Draft Submittal

OCONEE JUNE 2005 EXAM
50-269, 270, & 287/2005-301

JUNE 20 - 24, 2005
JUNE 30, 2005 (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: **Oconee** Date of Examination: **June, 2005**

Examination Level (circle one): RO / **SRO** Operating Test Number: ________

Administrative Topic	Describe activity to be performed
Conduct of Operations GEN 2.1.19 (3.0/3.0) **M, S**	**CRO-037, Calculate An Estimated Critical Rod Position** PT/1/A/1103/15, Reactivity Balance **(SRO only)** (17 min)
Conduct of Operations GEN 2.1.1 (3.7/3.8) **N**	**Admin-111, Perform the required Actions to Enter and Exit the SFP Area** (Performed in conjunction with JPM NLO-039.) (5 min)
Equipment Control GEN 2.2.18 (2.3/3.6) **N**	**Admin-203, Complete Plant Configuration Sheet (Calculate Time to Core Boil)** S. D. 1.3.5 Attachment 9.3A **(SRO only)** (group activity) (11 min)
Radiation Control GEN 2.3.4 (2.5/3.1) **N**	**Admin-302, Calculate the Maximum Permissible Stay Time Within Duke Power Basic Administrative Limits** (group activity) (11 min)
Emergency Plan GEN 2.4.38 (2.2/4.0) **N**	**Admin-405, Determine Emergency Classification and Protective Action Recommendations** **(SRO only)** (group activity) (20 min)

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

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

Facility: **Oconee** Date of Examination: **June, 2005**

Examination Level (circle one): **RO** / SRO Operating Test Number: ________

Administrative Topic	Describe activity to be performed
Conduct of Operations GEN 2.1.25 (2.8/3.1) **N**	**Admin-112, Calculate requirements to makeup to the BWST** EOP Encl. 5.4, Makeup to the BWST (12 min) **(RO only)**
Conduct of Operations GEN 2.1.1 (3.7/3.8) **N**	**Admin-111, Perform the required Actions to Enter and Exit the SFP Area** (Performed in conjunction with JPM NLO-039.) (5 min)
Equipment Control GEN 2.2.12 (3.0/3.4) **P S**	**Admin-202, Perform Surveillance to Verify SSF RCMUP Operability** PT/600/001 Encl. 13.1 (Mode 1 & 2) (15 min) **(RO only)**
Radiation Control GEN 2.3.4 (2.5/3.1) **N**	**Admin-302, Calculate the Maximum Permissible Stay Time Within Duke Power Basic Administrative Limits** (group activity) (13 min)
Emergency Plan GEN 2.4.39 (3.3/3.1)	

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

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

Facility: **Oconee** Date of Examination: **June, 2005**

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

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

System / JPM Title	Type Code*	Safety Function
a. **CRO-107, With the Reactor Critical, Increase Power From 1.5% to 15%** [KA: 001 A3.01 (4.1/4.0)] (20 min)	D, S, L	1
b. **CRO-200, Re-establish RCP Seal Injection and Normal RCS Makeup following loss of operating HPI Pump,** AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection [KA: APE 022 AA1.01 (3.4/3.3)] (15 min)	D, S	2
b. **CRO- 075, Initiate Automatic Pressurizer Spray (spray valve fails open with closed indication)** OP/1103/05, Pressurizer Operation, Encl. 4.1 [KA: 010 A2.02 (3.9/3.9)] (12 min)	D, A, S	3
c. **CRO-96, Align ECCS Suction From Emergency Sump (1LP-21 Fails to Close)** EOP, Enclosure 5.12 [KA:BW/E08 EA1.1 (4.0/3.7)] (PRA) (15 min)	M, A, S	4P
d. **CRO-017, Re-establish Main FDW Flow From Condensate Booster Pump Flow** EOP, LOHT Tab [APE-054 AK3.04 (4.4/4.6)] (15 min)	M, S	4S
e. **CRO-601, Synchronization with the grid following a load rejection** AP/1, Load Rejection [062 A4.07 (3.1*/3.1*) (10 min)	D, S	6
f. **CRO-700, Place ICS In Auto following Loss Of Auto Power** AP/23, Loss of ICS Power [KA: BW/A02 AA1.1 (4.0/3.8)] (20 min)	D, A, ~~S~~, P	7
g. **CRO-800, Perform Required Actions for an Intake Canal Dam Failure** AP/13, Dam Failure [KA: 075 A2.01 (3.0*/3.2)] (20 min)	N, S	8

	In-Plant Systems (3 for RO; 3 or SRO-I; 3 or 2 for SRO-U)		
16	h. **NLO-039, Prime The Spent Fuel Pool Fill Line** EOP Encl. 5.7, HPI Pump Operations from ASW Pump Switchgear [KA: APE022 AK3.02 (3.5/3.8)] (16 min)	D, R, P	2
16	i. **NLO-700, Restoration of ICS AUTO Power** AP/23 (Loss of ICS Power) Encl. 5.2, Restoration of ICS AUTO Power [KA: APE BW/A02 AK3.2 (3.7/4.0)] (16 min)	N, A, E	7
12	j. **NLO-037, Place A Control Battery Charger In Service** OP/1107/010, Removal From Service and Restoration To Service of Control Charger [KA: 063 K1.03 (2.9/3.5)] (12 min))	D	6

@	All control (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: **Oconee** Date of Examination: **June, 2005**

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

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

System / JPM Title	Type Code*	Safety Function
a. **CRO-107, With the Reactor Critical, Increase Power From 1.5% to 15%** [KA: 001 A3.01 (4.1/4.0)] (30 min)	D, S, L	1
b. **CRO-200, Re-establish RCP Seal Injection and Normal RCS Makeup following loss of operating HPI Pump,** AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection [KA: APE 022 AA1.01 (3.4/3.3)] (15 min)	D, S	2
b. **CRO- 075, Initiate Automatic Pressurizer Spray (spray valve fails open with closed indication)** OP/1103/05, Pressurizer Operation, Encl. 4.1 [KA: 010 A2.02 (3.9/3.9)] (12 min)	D, A, S	3
c. **CRO-96, Align ECCS Suction From Emergency Sump (1LP-21 Fails to Close)** EOP, Enclosure 5.12 [KA:BW/E08 EA1.1 (4.0/3.7)] (PRA) (15 min)	M, A, S	4P
d. **CRO-017, Re-establish Main FDW Flow From Condensate Booster Pump Flow** EOP, LOHT Tab [APE-054 AK3.04 (4.4/4.6)] (15 min)	M, S	4S
e. **CRO-601, Synchronization with the grid following a load rejection** AP/1, Load Rejection [062 A4.07 (3.1*/3.1*) (10 min)	D, S	6
f. **CRO-700, Place ICS In Auto following Loss Of Auto Power** AP/23, Loss of ICS Power [KA: BW/A02 AA1.1 (4.0/3.8)] (20 min)	D, A, S, P	7
g. **N/A**		

In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
h. **NLO-039, Prime The Spent Fuel Pool Fill Line** EOP Encl. 5.7, HPI Pump Operations from ASW Pump Switchgear [KA: APE022 AK3.02 (3.5/3.8)] (16 min)	D, R, P	2
i. **NLO-700, Restoration of ICS AUTO Power** AP/23 (Loss of ICS Power) Encl. 5.2, Restoration of ICS AUTO Power [KA: APE BW/A02 AK3.2 (3.7/4.0)] (16 min)	N, A, E	7
j. **NLO-037, Place A Control Battery Charger In Service** OP/1107/010, Removal From Service and Restoration To Service of Control Charger [KA: 063 K1.03 (2.9/3.5)] (12 min))	D	6

@ All control (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: **Oconee** Date of Examination: **June, 2005**

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

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

System / JPM Title	Type Code*	Safety Function
a. **CRO-107, With the Reactor Critical, Increase Power and Place The ICS in Auto** [KA: 001 A3.01 (4.1/4.0)] (30 min)	D, S, L	1
c. **CRO-96, Align ECCS Suction From Emergency Sump (1LP-21 Fails to Close)** EOP, Enclosure 5.12 [KA:BW/E08 EA1.1 (4.0/3.7)] (PRA) (15 min)	M, A, S	4P
e. **CRO-601, Synchronization with the grid following a load rejection** AP/1, Load Rejection [062 A4.07 (3.1*/3.1*) (10 min)	D, S	6
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
h. **NLO-039, Prime The Spent Fuel Pool Fill Line** EOP Encl. 5.7, HPI Pump Operations from ASW Pump Switchgear [KA: APE022 AK3.02 (3.5/3.8)] (16 min)	D, R, P	2
i. **NLO-700, Restoration of ICS AUTO Power** AP/23 (Loss of ICS Power) Encl. 5.2, Restoration of ICS AUTO Power [KA: APE BW/A02 AK3.2 (3.7/4.0)] (16 min)	N, A, E	7

@ All control (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
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(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-112

Calculate requirements to makeup to the BWST

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Calculate requirements to makeup to the BWST

Alternate Path:

No

Facility JPM #:

NEW

K/A Rating(s):

System: GEN
K/A: 2.1.25
Rating: 2.8/3.1

Task Standard:

Calculate volume of CBAST and DW needed to yield the proper volume at the correct Boron concentration to makeup to the BWST.

Preferred Evaluation Location:

Simulator _____ In-Plant __X___

Preferred Evaluation Method:

Perform _____ Simulate __X__

References:
EOP Enclosure 5.4, Makeup to the BWST

Validation Time: 12 minutes

Time Critical: NO

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Candidate: ____ NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________________ NAME ____________________________________/________ SIGNATURE DATE

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COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

NONE

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
2	These calculations are required for determining the correct water volumes.

Tools/Equipment/Procedures Needed:

- EOP Enclosure 5.4, Makeup to the BWST
- OP/0/A/1108/001, Curves and General Information
- COLR

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 shutdown and cool down in progress due to a tube rupture in the 1A SG.
- SGTR tab in progress at step 112.
- Unit 1 BWST level = 38 feet
- Unit 1 BWST Boron is 2500 ppm
- 1A BHUT level = 40 inches
- 1A BHUT Boron Concentration = 240 ppm
- CBAST Boron Concentration = 12,501 ppm

INITIATING CUES:

The SRO instructs you to initiate EOP Enclosure 5.4 (Makeup to the BWST) to determine the required volumes of CBAST and DW to begin makeup to the BWST from 1A BHUT. by filling the 1A BHUT to 180" and matching the BWST Boron concentration.

START TIME: ________

STEP 1: Step 1

Determine current volume in 1A BHUT using any of the following:

- OAC graphic CS01
- BHUT Volume vs Level Curve in OP/0/A/1108/001 (Curves and General Information)

STANDARD: Refer to BHUT Volume vs Level Curve in OP/0/A/1108/001 (Curves and General Information) and determine that the volume of water in the 1A BHUT is ≈ ~~18,100~~ 13,900 gallons.

COMMENTS:

CRITICAL STEP

___ SAT

___ UNSAT

STEP 2: Step 2

Determine volume of CBAST and DW required per the following to yield a volume in 1A BHUT of 80,000 to 82,000 gals at a concentration that complies with COLR requirements for the BWST:

Cue: ~~Direct the candidate to use 81,000 gals for 1A BHUT volume and 2,500 ppm Boron for final BHUT concentration.~~

$$\frac{(BHUT_{vf} \times BHUT_{cf}) - (BHUT_{vi} \times BHUT_{ci})}{CBAST_{c,}} = \text{\# gallons of CBAST needed}$$

$$\frac{(81{,}000 \times 2{,}500) - (13{,}900 \times 240)}{12{,}501} = \mathbf{15{,}932}$$

 # gallons of CBAST needed

BHUTvf - BHUTvi - # gallons CBAST needed = # gallons of DW needed

81,000 – 13,900 – 15,930 = **51,170**

 # gallons of DW needed

STANDARD: Candidate calculates the required volumes from CBAST and DW within 500 gallons of the above calculated values.

COMMENTS:

CRITICAL STEP

___ SAT

___ UNSAT

STOP TIME: ____________

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

INITIAL CONDITIONS:

- Unit 1 shutdown and cool down in progress due to a tube rupture in the 1A SG.
- SGTR tab in progress at step 112.
- Unit 1 BWST level = 38 feet
- until BWST Boron is 2500 ppm
- 1A BHUT level = 40 inches
- 1A BHUT Boron Concentration = 240 ppm
- CBAST Boron Concentration = 12,501 ppm

INITIATING CUES:

The SRO instructs you to initiate EOP Enclosure 5.4 (Makeup to the BWST) to determine the required volumes of CBAST and DW to begin makeup to the BWST from 1A BHUT. by filling the 1A BHUT to 180", and matching the BWST Boron concentration.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. Determine current volume in 1A BHUT using <u>any</u> of the following: __ OAC graphic CS01 __ BHUT Volume vs Level Curve in OP/0/A/1108/001 (Curves and General Information).	
2. __ Determine volume of CBAST and DW required per the following to yield a volume in 1A BHUT of 80,000 to 82,000 gals at a concentration that complies with COLR requirements for the BWST: Where: $BHUT_{vf}$ = Final BHUT volume (gal) $BHUT_{vi}$ = Initial BHUT volume (gal) $BHUT_{cf}$ = Final BHUT conc (ppmb) $BHUT_{ci}$ = Initial BHUT conc (ppmb) $CBAST_c$ = CBAST conc (ppmb)	

$$\frac{(BHUT_{vf} \times BHUT_{cf}) - (BHUT_{vi} \times BHUT_{ci})}{CBAST_c} = \text{\# gallons of CBAST needed}$$

$$\frac{(\_\_\_\_ \times \_\_\_\_) - (\_\_\_\_ \times \_\_\_\_)}{\_\_\_\_} = \_\_\_\_\_\_\_\_$$

 # gallons of CBAST needed

BHUTvf - BHUTvi - # gallons CBAST needed = # gallons of DW needed

____ - ____ - ________ = ________

 # gallons of DW needed

3. __ Verify boron addition to 1A BHUT required.	__ **GO TO** Step 46.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-037

CALCULATE AN ESTIMATED CRITICAL ROD POSITION

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Calculate an Estimated Critical Rod Position

Alternate Path:

No

Facility JPM #:

CRO-037

K/A Rating(s):

System: GEN
K/A: 2.1.19
Rating: 3.0/3.0

Task Standard:

Calculated inserted rod worth must agree within ± 5%wd of attached example.

Preferred Evaluation Location: Simulator __X__ In-Plant _____

Preferred Evaluation Method: Perform __X__ Simulate ____

References:

PT/1/A/1103/15 (Reactivity Balance Procedure), Encl. 13.4 (Computerized ECP Calculation)

Validation Time: 17 minutes_ **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 OPERATOR INSTRUCTIONS:

None

Tools/Equipment/Procedures Needed:

PT/1/A/1103/15 (Reactivity Balance Procedure), Encl. 13.4 (Computerized ECP Calculation)
Computer

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 operated from 1/15/05 – 4/3/05 at 100% power

4/3/05 1000 - Reactor shutdown is commenced at 10%/hr

EFPD = 127

PRESENT CONDITIONS:

4/10/05 1400 Unit #1 Startup in progress

RCS Boron = 1417

RCS Temperature = 532°F.

Group 8 positioned at 35% withdrawn

Computer network is down

INITIATING CUES:

The Control Room SRO directs you to calculate an original estimated critical rod position for 3 hours from the present time per PT/1/A/1103/15, Reactivity Balance Procedure.

START TIME: ______

STEP 1: Step 2.1 This enclosure must be performed twice – the second is the separate verification. Circle whether this is the original or the verification. STANDARD: Candidate should circle “original” and N/A the bullet step. Continue to Step 2.2 COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 2.2 OBTAIN the power history back to the last time of Xenon equilibrium to perform the Xenon calculation form a source such as PI Server, OAC, RO Log, etc. STANDARD: The candidate will indicate that he/she will obtain a power history from one of the listed sources. Continue to Step 2.3 ***Cue: Direct the candidate to obtain power history form the JPM initial conditions.*** COMMENTS:	___ SAT ___ UNSAT
CAUTION: IF the power history information from the last equilibrium Xe/Sm condition is **NOT** input into the code, significant error may result. STEP 3: Step 2.3 ATTACH actual power history to Enclosure 13.3 STANDARD: Student indicates that he/she will attach the power history to Enclosure 13.~~4~~3 Continue to Step 2.4 **NOTE: This step is not necessary for the purposes of this JPM.** COMMENTS:	___ SAT ___ UNSAT

STEP 4:	Step 2.4 SELECT the RhoCalc icon on the Control Room PC.	___ SAT
STANDARD:	Student locates the RhoCalc icon on the Control Room PC and opens the program. Continue to Step 2.5	___ UNSAT
COMMENTS:		
STEP 5:	Choose ECP	___ SAT
STANDARD:	Student selects the ECP button	___ UNSAT
COMMENTS:		
STEP 6:	Step 2.5 Choose whether to obtain data from the network or disk.	___ SAT
STANDARD:	Student selects to run the data from the Disk. Continue to Step 2.6	___ UNSAT
COMMENTS:		

STEP 7: Step 2.6 INPUT appropriate data for the estimated critical rod position calculation. STANDARD: Candidate inserts the data given to him into the program. • Name • Power History • Current Boron Concentration • EFPD • Group 8 position **NOTE: The student must also select the desired unit. This may be done before or after entering the other data** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 8: CALCULATE the Estimated Critical Rod Position. STANDARD: The "Calculate ECP" button is pressed to run the calculation. Critical rod limits must agree within ± 12% of attached example. ***Cue: Ask candidate to print the calculation.*** COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ___________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
7	Step is necessary because the candidate needs to perform this step for the computer to calculate the ECP to determine the expected rod positions for criticality.
8	Step is necessary because the candidate needs to perform this step for the computer to calculate the ECP to determine the expected rod positions for criticality.

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

INITIAL CONDITIONS:

Unit 1 operated from 1/15/05 – 4/3/05 at 100% power

4/3/05 1000 - Reactor shutdown is commenced at 10%/hr

EFPD = 127

PRESENT CONDITIONS:

4/10/05 1400 Unit #1 Startup in progress

RCS Boron = 1417

RCS Temperature = 532°F.

Group 8 positioned at 35% withdrawn

INITIATING CUES:

The Control Room SRO directs you to calculate an original estimated critical rod position for 3 hours from the present time per PT/1/A/1103/15, Reactivity Balance Procedure.

1. Purpose

1.1 The purpose of this enclosure is to calculate an estimated critical rod position to be used during unit start up.

2. Procedure

Calculation Performed by:____ ________________

_____ 2.1 This enclosure must be performed twice - the second is the separate verification. Circle whether this is the original or the verification:

Original - Must be performed by a Licensed Operator (N/A next bullet step)

Separate Verification - Must be performed by a Qualified Reactor Engineer (N/A steps 2.9-2.12 for Separate Verification)

_____ • **<u>IF</u>** returning from a forced outage, contact Reactor Engineering to perform an RCS flow check using POWCALC.XLS. The only acceptance criteria is that measured RCS % design flow is greater than that required. RPS flows can be expected to deviate from baseline.

_____ 2.2 Obtain the power history back to the last time of Xenon Equilibrium to perform the Xenon calculation from a source such as PI server, OAC Log, RO Log, etc.

CAUTION:	**<u>IF</u>** the power history information from the last equilibrium Xe/Sm condition is **<u>NOT</u>** input into the code, significant error may result.

_____ 2.3 Attach actual power history (from OAC log, TMS, PI Server, etc.) to this enclosure.

_____ 2.4 Select the RhoCalc Icon.

_____ 2.5 Choose whether to obtain data from the network or disk. Normally, the network is used unless it is down, in which case the control copy disk of the data must be obtained to run the code.

_____ 2.6 Input appropriate data for the estimated critical rod position calculation.

_____ 2.7 Verify Separate Verifications agree on the ECP within 5%wd for each time step that has an ECP prediction.

NOTE:	For a xenon free startup the T.S. 3.1.5 limit may not be reached.

_____ 2.8 **<u>IF</u>** applicable, document below the time from this ECP when the T.S. 3.1.5 column reaches 5<0%.

Time at which the safety rods must be fully withdrawn:

_______ hours on ______(date).

_____ 2.9 Discuss the results of ECP with the unit supervisor. (N/A this step on separate verification calculation).

________________________________Unit Supervisor

_____ 2.10 Attach results of ECP to the procedure **<u>AND</u>** turn the package over to the unit supervisor. (N/A this step on separate verification calculation).

_____ 2.11 Fill in the actual critical rod configuration **<u>AND</u>** notification limit check on the computer printout. (N/A this step on separate verification calculation).

NOTE:	The GO Nuclear Design Group requires the "Procedure Completion Approved" blank to be signed off prior to transmittal.

_____ 2.12 Forward the completed ECP to Reactor Engineering for transmission to GO Nuclear Design. (N/A this step on separate verification calculation.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-111

Perform required Actions to Enter and Exit the SFP Area

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Perform required actions to enter and exit the SFP area.

Alternate Path:

NO

Facility JPM #:

New

K/A Rating(s):

Gen 2.1.1 3.7/3.8

Task Standard:

Entry into the SFP area will be performed. Performance of at least four of the five conditions is required.

Preferred Evaluation Location:

Simulator _____ In-Plant __X____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

NSD-104 (Materiel Condition/Housekeeping, Cleanliness/Foreign Material Exclusion and Seismic Concerns)

Validation Time: 5 min.

Time Critical: NO

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Candidate: ______________________________ NAME

Time Start: ________

Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: ________

Examiner: ______________________ NAME ______________________ SIGNATURE / ________ DATE

==

Comments

SIMULATOR OPERATOR INSTRUCTIONS:

NONE

Tools/Equipment/Procedures Needed:

None

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:

Entry into the Unit 1 and 2 Spent Fuel Pool area is required.

INITIATING CUE:

Enter the Unit 1 and 2 Spent Fuel Pool area and perform all the required actions.

Cue 2:

START TIME: ______

Note: The order of the following items is not critical. However they should all be performed.

STEP 1: Determine the FME requirements for entering the SFP area. STANDARD: Refer to the excerpt of NSD-104 (Materiel Condition/Housekeeping, Cleanliness/Foreign Material Exclusion and Seismic Concerns) posted on the wall outside of the SFP. Determine and perform the following: 1. Badge lanyards shall be retained by tape, snaps, or inside clothing. 2. Safety glasses shall be worn. 3. Hard hat should be removed prior to SFP entry. Conditions do not warrant its use. ***Cue: Inform the candidate that for the purposes of this JPM the candidate should stay outside the pool handrail.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: The following radiological requirements should also be performed: 4. Review the plan view prior to entry in to the SFP area. 5. Perform a whole body frisk after exiting the SFP. STANDARD: COMMENTS: **Note: Correct performance of at least four of the five items is required to pass this JPM.** **END OF TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ______

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	Items 1-3 are required to meet the FME requirements for entry into the SFP.
2	Items 4 and 5 are required to meet the radiological requirements for entry into the SFP.

Note: Correct performance of at least four of the five items is required to pass this JPM.

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

INITIAL CONDITIONS:

Entry into the Unit 1 and 2 Spent Fuel Pool area is required.

INITIATING CUE:

Enter the Unit 1 and 2 Spent Fuel Pool area and perform all the required actions.

B.3.3 OCONEE NUCLEAR STATION SAFETY, HOUSEKEEPING, AND FME STANDARDS FOR SPENT FUEL POOL AREA (PAGE 1 OF 3)

Purpose: The purpose of this standard is to prevent/minimize foreign material from entering the Spent Fuel Pool.

This is accomplished by taking only necessary materials into and around the SFP area, positively controlling those materials, and then removing them from the area as soon as possible.

At the end of each shift, remove all materials from the cleanliness zone and document results, unless approved by the Fuel Handling Supervisor or Work Execution Manager to do otherwise.

Location: SFP Building, AB 6th Floor; Inside pool handrail

Condition: Cleanliness Zone Level 3

Item	Yes	No	Comment
Hard-hat		X	
Safety Glasses		X	(1)
Life Jacket	X		(2)
Lanyards on Tools	X		(3a)
Material Logging	X		(3b)
Buddy System	X		
Pockets empty or taped	X		

1. Safety glasses are optional unless conditions warrant. IF glasses (Safety or prescription) are worn in this area, they SHALL be secured with a safety strap.
2. Life jackets required within the confines of the RCZ around the Spent Fuel Pool.

   Once the worker is within the confines of the SFP Bridge handrails, the vest may be removed, but must be secured to prevent falling into the pool.
3. Lanyards SHALL be attached to all tools.

a. All items shall be tethered PRIOR to entering the FME/Cleanliness Zone.

b. All material entering SFP Cleanliness Zone 3 SHALL be logged-in to a "Tools and Materials Accountability Logsheet".

   Exceptions to this rule are life-rings, life-vests, and poles. These items do not require tethering or logging-in.

c. A pool net shall be readily available and accessible to personnel working around the Spent Fuel Pool.

4. If foreign material is introduced into the Spent Fuel Pool, IMMEDIATELY perform the following:
   - Notify the Control Room SRO
   - Notify the FH Supervisor.
   - Notify Maintenance management

A PIP is to be initiated as soon as possible following any FME Incident or Event.

(Refer to NSD-104, Appendix C.3, "Guidelines for Recovery from Loss of FME Controls")

Procedural guidelines for retrieval of foreign material from the Spent Fuel Pool are provided in MP/0/A/1800/110 (Retrieval of Foreign Objects from Fuel Transfer Canal or Spent Fuel Pool).

5. Special precautions should be taken when working in proximity of the Spent Fuel Cooling Pump suction lines. Ropes, plastics, and rags are not permitted in close proximity to these lines.

Storage/Use of Materials in the SFP (Inside ropes)

1. Temporary storage of material in the pool (items such as Tri-Nuc vacuum filters, Incore cans, etc.) must be in accordance with NSD-501 (Temporary Storage of Radioactive Material in the Spent Fuel Pool).
2. Fuel-Handling Equipment (items such as poles, cameras, grapples, etc.) stored long-term in the SFP shall be at the discretion of the Fuel-Handling supervisor.
   a. oles on the fuel bridge should be temporarily stored on designated pole racks only.
   b. Equipment and tools shall be removed from the area upon job completion.
3. Tools/material SHALL NOT be stored inside the Electrical cabinets of the SFP Bridge.
4. Tape use is prohibited unless prior permission is granted from FH Supervisor or Work Execution Manager.
5. Tie-wraps with metal inserts SHALL NOT be used in the SFP area.

Location: SFP Building, AB 6th Floor; Outside pool handrail, including Cask Decon Pit area

Condition: Cleanliness Zone Level 4

Item	Yes	No	Comment
Badge Lanyard Restraining Devices	X		(1)
Safety Glasses	X		
Hard-hat		X	(2)
Lanyards on Tools		X	(3)
Pockets empty or taped		X	(4)
Buddy System		X	
Material Logging		X	

1. Badge lanyards shall be retained by tape, snaps, or inside clothing.
2. Hard-hats required if conditions warrant.
3. Tools will have lanyards if working in close proximity to pool handrail.
4. Pockets will be empty or taped if working in close proximity to pool handrail.

