
B. Present NC System Boron Concentration	Step 2.3.3	1010 ppm
Boron Difference	**(A) - (B)**	203 **ppm**

NOTE: A negative boron difference in Step 2.7 implies that SDM is maintained for Xenon free conditions. A positive boron difference means that SDM is maintained using a Xenon credit and/or boration. {0-C99-0318}

N/A 2.7.1 IF Boron Difference (Step 2.7) is negative, N/A Step 2.8.
/ /

2.8 Determine the Xenon Credit as follows:

NOTE:	Interpolation is not required for step 2.8.1. Bounding NC System T-AVG and cycle burnup may be used to select the highest Differential Boron Worth from Section 5.3 of R.O.D manual.

2.8.1 Determine the ARI, Differential Boron Worth at lower T-AVG of Step 2.3.4 or 2.3.5 **AND** cycle burnup of step 2.3.6 from Section 5.3 of the R.O.D. manual. -8.11 pcm/ppm

2.8.2 Calculate the reactivity worth of the boron difference:

Description	Reference	Value
A. Boron Difference	Step 2.7	203 ppm
B. ARI Differential Boron Worth	Step 2.8.1	8.11 pcm/ppm
Reactivity Worth of Boron Difference	**(A) X (B)**	1646.33 **pcm**

2.8.3 Calculate the xenon worth that is required to ensure SDM at the present NC System boron.

A. **IF** T-AVG is ≥ 500 ° F, calculate the Xenon Worth as follows:

MISTAKE NOTED XENON WORTH SHOULD BE 1939.88 MH/3

Description	Reference	Value
A. Reactivity Worth	Step 2.8.2	1646.33 pcm
B. Difference from Eq Sm Worth	Step 2.3.7	(-) 2.57 pcm
Xenon Worth	**{(A) - (B)} / 0.85**	1401.565 **pcm**

B. **IF** T-AVG is < 500 ° F, calculate the Xenon Worth as follows:

Description	Reference	Value
A. Reactivity Worth	Step 2.8.2	pcm
B. Difference from Eq Sm Worth	Step 2.3.7	( ) pcm
Xenon Worth	**{(A) - (B)} X 2**	**pcm**

2.8.4 Predict Xenon for approximately two days into the future using OAC Xenon Predict Program or REACT program (per Enclosure 4.7) and data from 2.3.1 through 2.3.10.

CAUTION: SDM is ensured until the Date/Time recorded below at the present NC System boron or higher. After that time, NC System boration will be required to maintain SDM. {PIP C-03-04173}

2.8.5 Interpolate the Date/Time from the xenon predict of step 2.8.4 that equals the xenon worth of step 2.8.3.

Loss of SDM Date/Time 8/8/04 0517

PER XENON PREDICT SDM LOSS IS 8/7/04 2337

NOTE: Separate, independent calculation must be performed by the verifier.

2.9 Sign the appropriate space below. N/A the unsigned space.

Performed By: _____ Date/Time: 8/6/04 2235

Verified By: _____ Date/Time: 8/6/04 2345

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC –SRO-2/Admin

Determine the availability of operators to meet proper staffing levels.

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Determine the availability of operators to meet proper staffing levels.

Alternate Path: N/A

Facility JPM #: NEW

K/A Rating(s): Generic KA 2.1.4 (2.3/3.4)

Task Standard:

Candidate determines that NO Reactor operators have to stay over, the Senior Reactor Operator must stay over but cannot be the Fire Brigade Captain, the NLO must stay over and be the Fire Brigade Captain.

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-Plant _____ Perform __X__ Simulate _____

References:
OMP 1-10 (Shift Manning and Overtime Requirements)
Selected License Commitments 16.13-1 (Fire Brigade)
Selected License Commitments 16.13-4 (Minimum Station staffing Requirements)

Validation Time: 10 min. **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is in Mode 1 at 100% power.
Unit 2 is in Mode 5 at 150 °F.

INITIATING CUE:

Today is October 4, at 1745. Night shift is beginning to conduct turnover from dayshift.

The following is a list of night shift personnel who reported for night shift:

1. Three (3) of four (4) reactor operators scheduled for tonight. All reactor operators who arrived have active licenses.
2. One (1) of two (2) senior reactor operators scheduled for tonight. The SRO who showed up for tonight, DOES NOT have a active license.
3. All fire brigade team members reported for work; however, none are Fire Brigade Captain qualified.

The missing individuals will arrive 4 hours from now.

Using the status of the off going dayshift individuals, determine which personnel will be required to stay beyond their dayshift scheduled time and fill any empty positions for night shift. (See attached personnel status sheet).

add (2) RO's
show up.

STEP 1	The Candidate reviews the available operator information and determines the following:	**CRITICAL STEP**
STANDARD:	The three (3) reactor operators who did show up for nightshift can fill the required positions for both units (SLC 16.13-4) NO RO's have to stay over from dayshift. The SRO who showed cannot be the Control Room SRO. The dayshift shift SRO must stay and stay in the control room at all times (SLC 16.13-4), so he cannot be the Fire Brigade Captain The NLO is the only available Fire Brigade Captain and must stay after.	___SAT ___UNSAT
COMMENTS:		
This JPM is complete		

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 is in Mode 1 at 100% power.
Unit 2 is in Mode 5 at 150 °F.

INITIATING CUE:

Today is October 4, at 1745. Night shift is beginning to conduct turnover from dayshift.

The following is a list of night shift personnel who reported for night shift:

1. Three (3) of four (4) reactor operators scheduled for tonight. All reactor operators who arrived have active licenses.
2. One (1) of two (2) senior reactor operators scheduled for tonight. The SRO who showed up for tonight, DOES NOT have a active license.
3. All fire brigade team members reported for work; however, none are Fire Brigade Captain qualified.

The missing individuals will arrive 4 hours from now.

Using the status of the off going dayshift individuals, determine which personnel will be required to stay beyond their dayshift scheduled time and fill any empty positions for night shift. (See attached personnel status sheet).

Personnel Status Sheets

The following is the work history (excluding shift turnover time) of the off going operators who agreed to stay over if required.

Their work always began at 0600 each day and all the operators did receive a break of at least 8 hours occurred between all work periods.

DAY	1	2	3	4	5	6	7	8 (today)
RO #1	0	0	12	12	12	12	12	8
RO #2	0	0	12	12	12	12	12	12
NLO #1 Note 2	0	0	0	0	12	12	12	8
SRO #1 Note 1,2	0	0	0	0	12	12	12	8

Note 1: SRO #1 has been on medical leave from June 1st to September 17th of this year. Assume today's date is October 4th, 2004. His work history from September 18-30 was 8-12 hour shifts to reactivate his license. All other medical requirements were verified by medical. On October 1, the license reactivation was signed by the Shift Operation Manager.

Note 2: NLO #1 and SRO #1 are the only Fire Brigade Captain qualified individuals on site.

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC –SRO-3/Admin

Evaluate a request to perform maintenance during an outage period.

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Evaluate a request to perform maintenance during an outage period.

Alternate Path: N/A

Facility JPM #: NEW

K/A Rating(s): Generic KA 2.2.18 (2.3/3.6)

Task Standard:

Candidate determines the unit is in a Mode 5 High Decay Heat; Loops Not filled condition, determines that Tech Specs will not allow the diesel generator maintenance, and Site Directives 3.1.30 Section 5.2 will not allow KC pump and diesel maintenance.

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:
Site Directive 3.1.30 (Shutdown Risk Management (Modes 4, 5, 6, and No-Mode))
Technical Specifications 3.8.2, 3.7.7
Selected License Commitments 16.9-11

Validation Time: 10 min. **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is in day 5 of a refueling outage. A status sheet on Unit 1 equipment is attached.
Unit 2 is in Mode 1 at 100% power.

INITIATING CUE:

You are the WCCSRO reviewing 3 of the day's work list items:

- Boric Acid (BAT) storage tank is to be isolated to replace an outlet isolation valve.
- 1A1 KC pump will be shutdown and tagged to replace inboard pump bearing RTD.
- 1B diesel generator will be tagged out for refurbishment as part of the "B" Train Main power work items.

You are to consider the following:

1. Determine the current plant status of Unit 1 per Section 4 of Site Directive 3.1.30

2. For each maintenance item determine decide whether or not you can allow the maintenance based on Technical Specifications/Selected License Commitments requirements.

3. For each maintenance item determine decide whether or not you can allow the maintenance based Site Directive 3.1.30, Recommended Equipment for Shutdown Evolutions.

STEP 1: The Candidate reviews the available information and determines the following: 1. Determine the current plant status of Unit 1 per Section 4 of Site Directive 3.1.30. 2. For each maintenance item determine decide whether or not you <u>can allow</u> the maintenance based on Technical Specifications/Selected License Commitments requirements. 3. For each maintenance item determine decide whether or not you <u>can allow</u> the maintenance based Site Directive 3.1.30, Recommended Equipment for Shutdown Evolutions. STANDARD: Candidate determines each of the following items: 1. Site Directive 3.1.30 Section 4: **Mode 5, Heat Decay Heat, Loops not Filled.** 2. Can the maintenance be allowed per Technical Specification or Selected License Commitments (SLC) on the following equipment? • Boric Acid Storage Tank Isolation: **YES per SLC 16.9-11** • 1A1 KC pump shutdown and tagged: **YES per T.S 3.7.7** • 1B Diesel Generator Refurbishment: **NO per T.S. 3.8.2** 3. Can the maintenance be allowed per Site Directive 3.1.30, Recommended Equipment for Shutdown Evolutions? • Boric Acid Storage Tank Isolation: **YES** • 1A1 KC pump shutdown and tagged: **NO (required for ND)** • 1B Diesel Generator Refurbishment: **NO (required for ND)** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
This JPM is complete	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 is in day 5 of a refueling outage. A status sheet on Unit 1 equipment is attached.
Unit 2 is in Mode 1 at 100% power.

INITIATING CUE:

You are the WCCSRO reviewing 3 of the day's work list items:

- Boric Acid (BAT) storage tank is to be isolated to replace an outlet isolation valve.
- 1A1 KC pump will be shutdown and tagged to replace inboard pump bearing RTD.
- 1B diesel generator will be tagged out for refurbishment as part of the "B" Train Main power work items.

You are to consider the following:

1. Determine the current plant status of Unit 1 per Section 4 of Site Directive 3.1.30
2. For each maintenance item determine decide whether or not you can allow the maintenance based on Technical Specifications/Selected License Commitments requirements.
3. For each maintenance item determine decide whether or not you can allow the maintenance based Site Directive 3.1.30, Recommended Equipment for Shutdown Evolutions.

Unit 1 Pant Status, 0700 Outage day 5

Unit 1: Mode 5, NC system temperature 165 °F

- Reactor Coolant System level drained to 28%
- 1A and 1B ND Trains in service maintaining current temperature.
- 1A and 2B RN pumps in service
- 1A1 and 1B1 KC pumps in service
- 1A NV pump in service

NC Boron concentration 2950 ppm

Equipment Inoperable

1B NV pump
1A NI pump
1B NI pump
"B" Train Offsite Power
1B2 KC pump
1B Boric Acid Transfer pump
1B Reactor Makeup Water Pump
Boron Dilution Mitigation both trains

Makeup and Inventory Control System Status

Operable BAT; 7500 ppm boron
Operable FWST; 2800 ppm boron

Other System Status

- Two trains of Source Range Instruments
- Containment Closure established with 3 exceptions
- Equipment Hatch is closed
- Fire Protection and Detection operable per Selected License Commitments 16.9-6 and 16.9-2.
- Steam Generators in wet lay-up

Draft

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC-SRO/RO-4/ADMIN

Calculate Low Pressure Service Water Discharge Flow for Liquid Radioactive Release

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Calculate Low Pressure Service Water Discharge Flow for Liquid Radioactive Release.

Alternate Path: N/A

Facility JPM #: REPEAT FROM 2003

K/A Rating(s): GEN 2.3.11 (2.7/3.2)

Task Standard:

Candidate obtains needed data, correctly calculates total discharge flow and determines that the liquid waste release can continue.

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ___X___ In-Plant ___X___ Perform ___X___ Simulate _____

References:

PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations) Revision 039

Validation Time: 22 min. **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Tools/Equipment/Procedures Needed:

Each candidate will be provided a copy of PT/0/A/4250/011, appropriate data sheets, and a copy of the LWR permit report. A calculator will be needed to complete the enclosures.

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is currently performing a liquid waste release from the Waste Monitor building.
- Low Pressure Service Water (RL) Flow transmitter 0RLP5080 (RL Disch Flow) and OAC points C1P0903 and C2P0903 (RL Line A Disch Flow-Hourly Average) are inoperable and have been removed from service.
- The RN system is aligned to the RL discharge header.
- PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations) was last completed at 0700.
- Current time is 1030.

INITIATING CUE:

Calculate total discharge flow using Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011 and determine if adequate flow exists to continue the release per the LWR currently in progress.

START TIME: _____

AMINER CUE: Provide a copy of PT/0/A/4250/011, data sheet, and LWR permit report.	
EXAMINER NOTE: If asked about YT and YF inputs from RL, provide the following cue. **CUE: "This is chemistry, inputs to YT and YF were secured at 0645 today."**	
STEP 1: To obtain Total RL Supply perform the following: STANDARD: Calculates Total RL supply with the following: RL Disch Pressure = RL HDR PRESS (0RLP5030) + 5.6 psi 73 + 5.6 = **78.6 psi** (78.6 psig X 2.311 ft/psig) + (577.25 – 569 ft) = **189.89 ft Total Discharge Head** RL Pump A Flow **21000** gpm (obtained from Encl. 13.7 for Pump "A") RL Pump B Flow **25000** gpm (obtained from Encl. 13.7 for Pump "B") RL Pump C Flow **18000** gpm (obtained from Encl. 13.7 for Pump "C") Total RL Supply **64000** gpm (A) **EXAMINER NOTE: The following ranges on the flow calculations are acceptable:** **RL pump A: 20000 to 22000 gpm** **RL pump B: 24000 to 26000 gpm** **RL pump C: 17000 to 19000 gpm** **Total Flow range 61000 to 67000 gpm** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 2: To obtain Total RN Flow perform the following: ANDARD: Calculates Total RN Flow with the following: RN Pump 1B is the only pump in service, Train B meter = **17,000** gpm RN Pump Train A Flow = (1RNP7520) + (2RNP7520) = 0 gpm RN Pump Train B Flow = (1RNP7510) + (2RNP7510) = 17000 gpm Total RN Flow = **17000 gpm** (B) COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 3: To obtain Total Cooling Tower Evaporation, perform the following. STANDARD: Calculates Total Cooling Tower evaporation using the following: **IF** OAC is in service for Unit 1 Cooling Tower evaporation, perform the following calculations: (**3385.578** - **1222** +19) x 6.837 gpm = **14922.28** gpm Total Tower Evaporation C1P1355 C1A1632 mw OAC is in service for Unit 2 Cooling Tower evaporation, perform the following calculation: (**3381.399** - **1219** +19) x 6.837 gpm = **14914.22** gpm Total Tower Evaporation C1P1355 C1A1632 mw Total Evaporation = 14922.28 + 14914.22 = **29836.5** gpm (C) **EXAMINER NOTE: Due to potential for rounding, a range of 29836.5 +/- 100 gpm is acceptable.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4: To obtain Total RL Disch Flow, perform the following. STANDARD: Calculates Total Cooling Tower evaporation using the following: Total RL Supply 64000 (A) gpm + Total RN Flow 17000 (B) gpm - RL Disch Total Evaporation 29836.5 (C) gpm = Total Flow **51163.5** gpm **EXAMINER NOTE: Based on previous acceptable values, a range of 48163.5 gpm to 54163.5 gpm is acceptable.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 5: Data Recorded by: STANDARD: Candidate initials and enters date and time. COMMENTS:	___ SAT ___ UNSAT
STEP 6: Compare flow value obtained to required flow per LWR. STANDARD: Determines that LWR required flow is 21000 gpm and that the calculated flow exceeds the required flow and the LWR may continue. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Unit 1 and 2 Data Sheet for 1030

Unit 1 Generator Megawatts (PID C1A1632) 1222 MW
Reactor thermal Power, Best (PID C1P1355) 3385.578 MW

Unit 2 Generator Megawatts (PID C2A1632) 1219 MW
Reactor thermal Power, Best (PID C2P1355) 3381.399 MW

Low Pressure Service Water Status:

RL Pumps A, B, and C in service
Lake Wylie Level (ORNP7380) 569 feet
RL Header Pressure (ORLP5030) 73 PSIG

Nuclear Service Water Status:

1B RN pump in service
RN Pump Train A Flow (1RNP7520) = 0 gpm
RN Pump Train A Flow (2RNP7520) = 0 gpm
RN Pump Train B Flow (1RNP7510) = 17000 gpm
RN Pump Train B Flow (2RNP7510) = 0 gpm

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Unit 1 is currently performing a liquid waste release from the Waste Monitor building.
- Low Pressure Service Water (RL) Flow transmitter 0RLP5080 (RL Disch Flow) and OAC points C1P0903 and C2P0903 (RL Line A Disch Flow-Hourly Average) are inoperable and have been removed from service.
- The RN system is aligned to the RL discharge header.
- PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations) was last completed at 0700.
- Current time is 1030.

INITIATING CUE:

Calculate total discharge flow using Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011 and determine if adequate flow exists to continue the release per the LWR currently in progress.

2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC-SRO-5/Admin

Classify an event and complete a notification form

CANDIDATE _____

EXAMINER _____

Tools/Equipment/Procedures Needed:

RP/0/A/5000/001, Classification of Emergency
RP/0/B/5000/013, NRC Notification Requirements

READ TO OPERATOR

DIRECTIONS TO STUDENT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is in no-mode 1EOC13 refueling outage and Unit 2 is at 100% RTP.

One hour ago the following information was called into the control room:

1. Fire in warehouse number 2
2. One employee was killed and another has sustained a serious injury while trying to exit the building. MERT team has stabilized the injured employee who was transported to Piedmont Emergency 30 minutes ago.
3. Bethel Fire was called and arrived on site to assist site fire brigade team. The fire was extinguished 47 minutes after it was discovered.
4. The fire brigade captain has requested additional assistance to contain what appear to be oil and other solvents flowing out of the building along with the water used to extinguish the fire. The Oil Spill response procedures have been initiated.
5. Due to the amount of smoke seen by area residents and the possibility of an oil spill into the lake, a news release has been broadcast on local television stations.

INITIATING CUE:

You are the Operations Shift Manager, based on the event determine the classification per RP/0/A/5000/001, Classification of Emergency and any required notifications per RP/0/B/5000/013, NRC Notification Requirements.

IF a classification and/or notification are warranted, **THEN** complete any required forms for transmittal to the offsite agencies.

START TIME: _____

STEP 1: Based on the supplied information, determine appropriate event classification per RP/0/A/5000/001 STANDARD: Candidate determines that there is **no** classification required. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: RP/0/A/5000/013 Step 2.1 Based on supplied information, determine required notifications per RP/0/A/5000/013. STANDARD: Candidate uses RP-13 and from the initial conditions, determines that a 4-Hour notification is required per Enclosure 4.3 10CFR50.72(b)(2)(xi) **Offsite Notification (News Release)** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 3: 2.2: Select one of the following enclosures based on the circumstances of the event: · Enclosure 4.10, "Safeguards ENS Event Report" **OR** · Enclosure 4.11, "Event Notification Report" **OR** · Enclosure 4.13, "Fitness for Duty Event Notification Report" STANDARD: Candidate choose Enclosure 4.11 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
Step 4: 2.3 **IF** the Event Notification Report is being prepared for an "Immediate" or a "1-Hour" NRC notification, perform the following: STANDARD: Step does not apply COMMENTS:	___ SAT ___ UNSAT
NOTE: 1. A request for emergency response support (except an ambulance from an off-site agency) requires a 4-hour notification of the NRC as an "Off-site Notification." 2. A request for ambulance support for a "contaminated injury" is an 8-hour notification and the request for transport of a "clean injury" does not require a NRC notification.	

STEP 5: **IF** a "4-Hour," "8-Hour," or "24-Hour" NRC notification may be required, perform the following: 2.4.1 Notify the following individuals: STANDARD: Candidate reads step **EXAMINER CUE: All required personnel have been called and have agreed to notify the NRC, the media, and the states and counties.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 6: 2.4.2 Complete the Event Notification Report based on the decision reached during the conference call. STANDARD: Grade Enclosure 4.11 per the attached key **EXAMINER CUE: If asked, the following information may be supplied.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 is in no-mode 1EOC13 refueling outage and Unit 2 is at 100% RTP.

One hour ago the following information was called into the control room:

1. Fire in warehouse number 2
2. One employee was killed and another has sustained a serious injury while trying to exit the building. MERT team has stabilized the injured employee who was transported to Piedmont Emergency 30 minutes ago.
3. Bethel Fire was called and arrived on site to assist site fire brigade team. The fire was extinguished 47 minutes after it was discovered.
4. The fire brigade captain has requested additional assistance to contain what appear to be oil and other solvents flowing out of the building along with the water used to extinguish the fire. The Oil Spill response procedures have been initiated.
5. Due to the amount of smoke seen by area residents and the possibility of an oil spill into the lake, a news release has been broadcast on local television stations.

INITIATING CUE:

You are the Operations Shift Manager, based on the event determine the classification per RP/0/A/5000/001, Classification of Emergency and any required notifications per RP/0/B/5000/013, NRC Notification Requirements.

IF a classification and/or notification are warranted, **THEN** complete any required forms for transmittal to the offsite agencies.

SRO-5 ADMIN KEY

CRITICAL ITEMS

DRAFT

Enclosure 4.11

Event Notification Report

RP/0/B/5000/013

STATE: "THIS IS THE CATAWBA NUCLEAR SITE IN NRC REGION 2 MAKING AN EVENT NOTIFICATION REPORT" EN # 1

NOTIFICATION TIME/DATE	UNIT	CALLER'S NAME	CALLBACK TELEPHONE #:	NRC OPERATIONS OFFICER CONTACTED
TODAY / NOW	1/2	CANDIDATE	ENS 1-803-831-3920 (C/R) or 1-803-831-2674 (TSC)	

NRC OPERATION TELEPHONE NUMBER: PRIMARY - 1-301-816-5100 or 1-800-532-3469; BACKUPS - [1st] 1-301-951-0550 or 1-800-449-3694; [2nd] 1-301-415-0550; and [3rd] 1-301-415-0553

EVENT TIME &ZONE (time) Region II (zone)	EVENT DATE	POWER/MODE BEFORE	POWER/MODE AFTER
1 HOUR AGO	TODAY	100% / MODE 1	100% / MODE 1

EVENT CLASSIFICATIONS		1-HR NON-EMERGENCY 10CFR5072(b)(1)		8-HR NON-EMERGENCY	
	GENERAL EMERGENCY		TS Deviation pursuant to 10 CFR 50.54(x)		(ii)(A) Degraded Condition
	SITE AREA EMERGENCY		Accidental Criticality or Loss/Theft of Material		(ii)(B) Unanalyzed Condition
	ALERT		Physical Protection of Plant or Materials		(iv)(A) Valid System Actuation
	UNUSUAL EVENT				(v)(A) Safe S/D Capability
X	50.72 NON-EMERGENCY (see next columns)				(v)(B) RHR Capability
	PHYSICAL SECURITY (73.71)		4-HR NON-EMERGENCY 10 CFR 50.72(b)(2)		(v)(C) Control of Radiological
	TRANSPORTATION (10 CFR 20)		(i) TS Required S/D		(v)(D) Accident Mitigation
	MATERIAL/EXPOSURE (10 CFR 20)		(iv)(A) ECCS Discharge to RCS		(xii) Offsite Medical
	RETRACTION		(iv)(B) RPS Actuation when Rx is critical		(xiii) Lost ENS
		X	(xi) Offsite Notification		(xiii) Lost Emergency Assessment
					(xiii) Lost Offsite Communications.
					(xiii) Emergency Siren Inoperable
	OTHER UNSPECIFIED REQUIREMENT (IDENTIFY)		60-DAY OPTIONAL 10CFR50.73(a)(1) Invalid Specified System Actuation		24 HOUR NON EMERGENCY
					Radiological Exposure 10CFR20.2202
					Fitness For Duty 10CFR26.73
					Operating License Deviation

EVENT DESCRIPTION (Include: Systems affected, actuations & their initiating signals, causes, effect of event on plant, actions taken or planned, PARs etc.)

CATEGORY	INITIATION SIGNAL
____ REACTOR TRIP	
____ ESF ACTUATION	
____ ECCS ACTUATION	
____ SI FLOW	
____ LCO	N/A

SYSTEM ____

COMPONENT ____

CAUSE: ____ MECHANICAL ____ ELECTRICAL ____ PERSONNEL ERROR ____ OTHER

INFORMATION SUMMARIZED FROM CUE SHEET:

- NO EFFECT ON STATION EQUIPMENT
- FIRE IN OUTSIDE WAREHOUSE
- 1 DEATH, 1 INJURY TRANSPORT TO HOSPITAL
- POTENTIAL ENVIRONMENTAL RELEASE, SPILL RESPONSE IN PROGRESS
- LOCAL FIRE DEPARTMENT ASSISTED
- DENSE SMOKE
- NEW RELEASE
- FIRE OUT

Continue on Enclosures 4.11 page 2 of 2 if necessary.

NOTIFICATIONS	YES	NO	WILL BE
NRC RESIDENT			X
STATE(s) NC SC			X
LOCAL York County Gaston County Mecklenburg County			X
OTHER GOV AGENCIES			
MEDIA/PRESS RELEASE	X		

ANYTHING UNUSUAL OR NOT UNDERSTOOD? ☐ YES ☒ NO (Explain above)

DID ALL SYSTEMS FUNCTION AS REQUIRED? ☒ YES ☐ NO (Explain above)

MODE OF OPERATION UNTIL CORRECTED: MODE 1

ESTIMATED RESTART DATE: N/A

SRO-5 ADMIN KEY

SRO-5 ADMIN KEY

Enclosure 4.11

Event Notification Report

RADIOLOGICAL RELEASES: CHECK OR FILL IN APPLICABLE ITEMS (specific details/explanations should be covered in event description)

	LIQUID RELEASE		GASEOUS RELEASE		UNPLANNED RELEASE		PLANNED RELEASE		ONGOING		TERMINATED
	MONITORED		UNMONITORED		OFFSITE RELEASE		T.S. EXCEEDED		RM ALARMS		AREAS EVACUATED
	PERSONNEL EXPOSED OR CONTAMINATED				OFFSITE PROTECTIVE ACTIONS RECOMMENDED				State release path in description		

NOTE: Contact Radiation Protection Shift to obtain the following release information.
IF the notification is due and the information is not available, mark "Not Available" and complete the notification.

	Releases Rate (Ci/sec)	% T.S. LIMIT	HOO GUIDE	Total Activity (Ci)	% T.S. LIMIT	HOO GUIDE
Noble Gas			0.1 Ci/sec			1000 Ci
Iodine			10 uCi/sec			0.01 Ci
Particulate			1 uCi/sec			1 mCi
Liquid (excluding tritium & dissolved noble gases)			10 uCi/min	N/A		0.1 Ci
Liquid (tritium)			0.2 Ci/min			5 Ci
Total Activity						

CIRCLE RAD MONITORS IN ALARM	PLANT STACK (EMF 35, 36, 37)	CONDENSER/ AIR EJECTOR (EMF 33)	MAIN STEAM LINE (UNIT 1-EMF 26,27,28,29 UNIT 2-EMF 10, 11, 12,13)	SG BLOWDOWN (EMF 34)	OTHER
RAD MONITOR READINGS					
ALARM SETPOINTS: TRIP II					
% T.S. LIMIT (If applicable)	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	

RCS OR SG TUBE LEAKS: CHECK OR FILL IN APPLICABLE ITEMS (specific details/explanations should be covered in event description)

LOCATION OF THE LEAK (e.g. SG#, valve, pipe, etc.):

LEAK RATE: gpm/gpd | T.S. LIMITS EXCEEDED: | SUDDEN OR LONG TERM DEVELOPMENT:

LEAK START DATE: TIME | COOLANT ACTIVITY(Last Sample): PRIMARY SECONDARY-

LIST SAFETY RELATED EQUIPMENT NOT OPERATIONAL:

EVENT DESCRIPTION (Continued from Enclosure 4.11 Page 1 of 2)

ADDITIONAL INFORMATION MAY BE ENTERED HERE.

ADDITIONAL INFORMATION MAY BE ATTACHED.

APPROVED BY: SIGNATURE
Operations Shift Manager/Emergency Coordinator (eastern)

TIME/DATE: NOW / TODAYS DATE ___/___/___
mm dd yy

SRO-5 ADMIN KEY

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC –RO-1/Admin

Perform a shutdown margin calculation.

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Perform a shutdown margin calculation.

Alternate Path: N/A

Facility JPM #: 2003 NRC SRO ADMIN JPM 2S (Modified)

K/A Rating(s): Generic KA 2.1.25 (2.8/3.1)

Task Standard:

Candidate determines the unit has sufficient SDM until 8/7/2004 at 2337 ± 3 minutes.

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

OP/0/A/6100/006 (Reactivity Balance Calculation) Revision 66
Unit One Reactor Operating Data Book.

Validation Time: 15 min. **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____ / _____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 has shutdown from 100 % power to mode 3 in 4 hours. The unit will next cooldown to 500°F and remain there long enough to complete needed repairs.

Present conditions: Date: 8/6/2004 Time: 2230
Tave = 557 °F
EFPD: 250
Boron Concentration: 1010 PPM
Samarium Difference from Equilibrium = -2.57
Iodine Concentration = 7830 atm/cc
Xenon Concentration = 3290 atm/cc

INITIATING CUE:

You are instructed to perform a manual shutdown margin calculation using OP/0/A/6100/06 (Reactivity Balance Calculation) Enclosure 4.4 (Shutdown Margin (With or Without Xenon Credit)) to determine how long the unit can cooldown and then remain at the 500°F temperature using the present boron concentration.

EP 1 Review Limits and Precautions and per step 2.1, N/A's step 2.2 STANDARD: Step 2.2 is N/A'd COMMENTS:	___SAT ___UNSAT
STEP 2: 2.3 Determine the following information: STANDARD: Operator determines the following using the initial conditions. Unit: 1 Date/Time: 8/6/2004 / 2230 Present NC System Boron Concentration: **1010** ppm Present NC System T-AVG: **557** °F Desired NC System T-AVG: **500** °F Present Cycle Burnup: **250** EFPD Present Difference from Equilibrium Samarium Worth: **(-) 2.57** pcm Date and time of last valid Iodine and Xenon Concentrations: **EXAMINER CUE: Use 8/6/2004 / 2230** Iodine Concentration: **7830** atm/cc Xenon Concentration: **3290** atm/cc COMMENTS:	___SAT ___UNSAT
NOTE: Interpolation is not required for step 2.4. Bounding temperatures and burnups may be used to select the highest boron concentration in Section 5.11 of R.O.D manual.	