Storage of materials in the SFP Area (Outside the Ropes)

1. Equipment shall be removed from the area when job is complete, unless otherwise authorized by Fuel-Handling management.
2. Temporary Equipment stored in the Spent Fuel Pool area SHALL comply with NSD-104.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-202

Perform surveillance to verify SSF RCMUP Operability

CANDIDATE ____________________

EXAMINER ____________________

Simulator or ~~In plant~~

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Perform surveillance to verify SSF RCMUP Operability

Alternate Path:

No

Facility JPM #:

ADMIN-202

K/A Rating(s):

System: GEN
K/A: 2.2.12
Rating: 3.0/3.4

Task Standard:

Verify SSF RCMUP Operability using PT/1/A/0600/001 (Periodic Instrument Surveillance), Encl. 13.1 (Mode 1 & 2)

Preferred Evaluation Location:

Simulator _____ In-Plant __X___

Preferred Evaluation Method:

Perform _____ Simulate __X__

References:

PT/1/A/0600/001 (Periodic Instrument Surveillance), Encl. 13.1 (Mode 1 & 2) Page 37 of 38

Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve" of OP/0/A/1108/001 (Curves And General Information)

Validation Time: 15 minutes **Time Critical**: NO

==

Candidate: ________________________________ Time Start: _________

NAME Time Finish: _________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ________________________ ______________________________/________

NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

NONE

Tools/Equipment/Procedures Needed:

- PT/1/A/0600/001 (Periodic Instrument Surveillance), Encl. 13.1 (Mode 1 & 2) Page 37 of 38
- Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve" of OP/0/A/1108/001 (Curves And General Information)

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:

- U2EOC20 outage in progress
- Unit 2 was shutdown (subcritical) on 4/20/05 at 0200
- Unit 2 core is defueled
- Spent Fuel Pool Level = -0.2 feet
- Spent Fuel Pool Temperature = 107°F
- Current date and time: 4/25/05 at 1000
- PT/1/A/600/001, Enclosure 13.1 in progress

INITIATING CUES:

The SRO instructs you to continue with PT/1/A/600/001, Enclosure 13.1 starting at the top of page 37.

START TIME: _______

STEP 1: Determine if all fuel in SFP subcritical > maximum days specified on Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve" STANDARD: Refer to Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve" of OP/1108/001. Determine that Unit 2's fuel has been subcritical for 5 days and 8 hours. This is < than the maximum days specified on Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve". COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: Verify SFP level > specified on appropriate curve of Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve". STANDARD: Determine that the correct curve is "Day ≥ 4.5 & ≤ 6". Determine Spent Fuel Pool water temperature is 107°F by looking on SFP temperature gauge on 2AB3 or on the OAC Determine Spent Fuel Pool water level is - 0.20 feet by looking on SFP Level gauge on 2AB3. **Cue: When a SFP temperature indication is located indicate to the candidate that SFP temperature = 107°F (Use cue if performing in the Control Room)** Determine Spent Fuel Pool water level is - 0.20 feet by looking on SFP Level gauge on 2AB3. **Cue: When the Unit 1 & 2 SFP level indication is located indicate to the candidate that SFP level = - 0.2 feet. (Use cue if performing in the Control Room)** Determine that SFP level is **NOT** > than the appropriate curve. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 3: If limit exceeded, SSF RCMUP is inoperable. STANDARD: Declare Unit 1's SSF RCMUP inoperable. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	Must determine that some fuel has been subcritical < than the maximum days specified on Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve".
2	Required to determine is SFP level is adequate.
3	Unit 1's SSF RCMUP is declared inoperable.

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

INITIAL CONDITIONS:

- U2EOC20 outage in progress
- Unit 2 was shutdown (subcritical) on 4/20/05 at 0100
- Unit 2 core is defueled
- Spent Fuel Pool Level = -0.2 feet
- Spent Fuel Pool Temperature = 107°F
- Current date and time: 4/25/05 at 1100
- PT/1/A/600/001, Enclosure 13.1 in progress

INITIATING CUES:

The SRO instructs you to continue with PT/1/A/600/001, Enclosure 13.1 starting at the top of page 37.

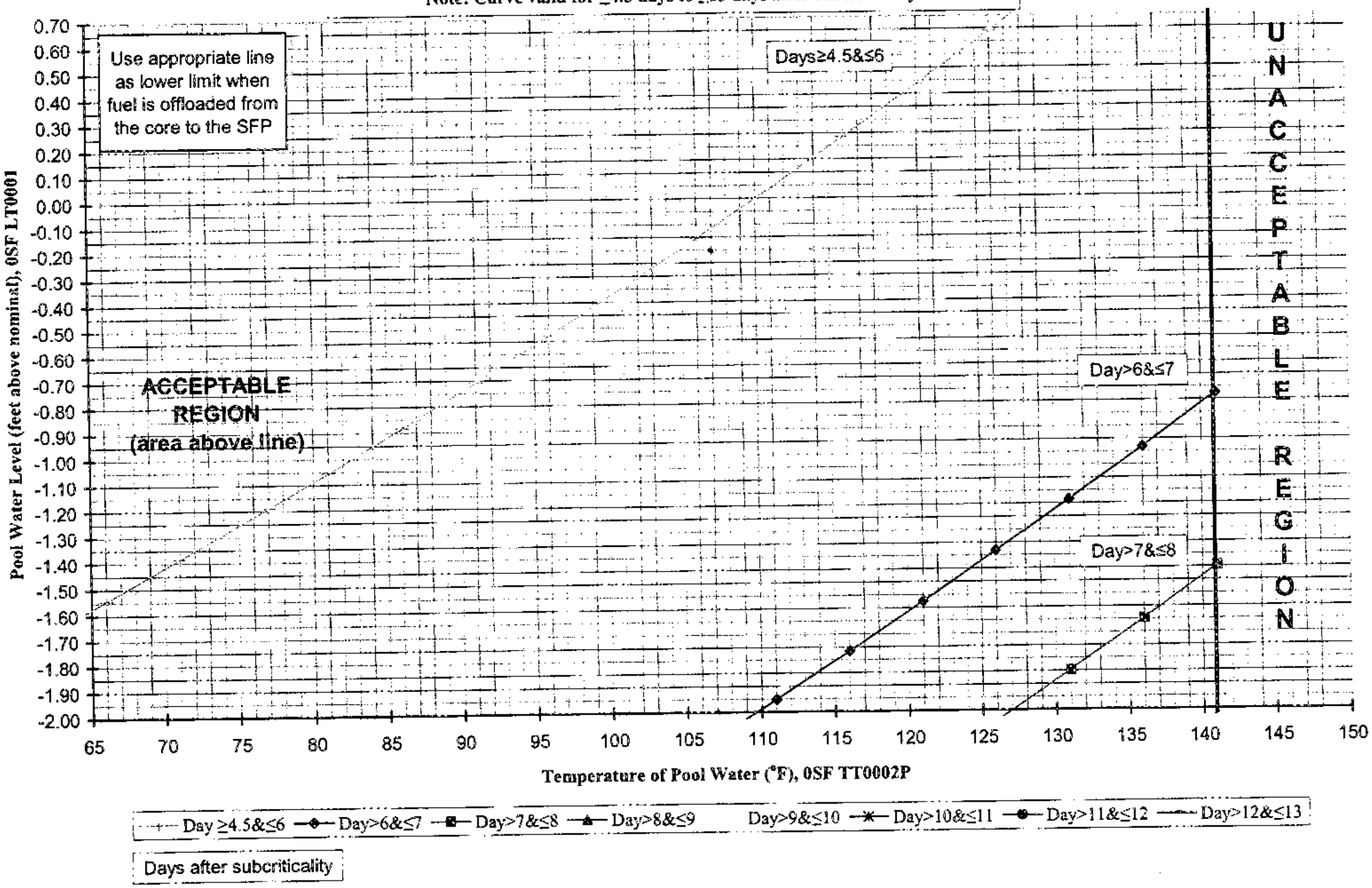
Enclosure 3.34

Unit 1&2 Spent Fuel Pool Level Vs. Temperature Curve (For Aid In Determining SSF RCMU System Operability)

Figure 1: Restrictions on Unit 1/2 Spent Fuel Pool When Core Offloading

U1EOC22

Note: Curve valid for ≥4.5 days to ≤13 days after subcriticality.



Enclosure 13.1

Mode 1 & 2

	COMPONENT	1900-0700	0700-1900	COMPUTER	REQUIRED CONDITIONS
TS 3.10.1	SFP Level	(N)	(D)		Verify SSF RCMUP Operable: **IF** all fuel in SFP subcritical > maximum days specified on Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve" of OP/0/A/1108/001 (Curves And General Information), verify SFP level > - 2 ft. **IF** any fuel in SFP subcritical ≤ maximum days specified on Enclosure "Unit 1&2 Spent Fuel Pool Level Vs Temperature Curve" of OP/0/A/1108/001 (Curves And General Information), verify SFP level > specified on appropriate curve. **IF** limit exceeded, SSF RCMUP is inoperable.
	Generator Voltage Schedule	(N)	(D)		**IF** Generator is supplying the Grid, maintain Generator Bus Voltage per Enclosure "Generator Voltage Schedule" of OP/0/A/1106/040 (Generator Voltage Schedule).

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-203

Complete Plant Configuration Sheet
(Time to Core Boil)

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Complete Plant Configuration Sheet (Time to Core Boil)

Alternate Path:

No

Facility JPM #:

NEW

K/A Rating(s):

System: GEN
K/A: 2.2.18
Rating: 2.3/3.6

Task Standard:

Tables in OP/0/A/1108/001 are used to determine Total Loss Of DHR Time to Boil

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate ____

References:

OP/0/A/1108/001 (Curves and General Information) Enclosure 3.46 (Total Loss of DHR Time to Boil)

Validation Time: 11 minutes

Time Critical: NO

==

Candidate: ______________________________________
NAME

Time Start: _________
Time Finish: _________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

NONE

Tools/Equipment/Procedures Needed:

OP/0/A/1108/001 (Curves and General Information) Enclosure 3.46 (Total Loss of DHR Time to Boil)

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 on 4/9/05 at 0400
- Site Directive 1.3.5 (Shutdown Protection Plan) Attachment 9.3.A is being prepared for this shift.

INITIATING CUES:

The SRO instructs you to complete the Plant Configuration Sheet by calculating the "Time To Core Boil".

START TIME: _______

STEP 1: Refer to enclosure 3.46 of OP/0/A/1108/001 Choose the appropriate table STANDARD: Refer to enclosure 3.46 of OP/0/A/1108/00 and use the "Prior to Core Offload, Initial Temp = 110ºF; Time to Boil in Minutes" table. COMMENTS:	___ SAT ___ UNSAT
STEP 2: Determine the number of days the reactor has been shutdown. STANDARD: Determine the reactor has been shutdown for ~~6~~ 3 days. COMMENTS:	___ SAT ___ UNSAT
STEP 3: Determine time to boil. STANDARD: Determine time to boil is **21.6 minutes** by using 3 days and 80 inches on LT-5. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	Required to determine the time for core boil.

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

INITIAL CONDITIONS:

- Unit 1 was shutdown on 4/9/05 at 0400
- Site Directive 1.3.5 (Shutdown Protection Plan) Attachment 9.3.A is being prepared for this shift.

INITIATING CUES:

The SRO instructs you to complete the Plant Configuration Sheet by calculating the "Time To Core Boil".

Attachment 9.3A - Plant Configuration Sheet

Unit 1	**Mode:** 6	**Preparer:**		**Date:** April 12, 2005	**Time:** 4:00
		Reviewer:		**Date:**	**Time:**

RCS Level:	80 in.	As Read On: LT-5		
RCS Level Control Band:	84 in. (High)	62 in. (Low)		
LPI Pumps Operable:	A ☑	B ☑	C ☑	
LPI Pumps Coolers:	A ☑	B ☑		
SF Pumps Operable:	A ☑	B ☑	C ☑	
SF Coolers Operable:	A ☑	B ☑	C ☑	
SFP Level:	0.18 ft.			
Level Control Band:	-2 ft.	To 1 ft.		
FTC Flooded	☐	NO ☑		
Fuel in Reactor Vessel	YES ☑	NO ☐		
Operable CETCs	SOME	List: G6,F7,F8,H9,G11		
Time To Core Boil	Minutes			
If Time to Core Boil is ≤ 6 min. ensure equipment hatch is closed.				
If Time to Core Boil is < 30 min. ensure SPOC is manning equip. hatch if open.				

RCS Temperature:	110 °F	As Read On: LPIP Suction		
RCS Temperature Band:	125 °F (High)	90 °F (Low)		
LPSW Pumps Operable	A ☑	B ☑	C ☑	
LPSW Suction From Unit:	2	CCW		
RCW Pumps Available:	A ☑	B ☑	C ☑	D ☑
RCW Coolers Available	A ☑	B ☑	C ☑	D ☑
SFP Temperature	71 °F			
Time For SFP Temperature to Reach 210 °F:	>66 hours			
Reactor Vessel Head	OFF ☐	ON ☑		
LP-19 Flange Installed	YES ☑	NO ☐		
LP-20 Flange Installed	YES ☐	NO ☑		
Reactor Bldg Purge is:	OFF ☑	ON ☐		
Equipment Hatch is:	CLOSED ☑	OPEN ☐		
SPOC is manning Equip. Hatch:	YES ☐	NO ☑		

RCS Makeup Paths

☐ BHUT --> HP-363 --> A / B LPI	A BHUT	57071	GAL.
☑ BWST --> A / B LPI (Forced / Gravity)	BWST	377146	GAL.
☑ BWST / BHUT --> HPI	CBAST	4770	GAL.
☐			

	A OTSG		B OTSG	
Upper Primary Handholes	ON ☐	OFF ☑	ON ☐	OFF ☑
OTSG Nozzle Dam Installed	YES ☐	NO ☑	YES ☐	NO ☑

RCS Boron:	2750 (Actual)	675 (Required)	
Canal Seal Plate:	ON ☑	OFF ☐	
Transfer Tube Covers	ON ☑	OFF ☐	

Cold Legs Are:	DRAINED ☐	NOT DRAINED ☑
SF-1	OPEN ☐	CLOSED ☑
SF-2	OPEN ☐	CLOSED ☑

OFFSITE POWER SOURCES

CT-1 ☐ CT-2 ☐ CT-3 ☐

BACKCHARGED MAIN TRANSFORMER ☑

CT-5 (From Central Switchyard) ☑

Main Feeder Bus # 1 Energized	YES ☑	NO ☐
Main Feeder Bus # 2 Energized	YES ☑	NO ☐

EMERGENCY POWER SOURCES

CT-1 ☑ CT-2 ☐ CT-3 ☐

CT-4 ☑

CT-5 (From Lee Combustion Turbine via Isolated Power Path) ☐

RC-66 Installed on PZR	YES ☐	NO ☑
RC-67 Installed on PZR	YES ☐	NO ☑
RC-68 Installed on PZR	YES ☐	NO ☑

NOTES:

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Prior to Core Offload, Initial Temp = 100 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
1.0	11.4	12.1	12.4	12.7	12.8	13.4	14.4	14.9	15.6	16.3	16.8
2.0	14.1	15.0	15.3	15.7	15.8	16.5	17.7	18.4	19.3	20.1	20.7
3.0	16.2	17.2	17.6	18.0	18.2	19.0	20.4	21.2	22.2	23.1	23.8
4.0	18.1	19.2	19.6	20.1	20.3	21.2	22.7	23.6	24.7	25.7	26.5
5.0	19.7	20.9	21.4	21.9	22.2	23.1	24.8	25.8	27.0	28.1	28.9
6.0	21.3	22.6	23.1	23.6	23.9	24.9	26.8	27.8	29.1	30.2	31.2
7.0	22.7	24.1	24.7	25.2	25.5	26.6	28.6	29.7	31.1	32.3	33.3
8.0	24.1	25.5	26.1	26.7	27.0	28.2	30.3	31.4	32.9	34.2	35.3
9.0	25.3	26.9	27.5	28.1	28.4	29.7	31.8	33.1	34.6	36.0	37.1
10.0	26.5	28.1	28.8	29.4	29.8	31.1	33.3	34.6	36.3	37.7	38.8
11.0	27.6	29.3	30.0	30.7	31.0	32.4	34.7	36.1	37.8	39.3	40.5
12.0	28.7	30.4	31.1	31.8	32.2	33.6	36.1	37.5	39.2	40.8	42.0
13.0	29.7	31.5	32.2	33.0	33.3	34.8	37.3	38.8	40.6	42.2	43.5
14.0	30.7	32.5	33.3	34.0	34.4	35.9	38.5	40.0	41.9	43.6	44.9
15.0	31.6	33.5	34.3	35.1	35.5	37.0	39.7	41.3	43.2	44.9	46.3
16.0	32.5	34.5	35.3	36.1	36.5	38.0	40.8	42.4	44.4	46.2	47.6
17.0	33.3	35.4	36.2	37.0	37.4	39.1	41.9	43.6	45.6	47.4	48.8
18.0	34.2	36.3	37.1	38.0	38.4	40.0	43.0	44.7	46.7	48.6	50.1
19.0	35.0	37.1	38.0	38.9	39.3	41.0	44.0	45.7	47.9	49.7	51.3
20.0	35.8	38.0	38.9	39.7	40.2	41.9	45.0	46.8	48.9	50.9	52.4
21.0	36.6	38.8	39.7	40.6	41.1	42.8	46.0	47.8	50.0	52.0	53.6
22.0	37.3	39.6	40.5	41.5	41.9	43.7	46.9	48.8	51.1	53.1	54.7
23.0	38.1	40.4	41.4	42.3	42.8	44.6	47.9	49.8	52.1	54.1	55.8
24.0	38.8	41.2	42.2	43.1	43.6	45.5	48.8	50.7	53.1	55.2	56.9
25.0	39.6	42.0	43.0	43.9	44.4	46.3	49.7	51.7	54.1	56.2	57.9

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Prior to Core Offload, Initial Temp = 110 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
1.0	10.4	11.0	11.3	11.5	11.7	12.2	13.1	13.6	14.2	14.8	15.3
2.0	12.8	13.6	13.9	14.2	14.4	15.0	16.1	16.8	17.5	18.2	18.8
3.0	14.7	15.6	16.0	16.4	16.6	17.3	18.5	19.3	20.2	21.0	21.6
4.0	16.4	17.4	17.8	18.2	18.4	19.2	20.6	21.5	22.5	23.3	24.1
5.0	17.9	19.0	19.5	19.9	20.1	21.0	22.6	23.4	24.5	25.5	26.3
6.0	19.3	20.5	21.0	21.5	21.7	22.7	24.3	25.3	26.5	27.5	28.4
7.0	20.7	21.9	22.4	22.9	23.2	24.2	26.0	27.0	28.2	29.4	30.3
8.0	21.9	23.2	23.8	24.3	24.6	25.6	27.5	28.6	29.9	31.1	32.1
9.0	23.0	24.4	25.0	25.6	25.9	27.0	29.0	30.1	31.5	32.7	33.8
10.0	24.1	25.6	26.2	26.8	27.1	28.2	30.3	31.5	33.0	34.3	35.4
11.0	25.1	26.6	27.3	27.9	28.2	29.4	31.6	32.8	34.3	35.7	36.8
12.0	26.1	27.7	28.3	28.9	29.3	30.5	32.8	34.1	35.6	37.1	38.2
13.0	27.0	28.6	29.3	30.0	30.3	31.6	33.9	35.3	36.9	38.4	39.6
14.0	27.9	29.6	30.3	30.9	31.3	32.6	35.0	36.4	38.1	39.6	40.9
15.0	28.7	30.5	31.2	31.9	32.2	33.6	36.1	37.5	39.3	40.8	42.1
16.0	29.5	31.3	32.1	32.8	33.1	34.6	37.1	38.6	40.4	42.0	43.3
17.0	30.3	32.2	32.9	33.7	34.0	35.5	38.1	39.6	41.5	43.1	44.5
18.0	31.1	33.0	33.7	34.5	34.9	36.4	39.1	40.6	42.5	44.2	45.6
19.0	31.8	33.8	34.6	35.3	35.7	37.3	40.0	41.6	43.5	45.2	46.7
20.0	32.5	34.5	35.3	36.1	36.5	38.1	40.9	42.5	44.5	46.3	47.7
21.0	33.2	35.3	36.1	36.9	37.3	38.9	41.8	43.4	45.5	47.3	48.8
22.0	33.9	36.0	36.9	37.7	38.1	39.8	42.7	44.3	46.4	48.3	49.8
23.0	34.6	36.7	37.6	38.4	38.9	40.6	43.5	45.2	47.4	49.2	50.8
24.0	35.3	37.5	38.3	39.2	39.6	41.3	44.4	46.1	48.3	50.2	51.8
25.0	36.0	38.2	39.1	39.9	40.4	42.1	45.2	47.0	49.2	51.1	52.8

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Prior to Core Offload, Initial Temp = 120 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
1.0	9.4	9.9	10.2	10.4	10.5	11.0	11.8	12.2	12.8	13.3	13.8
2.0	11.6	12.3	12.6	12.8	13.0	13.5	14.5	15.1	15.8	16.4	17.0
3.0	13.3	14.1	14.4	14.7	14.9	15.6	16.7	17.4	18.2	18.9	19.5
4.0	14.8	15.7	16.1	16.4	16.6	17.3	18.6	19.3	20.2	21.0	21.7
5.0	16.2	17.2	17.6	18.0	18.2	18.9	20.3	21.1	22.1	23.0	23.8
6.0	17.4	18.5	18.9	19.4	19.6	20.4	21.9	22.8	23.8	24.8	25.6
7.0	18.6	19.7	20.2	20.7	20.9	21.8	23.4	24.3	25.4	26.5	27.3
8.0	19.7	20.9	21.4	21.9	22.1	23.1	24.8	25.8	27.0	28.0	29.0
9.0	20.8	22.0	22.5	23.0	23.3	24.3	26.1	27.1	28.4	29.5	30.5
10.0	21.7	23.0	23.6	24.1	24.4	25.4	27.3	28.4	29.7	30.9	31.9
11.0	22.6	24.0	24.6	25.1	25.4	26.5	28.4	29.6	30.9	32.2	33.2
12.0	23.5	24.9	25.5	26.1	26.4	27.5	29.5	30.7	32.1	33.4	34.5
13.0	24.3	25.8	26.4	27.0	27.3	28.5	30.6	31.8	33.3	34.6	35.7
14.0	25.1	26.6	27.3	27.9	28.2	29.4	31.6	32.8	34.3	35.7	36.9
15.0	25.9	27.5	28.1	28.7	29.0	30.3	32.5	33.8	35.4	36.8	38.0
16.0	26.6	28.2	28.9	29.5	29.9	31.2	33.4	34.8	36.4	37.8	39.1
17.0	27.3	29.0	29.7	30.3	30.7	32.0	34.3	35.7	37.3	38.8	40.1
18.0	28.0	29.7	30.4	31.1	31.4	32.8	35.2	36.6	38.3	39.8	41.1
19.0	28.7	30.4	31.1	31.8	32.2	33.6	36.0	37.4	39.2	40.7	42.1
20.0	29.3	31.1	31.8	32.6	32.9	34.3	36.9	38.3	40.1	41.7	43.1
21.0	30.0	31.8	32.5	33.3	33.6	35.1	37.7	39.1	41.0	42.6	44.0
22.0	30.6	32.5	33.2	34.0	34.3	35.8	38.4	40.0	41.8	43.5	44.9
23.0	31.2	33.1	33.9	34.6	35.0	36.5	39.2	40.8	42.7	44.3	45.8
24.0	31.8	33.8	34.5	35.3	35.7	37.3	40.0	41.6	43.5	45.2	46.7
25.0	32.4	34.4	35.2	36.0	36.4	37.9	40.7	42.3	44.3	46.1	47.6

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Prior to Core Offload, Initial Temp = 130 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
1.0	8.3	8.8	9.1	9.3	9.4	9.8	10.5	10.9	11.4	11.8	12.3
2.0	10.3	10.9	11.2	11.4	11.5	12.0	12.9	13.4	14.1	14.6	15.1
3.0	11.8	12.5	12.8	13.1	13.3	13.8	14.9	15.4	16.2	16.8	17.4
4.0	13.2	14.0	14.3	14.6	14.8	15.4	16.5	17.2	18.0	18.7	19.4
5.0	14.4	15.3	15.6	16.0	16.2	16.8	18.1	18.8	19.7	20.4	21.2
6.0	15.5	16.5	16.8	17.2	17.4	18.2	19.5	20.3	21.2	22.0	22.8
7.0	16.6	17.6	18.0	18.4	18.6	19.4	20.8	21.6	22.6	23.5	24.4
8.0	17.5	18.6	19.1	19.5	19.7	20.5	22.1	22.9	24.0	24.9	25.8
9.0	18.5	19.6	20.1	20.5	20.7	21.6	23.2	24.1	25.2	26.2	27.2
10.0	19.3	20.5	21.0	21.5	21.7	22.6	24.3	25.2	26.4	27.5	28.5
11.0	20.1	21.4	21.9	22.4	22.6	23.6	25.3	26.3	27.5	28.6	29.6
12.0	20.9	22.2	22.7	23.2	23.5	24.5	26.3	27.3	28.6	29.7	30.8
13.0	21.6	23.0	23.5	24.0	24.3	25.3	27.2	28.3	29.6	30.7	31.9
14.0	22.4	23.7	24.3	24.8	25.1	26.2	28.1	29.2	30.5	31.7	32.9
15.0	23.0	24.4	25.0	25.6	25.8	27.0	28.9	30.1	31.5	32.7	33.9
16.0	23.7	25.1	25.7	26.3	26.6	27.7	29.8	30.9	32.4	33.6	34.9
17.0	24.3	25.8	26.4	27.0	27.3	28.5	30.6	31.7	33.2	34.5	35.8
18.0	24.9	26.4	27.1	27.7	28.0	29.2	31.3	32.5	34.1	35.4	36.7
19.0	25.5	27.1	27.7	28.3	28.6	29.9	32.1	33.3	34.9	36.2	37.6
20.0	26.1	27.7	28.3	29.0	29.3	30.6	32.8	34.1	35.7	37.1	38.4
21.0	26.7	28.3	29.0	29.6	29.9	31.2	33.5	34.8	36.4	37.9	39.2
22.0	27.2	28.9	29.6	30.2	30.6	31.9	34.2	35.5	37.2	38.7	40.1
23.0	27.8	29.5	30.2	30.8	31.2	32.5	34.9	36.3	38.0	39.5	40.9
24.0	28.3	30.0	30.7	31.4	31.8	33.2	35.6	37.0	38.7	40.2	41.7
25.0	28.8	30.6	31.3	32.0	32.4	33.8	36.2	37.7	39.4	41.0	42.5

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Prior to Core Offload, Initial Temp = 140 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
1.0	7.3	7.8	7.9	8.1	8.2	8.6	9.2	9.5	10.0	10.4	10.8
2.0	9.0	9.6	9.8	10.0	10.1	10.6	11.3	11.8	12.3	12.8	13.3
3.0	10.4	11.0	11.3	11.5	11.6	12.1	13.0	13.5	14.2	14.7	15.3
4.0	11.6	12.3	12.5	12.8	13.0	13.5	14.5	15.1	15.8	16.4	17.0
5.0	12.6	13.4	13.7	14.0	14.2	14.8	15.9	16.5	17.2	17.9	18.6
6.0	13.6	14.4	14.8	15.1	15.3	15.9	17.1	17.8	18.6	19.3	20.1
7.0	14.5	15.4	15.8	16.1	16.3	17.0	18.3	19.0	19.9	20.6	21.4
8.0	15.4	16.3	16.7	17.1	17.3	18.0	19.3	20 1	21.0	21.9	22.7
9.0	16.2	17.2	17.6	18.0	18.2	19.0	20.4	21.2	22.1	23.0	23.9
10.0	17.0	18.0	18.4	18.8	19.0	19.9	21.3	22.1	23.2	24.1	25.0
11.0	17.7	18.7	19.2	19.6	19.8	20.7	22.2	23.1	24.1	25.1	26.0
12.0	18.3	19.5	19.9	20.4	20.6	21.5	23.0	23.9	25.1	26.0	27.0
13.0	19.0	20.1	20.6	21.1	21.3	22.2	23.9	24.8	25.9	27.0	28.0
14.0	19.6	20.8	21.3	21.8	22.0	23.0	24.6	25.6	26.8	27.8	28.9
15.0	20.2	21.4	21.9	22.4	22.7	23.7	25.4	26.4	27.6	28.7	29.8
16.0	20.8	22.0	22.6	23.1	23.3	24.3	26.1	27.1	28.4	29.5	30.6
17.0	21.3	22.6	23.2	23.7	23.9	25.0	26.8	27.8	29.1	30.3	31.4
18.0	21.9	23.2	23.7	24.3	24.5	25.6	27.5	28.5	29.9	31.0	32.2
19.0	22.4	23.8	24.3	24.8	25.1	26.2	28.1	29.2	30.6	31.8	33.0
20.0	22.9	24.3	24.9	25.4	25.7	26.8	28.8	29.9	31.3	32.5	33.8
21.0	23.4	24.8	25.4	26.0	26.3	27.4	29.4	30.5	32.0	33.2	34.5
22.0	23.9	25.3	25.9	26.5	26.8	28.0	30.0	31.2	32.6	33.9	35.2
23.0	24.4	25.9	26.5	27.0	27.3	28.5	30.6	31.8	33.3	34.6	35.9
24.0	24.8	26.4	27.0	27.6	27.9	29.1	31.2	32.4	33.9	35.3	36.6
25.0	25.3	26.8	27.5	28.1	28.4	29.6	31.8	33.0	34.6	35.9	37.3

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Core Reload, Initial Temp = 100 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
12.0	34.9	37.0	37.9	38.7	39.2	40.8	43.8	45.5	47.7	49.5	51.3
13.0	36.1	38.3	39.2	40.1	40.5	42.3	45.4	47.1	49.3	51.3	53.1
14.0	37.3	39.6	40.5	41.4	41.9	43.7	46.9	48.7	51.0	53.0	54.9
15.0	38.5	40.8	41.8	42.7	43.2	45.0	48.3	50.2	52.5	54.6	56.6
16.0	39.6	42.0	43.0	43.9	44.4	46.3	49.7	51.7	54.1	56.2	58.2
17.0	40.7	43.2	44.2	45.2	45.7	47.6	51.1	53.1	55.6	57.8	59.8
18.0	41.7	44.3	45.3	46.3	46.9	48.9	52.4	54.5	57.0	59.3	61.4
19.0	42.8	45.4	46.4	47.5	48.0	50.0	53.7	55.8	58.4	60.7	62.9
20.0	50.7	53.8	55.0	56.3	56.9	59.4	63.7	66.2	69.3	72.1	74.3
21.0	51.8	54.9	56.2	57.5	58.1	60.6	65.1	67.6	70.8	73.6	75.9
22.0	52.9	56.1	57.4	58.7	59.4	61.9	66.5	69.1	72.3	75.1	77.4
23.0	53.9	57.2	58.6	59.9	60.6	63.2	67.8	70.5	73.8	76.7	79.0
24.0	55.0	58.3	59.7	61.1	61.7	64.4	69.1	71.8	75.2	78.2	80.6
25.0	56.0	59.4	60.8	62.2	62.9	65.6	70.4	73.2	76.6	79.6	82.1
26.0	57.0	60.5	61.9	63.3	64.0	66.8	71.7	74.5	78.0	81.1	83.6
27.0	58.0	61.6	63.0	64.4	65.2	68.0	73.0	75.8	79.4	82.5	85.0
28.0	59.0	62.6	64.1	65.5	66.3	69.1	74.2	77.1	80.7	83.9	86.5
29.0	60.0	63.7	65.2	66.6	67.4	70.3	75.5	78.4	82.1	85.3	87.9
30.0	61.0	64.7	66.2	67.7	68.5	71.4	76.7	79.7	83.4	86.7	89.3

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Core Reload, Initial Temp = 110 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
12.0	30.9	32.8	33.5	34.3	34.7	36.1	38.8	40.3	42.2	43.8	45.4
13.0	32.0	33.9	34.7	35.5	35.9	37.4	40.1	41.7	43.6	45.4	47.0
14.0	33.0	35.0	35.8	36.6	37.0	38.6	41.4	43.1	45.1	46.8	48.5
15.0	34.0	36.1	36.9	37.7	38.2	39.8	42.7	44.4	46.4	48.3	50.0
16.0	35.0	37.1	38.0	38.8	39.3	40.9	43.9	45.6	47.8	49.6	51.4
17.0	35.9	38.1	39.0	39.9	40.3	42.1	45.1	46.9	49.1	51.0	52.9
18.0	36.8	39.1	40.0	40.9	41.3	43.1	46.3	48.1	50.3	52.3	54.2
19.0	37.7	40.0	41.0	41.9	42.3	44.2	47.4	49.2	51.5	53.5	55.5
20.0	46.1	48.9	50.0	51.2	51.7	54.0	57.9	60.2	63.0	65.5	67.6
21.0	47.1	49.9	51.1	52.3	52.9	55.1	59.2	61.5	64.4	66.9	69.0
22.0	48.1	51.0	52.2	53.4	54.0	56.3	60.4	62.8	65.7	68.3	70.5
23.0	49.0	52.0	53.3	54.4	55.1	57.4	61.7	64.1	67.1	69.7	71.9
24.0	50.0	53.0	54.3	55.5	56.1	58.5	62.8	65.3	68.4	71.1	73.3
25.0	50.9	54.0	55.3	56.5	57.2	59.6	64.0	66.5	69.6	72.4	74.7
26.0	51.9	55.0	56.3	57.6	58.2	60.7	65.2	67.7	70.9	73.7	76.1
27.0	52.8	56.0	57.3	58.6	59.2	61.8	66.3	68.9	72.1	75.0	77.4
28.0	53.7	56.9	58.3	59.6	60.3	62.9	67.5	70.1	73.4	76.3	78.7
29.0	54.6	57.9	59.3	60.6	61.3	63.9	68.6	71.3	74.6	77.6	80.0
30.0	55.4	58.8	60.2	61.5	62.2	64.9	69.7	72.4	75.8	78.8	81.3

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Core Reload, Initial Temp = 120 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0”	10”	14”	18”	20”	28”	42”	50”	60”	70”	80”
12.0	27.8	29.5	30.2	30.9	31.2	32.5	34.9	36.3	38.0	39.5	40.9
13.0	28.8	30.5	31.3	31.9	32.3	33.7	36.2	37.6	39.3	40.9	42.4
14.0	29.7	31.5	32.3	33.0	33.4	34.8	37.3	38.8	40.6	42.2	43.7
15.0	30.6	32.5	33.2	34.0	34.4	35.8	38.5	40.0	41.8	43.5	45.1
16.0	31.5	33.4	34.2	35.0	35.4	36.9	39.6	41.1	43.0	44.7	46.4
17.0	32.4	34.3	35.1	35.9	36.3	37.9	40.6	42.2	44.2	45.9	47.6
18.0	33.2	35.2	36.0	36.8	37.2	38.8	41.7	43.3	45.3	47.1	48.8
19.0	34.0	36.0	36.9	37.7	38.1	39.8	42.7	44.3	46.4	48.2	50.0
20.0	41.5	44.1	45.1	46.1	46.6	48.6	52.2	54.2	56.8	59.0	61.0
21.0	42.4	45.0	46.1	47.1	47.6	49.7	53.3	55.4	58.0	60.3	62.3
22.0	43.3	46.0	47.0	48.1	48.6	50.7	54.4	56.6	59.2	61.5	63.6
23.0	44.2	46.9	48.0	49.1	49.6	51.7	55.5	57.7	60.4	62.8	64.9
24.0	45.0	47.8	48.9	50.0	50.6	52.8	56.6	58.8	61.6	64.0	66.2
25.0	45.9	48.7	49.8	51.0	51.5	53.7	57.7	59.9	62.7	65.2	67.4
26.0	46.7	49.6	50.7	51.9	52.5	54.7	58.7	61.0	63.9	66.4	68.6
27.0	47.5	50.4	51.6	52.8	53.4	55.7	59.8	62.1	65.0	67.6	69.8
28.0	48.4	51.3	52.5	53.7	54.3	56.6	60.8	63.2	66.1	68.7	71.0
29.0	49.2	52.2	53.4	54.6	55.2	57.6	61.8	64.2	67.2	69.9	72.2
30.0	50.0	53.0	54.2	55.5	56.1	58.5	62.8	65.2	68.3	71.0	73.4

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80” column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Core Reload, Initial Temp = 130 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
12.0	24.7	26.2	26.9	27.5	27.8	29.0	31.1	32.3	33.8	35.1	36.4
13.0	25.6	27.2	27.8	28.4	28.7	30.0	32.2	33.4	35.0	36.3	37.7
14.0	26.4	28.1	28.7	29.3	29.7	30.9	33.2	34.5	36.1	37.5	39.0
15.0	27.3	28.9	29.6	30.2	30.6	31.9	34.2	35.5	37.2	38.7	40.1
16.0	28.0	29.7	30.4	31.1	31.4	32.8	35.2	36.6	38.3	39.8	41.3
17.0	28.8	30.5	31.3	32.0	32.3	33.7	36.2	37.6	39.3	40.9	42.4
18.0	29.5	31.3	32.0	32.8	33.1	34.5	37.1	38.5	40.3	41.9	43.5
19.0	30.2	32.1	32.8	33.5	33.9	35.4	38.0	39.4	41.3	42.9	44.5
20.0	37.0	39.2	40.1	41.0	41.5	43.3	46.4	48.3	50.5	52.5	54.4
21.0	37.8	40.1	41.0	41.9	42.4	44.2	47.4	49.3	51.6	53.6	55.6
22.0	38.6	40.9	41.9	42.8	43.3	45.1	48.4	50.3	52.7	54.8	56.7
23.0	39.3	41.7	42.7	43.7	44.1	46.0	49.4	51.4	53.7	55.9	57.9
24.0	40.1	42.5	43.5	44.5	45.0	46.9	50.4	52.3	54.8	56.9	59.0
25.0	40.8	43.3	44.3	45.3	45.8	47.8	51.3	53.3	55.8	58.0	60.1
26.0	41.6	44.1	45.2	46.2	46.7	48.7	52.3	54.3	56.8	59.1	61.2
27.0	42.3	44.9	45.9	47.0	47.5	49.5	53.2	55.3	57.8	60.1	62.3
28.0	43.0	45.7	46.7	47.8	48.3	50.4	54.1	56.2	58.8	61.1	63.4
29.0	43.8	46.4	47.5	48.6	49.1	51.2	55.0	57.1	59.8	62.2	64.4
30.0	44.5	47.2	48.3	49.4	49.9	52.1	55.9	58.1	60.8	63.2	65.4

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

Enclosure 3.46

Total Loss Of DHR Time To Boil {12}

Core Reload, Initial Temp = 140 F; Time to Boil in Minutes

LT-5⇨ Days ⇩	0"	10"	14"	18"	20"	28"	42"	50"	60"	70"	80"
12.0	21.7	23.0	23.5	24.1	24.3	25.4	27.2	28.3	29.6	30.8	32.0
13.0	22.5	23.8	24.4	24.9	25.2	26.3	28.2	29.3	30.7	31.9	33.1
14.0	23.2	24.6	25.2	25.7	26.0	27.1	29.1	30.2	31.6	32.9	34.2
15.0	23.9	25.3	25.9	26.5	26.8	28.0	30.0	31.2	32.6	33.9	35.2
16.0	24.6	26.1	26.7	27.3	27.6	28.8	30.9	32.1	33.5	34.9	36.2
17.0	25.3	26.8	27.4	28.0	28.3	29.5	31.7	32.9	34.5	35.8	37.2
18.0	25.9	27.5	28.1	28.7	29.0	30.3	32.5	33.8	35.3	36.7	38.2
19.0	26.5	28.1	28.8	29.4	29.7	31.0	33.3	34.6	36.2	37.6	39.1
20.0	32.4	34.4	35.2	36.0	36.4	38.0	40.7	42.3	44.3	46.0	47.8
21.0	33.1	35.1	36.0	36.8	37.2	38.8	41.6	43.2	45.3	47.0	48.8
22.0	33.8	35.9	36.7	37.5	38.0	39.6	42.5	44.1	46.2	48.0	49.9
23.0	34.5	36.6	37.5	38.3	38.7	40.4	43.3	45.0	47.1	49.0	50.9
24.0	35.2	37.3	38.2	39.0	39.5	41.2	44.2	45.9	48.1	49.9	51.8
25.0	35.8	38.0	38.9	39.8	40.2	42.0	45.0	46.8	49.0	50.9	52.8
26.0	36.5	38.7	39.6	40.5	41.0	42.7	45.8	47.6	49.8	51.8	53.8
27.0	37.1	39.4	40.3	41.2	41.7	43.5	46.6	48.5	50.7	52.7	54.7
28.0	37.8	40.1	41.0	41.9	42.4	44.2	47.4	49.3	51.6	53.6	55.7
29.0	38.4	40.7	41.7	42.6	43.1	44.9	48.2	50.1	52.4	54.5	56.6
30.0	39.0	41.4	42.3	43.3	43.8	45.7	49.0	50.9	53.3	55.4	57.5

Note: 1. Limited boiling may occur prior to the above times due to incomplete mixing of the coolant exiting the core.
2. RCS Loops full with SGs **NOT** available use 80" column for Time to Boil.
3. RCS Loops full with SGs available use 2 hours as Time to Boil.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-302

Calculate the Maximum Permissible Stay Time Within Duke Power Basic Administrative Limits

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Calculate the Maximum Permissible Stay Time Within Duke Power Basic Administrative Limits

Alternate Path:

N/A

Facility JPM #:

New

K/A Rating(s):

Gen 2.3.4 2.5/3.1

Task Standard:

Calculate the Maximum Permissible Stay Time Within Duke Power Basic Administrative Limits

Preferred Evaluation Location:

Simulator ______ In-Plant __X__

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

NSD-507, Radiation Protection

Validation Time: 13 min.

Time Critical: NO

==

Candidate: ________________________________
NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ____________________________ ____________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

NONE

Tools/Equipment/Procedures Needed:

Room 217 (Seal Supply Filter) Plan View

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:

1. Today's date: 06-20-05
2. 2B Seal Supply Filter ~~is required to be isolated.~~ Repairs are ~~maintenance is~~ scheduled
3. The NEO selected to perform the ~~Isolation~~ JOB has the following dose history:
   - 1120 mrem TEDE received this year
   - 570 mrem TEDE received this quarter
4. The NEO will receive 20 mrem during the transit to the Seal Supply Filter room due to high dose rates in the auxiliary building and the route the NLO is required to take, and will return via the same path when the job is completed.
5. current RWP Requirements set the DAD @ 200mr/Hr and 150 mR.

INITIATING CUE:

Refer to the plan view for Unit 2 Seal Supply Filter Room and determine how long the NEO can stay in the room performing this isolation ~~without exceeding the Duke Power Administrative limit.~~ Before he is Required to exit the RCA.

START TIME: ________

Note: Candidate may perform these steps in a different order however the calculated stay time should be correct.

STEP 1:	Determine general area dose rate in room 217 (Seal Supply Filter) from Plan View.	___ SAT
STANDARD:	Plan View is referenced and the general area dose rate is determined to be 140 mr/hr at the "2B" Seal Supply Filter.	___ UNSAT
COMMENTS:		
STEP 2:	Determine dose ~~remaining~~ for the NEO this year from ~~his administrati~~ve ~~limit~~. the DAD limit	___ SAT
STANDARD:	~~Determines remaining dose to be 880 mrem~~ ~~Administrative limit - (dose this year) = remaining dose~~ ~~2,000 mrem/year - (1120 mrem) = 880 mrem~~	___ UNSAT
COMMENTS:	150 mR 20 mR = 130 mrem	
STEP 3:	Calculate maximum stay time	**CRITICAL STEP**
STANDARD:	Stay time is calculated to be: Available Dose / Dose Rate = 130 ~~880 mrem - (40 mrem)~~ / ~~140~~ mrem/hr = **6 hours** .928 = 56 min.	___ SAT ___ UNSAT
Note: The ~~40~~ 20 mrem is the dose the NLO will receive in transi~~ent~~ to and from the job.		
COMMENTS:		
	END OF TASK	

TIME STOP: ________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	Required to calculate stay time.

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

INITIAL CONDITIONS:

1. Today's date: 06-20-05
2. 2B Seal Supply Filter is required to be isolated.
3. The NEO selected to perform the isolation has the following dose history:
    - 1120 mrem TEDE received this year
    - 570 mrem TEDE received this quarter
4. The NLO will receive 20 mrem during transit to the Seal Supply Filter room due to high dose rates in the auxiliary building and the route the NLO is required to take.

INITIATING CUE:

Refer to the plan view for Unit 2 Seal Supply Filter Room and determine how long the NEO can stay in the room performing this isolation without exceeding the Duke Power Administrative limit.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-405

Determine Emergency Classification and Protective Action Recommendations

CANDIDATE ____________________

EXAMINER ____________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Determine Emergency Classification and Protective Action Recommendations

Alternate Path:

NO

Facility JPM #:

New

K/A Rating(s):

Gen 2.4.38 2.2/4.0

Task Standard:

Appropriate classification is determined and associated Protective Action Recommendations are made

Preferred Evaluation Location:

Simulator __X__ In-Plant __X__

Preferred Evaluation Method:

Perform _____ Simulate __X__

References:

RP/0/B/1000/01
RP/0/B/1000/02
BASIS Document (Volume "A", Section "D" of the Emergency Plan)

Validation Time: 20 min. **Time Critical:** NO

==

Candidate: ______________________________ Time Start: _________
NAME Time Finish: _________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ______________________________/__________
NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR INSTRUCTIONS:

NONE

Tools/Equipment/Procedures Needed:

RP/0/B/1000/01
RP/0/B/1000/02
BASIS Document (Volume "A", Section "D" of the Emergency Plan)

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 2 at 100% power

0900: Reactor trip due a Sheared RCP shaft on 2A1 RCP

0900: Control Room has indications that the 2A1 RCP Seals have failed

0904: ES 1 & 2 actuated

- RCS pressure = 1580 psig and decreasing
- RB pressure = 4.7 psig and increasing
- The 2A HPI pump fails to Auto start and can not be started manually

0910: RCS Saturated and stable at 1000 psig. All RCPs have been secured

0920: 2RIA-57 reads 350 R/HR and stable

0920: RB Pressure = 0.2 psig and stable

INITIATING CUE:

You are to perform the required actions of the Emergency Coordinator by referring to RP/0/B/1000/01, Emergency Classification and determining the emergency classification and any Protective Action Recommendations.

Note: Do not use Emergency Coordinator's judgment while classifying the event. When required, an operator will maintain the Emergency Coordinator's Log and assume the duties of the Control Room Offsite Communicator.

START TIME: _______

STEP 1:	Classify the Event	**CRITICAL STEP**
STANDARD:	Refer to RP/0/B/1000/01 (Emergency Classification) Enclosure 4.6 (Fires/Explosions and Security Actions). Classify the event as a "**General Emergency**" due to following: **Fission Product Barrier Matrix** • 5 points for RCS Barriers due to 1RIA-57 reading • 5 points for Fuel Clad Barriers due to 1RIA-57 reading • 3 points for Containment Barriers due to (Rapid unexplained containment pressure decrease after increase" 13 points total results in a **General Emergency**	___ SAT ___ UNSAT
COMMENTS:		
STEP 2:	Determine Protective Action Recommendations	
STANDARD:	Refer to RP/0/B/1000/002 (Control Room Emergency Coordinator Procedure) and **GO TO** Enclosure 4.1 (General Emergency)	___ SAT
COMMENTS:		___ UNSAT
STEP 3:	Step 1.1 **IF** It has been determined that an Emergency Action Level for an Initiating Conditions has been met, **THEN** Declare a **General Emergency** Time of Declaration: _____	___ SAT
STANDARD:	Determine Initiating Conditions have been met and Declare a General Emergency due to: **"Fission Product Barrier Matrix"** Determine Time of Declaration is present time.	___ UNSAT
COMMENTS:		

STEP 4: Step 1.2 Appoint a person to maintain the Emergency Coordinator Log OR maintain the log yourself. STANDARD: A person is appointed to maintain the Emergency Coordinator Log or indicate that you will maintain the log. COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 1.3 Appoint Control Room Offsite Communicator(s). STANDARD: A Control Room Offsite Communicator is appointed. COMMENTS:	___ SAT ___ UNSAT
STEP 6: Step 1.4 Provide the Protective Action Recommendations for use by the Offsite Communicator to complete the Emergency Notification Form. STANDARD: Determine from chart that the following Protective Action Recommendations should be given: Evacuate sectors: Pickens County – A0, A1, B1, C1; Oconee County – A0, D1, E1, F1 Shelter sectors: Pickens County – A2, B2, C2; Oconee County – D2, E2, F2 COMMENTS: **END OF TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	The candidate needs to be able to utilize the procedure and determine that a General Emergency should be declared.
6	The candidate must be able to make recommendations to the local agencies as the actions necessary to protect the health and safety of the public.

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

INITIAL CONDITIONS:

Unit 2 at 100% power

0900: Reactor trip due a Sheared RCP shaft on 2A1 RCP

0900: Control Room has indications that the 2A1 RCP Seals have failed

0904: ES 1 & 2 actuated

- RCS pressure = 1580 psig and decreasing
- RB pressure = 4.7 psig and increasing
- The 2A HPI pump fails to Auto start and can not be started manually

0910: RCS Saturated and stable at 1000 psig. All RCPs have been secured

0920: 2RIA-57 reads 350 R/HR and stable

0920: RB Pressure = 0.2 psig and stable

INITIATING CUE:

You are to perform the required actions of the Emergency Coordinator by referring to RP/0/B/1000/01, Emergency Classification and determining the emergency classification and any Protective Action Recommendations.

Note: Do not use Emergency Coordinator's judgment while classifying the event. When required, an operator will maintain the Emergency Coordinator's Log and assume the duties of the Control Room Offsite Communicator.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NLO-039

PRIME THE SPENT FUEL POOL FILL LINE

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

PRIME THE SPENT FUEL POOL FILL LINE

Alternate Path:

No

Facility JPM #:

NLO-039

K/A Rating(s):

System: APE022
K/A: AK3.02
Rating: 3.5/3.8

Task Standard:

SFP Priming Pump is aligned and started

Preferred Evaluation Location:

Simulator _____ In-Plant __X___

Preferred Evaluation Method:

Perform ______ Simulate __X__

References:

EOP Enclosure 5.7 "HPI Pump Operations from ASW Pump Switchgear"

Validation Time: 16 minutes

Time Critical: NO

===

Candidate: ________________________________ NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ____________________________ NAME ____________________________ SIGNATURE /________ DATE

===

COMMENTS

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:

A tornado has struck Unit 2 Turbine Building and destroyed the 4160 volt switchgear TC, TD, and TE.

It also struck the Unit 2 BWST, rupturing and draining it.

The SSF Reactor Coolant Makeup Pump failed to start.

2A HPIP has been powered from the ASW switchgear.

The Spent Fuel Pool level is currently +1.0 feet.

INITIATING CUES:

The EOP directs the operator to perform "HPI Pump Operation From ASW Pump Switchgear" Enclosure 5.7 to align HPIPs to the SFP.

Another operator is aligning the HPI Suction from the SFP.

The Control Room SRO directs you to prime the Spent Fuel Pool fill line on Unit 2 per Enclosure 5.7, beginning at Step 20.

START TIME: _______

STEP 1: Step 20 Obtain bucket and rope from EOP equipment locker U2AB5. (A-5, U2 elevator lobby) STANDARD: Locate EOP equipment locker U2AB5 located at A-5, U2 elevator lobby and indicate that you would obtain a bucket and rope from the locker. Continue to Step 21. ***Cue: Inform candidate that opening the locker is not required.*** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 21A Connect SF priming pump suction hose to quick disconnect fitting at SF-86 (SF PRIMING PUMP SEAL WATER INLET) STANDARD: Candidate connects suction hose to quick disconnect fitting at SF-86, or verifies it is connected Continue to Step 21B. COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 21B Connect the Spent Fuel Priming Pump suction hose to the Spent Fuel Pool Fill line connection tap on SF-85 (SF PRIMING PUMP UNDERWATER SUPPLY BLOCK). STANDARD: Verify the Spent Fuel Priming Pump suction hose to the Spent Fuel Pool Fill line connection tap on SF-85 (SF PRIMING PUMP UNDERWATER SUPPLY BLOCK) is connected. Continue to Step 21C. COMMENTS:	___ SAT ___ UNSAT

STEP 4: Step 21C Open SF-85 (SF PRIMING PUMP UNDERWATER SUPPLY BLOCK). STANDARD: The candidate locates and opens SF-85 (Pool Underwater Supply Block to Priming Pump) by rotating valve operator until handle is parallel with pipe. Continue to Step 21D. **Note: There is a special tool for operating SF-85 and SF-84 hanging at the South end of the Spent Fuel Pool.** COMMENTS:	**CRITICAL TASK** ___ SAT ___ UNSAT
STEP 5: Step 21D Place the flex hose on the discharge of the SF Priming Pump into the SFP. STANDARD: The candidate (simulates) placing the free end of discharge hose into the Spent Fuel Pool. Continue to Step 21E. COMMENTS:	___ SAT ___ UNSAT
STEP 6: Step 21E CLOSE SF-84 (SF POOL UNDERWATER SUPPLY VENT) STANDARD: SF-84 (SF Pool Underwater Supply Vent) is CLOSED by rotating valve operator until handle is perpendicular to pipe. Continue to Step 21F. **Note: There is a special tool for operating SF-85 and SF-84 hanging at the South end of the Spent Fuel Pool.** **Note: SF-84 is already closed.** COMMENTS:	___ SAT ___ UNSAT

<u>STEP 7</u>: Step 21F Fill the SF Priming Pump Seal Tank to at least half-full with DW or water from SFP using bucket. <u>STANDARD</u>: The candidate fills the SF Priming Pump Seal Tank at least half-full using DW from the North-West end of the SFP or by using the rope and bucket to dip out of the SFP. **Note: It will take several buckets of water to fill the SF Priming Pump Seal Tank half-full.** Continue to Step 22. ***CUE: Communications have been established with operators at the ASW Pump Room and East Penetration Room.*** <u>COMMENTS</u>:	**CRITICAL TASK** ___ SAT ___ UNSAT
<u>STEP 8</u>: Step 22 **WHEN** communication is established with operators in the following locations: • ASW Pump Room • East Pen Room **THEN** open SF-86 (SF PRIMING PUMP SEAL WATER INLET) <u>STANDARD</u>: Determine communications have been established with the above locations and then open SF-86 (SF PRIMING PUMP SEAL WATER INLET). Continue to Step 23. ***Cue: Communications have been established.*** <u>COMMENTS</u>:	~~**CRITICAL TASK**~~ ___ SAT ___ UNSAT

	CRITICAL TASK
STEP 9: Step 23 Notify operator in ASW pump Rm to start U1/2 SF PRIMING PUMP (remote starter on S wall) STANDARD: Notify operator in ASW pump Rm to start U1/2 SF PRIMING PUMP. Continue to Step 24. ***Cue: The U1/2 SF PRIMING PUMP is operating.*** COMMENTS:	___ SAT ___ UNSAT
STEP 10: Step 24 **IAAT** seal tank level begins to rise, **THEN** close SF-86 (SF PRIMING PUMP SEAL WATER INLET) STANDARD: Monitor seal tank level and determine it is NOT rising. Continue to Step 25. ***Cue: Seal tank level is NOT rising.*** COMMENTS:	___ SAT ___ UNSAT
STEP 11: Step 25 **WHEN** SFP fill line is primed (as indicated by a steady discharge stream from the SF priming pump), **THEN** notify Control Room of the following: • HPI suction aligned to SFP fill line • HPI pump cooling water status • An operator is available in the E Pen Rm to throttle 1HP-26 STANDARD: Monitor the hose attached to the SF priming pump discharge and determine the SFP line is primed. **THEN** Notify the Control Room the HPI suction is aligned to SFP fill line. ***Cue: The SF priming pump has steady discharge stream.*** ***Cue: Notifying the Control of the last two bulleted items is not required for this JPM.*** COMMENTS: **END TASK**	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
4	Necessary to provide suction to the priming pump.
7	Tank must be ½ full to provide adequate water for priming.
8	Required to provide flow path.
9	Priming pump must operate to fill the line.