EP 3: 2.4 Select the HIGHEST boron concentration for the T-AVG's between the range of present and desired T-AVG's at current cycle burnup per Section 5.11 of the R.O.D. manual. STANDARD: Determine the HIGHEST boron concentration for the T-AVG's to be **1213 ppm** per section 5.11 of the R.O.D. Manual. COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 4: 2.5.1 Determine there are no untrippable RCCA's per the initial conditions. STANDARD: Determines the untrippable rod penalty to be **0 pcm**. COMMENTS:	___SAT ___UNSAT
STEP 5: 2.5.2 Enter 0 ppm for Zero power physics testing penalty. STANDARD: Enter **0 ppm** for Zero power physics testing penalty in step 2.5.2. **EXAMNINER CUE: Zero Power Physics Testing has been completed** MMENTS:	___SAT ___UNSAT
STEP 6: 2.5.3 Calculate the total additional boron concentration penalty. STANDARD: Determines penalty to be **0 ppm** since there are no inoperable rods and ZPPT is complete. COMMENTS:	___SAT ___UNSAT
STEP 7: 2.6 Calculate total required boron concentration for SDM. STANDARD: Calculates a required boron concentration of **1213 ppm**. COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT

EP 8: 2.7 Determine the Boron Difference between Required Boron Concentration from SDM and current NC Boron Concentration. STANDARD: Calculation: **1213 PPM - 1010 PPM = 203 PPM** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
NOTE: A negative boron difference in Step 2.7 implies that SDM is maintained for Xenon free conditions. A positive boron difference means that SDM is maintained using a Xenon credit and/or boration.	
STEP 9: 2.7.1 IF Boron Difference (Step 2.7) is negative, N/A Step2.8 2.8 Determine Xenon credit as follows: STANDARD: Determines from Step 2.7 that boron difference is NOT negative and goes to step 2.8. COMMENTS:	___SAT ___UNSAT
NOTE: Interpolation is not required for step 2.8.1. Bounding NC System T-AVG and cycle burnup may be used to select the highest Differential Boron Worth from Section 5.3 of R.O.D manual.	
STEP 10: 2.8.1 Determine the ARI, Differential Boron Worth at lower T-AVG of Step 2.3.4 or 2.3.5 **AND** cycle burnup of step 2.3.6 from Section 5.3 of the R.O.D. manual. STANDARD: Determines a ARI, Differential Boron Worth at 500 °F of **-8.11 PCM/PPM** COMMENTS:	___SAT ___UNSAT

EP 11: 2.8.2 Calculate the reactivity worth of the boron difference. STANDARD: Calculation is **-8.11 PCM/PPM X 203 PPM = 1646.33 PCM.** COMMENTS:	___SAT ___UNSAT
STEP 12: 2.8.3 Calculate the xenon worth that is required to ensure SDM at the present NC System Boron. STANDARD: Determines for step 2.8.3. A. Calculation **(1649.33 PCM – (-)2.57)/ 0.85 = 1648.9 PCM / 0.85 =** **1939.88 PCM** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 13: 2.8.4 Predict Xenon for approximately two days into the future. STANDARD: Uses printed copy of OAC Xenon predict program. Comments	
CAUTION: SDM is ensured until the Date/Time recorded below at the present NC System boron or higher. After that time, NC System boration will be required to maintain SDM.	

STEP 14: 2.8.5 Interpolate the Date/Time from the Xenon predict of step 2.8.4 that equal the xenon worth of step 2.8.3 STANDARD: From the table, interpolation is: **7-AUG-2004 2330 1952.668 PCM** **7-AUG-2004 2340 1934.906 PCM** Based on a required reactivity worth of **1939.88 PCM** Difference between reactivity at 2340 and 2330 = 17.708 Difference between reactivity at 2330 and 1939.88 = 12.788 12.788 / 17.708 = 0.722 or 72.2% to 2330 = 7.22 minutes. 2330 + 7.22 = 2337 **Date/Time when SDM is lost is 8/7/2004 at 2337** Acceptable variance on the time is **2333 to 2340**	**CRITICAL STEP** ___SAT ___UNSAT
This JPM is complete	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 has shutdown from 100 % power to mode 3 in 4 hours. The unit will next cooldown to 500°F and remain there long enough to complete needed repairs.

Present conditions: Date: 8/6/2004 Time: 2230
Tave = 557 °F
EFPD: 250
Boron Concentration: 1010 PPM
Samarium Difference from Equilibrium = -2.57
Iodine Concentration = 7830 atm/cc
Xenon Concentration = 3290 atm/cc

INITIATING CUE:

You are instructed to perform a manual shutdown margin calculation using OP/0/A/6100/06 (Reactivity Balance Calculation) Enclosure 4.4 (Shutdown Margin (With or Without Xenon Credit)) to determine how long the unit can cooldown and then remain at the 500°F temperature using the present boron concentration.

RO-1 ADMIN
KEY

Duke Power Company Catawba Nuclear Station	Procedure No. OP/ 0/A/6100/006
	Revision No. 066
Reactivity Balance Calculation	
Continuous Use	Electronic Reference No. CN0892MR

PERFORMANCE

* * * * * * * * * * UNCONTROLLED FOR PRINT * * * * * * * * * *

(ISSUED) - PDF Format

DRAFT

RO-1 ADMIN
KEY

Reactivity Balance Calculation

1. Purpose

1.1 To estimate critical NC System boron concentration before criticality based on other assumed core reactivity conditions.

1.2 To estimate critical control bank position before criticality based on other assumed core reactivity conditions.

1.3 To calculate shutdown margin in Modes 1 and 2 with untrippable and/or misaligned RCCA's. (TS 3.1.4)

1.4 To calculate the NC System boron concentration at which shutdown margin will **NOT** be met in Modes 2 (with K-eff < 1.0), 3, 4, and 5. (TS 3.1.1)

1.5 To verify K-eff < 0.99 with shutdown banks withdrawn.

1.6 To calculate the NC System boron concentration at which refueling boron concentration will **NOT** be met in Mode 6. (TS 3.9.1)

2. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual.

2.1 Ensure all data used by this procedure are for the correct unit.

2.2 NC System T-AVG should be maintained within ±1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.

2.3 Shutdown margin (SDM) shall be ≥1000 pcm in Mode 5. (Tech Spec 3.1.1 and Enclosure 4.4)

2.4 SDM shall be ≥1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, or 4.4)

2.5 Required refueling boron concentration is obtained from Tech Spec 3.9.1 and Enclosure 4.6.

2.6 **IF** T-AVG <500 °F, credit for only 50% of xenon worth can be taken for verifying SDM.

2.7 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.

2.8 Criticality shall **NOT** be obtained outside the maximum window (±750 pcm) of estimated critical control bank position.

2.9 Desired critical control bank position shall **NOT** be below the control bank insertion limits **OR** above any temporary control bank withdrawal limits.

2.10 Verification of K-eff < 0.99 with shutdown banks withdrawn shall only be performed above 200 °F.

2.11 REACT and manual calculations may **NOT** yield equal results due to minor differences in methods (ie interpolation). Reactor Engineering should be contacted if questions arise.

3. Procedure

3.1 For estimated critical NC System boron concentration (ECB), refer to Enclosure 4.1.

3.2 For estimated critical control bank position (ECP) refer to Enclosure 4.2.

3.3 For SDM calculation with untrippable or misaligned RCCA's, refer to Enclosure 4.3.

3.4 For SDM verification in Modes 5, 4, 3, or 2 (with K-eff < 1.0), (with or without xenon credit), refer to Enclosure 4.4.

3.5 For Verification of K-eff < 0.99 with shutdown banks withdrawn, refer to Enclosure 4.5.

3.6 For refueling boron concentration verification in Mode 6, refer to Enclosure 4.6.

3.7 For instructions on running REACT computer program, refer to Enclosure 4.7.

3.8 For Shutdown Fission Product Correction Factor, refer to Enclosure 4.8.

4. Enclosures

4.1 Estimated Critical Boron Concentration (ECB).

4.2 Estimated Critical Control Bank Position (ECP).

4.3 Shutdown Margin - Untrippable / Misaligned RCCA(s) - Modes 1 and 2.

4.4 Shutdown Margin - (With or Without Xenon Credit).

4.5 Verification of K-eff < 0.99 with Shutdown Banks Withdrawn

4.6 Shutdown Boron Concentration - Mode 6.

4.7 REACT Computer Program Directions.

4.8 Shutdown Fission Product Correction Factor

Enclosure 4.4

Shutdown Margin (With or Without Xenon Credit)

1. Initial Conditions

1.1 Limits and Precautions have been reviewed.

2. Procedure

2.1 **IF** performing a MANUAL calculation, N/A Step 2.2.

N/A 2.2 Perform the following steps if using the REACT program to complete the calculation:

2.2.1 Access Reactivity Balance Program per Enclosure 4.7.

2.2.2 Select "View" then "Reactivity Balance Calculations" on toolbar.

NOTE: "SDM – Mode 5, 4, or 3" option also applies to Mode 2 with K-eff < 1.0.

2.2.3 Select "SDM – Mode 5, 4, or 3" tab in Reactivity Balance Calculations window.

NOTE:
1. Sign must be provided with Difference from Equilibrium Samarium [i.e., ( ) ___ pcm].
2. In REACT, "Inoperable RCCAs" refers to untrippable RCCAs.
3. Rod locations are put in REACT in a text only format (e.g. B12 or B-12). REACT uses the maximum stuck rod worth for all known untrippable RCCAs.

2.2.4 Enter appropriate values as prompted.

2.2.5 Click Calculate, print program results, label appropriately, and attach to this enclosure.

2.2.6 Compare required boron concentration to present boron concentration.

2.2.7 **IF** Xenon Credit was selected **AND** a potential boron deficit is indicated in the calculation results, complete the following steps:

A. Record "Adjusted SDM Deficit" from Reacivity Balance Calculation output: _____pcm

B. Select "View" then "Xenon/Samarium Calculations" on toolbar.

C. Select "Xenon" for Isotope and "Transient Prediction" for Calculation Type.

N/A

D. Enter initial concentrations. These can be obtained from the OAC or Reactor Engineering. The OAC point id's for these concentrations are C1(2)P0125 and C1(2)P0124.

E. Enter appropriate power history.

F. Print program results, label appropriately, and attach to this enclosure.

CAUTION: SDM is ensured until the Date/Time recorded below at the present NC System boron or higher. After that time, NC System boration will be required to maintain SDM. {PIP C-03-04173}

G. Interpolate the Date/Time from the xenon predict of step 2.2.7.F that equals the xenon worth of step 2.2.7.A

Loss of SDM Date/Time _____/_____

2.2.8 Ensure that a separate, independent calculation has been performed per steps 2.2.1 through 2.2.7.

2.2.9 Verify that both attachments to this enclosure yield the same results.

2.2.10 N/A the rest of this enclosure (steps 2.3 through 2.9).

Performed By: _____ Date/Time: _____/_____

Verified By: _____ Date/Time: _____/_____

NOTE: Assume all values are positive unless otherwise indicated by parentheses. **IF** parentheses precede the value [i.e. ( ) pcm], record the sign provided with data. The calculations account for these sign conventions.

2.3 Determine the following information:

Step	Description	Reference	Value
2.3.1	Unit	N/A	1
2.3.2	Date/Time	N/A	8/6/04 2230
2.3.3	Present NC System Boron Conc	N/A	1010 ppm
2.3.4	Present NC System T-AVG	N/A	557 °F
2.3.5	Desired NC System T-AVG	N/A	500 °F
2.3.6	Present cycle burnup	P1457 or Duty Reactor Engineer	250 EFPD
2.3.7	Present Difference from Equilibrium Samarium Worth	P1475 or Duty Reactor Engineer	(-) 257 pcm
2.3.8	Date and time of latest valid Iodine and Xenon concentrations. N/A if xenon free.	Duty Reactor Engineer or current time if using OAC	8/6/04 / 2230
2.3.9	Iodine concentration at time listed in step 2.3.8; 0 if xenon free.	P0124 or Duty Reactor Engineer	7830 atm/cc
2.3.10	Xenon concentration at time listed in step 2.3.8; 0 if xenon free.	P0125 or Duty Reactor Engineer	3290 atm/cc

NOTE: Interpolation is not required for step 2.4. Bounding temperatures and burnups may be used to select the highest boron concentration in Section 5.11 of R.O.D manual.

2.4 Select the highest boron concentration for the T-AVG's between the range of Step 2.3.4 and Step 2.3.5 at current cycle burnup (Step 2.3.6) in Section 5.11 of the R.O.D. manual. {PIP 0-C99-0318} 1213 ppm

2.5 Calculate additional boron concentration penalties:

2.5.1 Calculate untrippable RCCA penalty:

Description	Reference	Value
A. Number of Untrippable RCCA(s) not fully inserted	N/A	0
B. Boron Penalty per Untrippable rod	N/A	160 ppm
Untrippable RCCA Penalty	**(A) X (B)**	0 ppm

2.5.2 Enter Zero Power Physics Testing penalty; 100 ppm if physics testing is not complete, otherwise, enter 0 ppm. 0 ppm

2.5.3 Calculate total additional boron concentration penalty:

Description	Reference	Value
A. Untrippable RCCA Penalty	Step 2.5.1	0 ppm
B. Additional Boron Conc Penalty for ZPPT	Step 2.5.2	0 ppm
Total Boron Penalty	**(A) + (B)**	0 ppm

2.6 Calculate total required boron concentration for SDM:

Description	Reference	Value
A. Required SDM Boron	Step 2.4	1213 ppm
B. Total Boron Penalty	Step 2.5.3	0 ppm
Total Required Boron Concentration for SDM (Xenon Free)	**(A) + (B)**	1213 ppm

2.7 Determine the Boron Difference between Required Boron Concentration for SDM and current NC System boron concentration.

Description	Reference	Value
A. Total Required Boron Concentration for SDM	Step 2.6	1213 ppm
B. Present NC System Boron Concentration	Step 2.3.3	1010 ppm
Boron Difference	**(A) - (B)**	203 **ppm**

NOTE: A negative boron difference in Step 2.7 implies that SDM is maintained for Xenon free conditions. A positive boron difference means that SDM is maintained using a Xenon credit and/or boration. {0-C99-0318}

N/A 2.7.1 **IF** Boron Difference (Step 2.7) is negative, N/A Step 2.8.

2.8 Determine the Xenon Credit as follows:

> **NOTE:** Interpolation is not required for step 2.8.1. Bounding NC System T-AVG and cycle burnup may be used to select the highest Differential Boron Worth from Section 5.3 of R.O.D manual.

2.8.1 Determine the ARI, Differential Boron Worth at lower T-AVG of Step 2.3.4 or 2.3.5 **AND** cycle burnup of step 2.3.6 from Section 5.3 of the R.O.D. manual. -8.11 pcm/ppm

2.8.2 Calculate the reactivity worth of the boron difference:

Description	Reference	Value
A. Boron Difference	Step 2.7	203 ppm
B. ARI Differential Boron Worth	Step 2.8.1	8.11 pcm/ppm
Reactivity Worth of Boron Difference	**(A) X (B)**	1646.33 **pcm**

2.8.3 Calculate the xenon worth that is required to ensure SDM at the present NC System boron.

A. **IF** T-AVG is ≥ 500 ° F, calculate the Xenon Worth as follows:

Description	Reference	Value
A. Reactivity Worth	Step 2.8.2	1646.33 pcm
B. Difference from Eq Sm Worth	Step 2.3.7	(-)2.57 pcm
Xenon Worth	**{(A) - (B)} / 0.85**	1939.86 **pcm**

N/A B. **IF** T-AVG is < 500 ° F, calculate the Xenon Worth as follows:

Description	Reference	Value
A. Reactivity Worth	Step 2.8.2	pcm
B. Difference from Eq Sm Worth	Step 2.3.7	( ) pcm
Xenon Worth	**{(A) - (B)} X 2**	**pcm**

2.8.4 Predict Xenon for approximately two days into the future using OAC Xenon Predict Program or REACT program (per Enclosure 4.7) and data from 2.3.1 through 2.3.10.

CAUTION: SDM is ensured until the Date/Time recorded below at the present NC System boron or higher. After that time, NC System boration will be required to maintain SDM. {PIP C-03-04173}

2.8.5 Interpolate the Date/Time from the xenon predict of step 2.8.4 that equals the xenon worth of step 2.8.3.

Loss of SDM Date/Time 8/7/04/ 2337 ± 3 min KEY RANGE.

NOTE: Separate, independent calculation must be performed by the verifier.

2.9 Sign the appropriate space below. N/A the unsigned space.

Performed By: KEY Date/Time: /

Verified By: KEY Date/Time: /

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.11
MINIMUM SHUTDOWN MARGIN BORON

Required Boron Concentration for 1.3% Shutdown Margin as a Function of Temperature and Burnup

CORE AVERAGE TEMPERATURE (°F)

BURNUP (EFPD)	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	557
0	1863	1857	1851	1845	1838	1830	1821	1809	1796	1782	1765	1742	1712	1674	1627	1612
20	1827	1821	1814	1808	1800	1792	1782	1771	1757	1743	1724	1701	1670	1632	1584	1569
40	1791	1784	1778	1771	1763	1755	1745	1733	1718	1704	1685	1660	1629	1590	1541	1525
60	1755	1748	1741	1734	1727	1718	1708	1695	1680	1665	1645	1620	1588	1547	1497	1481
80	1718	1712	1705	1698	1690	1681	1671	1658	1643	1627	1606	1580	1547	1505	1454	1437
100	1682	1675	1669	1662	1654	1645	1634	1621	1605	1588	1567	1540	1506	1463	1410	1393
120	1645	1639	1632	1626	1618	1608	1597	1584	1567	1550	1528	1501	1465	1421	1366	1348
140	1609	1602	1596	1589	1581	1572	1560	1546	1530	1512	1489	1461	1424	1378	1322	1304
160	1572	1565	1559	1552	1544	1535	1523	1509	1492	1473	1450	1421	1383	1335	1277	1259
180	1534	1528	1522	1515	1507	1497	1485	1471	1453	1434	1411	1380	1341	1292	1232	1213
200	1497	1491	1484	1477	1469	1459	1447	1432	1414	1395	1370	1339	1299	1249	1188	1168
220	1460	1453	1446	1439	1430	1420	1408	1393	1374	1355	1330	1297	1257	1206	1143	1123
240	1421	1414	1407	1400	1391	1381	1368	1353	1334	1314	1288	1255	1213	1161	1098	1077
260	1382	1375	1368	1360	1351	1340	1327	1311	1292	1271	1244	1211	1168	1115	1050	1030
280	1342	1335	1328	1321	1311	1300	1286	1268	1248	1226	1199	1165	1121	1067	1001	980
300	1300	1295	1288	1280	1270	1258	1243	1225	1203	1181	1153	1117	1073	1018	950	929
320	1257	1252	1245	1237	1227	1214	1198	1179	1157	1134	1105	1069	1023	967	898	876
340	1212	1208	1201	1193	1182	1168	1152	1132	1109	1085	1056	1019	972	915	844	822
360	1167	1162	1156	1147	1136	1122	1105	1085	1061	1036	1006	968	921	862	790	767
380	1122	1117	1110	1101	1089	1075	1057	1036	1011	987	956	917	868	808	734	711
400	1076	1071	1063	1054	1042	1027	1009	987	962	936	905	865	815	753	678	654
420	1030	1024	1017	1007	995	979	961	938	912	886	853	812	761	698	621	597
440	985	978	970	960	947	931	912	889	863	835	802	760	708	643	565	540
460	940	933	924	913	900	884	864	841	813	785	751	708	654	588	508	483
480	896	888	878	867	853	836	816	792	764	735	700	655	601	533	452	426
490	874	866	856	844	830	813	793	768	740	710	674	629	574	506	424	398

NOTES: **1) Tech Spec Refueling boron concentration is 2700 ppmB (per C1C15 COLR)**

2) Fill and Vent Boron concentration is 1584 ppmB.

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.3
ARI DIFFERENTIAL BORON WORTH

CORE AVERAGE TEMP (F)

BURNUP (EFPD)	68	100	150	200	250	300	350	400
0	-9.62	-9.58	-9.46	-9.31	-9.11	-8.90	-8.64	-8.38
20	-9.66	-9.61	-9.49	-9.34	-9.12	-8.91	-8.65	-8.38
40	-9.69	-9.65	-9.52	-9.37	-9.14	-8.92	-8.65	-8.39
60	-9.73	-9.68	-9.56	-9.39	-9.16	-8.93	-8.66	-8.39
80	-9.76	-9.72	-9.59	-9.42	-9.18	-8.94	-8.67	-8.40
100	-9.80	-9.75	-9.62	-9.45	-9.20	-8.95	-8.68	-8.40
120	-9.86	-9.80	-9.67	-9.50	-9.25	-8.99	-8.72	-8.44
140	-9.91	-9.86	-9.72	-9.55	-9.29	-9.03	-8.76	-8.48
160	-9.97	-9.91	-9.77	-9.60	-9.34	-9.08	-8.80	-8.51
180	-10.02	-9.97	-9.83	-9.65	-9.38	-9.12	-8.84	-8.55
200	-10.08	-10.02	-9.88	-9.70	-9.43	-9.16	-8.88	-8.59
220	-10.18	-10.12	-9.98	-9.80	-9.52	-9.25	-8.96	-8.67
240	-10.28	-10.22	-10.08	-9.89	-9.61	-9.34	-9.05	-8.76
260	-10.39	-10.33	-10.17	-9.99	-9.71	-9.42	-9.13	-8.84
280	-10.49	-10.43	-10.27	-10.08	-9.80	-9.51	-9.22	-8.93
300	-10.59	-10.53	-10.37	-10.18	-9.89	-9.60	-9.31	-9.01
320	-10.72	-10.66	-10.50	-10.31	-10.02	-9.72	-9.43	-9.13
340	-10.86	-10.80	-10.64	-10.44	-10.14	-9.85	-9.55	-9.25
360	-10.99	-10.93	-10.77	-10.57	-10.27	-9.97	-9.67	-9.36
380	-11.13	-11.07	-10.90	-10.70	-10.40	-10.10	-9.79	-9.48
400	-11.26	-11.20	-11.03	-10.83	-10.52	-10.22	-9.91	-9.60
420	-11.42	-11.36	-11.19	-10.98	-10.67	-10.37	-10.05	-9.74
445	-11.62	-11.55	-11.39	-11.17	-10.86	-10.55	-10.23	-9.92
455	-11.7	-11.63	-11.46	-11.25	-10.93	-10.62	-10.31	-9.99

UNIT TWO
REACTOR OPERATING DATA
SECTION 5.3
ARI DIFFERENTIAL BORON WORTH

Source: CNEI-0400-30
Prepared By: M.W. Ha
Revision Number: 129
Date: April 28,1997

BURNUP (EFPD)	CORE AVERAGE TEMP (F) 450	500	510	520	530	540	550	557
0	-8.04	-7.70	-7.60	-7.50	-7.41	-7.31	-7.21	-7.14
20	-8.04	-7.69	-7.60	-7.50	-7.41	-7.31	-7.21	-7.15
40	-8.04	-7.69	-7.59	-7.50	-7.41	-7.31	-7.22	-7.15
60	-8.04	-7.68	-7.59	-7.50	-7.41	-7.31	-7.22	-7.16
80	-8.04	-7.68	-7.59	-7.50	-7.41	-7.32	-7.23	-7.16
100	-8.03	-7.67	-7.58	-7.49	-7.41	-7.32	-7.23	-7.17
120	-8.08	-7.71	-7.62	-7.54	-7.45	-7.36	-7.27	-7.21
140	-8.11	-7.75	-7.67	-7.58	-7.49	-7.40	-7.31	-7.25
160	-8.15	-7.80	-7.71	-7.62	-7.53	-7.44	-7.35	-7.29
180	-8.19	-7.84	-7.75	-7.66	-7.57	-7.48	-7.39	-7.33
200	-8.23	-7.88	-7.79	-7.70	-7.61	-7.52	-7.43	-7.37
220	-8.31	-7.96	-7.87	-7.78	-7.69	-7.60	-7.51	-7.44
240	-8.40	-8.03	-7.94	-7.85	-7.76	-7.67	-7.58	-7.52
260	-8.47	-8.11	-8.02	-7.93	-7.84	-7.75	-7.66	-7.59
280	-8.56	-8.18	-8.09	-8.00	-7.91	-7.82	-7.73	-7.67
300	-8.64	-8.26	-8.17	-8.08	-7.99	-7.90	-7.80	-7.74
320	-8.75	-8.37	-8.28	-8.19	-8.10	-8.01	-7.91	-7.85
340	-8.87	-8.48	-8.39	-8.30	-8.21	-8.12	-8.02	-7.96
360	-8.98	-8.60	-8.50	-8.41	-8.32	-8.23	-8.13	-8.07
380	-9.09	-8.71	-8.62	-8.52	-8.43	-8.34	-8.24	-8.18
400	-9.21	-8.82	-8.73	-8.63	-8.54	-8.45	-8.36	-8.29
420	-9.35	-8.96	-8.86	-8.76	-8.66	-8.56	-8.45	-8.38
445	-9.53	-9.13	-9.02	-8.91	-8.8	-8.69	-8.58	-8.5
455	-9.6	-9.2	-9.09	-8.97	-8.86	-8.74	-8.63	-8.55

XENON AND SAMARIUM REACTIVITY WORTH PREDICTION

Initial Values used for calculations:

250.0062 : BURNUP (EFPD)
3289.904 : XE-135 Concentration (Atoms/CC)
37001.88 : SM-149 Concentration (Atoms/CC)
16931.09 : PM-149 Concentration (Atoms/CC)
7830.452 : I-135 Concentration (Atoms/CC)

NO : Were Equilibrium Concentrations Selected?

------ Power Profile -------

DD-MMM-YYYY HH:MM	% POWER
06-AUG-2004 18:25	99.6
06-AUG-2004 19:25	75.0
06-AUG-2004 20:25	50.0
06-AUG-2004 21:25	25.0
06-AUG-2004 22:25	0.0
07-AUG-2004 02:25	0.0
07-AUG-2004 06:25	0.0
07-AUG-2004 10:25	0.0
08-AUG-2004 10:25	0.0
09-AUG-2004 10:25	0.0

DATE-TIME	%POWER	XE-135 CONC	I-135 CONC	XE WORTH PCM	XE-WORTH RATE PCM/MIN	SM-149 CONC	PM-149 CONC	SM WORTH PCM
06-AUG-2004 18:25	99.6	3289.9	7830.5	2648.486	0.000	37001.9	16931.1	904.333
6-AUG-2004 19:00	85.2	3311.6	7797.7	2665.983	0.904	37010.8	16922.2	904.551
6-AUG-2004 20:00	60.4	3434.0	7594.0	2764.475	2.214	37068.2	16864.6	905.953
6-AUG-2004 21:00	35.4	3643.0	7217.2	2932.734	3.281	37178.8	16753.7	908.657
6-AUG-2004 22:00	10.4	3928.3	6684.2	3162.441	4.296	37342.2	16590.0	912.650
6-AUG-2004 22:40	0.0	4156.3	6256.1	3345.992	4.527	37478.6	16453.6	915.984
6-AUG-2004 22:50	0.0	4210.7	6149.3	3389.731	4.323	37513.7	16418.5	916.842
6-AUG-2004 23:00	0.0	4262.5	6044.3	3431.465	4.124	37548.7	16383.4	917.698
6-AUG-2004 23:10	0.0	4311.9	5941.1	3471.246	3.930	37583.7	16348.5	918.552
6-AUG-2004 23:20	0.0	4359.0	5839.7	3509.121	3.741	37618.6	16313.6	919.404
6-AUG-2004 23:30	0.0	4403.7	5740.0	3545.140	3.556	37653.4	16278.8	920.255
6-AUG-2004 23:40	0.0	4446.2	5642.1	3579.347	3.376	37688.1	16244.1	921.104
6-AUG-2004 23:50	0.0	4486.5	5545.7	3611.791	3.201	37722.8	16209.4	921.951
7-AUG-2004 00:00	0.0	4524.7	5451.1	3642.514	3.030	37757.3	16174.8	922.796
7-AUG-2004 00:10	0.0	4560.8	5358.0	3671.562	2.863	37791.8	16140.3	923.640
7-AUG-2004 00:20	0.0	4594.8	5266.6	3698.977	2.701	37826.3	16105.9	924.481
7-AUG-2004 00:30	0.0	4626.9	5176.7	3724.801	2.543	37860.6	16071.5	925.321
7-AUG-2004 00:40	0.0	4657.0	5088.3	3749.074	2.389	37894.9	16037.2	926.159
7-AUG-2004 00:50	0.0	4685.3	5001.4	3771.839	2.239	37929.1	16003.0	926.995
7-AUG-2004 01:00	0.0	4711.8	4916.1	3793.134	2.093	37963.3	15968.9	927.830
7-AUG-2004 01:10	0.0	4736.4	4832.1	3812.996	1.951	37997.4	15934.8	928.662
7-AUG-2004 01:20	0.0	4759.4	4749.7	3831.465	1.813	38031.4	15900.8	929.493
7-AUG-2004 01:30	0.0	4780.6	4668.6	3848.578	1.678	38065.3	15866.9	930.322
7-AUG-2004 01:40	0.0	4800.3	4588.9	3864.370	1.547	38099.1	15833.0	931.150
7-AUG-2004 01:50	0.0	4818.3	4510.6	3878.876	1.419	38132.9	15799.2	931.975

XENON AND SAMARIUM REACTIVITY WORTH PREDICTION

7-AUG-2004	02:00	0.0	4834.7	4433.6	3892.133	1.295	38166.6	15765.5	932.799
7-AUG-2004	02:10	0.0	4849.7	4357.9	3904.172	1.174	38200.3	15731.9	933.621
7-AUG-2004	02:20	0.0	4863.2	4283.5	3915.027	1.056	38233.8	15698.3	934.442
7-AUG-2004	02:30	0.0	4875.2	4210.4	3924.731	0.942	38267.3	15664.8	935.260
7-AUG-2004	02:40	0.0	4885.9	4138.5	3933.316	0.831	38300.7	15631.4	936.077
7-AUG-2004	02:50	0.0	4895.2	4067.9	3940.812	0.723	38334.1	15598.1	936.892
7-AUG-2004	03:00	0.0	4903.2	3998.4	3947.250	0.618	38367.4	15564.8	937.705
7-AUG-2004	03:10	0.0	4909.9	3930.2	3952.659	0.516	38400.6	15531.6	938.517
7-AUG-2004	03:20	0.0	4915.4	3863.1	3957.069	0.416	38433.7	15498.4	939.327
7-AUG-2004	03:30	0.0	4919.7	3797.2	3960.507	0.320	38466.8	15465.4	940.135
7-AUG-2004	03:40	0.0	4922.8	3732.4	3963.002	0.226	38499.8	15432.4	940.941
7-AUG-2004	03:50	0.0	4924.7	3668.6	3964.580	0.135	38532.7	15399.5	941.746
7-AUG-2004	04:00	0.0	4925.6	3606.0	3965.270	0.047	38565.6	15366.6	942.549
7-AUG-2004	04:10	0.0	4925.4	3544.5	3965.094	-0.039	38598.3	15333.8	943.350
7-AUG-2004	04:20	0.0	4924.1	3484.0	3964.081	-0.122	38631.1	15301.1	944.150
7-AUG-2004	04:30	0.0	4921.8	3424.5	3962.254	-0.203	38663.7	15268.5	944.948
7-AUG-2004	04:40	0.0	4918.6	3366.1	3959.637	-0.281	38696.3	15235.9	945.744
7-AUG-2004	04:50	0.0	4914.4	3308.6	3956.255	-0.357	38728.8	15203.4	946.538
7-AUG-2004	05:00	0.0	4909.3	3252.1	3952.130	-0.431	38761.2	15170.9	947.331
7-AUG-2004	05:10	0.0	4903.3	3196.6	3947.285	-0.502	38793.6	15138.6	948.122
7-AUG-2004	05:20	0.0	4896.4	3142.1	3941.742	-0.571	38825.9	15106.3	948.911
7-AUG-2004	05:30	0.0	4888.6	3088.4	3935.524	-0.639	38858.1	15074.0	949.699
7-AUG-2004	05:40	0.0	4880.1	3035.7	3928.650	-0.703	38890.3	15041.9	950.485
7-AUG-2004	05:50	0.0	4870.8	2983.9	3921.143	-0.766	38922.4	15009.8	951.269
7-AUG-2004	06:00	0.0	4860.7	2933.0	3913.021	-0.827	38954.4	14977.8	952.052
7-AUG-2004	06:10	0.0	4849.9	2882.9	3904.304	-0.886	38986.3	14945.8	952.833
7-AUG-2004	06:20	0.0	4838.3	2833.7	3895.013	-0.943	39018.2	14913.9	953.612
7-AUG-2004	06:30	0.0	4826.1	2785.3	3885.166	-0.998	39050.0	14882.1	954.390
7-AUG-2004	06:40	0.0	4813.2	2737.8	3874.780	-1.052	39081.8	14850.4	955.166
7-AUG-2004	06:50	0.0	4799.6	2691.1	3863.875	-1.103	39113.5	14818.7	955.940
7-AUG-2004	07:00	0.0	4785.5	2645.1	3852.468	-1.153	39145.1	14787.1	956.713
7-AUG-2004	07:10	0.0	4770.7	2600.0	3840.575	-1.201	39176.6	14755.5	957.484
7-AUG-2004	07:20	0.0	4755.3	2555.6	3828.214	-1.248	39208.1	14724.0	958.254
7-AUG-2004	07:30	0.0	4739.4	2512.0	3815.402	-1.292	39239.5	14692.6	959.021
7-AUG-2004	07:40	0.0	4723.0	2469.1	3802.152	-1.336	39270.9	14661.3	959.787
7-AUG-2004	07:50	0.0	4706.0	2427.0	3788.483	-1.377	39302.2	14630.0	960.552
7-AUG-2004	08:00	0.0	4688.5	2385.6	3774.409	-1.417	39333.4	14598.8	961.315
7-AUG-2004	08:10	0.0	4670.5	2344.9	3759.944	-1.456	39364.5	14567.6	962.076
7-AUG-2004	08:20	0.0	4652.1	2304.8	3745.104	-1.493	39395.6	14536.6	962.836
7-AUG-2004	08:30	0.0	4633.2	2265.5	3729.901	-1.529	39426.6	14505.5	963.594
7-AUG-2004	08:40	0.0	4613.9	2226.8	3714.351	-1.564	39457.6	14474.6	964.350
7-AUG-2004	08:50	0.0	4594.2	2188.8	3698.467	-1.597	39488.4	14443.7	965.105
7-AUG-2004	09:00	0.0	4574.0	2151.5	3682.261	-1.628	39519.3	14412.9	965.858
7-AUG-2004	09:10	0.0	4553.5	2114.8	3665.748	-1.659	39550.0	14382.1	966.609
7-AUG-2004	09:20	0.0	4532.6	2078.7	3648.938	-1.688	39580.7	14351.5	967.359
7-AUG-2004	09:30	0.0	4511.4	2043.2	3631.846	-1.716	39611.3	14320.8	968.108
7-AUG-2004	09:40	0.0	4489.8	2008.3	3614.482	-1.743	39641.9	14290.3	968.854
7-AUG-2004	09:50	0.0	4468.0	1974.0	3596.858	-1.769	39672.4	14259.8	969.599
7-AUG-2004	10:00	0.0	4445.8	1940.4	3578.986	-1.793	39702.8	14229.4	970.343
7-AUG-2004	10:10	0.0	4423.3	1907.2	3560.876	-1.817	39733.1	14199.0	971.085
7-AUG-2004	10:20	0.0	4400.5	1874.7	3542.541	-1.839	39763.4	14168.7	971.826
7-AUG-2004	10:30	0.0	4377.4	1842.7	3523.988	-1.860	39793.7	14138.5	972.564
7-AUG-2004	10:40	0.0	4354.1	1811.3	3505.230	-1.881	39823.8	14108.3	973.301
7-AUG-2004	10:50	0.0	4330.6	1780.3	3486.277	-1.900	39853.9	14078.2	974.037
7-AUG-2004	11:00	0.0	4306.8	1750.0	3467.138	-1.918	39884.0	14048.2	974.771
7-AUG-2004	11:10	0.0	4282.8	1720.1	3447.822	-1.936	39913.9	14018.2	975.504
7-AUG-2004	11:20	0.0	4258.6	1690.7	3428.339	-1.952	39943.8	13988.3	976.235
7-AUG-2004	11:30	0.0	4234.2	1661.9	3408.698	-1.968	39973.7	13958.5	976.964
7-AUG-2004	11:40	0.0	4209.6	1633.5	3388.908	-1.983	40003.5	13928.7	977.692
7-AUG-2004	11:50	0.0	4184.9	1605.7	3368.977	-1.997	40033.2	13899.0	978.418

XENON AND SAMARIUM REACTIVITY WORTH PREDICTION

7-AUG-2004 12:00	0.0	4160.0	1578.3	3348.913	-2.010	40062.8	13869.3	979.143
7-AUG-2004 12:10	0.0	4134.9	1551.3	3328.726	-2.022	40092.4	13839.7	979.866
7-AUG-2004 12:20	0.0	4109.7	1524.9	3308.423	-2.033	40122.0	13810.2	980.588
7-AUG-2004 12:30	0.0	4084.3	1498.8	3288.011	-2.044	40151.4	13780.7	981.308
7-AUG-2004 12:40	0.0	4058.8	1473.3	3267.498	-2.054	40180.8	13751.3	982.027
7-AUG-2004 12:50	0.0	4033.2	1448.1	3246.892	-2.063	40210.2	13722.0	982.744
7-AUG-2004 13:00	0.0	4007.5	1423.4	3226.199	-2.071	40239.4	13692.7	983.459
7-AUG-2004 13:10	0.0	3981.7	1399.1	3205.427	-2.079	40268.7	13663.5	984.173
7-AUG-2004 13:20	0.0	3955.8	1375.3	3184.581	-2.086	40297.8	13634.4	984.885
7-AUG-2004 13:30	0.0	3929.9	1351.8	3163.670	-2.093	40326.9	13605.3	985.596
7-AUG-2004 13:40	0.0	3903.8	1328.7	3142.699	-2.099	40355.9	13576.3	986.306
7-AUG-2004 13:50	0.0	3877.7	1306.1	3121.674	-2.104	40384.9	13547.3	987.014
7-AUG-2004 14:00	0.0	3851.5	1283.8	3100.601	-2.108	40413.8	13518.4	987.720
7-AUG-2004 14:10	0.0	3825.3	1261.9	3079.487	-2.112	40442.6	13489.5	988.425
7-AUG-2004 14:20	0.0	3799.0	1240.3	3058.337	-2.116	40471.4	13460.8	989.128
7-AUG-2004 14:30	0.0	3772.7	1219.2	3037.156	-2.119	40500.1	13432.0	989.830
7-AUG-2004 14:40	0.0	3746.4	1198.4	3015.951	-2.121	40528.8	13403.4	990.531
7-AUG-2004 14:50	0.0	3720.0	1177.9	2994.725	-2.123	40557.4	13374.8	991.230
7-AUG-2004 15:00	0.0	3693.6	1157.8	2973.485	-2.124	40585.9	13346.3	991.927
7-AUG-2004 15:10	0.0	3667.2	1138.1	2952.235	-2.125	40614.4	13317.8	992.623
7-AUG-2004 15:20	0.0	3640.8	1118.7	2930.980	-2.126	40642.8	13289.4	993.317
7-AUG-2004 15:30	0.0	3614.4	1099.6	2909.725	-2.125	40671.2	13261.0	994.010
7-AUG-2004 15:40	0.0	3588.0	1080.8	2888.475	-2.125	40699.4	13232.7	994.702
7-AUG-2004 15:50	0.0	3561.6	1062.4	2867.233	-2.124	40727.7	13204.5	995.392
7-AUG-2004 16:00	0.0	3535.3	1044.2	2846.004	-2.123	40755.8	13176.3	996.080
7-AUG-2004 16:10	0.0	3508.9	1026.4	2824.792	-2.121	40784.0	13148.2	996.767
7-AUG-2004 16:20	0.0	3482.6	1008.9	2803.601	-2.119	40812.0	13120.2	997.453
7-AUG-2004 16:30	0.0	3456.3	991.7	2782.435	-2.116	40840.0	13092.2	998.137
7-AUG-2004 16:40	0.0	3430.0	974.8	2761.298	-2.113	40867.9	13064.2	998.820
7-AUG-2004 16:50	0.0	3403.8	958.2	2740.193	-2.110	40895.8	13036.4	999.501
7-AUG-2004 17:00	0.0	3377.7	941.8	2719.125	-2.106	40923.6	13008.6	1000.180
7-AUG-2004 17:10	0.0	3351.5	925.8	2698.095	-2.102	40951.4	12980.8	1000.859
7-AUG-2004 17:20	0.0	3325.5	910.0	2677.109	-2.098	40979.1	12953.1	1001.536
7-AUG-2004 17:30	0.0	3299.4	894.4	2656.167	-2.093	41006.7	12925.5	1002.211
7-AUG-2004 17:40	0.0	3273.5	879.2	2635.276	-2.088	41034.3	12897.9	1002.885
7-AUG-2004 17:50	0.0	3247.6	864.2	2614.436	-2.083	41061.8	12870.4	1003.558
7-AUG-2004 18:00	0.0	3221.8	849.4	2593.651	-2.077	41089.2	12842.9	1004.229
7-AUG-2004 18:10	0.0	3196.0	835.0	2572.925	-2.071	41116.6	12815.5	1004.898
7-AUG-2004 18:20	0.0	3170.4	820.7	2552.258	-2.065	41144.0	12788.2	1005.566
7-AUG-2004 18:30	0.0	3144.8	806.7	2531.655	-2.059	41171.3	12760.9	1006.233
7-AUG-2004 18:40	0.0	3119.3	793.0	2511.117	-2.052	41198.5	12733.7	1006.899
7-AUG-2004 18:50	0.0	3093.8	779.4	2490.647	-2.045	41225.7	12706.5	1007.563
7-AUG-2004 19:00	0.0	3068.5	766.1	2470.248	-2.038	41252.8	12679.4	1008.225
7-AUG-2004 19:10	0.0	3043.3	753.1	2449.921	-2.031	41279.8	12652.4	1008.886
7-AUG-2004 19:20	0.0	3018.1	740.2	2429.669	-2.023	41306.8	12625.4	1009.546
7-AUG-2004 19:30	0.0	2993.0	727.6	2409.495	-2.016	41333.7	12598.4	1010.204
7-AUG-2004 19:40	0.0	2968.1	715.2	2389.399	-2.008	41360.6	12571.5	1010.861
7-AUG-2004 19:50	0.0	2943.2	703.0	2369.385	-1.999	41387.4	12544.7	1011.517
7-AUG-2004 20:00	0.0	2918.5	691.0	2349.453	-1.991	41414.2	12518.0	1012.171
7-AUG-2004 20:10	0.0	2893.8	679.2	2329.606	-1.983	41440.9	12491.3	1012.823
7-AUG-2004 20:20	0.0	2869.3	667.6	2309.845	-1.974	41467.6	12464.6	1013.475
7-AUG-2004 20:30	0.0	2844.8	656.3	2290.173	-1.965	41494.2	12438.0	1014.125
7-AUG-2004 20:40	0.0	2820.5	645.1	2270.590	-1.956	41520.7	12411.5	1014.773
7-AUG-2004 20:50	0.0	2796.3	634.1	2251.099	-1.947	41547.2	12385.0	1015.420
7-AUG-2004 21:00	0.0	2772.2	623.3	2231.700	-1.938	41573.6	12358.6	1016.066
7-AUG-2004 21:10	0.0	2748.2	612.6	2212.395	-1.928	41600.0	12332.2	1016.711
7-AUG-2004 21:20	0.0	2724.3	602.2	2193.186	-1.919	41626.3	12305.9	1017.354
7-AUG-2004 21:30	0.0	2700.6	591.9	2174.074	-1.909	41652.5	12279.7	1017.995
7-AUG-2004 21:40	0.0	2677.0	581.8	2155.060	-1.899	41678.7	12253.5	1018.635
7-AUG-2004 21:50	0.0	2653.5	571.9	2136.145	-1.889	41704.9	12227.3	1019.274

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7-AUG-2004 22:00	0.0	2630.1	562.2	2117.330	-1.879	41730.9	12201.2	1019.912
7-AUG-2004 22:10	0.0	2606.9	552.6	2098.616	-1.869	41757.0	12175.2	1020.548
7-AUG-2004 22:20	0.0	2583.7	543.2	2080.005	-1.859	41783.0	12149.2	1021.183
7-AUG-2004 22:30	0.0	2560.8	533.9	2061.497	-1.848	41808.9	12123.3	1021.817
7-AUG-2004 22:40	0.0	2537.9	524.8	2043.094	-1.838	41834.7	12097.4	1022.449
7-AUG-2004 22:50	0.0	2515.2	515.8	2024.795	-1.827	41860.6	12071.6	1023.079
7-AUG-2004 23:00	0.0	2492.6	507.1	2006.603	-1.817	41886.3	12045.9	1023.709
7-AUG-2004 23:10	0.0	2470.1	498.4	1988.517	-1.806	41912.0	12020.2	1024.337
7-AUG-2004 23:20	0.0	2447.8	489.9	1970.539	-1.795	41937.6	11994.5	1024.964
7-AUG-2004 23:30	0.0	2425.6	481.6	1952.668	-1.784	41963.2	11968.9	1025.589
7-AUG-2004 23:40	0.0	2403.5	473.4	1934.906	-1.773	41988.8	11943.4	1026.213
7-AUG-2004 23:50	0.0	2381.6	465.3	1917.253	-1.763	42014.3	11917.9	1026.836
8-AUG-2004 00:00	0.0	2359.8	457.4	1899.711	-1.751	42039.7	11892.5	1027.457
8-AUG-2004 00:10	0.0	2338.1	449.6	1882.279	-1.740	42065.1	11867.1	1028.077
8-AUG-2004 00:20	0.0	2316.6	441.9	1864.957	-1.729	42090.4	11841.8	1028.696
8-AUG-2004 00:30	0.0	2295.2	434.4	1847.747	-1.718	42115.6	11816.5	1029.314
8-AUG-2004 00:40	0.0	2274.0	427.0	1830.649	-1.707	42140.8	11791.3	1029.930
8-AUG-2004 00:50	0.0	2252.9	419.7	1813.662	-1.696	42166.0	11766.2	1030.545
8-AUG-2004 01:00	0.0	2231.9	412.5	1796.788	-1.685	42191.1	11741.1	1031.158
8-AUG-2004 01:10	0.0	2211.1	405.5	1780.026	-1.673	42216.2	11716.0	1031.771
8-AUG-2004 01:20	0.0	2190.4	398.6	1763.378	-1.662	42241.1	11691.0	1032.381
8-AUG-2004 01:30	0.0	2169.9	391.8	1746.842	-1.651	42266.1	11666.1	1032.991
8-AUG-2004 01:40	0.0	2149.5	385.1	1730.420	-1.639	42291.0	11641.2	1033.599
8-AUG-2004 01:50	0.0	2129.2	378.6	1714.112	-1.628	42315.8	11616.4	1034.206
8-AUG-2004 02:00	0.0	2109.1	372.1	1697.917	-1.617	42340.6	11591.6	1034.812
8-AUG-2004 02:10	0.0	2089.1	365.8	1681.836	-1.605	42365.3	11566.9	1035.416
8-AUG-2004 02:20	0.0	2069.3	359.5	1665.869	-1.594	42390.0	11542.2	1036.019
8-AUG-2004 02:30	0.0	2049.6	353.4	1650.016	-1.582	42414.6	11517.6	1036.621
8-AUG-2004 02:40	0.0	2030.1	347.4	1634.277	-1.571	42439.2	11493.0	1037.222
8-AUG-2004 02:50	0.0	2010.7	341.5	1618.651	-1.560	42463.7	11468.5	1037.821
8-AUG-2004 03:00	0.0	1991.4	335.7	1603.140	-1.548	42488.2	11444.0	1038.419
8-AUG-2004 03:10	0.0	1972.3	330.0	1587.742	-1.537	42512.6	11419.6	1039.016
8-AUG-2004 03:20	0.0	1953.3	324.3	1572.459	-1.526	42537.0	11395.2	1039.611
8-AUG-2004 03:30	0.0	1934.4	318.8	1557.289	-1.514	42561.3	11370.9	1040.205
8-AUG-2004 03:40	0.0	1915.7	313.4	1542.232	-1.503	42585.5	11346.7	1040.798
8-AUG-2004 03:50	0.0	1897.2	308.0	1527.289	-1.491	42609.8	11322.4	1041.390
8-AUG-2004 04:00	0.0	1878.8	302.8	1512.460	-1.480	42633.9	11298.3	1041.981
8-AUG-2004 04:10	0.0	1860.5	297.6	1497.744	-1.469	42658.0	11274.2	1042.570
8-AUG-2004 04:20	0.0	1842.3	292.6	1483.141	-1.457	42682.1	11250.1	1043.158
8-AUG-2004 04:30	0.0	1824.3	287.6	1468.650	-1.446	42706.1	11226.1	1043.744
8-AUG-2004 04:40	0.0	1806.5	282.7	1454.273	-1.435	42730.0	11202.2	1044.330
8-AUG-2004 04:50	0.0	1788.8	277.9	1440.007	-1.424	42753.9	11178.3	1044.914
8-AUG-2004 05:00	0.0	1771.2	273.2	1425.854	-1.413	42777.8	11154.4	1045.497
8-AUG-2004 05:10	0.0	1753.7	268.5	1411.812	-1.401	42801.6	11130.6	1046.078
8-AUG-2004 05:20	0.0	1736.4	263.9	1397.882	-1.390	42825.3	11106.9	1046.659
8-AUG-2004 05:30	0.0	1719.3	259.4	1384.063	-1.379	42849.0	11083.2	1047.238
8-AUG-2004 05:40	0.0	1702.2	255.0	1370.355	-1.368	42872.7	11059.6	1047.816
8-AUG-2004 05:50	0.0	1685.3	250.7	1356.758	-1.357	42896.3	11036.0	1048.392
8-AUG-2004 06:00	0.0	1668.6	246.4	1343.271	-1.346	42919.8	11012.4	1048.968
8-AUG-2004 06:10	0.0	1652.0	242.2	1329.893	-1.335	42943.3	10988.9	1049.542
8-AUG-2004 06:20	0.0	1635.5	238.1	1316.625	-1.324	42966.8	10965.5	1050.115
8-AUG-2004 06:30	0.0	1619.1	234.0	1303.467	-1.313	42990.1	10942.1	1050.687
8-AUG-2004 06:40	0.0	1602.9	230.1	1290.417	-1.302	43013.5	10918.7	1051.257
8-AUG-2004 06:50	0.0	1586.9	226.2	1277.475	-1.291	43036.8	10895.4	1051.827
8-AUG-2004 07:00	0.0	1570.9	222.3	1264.641	-1.281	43060.0	10872.2	1052.395
8-AUG-2004 07:10	0.0	1555.1	218.5	1251.914	-1.270	43083.2	10849.0	1052.962
8-AUG-2004 07:20	0.0	1539.4	214.8	1239.295	-1.259	43106.4	10825.9	1053.527
8-AUG-2004 07:30	0.0	1523.9	211.2	1226.782	-1.249	43129.5	10802.8	1054.092
8-AUG-2004 07:40	0.0	1508.5	207.6	1214.375	-1.238	43152.5	10779.7	1054.655
8-AUG-2004 07:50	0.0	1493.2	204.0	1202.074	-1.228	43175.5	10756.7	1055.217

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8-AUG-2004 08:00	0.0	1478.0	200.6	1189.877	-1.217	43198.5	10733.8	1055.778
8-AUG-2004 08:10	0.0	1463.0	197.1	1177.786	-1.207	43221.4	10710.9	1056.338
8-AUG-2004 08:20	0.0	1448.1	193.8	1165.798	-1.196	43244.2	10688.0	1056.896
8-AUG-2004 08:30	0.0	1433.4	190.5	1153.915	-1.186	43267.0	10665.2	1057.453
8-AUG-2004 08:40	0.0	1418.7	187.3	1142.134	-1.175	43289.8	10642.5	1058.010
8-AUG-2004 08:50	0.0	1404.2	184.1	1130.456	-1.165	43312.5	10619.8	1058.564
8-AUG-2004 09:00	0.0	1389.9	180.9	1118.880	-1.155	43335.1	10597.1	1059.118
8-AUG-2004 09:10	0.0	1375.6	177.9	1107.405	-1.145	43357.7	10574.5	1059.671
8-AUG-2004 09:20	0.0	1361.5	174.9	1096.032	-1.135	43380.3	10551.9	1060.222
8-AUG-2004 09:30	0.0	1347.5	171.9	1084.759	-1.125	43402.8	10529.4	1060.772
8-AUG-2004 09:40	0.0	1333.6	169.0	1073.586	-1.115	43425.3	10507.0	1061.321
8-AUG-2004 09:50	0.0	1319.8	166.1	1062.512	-1.105	43447.7	10484.6	1061.869
8-AUG-2004 10:00	0.0	1306.2	163.3	1051.537	-1.095	43470.1	10462.2	1062.416
8-AUG-2004 10:10	0.0	1292.7	160.5	1040.661	-1.085	43492.4	10439.9	1062.961
8-AUG-2004 10:20	0.0	1279.3	157.8	1029.882	-1.075	43514.6	10417.6	1063.506
8-AUG-2004 10:30	0.0	1266.0	155.1	1019.200	-1.066	43536.9	10395.4	1064.049
8-AUG-2004 10:40	0.0	1252.9	152.4	1008.615	-1.056	43559.0	10373.2	1064.591
8-AUG-2004 10:50	0.0	1239.9	149.9	998.126	-1.047	43581.2	10351.1	1065.132
8-AUG-2004 11:00	0.0	1226.9	147.3	987.732	-1.037	43603.3	10329.0	1065.671
8-AUG-2004 11:10	0.0	1214.2	144.8	977.433	-1.028	43625.3	10306.9	1066.210
8-AUG-2004 11:20	0.0	1201.5	142.4	967.228	-1.018	43647.3	10285.0	1066.747
8-AUG-2004 11:30	0.0	1188.9	139.9	957.117	-1.009	43669.2	10263.0	1067.284
8-AUG-2004 11:40	0.0	1176.5	137.6	947.099	-1.000	43691.1	10241.1	1067.819
8-AUG-2004 11:50	0.0	1164.1	135.2	937.173	-0.990	43713.0	10219.3	1068.353
8-AUG-2004 12:00	0.0	1151.9	132.9	927.339	-0.981	43734.8	10197.5	1068.886
8-AUG-2004 12:10	0.0	1139.8	130.7	917.596	-0.972	43756.5	10175.7	1069.417
8-AUG-2004 12:20	0.0	1127.8	128.5	907.944	-0.963	43778.2	10154.0	1069.948
8-AUG-2004 12:30	0.0	1116.0	126.3	898.382	-0.954	43799.9	10132.3	1070.477
8-AUG-2004 12:40	0.0	1104.2	124.1	888.909	-0.945	43821.5	10110.7	1071.006
8-AUG-2004 12:50	0.0	1092.5	122.0	879.525	-0.936	43843.1	10089.2	1071.533
8-AUG-2004 13:00	0.0	1081.0	120.0	870.230	-0.927	43864.6	10067.6	1072.059
8-AUG-2004 13:10	0.0	1069.5	117.9	861.022	-0.919	43886.1	10046.2	1072.584
8-AUG-2004 13:20	0.0	1058.2	115.9	851.901	-0.910	43907.5	10024.7	1073.108
8-AUG-2004 13:30	0.0	1047.0	114.0	842.866	-0.901	43928.9	10003.3	1073.630
8-AUG-2004 13:40	0.0	1035.9	112.0	833.917	-0.893	43950.2	9982.0	1074.152
8-AUG-2004 13:50	0.0	1024.9	110.1	825.054	-0.884	43971.5	9960.7	1074.672
8-AUG-2004 14:00	0.0	1014.0	108.3	816.275	-0.876	43992.8	9939.5	1075.192
8-AUG-2004 14:10	0.0	1003.2	106.4	807.579	-0.867	44014.0	9918.2	1075.710
8-AUG-2004 14:20	0.0	992.5	104.6	798.968	-0.859	44035.2	9897.1	1076.227
8-AUG-2004 14:30	0.0	981.9	102.9	790.438	-0.851	44056.3	9876.0	1076.743
8-AUG-2004 14:40	0.0	971.4	101.1	781.991	-0.843	44077.3	9854.9	1077.258
8-AUG-2004 14:50	0.0	961.0	99.4	773.626	-0.835	44098.4	9833.9	1077.772
8-AUG-2004 15:00	0.0	950.7	97.7	765.341	-0.826	44119.3	9812.9	1078.285
8-AUG-2004 15:10	0.0	940.5	96.1	757.136	-0.818	44140.3	9792.0	1078.796
8-AUG-2004 15:20	0.0	930.4	94.4	749.012	-0.810	44161.2	9771.1	1079.307
8-AUG-2004 15:30	0.0	920.4	92.8	740.966	-0.803	44182.0	9750.2	1079.816
8-AUG-2004 15:40	0.0	910.5	91.3	732.999	-0.795	44202.8	9729.4	1080.325
8-AUG-2004 15:50	0.0	900.7	89.7	725.109	-0.787	44223.6	9708.7	1080.832
8-AUG-2004 16:00	0.0	891.0	88.2	717.297	-0.779	44244.3	9688.0	1081.338
8-AUG-2004 16:10	0.0	881.4	86.7	709.561	-0.772	44264.9	9667.3	1081.843
8-AUG-2004 16:20	0.0	871.9	85.2	701.902	-0.764	44285.6	9646.7	1082.347
8-AUG-2004 16:30	0.0	862.5	83.8	694.318	-0.757	44306.2	9626.1	1082.850
8-AUG-2004 16:40	0.0	853.1	82.4	686.809	-0.749	44326.7	9605.6	1083.352
8-AUG-2004 16:50	0.0	843.9	81.0	679.374	-0.742	44347.2	9585.1	1083.853
8-AUG-2004 17:00	0.0	834.8	79.6	672.013	-0.734	44367.6	9564.6	1084.353
8-AUG-2004 17:10	0.0	825.7	78.3	664.724	-0.727	44388.0	9544.2	1084.851
8-AUG-2004 17:20	0.0	816.7	76.9	657.508	-0.720	44408.4	9523.9	1085.349
8-AUG-2004 17:30	0.0	807.9	75.6	650.365	-0.713	44428.7	9503.5	1085.846
8-AUG-2004 17:40	0.0	799.1	74.4	643.292	-0.705	44449.0	9483.3	1086.341
8-AUG-2004 17:50	0.0	790.4	73.1	636.290	-0.698	44469.2	9463.0	1086.836

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8-AUG-2004	18:00	0.0	781.8	71.9	629.358	-0.691	44489.4	9442.8	1087.329
8-AUG-2004	18:10	0.0	773.3	70.7	622.496	-0.684	44509.6	9422.7	1087.821
8-AUG-2004	18:20	0.0	764.8	69.5	615.703	-0.678	44529.6	9402.6	1088.313
8-AUG-2004	18:30	0.0	756.5	68.3	608.978	-0.671	44549.7	9382.5	1088.803
8-AUG-2004	18:40	0.0	748.2	67.1	602.321	-0.664	44569.7	9362.5	1089.292
8-AUG-2004	18:50	0.0	740.0	66.0	595.731	-0.657	44589.7	9342.5	1089.780
8-AUG-2004	19:00	0.0	731.9	64.9	589.208	-0.651	44609.6	9322.6	1090.267
8-AUG-2004	19:10	0.0	723.9	63.8	582.751	-0.644	44629.5	9302.7	1090.753
8-AUG-2004	19:20	0.0	715.9	62.7	576.359	-0.638	44649.4	9282.9	1091.239
8-AUG-2004	19:30	0.0	708.1	61.7	570.032	-0.631	44669.2	9263.1	1091.723
8-AUG-2004	19:40	0.0	700.3	60.6	563.770	-0.625	44688.9	9243.3	1092.205
8-AUG-2004	19:50	0.0	692.6	59.6	557.572	-0.618	44708.6	9223.6	1092.687
8-AUG-2004	20:00	0.0	685.0	58.6	551.437	-0.612	44728.3	9203.9	1093.168
8-AUG-2004	20:10	0.0	677.4	57.6	545.365	-0.606	44748.0	9184.3	1093.648
8-AUG-2004	20:20	0.0	670.0	56.6	539.355	-0.599	44767.6	9164.7	1094.127
8-AUG-2004	20:30	0.0	662.6	55.7	533.406	-0.593	44787.1	9145.1	1094.605
8-AUG-2004	20:40	0.0	655.3	54.8	527.519	-0.587	44806.6	9125.6	1095.082
8-AUG-2004	20:50	0.0	648.0	53.8	521.692	-0.581	44826.1	9106.2	1095.558
8-AUG-2004	21:00	0.0	640.9	52.9	515.926	-0.575	44845.5	9086.7	1096.032
8-AUG-2004	21:10	0.0	633.8	52.0	510.219	-0.569	44864.9	9067.4	1096.506
8-AUG-2004	21:20	0.0	626.8	51.2	504.570	-0.563	44884.2	9048.0	1096.979
8-AUG-2004	21:30	0.0	619.8	50.3	498.981	-0.558	44903.5	9028.7	1097.451
8-AUG-2004	21:40	0.0	613.0	49.5	493.449	-0.552	44922.8	9009.4	1097.922
8-AUG-2004	21:50	0.0	606.2	48.6	487.975	-0.546	44942.0	8990.2	1098.391
8-AUG-2004	22:00	0.0	599.4	47.8	482.557	-0.540	44961.2	8971.0	1098.860
8-AUG-2004	22:10	0.0	592.8	47.0	477.196	-0.535	44980.3	8951.9	1099.328
8-AUG-2004	22:20	0.0	586.2	46.2	471.891	-0.529	44999.4	8932.8	1099.794
8-AUG-2004	22:30	0.0	579.7	45.4	466.641	-0.524	45018.5	8913.8	1100.260
8-AUG-2004	22:40	0.0	573.2	44.7	461.446	-0.518	45037.5	8894.7	1100.725
8-AUG-2004	22:50	0.0	566.8	43.9	456.305	-0.513	45056.5	8875.8	1101.189
8-AUG-2004	23:00	0.0	560.5	43.2	451.219	-0.507	45075.4	8856.8	1101.652
8-AUG-2004	23:10	0.0	554.2	42.5	446.185	-0.502	45094.3	8837.9	1102.113
8-AUG-2004	23:20	0.0	548.1	41.8	441.205	-0.497	45113.2	8819.1	1102.574
8-AUG-2004	23:30	0.0	541.9	41.1	436.276	-0.492	45132.0	8800.3	1103.034
8-AUG-2004	23:40	0.0	535.9	40.4	431.400	-0.486	45150.8	8781.5	1103.493
8-AUG-2004	23:50	0.0	529.9	39.7	426.575	-0.481	45169.5	8762.7	1103.951
9-AUG-2004	00:00	0.0	524.0	39.0	421.801	-0.476	45188.2	8744.1	1104.407
9-AUG-2004	00:10	0.0	518.1	38.4	417.077	-0.471	45206.8	8725.4	1104.863
9-AUG-2004	00:20	0.0	512.3	37.7	412.404	-0.466	45225.5	8706.8	1105.318
9-AUG-2004	00:30	0.0	506.5	37.1	407.779	-0.461	45244.0	8688.2	1105.772
9-AUG-2004	00:40	0.0	500.9	36.5	403.204	-0.456	45262.6	8669.7	1106.225
9-AUG-2004	00:50	0.0	495.2	35.9	398.678	-0.451	45281.1	8651.2	1106.677
9-AUG-2004	01:00	0.0	489.7	35.3	394.199	-0.447	45299.5	8632.7	1107.128
9-AUG-2004	01:10	0.0	484.2	34.7	389.768	-0.442	45317.9	8614.3	1107.578
9-AUG-2004	01:20	0.0	478.7	34.1	385.385	-0.437	45336.3	8595.9	1108.028
9-AUG-2004	01:30	0.0	473.3	33.5	381.048	-0.433	45354.7	8577.6	1108.476
9-AUG-2004	01:40	0.0	468.0	33.0	376.757	-0.428	45372.9	8559.3	1108.923
9-AUG-2004	01:50	0.0	462.7	32.4	372.512	-0.423	45391.2	8541.0	1109.369
9-AUG-2004	02:00	0.0	457.5	31.9	368.313	-0.419	45409.4	8522.8	1109.815
9-AUG-2004	02:10	0.0	452.4	31.4	364.159	-0.414	45427.6	8504.6	1110.259
9-AUG-2004	02:20	0.0	447.2	30.8	360.049	-0.410	45445.8	8486.5	1110.703
9-AUG-2004	02:30	0.0	442.2	30.3	355.983	-0.405	45463.9	8468.4	1111.145
9-AUG-2004	02:40	0.0	437.2	29.8	351.961	-0.401	45481.9	8450.3	1111.587
9-AUG-2004	02:50	0.0	432.3	29.3	347.982	-0.397	45500.0	8432.3	1112.027
9-AUG-2004	03:00	0.0	427.4	28.8	344.046	-0.393	45517.9	8414.3	1112.467
9-AUG-2004	03:10	0.0	422.5	28.4	340.152	-0.388	45535.9	8396.3	1112.906
9-AUG-2004	03:20	0.0	417.7	27.9	336.300	-0.384	45553.8	8378.4	1113.343
9-AUG-2004	03:30	0.0	413.0	27.4	332.490	-0.380	45571.7	8360.5	1113.780
9-AUG-2004	03:40	0.0	408.3	27.0	328.721	-0.376	45589.5	8342.7	1114.216
9-AUG-2004	03:50	0.0	403.7	26.5	324.993	-0.372	45607.3	8324.9	1114.651