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

INITIAL CONDITIONS:

A tornado has struck Unit 2 Turbine Building and destroyed the 4160 volt switchgear TC, TD, and TE.

It also struck the Unit 2 BWST, rupturing and draining it.

The SSF Reactor Coolant Makeup Pump failed to start.

2A HPIP has been powered from the ASW switchgear.

The Spent Fuel Pool level is currently +1.0 feet.

INITIATING CUES:

The EOP directs the operator to perform "HPI Pump Operation From ASW Pump Switchgear" Enclosure 5.7 to align HPIPs to the SFP.

Another operator is aligning the HPI Suction from the SFP.

The Control Room SRO directs you to prime the Spent Fuel Pool fill line on Unit 2 per Enclosure 5.7, beginning at Step 20.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. __ Close 1HP-139 (RCP SEAL FLOW CONTROL OUTLET) (A-3-306, CRD Filter Rm).	

NOTE

Cooling water to HPI Motor Coolers will be supplied by the following:

- HPSW via head from EWST
- Station ASW Pump, if operating, via 1CCW-265

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. Verify ≥ 1 gpm cooling water flow to HPI pump motor coolers on local indication (HPI Pump Rm): __ 1A HPI Pump (1LPS-PS-1013) __ 1B HPI Pump (1LPS-PS-1014)	__ Notify Control Room to contact TSC for guidance.
3. **GO TO** applicable step based on HPI pump suction source specified by Control Room: (see table below)	
4. Open the following (A-1-118, N end of 1&2 HPI Hatch Area, East wall): __ 1HP-24 (1A HPI BWST SUCTION) __ 1HP-25 (1B HPI BWST SUCTION)	
5. Proceed to East Penetration Room and notify Control Room of the following: __ HPI suction aligned to BWST __ HPI pump cooling water status __ Available to throttle 1HP-26	
6. __ **EXIT** this enclosure.	

Table for step 3:

	Desired Suction Source	Applicable Step
	BWST	4
	LDST	7
	SFP	9

[redacted]

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. Proceed to East Penetration Room and notify Control Room of the following: ___ HPI pump cooling water status __ Available to throttle 1HP-26	
8. __ **EXIT** this enclosure.	

• • • END • • •

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. Rack out the following breakers: __ 1A LPI Pump (1TC-10) __ 1B LPI Pump (1TD-10) __ 1A RBS Pump (1TC-11) __ 1B RBS Pump (1TD-11)	
10. __ Close 1LP-28 (BWST OUTLET) (Outside, East of Unit 1 BWST).	
11. Close the following (A-1, N end of 1&2 LPI Hatch Area, East wall): __ 1LP-21 (1A LPI BWST SUCTION) __ 1LP-22 (1B LPI BWST SUCTION) (32)	
12. __ Open 1HP-24 (1A HPI BWST SUCTION) (A-1-118, N end of 1&2 HPI Hatch Area, East wall).	
13. Perform the following (A-1-128, ASW Pump Rm): A. __ Close ASW SWGR FDR (ASW SWGR FDR FROM B1T-UNIT 10) (ASW 4160/600V SWGR ASWS-5). B. __ Close ASWS-6D (UNITS 1/2/3 SF PRIMING PUMP TRANSFORMER BKR) (600V Load Center). C. __ Close breaker U1/2 SF PRIMING PUMP (UNIT 1&2 SF PRIMING PUMP REMOTE STARTER) (S wall).	
14. Notify Control Room to stop the following: __ BWST Recirc Pump __ <u>All</u> SF Cooling pumps	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. Close the following (A-2-218, Unit 1&2 SF Cooler Rm): __ SF-53 (SF PUMP SUCTION HEADER BLOCK) __ SF-56 (SUCTION FROM UNIT 2 BWST) __ SF-54 (CANAL DRAIN HDR TO RECIRC. PUMP) __ SF-15 ('A' SF COOLER OUTLET) __ SF-17 ('B' SF COOLER OUTLET) __ SF-23 (UNIT 1 & 2 SF COOLER OUTLET HEADER BLOCK) (E wall by B cooler) __ SF-49 (SF FILTER OUTLET HEADER BLOCK) __ SF-57 (BWST RECIRC PUMP SUCTION) __ SF-94 (C SF COOLER OUTLET) (over C SF Pump)	
16. Open the following (A-2-218, Unit 1&2 SF Cooler Rm): __ SF-55 (SUCTION FROM UNIT 1 BWST) __ SF-21 (1&2 SFP COOLANT SUPPLY HEADER BLOCK)(Southwest) __ SF-51 ('B' SF COOLER OUTLET TO PUMP SUCTION HEADER)	
17. __ Close SF-22 (POOL SURFACE OUTLET) (A-4-407, <u>Unit 2</u> Pen Rm, at crossover on chain).	
18. __ Open SF-50 (SF POOL UNDERWATER SUPPLY) (A-4-407, <u>Unit 2</u> Pen Rm, at crossover on chain).	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19. Notify Control Room to dispatch operators to the following locations to establish communications and await further instruction: __ A-1-128, ASW Pump Rm __ A-4-402, E Pen Rm	
20. __ Obtain bucket and rope from EOP equipment locker U2AB5 (A-5, U2 elevator lobby).	
21. Perform the following (A-6-619, Unit 1&2 SF Pool Rm, S end): A. __ Connect SF priming pump suction hose to quick disconnect fitting at SF-86 (SF PRIMING PUMP SEAL WATER INLET). B. __ Connect SF priming pump suction hose to SFP fill line connection tap on SF-85 (SF PRIMING PUMP UNDERWATER SUPPLY BLOCK). C. __ Open SF-85. D. __ Place flex hose on discharge of SF priming pump into SFP. E. __ Close SF-84 (SF POOL UNDERWATER SUPPLY VENT). F. __ Fill SF Priming Pump Seal Tank to at least half full with DW or water from SFP using bucket.	
22. __ **WHEN** communication is established with operators in the following locations: __ A-1-128, ASW Pump Rm __ A-4-402, E Pen Rm **THEN** open SF-86 (SF PRIMING PUMP SEAL WATER INLET) (A-6-619, Unit 1&2 SF Pool Rm, S end).	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. __ Notify operator in ASW Pump Rm to start U1/2 SF PRIMING PUMP (remote starter on S wall).	
24. __ **IAAT** seal tank level begins to rise, **THEN** close SF-86 (SF PRIMING PUMP SEAL WATER INLET).	
25. __ **WHEN** SFP fill line is primed (as indicated by a steady discharge stream from the SF priming pump), **THEN** notify Control Room of the following: __ HPI suction aligned to SFP fill line __ HPI pump cooling water status __ An operator is available in the E Pen Rm to throttle 1HP-26	
26. __ **WHEN** HPI Pump is started, **THEN** close SF-85 (SF PRIMING PUMP UNDERWATER SUPPLY BLOCK).	
27. __ Notify operator in ASW Pump Rm to stop the U1/2 SF PRIMING PUMP.	
28. __ Close SF-86 (SF PRIMING PUMP SEAL WATER INLET).	
29. __ **EXIT** this enclosure.	

• • • END • • •

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NLO-700

Restoration of ICS AUTO Power

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Restoration of ICS AUTO Power

Alternate Path:

Yes

Facility JPM #:

NEW

K/A Rating(s):
System: APE BW/A02
K/A: AK3.2
Rating: 3.7/4.0

Task Standard:

ICS AUTO power is restored per AP/23, Loss of ICS Power.

Preferred Evaluation Location:

Simulator ____ In-Plant __X__

Preferred Evaluation Method:

Perform _____ Simulate __X__

References:
AP/23 (Loss of ICS Power) Enclosure 5.2 (Restoration of ICS AUTO Power)

Validation Time: 16 minutes

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 OPERATOR INSTRUCTIONS:

NONE

Tools/Equipment/Procedures Needed:

AP/23 (Loss of ICS Power) Enclosure 5.2 (Restoration of ICS AUTO Power)

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 operating at 100% power

1SA-2/B-11 (ICS AUTO POWER FAILURE) is actuated

INITIATING CUES:

The Control Room SRO directs you to use AP/23 (Loss of ICS Power) Enclosure 5.2 (Restoration of ICS AUTO Power) to restore ICS AUTO power on Unit 1.

START TIME: _______

STEP 1: Step 1 Verify the following breakers closed (Unit 1 Cable Rm): • 1KRA breaker #1 (100A 1P, POWER PANELBOARD 1KI) • 1KI BREAKER #1 (30A 1P, AUTO POWER (ICS)) STANDARD: Locate 1KRA panel board and breaker #1 and verify it is closed. ***Cue: Inform candidate that 1KRA breaker #1 is CLOSED.*** Locate 1KI panel board and breaker #1 and verify it is closed. ***Cue: Inform candidate that 1KI breaker #1 is OPEN.*** Continue Step 1 RNO. COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 1 RNO Reset and close the affected breakers (Unit 1 Cable Rm): • 1KI BREAKER #1 (30A 1P, AUTO POWER (ICS)) STANDARD: Reset and close 1KI BREAKER #1. ***Cue: Inform candidate that 1KI BREAKER #1 tripped open when re-closed.*** Continue to Step 2. COMMENTS:	___ SAT ___ UNSAT

STEP 3: Step 2 Notify Unit 1 CR to verify ICS AUTO power has been restored as indicated by 1SA-2/B-11 (ICS AUTO POWER FAILURE) off. STANDARD: Notify Unit 1 CR via phone or radio to verify ICS AUTO power has been restored as indicated by 1SA-2/B-11 (ICS AUTO POWER FAILURE) off. ***Cue: Inform candidate that 1SA-2/B-11 (ICS AUTO POWER FAILURE) is actuated.*** Continue to Step 2 RNO. COMMENTS:	___ SAT ___ UNSAT
STEP 4: Step 2 RNO **IF** ICS AUTO power has **NOT** been restored, **THEN** bypass 1KI inverter as follows (Unit 1 Equip Rm): • Open SW#1 (left switch). • Open SW#3 (right switch). • Close SW#2 (center switch). STANDARD: Determine ICS AUTO power has **NOT** been restored and then bypass 1KI inverter as follows (Unit 1 Equip Rm): • Open SW#1 (left switch). ***Cue: Inform candidate that SW#1 is open.*** • Open SW#3 (right switch). ***Cue: Inform candidate that SW#3 is open.*** • Close SW#2 (center switch). ***Cue: Inform candidate that SW#2 is closed.*** Continue to Step 3. COMMENTS:	**CRITICAL TASK** ___ SAT ___ UNSAT

STEP 5: Step 3 Notify Unit 1 CR that all applicable steps of this enclosure have been completed. STANDARD: Using a phone or radio, Notify Unit 1 CR that all applicable steps of this enclosure have been completed. ***Cue: Inform candidate that the Control Room has been notified.*** COMMENTS: **END TASK**	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
4	Step is required to align power to the 1KI bus.

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

INITIAL CONDITIONS:

Unit 1 operating at 100% power

1SA-2/B-11 (ICS AUTO POWER FAILURE) is actuated

INITIATING CUES:

The Control Room SRO directs you to use AP/23 (Loss of ICS Power) Enclosure 5.2 (Restoration of ICS AUTO Power) to restore ICS AUTO power on Unit 1.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. Verify the following breakers closed (Unit 1 Cable Rm): __ 1KRA breaker #1 (100A 1P, POWER PANELBOARD 1KI) __ 1KI BREAKER #1 (30A 1P, AUTO POWER (ICS))	Reset <u>and</u> close the <u>affected</u> breakers (Unit 1 Cable Rm): __ 1KRA breaker #1 (100A 1P, POWER PANELBOARD 1KI) __ 1KI BREAKER #1 (30A 1P, AUTO POWER (ICS))
2. __ Notify Unit 1 CR to verify ICS AUTO power has been restored as indicated by 1SA-2/B-11 (ICS AUTO POWER FAILURE) off.	__ **IF** ICS AUTO power has **NOT** been restored, **THEN** bypass 1KI inverter as follows (Unit 1 Equip Rm): A. __ Open SW#1 (left switch). B. __ Open SW#3 (right switch). C. __ Close SW#2 (center switch).
3. __ Notify Unit 1 CR that <u>all</u> applicable steps of this enclosure have been completed.	

•••END•••

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

NLO-037
PLACE A CONTROL BATTERY CHARGER IN SERVICE

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Place a Control Battery Charger In Service

Alternate Path:

No

Facility JPM #:

CRO-037

K/A Rating(s):

System: 063
K/A: K1.03
Rating: 2.9/3.5

Task Standard:

Control Battery Charger is placed in service correctly per procedure.

Preferred Evaluation Location:

Simulator _____ In-Plant __X__

Preferred Evaluation Method:

Perform _____ Simulate __X__

References:

Validation Time: 12 minutes

Time Critical: NO

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Candidate: ______________________________
NAME

Time Start: ________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: ________

Examiner: ______________________ NAME

______________________ SIGNATURE / ________ DATE

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COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

None

Tools/Equipment/Procedures Needed:

"Removal From Service and Restoration To Service of Control Charger" Enclosure (for CA or CB Control Charger) of OP/3/A/1107/10

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:

Last week, the 3CA Control Battery Charger was removed from service on Unit 3 which is currently operating at 100% power. I&E personnel have informed the Control Room SRO that 3CA Control Battery Charger is ready to be placed back in service. The Standby Control Battery Charger is currently in service. "Removal From Service and Restoration To Service of Control Charger CA" Enclosure of OP/3/A/1107/10 has been completed up to Step 2.2.

INITIATING CUES:

The Control Room SRO directs you to place the 3CA Control Battery Charger in service and remove the Standby Control Battery Charger from service on Unit 3 by procedure beginning at Step 2.2.

START TIME: _______

STEP 1: Step 2.2.1 At MCC 3XS1: Ensure closed 3XS1-F4A (3CA BATT CHGR BKR). STANDARD: The candidate locates 3XS1-F4A and verifies the breaker is closed. **CUE: Indicate to candidate that power supply breaker is already closed in.** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 2.2.2 At the control charger 3CA: • Close the AC INPUT circuit breaker. • Verify the AC POWER FAILURE light is off. • Verify after 20-30 seconds the DC VOLTS meter indicates 131-140 volts. • Close the DC OUTPUT circuit breaker. STANDARD: Candidate should proceed to control charger 3CA. • AC INPUT CIRCUIT BREAKER is placed in the ON position. **Cue: Breaker is closed** • Verify the AC POWER FAILURE light is off. **Cue: AC POWER FAILURE light is off** • Verify after 20-30 seconds the DC VOLTS meter indicates 131-140 volts. **Cue: Point to the different voltages on the meter for the 20-30 seconds that it takes the voltage to reach an acceptable voltage.** • Close the DC OUTPUT circuit breaker. **Cue: DC OUTPUT circuit breaker is closed.** COMMENTS:	**CRITICAL TASK** ___ SAT ___ UNSAT

STEP 3:	Step 2.2.3 At MCC 3DCA: • Close 3DCA-1B (3CA BATT CHGR TO 3DCA BKR) • Open 3DCA-2B (3CS BATT CHGR TO 3CA BATT BKR)	**CRITICAL TASK** ___ SAT ___ UNSAT
STANDARD:	Control Battery Charger breaker is located on 3DCA and is closed in by rotating breaker switch handle from the OPEN position to the CLOSED position. **Cue: After candidate simulates closing breaker, Indicate to candidate that breaker is closed in.** CS Battery Charger breaker is located on 3DCA and is opened by rotating breaker switch handle from the CLOSED position to the OPEN position. **Cue: After candidate simulates opening breaker, indicate to candidate that breaker is open.**	
COMMENTS:		
STEP 4:	Step 2.2.4 At CONTROL CHARGER 3CA: • Verify CONTROL CHARGER 3CA is supplying the load as indicated on the DC OUTPUT meter. • Ensure ALARM ENABLE/DEFEAT switch in "ENABLE".	___ SAT ___ UNSAT
STANDARD:	The DC PUTPUT meter is observed and verified to indicate load on the battery charger.	
Cue: Indicate to candidate that the DC AMPERES meter indicates approximately 190 amps.		
	The ALARM ENABLE/DEFEAT switch is located on the Control Charger cabinet and placed in the ENABLE position.	
Cue: Indicate to candidate that the ALARM ENABLE/DEFEAT switch is in the ENABLE position.		
COMMENTS:		

STEP 5: Step 2.2.5 At CONTROL CHARGER 3CS: • Place the ALARM ENABLE/DEFEAT switch to DEFEAT. • Open the DC OUTPUT circuit breaker. • Open the AC INPUT circuit breaker. STANDARD: The ALARM ENABLE/DEFEAT switch is located on the Control Charger cabinet and placed in the DEFEAT position. **Cue: Indicate to candidate that the ALARM ENABLE/DEFEAT switch is in the ENABLE position.** • DC OUTPUT CIRCUIT BREAKER is placed in the OFF position. **Cue: After candidate simulates opening breaker, indicate to candidate that DC Output CIRCUIT BREAKER is open.** • AC INPUT CIRCUIT BREAKER is placed in the OFF position. **Cue: After candidate simulates opening breaker, indicate to candidate that AC INPUT CIRCUIT BREAKER is open.** COMMENTS: END TASK	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
2	Step 2 is necessary because it energizes the Control Charger and verifies that it can assume the loads on the DC busses.
3	Step 3 is necessary because it closes the breaker from the Control Charger to the MCC to pick up loads prior to the shutdown of the Standby Charger.

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

INITIAL CONDITIONS:

Last week, the 3CA Control Battery Charger was removed from service on Unit 3 which is currently operating at 100% power. I&E personnel have informed the Control Room SRO that 3CA Control Battery Charger is ready to be placed back in service. The Standby Control Battery Charger is currently in service. "Removal From Service and Restoration To Service of Control Charger CA" Enclosure of OP/3/A/1107/10 has been completed up to Step 2.2.

INITIATING CUES:

The Control Room SRO directs you to place the 3CA Control Battery Charger in service and remove the Standby Control Battery Charger from service on Unit 3 by procedure beginning at Step 2.2.

1. Initial Conditions

_____ 1.1 CONTROL CHARGER 3CS is **NOT** supplying 3CB BATTERY.

_____ 1.2 Review Limits and Precautions.

2. Procedure

NOTE:	Red Tags should be attached per appropriate R&R.

2.1 Removal From Service:

2.1.1 At MCC 3XS3:

_____ _____ A. Ensure closed 3XS3-2C (3CS STDBY BATT CHGR BKR).

2.1.2 At CONTROL CHARGER 3CS:

_____ _____ A. Close AC INPUT circuit breaker.

_____ _____ B. Verify AC POWER FAILURE light is off.

_____ _____ C. Verify after 20-30 seconds DC OUTPUT volts meter indicates 131-140 Volts.

_____ _____ D. Close DC OUTPUT circuit breaker.

_____ E. Place ALARM ENABLE/DEFEAT switch to "ENABLE".

2.1.3 At MCC 3DCB:

_____ _____ A. **IF** required, lock and remove Kirk Key from 3DCB-2B (3CS BATT CHGR TO 3CB BATT BKR) compartment.

2.1.4 At MCC 3DCA:

____ ____ A. Unlock Kirk Key interlock inside 3DCA-2B (3CS BATT CHGR TO 3CA BATT BKR) compartment.

____ ____ B. Close 3DCA-2B (3CS BATT CHGR TO 3CA BATT BKR).

____ ____ C. Open 3DCA-1B (3CA BATT CHGR TO 3DCA BKR).

2.1.5 At CONTROL CHARGER 3CS:

____ ____ A. Verify CONTROL CHARGER 3CS is supplying load as indicated on DC OUTPUT amperes meter.

2.1.6 At CONTROL CHARGER 3CA:

____ A. Place ALARM ENABLE/DEFEAT switch to "DEFEAT".

____ ____ B. Open DC OUTPUT circuit breaker.

____ ____ C. Open AC INPUT circuit breaker.

____ ____ 2.1.7 **IF** Electrical Maintenance requests complete battery charger isolation, open 3XS1-F4A (3CA BATT CHARG BKR).

NOTE:	Red Tags should be removed per appropriate R&R.

2.2 Restoration To Service:

2.2.1 At MCC 3XS1:

_____ _____ A. Ensure closed 3XS1-F4A (3CA BATT CHARG BKR).

2.2.2 At CONTROL CHARGER 3CA:

_____ _____ A. Close AC INPUT circuit breaker.

_____ _____ B. Verify AC POWER FAILURE light is off.

_____ _____ C. Verify after 20-30 seconds DC OUTPUT volts meter indicates 131-140 Volts.

_____ _____ D. Close DC OUTPUT circuit breaker.

2.2.3 At MCC 3DCA:

_____ _____ A. Close 3DCA-1B (3CA BATT CHGR TO 3DCA BKR).

_____ _____ B. Open 3DCA-2B (3CS BATT CHGR TO 3CA BATT BKR).

2.2.4 At CONTROL CHARGER 3CA:

_____ _____ A. Verify CONTROL CHARGER 3CA is supplying load as indicated on DC OUTPUT amperes meter.

_____ B. Ensure ALARM ENABLE/DEFEAT switch in "ENABLE".

2.2.5 At CONTROL CHARGER 3CS:

_____ A. Place ALARM ENABLE/DEFEAT switch to "DEFEAT".

_____ _____ B. Open DC OUTPUT circuit breaker.

_____ _____ C. Open AC INPUT circuit breaker.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-107
With Reactor Critical,
Increase Power From 1.5% to 15%

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

With the Reactor Critical, increase power from 1.5% to 15%

Alternate Path:

No

Facility JPM #:

CRO-107

K/A Rating(s):

System: 001
K/A: A3.01
Rating: 4.1/4.0

Task Standard:

1. Follow procedure correctly and place the ICS in automatic.
2. Increase reactor power within the allowable maneuvering limit and heatup limit.
3. Maintain Pressurizer level <260 inches.

Preferred Evaluation Location:

Simulator __X__ In-Plant ______

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

OP/1/A/1102/01, Enclosure 4.17, Unit Startup From 532°F And 2155 psig

PT/0/A/1103/020 (Power Maneuvering Predictions)

Validation Time: 30 minutes

Time Critical: NO

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Candidate: ____________________________________
NAME

Time Start: __________
Time Finish: _________

Performance Rating: SAT ______ UNSAT ______

Performance Time: __________

Examiner: ____________________________ __________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall Snap 204
2. Go to RUN

Tools/Equipment/Procedures Needed:

OP/1/A/1102/01, Enclosure 4.17, Unit Startup From 532°F and 2155 psig
PT/0/A/1103/020 (Power Maneuvering Predictions)

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 operated at 100% power for 128 days and was then shut down for a tube leak

Unit was shut down for 8 days

A reactor startup is in progress

Reactor power is ≈1.5%

Criticality was achieved within the acceptable limits of the ECP

No LCOs in effect

No equipment is OOS at this time

INITIATING CUES:

You are to continue with the reactor startup at step 2.36 of Enclosure 4.17 of OP/1/A/1102/01, Controlling Procedure for Unit Startup. The Control Room SRO has directed you to maintain Pressurizer level <260 inches.

START TIME: _______ Prebrief

Cue: Inform the students that all previous steps have been satisfactorily completed; however, the Limits and Precautions should be reviewed.

STEP 1: Step 2.36 Increase reactor power to ≈ 3%. STANDARD: Manually withdraw Control Rods to increase reactor power to 3%. Continue to Step 2.37 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: Step 2.37 Place the Reactor Master and the Diamond in "AUTO". STANDARD: The Reactor Master ICS Bailey control is located on 1UB1. The red AUTO pushbutton is depressed, and the white MANUAL light is observed to go OFF and the red AUTO light is observed to come ON. The Diamond Panel is located on 1UB1 and the AUTO/MANUAL button is depressed. The MANUAL indicating light is observed to go OUT and the AUTO indicating light is observed to come ON. Continue to Step 2.38 **NOTE: Reactor Power MUST be ≥ 2% in order for the ICS to go into AUTO.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 3: Step 2.38 Ensure complete Enclosure "Prior To Entry Into MODE1" of PT/1/A/0630/001 (Mode Change Verification). STANDARD: Ensure complete Enclosure "Prior To Entry Into MODE1" of PT/1/A/0630/001 (Mode Change Verification). Continue to Step 2.39 ***Cue: Inform candidate that Enclosure "Prior To Entry Into MODE1" of PT/1/A/0630/001 (Mode Change Verification) is complete.*** COMMENTS:	___ SAT ___ UNSAT

STEP 4:	Step 2.39 Review mechanical maneuvering rates and allowable ramp rates in PT/0/A/1103/020 (Power Maneuvering Predictions).	___ SAT ___ UNSAT
STANDARD:	Review PT/0/A/1103/020 and determine that the maneuvering rate in affect is ≤ 30%/hour up to 100% power. (Fully conditioned fuel-return to power) Continue to Step 2.40	
COMMENTS:		
STEP 5:	Step 2.40 Begin power increase to 15% to 19% as follows: • Perform Enclosure 4.23 “CTP Adjustments”. • During power increase, begin adjusting 1HP-120 (RC VOLUME CONTROL) setpoint to 220”.	___ SAT ___ UNSAT
STANDARD:	Continue to Enclosure 4.23 “CTP Adjustments”. Begin adjusting 1HP-120 (RC VOLUME CONTROL) setpoint to 220”. Continue to Step 1.1	
COMMENTS:		
STEP 6:	Enclosure 4.23 “CTP Adjustments” Step 1.1 Verify REACTOR MASTER in "AUTO".	___ SAT ___ UNSAT
STANDARD:	REACTOR MASTER is verified in "AUTO" by observing the “AUTO” light is illuminated on the reactor bailey. Continue to Step 1.2	
COMMENTS:		

STEP 7:	Enclosure 4.23 "CTP Adjustments" Step 1.2 Verify DIAMOND in "AUTO".	___ SAT
STANDARD:	DIAMOND is verified in "AUTO" by observing the "AUTO" light is illuminated on the Diamond. Continue to Step 1.3	___ UNSAT
COMMENTS:		
STEP 8:	Enclosure 4.23 "CTP Adjustments" Step 1.3 Review Limits And Precautions.	___ SAT
STANDARD:	Limits And Precautions are reviewed. Continue to Step 2.1	___ UNSAT
COMMENTS:		
STEP 9:	Enclosure 4.23 "CTP Adjustments" Step 2.1 IF hold in power is desired, ensure "HOLD" selected.	___ SAT
STANDARD:	Select "HOLD" if desired. Continue to Step 2.2	___ UNSAT
COMMENTS:		

STEP 10: Enclosure 4.23 "CTP Adjustments" Step 2.2 **IF** hold in power **NOT** required, ensure "HOLD" is **NOT** selected. STANDARD: De-select "HOLD" if desired. Continue to Step 2.3 COMMENTS:	___ SAT ___ UNSAT
CAUTION: Do **NOT** exceed power level allowed in controlling enclosure. STEP 11: Enclosure 4.23 "CTP Adjustments" Step 2.3 **IF** change in power/rate is desired, STANDARD: Determine a change in power/rate is desired. Continue to Step 2.3.1 COMMENTS:	___ SAT ___ UNSAT

STEP 12: Step 2.3.1
Review the following regarding current power change:
• PT/0/A/1103/020 (Power Maneuvering Guidelines)
• If applicable, PT/0/A/0811/001 (Power Escalation Test)
• If applicable, Maneuvering Plan
• Core Operating Limits Report:
  ○ CRD Groups 5-8 position limits
  ○ Core Power Imbalance limits
  ○ Quadrant Power Tilt limits
 	
STANDARD: Review PT/0/A/1103/020 (Power Maneuvering Guidelines) regarding current power change.
 	