XENON AND SAMARIUM REACTIVITY WORTH PREDICTION

9-AUG-2004	04:00	0.0	399.1	26.1	321.306	-0.368	45625.1	8307.2	1115.085
9-AUG-2004	04:10	0.0	394.6	25.7	317.658	-0.364	45642.8	8289.4	1115.518
9-AUG-2004	04:20	0.0	390.1	25.2	314.050	-0.360	45660.5	8271.7	1115.950
9-AUG-2004	04:30	0.0	385.7	24.8	310.481	-0.356	45678.1	8254.1	1116.382
9-AUG-2004	04:40	0.0	381.3	24.4	306.950	-0.352	45695.7	8236.5	1116.812
9-AUG-2004	04:50	0.0	377.0	24.0	303.458	-0.348	45713.3	8218.9	1117.241
9-AUG-2004	05:00	0.0	372.7	23.6	300.005	-0.344	45730.8	8201.4	1117.670
9-AUG-2004	05:10	0.0	368.4	23.2	296.588	-0.341	45748.3	8183.9	1118.098
9-AUG-2004	05:20	0.0	364.2	22.8	293.210	-0.337	45765.8	8166.4	1118.524
9-AUG-2004	05:30	0.0	360.1	22.5	289.867	-0.333	45783.2	8149.0	1118.950
9-AUG-2004	05:40	0.0	356.0	22.1	286.562	-0.330	45800.6	8131.6	1119.375
9-AUG-2004	05:50	0.0	351.9	21.7	283.293	-0.326	45817.9	8114.3	1119.799
9-AUG-2004	06:00	0.0	347.9	21.4	280.059	-0.322	45835.3	8097.0	1120.222
9-AUG-2004	06:10	0.0	343.9	21.0	276.861	-0.319	45852.5	8079.7	1120.644
9-AUG-2004	06:20	0.0	340.0	20.7	273.698	-0.315	45869.8	8062.5	1121.066
9-AUG-2004	06:30	0.0	336.1	20.3	270.569	-0.312	45887.0	8045.3	1121.486
9-AUG-2004	06:40	0.0	332.3	20.0	267.475	-0.309	45904.1	8028.1	1121.905
9-AUG-2004	06:50	0.0	328.5	19.7	264.415	-0.305	45921.3	8011.0	1122.324
9-AUG-2004	07:00	0.0	324.7	19.3	261.389	-0.302	45938.4	7993.9	1122.742
9-AUG-2004	07:10	0.0	321.0	19.0	258.396	-0.298	45955.4	7976.8	1123.158
9-AUG-2004	07:20	0.0	317.3	18.7	255.436	-0.295	45972.4	7959.8	1123.574
9-AUG-2004	07:30	0.0	313.7	18.4	252.508	-0.292	45989.4	7942.8	1123.989
9-AUG-2004	07:40	0.0	310.1	18.1	249.613	-0.289	46006.3	7925.9	1124.403
9-AUG-2004	07:50	0.0	306.5	17.8	246.750	-0.286	46023.3	7909.0	1124.817
9-AUG-2004	08:00	0.0	303.0	17.5	243.919	-0.282	46040.1	7892.1	1125.229
9-AUG-2004	08:10	0.0	299.5	17.2	241.119	-0.279	46057.0	7875.3	1125.640
9-AUG-2004	08:20	0.0	296.1	17.0	238.349	-0.276	46073.8	7858.5	1126.051
9-AUG-2004	08:30	0.0	292.7	16.7	235.611	-0.273	46090.5	7841.7	1126.461
9-AUG-2004	08:40	0.0	289.3	16.4	232.903	-0.270	46107.3	7825.0	1126.870
9-AUG-2004	08:50	0.0	286.0	16.1	230.225	-0.267	46123.9	7808.3	1127.278
9-AUG-2004	09:00	0.0	282.7	15.9	227.577	-0.264	46140.6	7791.6	1127.685
9-AUG-2004	09:10	0.0	279.4	15.6	224.958	-0.261	46157.2	7775.0	1128.091
9-AUG-2004	09:20	0.0	276.2	15.4	222.368	-0.258	46173.8	7758.4	1128.496
9-AUG-2004	09:30	0.0	273.0	15.1	219.807	-0.255	46190.4	7741.8	1128.901
9-AUG-2004	09:40	0.0	269.9	14.9	217.275	-0.253	46206.9	7725.3	1129.305
9-AUG-2004	09:50	0.0	266.8	14.6	214.770	-0.250	46223.4	7708.9	1129.708
9-AUG-2004	10:00	0.0	263.7	14.4	212.294	-0.247	46239.8	7692.4	1130.109
9-AUG-2004	10:10	0.0	260.7	14.2	209.846	-0.244	46256.2	7676.0	1130.510
9-AUG-2004	10:20	0.0	257.7	13.9	207.424	-0.241	46272.6	7659.6	1130.910

XENON AND SAMARIUM REACTIVITY WORTH PREDICTION

FXS	=	0.836631E+01 (CM(-1) x 10(-2))	- Macro Fission X-Sect
YX	=	0.518772E-02	- XE-135 Yeilds/Fission
YI	=	0.643346E-01	- I-135 Yields/Fission
YP	=	0.172559E-01	- PM-149 Yields/Fission
AXSX	=	0.128266E+02 CM(-1) x 10(-19)	- XE-135 Micro Absorption X-Sect
AXSS	=	0.390157E+00 CM(-1) x 10(-10)	- SM-149 Micro Absorption X-Sect
XWH	=	0.821145E-12 (PCM/XE cm(3)) x 10(-12)	- XE-135 Reactivity Worth
SWH	=	0.244402E-13 (PCM/SM cm(3)) x 10(-12)	- SM-149 Reactivity Worth
ATE	=	0.304604E+05 x 10(-2)	- Fissions/MW Sec
XSIGMA	=	0.987909E+00	- XE-135 Micro X-Sect Correction
XRHO	=	0.980380E+00	- XE-135 Worth/Atom Correction

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC –RO-2/Admin
Calculate Reactor Coolant System Subcooling during Loss of OAC

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Calculate Reactor Coolant System subcooling during a Loss of OAC

Alternate Path: N/A

Facility JPM #: Modified 2003 NRC JPM 2R/ADMIN

K/A Rating(s): Generic KA: 2.1.23 (3.9/4.0)

Task Standard:

Using the parameter information provided and interpreting data book curves, determines that the required subcooling margins are not met and notifies SRO.

Preferred Evaluation Location:

Simulator __X__ In-Plant __X__

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

PT/1/A/4600/009 (Loss of Operator Aid Computer) Revision 70

Validation Time: 7 minutes **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____ / _____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Tools/Equipment/Procedures Needed:

PT/1A/4600/009 (Loss of Operator Aid Computer)
Data sheets
Unit 1 Data Book Curves

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is in Mode 4 with 1B ND pump and 1B reactor coolant pump in service. You are the Balance of Plant operator responding to a Loss of Operator Aid Computer. Plant parameters are:

Pressurizer Pressure	Ch I: 1700	Ch II: 1700	Ch III: 1700	Ch IV: oos
NC Loop B Pressure	146 psig			
NC Loop C Pressure	157 psig			
ND Pump Discharge Pressure	308 psig			
ND Inlet Temperature	319 °F			
N/R Loop A T-hot	530 °F			
N/R Loop B T-hot	530 °F			
N/R Loop C T-hot	530 °F			
N/R Loop D T-hot	530 °F			
W/R Loop A T-hot	321 °F			
W/R Loop B T-hot	323 °F			
W/R Loop C T-hot	319 °F			
W/R Loop D T-hot	318 °F			
Train A 5 highest average T/Cs	329 °F			
Train B 5 highest average T/Cs	325 °F			

INITIATING CUE:

It has been one hour since the loss of OAC has occurred. The Control Room SRO directs you to perform Enclosure 13.10 (Subcooling Data), evaluate the data obtained from the enclosure, determine if it is acceptable, and then notify the Control Room SRO of the results.

Start Time:_____

EP 1: Enclosure 13.10 INFORMATION: for NC pressure – Record the lowest indicated system pressure. STANDARD: Based on information provided, Loop B NC Pressure (146 psig) is the lowest. COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 2: Enclosure 13.10 INFORMATION: T-SAT – Using NC pressure, determine the saturation temperature from the Unit One Revised Data Book Figure 57 or Figure 58. STANDARD: Based on NC pressure Loop B of 146 psig, Figure 58 is used and T-SAT equals 345 °F (acceptable range is 340 – 350 °F). COMMENTS:	___SAT ___UNSAT
STEP 3: Enclosure 13.10 INFORMATION: Highest NC Temp – In Modes 3-6: Compare the average of the 5 highest reading operable core exit T/Cs to Loop Thot. OR Use the operating train(s) of ND inlet temperature, Loop Thot and/or the operable core exit T/Cs. STANDARD: For the Train "A" 5 highest average T/Cs compared to Loop Thots and ND Inlet Temperature, the T/Cs value of 329 °F is to be used. COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT

STEP 4: Enclosure 13.10 INFORMATION: °F Subcooled – Calculated by subtracting "HIGHEST NC TEMP" from "T-SAT" STANDARD: °F Subcooled = (T-SAT) 345 °F - (HIGHEST NC TEMP) 329 °F °F Subcooled = 16 °F (acceptable range of 11-21 °F) COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 5: Per initiating cue, determine whether the calculated value of Subcooling is acceptable, and report results to SRO. STANDARD: Candidate reports that for Mode 4, Subcooling less than 30 °F is unacceptable. **EXAMINER CUE: I understand that Subcooling does not meet the acceptable criteria.** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
JPM Complete	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 is in Mode 4 with 1B ND pump and 1B reactor coolant pump in service. You are the Balance of Plant operator responding to a Loss of Operator Aid Computer. Plant parameters are:

Pressurizer Pressure	Ch I: 1700	Ch II: 1700	Ch III: 1700	Ch IV: oos
NC Loop B Pressure	146 psig			
NC Loop C Pressure	157 psig			
ND Pump Discharge Pressure	308 psig			
ND Inlet Temperature	319 °F			
N/R Loop A T-hot	530 °F			
N/R Loop B T-hot	530 °F			
N/R Loop C T-hot	530 °F			
N/R Loop D T-hot	530 °F			
W/R Loop A T-hot	321 °F			
W/R Loop B T-hot	323 °F			
W/R Loop C T-hot	319 °F			
W/R Loop D T-hot	318 °F			
Train A 5 highest average T/Cs	329 °F			
Train B 5 highest average T/Cs	325 °F			

INITIATING CUE:

It has been one hour since the loss of OAC has occurred. The Control Room SRO directs you to perform Enclosure 13.10 (Subcooling Data), evaluate the data obtained from the enclosure, determine if it is acceptable, and then notify the Control Room SRO of the results.

RO-2 ADMIN KEY

DRAFT

Duke Power Company
Catawba Nuclear Station

Procedure No.
PT/ 1/A/4600/009

Revision No.
070

Loss of Operator Aid Computer

Electronic Reference No.
CN005GA4

Continuous Use

PERFORMANCE

* * * * * * * * * * UNCONTROLLED FOR PRINT * * * * * * * * * *

(ISSUED) - PDF Format

RO-2 ADMIN KEY

Loss of Operator Aid Computer

1. Purpose

To document Technical Specifications requirements normally performed by the Operator Aid Computer in the event that the unit Operator Aid Computer is out of service.

2. Reference

2.1 OP/1/A/6700/003 (Operation with the Operator Aid Computer Out of Service)

2.2 Catawba TS and SLC Requirements:

2.2.1 TS 3.1.4

2.2.2 TS 3.1.6

2.2.3 TS 3.2.3

2.2.4 TS 3.2.4

2.2.5 TS 3.3.1

2.2.6 TS 3.4.2

2.2.7 TS 3.7.5

2.2.8 TS 3.4.13

2.2.9 TS 3.4.15

2.2.10 SR 3.1.4.1

2.2.11 SR 3.1.6.2

2.2.12 SR 3.2.3.1

2.2.13 SR 3.2.4.1

2.2.14 SR3.4.2.1

2.2.15 SLC 16.5-7

2.2.16 TS 3.6.3

2.2.17 TS 3.7.3

3. Time Required

3.1 Manpower - One Operator

3.2 Time - Until the Operator Aid Computer is restored to service.

3.3 Frequency - When the Operator Aid Computer is out of service.

4. Prerequisite Tests

None

5. Test Equipment

5.1 Pyrometer

5.2 Calibrated Keithley 872 Digital Thermometer, Model "J", or equivalent

6. Limits and Precautions

6.1 If acceptance criteria is **NOT** met, the Operations Shift Manager and the Operator at the Controls should be notified immediately.

6.2 If the unit status or system condition prevents the performance of a surveillance item, the item should be noted on the affected data sheet with an explanation and the Operations Shift Manager and the Operator at the Controls should be notified immediately.

7. Required Unit Status

None

8. Prerequisite System Condition

Verify the Operator Aid Computer is out of service.

9. Test Method

A visual inspection of various system instrumentation will be made until the computer is returned to service.

10. Data Required

Complete Enclosures as required.

11. Acceptance Criteria

No data taken shall exceed limits listed on the Enclosures.

12. Procedure

NOTE:	Enclosures 13.4, 13.16, and 13.17 should be performed by an NLO.

12.1 **IF** in Modes 5 **OR** 6, EVERY 15 MINUTES document the critical core parameters listed on Enclosure 13.1 (Critical Core Parameters Sheet) (Reference OEP).

12.2 **IF** Start Up Of ND System During Plant Cooldown (OP/1/A/6200/004) is in progress **AND** KCHX Maximized Cooling Temperature Monitoring is being performed, within 15 minutes and every 15 minutes thereafter record parameters on Enclosure 13.2 (KCHX Maximized Cooling Temperature Monitoring).

12.3 EVERY 15 MINUTES record on Enclosure 13.3 (Auxiliary Building Ventilation Supply Unit Status) the status of the Auxiliary Building Ventilation System supply units.

12.4 **IF** in Modes 1-4, within 30 minutes of Loss of OAC and once per hour thereafter, verify and record on Enclosure 13.4 (Ventilation Unit Condensate Drain Tank Input Rate Determination) that the rate of increase in VUCDT level is < 1% per hour. (TS 3.4.13 and 3.4.15)

12.5 **IF** in Modes 1-4, within 30 minutes of Loss of OAC, begin performing Enclosure 13.5 (Containment Floor and Equipment Sumps Input Rate Determination) to verify input to the Containment Floor and Equipment Sump is less than 1 gpm. (TS 3.4.13 and 3.4.15)

12.6 **IF** in Modes 1-4, within 30 minutes of Loss of OAC and once per hour thereafter, verify and record on Enclosure 13.6 (1EMF-38 Delta Count Rate Determination) that the change in count rate on 1EMF-38 is < 750 cpm in one hour. (TS 3.4.13 and 3.4.15)

12.7 **IF** in Modes 1-4, within 30 minutes of Loss of OAC and once per hour thereafter, verify and record on Enclosure 13.7 (1EMF-39 Delta Count Rate Determination) that the change in count rate on 1EMF-39 is < 6700 cpm in one hour. (TS 3.4.13 and 3.4.15)

12.8 **IF** ALL the following conditions exist (Reference SR 3.4.2.1):

- Reactor Critical
- T_{AVG} < 561°F
- T_{REF} - T_{AUCT} - Hi/Lo Alarm Present, Annunciator 1AD2 A/4

EVERY 30 MINUTES verify Reactor Coolant loops $T_{AVG} \geq$ 551°F by completing Enclosure 13.8 (T_{AVG} Data Sheet).

NOTE: The YC Operable But Degraded Condition is normally active during the winter months based on Lake Wylie and SNSWP temperatures.

12.9 **IF** the YC Operable But Degraded Condition is active, perform Enclosure 13.9 (YC Operable But Degraded Temperature Monitoring).

12.10 **IF** both trains of the plasma display monitor are inoperable in Modes 1-6, EVERY 60 MINUTES or after 10% change in power, complete Enclosure 13.10 (Subcooling Data Sheet) to monitor subcooling margin.

12.11 **IF** Unit 1 net generation **CANNOT** be obtained from the Unit 1 operator aid computer, perform the following:

12.11.1 At the top of the first hour during loss of OAC, notify SOC that they will not be getting station or unit MWH hourly values from both CNS units.
Person notified _____

12.11.2 EVERY HOUR on the HOUR complete Enclosure 13.11 (Electrical Data Sheet).

NOTE:
1. If pressures (primary and secondary) are verified < 200 psig, then temperatures are **NOT** required to be taken nor recorded.
2. Use a calibrated pyrometer to obtain S/G shell temperatures.

12.12 **IF** NC T_C is > 80°F **AND** a NC pump is operating, then the secondary side temperature is > 80°F and documentation of shell temps is **NOT** necessary. **IF** in Modes 5, 6 **OR** No Mode, EVERY 60 MINUTES complete Enclosure 13.12 (Steam Generator Data Sheet) (Reference SLC 16.5-7).

12.13 **IF** in Mode 1 **AND** less than 50% rated power, prior to exceeding 50% rated power and every 1 hour thereafter, with the AFD monitor alarm inoperable, monitor and log the indicated Axial Flux Difference for each operable excore channel on Enclosure 13.13 (Axial Flux Difference (%Δ Flux) Following Loss of AFD Monitor Alarm). (Reference SR 3.2.3.1 and TS 3.2.3).

12.14 **IF** in Mode 1 **AND** ≥ 50% rated power, once within 1 hour and every 1 hour thereafter with the AFD monitor alarm inoperable, monitor and log the indicated Axial Flux Difference for each operable excore channel on Enclosure 13.13 (Axial Flux Difference (%Δ Flux) Following Loss of AFD Monitor Alarm). (Reference SR 3.2.3.1 and TS 3.2.3).

12.15 **IF** in Modes 1 **OR** 2, EVERY 4 HOURS verify by signing off on Enclosure 13.14 (Rod Verification Checklist) that the Digital Rod Position indication for all rods are within ± 12 steps of their group step counter demand position and operable (Reference SR 3.1.4.1).

12.16 **IF** in Mode 1 **OR** 2 **AND** $K_{EFF} \geq 1.0$, EVERY 4 HOURS verify and record on Enclosure 13.15 (Rod Insertion Limit Checksheet) that each control bank of rods is above the rod insertion limit (Reference SR 3.1.6.2).

12.17 **IF** in Modes 1,2, 3, **OR** Mode 4, when steam generators are being used for heat removal, EVERY 4 HOURS record CA suction source temperatures measured locally using a calibrated Keithley 872 digital thermometer, Model J or its equivalent, as required, per Enclosure 13.16 (CA Suction Source Temperature Monitoring Data)

12.18 **IF** in Modes 1-4, within 4 HOURS and every 4 hours thereafter, monitor the CF containment isolation valves N2 accumulator pressures on Enclosure 13.17 (CF Containment Isolation Valve N2 Accumulator Pressure Monitoring).

12.19 **IF** in Modes 1-4, EVERY 6 HOURS, document data needed for primary to secondary leakage calculation on Enclosure 13.18 (Primary to Secondary Leakage Calculation Data) and provide data to Chemistry. Notify Secondary Chemistry to perform PT/1/B/4600/028 (Determination Of Steam Generator Tube Leak Rate For Unit 1).

12.20 **IF** Auxiliary Spray is being used for pressurizer pressure control, EVERY 12 HOURS complete Enclosure 13.19 (Pressurizer Spray ΔT Data Sheet).

12.21 **IF** in Mode 1 **AND** above 50% rated power, once within 12 hours and every 12 hours thereafter, document Quadrant Power Tilt Ratio, as calculated by PT/0/A/4600/08B (Man. Cal. of Quad. Tilt), in Enclosure 13.1 of PT/1/A/4600/002A (Mode 1 Periodic Surveillance Items). (Reference SR 3.2.4.1)

12.22 **IF** in Modes 1-3, within 12 HOURS of the Loss of OAC and every 12 hours thereafter, monitor the CA piping surface temperatures. Perform OP/1/A/6250/002, Enclosure 4.12 (Checking Pipe Surface Temperatures).

12.23 **IF** in Modes 1-2, within 12 HOURS of the Loss of OAC and every 12 hours thereafter, monitor the Overtemperature Delta T parameters and record on Enclosure 13.20 (Overtemperature Delta T Setpoint Channel Check). (Reference SR 3.3.1.1)

12.24 **IF** in Modes 1-4, EVERY 24 HOURS perform a manual leakage calculation of the NC System in accordance with PT/1/A/4150/001I (NC Manual Leakage Calculation). (Reference TS 3.4.15, Required Action A.1).

12.25 Update Enclosure 13.21 (Chemistry Data Sheet) as information becomes available from Chemistry.

12.26 **IF** in Modes 1-4, EVERY 4 HOURS perform a check of the Strong Motion Accelerograph and complete Enclosure 13.22 (Strong Motion Accelerograph).

12.27 **WHEN** the OAC is returned to service, notify Shift Work Manager to coordinate with Local IT and Reactor Group Duty Engineer to ensure OAC is updating properly.

12.27.1 Notify SOC that MWH data should be valid at the top of the next hour.
Person notified _____

12.27.2 Give a copy of Enclosure 13.11 to the SSA to assist them in editing the switch board logs.

12.28 Evaluate the acceptance criteria by performing one of the following:

_____ 12.28.1 Verify the acceptance criteria specified in Section 11 is met.

OR

_____ 12.28.2 **IF** the acceptance criteria is **NOT** met, perform the following:

☐ Notify the Unit/WCC SRO that the acceptance criteria is **NOT** met.

_____ _____ ___/___
Unit/WCC SRO Contacted Date Time

☐ Initiate a PIP to document the test failure.

☐ Document all issues on a procedure discrepancy sheet.

_____ 12.29 **IF** any discrepancy is noted during the performance of this test that does **NOT** keep the test from meeting the acceptance criteria, it shall be given to the Unit/WCC SRO for evaluation via a discrepancy sheet.

_____ 12.30 Submit PT/1/A/4600/009 (Loss of Operator Aid Computer) to the Unit/WCC SRO.

13. Enclosures

13.1 Critical Core Parameters Sheet

13.2 KCHX Maximized Cooling Temperature Monitoring

13.3 Auxiliary Building Ventilation Supply Unit Status

13.4 Ventilation Unit Condensate Drain Tank Input Rate Determination

13.5 Containment Floor and Equipment Sumps Input Rate Determination

13.6 1EMF-38 Delta Count Rate Determination

13.7 1EMF-39 Delta Count Rate Determination

13.8 T_{AVG} Data Sheet

13.9 YC Operable But Degraded Temperature Monitoring

13.10 Subcooling Data Sheet

13.11 Electrical Data Sheet

13.12 Steam Generator Data Sheet

13.13 Axial Flux Difference (%Δ Flux) Following Loss of AFD Monitor Alarm

13.14 Rod Verification Checklist

13.15 Rod Insertion Limit Checksheet

13.16 CA Suction Source Temperature Monitoring Data

13.17 CF Containment Isolation Valve N2 Accumulator Pressure Monitoring

13.18 Primary to Secondary Leakage Calculation Data

13.19 Pressurizer Spray ΔT Data Sheet

13.20 Overtemperature Delta T Setpoint Channel Check

13.21 Chemistry Data Sheet

13.22 Strong Motion Accelerograph

Enclosure 13.10

Subcooling Data Sheet

PT/1/A/4600/009

CALCULATION SHEET FOR NC SYSTEM DEGREES SUBCOOLED

Date/Time	NC Press	T-SAT	Highest NC Temp	°F Subcooled	Initials
TODAY/NOW	146 PSIG	345°F	329°F	16°	INITIALS
		↗		↗	
	(340-350)		(11-21)		

ACCEPTANCE CRITERIA:

Subcool limit is 10°F while at power.

30°F while shutdown.

INFORMATION:

NC Pressure - Record lowest indicated system pressure.

T-SAT - Using NC pressure, determine saturation temperature from the Unit One Revised Data Book Figure 57 or Figure 58.

Highest NC Temp - Determine the highest NC Temp:

- In Modes 1 and 2, use Loop T_{HOT}.
- In Modes 3-6:
  - Compare the average of the 5 highest reading operable core exit T/Cs to Loop T_{HOT}.
    OR
  - Use the operating train(s) of ND inlet temperature, Loop T_{HOT} and/or the operable core exit T/Cs.

°F Subcooled - Calculate by subtracting "HIGHEST NC TEMP" from "T-SAT".

CANDIDATE STATES THERE IS INSUFFICIENT SUBCOOLING.

Source: OAC Reactor Coolant Saturation Calculations

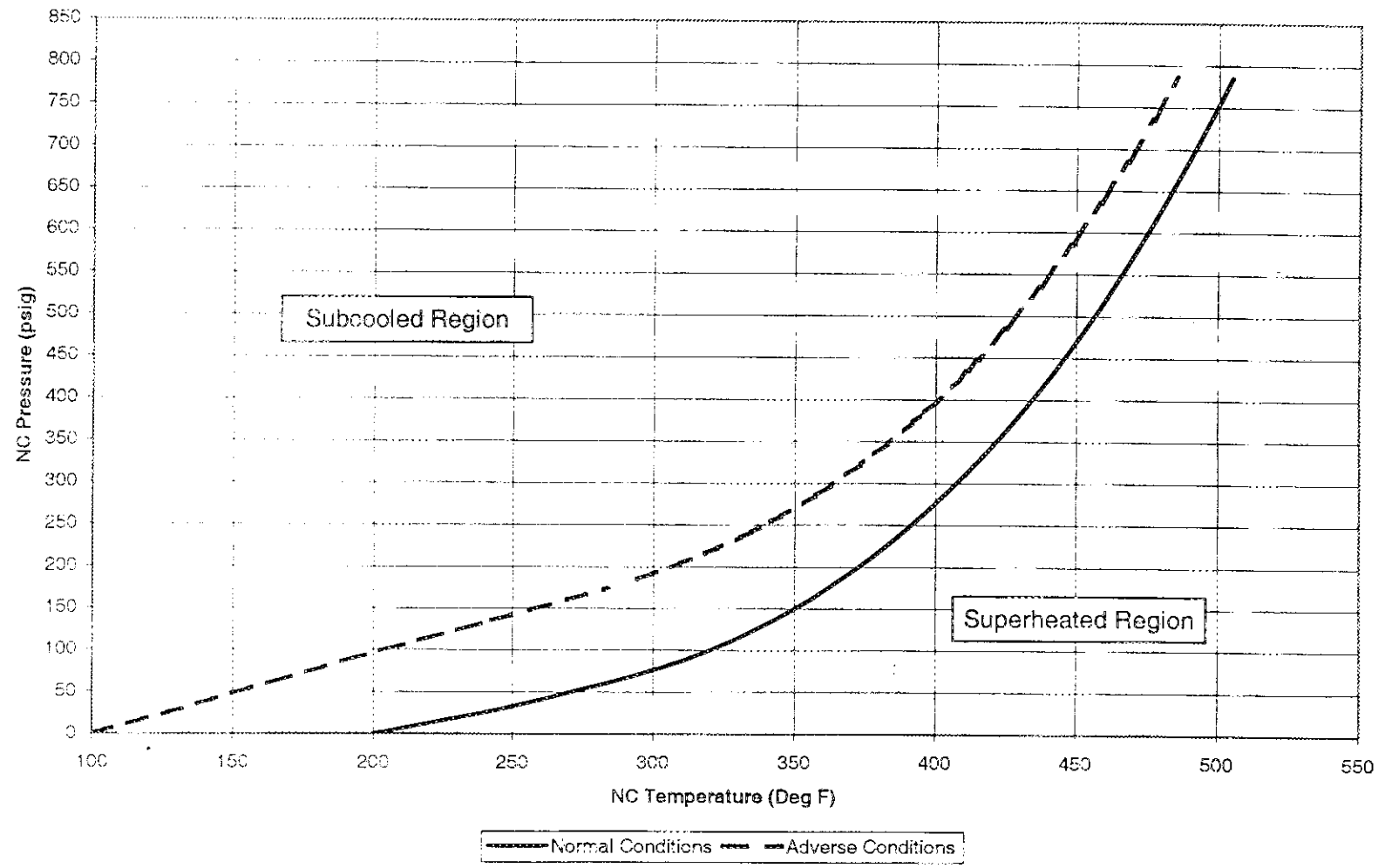

Figure 58 - Reactor Coolant Saturation Curve, Narrow Range

Source: OAC Reactor Coolant Saturation Calculations

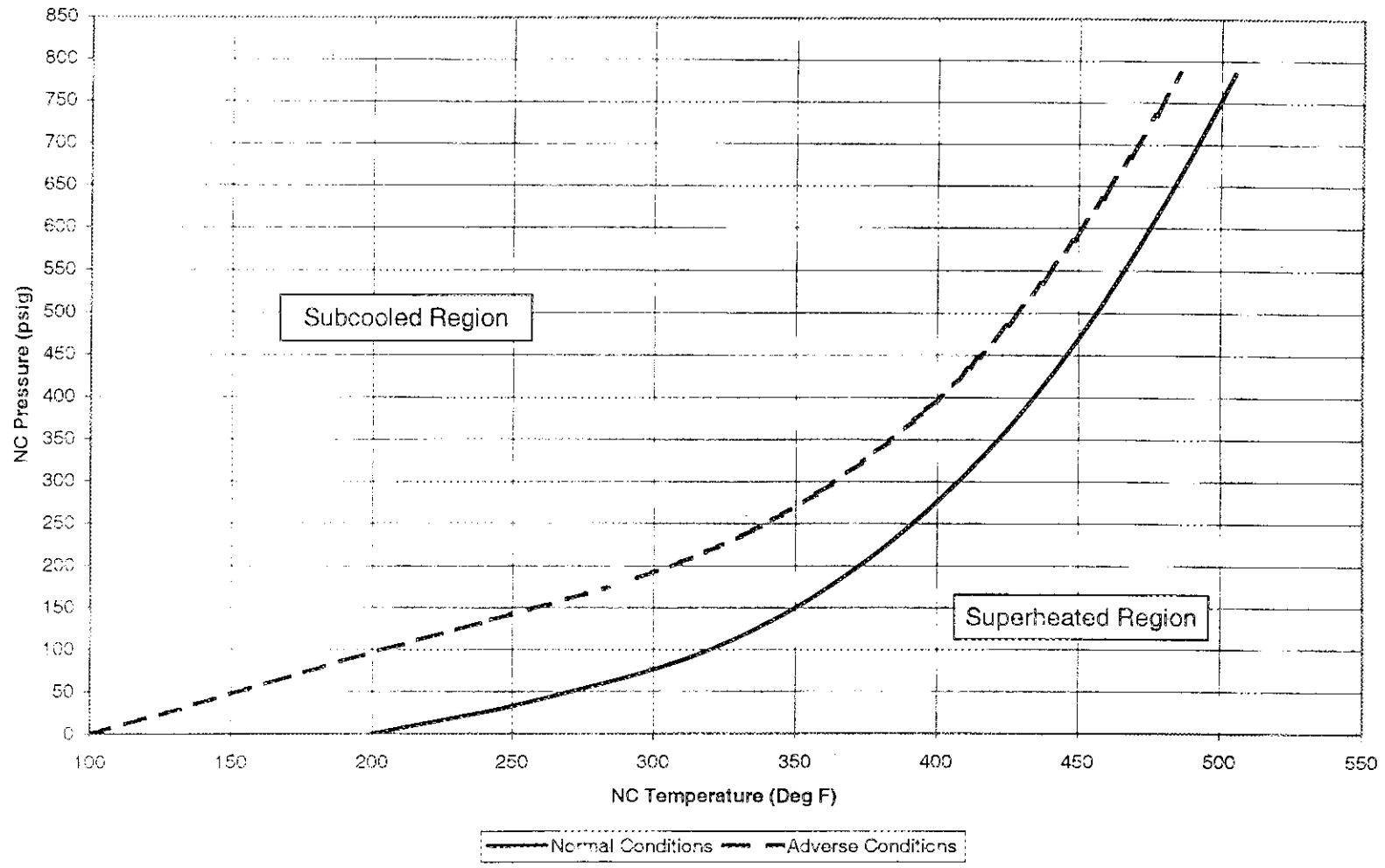

Figure 58 - Reactor Coolant Saturation Curve, Narrow Range

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NRC-RO-3/ADMIN

Perform emergency plan requirements for a site fire emergency

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Perform emergency plan requirements for a site fire emergency

Alternate Path: NO

Facility JPM #: New

K/A Rating(s): Generic KA: 2.4.43 (2.8/3.5)

Task Standard:

Candidate completes the immediate action steps of RP/0/B/5000/029 enclosure 3.1 to activate the fire brigade response.

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ___X___ In-Plant __X____ Perform _____ Simulate __X____

References:

RP/0/B/5000/029 (Fire Brigade Response) Revision 7

Validation Time: 10 min . **Time Critical:** NO

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT ____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Tools/Equipment/Procedures Needed:

Each candidate requires one copy of the following: RP/0/B/5000/029 and appropriate information sheets.

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

You are the Unit 2 BOP and have answered a 4911 phone call from a site employee who has reported a fire into the control room (Phone call information is below). The CRSRO has directed you to perform the immediate actions of RP/0/B/5000/029 Fire Brigade Response.

Information Sheet

Phone call information given to the control room on October 6, 2004 at 1127.

This is Dean Smith from Site Facilities reporting a fire located in warehouse number 2 at the south end of the building near the loading dock. The smoke is thick and there are visible flames coming out of the loading doors. This location contains discarded package material being processed for recycling. Myself and 4 others were in the building when the fire broke out. I observed 3 other members of my work crew leaving by the rear exit, the rest of us are on the south side of the building near the other warehouses. I don't think there are any others inside the building. You can reach me here in Warehouse number 1 extension 5992.

EXAMINER NOTE: Ensure candidate knows this is a simulation. Both the Control Room and Simulator locations can perform the notification of the Fire Brigade members. **Hand copy of RP/029 and phone call information to candidate with today's date on the information sheet.**	
STEP 1: From initial conditions, candidate determines that TSC/OSC is not activated and proceeds to Enclosure 3.1. STANDARD: Candidate selects Enclosure 3.1 from initial conditions: COMMENTS:	___ SAT ___ UNSAT
STEP 2: Candiate performs immediate action 1.1 from information on phone message sheet: • Name/group of person reporting fire: **Dean Smith** • Location of fire: **Warehouse #2** • Elevation: **N/A** Column Line: **N/A** • Are smoke and flames visible? **Yes** • Equipment/components affected **Contents in warehouse** • Are there any injured/missing people? **NO** How Many? **N/A?** • Are there people in the immediate area who need to be relocated to a safer area? **NO** Call back number: **5992** • Time of call: **Today and Now** STANDARD: The candidate fills in the enclosure 3.1 step 1.1 blanks with the above information. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 3: In step 1.2, candidate determines the correct course of action based on data entered in step 1.1. STANDARD: Based on the 3rd bulleted information concerning level of fire, candidate selects 1.2 first option to dispatch fire brigade per Enclosure 3.5. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

	CRITICAL STEP
STEP 4: Candidate proceeds to Enclosure 3.5 to perform step 1. ANDARD: Candidate performs the actions at the Quiktel Key Pad as follows: • Type in **"FIRE"** and press **"ENTER"** **EXAMINER CUE: "FIRE" has been typed and "ENTER" depressed** • Type the **"M"** **EXAMINER CUE: "M" has been typed** • Type the following message: **"Fire Brigade Emergency at Warehouse #2. Fire Brigade please respond."** **EXAMINER CUE: "Fire Brigade Emergency at Warehouse #2. Fire Brigade please respond" has been typed** • Press **"Enter".** **EXAMINER CUE: "Enter" has been depressed** • Reads the note about the time delay and monitors the confirmation pager located at the Quiktel Key Pad **AMINER NOTE: When the message is sent, the candidate will read the note after step 1.4 When read, then provide the cue.** **EXAMINER CUE: Confirmation Pager reads the sent fire brigade message.** COMMENTS:	___ SAT ___ UNSAT
STEP 5: Enclosure 3.5 step 1.2 and step 1.3 STANDARD: Step 1.2 is N/A. Step 1.3 is read to determine a need for additional fire brigade response. **EXAMINER CUE: Additional off-shift/off-duty Fire Brigade member response is not needed.** COMMENTS:	___ SAT ___ UNSAT
XAMINER NOTE: Candidate returns to Enclosure 3.1 step 1.4	

STEP 6: Step 1.4, announce the following over the PA system: ANDARD: Candidate locates the gray phone located on MC-01 or uses the page through a site telephone and delivers the announcement: "Attention Fire Brigade members. Attention Fire Brigade members. This is the Control Room. A fire has been reported at (Warehouse #2). All Fire Brigade members please respond. All other plant personnel please stay clear of the area until further notice." **EXAMINER CUE: Plant page announced with Warehouse #2 location has been made.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 7: Step 1.5, announce the following over the Fire Brigade radio, channel 1: STANDARD: Candidate locates radio on channel 1 to make the announcement: "Catawba Control Room to all units – clear channel 1 for emergency use." **EXAMINER CUE: Announcement on radio channel 1 for emergency use has been made.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 8: Step 1.6, Notifies Central Alarm Station (CAS at 5364) or Secondary Alarm Station (SAS at 5766) of Fire Brigade Response. STANDARD: Candidate uses a plant phone and contact either CAS or SAS using the assigned phone numbers to give the following information: • Location of response is "warehouse #2" • Initiate a MERT response to the location **EXAMINER CUE: I understand that a fire brigade response has been sent to warehouse #2 and we should initiate a MERT team response to the warehouse #2 location..** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 9: Step 1.7, If offsite fire department is needed, refer to enclosure 3.6 ANDARD: Candidate uses information to make step 1.7 determination. **EXAMINER CUE: The Fire Brigade Captain has responded and states that off-site department assistance is not needed.** COMMENTS:	___ SAT ___ UNSAT
STEP 10: Step 1.8, **WHEN** requested provide information to the responding Fire Brigade personnel. Refer to the Site Fire Plan. STANDARD: Candidate reads step. **EXAMINER CUE: No fire brigade team member has requested any information.** COMMENTS:	___ SAT ___ UNSAT
EP 11: Step 1.9, Notify RP Shift Technician (5572/pager #778-2777) of Fire Brigade response: • Record RP Shift Technician's name • Report location of response STANDARD: Candidate calls RP Shift Tech at 5572 to notify them of the fire response. Records technicians name and location of response as warehouse #2. **EXAMINER CUE: This is RP Technician "Dana" and I understand the fire response is at "warehouse #2".** COMMENTS:	___ SAT ___ UNSAT

STEP 12: Step 1.0, Notify the CNS Environmental, Health and Safety duty person (3333/pager 777-3333) of the Fire Brigade response. STANDARD: Candidate notifies CNS Environmental, Health and Safety duty person at 3333 of fire response. **EXAMINER CUE: This is Robert and I understand the fire response is at "warehouse #2".** COMMENTS:	___ SAT ___ UNSAT
STEP 13: Step 1.11 Determine required classification and notifications. STANDARD: Candidate reads step .11 **EXAMINER CUE: The Operations Shift Manager and Unit supervisor will perform Step 1.11.** COMMENTS:	___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIATING CUE:

You are the Unit 2 BOP and have answered a 4911 phone call from a site employee who has reported a fire into the control room (Phone call information is below). The CRSRO has directed you to perform the immediate actions of RP/0/B/5000/029 Fire Brigade Response.

Information Sheet

Phone call information given to the control room on October 6, 2004 at 1127.

This is Dean Smith from Site Facilities reporting a fire located in warehouse number 2 at the south end of the building near the loading dock. The smoke is thick and there are visible flames coming out of the loading doors. This location contains discarded package material being processed for recycling. Myself and 4 others were in the building when the fire broke out. I observed 3 other members of my work crew leaving by the rear exit, the rest of us are on the south side of the building near the other warehouses. I don't think there are any others inside the building. You can reach me here in Warehouse number 1 extension 5992.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

RO-3 ADMIN
KEY

DRAFT

Duke Power Company Catawba Nuclear Station	Procedure No. RP/ 0/B/5000/029
	Revision No. 007
Fire Brigade Response	
Reference Use	Electronic Reference No. CP00953N

PERFORMANCE

* * * * * * * * * * UNCONTROLLED FOR PRINT * * * * * * * * * *

(ISSUED) - PDF Format

RO-3 ADMIN
KEY

Fire Brigade Response

1. Symptoms

1.1 Fire, alarms, explosions, or conditions associated with a fire that have been reported to the Control Room or OSC (when activated).

1.2 This procedure shall provide guidance to shift personnel and Emergency Coordinator for response, actions, and coordination associated with an incident involving real or suspected fires and fire drills.

2. Initial Actions

2.1 Select the appropriate enclosure to document reported information and to respond to the situation in progress:

- Actual Event without TSC/OSC Activation - Enclosure 3.1
- Actual Event after TSC/OSC Activation - Enclosure 3.2
- Shift Fire Drill without TSC/OSC Activation - Enclosure 3.3
- Shift Fire Drill after TSC/OSC Activation - Enclosure 3.4

3. Enclosures

3.1 Fire Brigade Response to an Actual Event without TSC/OSC Activation

3.2 Fire Brigade Response to an Actual Event after TSC/OSC Activation

3.3 Fire Brigade Response to a Shift Fire Drill without TSC/OSC Activation

3.4 Fire Brigade Response to a Shift Fire Drill after TSC/OSC Activation

3.5 Fire Brigade Response Activation

3.6 Off-site Fire Department Notification and Response

3.7 Courtesy Notification to States and Counties for a Non-emergency Plant Event

3.8 Corrective Actions or Commitments

Enclosure 3.1

Fire Brigade Response to an Actual Event without TSC/OSC Activation

1. Immediate Actions

INITIAL

1.1 Record the following information taken from the caller:

- Name/group of person reporting fire: DEAN SMITH
- Location of fire: WAREHOUSE #2
  Elevation: - Column Line: -
- Are smoke and flames visible? YES
- Equipment/components affected CONTENTS (NO SPECIFIC INFORMATION IS SUPPLIED
- Are there any injured/missing people? NO How Many? -
- Are there people in the immediate area who need to be relocated to a safer area? NO
- Call back number: 5992
- Time of call: (10-6-09) TODAY / 1127

NOTE: The level of Fire Brigade response should be determined based on the information received. Example: An alarm may only need an operator to respond, investigate and report back to the Control Room.

1.2 Determine initial response based on the information received and one of the following conditions:

STEP APPLIES

- **IF** flames or smoke and sensed heat are reported, dispatch the Fire Brigade. Refer to Enclosure 3.5.

SEE PAGE ENCL 3.5 page 1 of 2

- **IF** a plant alarm or the report indicates overheating, dispatch an operator to determine the need for additional Fire Brigade response.

1.3 **IF** a Fire Brigade response is **NOT** needed and no flames or smoke have been reported, complete procedure steps 2.7 and 2.9 and exit procedure.

_____ 1.4 Announce the following over the PA system:

"Attention Fire Brigade members. Attention Fire Brigade members. This is the Control Room. A fire has been reported at (give location/elev., etc.) . All Fire Brigade members please respond. All other plant personnel please stay clear of the area until further notice."

WAREHOUSE #2

_____ 1.5 Announce the following on the Fire Brigade radio, channel 1:

"Catawba Control Room to all units – clear channel 1 for emergency use."

_____ 1.6 Notify the Central Alarm Station (CAS - 5364) or Secondary Alarm Station (SAS - 5766) of Fire Brigade response:

- Report location of response WAREHOUSE #2
- Request for assistance with CAD door access if needed.
- Request Security to initiate a MERT response to the location.
- **IF** fire is located inside containment Unit 1 or Unit 2, instruct the CAS/SAS operator to change radio selector switch from position "D" to the appropriate position for the affected unit (unit 1, position "A"; unit 2, position "B").

_____ 1.7 **IF** off-site fire department assistance is needed, refer to Enclosure 3.6.

_____ 1.8 **WHEN** requested provide information to the responding Fire Brigade personnel. Refer to the Site Fire Plan.

_____ 1.9 Notify RP Shift Technician (5572/pager #778-2777) of Fire Brigade response:

- Record RP Shift Technician's name DANA
- Report location of response WAREHOUSE #2

_____ 1.10 Notify the CNS Environmental, Health and Safety duty person (3333/pager 777-3333) of the Fire Brigade response.

1.11 Determine required classifications and notifications. Refer to the following procedures:

_____ • RP/0/A/5000/001 (Classification of Emergency)

_____ • RP/0/B/5000/013 (NRC Notification Requirements)

STOPS HERE. REMAINING ACTIONS ARE FOR AFTER THE FIRE IS EXTINGUISHED.

2. Subsequent Actions

NOTE: 1. Subsequent Actions are performed after the fire is extinguished.

2. Lines in left margin are for place keeping. Subsequent Actions may be performed simultaneously.

_____ 2.1 Announce the following over the plant PA System:

"Attention plant personnel. Attention plant personnel. This is the Control Room. The fire incident at (give location) has been terminated. Normal duties may now resume."

_____ 2.2 Announce the following on the Fire Brigade radio, channel 1:

"Catawba Control Room to all units - fire incident secured. Resume normal communications. KNHP-589 clear."

_____ 2.3 **IF** any "fixed" fire protection suppression system has been activated/discharged, notify the site Fire Protection Engineer.

_____ 2.4 **IF** smoke is generated inside the main plant complex, notify the following Engineering personnel to evaluate HVAC filters:

- Mech Syst
- BOP
- HVAC Grp Supvr

_____ 2.5 **IF** both of the following conditions are met, perform steps 2.5.1 through 2.5.3 below:

- An emergency has **NOT** been declared for this event per RP/0/A/5000/001
- The NRC **WILL NOT** be notified of this event per RP/0/B/5000/013

_____ 2.5.1 Notify the duty Emergency Planner.

_____ 2.5.2 Notify the EnergyQuest/Public Affairs duty person.

_____ 2.5.3 Make a courtesy notification to the states and counties using Enclosure 3.7. {1}

NOTE: The following actions are performed by the Fire Brigade Leader on duty.

_____ 2.6 Process a Fire Emergency Report as follows:

_____ A. Complete a "Fire Emergency Report" (Appendix A, NSD 112).

_____ B. Route a copy of the report to the site Fire Protection Engineer (CN03SE).

_____ C. Route the original report to the Emergency Planning Group (CN01EP).

_____ 2.7 Initiate a PIP for event information retention.

PIP # _____

_____ 2.8 **IF** Fire Brigade equipment **OR** supplies have been used, perform the following:

_____ 2.8.1 Ensure all equipment is returned to is proper storage/readiness location.

_____ 2.8.2 **IF** plant fire extinguishers have been used, notify the Site Services duty person of location and type.

_____ 2.8.3 Complete a Fire Brigade Equipment Checklist located in the Fire Brigade Building.

_____ 2.8.4 **IF** consumable supplies have been used, notify the Emergency Planning duty person.

_____ 2.9 Notify the Central Alarm Station (CAS-5364) or Secondary Alarm Station (SAS-5766) that the fire event has been terminated and the radio selector switch in the CAS/SAS can be returned to position "D" for normal operations.

_____ 2.10 Forward this procedure to the Emergency Planning Group (CN01EP).

1. Fire Brigade Response for an Actual Emergency:

1.1 Activate the emergency pager system from the Quiktel Key Pad located in the Control Room.

_____ 1.1.1 Type in "Fire" and press "Enter".

_____ 1.1.2 Type the letter "M".

_____ 1.1.3 Type the following message:

"Fire Brigade Emergency at WAREHOUSE #2 **(location). Fire Brigade please respond."**

_____ 1.1.4 Press "Enter".

NOTE: Pager activation can be delayed up to 5 minutes depending on pager system status.

_____ 1.1.5 Monitor the confirmation pagers located at the Quiktel Key Pad to verify proper pager activation.

1.2 **IF** Quiktel Key Pad is unavailable, the site Public Address System shall be used to initiate a Fire Brigade Response.

1.3 **IF** additional off-shift/off-duty Fire Brigade member response is needed, perform the following:

_____ 1.3.1 Activate the emergency pager system from the Quiktel Key Pad located in the Control Room.

_____ A. Type in "Fire" and press "Enter".

_____ B. Type the letter "M".

_____ C. Type in the following message:

"Fire Brigade Emergency. Off-shift/off-duty Fire Brigade Members, please respond and report to the OSC if available and fit for duty."

_____ D. Press "Enter".

NOTE: Pager activation can be delayed up to 5 minutes depending on pager system status.

_____ E. Monitor the confirmation pagers located at the Quiktel Key Pad to verify proper pager activation.

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/PLT-1

Restore power to 2ERPB using swing inverter 2EIF.

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Restore power to 2ERPB using swing inverter 2EIF.

Alternate Path: NO

Facility JPM #: NEW

K/A Rating(s): Safety Function 6 APE: 057 AA1.01 (3.7/3.7)

Task Standard:

Startup inverter 2EIF and connect it to 2ERPB.

Preferred Evaluation Simulator:

Control Room _____ In-Plant __X__

Preferred Evaluation Perform

Perform _____ Simulate __X__

References:

AP/1/A/5500/029 Loss of Vital or Aux Control Power Revision 16

Validation Time: 15 min. **Time Critical:** NO

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____ / _____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Tools/Equipment/Procedures Needed:

Copy of AP/2/A/5500/029 Enclosure 11, Restoring power to 2ERPB

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUES:

A fault in Unit 2 Inverter 2EIB has resulted in a loss of power to Vital Instrument buss 2ERPB. Repairs are in effect for the inverter. The Control Room SRO instructs you to use AP1/A/5500/029 (Loss of Vital or Aux Control Power) and use "swing inverter" 2EIF to restore power to 2ERPB by performing step 8 of Enclosure 11, Restoring Power to 2ERPB.

START TIME: _____

EXAMINER NOTE: If the candidates notes the need for Key #264 provide the cue now. **EXAMINER CUE: You have obtained Key #264**	
STEP 1: 8a: Notify CEN Power System Engineer of the intent to restore from the swing inverter. STANDARD: Candidate states the need to inform the CEN engineer. **EXAMINER CUE: The Power System Engineer has been informed.** COMMENTS:	___ SAT ___ UNSAT
EXAMINER NOTE: IF not evaluating the candidate in acquiring the key, use the cue. STEP 2: 8b: Obtain key #264 from WCC. STANDARD: Candidate makes statement and heads to WCC for key. **EXAMINER CUE: You have obtained Key #264** COMMENTS:	___ SAT ___ UNSAT
STEP 3: 8c: Verify the following breakers on swing inverter 2EIF – OFF: • 2EIF B1 (2EIF DC Input From 2EDB) • 2EIF B3 (2EIF DC Input From 2EDD) • 2EIF B2 (2EIF Inverter AC Output) STANDARD: Candidate breakers B1, B3 and B2 are positioned down towards "OFF". **EXAMINER CUE: 2EIF B1, 2EIF-B2, 2EIF-B3 are positioned towards "OFF"** COMMENTS:	___ SAT ___ UNSAT

STEP 4: 8d: Verify IAE actions required in Step 3 are complete. ANDARD: Candidate inquires if IAE has performed step 3. **EXAMINER CUE: IAE has performed step 3.** COMMENTS:	___ SAT ___ UNSAT
NOTE Both 2VRD-F01E and inverter 2EIF route power through 2EMF to supply 2ERPB or 2ERPD. Only one power supply at a time can be in service through 2EMF.	
STEP 5: 8e: IF 2VRD is not supplying 2ERPD THEN ensure breaker 2VRD-F01E (Alternate Power Supply For 120VAC Power Pnlbd 2ERPB Or 2ERPD) - OFF. STANDARD: Candidate locates 2VRD to determine output breaker status to 2ERPD by verifying 2VRD-F01E is selected to "OFF". **EXAMINER CUE: Breaker 2VRD-F01E is positioned to "OFF"** COMMENTS:	___ SAT ___ UNSAT
STEP 6: 8f: Unlock breaker 2EDB-F01D. STANDARD: Candidate uses key to unlock and remove padlock. **EXAMINER CUE: Padlock has been removed on 2EDB-F01D.** COMMENTS:	___ SAT ___ UNSAT
STEP 7: 8g: Ensure breaker 2EDB-F01D - ON STANDARD: Candidate rotates 2EDB-F01D to the "ON" position. **EXAMINER CUE: 2EDB-F01D is positioned to "ON"** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

NOTE Step 8.i must be performed immediately after Step 8.h is completed. Failure to close breaker 2EIF B1 (2EIF DC Input From 2EDB) immediately after the "PRECHARGE" switch is released may result in blown inverter input fuses.	
STEP 8: 8h: Turn and hold the "PRECHARGE" switch on the swing inverter 2EIF in the "EDB-LEFT position until the "PRECHARGE" indicator lamp has been illuminated for a minimum of 5 seconds. STANDARD: Candidate rotates the "EDB-LEFT" switch Counter clockwise and looks for the AMBER lamp to light then holds switch for at least 5 seconds. **EXAMINER CUE: The "PRECHARGE" switch has been rotated to the EDB-LEFT position, the AMBER lamp is lit, and switches then held for 5 seconds.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9: 8i: Close breaker 2EIF B1 (2EIF DC Input From 2EDB) on 2EIF STANDARD: Candidate pushes 2EIF B1 up to the "ON" position without delay. **EXAMINER CUE: Breaker 2EIF B1 is positioned to "ON".** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 10: 8j: Close breaker 2EIF B2 (2EIF Inverter AC Output) on 2EIF STANDARD: Candidate pushes 2EIF B2 up to the "ON" position. **EXAMINER CUE: Breaker 2EIF B2 is positioned to "ON".** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 11: 8k: Unlock breaker 2EMF B4 (2ENF Output To 2EMB) on 2EMF (Manual Bypass Switch for Swing Inverter 2EIF) STANDARD: Candidate unlocks padlock on 2EMF B4 breaker and removes. **EXAMINER CUE: Padlock on 2EMF B4 has been removed.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 12: 8l: Ensure breaker 2EMF B4 (2EMF Output To 2EMB) on 2EMF - ON STANDARD: Candidate pushes 2EMF B4 up to the "ON" position. **EXAMINER CUE: Breaker 2EMF B4 is positioned to "ON".** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 13: 8m: Ensure the "MANUAL BYPASS SWITCH" on 2EMF selected to the "INVERTER TO LOAD" position. STANDARD: Candidate rotates Manual Bypass Switch on 2EMF Counter Clockwise to the "INVERTER TO LOAD" position. **EXAMINER CUE: Manual Bypass switch on 2EMF is rotated to the "INVERTER TO LOAD" position.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 14: 8n: Ensure the "MANUAL BYPASS SWITCH" on 2EMB selected to "ALTERNATE AC SOURCE TO LOAD" position. STANDARD: Candidate rotates the Manual Bypass switch on 2EMB clockwise to the "ALTERNATE AC SOURCE TO LOAD" position. **EXAMINER CUE: Manual Bypass switch on 2EMB has been rotated clockwise to the "ALTERNATE AC SOURCE TO LOAD" position.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 15: 8o: Verify "AC OUTPUT VOLTAGE" volts on 2EMB – Greater than or equal to 115 AC volts. STANDARD: Candidate locates AC OUTPUT VOLTAGE meter on 2EMB and verifies voltage greater than or equal to 115 VAC **EXAMINER CUE: AC OUTPUT VOLTAGE meter on 2EMB voltage meter is 121 VAC.** COMMENTS:	___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 16: 8p: Dispatch IAE to close the following breakers located inside the front/middle bay of "2PCC2 Process Control Cab 2 Protection Set 2": 1. "CAB 2 26 VDC PWR Supply BKR" 2. "CAB 2 24 VDC PWR Supply BKR" STANDARD: Candidate makes statement that IAE must perform action. **EXAMINER CUE: IAE has closed the 2 breakers in the front/middle bay of "2PCC2 Process Control Cab 2 Protection Set 2"** COMMENTS:	___ SAT ___ UNSAT
STEP 17: 8q: Activate swing inverter 2EIF alarm circuits as follows: • Rotate 2EIF alarm bypass keyswitch counterclockwise • Rotate 2EMF alarm bypass keyswitch clockwise STANDARD: Candidate rotates the 2EIF alarm bypass keyswitch to the counterclockwise position. Candidate rotates the 2EMF alarm bypass keyswitch to the clockwise position. **EXAMINER CUE: The 2EIF alarm bypass keyswitch is rotated to the counterclockwise position.** **The 2EMF alarm bypass keyswitch is rotated to the clockwise position.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 18: 8r: Return this enclosure to the Control Room SRO **EXAMINER CUE: Control Room SRO has been given the enclosure.**	___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIATING CUES:

A fault in Unit 2 Inverter 2EIB has resulted in a loss of power to Vital Instrument buss 2ERPB. Repairs are in effect for the inverter. The Control Room SRO instructs you to use AP1/A/5500/029 (Loss of Vital or Aux Control Power) and use "swing inverter" 2EIF to restore power to 2ERPB by performing step 8 of Enclosure 11, Restoring Power to 2ERPB.

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/Plant-2

Restore the VA System to Normal Alignment Following an Inadvertent Safety Injection Actuation

CANDIDATE _____

EXAMINER _____

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Restore the Auxiliary Building ventilation system to normal alignment following an inadvertent Safety Injection actuation.

Alternate Path: NO

Facility JPM #: (2003 Repeat) OP-CN-PSS-VA-001

K/A Rating(s): Safety Function 2 SYSTEM 013 A3.02 (4.1/4.2)

Task Standard:

All Train A and B VA Filter Isolation dampers and Auxiliary Shutdown Panel Supply Units are reset per OP/0A/6450/003 (Auxiliary Building Ventilation System) Enclosure 4.7.

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator _____ In-Plant ___X___ Perform _____ Simulate ___X___

References:

OP/0/A/6450/003 (Auxiliary Building Ventilation System) Enclosure 4.7 Revision 40

Validation Time: 12 min. **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT ____ UNSAT ____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

Tools/Equipment/Procedures Needed:

Have enough copies of OP/0/A/6450/003, Enclosure 4.7 available for each candidate.

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

While conducting ESF testing, an inadvertent Safety Injection on low Pressurizer Pressure occurred. EP/1/A/5000/ES-1.1 (Safety Injection Termination) has been entered. ECCS and the Diesel Generator Load Sequencers have been reset and the control room crew is restoring various plant systems. The Control Room SRO instructs you to reset the Auxiliary Building Ventilation to restore the system to normal operations per OP/0/A/6450/003 (Auxiliary Building System) Enclosure 4.7. Initial conditions 1.1, 1.2, 1.3, 1.4 have been completed and you have obtained Key # 209 per step 1.5.