Note: Candidate may elect not to review Power Maneuvering Guidelines because they were just reviewed.
 	
Cue: Inform candidate that other parts of this step will be performed by the SRO.
 	
Continue to Step 2.3.2
 	
COMMENTS:
	___ SAT
	
	___ UNSAT

STEP 13: Step 2.3.2 Ensure "HOLD" is selected. STANDARD: Ensure "HOLD" is selected by depressing the "HOLD" pushbutton and verifying the light illuminates. Continue to Step 2.3.3 COMMENTS:	___ SAT ___ UNSAT

<u>STEP 14</u>:	Step 2.3.3 Ensure selected "%/MIN" or "%/HR" on "RATE SET" pushbutton.	___ SAT ___ UNSAT
<u>STANDARD</u>:	Ensure "%/MIN" or "%/HR" on "RATE SET" pushbutton is selected. Continue to Step 2.3.4	
<u>COMMENTS</u>:		
<u>STEP 15</u>:	Step 2.3.4 Ensure desired rate selected on "RATE SET" thumbwheels.	___ SAT ___ UNSAT
<u>STANDARD</u>:	Select desired rate on the RATE SET thumbwheels to stay within maneuvering limit and heatup limit. Continue to Step 2.3.5	
<u>COMMENTS</u>:		
<u>STEP 16</u>:	Step 2.3.5 Ensure rate selected is within above limits.	___ SAT ___ UNSAT
<u>STANDARD</u>:	Rate selected is determined to be within above limits. Continue to Step 2.3.6	
<u>COMMENTS</u>:		

STEP 17: Step 2.3.6 Insert desired CTPD SET using "INCREASE/DECREASE" pushbuttons. STANDARD: CTPD SET should be set to 15% - 19% power using the "INCREASE" pushbutton. Continue to Step 2.3.7 COMMENTS:	___ SAT ___ UNSAT
STEP 18: Step 2.3.7 Ensure CTPD SET is within above limits. STANDARD: CTPD SET is determined to be within above limits. Continue to Step 2.3.8 COMMENTS:	___ SAT ___ UNSAT
STEP 19: Step 2.3.8 Ensure "HOLD" is **NOT** selected. STANDARD: Ensure "HOLD" is **NOT** selected by verifying the "HOLD" light is not illuminated. **Note: power will begin to increase when the "HOLD" button is depressed.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 20: Increase reactor power to 15% to 19% and maintain PZR level < 260". STANDARD: Power is increased at less than 30%/hour and PZR level is maintained < 260". Adjust letdown flow and/or adjust RATE SET thumbwheels to control Pressurizer level <260 inches during the heatup. **OR** The candidate may select "HOLD" as required to stabilize plant conditions ***Cue: Another operator will complete required steps in the S/U procedure until 15% power is reached. Continue reactor power increase to 15% to 19% and maintain PZR level < 260".*** **Note: When the candidate demonstrates that the power increase can be performed and the plant maintained within the guidelines of the JPM, the examiner may terminate the JPM** COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ___________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	Required to increase reactor power.
2	Required to place ICS in AUTO.
19	Power will not increase unless the HOLD button is depressed.
20	Required to increase power and maintain PZR level < 260 inches.

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

INITIAL CONDITIONS:

Unit operated at 100% power for 128 days and was then shut down for a tube leak

Unit was shut down for 8 days

A reactor startup is in progress

Reactor power is ≈1.5%

Criticality was achieved within the acceptable limits of the ECP

No LCOs in effect

No equipment is OOS at this time

INITIATING CUES:

You are to continue with the reactor startup at step 2.36 of Enclosure 4.17 of OP/1/A/1102/01, Controlling Procedure for Unit Startup. The Control Room SRO has directed you to maintain Pressurizer level <260 inches.

NOTE:
- POAH is normally achieved from 0.05 to 0.15% power on Wide Range Indications. {27}
- When POAH is achieved: TBVs will begin to open, 1HP-120 will begin to close, T_{AVE} will increase, & SUR will decrease with negative Moderator Temperature Coefficient. {27} (R.M.)

CAUTION: > 0.5 DPM SUR may lead to plant stability problems, when POAH is reached. {27}

____ ____ 2.36 Increase reactor power to ≈3% FP. (R.M.)
SRO

NOTE:
- T_{AVE} error is blocked when on Low Level Limit and T_{AVE} is < setpoint.
- Core reactivity effects are minimized with RX in automatic. (R.M.)

2.37 At ≈3% Power as indicated on NI-5, NI-6, and NI-9 (ICS median select): {23} (R.M.)

____ ____ 2.37.1 Place REACTOR MASTER to "AUTO".

____ ____ 2.37.2 Place DIAMOND to "AUTO".

____ ____ 2.38 Ensure complete Enclosure "Prior To Entry Into MODE 1" of PT/1/A/0630/001 (Mode Change Verification).
SRO

____ ____ 2.39 Review mechanical maneuvering rates and allowable ramp rates in PT/0/A/1103/020 (Power Maneuvering Guidelines). {54} (R.M.)
SRO

2.40 <u>Begin</u> power increase to 15% to 19% as follows:

____ 2.40.1 Perform Enclosure 4.23 "CTP Adjustments".

____ 2.40.2 During power increase, <u>begin</u> adjusting 1HP-120 (RC VOLUME CONTROL) setpoint to 220".

NOTE:	Intermediate indication for Main FDW Block Valves may occur due to FDW SU Valve demand dropping below 50% when above 10% power. Main FDW Block Valves will **NOT** close when above 10% power. {42}

2.41 **WHEN** 1FDW-35 (1A STARTUP FDW CONTROL) **AND** 1FDW-44 (1B STARTUP FDW CONTROL) are 90% OPEN, perform the following: (continue)

_____ 2.41.1 Verify 1FDW-31 switch (1A MAIN FDW BLOCK) "AUTO".

_____ 2.41.2 Verify open 1FDW-31 (1A MAIN FDW BLOCK).

_____ 2.41.3 Verify 1FDW-40 switch (1B MAIN FDW BLOCK) "AUTO".

_____ 2.41.4 Verify open 1FDW-40 (1B MAIN FDW BLOCK).

NOTE:	• Turbine Overspeed Testing is required if front standard work was performed. • Turbine Exhaust Hood temperatures need to be ≥ 100°F.

_____ 2.42 **IF** Turbine-Generator Overspeed Testing during startup is required, begin raising Exhaust Hood Temperatures OP/1/A/1106/001 (Turbine Generator).

NOTE:	OP/0/A/1106/031 (Primary to Secondary Leak Rate Monitoring and Instrumentation) contains guidance for SG tube leak detection during transient Xenon operation.

_____ 2.43 **WHEN** Reactor Power is ≈ 5%, begin OP/0/A/1106/031 (Primary to Secondary Leak Rate Monitoring and Instrumentation). {18}

2.44 **WHEN** Reactor Power is > 5%:

_____ • Ensure MODE 1 selected on OAC.

_____ • Announce on Plant Page "Unit 1 has entered MODE 1".

_____ • Notify Assistant Outage Manager of Unit 1 entry into MODE 1.

______________________ ______/______
Person Contacted Date Time

_____ • Print OAC "Alarm Screen Report", "Point Processing Status Log", & route to Ops Support.

____ 2.45 **IF** required, secure QT recirc per OP/1/A/1104/017 (Quench Tank Operation). {26}

- ____ • Remove "T/O Sheet" CR Tag on COMPONENT DRAIN PUMP.
- ____ • Remove "T/O Sheet" CR Tag on QUENCH TANK DRAIN PUMP.
- ____ • Remove note from Turnover sheet: "QT in recirc per S/U procedure".

2.46 **WHEN** T_{AVE} reaches ≈ 560°F, ensure open:

- ____ • 1SD-421 (#1 SV BEFORE SEAT DRN).
- ____ • 1SD-420 (#2 SV BEFORE SEAT DRN).
- ____ • 1SD-419 (#3 SV BEFORE SEAT DRN).
- ____ • 1SD-418 (#4 SV BEFORE SEAT DRN).

NOTE:	Delaying Steam Chest and Shell Warming can cause outage delays.

____ 2.47 Refer to OP/1/A/1106/001 (Turbine Generator) for startup of Turbine Generator. (Continue)

2.48 Isolate minimum feed valves:

- ____ • Close 1FDW-127 (1A FDW Header Drn Block). (T-3-M22)
- ____ • Close 1FDW-216 (1B FDW Header Drn Block). (T-3-M23)
- ____ • Close 1FDW-237 (1B S/G FDW Hdr Drain). (T-3-L23)

NOTE:	Enclosure 4.23 "CTP Adjustments" is available to hold, stop, or start power increase.

2.49 **WHEN** Reactor Power is 15% to 19%: {58}

____ 2.49.1 Ensure Pzr level ≈ 220".

____ 2.49.2 Ensure 1HP-120 (RC VOLUME CONTROL) setpoint at 220".

____ 2.49.3 Ensure 1HP-120 in "AUTO".

____ 2.50 Go To Enclosure 4.21 "Unit Startup From MODE 1".

1. Initial Conditions

_____ 1.1 Verify REACTOR MASTER in "AUTO".

_____ 1.2 Verify DIAMOND in "AUTO".

_____ 1.3 Review Limits And Precautions.

2. Procedure (R.M.) {67}

_____ 2.1 **IF** hold in power is desired, ensure "HOLD" selected. {61}

_____ 2.2 **IF** hold in power **NOT** required, ensure "HOLD" is **NOT** selected. {61}

CAUTION: Do **NOT** exceed power level allowed in controlling enclosure.

2.3 **IF** change in power/rate is desired,

_____ 2.3.1 Review the following regarding current power change:

- ☐ PT/0/A/1103/020 (Power Maneuvering Guidelines)
- ☐ If applicable, PT/0/A/0811/001 (Power Escalation Test)
- ☐ If applicable, Maneuvering Plan
- ☐ Core Operating Limits Report:
  - CRD Groups 5-8 position limits
  - Core Power Imbalance limits
  - Quadrant Power Tilt limits

_____ 2.3.2 Ensure "HOLD" is selected. {61}

_____ 2.3.3 Ensure selected "%/MIN" or "%/HR" on "RATE SET" pushbutton.

_____ 2.3.4 Ensure desired rate selected on "RATE SET" thumbwheels.

_____ SRO _____ 2.3.5 Ensure rate selected is within above limits.

_____ 2.3.6 Insert desired CTPD SET using "INCREASE/DECREASE" pushbuttons.

_____ SRO _____ 2.3.7 Ensure CTPD SET is within above limits.

_____ 2.3.8 Ensure "HOLD" is **NOT** selected. {61}

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-200

Re-establish RCP Seal Injection and Normal RCS Makeup following loss of operating HPI Pump

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Re-establish RCP Seal Injection and Normal RCS Makeup following loss of operating HPI Pump

Alternate Path:

NO

Facility JPM #:

CRO-200

K/A Rating(s):
System: APE 022
K/A: AA1.01
Rating: 3.4/3.3

Task Standard:

AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection, is used to Re-establish RCP Seal Injection and Normal RCS Makeup.

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection

Validation Time: 15 minutes

Time Critical: NO

==

Candidate: ______________________________
NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ________________________ ____________________________/_______
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall IC-30
2. Import files for CRO-200
3. Go to run
4. When directed by examiner Fire timer 1

Tools/Equipment/Procedures Needed:

AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection

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 MODE 1 at 100% power
No equipment OOS

INITIATING CUES:

Respond to plant conditions.

START TIME: _______

STEP 1: Refer to ARG for Statalarms 1SA-2/B-2 (RCP Seal Inlet Header Flow Hi/Low) and 1SA-2/C-2 (Injection Pump Discharge Header Pressure Low) and then refer to AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection. STANDARD: Candidate refers to ARG for Statalarms 1SA-2/B-2 (RCP Seal Inlet Header Flow Hi/Low) and/or 1SA-2/C-2 (Injection Pump Discharge Header Pressure Low) and then refers to AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection. ***Cue: If candidate informs the SRO that the 1A HPI has a sheared shaft and would like to secure the 1A HPI pump, inform him to "secure the 1A HPI pump".*** ***Cue: If candidate informs the SRO that a loss of HPI has occurred. As the SRO, direct the candidate to perform AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection.*** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 3.1 **IAAT** RCP seal injection flow is lost, **AND** Component Cooling is lost, **THEN** perform the following: • Trip the Rx. • Stop <u>all</u> RCPs. • Initiate AP/25 (SSF EOP). STANDARD: Determine that this IAAT step does not apply because Component Cooling is available by observing 1A CC pump operating, about 900 gpm total CC flow. Continue to Step 3.2 COMMENTS:	___ SAT ___ UNSAT

STEP 3: Step 3.2 **IAAT** loss of suction to operating HPI pumps is indicated: • Motor amps low or cycling • Discharge pressure low or cycling • Abnormal LDST level trend **THEN GO TO** Step 3.3. ***Cue: If asked, indicate that none of the above conditions existed when the HPI pumps failed.*** STANDARD: Determine that a loss of suction to the HPI pumps has not occurred observing LDST level, pressure and HPI pump suction flow path. Use the RNO step to **GO TO** Step 4.7. Continue to Step 4.7 COMMENTS:	___ SAT ___ UNSAT
STEP 4: Step 4.7 Announce AP entry using PA system. STANDARD: Candidate announces AP entry using the PA system. Continue to Step 4.8 COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 4.8 Verify any HPI pump operating. STANDARD: Determine that NO HPI pumps are operating. The 1A HPI pump has no "amps" and the 1B HPI pump has not auto started. Perform the RNO steps. Continue to Step 4.8 RNO COMMENTS:	___ SAT ___ UNSAT

STEP 6:	Step 4.8 RNO (1) Close 1HP-5 (Letdown Isolation).	___ SAT
STANDARD:	1HP-5 located on 1UB1 is closed.	___ UNSAT
COMMENTS:		
STEP 7:	Step 4.8 RNO (2) Ensure 1HP-120 (RC Volume Control) in HAND and closed.	___ SAT
STANDARD:	1HP-120, located on 1UB1 is placed in HAND by depressing the white button and using the toggle switch to close 1HP-120 (Green position indicating light and "0" demand).	___ UNSAT
COMMENTS:		
STEP 8:	Step 4.8 RNO (3) Place 1HP-31 (RCP Seal Flow Control) in HAND and close.	**CRITICAL STEP** ___ SAT
STANDARD:	1HP-31, located on 1UB1 is placed in HAND by depressing the white button and using the toggle switch to close 1HP-31 (Green position indicating light and "0" demand)..	___ UNSAT
COMMENTS:		
STEP 9:	Step 4.8 RNO (4) Attempt to start the standby HPI pump.	**CRITICAL STEP** ___ SAT
STANDARD:	"1B" HPI pump, located on 1UB1 is started by taking the switch to the START position. Pump verified to be operating by red "on" light and pump amps.	___ UNSAT
COMMENTS:		

STEP 10:	Step 4.8 RNO (5) **IF** standby HPI pump started, **THEN GO TO** Step 4.115.	___ SAT ___ UNSAT
STANDARD:	Determine that the 1B HPI pump started by observing pump amps and discharge pressure > 3000 psig on 1UB1. **GO TO** Step 4.115. Continue to Step 4.115	
COMMENTS:		
STEP 11:	Step 4.115 Place 1HP-31 (RCP Seal Flow Control) in HAND.	___ SAT ___ UNSAT
STANDARD:	Verify 1HP-31, located on 1UB1, in HAND by observing the white HAND light lit. Continue to Step 4.116	
COMMENTS:		
STEP 12:	Step 4.116 Slowly open 1HP-31 (RCP Seal Flow Control) in small increments until ≈ 8 gpm/RCP is achieved.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Use the toggle switch to slowly open 1HP-31 until ≈ 8 gpm/RCP is achieved. RCP Seal flow to each RCP is monitored on VB3. Continue to Step 4.117	
COMMENTS:		

STEP 13: Step 4.117 Re-establish normal makeup through 1HP-120 (RC Volume Control). STANDARD: 1HP-120 is returned to normal by: • Slowly opening 1HP-120 with the toggle switch to establish makeup flow. Monitor RC Makeup Flow gauge located on 1UB1 to determine makeup rate. • *When PZR level is near setpoint (220") 1HP-120 may be placed in auto. ***Step not critical.** ***Cue: When normal makeup has been re-established, inform the candidate that this JPM is complete.*** COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ___________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
7	1HP-31 should be closed prior to restarting an HPI pump to prevent RCP seal damage from hydraulic shock.
8	An HPI pump must be started to reestablished RCP seals and normal makeup.
11	1HP-31 must be opened to establish RCP seal flow.
12	1HP-120 must be opened to establish normal makeup.

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

INITIAL CONDITIONS:

Unit 1 in MODE 1 at 100% power
No equipment OOS

INITIATING CUES:

Respond to plant conditions.

Sim
Brief
SR
115
HLP
GCW
HLP class

NSD 703 (R04-01)

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No AP/1/A/1700/014
Revision No 014

OTC MASTER FILE

PREPARATION

(2) Station OCONEE NUCLEAR STATION

(3) Procedure Title Loss of Normal HPI Makeup and/or RCP Seal Injection

(4) Prepared By A.S. Hollingsworth (Signature) Anthony Scott Hollingsworth Date 02-07-05

(5) Requires NSD 228 Applicability Determination?
☒ Yes (New procedure or revision with major changes)
☐ No (Revision with minor changes)
☐ No (To incorporate previously approved changes)

(6) Reviewed By Barry Honeycutt (QR) Date 2-16-05
Cross-Disciplinary Review By Jason D Patton (ENGINEERING)(QR)NA ______ Date 2-28-05
Reactivity Mgmt Review By ______ (QR)NA BTH Date 2-16-05
Mgmt Involvement Review By ______ (Ops Supt) NA BTH Date 2-16-05

(7) Additional Reviews
Reviewed By ______ Date ______
Reviewed By ______ Date ______

(8) Temporary Approval *(if necessary)*
By ______ (OSM/QR) Date ______
By ______ (QR) Date ______

(9) Approved By ______ Date 2/28/05

PERFORMANCE ***(Compare with control copy every 14 calendar days while work is being performed.)***

(10) Compared with Control Copy ______ Date ______
Compared with Control Copy ______ Date ______
Compared with Control Copy ______ Date ______

(11) Date(s) Performed ______
Work Order Number (WO#) ______

COMPLETION

(12) Procedure Completion Verification:
☐ Unit 0 ☐ Unit 1 ☐ Unit 2 ☐ Unit 3 Procedure performed on what unit?
☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
☐ Yes ☐ NA Required enclosures attached?
☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?
☐ Yes ☐ NA Charts, graphs, etc. attached, dated, identified, and marked?
☐ Yes ☐ NA Procedure requirements met?

Verified By ______ Date ______

(13) Procedure Completion Approved ______ Date ______

(14) Remarks ***(Attach additional pages, if necessary)***

Duke Power Company Oconee Nuclear Station **Loss of Normal HPI Makeup and/or RCP Seal Injection**	Procedure No. AP/**1**/A/1700/014 Revision No. 014 Electronic Reference No. OX002RGR

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1. Entry Conditions

1.1 Loss of or leak from any of the following:

- Normal HPI makeup
- RCP seal injection to any RCP

1.2 Directed entry from any of the following:

- AP/1/A/1700/016 (Abnormal Reactor Coolant Pump Operation)
- Alarm Response Guide

2. Automatic Systems Actions {3}

2.1 Standby HPI pump starts on low RCP seal injection flow (22 gpm).

2.2 All RCP seal return valves close upon loss of both RCP seal injection (< 22 gpm) and CC (< 575 gpm) with RCS pressure > 400 psig.

3. Immediate Manual Actions

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.1 **IAAT** RCP seal injection flow is lost, **AND** Component Cooling is lost, **THEN** perform the following: A. __ Trip the Rx. B. __ Stop all RCPs. C. __ Initiate AP/25 (SSF EOP).	
3.2 __ **IAAT** loss of suction to operating HPI pumps is indicated: • Motor amps low or cycling • Discharge pressure low or cycling • Abnormal LDST level trend **THEN GO TO** Step 3.3.	__ **GO TO** Step 4.7.
3.3 __ Stop all HPI pumps.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

4. Subsequent Actions

ACTION/EXPECTED RESPONSE		RESPONSE NOT OBTAINED
4.1	__ Close 1HP-5.	
4.2	__ Announce AP entry using PA System.	
4.3	__ Place 1HP-120 in HAND and close.	
4.4	__ Place 1HP-31 in HAND and close.	
4.5	Verify RCP seal injection or HPI makeup line leak indicated by <u>any</u> of the following: __ Report of line leak __ Abnormal LDST level decrease __ 1RIA-32 (AUX BLDG GAS) __ 1RIA-45 (NORM VENT GAS) __ RB RIAs in alarm __ Abnormal RBNS level increase __ Abnormal LAWT or HAWT level increase	__ **GO TO** Step 4.15.
4.6	__ **GO TO** Step 4.134.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.7 ___ Announce AP entry using PA System.	
4.8 ___ Verify <u>any</u> HPI pump operating.	1. ___ Close 1HP-5. 2. ___ Place 1HP-120 in HAND and close. 3. ___ Place 1HP-31 in HAND and close. 4. ___ Attempt to start the standby HPI pump. 5. ___ **IF** standby HPI pump started, **THEN GO TO** Step 4.115. 6. ___ **GO TO** Step 4.15.
4.9 Verify RCP seal injection or HPI makeup line leak indicated by <u>any</u> of the following: ___ Report of line leak ___ Abnormal LDST level decrease ___ 1RIA-32 (AUX BLDG GAS) ___ 1RIA-45 (NORM VENT GAS) ___ RB RIAs in alarm ___ Abnormal RBNS level increase ___ Abnormal LAWT or HAWT level increase	___ **GO TO** Step 4.11.
4.10 ___ **GO TO** Step 4.133.	
4.11 ___ Verify RCP seal injection flow exists to <u>any</u> RCP.	1. ___ Start the standby HPI pump. 2. ___ Place 1HP-31 in HAND and close. 3. ___ **GO TO** Step 4.15.
4.12 ___ **IAAT** <u>any</u> RCP seal return temperature is > 240°F, **THEN** notify Engineering to evaluate seal return penetration operability. {4}	
4.13 ___ Verify 1HP-120 has failed.	___ **WHEN** conditions permit, **THEN EXIT** this procedure.
4.14 ___ **GO TO** Step 4.183.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.15 __ Ensure proper operation of CC System.	
4.16 Dispatch an operator to close the following (AB-3-306, Unit 1 CRD Filter Rm): __ 1HP-64 (1A1 RCP SEAL INJECTION THROTTLE) __ 1HP-65 (1A2 RCP SEAL INJECTION THROTTLE) __ 1HP-66 (1B1 RCP SEAL INJECTION THROTTLE) __ 1HP-67 (1B2 RCP SEAL INJECTION THROTTLE)	
4.17 __ **IAAT** <u>any</u> RCP seal return temperature is > 240°F, {4} **THEN** perform Steps 4.18 - 4.19.	__ **GO TO** Step 4.20.
4.18 Close the following: __ 1HP-20 __ 1HP-21	
4.19 __ Initiate AP/16 (Abnormal Reactor Coolant Pump Operation).	
4.20 __ Verify <u>all</u> RCP seal return temperatures ≤ 200°F. (Turn-on code "RCP")	__ **GO TO** Step 4.23.
4.21 Open the following: __ 1HP-20 __ 1HP-21	
4.22 Open the following for operating RCPs with seal return temperatures ≤ 200°F: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

(4.17) <u>any</u> RCP seal return temperature is > 240°F … (isolate seal return)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.23 __ **IAAT** <u>any</u> RCP seal return temperature is > 195°F, **THEN** perform Steps 4.24 - 4.25.	__ **GO TO** Step 4.26.
4.24 __ Start standby CC pump.	
4.25 __ Ensure LDST pressure ≥ 30 psig.	

NOTE

Continued operation with a loss of RCP seal injection is permitted provided the CC System is functioning normally and RCP operating limits are not exceeded.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.26 Notify OSM and RCP Component Engineer to provide the following: __ Immediate evaluation __ Additional monitoring requirements __ Extended limits	
4.27 __ Verify <u>any</u> HPI pump operating.	__ **GO TO** Step 4.29.
4.28 __ **GO TO** Step 4.73.	
4.29 __ Dispatch an operator to establish SSF RC Makeup per Encl 5.1 (SSF RC Makeup).	
4.30 __ **IAAT** an RCP has been shutdown for ≥ 30 minutes, **THEN** close the associated RCP motor cooler inlet/outlet valve: __ 1LPSW-7&8 (1A1 RCP) __ 1LPSW-9&10 (1B1 RCP) __ 1LPSW-13&14 (1A2 RCP) __ 1LPSW-11&12 (1B2 RCP)	
4.31 __ Verify 1C HPI Pump available.	__ **GO TO** Step 4.89.
4.32 Verify <u>all</u> the following conditions: __ Rx shutdown __ **NO** abnormal RCS leakage	__ **GO TO** Step 4.34.

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

(4.17) <u>any</u> RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) <u>any</u> RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

An RCS heatup of ≤ 10°F should provide sufficient time to recover an RCS makeup source per this procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.33 Initiate RCS heatup within the following limits to control Pzr level ≥ 100″: __ Subcooling Margin ≥ 5°F __ Heatup ≤ 10°F or as directed by TSC __ Within LPI maximum limit of 246°F (if applicable)	
4.34 Verify LDST is available as indicated by all the following: __ 1HP-23 open __ Both trains of LDST level indicate > 55″ __ LDST pressure normal __ **NO** abnormal pump motor current cycling prior to loss of failed pump	__ **GO TO** Step 4.39.
4.35 __ Close 1HP-27.	
4.36 __ Open 1HP-115.	
4.37 Dispatch an operator to perform the following: __ Open 1HP-116 (1B & 1C HPI PUMPS DISCHARGE HDR SEPARATION) (Remote operator on HPI hatch area wall at col. R-72, SE of 1B HPI Pump) __ Ensure 1HP-116 (1B & 1C HPI PUMPS DISCHARGE HDR SEPARATION) indicates open (2' SE 1B HPI Pump, 10' up). {2}	
4.38 __ **WHEN** 1HP-116 is open, **THEN GO TO** Step 4.60.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.17) any RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) any RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

The valve alignments in Encl 5.2 will allow the 1C HPI Pump to supply normal RCS makeup and RCP seal injection from the BWST. Minimum recirc for the 1C HPI Pump will be aligned to 1A BHUT.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.39 ___ Dispatch an operator to perform Encl 5.2 (Emergency Alignment of 1C HPI Pump for Normal Makeup).	
4.40 ___ Notify SPOC to perform Encl 5.3 (Defeating 1HP-14 (LDST BYPASS) Interlocks).	
4.41 ___ Close 1HP-27.	
4.42 ___ Close 1HP-26.	
4.43 ___ Open 1HP-25.	
4.44 ___ Close 1HP-17.	
4.45 ___ Close 1HP-18.	
4.46 ___ Close 1HP-19.	
4.47 ___ Verify a purification IX in service.	___ Open 1HP-13.
4.48 ___ Open 1CS-26.	
4.49 ___ Open 1CS-41.	
4.50 ___ Close 1CS-51.	
4.51 ___ Place 1HP-14 in BLEED.	
4.52 ___ Open 1HP-115.	
4.53 ___ Notify CR crew that deborating IXs should **NOT** be placed in service.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.17) any RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) any RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.54 __ **WHEN** notified that preliminary lineup for 1C HPI Pump is complete, **THEN** direct the operator to start 1C HPI Pump flush.	
4.55 __ **WHEN** notified that 1C HPI Pump flush has been started, **THEN** monitor HAWT level.	
4.56 __ **WHEN** HAWT level increases ≥ 5″, **THEN** notify operator in the HPI Pump Room to perform the following: __ Stop flushing 1C HPI Pump. __ Start venting 1C HPI Pump.	
4.57 __ **WHEN** notified that 1C HPI Pump venting has been started, **THEN** monitor HAWT level.	
4.58 __ **WHEN** HAWT level increases ≥ 5″, **THEN** notify operator in the HPI Pump Room to perform the following: __ Stop venting 1C HPI Pump. __ Complete Encl 5.2 (Emergency Alignment of 1C HPI Pump for Normal Makeup).	
4.59 __ **WHEN** notified that Encl 5.2 (Emergency Alignment of 1C HPI Pump for Normal Makeup) is complete, **THEN** continue this procedure.	
4.60 __ Start 1C HPI PUMP.	
4.61 Verify 1C HPI Pump normal operation: __ Pump amps return to normal __ Pump discharge pressure normal	1. __ Stop 1C HPI PUMP. 2. __ **GO TO** Step 4.89.

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

(4.17) <u>any</u> RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) <u>any</u> RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

If the suction of 1C HPI Pump is aligned from the BWST and the unit is at power, Rx shutdown rate will be affected due to BWST boron concentration.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.62 Ensure the following: __ 1HP-120 setpoint as desired __ 1HP-120 in AUTO	
4.63 __ Log thermal cycle of 1A HPI header.	
4.64 __ **IAAT** CC System is operating properly, **AND** letdown flow is desired, **THEN** perform Steps 4.65 - 4.71 to re-establish letdown.	**GO TO** Step 4.72.
4.65 __ Reduce 1HP-7 demand to 0%.	
4.66 __ Close 1HP-6.	
4.67 Open the following: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
4.68 __ Open 1HP-5.	
4.69 __ Throttle open 1HP-7 for ≈ 20 gpm letdown flow.	
4.70 __ Open 1HP-6.	
4.71 __ Adjust 1HP-7 for desired letdown flow.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.17) any RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) any RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

(4.64) CC is operating properly and LD flow is desired … (re-establish LD)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.72 __ **WHEN** seal injection can be restored to the RCPs from HPI, **THEN** locally open 1HP-139 (RCP SEAL FLOW CONTROL OUTLET) (A-3-306, Unit 1 CRD Filter Rm).	
4.73 __ **WHEN** the following are closed: __ 1HP-64 (1A1 RCP SEAL INJECTION THROTTLE) __ 1HP-65 (1A2 RCP SEAL INJECTION THROTTLE) __ 1HP-66 (1B1 RCP SEAL INJECTION THROTTLE) __ 1HP-67 (1B2 RCP SEAL INJECTION THROTTLE) **THEN** increase 1HP-31 demand to ≈ 50%.	__ Locally open 1HP-140 (RCP SEAL FLOW CONTROL BYPASS) (A-3-306, Unit 1 CRD Filter Rm).

CAUTION

Re-establishing injection flow to the RCP seals too fast may cause thermal shock which could damage the RCP or RCP seal. RCP seal return and RCP bearing temperature changes should be limited to an average of 1°F/min.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.74 Locally throttle open the following to establish ≈ 8 gpm/RCP while limiting RCP seal return temperature change to an average of 1°F/min (A-3-306, Unit 1 CRD Filter Rm): __ 1HP-64 (1A1 RCP SEAL INJECTION THROTTLE) __ 1HP-65 (1A2 RCP SEAL INJECTION THROTTLE) __ 1HP-66 (1B1 RCP SEAL INJECTION THROTTLE) __ 1HP-67 (1B2 RCP SEAL INJECTION THROTTLE)	
4.75 __ **WHEN** SEAL INLET HDR FLOW ≈ 32 gpm, **AND** 1HP-31 demand 45 - 55%, **THEN** place 1HP-31 in AUTO.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost ... (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated ... (stop <u>all</u> HPI pumps)

(4.17) <u>any</u> RCP seal return temperature is > 240°F ... (isolate seal return)

(4.23) <u>any</u> RCP seal return temperature is > 195°F ... (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes ... (secure LPSW)

(4.64) CC is operating properly and LD flow is desired ... (re-establish LD)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.76 __ Verify seal injection flow of ≈ 8 gpm/RCP.	Locally re-adjust RCP seal injection throttle valves as necessary to achieve ≈ 8 gpm seal injection flow per RCP (A-3-306, Unit 1 CRD Filter Rm): __ 1HP-64 (1A1 RCP SEAL INJECTION THROTTLE) __ 1HP-65 (1A2 RCP SEAL INJECTION THROTTLE) __ 1HP-66 (1B1 RCP SEAL INJECTION THROTTLE) __ 1HP-67 (1B2 RCP SEAL INJECTION THROTTLE)
4.77 __ Monitor RCP seal parameters.	
4.78 __ Verify 1C HPI Pump operating.	__ **GO TO** Step 4.83.
4.79 __ Notify the SSF operator to secure SSF RC Makeup per Encl 5.1 (SSF RC Makeup).	
4.80 __ Verify 1C HPI Pump suction from BWST.	**GO TO** Step 4.83.
4.81 __ Commence unit shutdown per the following applicable procedure: • OP/1/A/1102/004 (Operation at Power) • OP/1/A/1102/010 (Controlling Procedure for Unit Shutdown)	

CAUTION

Reactivity Management Concern:

- Makeup to the BWST from 1A BHUT will provide a complete recirc flowpath for 1C HPI Pump.
- BWST boron concentration will decrease due to this lineup.
- Boric acid addition to the BWST may be necessary.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.82 __ Initiate makeup to the BWST per OP/1/A/1104/004A (BWST Operation).	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

(4.17) <u>any</u> RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) <u>any</u> RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

(4.64) CC is operating properly and LD flow is desired … (re-establish LD)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.83 Open the following: __ 1HP-20 __ 1HP-21 __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230	
4.84 __ **IAAT** RCP restart is desired, **THEN** perform Steps 4.85 - 4.86.	__ **GO TO** Step 4.87.
4.85 __ Notify RCP Component Engineer of desire to restart an RCP.	
4.86 __ Restart RCPs per OP/1/A/1103/006 (RCP Operation) as desired.	
4.87 Stop the following and place in AUTO, as desired: __ Standby HPI pump __ Standby CC pump	
4.88 __ **WHEN** conditions permit, **THEN EXIT** this procedure.	

• • • END • • •

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.17) any RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) any RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.89 __ Verify unit is at power.	__ **GO TO** Step 4.91.
4.90 __ Commence unit shutdown at 1%/min per the following applicable procedure: • OP/1/A/1102/004 (Operation at Power) • OP/1/A/1102/010 (Controlling Procedure for Unit Shutdown)	
4.91 __ **IAAT** <u>any</u> source of makeup or seal injection flow is established, **AND NO** letdown flow exists, **THEN** perform Steps 4.92 - 4.98 to re-establish letdown.	__ **GO TO** Step 4.99.
4.92 __ Ensure Component Cooling System operating properly.	
4.93 __ Reduce 1HP-7 demand to 0%.	
4.94 __ Close 1HP-6.	
4.95 Open the following: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
4.96 __ Open 1HP-5.	
4.97 __ Throttle open 1HP-7 for ≈ 20 gpm letdown flow.	
4.98 Perform the following as necessary to obtain desired letdown flow: __ Open 1HP-6. __ Adjust 1HP-7.	
4.99 __ Makeup to SFP as necessary to maintain normal level per OP/1&2/A/1104/006C (SFP Makeup).	
4.100 __ Activate the TSC and OSC.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.17) any RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) any RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

(4.91) any source of makeup or seal injection flow is established **AND NO** LD flow exists … (re-establish LD)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.101 __ **WHEN** Rx is shutdown, **THEN** maintain stable plant conditions until <u>one</u> of the following occurs: __ An HPI pump is restored to service __ TSC provides cooldown directions	

NOTE

HPI pump minimum flow is met with > 50 gpm makeup flow until RCP seal injection is re-established.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.102 __ **WHEN** normal makeup is available, **THEN** perform the following: A. __ Establish normal makeup. B. __ Place 1HP-120 in AUTO with setpoint per the shutdown procedure in effect. C. __ Re-establish letdown. D. __ Log thermal cycle of 1A HPI header.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.17) any RCP seal return temperature is > 240°F … (isolate seal return)

(4.23) any RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes … (secure LPSW)

(4.91) any source of makeup or seal injection flow is established **AND NO** LD flow exists … (re-establish LD)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.103 **WHEN** seal injection can be restored to the RCPs, **THEN** locally open 1HP-139 (RCP SEAL FLOW CONTROL OUTLET) (A-3-306, Unit 1 CRD Filter Rm).	
4.104 __ Increase 1HP-31 demand to ≈ 50%.	__ Locally open 1HP-140 (RCP SEAL FLOW CONTROL BYPASS) (A-3-306, Unit 1 CRD Filter Rm).

CAUTION

Re-establishing injection flow to the RCP seals too fast may cause thermal shock which could damage the RCP or RCP seal. RCP seal return and RCP bearing temperature changes should be limited to an average of 1°F/min.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.105 Locally throttle open the following to establish ≈ 8 gpm/RCP while limiting RCP seal return temperature change to an average of 1°F/min (A-3-306, Unit 1 CRD Filter Rm): __ 1HP-64 (1A1 RCP SEAL INJECTION THROTTLE) __ 1HP-65 (1A2 RCP SEAL INJECTION THROTTLE) __ 1HP-66 (1B1 RCP SEAL INJECTION THROTTLE) __ 1HP-67 (1B2 RCP SEAL INJECTION THROTTLE)	
4.106 __ **WHEN** SEAL INLET HDR FLOW ≈ 32 gpm, **AND** 1HP-31 demand 45 - 55%, **THEN** place 1HP-31 in AUTO.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost ... (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated ... (stop <u>all</u> HPI pumps)

(4.17) <u>any</u> RCP seal return temperature is > 240°F ... (isolate seal return)

(4.23) <u>any</u> RCP seal return temperature is > 195°F ... (start standby CC pump & ensure adequate LDST pressure)

(4.30) an RCP has been shutdown for ≥ 30 minutes ... (secure LPSW)

(4.91) <u>any</u> source of makeup or seal injection flow is established **AND NO** LD flow exists ... (re-establish LD)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.107 __ Verify seal injection flow of ≈ 8 gpm/RCP.	Locally re-adjust RCP seal injection throttle valves as necessary to achieve ≈ 8 gpm seal injection flow per RCP (A-3-306, Unit 1 CRD Filter Rm): __ 1HP-64 (1A1 RCP SEAL INJECTION THROTTLE) __ 1HP-65 (1A2 RCP SEAL INJECTION THROTTLE) __ 1HP-66 (1B1 RCP SEAL INJECTION THROTTLE) __ 1HP-67 (1B2 RCP SEAL INJECTION THROTTLE)
4.108 __ Monitor RCP seal parameters.	
4.109 __ Notify the SSF operator to secure SSF RC Makeup per Encl 5.1 (SSF RC Makeup).	
4.110 Open the following: __ 1HP-20 __ 1HP-21 __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230	
4.111 __ **IAAT** RCP restart is desired, **THEN** perform Steps 4.112 - 4.113.	__ **GO TO** Step 4.114.
4.112 __ Notify RCP Component Engineer of desire to restart an RCP.	
4.113 __ Restart RCPs per OP/1/A/1103/006 (RCP Operation) as desired.	
4.114 __ **WHEN** conditions permit, **THEN EXIT** this procedure.	

••• END •••

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.115 __ Place 1HP-31 in HAND.	
4.116 __ Slowly open 1HP-31 in small increments until ≈ 8 gpm/RCP is achieved.	
4.117 __ Re-establish normal makeup through 1HP-120.	
4.118 __ Ensure proper operation of the Component Cooling System.	
4.119 __ Reduce 1HP-7 demand to 0%.	
4.120 __ Close 1HP-6.	
4.121 Open the following: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
4.122 __ Open 1HP-5.	
4.123 __ Throttle open 1HP-7 for ≈ 20 gpm letdown flow.	
4.124 __ Open 1HP-6.	
4.125 __ Adjust 1HP-7 for desired letdown flow.	
4.126 Open the following: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230	
4.127 __ Open 1HP-21.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.128 ___ **IAAT** SEAL INLET HDR FLOW ≈ 32 gpm, **THEN** place 1HP-31 in AUTO.	
4.129 ___ Monitor RCP seal parameters.	
4.130 ___ Maintain RCP seal injection flows as required.	
4.131 ___ Log thermal cycle of 1A HPI header.	
4.132 ___ **WHEN** conditions permit, **THEN EXIT** this procedure.	

• • • **END** • • •

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.133 __ Start the standby HPI pump.	

NOTE

When 1HP-115 is closed and 1B HPI Pump stopped, indications for HPI header pressure in the Control Room (gauge and computer) are lost.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.134 __ Close 1HP-115.	
4.135 __ **IAAT** LDST level approaches 40", **THEN** open 1HP-24 or 1HP-25.	
4.136 __ Verify adequate makeup to maintain Pzr level.	__ Close 1HP-5.
4.137 __ Verify leak is contained in RB.	__ Notify RP to survey for leak outside RB.
4.138 __ Verify leak exists on 1A HPI injection header.	__ **GO TO** Step 4.151.
4.139 __ Stop 1A HPI PUMP.	
4.140 __ Start the 1B HPI PUMP.	__ **GO TO** Step 4.142.
4.141 __ **GO TO** Step 4.146.	
4.142 __ Close 1HP-27.	
4.143 __ Close 1HP-31.	
4.144 Locally perform the following: A. __ Open 1HP-116 (1B & 1C HPI PUMPS DISCHARGE HDR SEPARATION) (Remote operator on HPI hatch area wall at col. R-72, SE of 1B HPI Pump) B. __ Ensure 1HP-116 (1B & 1C HPI PUMPS DISCHARGE HDR SEPARATION) indicates open (2' SE 1B HPI Pump, 10' up). {2}	
4.145 __ Start 1C HPI PUMP.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

(4.135) LDST level approaches 40″ … (open 1HP-24 or 1HP-25)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Continuous flow in the 1B Injection nozzles is more desirable than intermittent flow due to thermal stress. Manual operation of 1HP-409 (1B Injection Bypass) from the Penetration Room may be required.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.146 ___ Perform the following as necessary to control Pzr level: • Adjust letdown. • Throttle 1HP-409 to makeup.	
4.147 ___ Verify ≈ 8 gpm/RCP seal injection flow.	1. ___ Slowly open 1HP-31 in small increments until ≈ 8 gpm/RCP is achieved. 2. Open the following: ___ 1HP-228 ___ 1HP-226 ___ 1HP-232 ___ 1HP-230 3. ___ Open 1HP-21. 4. ___ Place 1HP-31 in AUTO.
4.148 ___ Monitor RCP seal parameters.	
4.149 ___ Maintain RCP seal injection flows as required.	
4.150 ___ **GO TO** Step 4.172.	
4.151 ___ Verify leak exists on RCP seal injection header.	___ **GO TO** Step 4.174.
4.152 ___ Stop 1B HPI PUMP.	
4.153 ___ Ensure proper operation of CC System.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.135) LDST level approaches 40″ … (open 1HP-24 or 1HP-25)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.154 Dispatch an operator to close the following (AB-3-306, Unit 1 CRD Filter Rm): __ 1HP-64 (1A1 RCP SEAL INJECTION THROTTLE) __ 1HP-65 (1A2 RCP SEAL INJECTION THROTTLE) __ 1HP-66 (1B1 RCP SEAL INJECTION THROTTLE) __ 1HP-67 (1B2 RCP SEAL INJECTION THROTTLE)	
4.155 __ **IAAT** <u>any</u> RCP seal return temperature is > 240°F, {4} **THEN** perform Steps 4.156 -4.157.	__ **GO TO** Step 4.158.
4.156 Close the following: __ 1HP-20 __ 1HP-21	
4.157 __ Initiate AP/16 (Abnormal Reactor Coolant Pump Operation).	
4.158 __ Verify <u>all</u> RCP seal return temperatures ≤ 200°F. (Turn-on code "RCP")	__ **GO TO** Step 4.161.
4.159 Open the following: __ 1HP-20 __ 1HP-21	
4.160 Open the following for operating RCPs with seal return temperatures ≤ 200°F: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230	
4.161 __ **IAAT** <u>any</u> RCP seal return temperature is > 195°F, **THEN** perform Steps 4.162 - 4.163.	__ **GO TO** Step 4.164.
4.162 __ Start standby CC pump.	
4.163 __ Ensure LDST pressure ≥ 30 psig.	

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

(4.135) LDST level approaches 40″ … (open 1HP-24 or 1HP-25)

(4.155) <u>any</u> RCP seal return temperature is > 240°F … (isolate seal return)

(4.161) <u>any</u> RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Continued operation with a loss of RCP seal injection is permitted provided the CC System is functioning normally and RCP operating limits are not exceeded.	
4.164 Notify OSM and RCP Component Engineer to provide the following: __ Immediate evaluation __ Additional monitoring requirements __ Extended limits	
4.165 __ Start the 1A HPI PUMP.	__ **GO TO** Step 4.168.
NOTE HPI pump minimum flow is met with > 50 gpm makeup flow.	
4.166 __ Use 1HP-120 to provide normal makeup as necessary to control Pzr level.	
4.167 _ **GO TO** Step 4.173.	
4.168 Locally perform the following: __ Close 1HP-116 (1B & 1C HPI PUMPS DISCHARGE HDR SEPARATION) (Remote operator on HPI hatch area wall at col. R-72, SE of 1B HPI Pump). __ Ensure 1HP-116 (1B & 1C HPI PUMPS DISCHARGE HDR SEPARATION) indicates closed (2' SE 1B HPI Pump, 10' up). {2}	
4.169 __ Close 1HP-27.	
NOTE HPI pump minimum flow is met with > 50 gpm makeup flow.	
4.170 __ Start 1C HPI PUMP.	1. __ **IF** management desires, **THEN** dispatch an operator to establish SSF RC Makeup per Encl 5.1 (SSF RC Makeup). 2. __ **GO TO** Step 4.173.

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop all RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop all HPI pumps)

(4.135) LDST level approaches 40″ … (open 1HP-24 or 1HP-25)

(4.155) any RCP seal return temperature is > 240°F … (isolate seal return)

(4.161) any RCP seal return temperature is > 195°F … (start standby CC pump & ensure adequate LDST pressure)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Continuous flow in the 1B Injection nozzles is more desirable than intermittent flow due to thermal stress. Manual operation of 1HP-27 (1B HP Injection) from the Unit 1 West Penetration Room may be required.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.171 __ Throttle open 1HP-27 as necessary to maintain desired Pzr level.	
4.172 __ Log use of 1B HPI train in Unit Log.	
4.173 __ Initiate isolation and repair efforts as time and conditions permit.	
4.174 Verify <u>all</u> of the following: __ Letdown is isolated. __ The CC System is operating properly. __ It is desired to restore letdown. __ An HPI pump is supplying makeup.	__ **GO TO** Step 4.182.
4.175 __ Reduce 1HP-7 demand to 0%.	
4.176 __ Close 1HP-6.	
4.177 Open the following: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
4.178 __ Open 1HP-5.	
4.179 __ Throttle open 1HP-7 for ≈ 20 gpm letdown flow.	
4.180 __ Open 1HP-6.	
4.181 __ Adjust 1HP-7 for desired letdown flow.	
4.182 __ **WHEN** conditions permit, **THEN EXIT** this procedure.	

•••END•••

IF AT ANY TIME:

(3.1) RCP seal injection and CC are lost … (trip Rx, stop <u>all</u> RCPs, and initiate AP/25)

(3.2) loss of suction to operating HPI pumps is indicated … (stop <u>all</u> HPI pumps)

(4.12) <u>any</u> RCP Seal Return Temperature is > 240°F … (notify Engineering)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.183 Perform the following as necessary to maintain Pzr level > 200″: __ Close 1HP-6. __ Throttle 1HP-7. __ Throttle 1HP-26.	__ **IF** makeup is necessary, **AND** 1HP-26 fails to open, **THEN** dispatch an operator to throttle 1HP-122 (RC VOLUME CONTROL BYPASS) (Unit 1 Pen Rm, SW of 1HP-120).
4.184 __ Place 1HP-120 in HAND and close.	
4.185 __ Notify SPOC to investigate and repair 1HP-120.	
4.186 __ **WHEN** 1HP-120 is repaired, **THEN** slowly re-establish flow through 1HP-120.	
4.187 __ Place 1HP-120 in AUTO.	
4.188 __ Close 1HP-26.	
4.189 __ Verify 1HP-122 (RC VOLUME CONTROL BYPASS) throttled.	__ **GO TO** Step 4.191.
4.190 __ Dispatch an operator to close 1HP-122 (RC VOLUME CONTROL BYPASS) (Unit 1 Pen Rm, SW of 1HP-120).	
4.191 __ Open 1HP-5.	
4.192 __ Throttle open 1HP-7 for ≈ 20 gpm letdown flow.	
4.193 __ Open 1HP-6.	
4.194 __ Adjust 1HP-7 for desired letdown flow.	
4.195 __ **WHEN** conditions permit, **THEN EXIT** this procedure.	

••• END •••

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REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-075
INITIATE AUTOMATIC PRESSURIZER SPRAY

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Initiate Automatic Pressurizer spray

Alternate Path:

Yes

Facility JPM #:

CRO-075

K/A Rating(s):

010 A2.02 (3.9 / 3.9)

Task Standard:

Automatic pressurizer spray is properly initiated by procedure. 1RC-3 is closed to terminate the depressurization.

Preferred Evaluation Location:

Simulator __X__ In-Plant ______

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

OP/1/A/1103/05, Pressurizer Operation, Enclosure 4.1

Validation Time: 12 min

Time Critical: NO

==

Candidate: ________________________________ Time Start: _________

NAME

Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ________________________ ____________________________/________

NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall SNAP 207
2. Import CRO-075
3. Go to RUN
4. After spray valve cycles open and then closes Activate Timer #1.

Tools/Equipment/Procedures Needed:

OP/1/A/1103/05 (Pressurizer Operation).

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 at 100% Rx Power

Greater than 50 ppm Boron difference exists between the RCS and Pressurizer.

INITIATING CUES:

SRO in Control Room instructs you to initiate automatic pressurizer spray to equalize boron concentration per OP/1/A/1103/05 (Pressurizer Operation) Enclosure 4.1 (Establishing Auto PZR Spray).

- Procedure has been completed up to Step 2.3. 2.1.3
- The affect of spraying the PZR on RCS boron has been determined and the SRO concurs that the affect is acceptable.
- Use heater banks 2, 3, and 4.

START TIME: ________

STEP 1: Review Limits and Precautions STANDARD: Candidate reviews the in progress procedure OP/0/A/1103/05, Pressurizer Operation and begin at Step 2.3. COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 2.3.1 Verify 1RC-1 (PZR SPRAY) in AUTO. STANDARD: 1RC-1 (PZR SPRAY) controller is located by the candidate on 1UB1 and verified to be in AUTO, by observing the blue "AUTO" indication illuminated. COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 2.3.2 Verify 1RC-3 (SPRAY BLOCK) OPEN. STANDARD: 1RC-3 (SPRAY BLOCK) controller is located by the candidate on 1UB1 and verified to be full open, by observing the red "OPEN" indication illuminated and the green "CLOSED" indication extinguished COMMENTS:	___ SAT ___ UNSAT
STEP 4: Step 2.3.3 Place PZR Heaters to ON. STANDARD: Pressurizer Heater banks 2, 3, and/or 4 are located by the candidate on 1UB1. The candidate energizes Pressurizer Heater banks 2, 3, and 4 by depressing the red ON pushbutton on each heater bank, and the red ON indication illuminated. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 5: Step 2.3.~~3~~ 4
Ensure 1RC-1 (PZR SPRAY) cycles to control RCS pressure.

___ SAT

___ UNSAT

STANDARD: The candidate monitors RCS pressure by observing:

RCS PRESSURE WR or NR chart recorders on 1UB1,

OR

RCS WR PRESS LOOP A or LOOP B meters on 1UB1,

OR

By use of the Operator Aid Computer.

The candidate observes 1RC-1 (Pzr Spray) on 1UB1 to ensure it opens automatically, at approximately 2205 psi.

The candidate observes 1RC-1 (Pzr Spray) valve to ensure it closes at approximately 2155 psi.

NOTE: After 1RC-1 opens and cycles closed, it will fail open but indicate that it is closed. The candidate must recognize and stop the depressurization.

COMMENTS:

STEP 6: TERMINATE the depressurization.

CRITICAL STEP

___ SAT

___ UNSAT

STANDARD: The candidate recognizes that the spray valve is still open with closed indication by RCS pressure trend.

The candidate may attempt to close 1RC-1 (Pzr Spray) manually by depressing the green CLOSE pushbutton on 1UB1 (1RC-1 will not close).

The candidate will close 1RC-3 (Spray Block) by depressing and holding the green CLOSE pushbutton until the green "CLOSE" indication is illuminated and the red "OPEN" indication is extinguished on 1UB1.

Note: If the candidate does not immediately close 1RC-3, RCS pressure will continue to decrease resulting in Statalarm 1SA-2/D-3 (RC Press High/Low) actuating. The ARG will give guidance to close the PZR spray and block valve.

COMMENTS:

STEP 7: STABILIZE RCS pressure STANDARD: The candidate SHOULD monitor RCS pressure and recognize that the Pressurizer Heaters are still in manual and "ON". The candidate will place Pressurizer Heater Banks 2, 3, and 4 in AUTO, as required, by depressing the blue AUTO pushbuttons on Pressurizer Heater Banks 2, 3, and/or 4 controllers, and verify the blue back light comes on, on 1UB1. **Cue: If asked as the SRO, give the candidate permission to place the Pressurizer Heaters in AUTO.** COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
4	Step 4 is necessary to increase the RCS pressure and make the spray valve cycle to equalize boron concentration between the RCS and the Pressurizer.
6	Step 6 is necessary because the candidate must realize that the spray valve has not closed even though it indicates closed and close 1RC-3 to terminate the depressurization. If not a reactor trip could occur.
7	Step 7 is necessary because the heaters will not cycle in manual. The candidate needs to realize this and place the heaters in AUTO so that pressure control can be re-established.

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

INITIAL CONDITIONS:

Unit 1 at 100% Rx Power

Greater than 50 ppm Boron difference exists between the RCS and Pressurizer.

INITIATING CUES:

SRO in Control Room instructs you to initiate automatic pressurizer spray to equalize boron concentration per OP/1/A/1103/05 (Pressurizer Operation) Enclosure 4.1 (Establishing Auto PZR Spray).

- Procedure has been completed up to Step 2.3.
- The affect of spraying the PZR on RCS boron has been determined and the SRO concurs that the affect is acceptable.
- Use heater banks 2, 3, and 4.

1. Initial Conditions

_____ 1.1 Spraying Pzr is required.

_____ 1.2 RCS at normal operating pressure (≈ 2155 psig)

_____ 1.3 Ensure a Pzr boron sample has been taken within the last week. (R.M.)

_____ 1.4 Review Limits and Precautions.

NOTE:
- If RCS is at normal operating pressure this enclosure is preferred method of Pzr spray.
- RCS boron will change if Pzr is **NOT** at same boron as RCS. (R.M.)