START TIME: _____

EP 1: Operator begins with step 1.6. STANDARD: Operator begins with OP/0/A/6450/003, Enclosure 4.7 step 1.6 COMMENTS:	___ SAT ___ UNSAT
STEP 2: 1.6: Verify 1ELCP0189 A Train Post LOCA HVAC Control Panel selector switch is in the "OFF" position (AB-597, CC-52, Rm 576). STANDARD: Candidate determines that the A Train Post LOCA HVAC Control Panel selector switch is in the "OFF" position. ***CUE: The A Train Post LOCA HVAC Control Panel selector switch is in the "OFF" position.*** COMMENTS:	___ SAT ___ UNSAT
EP 3: 1.7: Verify 1ELCP0190 B Train Post LOCA HVAC Control Panel selector switch is in the "OFF" position (AB-597, CC-53, Rm 576). STANDARD: Candidate determines that the B Train Post LOCA HVAC Control Panel selector switch is in the "OFF" position. ***CUE: The B Train Post LOCA HVAC Control Panel selector switch is in the "OFF" position.*** COMMENTS:	___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 4: 2.1 To reset Train A dampers, perform the following: 2.1.1 Insert key and turn the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" switch fully (AB-597, HH-56, Rm 500) (Panel 1AB-ECP-2 1ELCP0112). STANDARD: Candidate inserts the key and turns the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" switch fully. ***CUE: The key has been inserted and the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" switch has been turned fully.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 5: 2.1.2 Depress key switch firmly. STANDARD: Candidate depresses the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" key switch firmly. ***CUE: The key switch has been depressed firmly.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 6: 2.1.3 After switch has come back out, return it to its original position and remove key. STANDARD: Candidate releases pressure on the key switch allowing the switch to come back out and returns the switch to its original position. ***CUE: The key switch has come back out and is in its original position.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 7: 2.1.4 Depress the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-1A ASPSU-1A (1AHUN0060) SEQUENCED ON" switch (AB-597, HH-56, Rm 500) (Panel 1AB-ECP-2 1ELCP0112). STANDARD: Candidate depresses the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-1A ASPSU-1A SEQUENCED ON" switch. ***CUE: The "RESET" pushbutton on "AUX SHUTDOWN PANEL SUPPLY UNIT-1A ASPSU-1A SEQUENCED ON" switch has been depressed.*** ***(Though not checked in procedure, but IF ADDRESSED, state that the reset light is dark.)*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 8: 2.1.5: Depress the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-2A ASPSU-2A (2AHUN0060) SEQUENCED ON" switch (AB-597, HH-58, Rm 500) (Panel 2AB-ECP-2 2ELCP0112). STANDARD: Candidate depresses the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-2A ASPSU-2A SEQUENCED ON" switch. ***CUE: The "RESET" pushbutton on "AUX SHUTDOWN PANEL SUPPLY UNIT-2A ASPSU-2A SEQUENCED ON" switch has been depressed.*** ***(Though not checked in procedure, but IF ADDRESSED, state that the reset light is dark.)*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 9: 2.2 To reset Train B dampers, perform the following: 2.2.1 Insert key and turn the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" switch fully (AB-597, LL-52, Rm 500) (Panel 1AB-ECP-3 1ELCP0113). STANDARD: Candidate inserts the key and turns the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" switch fully. ***CUE: The key has been inserted and the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" switch has been turned fully.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 10: 2.2.2 Depress key switch firmly. STANDARD: Candidate depresses the "AUX BLDG FILTER TRAIN ISO. DAMPERS RESET" key switch firmly. ***CUE: The key switch has been depressed firmly.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 11: 2.2.3 After switch has come back out, return it to its original position and remove key. STANDARD: Candidate releases pressure on the key switch allowing the switch to come back out and returns the switch to its original position. ***CUE: The key switch has come back out and is in its original position.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 12: 2.2.4 Depress the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-1B ASPSU-1B (1AHUN0061) SEQUENCED ON" switch (AB-597, LL-52, Rm 500) (Panel 1AB-ECP-3 1ELCP0113). STANDARD: Candidate depresses the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-1B ASPSU-1B SEQUENCED ON" switch. ***CUE: The "RESET" pushbutton on "AUX SHUTDOWN PANEL SUPPLY UNIT-1B ASPSU-1B SEQUENCED ON" switch has been depressed.*** ***(Though not checked in procedure, but IF ADDRESSED, state that the reset light is dark.)*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 13: 2.2.5 Depress the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-2B ASPSU-2B (2AHUN0061) SEQUENCED ON" switch (AB-597, LL-62 Rm 500) (Panel 2AB-ECP-3 2ELCP0113). STANDARD: Candidate depresses the "RESET" pushbutton on "AUX S/D PNL SUP UNIT-2A ASPSU-2A SEQUENCED ON" switch. ***CUE: The "RESET" pushbutton on "AUX SHUTDOWN PANEL SUPPLY UNIT-2A ASPSU-2A SEQUENCED ON" switch has been depressed.*** ***(Though not checked in procedure, but IF ADDRESSED, state that the reset light is dark.)*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 14: 2.3 Return the VA System to normal operation per Enclosure 4.1 (Startup and Operation) of this procedure. STANDARD: No action required by the candidate. ***CUE: The SRO has directed another operator to perform Enclosure 4.1.*** COMMENTS:	___ SAT ___ UNSAT
This JPM is complete.	

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIATING CUE:

While conducting ESF testing, an inadvertent Safety Injection on low Pressurizer Pressure occurred. EP/1/A/5000/ES-1.1 (Safety Injection Termination) has been entered. ECCS and the Diesel Generator Load Sequencers have been reset and the control room crew is restoring various plant systems. The Control Room SRO instructs you to reset the Auxiliary Building Ventilation to restore the system to normal operations per OP/0/A/6450/003 (Auxiliary Building System) Enclosure 4.7. Initial conditions 1.1, 1.2, 1.3, 1.4 have been completed and you have obtained Key # 209 per step 1.5.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/PLT-3

Borate the reactor coolant system from outside the control room

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Borate the reactor coolant system from outside the control room..

Alternate Path: NO

Facility JPM #: OP-CN-PS-NV-078 (Modified to Unit 2)

K/A Rating(s): Safety Function 8 APE 068 AA2.02 (3.7/4.2)

Task Standard:

Boric Acid is being added to the NCS from the ASP with total to be added calculated to be between 15126 and 16061 gallons and the time to add the boric acid calculated by dividing by the observed boric acid flow rate on the ASP.

Preferred Evaluation Simulator: **Preferred Evaluation Perform**

Control Room _____ In-Plant _X_ Perform _____ Simulate _X_

References:

AP/2/A/5500/017 (Loss of Control Room) Revision 039
Unit 2 Boration and Dilution Tables

Validation Time: 10 min. **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

Tools/Equipment/Procedures Needed:

Auxiliary Shutdown Panel Room key checked out as needed
AP/2/A/5500/017 Enclosure 6
Unit 2 Rod Book Section 4.1

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

You are the OATC at Auxiliary Shutdown Panel 2A performing Enclosure 1 of AP/17. The Main Control Room was abandoned due to a fire in the Cable Room. The Reactor was tripped from the control room and is currently at 558 °F and 2235 psig.

INITIATING CUES:

You are currently at Step 22 of Enclosure 1 of AP/2/A/5500/017 where you have been directed to "Ensure adequate shutdown margin" by performing Enclosure 6 (Shutdown Margin and Boration).

START TIME: _____

A Key is required to enter ASP Room 2A, it can be obtained from the WCCSRO

EP 1: When the candidate arrives at the ASP rooms, he/she locates the procedure box, for Enclosure 6 and Rod Book Section 4.1. STANDARD: Operator locates the stored copies of Enclosure 6 and Rod Book Section 4.1. **EXAMINER CUE: Hand copies of Enclosure 6 and the Rod Book Section 4.1 to the operator as he/she locates the document.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: **Determine amount of boric acid to be added as follows:** 1a. In the following steps, borate the NC System to greater than or equal to 2850 PPM. 1b. Determine the amount of boric acid to be added using the last known NC System boron concentration. **REFER TO** ROD Book Section 4.1. STANDARD: For "1b", operator determines the needed gallons of boric acid based on CUE'd value of 1500 ppm and required concentration of 2850 ppm or greater. From ROD Book Section 4.1, operator should calculate the following: 1500 – 1780 ppm = 2924 gallons 1780 – 1980 ppm = 2177 gallons 1980 – 2180 ppm = 2258 gallons 2180 – 2380 ppm = 2344 gallons 2380 – 2580 ppm = 2438 gallons 2580 – 2760 ppm = 2280 gallons Interpolation for 2840 – 2880 = 1173 gallons Total = 15594 gallons An acceptable range ± 3% = 15126 to 16061 gallons of boric acid **EXAMINER CUE: Current boron concentration is 1500 ppm.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 3: **Align boric acid pumps to NV pump(s) suction as follows:** 2a. Ensure following valves - OPEN: • 2NV-238A (B/A Xfer Pmp To Blender Ctrl) (AB-550, HH-JJ, 53-54, Rm 234) • 2NV-186A (B/A Blender Otlt To VCT Otlt) (AB-586, KK-50, Rm 419). STANDARD: Operator opens the valves: • Positions the switch for 2NV-238A to the "OPEN" position and verifies the red "OPEN" light is LIT. ***CUE: The switch for 2NV-238A is selected to OPEN, the RED "OPEN" light is lit.*** • Depresses the "OPEN" pushbutton for 1NV-286A and verifies the red "OPEN" light is LIT. ***CUE: The OPEN pushbutton for 2NV-186A is depressed and the RED "OPEN" light is lit.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.*

STEP 4: 2b. Start the boric acid pump(s) ANDARD: Operator depresses the "ON" pushbutton for "B/A XFER PMP 2A" on Auxiliary Shutdown Panel 2A and verifies red "ON" light LIT. If checked, B/A BLENDER FLOW will be show 44 GPM. ***CUE: The ON pushbutton for Boric Acid pump 2A is depressed and the RED "ON" light is lit.*** ***IF CHECKED **CUE: B/A BLENDER FLOW meter indicates 44 GPM.*** **EXAMINER NOTE: The operator may elect to go to ASP 2B to start the second boric acid pump. If he/she does, then provide the following cue as needed. The procedure step allows one or both pumps.** STANDARD: Operator depresses the "ON" pushbutton for "B/A XFER PMP 2B" on Auxiliary Shutdown Panel 2B and verifies red "ON" light is LIT. If checked, B/A BLENDER FLOW will now be 65 GPM. ***CUE: The ON pushbutton for Boric Acid pump 2B is depressed and the RED "ON" light is lit.*** ***IF CHECKED **CUE: B/A BLENDER FLOW meter indicates 65 GPM.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
EXAMINER NOTE: When any pump is on, the boric acid flow rate can be read on either panel.	

STEP 5: **WHEN desired amount of boric acid has been added, THEN:** 3a. Stop boric acid pump(s).	**CRITICAL STEP**
STANDARD: Based on the amount of acid determined in JPM step 2: • For one Boric Acid Pump: 15594 gallons/44 gpm = 354.4 minutes or 5.9 hours. ± 3% = 343.76 to 365.03 minutes • For two Boric Acid pumps: 15594 gallons/65 gpm = 239.9 minutes or 3.998 hours. ± 3% = 247.09 to 232.70 minutes	___ SAT ___ UNSAT
EXAMINER CUE: The required pump run time has been completed.	
STANDARD: Operator depresses the "OFF" pushbutton for "B/A XFER PMP 2A" on Auxiliary Shutdown Panel 2A and verifies the RED "ON" light is dark and GREEN "OFF" light is lit.	
***CUE: The OFF pushbutton for Boric Acid pump 2A is depressed and the RED "ON" light is dark and GREEN "OFF" light is lit..**	
EXAMINER NOTE: If the operator used the second boric acid pump then provide the following cue as needed.	
STANDARD: Operator depresses the "OFF" pushbutton for "B/A XFER PMP 2B" on Auxiliary Shutdown Panel 2B and verifies the RED "ON" light is dark and GREEN "OFF" light is lit.	
***UE: The OFF pushbutton for Boric Acid pump 2B is depressed and the RED "ON" light is dark and GREEN "OFF" light is lit.**	
COMMENTS:	

STEP 6: 3b. Close the following valves: • 2NV-238A (B/A Xfer Pmp To Blender Ctrl) (AB-550, HH-JJ, 53-54, Rm 234) • 2NV-186A (B/A Blender Otlt To VCT Otlt) (AB-586, KK-50, Rm 419). STANDARD: Operator closes the valves: • Positions the switch for 2NV-238A to the "CLOSE" position and verifies the green "CLOSE" light is lit and the red "OPEN" light is dark. ***CUE: The switch for 2NV-238A is selected to CLOSE, and the green "CLOSE" light is lit and the red "OPEN" light is dark.*** • Depresses the "OPEN" pushbutton for 1NV-286A and verifies the green "CLOSE" light is lit and the red "OPEN" light is dark. ***CUE: The CLOSE pushbutton for 2NV-186A is depressed and verifies the green "CLOSE" light is lit and the red "OPEN" light is dark.*** COMMENTS:	___ SAT ___ UNSAT
STEP 7: **Maintain shutdown margin as follows:** 4a. Notify Chemistry to initiate periodic sampling for NC System boron concentration. 4b. Adjust NC System boron concentration to maintain S/D margin greater than the required shutdown margin. STANDARD: For step 4a, operator contacts Chemistry by phone to initiate periodic sampling for the NC system boron concentration. **EXAMINER CUE: Chemistry has been contacted and will periodically sample the NC system for boron..** For step 4b. Operator makes statement concerning need to adjust boron concentration as needed. **EXAMINER CUE: The SRO will monitor boron concentration and ensure shutdown margin is being maintained.** COMMENTS:	___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

You are the OATC at Auxiliary Shutdown Panel 2A performing Enclosure 1 of AP/17. The Main Control Room was abandoned due to a fire in the Cable Room. The Reactor was tripped from the control room and is currently at 558 °F and 2235 psig.

INITIATING CUES:

You are currently at Step 22 of Enclosure 1 of AP/2/A/5500/017 where you have been directed to "Ensure adequate shutdown margin" by performing Enclosure 6 (Shutdown Margin and Boration).

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/SIM-1

Realign a control rod

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Realign a control rod.

Alternate Path: YES

Facility JPM #: Modified OP-CN-IC-IRE-001

K/A Rating(s): Safety Function 1 SYSTEM 001 A2.03 (3.5/4.2)

Task Standard:

1. Control Bank D is disconnected for all rods except D-12 in preparation to realign the control rod.
2. Operator correctly recognizes an uncontrolled reactivity addition from Rod D-12 and manually performs a reactor trip and performs EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) Immediate action steps 2 and 3 from memory.

Preferred Evaluation Simulator: **Preferred Evaluation Perform**

Simulator _X_ In-Plant ____ Perform _X_ Simulate _____

References:

OP/1/A/6150/008, Rod Control, Enclosure 4.6, Rod Retrieval, Enclosure 4.7, Master Cycler Position, Revision 049
EP/1/A/5000/E-0, Reactor Trip or Safety Injection Revision 024

Validation Time: 15 min. **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

SIMULATOR SETUP SHEET

1. Init to IC #1 and place simulator on Run
2. Insert **MAL-IRX003B**, Uncontrolled Rod Withdrawal, Trigger = **1**
3. Drive control banks in 6-12 steps to see the position change on DRIP!
4. Insert **MAL-IRX016D12, Immovable Rod D-12.**
5. Restore control banks to stabilize temperature and create mismatch with Rod D-12.
6. Delete **MAL-IRX016D12**
7. **FREEZE** simulator.
8. Write to Protected IC.

SNAP No.: 104

SIMULATOR OPERATOR INSTRUCTIONS:

1. **When** candidate is ready to withdrawal Rod D12, activate **Trigger 1**.

Tools/Equipment/Procedures Needed:

OP/1/A/6150/008, Rod Control, Enclosure 4.6, Rod Retrieval
Enclosure 4.7, Master Cycler Position
Enclosure 4.8, Rod Control Data Sheet.

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is in Mode 1 with temperature and power stable.
- During a control rod bank insertion for testing, Rod D-12 became misaligned with Control Bank D.
- IAE technicians and the Reactor Engineer have recommended that the rod be realigned with its control bank.

INITIATING CUES:

The Rod Control procedure OP/1/A/6150/008, Enclosure 4.6 has been completed through step 2.5. An NLO is standing by on the phone to provide rod control cabinet information. The Control Room SRO instructs you to complete the rod realignment by performing Enclosure 4.6, steps 2.6 through 2.13.

START TIME: _____

EP 1: 2. 6: Dispatch operator to Rod Control Power Cabinets to verify the following: 2.6.1 The "MASTER CYCLER" displays per Enclosure 4.7 (Master Cycler Position). 2.6.2 Verify the selected banks "GRP SELECT" lights illuminate per Enclosure 4.14 (Rod Control Power Cabinet GRP Select Lights). STANDARD: Operator standing by per the initial cue. **EXAMINER CUE: This is Fred standing by at the rod control cabinets.** COMMENTS:	___ SAT __ UNSAT
STEP 2: Record the following on Enclosure 4.8 (Rod Control Data Sheet) 2.7.1: Step Demand counter readings for each rod group in affected bank. 2.7.2: The step demand counter reading for all of the other rod groups NOT affected STANDARD: For Step 2.7.1 data is entered for Bank D Group 1 and Group 2 ***CUE: Rod Group 1 is 220 and Rod Group 2 is 220 steps.*** For step 2.7.2 data is entered for Shutdown Banks A,B,C,D,E and Control Banks A,B,C ****CUE: All Shutdown Banks and Control Banks A,B, and C are 230 steps.*** COMMENTS:	___ SAT __ UNSAT

STEP 3: Notify the dispatched operator to report the following: 2.7.3.1 The "MASTER CYCLER" display (located in the Logic Cabinet) for the affected bank (except Shutdown Banks C, D, E). Record on Enclosure 4.8 (Rod Control Data Sheet). 2.7.3.2 The "BANK OVERLAP DISPLAY" as seen on the digital readout inside the Logic Cabinet. Record on Enclosure 4.8 (Rod Control Data Sheet). STANDARD: For step 2.7.3.1, requests MASTER CYCLER display for Control Bank D and records on Enclosure 4.8. **EXAMINER CUE: Bank "D" Master Cycler Display reads "LIT LIT OFF".** **For step 2.7.3.2, requests** BANK OVERLAP DISPLAY" as seen on the digital readout inside the Logic Cabinet record on Enclosure 4.8. **EXAMINER CUE: Bank Overlap Display reads 568.** COMMENTS:	___ SAT __ UNSAT
EP 4: **WHEN** steady-state plant conditions are obtained, turn the "CRD BANK SELECT" switch to the bank that contains the affected rod. STANDARD: Locates Tavg and power indications and determines that unit is stable then rotates the "CRD BANK SELECT" switch to Control Bank "D" ***CUE: Unit 1 power and temperature are stable. "CRD BANK SELECT" switch is rotated to Control Bank "D"*** COMMENTS:	___ SAT __ UNSAT
STEP 5: Notify dispatched operator to verify the selected banks "GRP SELECT" light illuminates. STANDARD: Acknowledges local operators reply for Bank "D". **EXAMINER CUE: Control Bank "D" "GRP SELECT" light is LIT.** COMMENTS:	___ SAT __ UNSAT

STEP 6: **IF** the affected rod is in a control bank: 2.10.1 Position the "BANK POSITION DISPLAY" switch (located inside the P/A Converter Cabinet) to the affected bank. 2.10.2 Record the "BANK POSITION DISPLAY" on Enclosure 4.8 (Rod Control Data Sheet). STANDARD: Step 2.10 applies. For step 2.10.1, directs operator to position the "BANK POSITION DISPLAY" to Control Bank "D" For Step 2.10.2, requests the position of Control Bank "D" and records on Enclosure 4.8. **EXAMINER CUE: BANK POSITION DISPLAY is selected to BANK "D"** **EXAMINER CUE: Bank "D" position reads 220.** COMMENTS:	___ SAT __ UNSAT
STEP 7: Disconnect all lift coils in the affected bank, except for the affected rod, by placing the control rod disconnect switches in the "DISCONNECTED" position. (These are located in the "CONTROL ROD DISCONNECT SWITCH BOX" on 1MC5.) STANDARD: Candidate locates CONTROL ROD DISCONNECT SWITCH BOX and positions the switches for RODS: D4, M12, M4, H8 to the disconnect position. ***CUE: RODS D4, M12, M4, H8 disconnect switches are in the DISCONNECT position.*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 8: IF the rod is dropped, then proceed to Step 2.14. to retrieve the dropped rod. STANDARD: Rod is not dropped, candidate goes to step 2.13. COMMENTS:	___ SAT ___ UNSAT

STEP 9: IF the rod is misaligned, then perform the following: 2.13.1 Adjust turbine load to maintain T-Avg ± 2°F of T-Ref STANDARD: Candidate checks current value of T-Avg and T-Ref to determine difference. Since difference is less than 2°F, no action necessary. ***CUE: The difference between T-Avg and T-Ref is -0.2°F.*** COMMENTS:	___ SAT __ UNSAT
STEP 10: 2.13.2 Bring the misaligned rod into alignment with its bank using the "ROD MOTION" lever, observing that only the affected rod moves per DRPI. STANDARD: Operator positions Rod motion lever to the "OUT" position to align rod "D12". When operator releases ROD MOTION lever, determines that the rod is continuing to withdrawal uncontrollably. ***CUE: "ROD MOTION lever is selected to "OUT" and rod D12 is withdrawing. ROD MOTION lever is released, rod D12 continues to step OUT and cannot be stopped.*** MMENTS:	___ SAT __ UNSAT

STEP 11: Operator takes actions allowed per Operations Management Procedure 1-8 and places the reactor in a safe condition by manually tripping the reactor by rotating the "RX TRIP TRN A' and RX TRIP TRN B" handles CCW to the "TRIP" positions and performs the immediate actions of EP/1/A/5000/E-0, Reactor Trip or Safety Injection. STANDARD: Rotates the "RX TRIP TRN A' and RX TRIP TRN B" handles CCW to the "TRIP" position. ***CUE: Reactor Trip breaker handles 1A and 1B have been rotated CCW.*** E-0, Step 2: **Verify Reactor Trip:** All rod bottom lights – LIT, All reactor trip and bypass breakers – OPEN, I/R amps - DECREASING. STANDARD: Candidate verifies the reactor trip breaker 1A and 1B GREEN "OPEN" lights are LIT, Intermediate Range amp meter indications are decreasing, ALL rod bottom light displays on the DRPI screens read "RB". ***CUE: All rod bottom displays read – RB, All reactor trip breaker GREEN "OPEN" lights are lit, Intermediate range amps - DECREASING.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
p 12: **Verify Turbine Trip:** All turbine stop valves – CLOSED OR Both of the following: All MSIVs – CLOSED and All MSIV bypass valves - CLOSED. STANDARD: Candidate verifies the stop valves – CLOSED or both of the following: ALL MSIVs and MSIV bypass valves –CLOSED. ***CUE: All turbine stop valves – CLOSED OR Both of the following: All MSIVs – CLOSED and All MSIV bypass valves - CLOSED.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 13: Perform EP/1/A/5000/E-0 Immediate steps 4 and 5 ANDARD: Operator proceeds to perform steps 4 and 5. ***CUE: The BOP is completing the remaining E-0 Immediate actions, this JPM is complete.*** COMMENTS:	___ SAT __ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Unit 1 is in Mode 1 with temperature and power stable.
- During a control rod bank insertion for testing, Rod D-12 became misaligned with Control Bank D.
- IAE technicians and the Reactor Engineer have recommended that the rod be realigned with its control bank.

INITIATING CUES:

The Rod Control procedure OP/1/A/6150/008, Enclosure 4.6 has been completed through step 2.5. An NLO is standing by on the phone to provide rod control cabinet information. The Control Room SRO instructs you to complete the rod realignment by performing Enclosure 4.6, steps 2.6 through 2.13.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/SIM-2

Increase Cold Leg Accumulator 1D level

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Increase Cold Leg Accumulator 1D Level

Alternate Path: NO

Facility JPM #: New

K/A Rating(s): Safety Function 2 SYSTEM 006 A4.07 (4.4/4.4)

Task Standard:

Cold Leg accumulator 1D level is increased to 90% using Safety Injection pump 1A and the low pressure condition is cleared.

Preferred Evaluation Simulator: **Preferred Evaluation Perform**

Control Room ___X___ In-Plant ____ Perform ___X___ Simulate

_____

References:

OP/1/A/6200/009 (Cold Leg Accumulator Operation) Enclosure 4.4 Revision 068

Validation Time: 12 min. **Time Critical:** NO

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____
_____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

SIMULATOR SETUP SHEET

1. Init to IC #1.

2. Operate the drain system for CLA 1D per Enclosure 4.5 and decrease level to 86.5%

3. Ensure the low pressure alarm for CLA 1D is also in.

Write to Protected IC.

SNAP No.: 113

SIMULATOR OPERATOR INSTRUCTIONS:

None.

Tools/Equipment/Procedures Needed:

Copies of OP/1/A/6200/009, Enclosure 4.4 Revision 68

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A sample line leak is suspected as the cause of loss of accumulator 1D level.
The low level condition has also caused a low pressure condition.

INITIATING CUES:

The CRSRO has directed you to increase Cold Leg Accumulator 1D level to 90% using OP1/A/6200/009 (Cold Leg Accumulator Operation) Enclosure 4.4. Both Safety Injection pumps are operable and NI pump 1A has been checked out by an NLO. Begin at step 2.4.3 and during the fill process, ensure the low pressure condition is corrected. Independent verification will be waived during this JPM.

START TIME: _____

EP 1: Step 2.4.3 **IF** a Safety Injection should occur during the performance of Steps 2.4.4 through 2.25, open 1NI-118A (NI Pump 1A C-Leg Inj Isol). Sign below to document understanding of responsibility. Responsible NCO _____ Date _____ Responsible SRO _____ Date _____ STANDARD: Operator signs the NCO slot for understanding and asks that the SRO sign for his/her understanding of responsibility. **EXAMINER CUE: SRO Joe Cornwell has signed.** COMMENTS:	___ SAT __ UNSAT
STEP 2: 2.4.4 Close 1NI-118A (NI Pump 1A C-Leg Inj Isol). STANDARD: Candidate depresses the GREEN "CLOSE" button for 1NI-118A on MC-11 and verifies the RED "OPEN" light is DARK and the GREEN "CLOSE" light is LIT. ***CUE: The GREEN "CLOSE" button for 1NI-118A on MC-11has been depressed, the RED "OPEN" light is DARK and the GREEN "CLOSE" light is LIT.*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 3: 2.4.5 Use NI Pump 1A for CLA makeup. STANDARD: Candidate understands that based on step 2.4, he/she is to use NI pump 1A. COMMENTS:	___ SAT __ UNSAT

STEP 4: 2.5 **IF** NI Pump 1B is **NOT** operable **AND NOT** available, use NI Pump 1A for CLA makeup. 2.6 **IF** either of the following conditions exist, use NI Pump 1B for CLA makeup. • NI Pump 1A is **NOT** operable **AND NOT** available • NI Pump 1B is **NOT** operable but is available 2.7 Log one NI Pump in TSAIL due to opening 1NI-120B (NI Pmps To C-Leg Accum Fill) and 1NI-363 (NI To Cold Leg Accum Fill). STANDARD: Per the initial cues, step 2.5 and 2.6 do not apply. The SRO should be directed to Log the pump in TSAIL due to opening NI-120. **EXAMINER CUE: SRO Joe Cornwell has logged NI pump 1A in TSAIL.** COMMENTS:	___ SAT __ UNSAT
STEP 5: 2.8 Open 1NI-363 (NI To Cold Leg Accum Fill) STANDARD: Candidate contacts NLO and directs that 1NI-363 be locally opened. **EXAMINER CUE: Time Compression: the NLO has opened 1NI-363.** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 6: 2.9 Open 1NI-120B (NI Pmps To C-Leg Accum Fill). STANDARD: Candidate depresses the RED "OPEN" button for 1NI-120B on MC-11 and verifies the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK. *****CUE: The RED "OPEN" button for 1NI-120B on MC-11 has been depressed and the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK..*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT

STEP 7: 2.10 Start the desired NI pump: NI PMP 1A STANDARD: Candidate depresses the RED "ON" button for NI pump 1A on MC-11 and verifies the RED "ON" light is LIT and the GREEN "OFF" light is DARK. ***CUE: The RED "ON" button for NI pump 1A on MC-11 has been depressed and the RED "ON" light is LIT and the GREEN "OFF" light is DARK..*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 8: 2.11 Open 1NI-95A (C-Leg Accum Chk Viv Tst Isol). STANDARD: Candidate depresses the RED "OPEN" button for 1NI-95A on MC-11 and verifies the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK. ***CUE: The RED "OPEN" button for 1NI-95A on MC-11 has been depressed and the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK..*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
EP 9: 2.12 Position 1CB-1 (located behind control panel 1MC6, BB-56) to "ON" STANDARD: Candidate enters the main control boards to position 1CB-1 breaker to the ON position. ***CUE: 1MC6 has been accessed and 1CB-1 has been positioned to ON.*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 10: 2.13 Record the initial level of accumulator(s) to be filled. CLA: 1D_____% STANDARD: Candidate records initial level from meters on MC-11 or OAC for 1D CLA. ***CUE: 1D CLA level is 86.5%.*** COMMENTS:	___ SAT __ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 11: 2.14 Open the corresponding valve for the accumulator to be filled: • 1NI-90 (C-Leg Accum D Fill Isol) STANDARD: Candidate depresses the RED "OPEN" button for 1NI-90 on MC-11 and verifies the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK. ***CUE: The RED "OPEN" button for 1NI-90 on MC-11 has been depressed and the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK..*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 12: 2.16 Monitor level continuously during the fill process. STANDARD: Candidate monitors CLA 1D level on MC-11 and or on OAC graphics. ***CUE: 1D CLA level is increasing and is now 90% on MC-11 level instrument.*** COMMENTS:	___ SAT __ UNSAT
STEP 13: 2.16 **WHEN** the accumulator is at the desired level, close the corresponding valve: • 1NI-90 (C-Leg Accum D Fill Isol) STANDARD: Candidate depresses the GREEN "CLOSE" button for 1NI-90 on MC-11 and verifies the GREEN "CLOSE" light is LIT and the " RED "OPEN" light is DARK. ***CUE: The GREEN "CLOSE" button for 1NI-90 on MC-11 has been depressed and the RED "OPEN" light is DARK and the GREEN "CLOSE" light is LIT.*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT

STEP 14: 2.18 Record the final level of accumulator(s) to be filled. CLA: 1D_____% STANDARD: Candidate records final level from meters on MC-11 or OAC for 1D CLA. ***CUE: 1D CLA level is 90%.*** COMMENTS:	___ SAT __ UNSAT
STEP 15: 2.19 Position 1CB-1 (located behind control panel 1MC6, BB-56) to "OFF" STANDARD: Candidate enters the main control boards either at 1MC6 or at the end of the horseshoe to position 1CB-1 breaker to the OFF position. ***CUE: 1MC6 has been accessed and 1CB-1 has been positioned to OFF.*** COMMENTS:	___ SAT __ UNSAT
STEP 16: 2.20 Stop the pump started in Step 2.10: NI PMP 1A ANDARD: Candidate depresses the GREEN "OFF" button for NI pump 1A on MC-11 and verifies the RED "ON" light is DARK and the GREEN "OFF" light is LIT. ***CUE: The GREEN "OFF" button for NI pump 1A on MC-11 has been depressed and the RED "ON" light is DARK and the GREEN "OFF" light is LIT.*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 17: 2.21 Perform the following to reduce 1A NI Pump header pressure to less than 100 psig as indicated by 1NIP5440: STANDARD: Candidate prepares to direct local operator actions to reduce header pressure. **EXAMINER CUE: Using time compression, step 2.21 has been completed and header pressure reduced to less than 100 psig.** COMMENTS:	___ SAT __ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 18: 2.22 Close 1NI-95A (C-Leg Accum Chk Vlv Tst Isol). STANDARD: Candidate depresses the GREEN "CLOSE" button for 1NI-195A on MC-11 and verifies the RED "OPEN" light is DARK and the GREEN "CLOSE" light is LIT. ***CUE: The GREEN "CLOSE" button for 1NI-195A on MC-11 has been depressed and the RED "ON" light is DARK and the GREEN "OFF" light is LIT.*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 19: 2.23 Close 1NI-120B (NI Pmps To C-Leg Accum Fill). STANDARD: Candidate depresses the GREEN "CLOSE" button for 1NI-120B on MC-11 and verifies the RED "OPEN" light is DARK and the GREEN "CLOSE" light is LIT. ***CUE: The GREEN "CLOSE" button for 1NI-120B on MC-11 has been depressed and the RED "ON" light is DARK and the GREEN "OFF" light is LIT.*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 20: 2.24 Close 1NI-363 (NI To Cold Leg Accum Fill). STANDARD: Candidate directs NLO to locally close 1NI-363. **EXAMINER CUE: Time compression: the NLO has closed 1NI-363.** COMMENTS:	___ SAT __ UNSAT

STEP 21: 2.25 Ensure 1NI-118A (NI Pump 1A C-Leg Inj Isol) is open. STANDARD: Candidate depresses the RED "OPEN" button for 1NI-118A on MC-11 and verifies the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK. ***CUE: The RED "OPEN" button for 1NI-118A on MC-11 has been depressed and the RED "OPEN" light is LIT and the GREEN "CLOSE" light is DARK..*** COMMENTS:	**CRITICAL STEP** ___ SAT __ UNSAT
STEP 22: 2.26 Clear the TSAIL entry(s) made in Step 2.4 (if one was required) and Step 2.7. STANDARD: Operator directs SRO to clear TSAIL entry for 1A NI pump. **EXAMINER CUE: TSAIL entry has been cleared.** COMMENTS: 2.27 Record the following in Autolog: Affected Accumulator Initial level (from Step 2.13) Final level (from Step 2.18) STANDARD: Candidate discusses need to make autolog entries. **EXAMINER CUE: Another operator will complete needed AutoLog entries.** COMMENTS:	___ SAT __ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

A sample line leak is suspected as the cause of loss of accumulator 1D level.
The low level condition has also caused a low pressure condition.