2. Procedure

NOTE:
- Pzr volume vs level = 23.94 gal/inch. (R.M.)
- Total volume left in Pzr and surge line when Pzr level is at 0" is 881gallons. (R.M.)
- Volume for RCS + HPI - Pzr (Hot Volume) = 7179 ft^3 (53,712 gal) (R.M.)

_____ 2.1 Determine affect on RCS boron from spraying Pzr. (R.M.)

_____ 2.2 SRO approval of RCS boron affects.
SRO

2.3 Establish automatic Pzr spray as follows:

_____ 2.3.1 Verify 1RC-1 (PZR SPRAY) in "AUTO".

_____ 2.3.2 Verify 1RC-3 (SPRAY BLOCK) "OPEN".

_____ 2.3.3 Place required Pzr Heater Groups to "ON".

_____ 2.3.4 Ensure 1RC-1 (PZR SPRAY) cycles to control RCS pressure.

_____ 2.4 **IF** required, make-up per OP/1/A/1103/004 (Soluble Poison) to compensate for Pzr Spray affects on RCS boron. (R.M.)

2.5 **WHEN** auto Pzr spray is no longer required, ensure the following:

_____ _____ • Pzr Heater Group 1 to "AUTO"

_____ _____ • Pzr Heater Group 2 to "AUTO"

_____ _____ • Pzr Heater Group 3 to "AUTO"

_____ _____ • Pzr Heater Group 4 to "AUTO"

_____ 2.6 **IF** desired, request sample for RCS boron. (R.M.)

_____ 2.7 **IF** desired, request sample for Pzr boron. (R.M.)

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-096

Align ECCS Suction from Emergency Sump (LP-21 Fails to Close)

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Align ECCS Suction from Emergency Sump

Alternate Path:

YES

Facility JPM #:

CRO-096

K/A Rating(s):

System: BW/E08
K/A: EA1.1
Rating: 4.0/3.7

Task Standard:

Enclosure 5.12, ECCS Suction Swap to RBES is properly completed to align ECCS from the Emergency sump.

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

EP/1/A/1800/01, LOCA CD
Enclosure 5.12 (ECCS Suction Swap to RBES) of the EOP

Validation Time: 15 minutes

Time Critical: NO

==

Candidate: ____________________________
NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________ ________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall 206
2. Import files for CRO-096
3. Go to run
4. Timer 3 will lower BWST Level to < 9' if needed at step 5
5. Timer 4 will lower BWST Level to < 6' if needed at step 6

Note: Procedure should be placed in a binder.

Tools/Equipment/Procedures Needed:

Enclosure 5.12, ECCS Suction Swap to RBES, of the EOP

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 large break LOCA has occurred which is depleting the BWST.

EOP is being followed, currently in LOCA CD tab.

INITIATING CUES:

The Control Room SRO directs you to Align ECCS Suction from Emergency Sump per Enclosure 5.12, ECCS Suction Swap to RBES, of the EOP.

START TIME: _______

STEP 1:	Step 1 Start both of the following: • 1A LPI Pump • 1B LPI Pump	___ SAT ___ UNSAT
STANDARD:	Locates control switches for 1A and 1B LPI Pumps on 1UB2 and verifies red ON lights are illuminated and pump amps indicated. Continue to Step 2	
COMMENTS:		
STEP 2:	Step 2 Verify either of the following exists: • LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm • Only one LPI header is operating, **AND** flow in that header is ≥ 2900 gpm	___ SAT ___ UNSAT
STANDARD:	Candidate should determine that step is met by observing LPI FLOW TRAIN A plus LPI FLOW TRAIN B is ≥ 3400 gpm. Flow gauges are located on 1UB2. Continue to Step 3	
COMMENTS:		
STEP 3:	Step 3 **GO TO** Step 51	___ SAT ___ UNSAT
STANDARD:	GO TO Step 51. Continue to Step 51	
COMMENTS:		

STEP 4:	Step 51 **WHEN** BWST level is ≤ 15', **THEN** stop all HPI pumps.	___ SAT ___ UNSAT
STANDARD:	Locates the BWST level gauges on 1UB2. The candidate determines level to be ≤ 15'. or May obtain BWST level from the OAC (Operator Aid Computer), at 1UB1, 1UB2, or STA monitor. or ICCM monitors on 1UB1. Places control switch for any operating HPI pump in the TRIP or PTL position and verifies all HPI pumps are not operating by the red ON lights not illuminated. Continue to Step 52	
COMMENTS:		

NOTE
RB level of ≥ 2' is expected when BWST level reaches 9'.

STEP 5:	Step 52 **WHEN** BWST level ≤ 9', **AND** RB level is rising, **THEN** continue procedure.	___ SAT ___ UNSAT
STANDARD:	Verifies BWST level < 9 feet on gauges on 1UB2 or from the OAC (1UB1, 1UB2, or STA monitor) or the ICCM monitors on 1UB1. Continue to Step 53	

Cue: If needed, inform candidate that using time compression BWST level will be lowered to < 9' and RB level will be increased.

COMMENTS:

STEP 6:	Step 53 Simultaneously open the following: • 1LP-19 (1A RB Suction) • 1LP-20 (1B RB Suction)	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Candidate locates the control switch for 1LP-19 ('1A' RX. BLDG. SUCTION) on 1UB2 and rotates the switch in the OPEN direction. Verifies red OPEN light comes on, and green CLOSED light goes off. Then locates the control switch for 1LP-20 ('1B' RX. BLDG. SUCTION) on 1UB2 and rotates the switch in the OPEN direction. Verifies red OPEN light comes on, and green CLOSED light goes off. Continue to Step 54	
COMMENTS:		
STEP 7:	Step 54 **IAAT** BWST level ≤ 6', **THEN** perform Steps 55 – 58.	___ SAT ___ UNSAT
STANDARD:	Candidate verifies BWST level ≤ 6' using: BWST level gauges on 1UB2. BWST level from the OAC, at 1UB1, 1UB2, or STA monitor. ICCM monitors on 1UB1. When BWST level is ≤ 6' go to the IAAT step and then perform Steps 55 through 58 Continue to Step 55	
Cue: If needed, inform candidate that using time compression BWST level will be lowered to < 6' and RB level will be increased.		
COMMENTS:		

STEP 8:	Step 55 Verify 1LP-19 (1A RB Suction) open.	
STANDARD:	Locates the control switch for 1LP-19 on 1UB2 and verifies red OPEN light is illuminated. Continue to Step 56	___ SAT ___ UNSAT
COMMENTS:		
STEP 9:	Step 56 Verify 1LP-20 (1B RB Suction) open.	___ SAT
STANDARD:	Locates the control switch for 1LP-19 on 1UB2 and verifies red OPEN light is illuminated. Continue to Step 57	___ UNSAT
COMMENTS:		
STEP 10:	Step 57 Simultaneously close the following: • Close 1LP-21 (1A LPI BWST Suction) • Close 1LP-22 (1B LPI BWST Suction)	**CRITICAL STEP** ___ SAT
STANDARD:	Locates the controls for 1LP-21 on the RZ module and depresses the MANUAL pushbuttons for ES channels 3 and 7, on 1VB2. The candidate then locates the control switch for 1LP-21 on 1UB2 and rotates it in the CLOSE direction. **Note: 1LP-21 will not close.** Locates the controls for 1LP-22 on the RZ module and depresses the MANUAL pushbuttons for ES channels 3 and 7, on 1VB2. The candidate then locates the control switch for 1LP-22 on 1UB2 and rotates it in the CLOSE direction. Candidate should recognize that 1LP-21 did not close and then perform RNO. Continue to Step 57 RNO	___ UNSAT
COMMENTS:		

STEP 11: Step 57 RNO **IF** 1LP-21 fails to close, **THEN** perform the following: • Stop 1A LPI PUMP. • Stop 1A RBS PUMP. STANDARD: Locates RB Spray Pump B control on ES RZ module on 1VB2. MANUAL pushbutton for ES channel 8 is depressed. Green OFF pushbutton is depressed and verified lit, while white RUN light is off. Locates LPI Pump B control on 1UB2 and turns pump switch to "off". Red light is verified off and white light verified on. Continue to Step 58 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 12: Step 58 Dispatch an operator to close 1LP-28 (BWST Outlet) (East of Unit 1 BWST). ***Cue: An operator has been dispatched to close 1LP-28.*** STANDARD: An operator is Dispatch an operator to close 1LP-28 (BWST Outlet) (East of Unit 1 BWST). COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ___________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
6	Aligns LPI Pump suction to Reactor Building Emergency Sump.
10	Secures LPI Pump suction from the BWST.
10	Secures 1B LPI pump – prevents pump damage. Secure 1B RBS pump – Limits flow in suction line to maintain adequate flow for the LPI pump.
11	1A LPI and 1A RBS pumps are secured to prevent damage.
12	Close 1LP-28 (BWST Isolation) - Isolates suction from the BWST.

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

INITIAL CONDITIONS:

1. A large break LOCA has occurred which is depleting the BWST.

2. EOP is being followed, currently in LOCA CD tab.

INITIATING CUES:

The Control Room SRO directs you to Align ECCS Suction from Emergency Sump per Enclosure 5.12, ECCS Suction Swap to RBES, of the EOP.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. Start both of the following: __ 1A LPI PUMP __ 1B LPI PUMP	
2. Verify either of the following exists: __ LPI FLOW TRAIN A plus LPI FLOW TRAIN B $\geq$ 3400 gpm __ Only one LPI header is operating, **AND** flow in that header is $\geq$ 2900 gpm	__ **GO TO** Step 4.
3. __ **GO TO** Step 51.	
4. __ Verify < three HPI pumps operating.	__ Stop 1B HPI PUMP.
5. __ Notify Control Room personnel that the 170 gpm/pump minimum HPI flow requirement is in effect.	

CAUTION

ECCS pump damage may occur if LPI pumps are operated below the following minimum flows:

- Any LPI pump operated at < 100 gpm for > 30 minutes
- Two LPI pumps operating in piggyback with **NO** LPI flow and total HPI flow < 500 gpm

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. __ Verify two LPI pumps operating.	__ **GO TO** Step 10.
7. __ Verify total HPI flow including seal injection is > 500 gpm.	__ **IF** both of the following exist: __ **NO** flow on LPI FLOW TRAIN A __ **NO** flow on LPI FLOW TRAIN B **THEN** perform the following: A. __ Secure one LPI pump due to low flow conditions. B. __ **GO TO** Step 10.
8. Simultaneously open the following: __ 1LP-15 __ 1LP-16	__ Limit total HPI flow to $\leq$ 750 gpm including seal injection.
9. __ **GO TO** Step 13.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Total LPI flow = LPI header flow + HPI header flow + seal injection.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. __ Maximize <u>total</u> LPI flow < 3100 gpm by throttling HPI flow.	
11. __ Limit <u>total</u> HPI flow to ≤ 750 gpm including seal injection.	
12. <u>Simultaneously</u> open the following: __ 1LP-15 __ 1LP-16	1. __ **IF** 1LP-15 fails to open, **THEN** start 1B LPI PUMP. 2. __ **IF** 1LP-16 fails to open, **THEN** start 1A LPI PUMP.
13. __ Place LDST LEVEL INTERLOCK switch in DISABLE.	
14. Position the following valve switches to close until valve travel is initiated: __ 1HP-23 __ 1HP-24 __ 1HP-25 {3}	__ Continue procedure.
15. <u>Simultaneously</u> position the following valve switches to open until valve travel is initiated: __ 1HP-939 __ 1HP-940	__ Continue procedure.
16. Verify <u>any</u> of the following are open: __ 1LPSW-4 __ 1LPSW-5	__ **GO TO** Step 18.
17. __ **GO TO** Step 22.	

NOTE

The DIXON LPSW flow indicators must be used when determining post accident flow readings.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. __ Verify **NEITHER** LPI cooler <u>LPSW flow</u> DIXON indicator is blank.	1. __ Consider LPI cooler with blank LPSW flow DIXON unavailable. 2. __ **GO TO** Step 22.
19. Verify the following are open: __ 1LP-15 __ 1LP-16	1. __ Consider LPI cooler associated with the closed piggyback valve unavailable. 2. __ **GO TO** Step 22.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. ___ Throttle 1LPSW-4 for 3000-3300 gpm flow to 1A LPI cooler.	___ **GO TO** Step 22.
21. ___ Throttle 1LPSW-5 for 3000-3300 gpm flow to 1B LPI cooler.	

NOTE

- An LPI pump secured due to low flow conditions is considered available.
- The capability to align 1C LPI pump is **NOT** considered available unless already in use.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22. ___ Verify both LPI coolers available for LPI and LPSW.	1. ___ **IF** 1A LPI Cooler is available, **THEN** perform the following: A. ___ Close 1LPSW-5. B. ___ Open 1LPSW-4. C. ___ Reduce total HPI flow to $\leq$ 750 gpm including seal injection. D. ___ Close 1LP-16. 2. ___ **IF** 1B LPI Cooler is available, **THEN** perform the following: A. ___ Close 1LPSW-4. B. ___ Open 1LPSW-5. C. ___ Reduce total HPI flow to $\leq$ 750 gpm including seal injection. D. ___ Close 1LP-15.
23. ___ Verify any LPI pump has been secured in this enclosure due to low flow conditions.	___ **GO TO** Step 25.
24. ___ **WHEN** BWST level is $\leq$ 10', **THEN** start any LPI pump previously stopped due to low flow conditions.	

NOTE

RB level of $\geq$ 2' is expected when BWST level reaches 9'.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25. ___ **WHEN** BWST level is $\leq$ 9', **AND** RB level is rising, **THEN** continue in this enclosure. (4)	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26. Simultaneously open the following: __ 1LP-19 __ 1LP-20	1.__ **IF** 1LP-19 fails to open, **THEN** stop the 1A RBS PUMP. 2.__ **IF** 1LP-20 fails to open, **THEN** stop the 1B RBS PUMP.
27. __ **IAAT** BWST level is ≤ 6', **THEN** perform Steps 28 - 32.	__ **GO TO** Step 32.
28. __ Verify 1LP-19 open.	__ Stop 1A LPI PUMP.
29. __ Verify 1LP-20 open.	__ Stop 1B LPI PUMP.
30. Simultaneously close the following: __ 1LP-21 __ 1LP-22	1.__ **IF** 1LP-21 fails to close, **THEN** perform the following: __ Stop 1A LPI PUMP. __ Stop 1A RBS PUMP. 2.__ **IF** 1LP-22 fails to close, **THEN** perform the following: __ Stop 1B LPI PUMP. __ Stop 1B RBS PUMP.
31. __ Dispatch an operator to close 1LP-28 (BWST OUTLET) (East of Unit 1 BWST).	
32. __ Verify two LPI pumps operating.	1.__ Maximize total LPI flow < 3100 gpm by throttling HPI flow. 2.__ Limit total HPI flow to ≤ 750 gpm including seal injection.
33. __ **IAAT** an operating LPI Pump (1A **OR** 1B) fails, **THEN** perform Steps 34 - 41.	__ **GO TO** Step 42.
34. __ Verify any LPI pump operating.	1.__ **IF** 1A LPI PUMP or 1B LPI PUMP is available, **THEN** attempt to start the available LPI pump. 2.__ **IF** any LPI pump is operating, **THEN GO TO** Step 35. 3.__ **GO TO** Step 37.

IF AT ANY TIME:

(27) BWST level is ≤ 6'… (transfer suction to only the RB sump)

(33) an operating LPI Pump (1A **OR** 1B) fails… (verify any LPI pump operating **OR** start 1C LPI pump)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. Open the following for the running LPI pump: (see table below)	
36. __ **GO TO** Step 40.	
37. Perform the following: A. __ Open 1LP-19. B. __ Open 1LP-6.	1. __ Open 1LP-20. 2. __ Open 1LP-7.
38. Open the following to align 1C LPI PUMP to <u>any</u> header with LPSW aligned: (see table below)	
39. __ Start 1C LPI PUMP.	
40. __ Verify LPSW aligned to the in-service LPI train.	1. __ **IF** A LPI train in-service, **THEN** perform the following: A. __ Close 1LPSW-5. B. __ Open 1LPSW-4 2. __ **IF** B LPI train in-service, **THEN** perform the following: A. __ Close 1LPSW-4. B. __ Open 1LPSW-5.

Step 35:

✓	1A LPI Pump	✓	1B LPI Pump
	1LP-15		1LP-16
	1LP-17		1LP-18

Step 38:

✓	A LPI HDR	✓	B LPI HDR
	1LP-15		1LP-16
	1LP-9		1LP-10
	1LP-17		1LP-18

IF AT ANY TIME

(27) BWST level is ≤ 6'… (transfer suction to only the RB sump)

(33) an operating LPI Pump (1A **OR** 1B) fails… (verify any LPI pump operating **OR** start 1C LPI pump)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
41. Perform the following: A. __ Maximize total LPI flow < 3100 gpm by throttling HPI flow. B. __ Limit total HPI flow to ≤ 750 gpm including seal injection.	
42. __ Notify Chemistry to periodically sample LPI discharge for boron concentration.	
43. __ **IAAT** the TSC is operational, **THEN** notify TSC to provide guidance on long term operation of LPI pumps.	
44. __ **WHEN** 1LP-28 is closed, **THEN** continue in this enclosure.	
45. __ Verify 1LP-19 open.	__ **GO TO** Step 49.
46. __ Verify 1A LPI PUMP operating.	__ **IF** TSC approves restart, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ **GO TO** Step 49.
47. __ Verify 1LP-20 open.	__ **GO TO** Step 49.
48. __ Verify 1B LPI PUMP operating.	__ **IF** TSC approves restart, **THEN** start 1B LPI PUMP.
49. __ Initiate Encl 5.4 (Makeup to the BWST) to replenish inventory for subsequent use if needed.	
50. __ **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

••••• END •••••

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Unit Status LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm **OR** Only one LPI header in operation with header flow ≥ 2900 gpm.	
51. ___ **WHEN** BWST level is ≤ 15', **THEN** stop all HPI pumps.	
NOTE RB level of ≥ 2' is expected when BWST level reaches 9'.	
52. ___ **WHEN** BWST level ≤ 9', **AND** RB level is rising, **THEN** continue procedure.	
53. Simultaneously open the following: ___ 1LP-19 ___ 1LP-20 (4)	1.___ **IF** 1LP-19 fails to open, **THEN** stop the 1A RBS PUMP. 2.___ **IF** 1LP-20 fails to open, **THEN** stop the 1B RBS PUMP.
54. ___ **IAAT** BWST level is ≤ 6', **THEN** perform Steps 55 - 58.	___ **GO TO** Step 59.
55. ___ Verify 1LP-19 open.	___ Stop the 1A LPI PUMP.
56. ___ Verify 1LP-20 open.	___ Stop the 1B LPI PUMP.
57. Simultaneously close the following: ___ 1LP-21 ___ 1LP-22	1.___ **IF** 1LP-21 fails to close, **THEN** perform the following: ___ Stop 1A LPI PUMP. ___ Stop 1A RBS PUMP. 2.___ **IF** 1LP-22 fails to close, **THEN** perform the following: ___ Stop 1B LPI PUMP. ___ Stop 1B RBS PUMP.
58. ___ Dispatch an operator to close 1LP-28 (BWST OUTLET) (East of Unit 1 BWST).	

IF AT ANY TIME:

(54) BWST level is ≤ 6'… (transfer suction to only the RB sump)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
59. __ **IAAT** an operating LPI Pump (1A **OR** 1B) fails, **THEN** perform Steps 60 - 66.	__ **GO TO** Step 67.
60. __ Verify <u>any</u> LPI pump operating.	__ **GO TO** Step 63.
61. Open the following for the running LPI pump:	
62. __ **GO TO** Step 66.	
63. Perform the following: A. __ Open 1LP-19. B. __ Open 1LP-6.	1.__ Open 1LP-20. 2.__ Open 1LP-7.
64. Open the following to align 1C LPI pump to the desired header:	
65. __ Start 1C LPI PUMP.	
66. __ Verify LPSW aligned to the in-service LPI train.	1.__ **IF** A LPI train in-service, **THEN** perform the following: A. __ Close 1LPSW-5. B. __ Open 1LPSW-4 2.__ **IF** B LPI train in-service, **THEN** perform the following: A. __ Close 1LPSW-4. B. __ Open 1LPSW-5.

Step 61 table:

✓	1A LPI Pump	✓	1B LPI Pump
	1LP-17		1LP-18

Step 64 table:

✓	A LPI HDR	✓	B LPI HDR
	1LP-9		1LP-10
	1LP-17		1LP-18

IF AT ANY TIME:

(54) BWST level is ≤ 6'… (transfer suction to only the RB sump)

(59) an operating LPI Pump (1A **OR** 1B) fails ... (verify any LPI pump operating **OR** start 1C LPI pump)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
67. __ Notify Chemistry to periodically sample LPI discharge for boron concentration.	
68. Verify any of the following are open: __ 1LPSW-4 __ 1LPSW-5	__ **GO TO** Step 70.
69. __ **GO TO** Step 73.	

NOTE

The DIXON LPSW flow indicators must be used when determining post accident flow readings.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
70. __ Verify **NEITHER** LPI cooler LPSW flow DIXON is blank.	1. __ Consider LPI cooler with blank LPSW flow DIXON unavailable. 2. __ **GO TO** Step 73.
71. __ Throttle 1LPSW-4 for 3000-3300 gpm flow to the 1A LPI cooler.	__ **GO TO** Step 73.
72. __ Throttle 1LPSW-5 for 3000-3300 gpm flow to the 1B LPI cooler.	

IF AT ANY TIME:

(54) BWST level is ≤ 6'… (transfer suction to only the RB sump)

(59) an operating LPI Pump (1A **OR** 1B) fails ... (verify any LPI pump operating **OR** start 1C LPI pump)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE The capability to align 1C LPI pump is **NOT** considered available unless already in use.	
73. __ Verify <u>both</u> LPI coolers <u>available</u> for LPI <u>and</u> LPSW. {21}	1. __ **IF** 1A LPI Cooler is available, **THEN** perform the following: A. __ Close 1LPSW-5. B. __ Open 1LPSW-4. 2. __ **IF** 1B LPI Cooler is available, **THEN** perform the following: A. __ Close 1LPSW-4. B. __ Open 1LPSW-5.
74. Open the following: __ 1HP-939 __ 1HP-940	
75. __ **WHEN** 1LP-28 is closed, **THEN** continue in this enclosure.	
76. __ Verify 1LP-19 open.	__ **GO TO** Step 80.
77. __ Start 1A LPI PUMP.	__ **GO TO** Step 80.
78. __ Verify 1LP-20 open.	__ **GO TO** Step 80.
79. __ Start 1B LPI PUMP.	
80. __ Initiate Encl 5.4 (Makeup to the BWST) to replenish inventory for subsequent use if needed.	
81. __ **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

• • • END • • •

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REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-017
RE-ESTABLISH MAIN FDW FLOW FROM CONDENSATE BOOSTER PUMP FLOW

CANDIDATE ______________________________

EXAMINER ______________________________

fail s/u valve OPEN

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Re-establish Main FDW flow from CBP flow

Alternate Path:

No

Facility JPM #:

CRO-017

K/A Rating(s):

System: APE-054

K/A; AK3.04

Rating: 4.4 / 4.6

Task Standard:

Main FDW Flow is re-established, and a controlled cooldown to 555°F is initiated without establishing level in the OTSGs.

Preferred Evaluation Location:

Simulator __X__ In-Plant ______

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

EOP, LOHT Tab

Validation Time: 15 min

Time Critical: NO

==

Candidate: ____________________________________
NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ____________________________ ____________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall SNAP 208
2. Import CRO-017
3. Go to RUN

Tools/Equipment/Procedures Needed:

EOP, LOHT Tab

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 loss of both Main FDW Pumps has initiated a Rx trip.

Subsequently, the EFW system failed.

The CBPs are supplying the SGs per Rule 3.

Repairs have been completed on the Main FDW Pump circuitry and the 1A Main FDW Pump is currently operating in AUTO at the ICS Low Speed Stop.

The LOHT Tab of the EOP has been completed up to step 56.

INITIATING CUES:

The SRO in the Control Room directs you to re-establish Main FDW Flow to the SGs per the LOHT Tab of the EOP beginning at Step 56.

START TIME: _______

STEP 1:	Step 56 Verify Main FDW pump available and reset.	___ SAT ___ UNSAT
STANDARD:	Candidate observes that MFDWP HP and LP stop valves are all open. MFDWP ICS control is in AUTO. Continues to Step 57	
COMMENTS:		
STEP 2:	Step 57 Open the following on each <u>available</u> SG: • 1FDW-38 • 1FDW-47	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Candidate places the switches for 1FDW-38 and 1FDW-47 in the open direction. Continues to Step 58	
COMMENTS:		
STEP 3:	Step 58 Close the following on each <u>available</u> SG: • 1FDW-36 • 1FDW-45	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Candidate places the switches for 1FDW-36 and 1FDW-45 in the closed direction. Continues to Step 59	
COMMENTS:		

STEP 4:	Step 59 Ensure Main FDW Pump is operating	___ SAT ___ UNSAT
STANDARD:	Candidate ensures Main FDW Pump is operating by observing steam valves open and Main FDW pump speed. Continues to Step 60	
COMMENTS:		
STEP 5:	Step 60 **GO TO** Step 62.	___ SAT ___ UNSAT
STANDARD:	Candidate continues to Step 62.	
COMMENTS:		
STEP 6:	Step 62 Verify all the following: • T_{cold} > 500°F • TBVs available	___ SAT ___ UNSAT
STANDARD:	Candidate verifies T_{cold} > 500°F Verifies TBVs available by: • condenser vacuum > 7" • CCW pump operating • TBV Baileys have power • CSAE have condensate cooling Continues to Step 63	
COMMENTS:		

STEP 7: Step 63 Verify $T_{cold} \leq 547°F$ STANDARD: Candidate determines $T_{cold} > 547°F$ Continue to Step 63 RNO COMMENTS:	___ SAT ___ UNSAT
STEP 8: Step 63 RNO Set THP setpoint at ≈ 885 psig STANDARD: Candidate sets THP setpoint at ≈ 885 psig Continue to Step 66 COMMENTS:	___ SAT ___ UNSAT
STEP 9: Step 66 Place TBVs in AUTO for available SGs STANDARD: If not already in Auto, candidate places both TBV controllers in AUTO. Continues to Step 67 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 10:	Step 67 Initiate feed to available SGs per Rule 7 (SG Feed Control)	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Candidate references Rule 7 and determines that, since Main FDW is being used, the flow instrument used will be the S/U FDW Flow indicator (Table 1). Determines also that the maximum feed rate to the dry SGs is limited to 0.5 E6 lbm/hr to each SG since the SGs already have heat transfer (Table 1). Determines that the SGs level control point will be 25" S/U range (Table 4). Throttles S/U FDW control valves to establish flow within limits and to prevent over cooling while feeding to attain level in the SGs. Continues to Step 68	
COMMENTS:		
STEP 11:	Step 68 **IAAT** heat transfer is established in any SG, **THEN GO TO** Step 79	___ SAT ___ UNSAT
STANDARD:	Determines that Heat transfer is established. Goes to Step 79	
COMMENTS:		

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<u>STEP 12:</u> Step 79

Control feeding and steaming of available SGs to maintain SG level at setpoint and cooldown rate within Tech Spec limits.

- $T_{COLD} > 280°F$: $\leq 50°F / ½ hr$
- $T_{COLD} \leq 280°F$: $\leq 25°F / ½ hr$

<u>STANDARD</u>: Determines cooldown limit is $\leq 50°F / ½ hr$ since $T_{COLD} > 280°F$

Throttles feedwater flow as necessary to establish a controlled cooldown while feeding to attain a level in the dry SGs.