INITIATING CUES:

The CRSRO has directed you to increase Cold Leg Accumulator 1D level to 90% using OP1/A/6200/009 (Cold Leg Accumulator Operation) Enclosure 4.4. Both Safety Injection pumps are operable and NI pump 1A has been checked out by an NLO. Begin at step 2.4.3 and during the fill process, ensure the low pressure condition is corrected. Independent verification will be waived during this JPM.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/SIM-3

Perform Enclosure 6 of ES-3.2 (SGTR Cooldown Using Blowdown)

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Perform Enclosure 6 of ES-3.2 (SGTR Cooldown Using Blowdown).

Alternate Path: NO

Facility JPM #: OP-CN-EP-EP4-002

K/A Rating(s): Safety Function 3 EPE 038 EA1.18 (4.0/3.9)

Task Standard:

Blowdown flow is established from steam generator 1C at less than or equal to 100 gpm.

Preferred Evaluation Simulator: **Preferred Evaluation Perform**

Control Room ___X___ In-Plant _____ Perform ___X___ Simulate _____

References:

EP/1/A/5000/ES-3.2 (Post – SGTR Cooldown Using Blowdown) Enclosure 6 Revision 13

Validation Time: 12 min. **Time Critical:** NO

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Candidate: _____ Time Start :
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

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_____

SIMULATOR SET-UP SHEET

1. Reset to a 100% MOL IC.
2. Insert **MAL-SG001C**, Value = **400** gpm.
3. Complete actions of E-0 and E-3.
4. Ensure BB tank Level Lo Alarm (D1880) clear.
5. Ensure BB pump 1A is off.
6. Freeze simulator.

Write to a protected snap 115

SIMULATOR OPERATOR INSTRUCTIONS:

Reset to snap _____

Tools/Equipment/Procedures Needed:

Copy of EP/1/A/5000/ES-3.2 Enclosure 6

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUES:

EP/1/A/5000/ES-3.2 (Post-SGTR Cooldown Using Blowdown) has been implemented following a tube rupture on S/G 1C. As BOP you are directed to establish blowdown from the ruptured S/G using Enclosure 6 of EP/ES-3.2.

START TIME: _____

EP 1: Ensure CA system valve control rest. STANDARD: Operator ensures "CA SYS VLV CTRL TRN A(B) YELLOW reset lights are LIT on MC-10. ***CUE: "CA System Valve Control Train A and B" YELLOW reset lights are LIT.*** COMMENTS:	___ SAT ___ UNSAT
EXAMINER NOTE: The flow controllers for the blowdown system are tripped close at the beginning of the tube rupture. This step only positions the controller function to zero flow. Actual flow, the BLACK needle, is already at bottom of scale. STEP 2: Close the following controllers: "S/G A BLDWN FLOW CTRL" "S/G B BLDWN FLOW CTRL" "S/G C BLDWN FLOW CTRL" "S/G D BLDWN FLOW CTRL" TANDARD: Operator positions "S/G A (B,C,D) BLDWN FLOW CTRL" to close by rotating the positioners counter-clockwise until the RED needle is at the bottom of scale. (MC-04) ***CUE: Flow controller "S/G A (B,C,D) BLDWN FLOW CTRL" positioner is rotated counter-clockwise and the RED needle is reading zero.*** COMMENTS:	___ SAT ___ UNSAT

STEP 3: Ensure 1BB-178 (BB Demin To Cond Drn Hdr Isol) – OPEN STANDARD: Operator ensures 1BB-178 RED "OPEN" light is LIT and GREEN "CLSD" light is DARK on MC-04. ***CUE: Valve 1BB-178 RED "OPEN" light is LIT and GREEN "CLOSED" light is DARK on MC-04.** COMMENTS:	___ SAT ___ UNSAT
STEP 4: Ensure 1BB-48 (BB Pumps Disch To TB Smp) – CLOSED STANDARD: Operator ensures 1BB-48 RED "OPEN" light is DARK and GREEN "CLSD" light is LIT on MC-04. ***CUE: Valve 1BB-48 RED "OPEN" light is DARK and GREEN "CLOSED" light is LIT on MC-04.** COMMENTS:	___ SAT ___ UNSAT
TEP 5: Ensure Override 1EMF-33 by depressing "OVRIDE" on the RAD MON OVERRIDE Pushbutton (1MC-4). STANDARD: Operator depresses "OVRIDE" on the RAD MON OVERRIDE pushbutton for 1EMF-33(1MC-4). ***CUE: "OVERRIDE" pushbutton for 1EMF-33 "RAD MON OVERRIDE" has been depressed on MC-04.*** *If operator uses the WHITE light to verify the override status, state that the WHITE "OVERRIDE" light is LIT* COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

STEP 6: Notify station management to determine the maximum blowdown flowrate from ruptured S/G(s). (step 6) STANDARD: Operator asked that a management decision be sought for the maximum flowrate. **EXAMINER CUE: Management has determined that the maximum flowrate is 100 gpm.** COMMENTS:	___ SAT ___ UNSAT
STEP 7: Align blowdown from ruptured S/G(s) as follows: STANDARD: Operator performs the following for S/G 1C: a. Ensure 1BB-82 (1C S/G Blowdown Penetration Valve Test Isol) - OPEN **EXAMINER CUE: 1BB-82 is OPEN** *b. Open 1BB-60A (S/G 1C Bldwn Cont Isol Insd) STANDARD: Operator depresses "OPEN" pushbutton for 1BB-60A on MC-10 and verifies RED "OPEN" light is LIT and GREEN "CLSD" light is DARK. ***CUE: Valve 1BB-60A RED pushbutton is depressed, RED "OPEN" light is LIT and GREEN "CLOSED" light is DARK on MC-10.**** COMMENTS: *c. Open 1BB-149B (S/G 1C Bldwn Cont Isol Byp) STANDARD: Operator depresses "OPEN" pushbutton for 1BB-149B on MC-10 and verifies RED "OPEN" light is LIT and GREEN "CLSD" light is DARK. ***CUE: Valve 1BB-149B RED pushbutton is depressed, RED "OPEN" light is LIT and GREEN "CLOSED" light is DARK on MC-10.**** COMMENTS: d. Do not continue until 5 minutes has elapsed. STANDARD: Operator checks time and waits for 5 minutes before continuing. **EXAMINER CUE: 5 minutes have elapsed.** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

STEP 7: (step 7 continued) Align blowdown from ruptured S/G(s) as follows: STANDARD: Operator performs the following for S/G 1C: *e. Open 1BB-61B (S/G 1C Bldwn Cont Isol Otsd) STANDARD: Operator depresses "OPEN" pushbutton for 1BB-61B on MC-10 and verifies RED "OPEN" light is LIT and GREEN "CLSD" light is DARK. ***CUE: Valve 1BB-61B RED pushbutton is depressed, RED "OPEN" light is LIT and GREEN "CLOSED" light is DARK on MC-10.**** COMMENTS: *f. Close 1BB-149B (S/G 1C Bldwn Cont Isol Byp) STANDARD: Operator depresses "CLSD" pushbutton for 1BB-149B on MC-10 and verifies RED "OPEN" light is DARK and GREEN "CLSD" light is LIT. ***CUE: Valve 1BB-149B GREEN pushbutton is depressed, RED "OPEN" light is DARK and GREEN "CLOSED" light is LIT on MC-10.**** COMMENTS: *g. Slowly open "S/G C BLDWN FLOW CTRL" until flow is indicated. STANDARD: On MC-04, operator rotates controller positioner clockwise and looks for BLACK needle to increase above zero GPM flow. **EXAMINER NOTE: The flow is indicated on the BLACK needle and "demanded" position is the RED needle.** ***CUE: "S/G C BLDWN FLOW CTRL" positioner has been rotated clockwise. The BLACK needle reads 10 gpm.**** COMMENTS: h. Do not continue until 10 minutes has elapsed. STANDARD: Operator checks time and waits for 10 minutes before continuing. **EXAMINER CUE: 10 minutes have elapsed.** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 7: (step 7 continued) Step 7 i Verify blowdown system – PREVIOUSLY ALIGNED FOR COLD WATER INJECTION STANDARD: Operator asked for history of Blowdown system alignment. When noted, operator goes to RNO for actions. **EXAMINER CUE: The blowdown system was not aligned for Cold Water Injection.** COMMENTS: *I RNO. WHEN "S/G BLOWDOWN TANK LEVEL LO" alarm (OAC POINT D1880) (28% level on local gauge) clears, THEN restart the BB pump. STANDARD: Operator locates OAC POINT D1880 to determine that "S/G BLOWDOWN TANK LEVEL LO" is not in alarm. Restarts 1A BB pump by depressing the RED "ON" pushbutton verifying the RED "ON" light is LIT and GREEN "OFF" light is DARK on MC-04 **EXAMINER CUE: 1A BB pump was previously running and should be restarted.** ***CUE: OAC POINT D1880 "S/G BLOWDOWN TANK LEVEL LO" is not in alarm. On MC-04, 1A Blowdown pump RED "ON pushbutton has been depressed, the RED "ON" light is LIT and GREEN "OFF" light is DARK.**** COMMENTS: *j. Throttle "S/G C BLDWN FLOW CTRL" to maintain flow as required from Step 6. STANDARD: On MC-04, operator rotates controller positioner clockwise and looks for RED needle to no more than 100 GPM flow. **EXAMINER NOTE: The flow is indicated on the BLACK needle and "demanded" position is the RED needle. The OAC displays a flowrate also.** ***CUE: "S/G C BLDWN FLOW CTRL" positioner has been rotated clockwise. The BLACK needle reads 100 gpm.**** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

STEP 8: IF required, THEN shift blowdown operating modes. STANDARD: No change is mode to the operating modes. ***EXAMINER CUE: No change will be made to the operating mode.*** COMMENTS:	___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIATING CUES:

EP/1/A/5000/ES-3.2 (Post-SGTR Cooldown Using Blowdown) has been implemented following a tube rupture on S/G 1C. As BOP you are directed to establish blowdown from the ruptured S/G using Enclosure 6 of EP/ES-3.2.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

DRAFT

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/SIM-4

Respond to a loss of normal feedwater

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Respond to a loss of normal feedwater.

Alternate Path: YES

Facility JPM #: NEW

K/A Rating(s): Safety Function 4(Secondary) SYSTEM 059 A2.07 (3.0/3.3)

Task Standard:

Determine the loss of normal feedwater, insert a manual reactor trip and perform manual actions to close the main turbine control valves.

Preferred Evaluation Simulator:

Control Room __X____ In-Plant ____

Preferred Evaluation Perform

Perform __X___ Simulate _____

References:

OP/1/A/6100/001 (Controlling Procedure for Unit Startup Enclosure 4.1 Revision 208
AP/1/A/5500/006 (Loss of S/G Feedwater) Revision 034
EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) Revision 024

Validation Time: 10 min. **Time Critical:** NO

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Candidate: _____ Time Start: _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

Simulator Setup

1. Init to IC set for swapping to the CF nozzles
2. Increase turbine to meet the requirements of OP/1/A/6100/001 Enclosure 4.1 Step 2.186 to achieve a LIT status for the CF NOZZLE status lights of all steam generators.
3. Insert **OVR-CF039B,** S/G B CF/CA Nozzle Swap Perm Light CF Nozz LT, Value = **0**
4. Insert **MAL-EHC002**, Turbine Trip Failure, Value = **2** (BOTH)
5. Insert **OVR-FWP012C**, VALUE = **1** TRIGGER = **1** (This will trip the feed pump)
6. Stabilize snap and write to IC set ___118_____

SIMULATOR OPERATOR ACTIONS

1. When JPM Step 4 is performed, candidate will check CM-839, then insert Trigger 1

Tools/Equipment/Procedures Needed:

OP/1/A/6100/001 (Controlling Procedure for Unit Startup Enclosure 4.1 pages 54 to 57 Revision 208

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 in staring up and at 20% power.
- Turbine is in "HOLD" to swap to the main feedwater system nozzles.

INITIATING CUES:

The SRO has directed you to complete OP/1/A/6100/001, Controlling Procedure for Unit Startup, Enclosure 4.1 step 2.188 for an automatic transfer to the main CF nozzles. All enclosure actions up to this step have been completed.

START TIME: _____

STEP 1: Step 2.188: IF automatic transfer from the CA nozzle to the CF nozzle is desired, do the following: STANDARD: From initial conditions, candidate begins here for automatic transfer. COMMENTS:	___ SAT ___ UNSAT
NOTE: The Nozzle Swap Permissive lights are lit by 1CF-100 (S/G CA Nozz Tempering Ctrl) being open, 1CM-839 (S/G Warming Isol to Cond 1A) being closed and the Feedwater Isolation Valve for the S/G being closed.	
STEP 2: For S/G 1A: Step 2.188.1.1: Check that the "CF NOZZLE" light on "S/G 1A Nozzle Swap Permissive" is lit. STANDARD: Candidate checks the "CF NOZZLE" light on "S/G 1A Nozzle Swap Permissive" is lit on MC-02. ***CUE: "CF NOZZLE" light on "S/G 1A Nozzle Swap Permissive" on MC-02 is lit.*** COMMENTS: Step 2.188.1.2: IF the "CF NOZZLE" light is NOT lit, verify the following: STANDARD: The light is LIT from the previous step action and is not performed. COMMENTS: Step 2.188.1.3: Press the "CF Nozzl" on "S/G 1A Nozzle Swap Select" STANDARD: Pushbutton for "CF Nozzl" depressed on MC-02 for S/G 1A. ***CUE: "CF Nozzl" pushbutton depressed on MC-02 for S/G 1A.*** COMMENTS:	___ SAT ___ UNSAT

STEP 3: Step 2.188.1.4: Verify the following:.

C. 1CF-90 (S/G 1A CF Cont Isol Byp Ctrl) closes

STANDARD: Candidate verifies on MC-02 that 1CF-90 GREEN CLOSE light is LIT and RED OPEN light is dark.

CUE: 1CF-90 GREEN CLOSE light is LIT, and RED OPEN light is dark on MC-02.

COMMENTS:

___ SAT

___ UNSAT

B. 1CF-33 (S/G 1A CF Cont Isol) opens

STANDARD: Candidate verifies on MC-02 that 1CF-33 GREEN CLOSE light is DARK and RED OPEN light is LIT.

CUE: 1CF-33 GREEN CLOSE light is DARK, and RED OPEN light is LIT on MC-02.

COMMENTS:

C. 1CA-149 (S/G 1A CF Byp to CA Nozzle) closes

STANDARD: Candidate verifies on MC-02 that 1CF-149 GREEN CLOSE light is LIT and RED OPEN light is DARK.

CUE: 1CF-149 GREEN CLOSE light is LIT, and RED OPEN light is DARK on MC-02.

COMMENTS:

STEP 4:	For S/G 1B: (step 2.188.2)	___ SAT
	Step 2.188.2.1: Check that the "CF NOZZLE" light on "S/G 1B Nozzle Swap Permissive" is lit.	
STANDARD:	Candidate checks the "CF NOZZLE" light on "S/G 1A Nozzle Swap Permissive" is DARK on MC-02.	___ UNSAT
	***CUE: "CF NOZZLE" light on "S/G 1B Nozzle Swap Permissive" on MC-02 is DARK.**	
	COMMENTS:	
	Step 2.188.2.2: IF the "CF NOZZLE" light is NOT lit, verify the following:	
STANDARD:	Candidate checks these valves: 1CF-100 (S/G CA Nozz Tempering Ctrl) – OPEN 1CM-839 (S/G Warming Isol to Cond 1A) – CLOSED 1CF-42 (S/G 1B CF Cont Isol) – CLOSED	
	1CF-100 (S/G CA Nozz Tempering Ctrl) is open	
STANDARD:	Candidate verifies on MC-02 that 1CF-100 GREEN CLOSE light is DARK and RED OPEN light is LIT.	
	***CUE: 1CF-100 GREEN CLOSE light is DARK, and RED OPEN light is LIT on MC-02.**	
	COMMENTS:	
	1CM-839 (S/G Warming Isol to Cond 1A) is closed	
STANDARD:	Candidate verifies on MC-02 that 1CM-839 GREEN CLOSE light is LIT and RED OPEN light is DARK.	
	***CUE: 1CM-839 GREEN CLOSE light is LIT, and RED OPEN light is DARK on MC-02.**	
	COMMENTS:	
EXAMINER NOTE: **As soon as S/G 1B Nozzle Swap button is depressed, the loss of feedwater will occur.** **All the remaining actions are Immediate Actions from AP-06 and EP-E-0**		

STEP 5: 2.188.2.3 Press the "CF NOZZL" on "S/G 1B Nozzle Swap Select" STANDARD: Candidate depresses the "CF NOZZL" on "S/G 1B Nozzle Swap Select" on MC-2	___ SAT ___ UNSAT
STEP 6: 1A CFPT trips and Annunciator 1AD-5 A/1 is LIT STANDARD: Per the Immediate actions of AP/06 Case I, Loss of CF Supply to S/Gs, candidate must verify reactor power. The candidate determines power is NOT less than 5% and performs a manual reactor trip by rotating the "RX TRIP TRN A" and "RX TRIP TRN B" handles counter-clockwise on MC-01. ***CUE: "RX TRIP TRN A" and RX TRIP TRN B" handles have rotated counter clockwise.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 7: E-0 Step 2: Verify Reactor Trip: (E-0, Step 2) • All rod bottom lights – LIT • All reactor trip and bypass breakers – OPEN • I/R amps – DECREASING STANDARD: Candidate determines that all rod bottom lights are lit, all reactor trip and bypass breakers are open and I/R amps are decreasing. ***CUE: All rod bottom lights are lit, all reactor trip and bypass breakers are open and I/R amps are decreasing.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 8: E-0 Step 3 Verify Turbine Trip: • All turbine stop valves – CLOSED OR • Both of the following: • All MSIVs - CLOSED • All MSIV bypass valves - CLOSED. STANDARD: Candidate determines that the turbine is not tripped and performs Step 2 RNO. ***CUE: Turbine stop valves are not closed.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9: E-0, Step 3. RNO a: Manually trip the turbine. STANDARD: Candidate depresses the manual trip pushbutton on the turbine control panel and determines that the turbine has not tripped by observing that the turbine stop valves still indicate open on DEH graphics. ***CUE: The manual trip pushbutton on the turbine control panel has been depressed. The turbine stop valves indicate open.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.*

STEP 10: E-0 Step 3 RNO b: IF turbine will not trip, THEN: Depress the "MANUAL" pushbutton on the turbine control panel. STANDARD: "MANUAL" pushbutton depressed. ***CUE: "Manual" pushbutton on control panel depressed.**. COMMENTS: *Rapidly unload turbine by simultaneously depressing the "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons. STANDARD: Both "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons depressed and held down to reduce load on control panel. ***CUE: Both "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons depressed.** COMMENTS: IF turbine will not runback, THEN. STANDARD: Candidate determines that the turbine is unloading and Megawatts are zero and control valves are closed on DEH graphics. ***UE: Megawatts are zero and control valves are closed.*** COMMENTS: **EXAMINER CUE: Another operator will perform the remaining required actions.**	**CRITICAL STEP** ___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Unit 1 in staring up and at 20% power.
- Turbine is in "HOLD" to swap to the main feedwater system nozzles.

INITIATING CUES:

The SRO has directed you to complete OP/1/A/6100/001, Controlling Procedure for Unit Startup, Enclosure 4.1 step 2.188 for an automatic transfer to the main CF nozzles. All enclosure actions up to this step have been completed.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM/SIM-5

Align the NS System to Cold Leg Recirculation

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Align the NS System to Cold Leg Recirculation

Alternate Path: YES

Facility JPM #: 2003 NRC Repeat (OP-CN-ECCS-NS-101)

K/A Rating(s): Safety Function 5 SYSTEM 026 A2.04 (3.9/4.2)

Task Standard:

NS Pump1B is in operation with its suction aligned to the containment sump and proper RN flow established to the NS 1B NS heat exchanger.

Preferred Evaluation Location:

Simulator ___X___ In-Plant _____

_____

Preferred Evaluation Method:

Perform ___X___ Simulate

References:

EP/1/A/5000/ES-1.3 (transfer to Cold Leg Recirculation) Enclosure 2; Revision 15

Validation Time: 6 min. **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

SIMULATOR SET-UP SHEET

1. Reset to any power IC set.
2. Ensure RN Pump 1A is NOT in service.
3. Insert the following:

   - **MAL-NC013B** (Cold Leg Leak) set malfunction value = **27.0**.
   - **MAL-RN003A** (Nuclear Service Water Pump 1A Failure) Value = **BOTH**.
   - **MAL-NS001B** (Containment Spray Pump 1B Failure) Value = **AUTO**
   - **VLV-NI038F** (NI-185A CNMT Sump Line 1A ISO (Stem) Fail To Position) Value = **0**.

4. Run the simulator until the "FWST LO-LO LEVEL" alarm is received while performing all required actions of EP/E-0, EP/E-1 and EP/ES-1.3 up through step 7a by stopping NS pumps.

5. Freeze the simulator and write snap.

Selected IC 114

SIMULATOR OPERATOR INSTRUCTIONS:

None required.

Tools/Equipment/Procedures Needed:

Have enough copies of EP/1/A/5000/ES-1.3 Revision 15 Enclosure 2 for each candidate.

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

EP/1/A/5000/ES-1.3, Transfer to Cold Leg Recirculation has been implemented following a LOCA. With containment pressure previously reaching 6 psig and currently above the shutdown criteria, containment spray is still required. "FWST Lo-Lo Level" alarm has been received and the NS pumps have been stopped per ES-1.3 step 7. The SRO instructs you to align NS to Cold Leg Recirculation per Enclosure 2 of EP/ES-1.3.

START TIME: _____

EP 1: 1. Align NS as follows. (Enclosure 2, Step 1) 1a. Close the following valves: • Close 1NS-20A (NS Pump 1A Suct From FWST) • Close 1NS-3B (ND Pump 1B Suct From FWST). STANDARD: Candidate depresses the GREEN "CLOSE" pushbutton for 1NS-20A (1MC-11). Verifies GREEN "CLSD" light LIT and RED "OPEN" light DARK. Candidate depresses the GREEN "CLOSE" pushbutton for 1NS-3B (1MC-11). Verifies GREEN "CLSD" light lit and RED "OPEN" light dark. ***CUE: The GREEN "CLOSED" pushbutton for 1NS-20A has been depressed. 1NS-20A RED "OPEN" light is DARK and the GREEN "CLSD" light LIT.**** ***CUE: The GREEN "CLOSED" pushbutton for 1NS-3B has been depressed. The RED "OPEN" light is DARK and the GREEN "CLSD" light is LIT.**** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: 1b. Verify 1NI-185A (ND Pump 1A Cont Sump Suct) open. STANDARD: Candidate verifies RED "OPEN" light DARK and GREEN "CLSD" light LIT for 1NI-185A (1MC-11). Transitions to Step 1.b. RNO. ***CUE: The 1NI-185A RED "OPEN" light is DARK and GREEN "CLSD" light is LIT **** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
EXMAINER NOTE: NS pump 1B will not automatically start in the next step. The candidate may attempt to start the pump at this point or may wait until directed by step JPM Step 5 (Enclosure 2, step 4).	

STEP 3: b.1) RNO: Open 1NS-1B (NS PMP 1B Suct From Cont Sump). ANDARD: Candidate depresses the RED "OPEN" pushbutton for 1NS-1B (1MC-11). Verifies RED "OPEN" light LIT, GREEN "CLSD" light DARK, Continues to Step 2. ***CUE: The RED "OPEN" pushbutton for 1NS-1B has been depressed. The RED "OPEN" light is LIT and the GREEN "CLSD" light is DARK.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 4: 2. Verify containment pressure has exceeded 3 psig. STANDARD: Candidate verifies containment pressure is greater than 3 psig on 1NSCR5040/5390 (pen 1) (1MC-9) or 1MICR5340/5350 (pen 3) (1MC-7). **EXAMINER CUE: Provide cue IF pressure is less than 3 psig. Containment Pressure has exceeded 3 psig** ***CUE: Containment pressure is greater than 3 psig.***)MMENTS:	___ SAT ___ UNSAT
STEP 5: 3. Verify containment pressure greater than 1 psig. STANDARD: Candidate verifies containment pressure is greater than 1 psig 1NSP5040/5050/5060/5070 (1MC-11) or 1NSCR5040/5390 (pen 1) (1MC-7) or 1MICR5340/5350 (pen 3) (1MC-9). ***CUE: Containment pressure is greater than 1 psig.*** COMMENTS:	___ SAT ___ UNSAT

STEP 6: 4. Ensure NS pump (s) aligned to an open containment suction valve-ON. ANDARD: Candidate determines NS Pump 1B is not running, NS Pump 1B RED "ON" light DARK and 1NI-184B RED "OPEN" light LIT and GREEN "CLSD" light DARK. Candidate depresses the RED "ON" pushbutton for NS pump 1B and verifies the RED "ON" light is LIT and the GREEN "OFF" light is DARK. **EXAMINER NOTE: NS pump 1B may have been started in JPM Step 3 (Enclosure 2, step 1.b. RNO).** ***CUE: The RED "ON" pushbutton for NS pump 1B has been depressed. The RED "ON" light is LIT and the GREEN "OFF" light is DARK.**** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 7: 5. Verify all Unit 1 and Unit 2 RN pumps on. STANDARD: Candidate verifies RN Pump 1A RED "ON" light is DARK and the GREEN "OFF" light is LIT. RN Pump 1B RED "ON" light LIT with pump current at midscale on ammeter, RN Pump 2A RED "ON" light LIT and RN Pump 2B RED "ON" light LIT. Candidate transitions to step 5 RNO and goes to Step 7. *:UE:* • *The RED "ON" light for RN pump 1A is DARK, and the GREEN "OFF" light is LIT* • *The RED "ON" light for RN pump 1B is LIT, and the GREEN "OFF" light is DARK.* • *The RED "ON" light for RN pump 2A is LIT, and the GREEN "OFF" light is DARK.* • *The RED "ON" light for RN pump 2B is LIT, and the GREEN "OFF" light is DARK.* COMMENTS:	___ SAT ___ UNSAT

STEP 8: 7. Align RN to NS HX(s) based on RN and NS pumps status: a. Verify NS Pump 1A on: STANDARD: Candidate determines that NS pump 1A is not running and transitions to Step 7.a. RNO ***CUE: NS pump 1A RED :ON" light is DARK and the GREEN "OFF" light is LIT.** COMMENTS: 7a.RNO: Perform the following: 1) IF only one B Train RN pump is on, THEN close 2RN-47A (RN Supply X-Over) STANDARD: Candidate determines that BOTH B Train RN pumps are running. Continues to step 7. RNO a.2) ***CUE. RN pump 1B RED :ON" light is LIT and GREEN "OFF" light is DARK and RN pump 2B RED :ON" light is LIT and the GREEN "OFF" light is DARK .** COMMENTS: 7a. RNO 2) IF only B train RN pumps are on, THEN STANDARD: Candidate determines that 2A RN pump is running. Continues to step 7 RNO.a.3) ***CUE:. RN pump 2A RED :ON" light is LIT and the GREEN "OFF" light is DARK.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

STEP 9: *7a. RNO 3) Open 1RN-225B (NS HX 1B Inlet Isol). STANDARD: Candidate depresses the RED "OPEN" pushbutton for 1RN-225B (1MC-11). Verifies RED "OPEN" light is LIT and the GREEN "CLSD" light is DARK. ***CUE: The RED "OPEN" pushbutton for 1RN-225B has been depressed. 1RN-225B RED "OPEN" light LIT and GREEN "CLSD" light DARK*** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT
*7a. RNO 4) Throttle open 1RN-229B (NS HX Outlet Isol) to obtain one of the following: • 4600 GPM flow through NS Hx 1B OR • 1RN 229B full open STANDARD: Candidate depresses RED "OPEN" pushbutton for 1RN-229B until flow meter for 1B NS HX (1RNP5850 on 1MC-9) indicates 4600 gpm or 1RN-229B is fully open, with the RED "OPEN" light LIT and the GREEN "CLSD" light DARK. ***CUE: The RED "OPEN" pushbutton for 1RN-229B has been depressed. 1RN-229B RED "OPEN" light LIT and GREEN "CLSD" light DARK*** COMMENTS:	
7a RNO 5) Go to Step 8	

STEP 10.: 8. Verify adequate RN heat sink as follows: RN system suction aligned to Lake Wylie STANDARD: Verifies RN pump suctions open from Lake Wylie: RED "OPEN" lights lit and GREEN "CLSD" lights dark: • 1RN-1A RED "OPEN" light LIT and GREEN "CLSD" light DARK: • 1RN-2B RED "OPEN" light LIT and GREEN "CLSD" light DARK • 1RN-5A RED "OPEN" light LIT and GREEN "CLSD" light DARK • 1RN-6B RED "OPEN" light LIT and GREEN "CLSD" light DARK ***CUE:*** • ***1RN-1A RED "OPEN" light LIT and GREEN "CLSD" light DARK*** • ***1RN-2B RED "OPEN" light LIT and GREEN "CLSD" light DARK*** • ***1RN-5A RED "OPEN" light LIT and GREEN "CLSD" light DARK*** • ***1RN-6B RED "OPEN" light LIT and GREEN "CLSD" light DARK*** COMMENTS:	___ SAT ___ UNSAT
STEP 11: 8. RN essential header temperatures at one of the following locations- LESS THAN OR EQUAL TO 82.5°F.: • 1MC-9 OR • RO Logbook STANDARD: Candidate determines from either 1RNP5000 or 1RNP5010 that RN essential header temperature is approximately 69 °F. or determines temperature from RO Logbook. ***CUE: RN essential header temperature is 69°F.**** COMMENTS:	___ SAT __ UNSAT
This JPM is complete.	

TIME STOP: _____

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.*

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIATING CUE:

EP/1/A/5000/ES-1.3, Transfer to Cold Leg Recirculation has been implemented following a LOCA. With containment pressure previously reaching 6 psig and currently above the shutdown criteria, containment spray is still required. "FWST Lo-Lo Level" alarm has been received and the NS pumps have been stopped per ES-1.3 step 7. The SRO instructs you to align NS to Cold Leg Recirculation per Enclosure 2 of EP/ES-1.3.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/SIM-6

Restore power to Blackout Buss 1FTA from 1ETA

CANDIDATE _____

EXAMINER

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Restore power to Blackout Busses 1FTA from 1ETA.

Alternate Path: YES

Facility JPM #: NEW

K/A Rating(s): Safety Function 6 APE: 056 AA1.28 (3.1/3.1)

Task Standard:

Restart both trains of ND pumps, select the "THROT" position to establish manual control of temperature through 1NI-173A and 1NI-178B, and restore power to 1FTA from 1ETA.

Preferred Evaluation Simulator:

Control Room __X____ In-Plant ____

Preferred Evaluation Perform

Perform __X____ Simulate _____

References:

AP/1/A/5500/007 Loss of Normal Power Case I, Loss of Normal Power to an Essential Train Revision 38

Validation Time: 15 min. **Time Critical:** NO

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT ____ Performance Time _____

Examiner: _____

_____/_____
NAME SIGNATURE

DATE

==========

COMMENTS

_____

_____

_____

SIMULATOR SETUP SHEET

1. Init to IC #36

2. Setup the power failure as follows:
   a. Start the temporary VI compressor, **LOA-VI011,** Value = **ON**
   b. Insert **LOA-EP075** (Rackout FTA B/O ALT FDR from ETA) Value = **Rackout**
   c. Then Insert **MAL-EP01C** (Loss of Red and Yellow Switchyard busses) Value = **0**
   d. Set utility video to ND graphic on MC-2

3. When both diesels have re-energized ETA and ETB and Incore CETs read 190 °F then go to freeze.

   Both trains of ND have shutdown with the power loss. AP-07 Case 1 will reset the sequencer and have the operator restart both trains

4. Write to Protected IC.

SNAP No.: 117

SIMULATOR OPERATOR INSTRUCTIONS:

1. **WHEN** the 1A and 1B D/G load sequencers are reset in STEP 8c, **THEN** insert **LOA-EP075** Value = **RACKIN.**

2. **WHEN** an NLO is tasked to open the 1LXI-4B breaker, insert **LOA-EP077,** Value = OPEN.

3. **WHEN** an NLO is tasked to close the 1LXI-4B breaker, insert **LOA-EP077**, Value = CLOSE

Tools/Equipment/Procedures Needed:

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is shutdown in Mode 5.
- Both trains of ND were in service maintaining a slight 18°F/hr cooldown rate.
- Core Exit thermocouples were 157 °F

INITIATING CUES:

A station blackout has occurred and the ND systems have shutdown on the power loss. Both diesels have started and are carrying their respective essential busses. The Control Room SRO instructs you to use AP1/A/5500/007 (Loss of Normal Power) Case 1 steps 1 through step 9 to restore the electrical systems.

START TIME: _____

EP 1: 1: Monitor Enclosure STANDARD: Candidate reads step 1. **EXAMINER CUE: The extra BOP will monitor Enclosure 1.** COMMENTS:	___ SAT ___ UNSAT
EXAMINER NOTE: ETA and ETB undervoltage status lights are no longer the sole method to verify buss status. The operators may use them but also can use a valve powered from the affected buss. STEP 2: 2: Verify affected busses energized. STANDARD: Candidate locates valves and other components powered by respective ETA and ETB to verify the lights are lit. ****CUE:* "A" and "B" train powered component lights are lit.** COMMENTS:	___ SAT ___ UNSAT

****Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.***

STEP 3: 3: Verify proper diesel generator operation as follows: a. Dispatch operator to affected D/G rooms to monitor operation. Refer to OP/1/A/6350/002. STANDARD: Candidate dispatches one operator to each D/G in operation to monitor per the operating procedure. **EXAMINER CUE: Two NLO's have been dispatched to monitor diesel generator operation per the OP.** 3b: Verify RN cooling flow to the affected D/G. STANDARD: Candidate locates 1A and 1B D/G HX Outlet Flow on MC-9 (1RNP5930 and 1RNP5980) and verifies flow is indicated. (Normal is about 1300 GPM) ***CUE: 1A and 1B D/G HX Outlet Flows on MC-9, 1RNP5930 and 1RNP5980, read 1250 GPM each.*** COMMENTS:	___ SAT ___ UNSAT
STEP 4: 4: Stop any dilutions in progress. STANDARD: At MC-10, charging and makeup controls, candidate verifies no makeup's are in progress. M/U pumps are off. ***CUE: Makeup system is not in operation.*** COMMENTS:	___ SAT ___ UNSAT
STEP 5: 5: Verify CA Pump #1 is ON. STANDARD: Candidate may request actual plant status of the CA system. For Mode 5, CA pump #1 is not aligned for standby readiness. Candidate should continue in AER column of AP-07. COMMENTS:	___ SAT ___ UNSAT

STEP 6: 6: Maintain reactor power less than or equal to 100%. ANDARD: Candidate knows from initial conditions, unit is in Mode 5. COMMENTS:	___ SAT ___ UNSAT
STEP 7: 7: Verify S/I has Actuated STANDARD: Candidate locates "SAFETY INJECTION ACTUATED" status light on SI-13 is dark and goes to Step 8. ***CUE: "SAFETY INJECTION ACTUATED" status light on SI-13 is dark.*** COMMENTS:	___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 8:	8 Verify ND System status as follows: 8a Verify ND on affected train previously operating in RHR mode.	**CRITICAL STEP** ___ SAT
STANDARD:	Candidate acknowledges both trains of ND previously in RHR mode per initial cue.	
	8b Verify AP/1/A/5500/019, Loss of Residual Heat Removal System NOT Implemented.	___ UNSAT
STANDARD:	Candidate acknowledges that AP-19 has not been implemented per SRO instructions to use AP-07 for the Loss of Normal power.	
	8c Reset affected D/G load sequencer.	
STANDARD:	Candidate locates 1A and 1B D/G Load Sequencer RESET pushbutton and depresses and verifies the YELLOW "RESET" lights are lit on MC-11 under the plexiglass covers.	
CUE: 1A and 1B D/G Load Sequencer RESET pushbuttons have been depressed and the RESET lights are LIT on MC-11		
	8d Restart previously operating ND pump.	
STANDARD:	Candidate locates 1A and 1B ND pushbuttons and depresses the RED ON button for each. Verifies the RED ON lights are lit and amps indicated on ND pump meters. May also verify flow is indicated on ND FLOW TO C-LEGS: 1NDP5190 and 1NDP5180.	
CUE: ND pump 1A and 1B ON pushbuttons have been depressed, the RED ON lights are lit and ND FLOW to C-LEGs indicate flow.		
COMMENTS:		

STEP 9: 9: Verify B/O busses are energized as follows: 9a: 1AD-11 K/3 "4KV B/O BUS FTA VOLTAGE LO" - DARK STANDARD: Candidate determines that 1AD-11 K/3 is LIT. And enters Step 9 RNO column. ***CUE: 1AD-11 K/3 "4KV B/O BUS FTA VOLTAGE LO" is LIT.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9 continued: *9a1) RNO: IF ND pump 1A is operating in RHR mode then: a): Place the "PWR DISCON FOR 1NI173A" in "THROT" STANDARD: Candidate determines the previous lineup on MC-11 rotates the power disconnect switch for 1NI-173A to the "THROT" position ***CUE: On MC-11switch "PWR DISCON FOR 1NI173A" is rotated to the "THROT" position.*** COMMENTS: *B): Throttle 1NI-173A to stabilize NC temperature. STANDARD: Temperature is monitored and 1NI-173A adjusted as needed. **EXAMINER NOTE: The temperatures available to the operator are OAC points for Wide range Tcold, Thots, ND heat exchanger Inlet and Outlet temperatures, and RVLIS incore thermocouples. ND heat exchanger inlet is normally used.** **EXAMNIER CUE: WHEN candidate selects "THROT" and begins to monitor temperature, provide cue: Temperature increase has stopped and is stabilizing.** ***CUE: On MC-11 pushbutton for 1NI-173A has been adjusted to establish flow. NC temperature has stabilized.*** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

STEP 9 continued: *9a2) RNO: IF ND pump 1B is operating in RHR mode then: a): Place the "PWR DISCON FOR 1NI178B" in "THROT" STANDARD: Candidate determines the previous lineup and on MC-11 rotates the power disconnect switch for 1NI-178B to the "THROT" position ***CUE: On MC-11switch "PWR DISCON FOR 1NI178B" is rotated to the "THROT" position.*** COMMENTS: *B): Throttle 1NI-178B to stabilize NC temperature. STANDARD: Temperature is monitored and 1NI-178B adjusted as needed. **EXAMINER NOTE: The temperatures available to the operator are OAC points for Wide range Tcold, Thots, ND heat exchanger inlet and Outlet temperatures, and RVLIS incore thermocouples. ND heat exchanger inlet is normally used.** **EXAMNIER CUE: WHEN candidate selects "THROT" and begins to monitor temperature, provide cue: Temperature increase has stopped and is stabilizing.** ***CUE: On MC-11 pushbutton for 1NI-178B has been adjusted to establish flow. NC temperature has stabilized.*** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9 continued: 9a3 RNO: Ensure breaker "FTA B/O NORM FDR FRM ATC" OPEN. STANDARD: On MC-11 candidate locates "FTA B/O NORM FDR FRM ATC" and verifies the green OPEN light is LIT. ***CUE: On MC-11, "FTA Blackout Normal Feeder From ATC" green OPEN light is LIT.*** COMMENTS:	___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 9 continued: 9a4 RNO: Dispatch operator to open 1LXI-4B (SB-594 U-V, 29-30). STANDARD: Candidate contacts an NLO to locally open 1LXI-4B in the service building location. **EXAMINER CUE: I understand to locally open the 1LXI-4B breaker.** COMMENTS:	___ SAT ___ UNSAT
STEP 9 continued: 9a5 RNO: IF S/I has actuated..... STANDARD: On SI-13, candidate notes that the Safety Injection Actuated status light is dark. ***CUE: On SI-13, "SAFETY INJECTION ACUTATED" light is dark.*** COMMENTS:	___ SAT ___ UNSAT
STEP 9 continued: 9a6 RNO: Reset "D/G 1A LOAD SEQ RESET". STANDARD: From step 8c, candidate determines that the 1A sequencer is already reset. COMMENTS:	___ SAT ___ UNSAT

STEP 9 continued: 9a7 RNO: When notified by the dispatched operator that 1LXI-4B is open, Then perform the following: **EXAMINER CUE: Using time compression, the dispatched NLO has opened the 1LXI-4B breaker.** *a): Close breaker "FTA B/O ALT FDR FRM ETA" STANDARD: On MC-11 candidate locates and depressed the red CLOSE button for FTA B/O ALT FDR FRM ETA and verifies the red CLOSE light is lit. ***CUE: On MC-11 "FTA B/O ALT FDR FRM ETA" red CLOSE button has been depressed and the red CLOSE light is lit.*** COMMENTS: *b): Close breaker "ETA ALT FDR TO FTA" STANDARD: On MC-11 candidate locates and depressed the red CLOSE button for "ETA ALT FDR TO FTA" and verifies the red CLOSE light is lit. ***CUE: On MC-11 "ETA Alternate Feeder to FTA" red CLOSE button has been depressed and the red CLOSE light is lit.*** COMMENTS: *c): Dispatch operator to close 1LXI-4B (SB-594 U-V, 29-30). STANDARD: Candidate contacts an NLO to locally close 1LXI-4B in the service building location. **EXAMINER CUE: Time Compression, the NLO has closed the 1LXI-4B breaker.** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

STEP 17: 9b: 1AD-11 K/4 "4KV B/O BUS FTB VOLTAGE LO" - DARK ANDARD: Candidate determines that 1AD-11 K/4 is DARK. ***CUE: 1AD-11 K/4 "4KV B/O BUS FTB VOLTAGE LO" is DARK.*** COMMENTS:	___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Unit 1 is shutdown in Mode 5.
- Both trains of ND were in service maintaining a slight 18°F/hr cooldown rate.
- Core Exit thermocouples were 157 °F

INITIATING CUES:

A station blackout has occurred and the ND systems have shutdown on the power loss. Both diesels have started and are carrying their respective essential busses. The Control Room SRO instructs you to use AP1/A/5500/007 (Loss of Normal Power) Case 1 steps 1 through step 9 to restore the electrical systems.

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/SIM-7

Restore Adequate Nuclear Service Water Flow

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Restore adequate Nuclear Service Water flow

Alternate Path: NO

Facility JPM #: OP-CN-PSS-RN-004

K/A Rating(s): Safety Function 4(Primary) APE: 062 AK 3.03 (4.0/4.2)

Task Standard: RN pump 1A is shutdown with RN pump 1B running between 8000 and 23000 gpm.

Preferred Evaluation Simulator:

Control Room ___X___ In-Plant ____

Preferred Evaluation Perform

Perform __X___ Simulate _____

References:

AP/0/A/5500/020 (Loss of Nuclear Service Water) Case I Revision 032

Validation Time: 5 min. **Time Critical:** NO

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

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COMMENTS

_____

_____

_____

SIMULATOR SETUP SHEET

1. Init to any IC set.
2. Ensure RN pump 1A is on.
3. Stop all other operating RN pumps.
4. Insert **MAL-RN002A** (RN pump 1A strainer HI Delta P) Set Value = **100**.
5. Acknowledge alarms freeze and write a protected snap.

Write to Protected IC.

SNAP No.: 199

SIMULATOR OPERATOR INSTRUCTIONS:

None.

Tools/Equipment/Procedures Needed:

Copy of AP/0/A/5500/020 Case I

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Both units are at 100% power. RN Pump 1A is in service. "RN PMP A FLOW HI/LO" and RN PMP 1A STRAINER HI D/P" annunciators have alarmed. The SRO instructs you to respond and take appropriate actions per Case I of AP/0/A/5500/020 (Loss of Nuclear Service Water).

START TIME: _____

EP 1: 1. Start idle RN pump(s) as required. STANDARD: Candidate depresses ON pushbutton for RN Pump 1B and verifies red "ON" light is lit, pump current indicating on meter. ***CUE: RN pump 1B "ON" pushbutton is depressed, RED "ON" light is LIT, amps are indicated on meter.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: 2. Monitor enclosure 1. STANDARD: Candidate reads step. **EXAMINER CUE: An extra RO will monitor Enclosure 1.**	___ SAT ___ UNSAT
TEP 3: 3. Verify each operating RN pump discharge flow- Greater Than 8600 gpm. STANDARD: Candidate locates RN pump flow transmitters on 1MC-9: RN pump 1A (1RNP7520) reads less than 8600 gpm. RN Pump 1B (1RNP7510) reads greater than 8600 gpm. Based on meter readings, candidate continues in Step 3 RNO column. ***CUE: On MC-9, RN pump 1A discharge flow on 1RNP7520 reads 0 gpm and RN pump 1B discharge flow on 1RNP7510 reads greater than 8600 gpm.*** COMMENTS:	___ SAT ___ UNSAT

STEP 4: 3aRNO: Stop any RN pumps not required to support system operation. STANDARD: On MC-11, candidate depresses OFF pushbutton for RN pump 1A and verifies OFF light is LIT and no amps on meter. ***CUE: RN pump 1A OFF pushbutton depressed, GREEN OFF light LIT, zero amps indicated.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 5: 3bRNO: Ensure the following suction valves to lake open: • 1RN-1A (RN P/H Pit A Isol From Lake) • 1RN-2B (RN P/H Pit A Isol From Lake) • 1RN-5A (RN P/H Pit B Isol From Lake) • 1RN-6B (RN P/H Pit B Isol From Lake) STANDARD: Candidate locates 1RN-1A,1RN-2B,1RN-5A, 1RN-6B on MC-11 and verifies RED OPEN lights are LIT. ***CUE: On MC-11 1RN-1A,1RN-2B,1RN-5A, 1RN-6B RED OPEN lights are LIT*** COMMENTS:	___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 6: 3cRNO: Ensure the following essential header isolation valves for required trains open: • 1RN-67A (RN Hdr 1A Supply Isol) • 1RN-69B (RN Hdr 1B Supply Isol) • 2RN-67A (RN Hdr 2A Supply Isol) • 2RN-69B (RN Hdr 2B Supply Isol) STANDARD: Candidate locates 1RN-69A and 1RN-69B on 1MC-11 and verifies the RED OPEN lights are LIT. For 2RN-67A and 2RN-69B, candidate request valve position from Unit 2 BOP. ***CUE:1RN-69A and 1RN-69B RED OPEN lights are LIT on 1MC-11.*** **EXAMINER CUE: This is the Unit 2 BOP, 2RN-67A and 2RN-69B RED OPEN lights are LIT on 2MC-11.** COMMENTS:	___ SAT ___ UNSAT
STEP 7: 3dRNO: Ensure the following RN to RL discharge valves open: • 1RN-57A (Station RN Disch To RL Syst) • 1RN-843B (Station RN Disch To RL Syst) ANDARD: Candidate locates 1RN-57A and 1RN-843B on 1MC-11 and verifies RED OPEN lights are LIT. ***CUE: On MC-11 1RN-57A and 1RN-843B RED OPEN lights are LIT*** COMMENTS:	___ SAT ___ UNSAT

EXAMINER NOTE: These valves are open with power removed. Red collar covers state their condition. EP 8: 3eRNO: Ensure the following RL discharge valves - OPEN: • 1RL-54 (RN Sys Disch To RL Hdr A) • 1RL-62 (RN Sys Disch To RL Hdr B) STANDARD: Candidate locates 1RL-54 and 1RL-62 on 1MC-13 and notes the valve indicator lights are dark. Red collar is covering switch control and states breaker open by procedure. ***CUE: On MC-13, 1RL-54 and 1RL-62 lights are dark, red collar covering switch states breakers are open by procedure.*** COMMENTS:	___ SAT ___ UNSAT
STEP 9: 3fRNO: Ensure the following station RN discharge header crossover valves open: • 1RN-54A (Station RN Disch Hdr X-Over) • 1RN-53B (Station RN Disch Hdr X-Over) STANDARD: Candidate locates 1RN-54A and 1RN-53B on 1MC-11 and verifies RED OPEN lights are LIT. ***UE: On MC-11 1RN-54A and 1RN-53B RED OPEN lights are LIT*** COMMENTS:	___ SAT ___ UNSAT
STEP 10: 3gRNO: If either of the following conditions is met: RN cannot be aligned to the lake OR No flow indicated on operating RN pump(s). STANDARD: Candidate determines neither condition applies and continues to step 3hRNO. COMMENTS:	___ SAT ___ UNSAT

STEP 11: 3hRNO: Verify the following alarms dark: • 1AD-12, C/2 "RN PMP A STRAINER HI D/P" • 1AD-12, C/5 "RN PMP B STRAINER HI D/P" • 2AD-12, C/2 "RN PMP A STRAINER HI D/P" • 2AD-12, C/5 "RN PMP B STRAINER HI D/P" STANDARD: Candidate locates annunciators on 1AD-12 and verifies C/2 and C/5 light is dark. For 2AD-13 C/2 and C/5, candidate requests Unit 2 BOP verify dark status. ***CUE: On 1AD-12, C/2 and C/5 lights are DARK.*** ***When Unit 2 is addressed:*** **EXAMINER CUE: This is the Unit 2 BOP, 2AD-12 C/2 and C/5 lights are DARK.** COMMENTS:	___ SAT ___ UNSAT
STEP 12: 3iRNO: IF any of the previous alarms lit, THEN manually backflush affected strainer. Refer to OP/0/A/6400/006C. STANDARD: Candidate determines annunciator 1AD-12 C/2 was lit and 1A strainer must be backflushed. **EXAMINER CUE: This is the Unit 2 BOP I will backflush the 1A pump strainer.** COMMENTS:	___ SAT ___ UNSAT
STEP 13: 4. Verify each operating RN pump discharge flow- less than 23000 gpm. STANDARD: Candidate locates RN pump flow transmitter on 1MC-9: RN Pump 1B (1RNP7510) reads less than 23000 gpm. Based on meter readings, candidate continues in Step 3 RNO column. ***CUE: On MC-9, RN pump 1B discharge flow on 1RNP7510 reads less than 23000gpm.*** **EXAMINER CUE: The control Room SRO and Unit 2 BOP will complete the remaining AP20 actions.** COMMENTS:	___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIATING CUE:

Both units are at 100% power. RN Pump 1A is in service. "RN PMP A FLOW HI/LO" and RN PMP 1A STRAINER HI D/P" annunciators have alarmed. The SRO instructs you to respond and take appropriate actions per Case I of AP/0/A/5500/020 (Loss of Nuclear Service Water).

***Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.**

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM NRC/SIM-8

Place Standby Component Cooling Train In Service

CANDIDATE _____

EXAMINER _____

CATAWBA 2004 NRC
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Place Standby Component Cooling Train In Service.

Alternate Path: NO

Facility JPM #: Modified (OP-CN-PSS-KC-082)

K/A Rating(s): Safety Function 8: SYSTEM 008 A4.01 (3.3/3.1)

Task Standard:

"B" Train KC header cross-connected to "A" train KC with "1B1" Component Cooling Pump and "B" KC heat exchanger outlet valve is selected to "KC TEMP'. "1A2" KC pump is shutdown with the "A" KC heat exchanger outlet valve selected to "MINI FLOW"

Preferred Evaluation Simulator: **Preferred Evaluation Perform**

Control Room __X____ In-Plant ____ Perform __X____ Simulate

References: OP/1/A/6400/005 (Component Cooling System) Enclosure 4.3 Revision 100

Validation Time: 15 min. **Time Critical:** NO

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

COMMENTS

_____

_____

_____

SIMULATOR SETUP SHEET

1. Init to IC #11
2. Ensure 1A2 KC pump in service.
3. Close all the following valves: 1KC-2B, 1KC-18B, 1KC-53B, 1KC-228B
4. Insert **ANN-AD07-D03**, NV pump 1B Oil Cooler LO Flow, Value = **0**

Write to Protected IC.

SNAP No.: 116

SIMULATOR OPERATOR INSTRUCTIONS:

None.

Tools/Equipment/Procedures Needed:

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is operating at 100%.
- Component Cooling Train "A" is in service with "1A2" KC Pump in operation and not cross-connected to "B" train which has been under repairs.
- Maintenance on Train "B" is now complete and is ready to be placed in service.

INITIATING CUES:

The Control Room SRO instructs you to shift trains of KC with 1B1 KC Pump in service per enclosure 4.3 of OP/1/A/6400/005. The initial conditions are complete and the 1B1 KC pump has been "checked out" satisfactorily by an NLO. Independent verification will be waved during the performance of this JPM.

START TIME: _____

EP 1: To shift from KC Train 1A to KC Train 1B with the trains **NOT** cross-connected, complete the following steps: STANDARD: Operator uses enclosure 4.3 and begins with step 2.2. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: 2.2.1 Complete the following steps to ensure the RN System has minimum flow protection: 2.2.1.1 IF a Unit 2 KC Hx discharge valve is in the "MINIFLOW" position, ensure the associated inlet valve is open: • 2RN-287A (KC Hx 2A Inlet Isol) • 2RN-347B (KC Hx 2B Inlet Isol) STANDARD: Operator must inquire the status of Unit 2 KC heat exchanger discharge valve operating mode then ensure its associated inlet valve is open. **EXAMINER CUE: Unit 2B KC heat Exchanger is in miniflow and 2RN-347B is open.** 2.2.1.2 If no Unit 2 KC Hxs are available for RN Miniflow..... STANDARD: Operator N/A's step 2.1.1.2 based on cue. COMMENTS:	___ SAT ___ UNSAT
STEP 3: 2.2.2 Ensure 1RN-347B (KC Hx 1B Inlet Isol) is open. STANDARD: Candidate ensures 1RN-347B RED OPEN light is LIT on MC-11. ***CUE: 1RN-347B red OPEN light is lit on MC-11.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 4: 2.2.3 Ensure "KC HX 1B OTLT MODE" is in "KC TEMP". STANDARD: Candidate selects "KC HX 1B OTLT MODE" switch on MC-11 to the "KC TEMP" mode. ***CUE: "KC HX 1B OTLT MODE" switch on MC-11 is in the "KC TEMP" position.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
Step 5: 2.2.4 Ensure 1KC-81B (KC To ND Hx 1B Sup Isol) is closed. STANDARD: Candidate locates 1KC-81B and verifies that the GREEN "CLOSE" light is lit. ***CUE: 1KC-81B GREEN "CLOSE" light is LIT.*** COMMENTS:	___ SAT ___ UNSAT
Step 6: 2.2.5 Start either KC Train 1B pump: "KC PMP B1" or "KC PMP B2" STANDARD: Candidate depresses ON pushbutton for the 1B1 KC pump and verifies pump "ON" light is lit on MC-11. ***CUE: "ON" pushbutton has been depressed and the "ON" light is lit for 1B1 KC pump.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
Step 7: 2.2.6 Ensure 1KC-C40B (Train B Miniflow Isol) opens. STANDARD: Candidate notes that 1KC-C40B RED "OPEN" light is LIT ***CUE: 1KC-C40B RED "OPEN" light is LIT.*** COMMENTS:	___ SAT ___ UNSAT

Italicized Cues Are To Be Used Only If JPM Performance Is Being Simulated.

STEP 8: 2.2.7 Adjust the following flow controllers on 1MC11 to zero gpm flow: • 1KC-149 (KF Hx 1A Cool Wtr Otlt) • 1KC-156 (KF Hx 1B Cool Wtr Otlt) STANDARD: Candidate determines KF 1A train is in service and reduces flow to zero gpm by rotating the control knob counter clockwise using 1KC-149 and verifying the red demand needle is reading zero on MC-11. ***CUE: 1KC-149 control knob has been rotated counter clockwise and the red needle is set at 0 gpm.*** COMMENTS:	___ SAT ___ UNSAT
STEP 9: 2.2.8 IF letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), stabilize letdown hx outlet temp by placing 1KC-132 (Letdn Hx Otlt Temp Ctrl) in manual. STANDARD: Candidate depresses manual pushbutton for 1KC-132 and verifies the red manual light is lit on MC-10. ***CUE: 1KC-132 manual pushbutton has been depressed; the manual light is lit on MC-10.*** COMMENTS:	___ SAT ___ UNSAT

Step 10: 2.2.9: Open the following valves: 2.2.9.1 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol) 2.2.9.2 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) 2.2.9.3 1KC-53B (Aux Bldg Non-Ess Hdr Isol) 2.2.9.4 1KC-228B (Rx Bldg Non-Ess Hdr Isol) STANDARD: Candidate depresses the RED OPEN pushbutton for 1KC-2B and verifies the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark. ***CUE: The RED OPEN pushbutton for 1KC-2B has been depressed and the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark.*** Candidate depresses the RED OPEN pushbutton for 1KC-18B and verifies the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark. ***CUE: The RED OPEN pushbutton for 1KC-18B has been depressed and the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark.*** Candidate depresses the RED OPEN pushbutton for 1KC-53B and verifies the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark. ***CUE: The RED OPEN pushbutton for 1KC-53B has been depressed and the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark.*** Candidate depresses the RED OPEN pushbutton for 1KC-228B and verifies the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark. ***CUE: The RED OPEN pushbutton for 1KC-228B has been depressed and the RED "OPEN" light is lit and the GREEN "CLOSE" light is dark.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 11: 2.2.10 Stop all KC Train 1A pumps: "KC PMP A1" or "KC PMP A2" STANDARD: Candidate depresses OFF pushbutton for 1A2 KC pump and verifies pump "OFF" light is lit on MC-11. ***CUE: "OFF" pushbutton has been depressed and the "OFF" light is lit for 1A2 KC pump.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

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STEP 12: 2.2.11 Place "KC HX 1A OTLT MODE" in "MINIFLOW" position. ANDARD: Candidate selects "KC HX 1A OTLT MODE" switch on MC-11 to the "MINIFLOW" position. ***CUE: "KC HX 1A OTLT MODE" switch on MC-11 is in the "MINIFLOW" position.*** COMMENTS:	___ SAT ___ UNSAT
EXAMINER NOTE: Operator will mostly likely reset 1KC-149 to the initial value of about 1500 gpm. But may set also set it to the procedure step value. STEP 13: 2.2.12 Perform the following for the KF cooling loops that are in service: Adjust 1KC-149 (KF Hx 1A Cool Wtr Otlt) flow controller on 1MC-11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature <125°F. STANDARD: Candidate determines KF 1A train is in service and restores KC flow to original the value or as directed to maintain temperature by rotating 1KC-149 control knob clockwise verifying the red demand needle is reading the desired value. ***CUE: 1KC-149 control knob has been rotated clockwise and the red needle is set at 3000 gpm.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 14: 2.2.13 IF KC flow requirements is > 5700 gpm, perform the following: 2.1.13.1 Ensure 1KC-C40B (Train B Miniflow Isol) is closed. 2.1.13.2 If KC flow is > 5700 gpm, start the remaining KC Train 1B pump. STANDARD: Based on JPM step 10, candidate should not have to add a second by verifying "KC HX 1B Inlet Flow" on MC-11 reading less than 5700 gpm. ***CUE: ""KC HX 1B Inlet Flow" on MC-11 is reading 5000 gpm.*** COMMENTS:	___ SAT ___ UNSAT

STEP 15: 2.2.14 IF letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), WHEN KC flow and temperature have stabilized, return 1KC-132 (Letdn Hx Otlt Temp Ctrl) to automatic. STANDARD: Candidate verifies KC system flow and temperature parameters on MC-11 and depresses automatic pushbutton for 1KC-132 and verifies the red auto light is lit on MC-10. ****CUE: KC flow and temperature have stabilized. (WHEN Identified; then CUE: 1KC-132 auto pushbutton has been depressed; the auto light is lit on MC-10.*** COMMENTS:	___ SAT ___ UNSAT
STEP 16: 2.2.15 Secure any NS Hx that was aligned for RN miniflow in step 2.2.1.2. STANDARD: Candidate determines this step was N/A'd and requires no action. COMMENTS:	___ SAT ___ UNSAT
This JPM is complete.	

TIME STOP: _____

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CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Unit 1 is operating at 100%.
- Component Cooling Train "A" is in service with "1A2" KC Pump in operation and not cross-connected to "B" train which has been under repairs.
- Maintenance on Train "B" is now complete and is ready to be placed in service.

INITIATING CUES:

The Control Room SRO instructs you to shift trains of KC with 1B1 KC Pump in service per enclosure 4.3 of OP/1/A/6400/005. The initial conditions are complete and the 1B1 KC pump has been "checked out" satisfactorily by an NLO. Independent verification will be waved during the performance of this JPM.

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