<u>COMMENTS</u>:

</td><td>

CRITICAL STEP

___ SAT

___ UNSAT

</td></tr>
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TERMINATE JPM WHEN:

- SG Pressure ≈ 1010 psig
- Turbine Bypass Valves are in AUTO
- Feeding is established with Tech Spec Cooldown Rate Limit demonstrated to <u>not</u> be exceeded

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</table>

END TASK

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
2	Ensures proper valve lineup for flow to the upper feed ring
3	Ensures proper valve lineup for flow to the upper feed ring
9	Sets up the Turbine Bypass Valves to control properly.
10	Necessary to put flow into the SGs.
12	Necessary to cooldown in a controlled manner.

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

INITIAL CONDITIONS:

A loss of both Main FDW Pumps has initiated a Rx trip.

Subsequently, the EFW system failed.

The CBPs are supplying the SGs per Rule 3.

Repairs have been completed on the Main FDW Pump circuitry and the 1A Main FDW Pump is currently operating in AUTO at the ICS Low Speed Stop.

The LOHT Tab of the EOP has been completed up to step 56.

INITIATING CUES:

The SRO in the Control Room directs you to re-establish Main FDW Flow to the SGs per the LOHT Tab of the EOP beginning at Step 56.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. __ Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete.	
2. __ **IAAT** the RCS heats to the point where core SCM = 0°F, **THEN GO TO** Step 4.	
3. __ **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency), **AND** any of the following exists: __ RCS pressure reaches 2300 psig **OR** NDT limit __ Pzr level reaches 375" [340" acc] **THEN GO TO** Step 4.	**NOTE** 1A1 RCP provides the best Pzr spray. 1. __ Reduce operating RCPs to one pump/loop. 2. __ **WHEN** any of the following exists: __ Unit 1 EFDW available __ EFDW aligned from another unit __ Main FDW pump available **AND** reset **THEN GO TO** Step 53.

NOTE
SCM may be lost when the PORV is opened. Transition to LOSCM tab is **NOT** required.

4. __ **PERFORM** Rule 4 (Initiation of HPI Forced Cooling).	
5. Verify all the following: __ At least two HPI pumps operating __ Acceptable HPI flow exists in both HPI headers per Rule 4 (Initiation of HPI Forced Cooling) __ PORV open __ 1RC-4 open	1. __ **IF** any HPI pump is providing injection flow, **THEN GO TO** Step 7. 2. __ **GO TO** Step 12.
6. __ **GO TO** HPI CD tab.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. __ Verify SSF-ASW available.	1. __ Dispatch an operator to the Penetration Room to perform the following: • Establish communications with Control Room • Stand by to throttle Station ASW 2. __ Dispatch an operator to perform Encl 5.10 (Station ASW Pump Alignment). **(PS)** 3. __ Initiate Encl 5.8 (Feeding SGs with Station ASW). 4. __ **GO TO** Step 9.
8. __ Dispatch a licensed operator to perform Encl 5.34 (Aligning SSF-ASW for SG Feed).	
9. Locally close the following (Unit 1 Cable Rm): __ 1SKJ-08 (1RC-155/1RC-156) __ 1SKK-08 (1RC-157/1RC-158) __ 1SKL-08 (1RC-159/1RC-160)	
10. Open the following: __ 1RC-155 __ 1RC-156 __ 1RC-157 __ 1RC-158 __ 1RC-159 __ 1RC-160	
11. __ **GO TO** HPI CD tab.	
12. __ Verify 1RC-4 open.	__ **GO TO** Step 14.
13. __ Cycle PORV as necessary to maintain RCS pressure between 2300 psig and minimum SCM.	
14. __ **IAAT** HPI flow is established, **AND NO** SGs can be fed with FDW (Main/Emergency), **THEN GO TO** Step 15.	__ **GO TO** Step 24.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. __ Verify 1RC-4 is open.	**GO TO** Step 19.
16. __ Open the PORV.	__ **GO TO** Step 19.
17. Verify <u>all</u> the following: __ At least two HPI pumps operating __ Acceptable HPI flow exists in <u>both</u> HPI headers per Rule 4 (Initiation of HPI Forced Cooling)	__ **GO TO** Step 19.
18. __ **GO TO** HPI CD tab.	
19. __ Verify SSF-ASW available.	1. __ Dispatch an operator to the Penetration Room to perform the following: • Establish communications with Control Room • Stand by to throttle Station ASW 2. __ Dispatch an operator to perform Encl 5.10 (Station ASW Pump Alignment). **(PS)** 3. __ Initiate Encl 5.8 (Feeding SGs with Station ASW). 4. __ **GO TO** Step 21.
20. __ Dispatch a licensed operator to perform Encl 5.34 (Aligning SSF-ASW for SG Feed).	
21. Locally close the following (Unit 1 Cable Rm): __ 1SKJ-08 (1RC-155/1RC-156) __ 1SKK-08 (1RC-157/1RC-158) __ 1SKL-08 (1RC-159/1RC-160)	
22. Open the following: __ 1RC-155 __ 1RC-156 __ 1RC-157 __ 1RC-158 __ 1RC-159 __ 1RC-160	
23. __ **GO TO** HPI CD tab.	

IF AT ANY TIME:

(14) HPI flow is established, **AND NO** SGs can be fed … (**GO TO** path to establish HPI forced cooling)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Unit Status

- HPI forced cooling criteria has been met but **CANNOT** be established.
- Attempts to restore feedwater and establish HPI forced cooling are in progress.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. __ Verify SSF-ASW available.	1. __ Dispatch an operator to the Penetration Room to perform the following: • Establish communications with Control Room • Stand by to throttle Station ASW 2. __ Dispatch an operator to perform Encl 5.10 (Station ASW Pump Alignment). **(PS)** 3. __ Initiate Encl 5.8 (Feeding SGs with Station ASW). 4. __ **GO TO** Step 26.
25. __ Dispatch a licensed operator to perform Encl 5.34 (Aligning SSF-ASW for SG Feed).	
26. __ **WHEN** <u>any</u> of the following exists: __ Unit 1 EFDW available __ EFDW aligned from another unit __ Main FDW pump available **AND** reset __ SSF-ASW pump running **AND** ready to feed **THEN** continue in this procedure.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27. __ Verify Main FDW or Unit 1 EFDW available.	__ **GO TO** Step 36.
28. __ Verify Encl 5.27 (Alternate Methods For Controlling EFDW Flow) is in progress.	__ **GO TO** Step 30.
29. __ **GO TO** Step 36.	
30. __ Verify Main FDW pump available and reset.	__ **GO TO** Step 35.
31. Open the following on each available SG:	
32. Close the following on each available SG:	
33. __ Ensure Main FDW pump is operating.	
34. __ **GO TO** Step 36.	

Step 31 valves:

	1A SG		1B SG
	1FDW-38		1FDW-47

Step 32 valves:

	1A SG		1B SG
	1FDW-36		1FDW-45

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. Verify one of the following: __ Both MDEFDWPs operating __ TDEFDWP operating	1. Close the following: __ 1FDW-315 __ 1FDW-316 2. __ Start MDEFDWP for each available SG. 3. __ **IF** only one MDEFDWP is operating, **AND** both SGs are available, **THEN** locally open the following: __ 1FDW-313 (1A EFDW LINE DISCH TO 1A S/G X-CONN) (T-1, 1' N of M-16, 18' up) __ 1FDW-314 (1B EFDW LINE DISCH TO 1B S/G X-CONN) (T-1, 3' S of M-24, 10' up)
36. Verify all the following: __ $T_{cold} > 500°F$ __ TBVs available	1. Manually control SG pressure to match RCS P_{sat} using either of the following: __ TBVs __ Dispatch two operators to perform Encl 5.24 (Operation of the ADVs). **(PS)** 2. __ **GO TO** Step 41.
37. __ Verify $T_{cold} \leq 547°F$.	1. __ Set THP setpoint at ≈ 885 psig. 2. __ **GO TO** Step 40.
38. __ Determine P_{sat} for existing RCS temperature (RCS P_{sat}).	
39. __ Adjust THP setpoint to RCS P_{sat} minus 140 psi: Setpoint = ____ (RCS P_{sat} (psia)) - 140 psi = ____ psig	
40. __ Place TBVs in AUTO for available SGs.	1. __ **IF** T_{cold} is $\leq 547°F$, **THEN** manually control SG pressure to match RCS P_{sat}. 2. __ **IF** T_{cold} is $> 547°F$, **THEN** manually control SG pressure ≈ 1010 psig.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
41. __ Verify source of feed is Main FDW or EFDW.	1. __ Notify SSF-ASW operator to establish SG feed rate and level per Rule 7 (SG Feed Control) for each available SG. 2. __ **GO TO** Step 43.
42. __ Initiate feed to available SGs per Rule 7 (SG Feed Control).	
43. __ **IAAT** heat transfer is established in any SG, **THEN GO TO** Step 79.	
44. __ Establish and maintain appropriate level in all available SGs per Rule 7 (SG Feed Control).	
45. __ Decrease SG pressure to establish SG T_{sat} 40 - 60°F < CETC temperature.	
46. __ Verify core SCM > 0°F.	__ **GO TO** Step 49.
47. __ Verify any RCP available.	__ **GO TO** Step 49.
48. __ **PERFORM** Encl 5.6 (RCP Restart) to start one RCP (preferably in loop with feedwater).	
49. __ Verify HPI available.	__ **GO TO** Step 52.

50. Locally close breaker for high point vent on all loops with no RCP operating (Unit 1 Cable Rm):

	Loop 1A		Loop 1B
	1SKJ-08 (1RC-155/ 1RC-156)		1SKK-08 (1RC-157/ 1RC-158)

51. Open high point vents on all loops with no RCP operating:

	Loop 1A		Loop 1B
	1RC-155		1RC-157
	1RC-156		1RC-158

52. __ **WHEN** heat transfer is established in any SG,
THEN GO TO Step 79.

IF AT ANY TIME:

(2) the RCS heats to the point where <u>core</u> SCM = 0°F … (**GO TO** path to establish HPI forced cooling)

(3) **NO** SGs can be fed **AND** <u>any</u> of the following exists: RCS pressure ≥ 2300 psig, RCS pressure ≥ NDT limit, Pzr level ≥ 375″ [340″ acc] … (**GO TO** path to establish HPI forced cooling)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Unit Status Main or Emergency FDW is available.	
53. __ Verify Main FDW or Unit 1 EFDW available.	__ **GO TO** Step 62.
54. __ Verify Encl 5.27 (Alternate Methods For Controlling EFDW Flow) is in progress.	__ **GO TO** Step 56.
55. __ **GO TO** Step 62.	
56. __ Verify Main FDW pump available and reset.	__ **GO TO** Step 61.
57. Open the following on each available SG:	
58. Close the following on each available SG:	
59. __ Ensure Main FDW pump is operating.	
60. __ **GO TO** Step 62.	

Step 57:

	1A SG		1B SG
	1FDW-38		1FDW-47

Step 58:

	1A SG		1B SG
	1FDW-36		1FDW-45

IF AT ANY TIME:

(2) the RCS heats to the point where <u>core</u> SCM = 0°F … (**GO TO** path to establish HPI forced cooling)

(3) **NO** SGs can be fed **AND** <u>any</u> of the following exists: RCS pressure ≥ 2300 psig, RCS pressure ≥ NDT limit, Pzr level ≥ 375″ [340″ acc] … (**GO TO** path to establish HPI forced cooling)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
61. Verify <u>one</u> of the following: __ <u>Both</u> MDEFDWPs operating __ TDEFDWP operating	1. Close the following: __ 1FDW-315 __ 1FDW-316 2. __ Start MDEFDWP for each <u>available</u> SG. 3. __ **IF** only one MDEFDWP is operating, **AND** <u>both</u> SGs are available, **THEN** locally open the following: __ 1FDW-313 (1A EFDW LINE DISCH TO 1A S/G X-CONN) (T-1, 1' N of M-16, 18' up) __ 1FDW-314 (1B EFDW LINE DISCH TO 1B S/G X-CONN) (T-1, 3' S of M-24, 10' up)
62. Verify <u>all</u> the following: __ $T_{cold} > 500°F$ __ TBVs available	1. Manually control SG pressure to match RCS P_{sat} using <u>either</u> of the following: __ TBVs __ Dispatch <u>two</u> operators to perform Encl 5.24 (Operation of the ADVs). **(PS)** 2. __ **GO TO** Step 67.
63. __ Verify $T_{cold} \leq 547°F$.	1. __ Set THP setpoint at ≈ 885 psig. 2. __ **GO TO** Step 66.
64. __ Determine P_{sat} for existing RCS temperature (RCS P_{sat}).	
65. __ Adjust THP setpoint to RCS P_{sat} minus 140 psi: Setpoint = ____ (RCS P_{sat} (psia)) - 140 psi = ____ psig	
66. __ Place TBVs in AUTO for <u>available</u> SGs.	1. __ **IF** T_{cold} is ≤ 547°F, **THEN** manually control SG pressure to match RCS P_{sat}. 2. __ **IF** T_{cold} is > 547°F, **THEN** manually control SG pressure ≈ 1010 psig.

IF AT ANY TIME:

(2) the RCS heats to the point where core SCM = 0°F ... (**GO TO** path to establish HPI forced cooling)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
67. __ Initiate feed to available SGs per Rule 7 (SG Feed Control).	
68. __ **IAAT** heat transfer is established in any SG, **THEN GO TO** Step 79.	
69. __ Cycle PORV as necessary to maintain RCS pressure between 2300 psig and minimum SCM.	
70. __ Establish and maintain appropriate level in all available SGs per Rule 7 (SG Feed Control).	
71. __ Decrease SG pressure to establish SG T_{sat} 40 - 60°F < CETC temperature.	
72. __ Verify core SCM > 0°F.	__ **GO TO** Step 75.
73. __ Verify any RCP available.	__ **GO TO** Step 75.
74. __ **PERFORM** Encl 5.6 (RCP Restart) to start one RCP (preferably in loop with feedwater).	
75. __ Verify HPI available.	__ **GO TO** Step 78.
76. Locally close breaker for high point vent on all loops with no RCP operating (Unit 1 Cable Rm):	
77. Open high point vents on all loops with no RCP operating:	
78. __ **WHEN** heat transfer is established in any SG, **THEN** continue in this procedure.	

Step 76 table:

	Loop 1A		Loop 1B
	1SKJ-08 (1RC-155/ 1RC-156)		1SKK-08 (1RC-157/ 1RC-158)

Step 77 table:

	Loop 1A		Loop 1B
	1RC-155		1RC-157
	1RC-156		1RC-158

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Unit Status Heat transfer has been restored in at least one SG.	
79. ___ Control feeding and steaming of available SGs to maintain SG level at setpoint and cooldown rate within Tech Spec limits: • $T_{cold} > 280°F$: $\leq 50°F$ / ½ hr • $T_{cold} \leq 280°F$: $\leq 25°F$ / ½ hr	
80. Close all loop high point vents: ___ 1RC-155 ___ 1RC-156 ___ 1RC-157 ___ 1RC-158	
81. ___ **WHEN** all SCMs are > 0°F, **OR** HPI flow is established, **THEN** continue in this procedure.	
82. ___ Verify indications of SGTR exist.	___ **GO TO** Step 84.
83. ___ **GO TO** SGTR tab.	
84. ___ Verify required RCS makeup flow within normal makeup capability.	___ **GO TO** LOCA CD tab.
85. Verify either of the following: ___ Any SG isolated ___ Any SG has an unisolable steam leak	___ **GO TO** Step 87.
86. ___ **GO TO** FCD tab.	
87. ___ **GO TO** Subsequent Actions tab.	

••• END •••

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REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-601

Synchronization With the Grid Following a Load Rejection

CANDIDATE ______________________________

EXAMINER ______________________________

check on sync interlock ~~defect~~

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Synchronization With the Grid Following a Load Rejection

Alternate Path:

No

Facility JPM #:

CRO-601

K/A Rating(s):

System: 062
K/A: A4.07
Rating: 3.1*/3.1*

Task Standard:

The main generator is synchronized to the electrical grid using AP/001 (Load Rejection)

Preferred Evaluation Location:

Simulator __X__ In-Plant ______

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

AP/001 (Load Rejection)

Validation Time: 10 minutes

Time Critical: No

==

Candidate: ________________________________
NAME

Time Start: _________
Time Finish: _________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ________________________ ______________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall Snap 205
2. Place simulator in RUN

Tools/Equipment/Procedures Needed:

AP/001 (Load Rejection)

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 initially operating at 40% power when PCB-20 (GENERATOR BREAKER) and PCB-21 (GENERATOR BREAKER) trip open due to a faulty relay

Unit is currently at ≈ 20% power

The faulty relay that initiated the load rejection has been repaired

AP/1 (Load Rejection) in progress up to step 4.11

INITIATING CUES:

The SRO directs you to continue with AP/1 (Load Rejection) beginning at step 4.11.

START TIME: _______

STEP 1: Step 4.11 **WHEN** plant conditions allow, **AND** cause of load rejection has been determined, **THEN** continue. STANDARD: Candidate determines that the cause of the load rejection has been determined and continues with procedure. Continue to Step 4.12 ***Cue: If asked as the SRO, inform candidate that he should continue with the procedure.*** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 4.12 Notify SOC of pending unit synchronization. STANDARD: The CR phone is used to notify the SOC of pending unit synchronization. Continue to Step 4.13 COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 4.13 Place PCB-20 (GENERATOR BREAKER) synchronizing switch in ON. STANDARD: PCB-20 (GENERATOR BREAKER) synchronizing switch located on 1UB2 is placed in ON. Continue to Step 4.14 **Note: There is only one synchronizing switch handle for PCB-20 and PCB-21. The candidate must ensure the handle is in the PCB-20 synchronizing switch location prior to operating the synchronizing switch.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4: Step 4.14 Verify automatic SPEED MATCH is desired. STANDARD: Determine if automatic SPEED MATCH is desired. Continue to Step 4.15 ***Cue: If asked as the SRO, inform candidate that automatic SPEED MATCH is desired.*** COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 4.15 Select SPEED MATCH on SELECT SPEED TARGET. STANDARD: SPEED MATCH is selected on SELECT SPEED TARGET. Continue to Step 4.16 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 6: Step 4.16 **GO TO** Step 4.19. STANDARD: Candidate goes to Step 4.19. Continue to Step 4.19 COMMENTS:	___ SAT ___ UNSAT

STEP 7:	Step 4.19 Using Voltage Adjuster AUTO, adjust T1 OUTPUT VOLTS to match SWITCHYARD VOLTS when the synchroscope pointer is vertical.	___ SAT
STANDARD:	The candidate uses the AUTO Voltage Adjuster located on 1UB2 to increase T1 (Main Transformer) OUTPUT VOLTS to match SWITCHYARD VOLTS when the synchroscope pointer is vertical. Continue to Step 4.20	___ UNSAT
COMMENTS:		
STEP 8:	Step 4.20 **WHEN** synchroscope pointer is ≈ 5° before vertical, **THEN** close PCB-20 (GENERATOR BREAKER).	**CRITICAL STEP** ___ SAT
STANDARD:	The synchroscope located on 1UB2 is monitored and when the pointer is ≈ 5° before vertical, PCB-20 (GENERATOR BREAKER) is closed by rotating the switch to the close position. The red CLOSED light illuminates and the white OPEN light extinguishes. Continue to Step 4.21	___ UNSAT
COMMENTS:		
STEP 9:	Step 4.21 Place PCB-20 (GENERATOR BREAKER) synchronizing switch in OFF.	___ SAT
STANDARD:	PCB-20 (GENERATOR BREAKER) synchronizing switch located on 1UB2 is placed in OFF. Continue to Step 4.22	___ UNSAT
COMMENTS:		

STEP 10: Step 4.22 Establish Generator load of ≈ 35 MW_e by using one of the following: • LOAD REFERENCE DEMAND • TURBINE MASTER STANDARD: The LOAD REFERENCE DEMAND (on HMI screen) or the TURNBINE MASTER (on 1UB1) is used to establish ≈ 35 MW_e load. Continue to Step 4.23 COMMENTS:	___ SAT ___ UNSAT
STEP 11: Step 4.23 Place PCB-21 (GENERATOR BREAKER) synchronizing switch in SYNCH. STANDARD: PCB-21 (GENERATOR BREAKER) synchronizing switch located on 1UB2 is placed in SYNCH. Continue to Step 4.24 **Note: The synchronizing switch handle must be removed from PCB-20 synchronizing switch location and placed into the PCB-21 synchronizing switch location.** **Note: The PCB-21 synchronizing switch ON position is labeled SYNC. The candidate may ask for a soft match from the SRO.** COMMENTS:	___ SAT ___ UNSAT
STEP 12: Step 4.24 Close PCB-21 (GENERATOR BREAKER). STANDARD: PCB-21 (GENERATOR BREAKER) located on 1UB2 is closed by rotating the switch to the close position. The red CLOSED light illuminates and the white OPEN light extinguishes. Continue to Step 4.25 COMMENTS:	___ SAT ___ UNSAT

STEP 13: Step 4.25 Place PCB-21 (GENERATOR BREAKER) synchronizing switch in OFF. STANDARD: PCB-21 (GENERATOR BREAKER) synchronizing switch located on 1UB2 is placed in OFF. Continue to Step 4.26 COMMENTS:	___ SAT ___ UNSAT
STEP 14: Step 4.26 Verify TURBINE AUTO LOAD PERMISSIVE satisfied. STANDARD: The TURBINE AUTO LOAD PERMISSIVE is verified to be satisfied by observing the status on the HMI Panel. Continue to Step 4.27 COMMENTS:	___ SAT ___ UNSAT
STEP 15: Step 4.27 Place TURBINE MASTER in AUTO. STANDARD: TURBINE MASTER is placed in AUTO by depressing the AUTO pushbutton on the TURBINE MASTER Bailey. **Note: The candidate may select MEAS. VAR. and verify pointer on the "caret" or verify that Turbine Header Pressure is at setpoint prior to selecting AUTO on the TURBINE MASTER.** ***Cue: When the candidate has placed the Turbine Master in AUTO, inform candidate the JPM is complete.*** COMMENTS: **END TASK**	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	Sync switch must be ON to satisfy the interlock close the PCB (generator output breaker)
5	This ensures that the generator picks up electrical load (MWs) when the generator output breaker is closed and prevents motoring the generator.
8	Required to tie generator to grid.

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

INITIAL CONDITIONS:

Unit 1 initially operating at 40% power when PCB-20 (GENERATOR BREAKER) and PCB-21 (GENERATOR BREAKER) trip open due to a faulty relay

Unit is currently at ≈ 20% power

The faulty relay that initiated the load rejection has been repaired

AP/1 (Load Rejection) in progress up to step 4.11

INITIATING CUES:

The SRO directs you to continue with AP/1 (Load Rejection) beginning at step 4.11

JMB/KFS
Sim (3)
Brief
115
HLP-12
GR-13
GCW

TRNG

NSD 703 (R04-01)

Duke Power Company
PROCEDURE PROCESS RECORD

OTC MASTER FILE

(1) ID No AP/1/A/1700/001
Revision No 07

PREPARATION

(2) Station OCONEE NUCLEAR STATION

(3) Procedure Title Load Rejection

(4) Prepared By H.E. Woodall (Signature) HEWoodall Date 11-4-03

(5) Requires NSD 228 Applicability Determination?

☒ Yes (New procedure or revision with major changes)
☐ No (Revision with minor changes)
☐ No (To incorporate previously approved changes)

(6) Reviewed By ________ (QR) Date 12-3-03

Cross-Disciplinary Review By ________ (QR)NA ________ Date ________

Reactivity Mgmt Review By ________ (QR)NA ________ Date ________

Mgmt Involvement Review By ________ (Ops Supt) NA ________ Date ________

(7) Additional Reviews

Reviewed By Anthony Scott Hollingsworth Date 12-3-03

Reviewed By ________ Date ________

(8) Temporary Approval *(if necessary)*

By ________ (OSM/QR) Date ________

By ________ (QR) Date ________

(9) Approved By ________ Date 12-3-03

PERFORMANCE *(Compare with control copy every 14 calendar days while work is being performed.)*

(10) Compared with Control Copy ________ Date ________

Compared with Control Copy ________ Date ________

Compared with Control Copy ________ Date ________

(11) Date(s) Performed ________

Work Order Number (WO#) ________

COMPLETION

(12) Procedure Completion Verification:

☐ Unit 0 ☐ Unit 1 ☐ Unit 2 ☐ Unit 3 Procedure performed on what unit?

☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
☐ Yes ☐ NA Required enclosures attached?
☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?
☐ Yes ☐ NA Charts, graphs, etc. attached, dated, identified, and marked?
☐ Yes ☐ NA Procedure requirements met?

Verified By ________ Date ________

(13) Procedure Completion Approved ________ Date ________

(14) Remarks *(Attach additional pages, if necessary)*

Received
DEC 2003
Operator Training

SUMMARY OF CHANGES: (DESCRIPTION AND REASON)

General Changes

Made various editorial changes to meet requirements of the "Writer's Guide For Two Column Emergency and Abnormal Procedures".

Old Step	New Step	Description
1	1	Changed entry conditions as recommended by AP Entry Condition Review (see PIP 02-7169).PCR 2003-6789.
N/A	4.1	Added step to announce plant condition and AP entry. PCR 2003-7350.
4.1,4.16,4.23,4.24 RNO,4.27 note and RNO,4.30.	4.2,4.26,4.33,4.35,4.38 note,4.38 RNO,4.41.	Replaced word ensure with other more appropriate wording.
Step 4.13	Step 4.22	Replaced word "on" with "synch" This makes procedure correct for actual label on switch. PCR 2003-2935.
Step 4.8,4.12	Steps 4.14,4.15,4.17,4.18,4.22.	NSM 13073 has changed some of the Main Turbine controls. This procedure changes incorporate the new way of controlling the turbine once NSM 13073 is implemented. PCR 2003-4308.
4.2,4.3	4.3 through 4.8	Clarifies for CR personnel when a reactor trip is and <u>is not</u> required after a load rejection.
Section 4 note.	Section 4 Caution	Note changed to a caution and more details added so it is clear that a manual or automatic turbine trip after a load rejection will result in a reactor trip. In this case, it is more desirable to do a manual trip.
4.24	4.33	Deleted the word "NOT" from left hand column. Added the associated RNO step to route procedure director appropriately.

PCR Numbers Incorporated

2003-2935, 2003-4308, 2003-6789, 2003-7350.

Duke Power Company Oconee Nuclear Station **Load Rejection**	Procedure No. AP/1/A/1700/001 Revision No. 007 Electronic Reference No. OX002RGE

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1. Entry Conditions

Turbine Generator providing in house loads with the generator output breakers open.

2. Automatic Systems Actions

- Core Thermal Power Demand Setpoint goes to ≈ 20%.
- TBVs control steam pressure at setpoint.
- Main Steam relief valves open.
- Pzr spray valve may open.
- ICS may revert to TRACK.
- TURBINE MASTER may revert to manual.

3. Immediate Manual Actions

None

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4. Subsequent Actions

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.1 __ Announce AP entry using the PA system.	
4.2 Make the following notifications: __ OSM to reference OMP 1-14 (Notifications) __ STA	

CAUTION

If auxiliary loads are being supplied by Auxiliary Transformer 1T and the AUTO/MAN transfer switches are in AUTO, a Turbine trip will result in a slow transfer (≈ 1 second delay) of 4160V auxiliaries to CT-1. A slow transfer will result in the loss of most load shed loads and cause a reactor trip (2)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.3 __ **IAAT** Main Turbine approaches operating limits per Encl 5.1 (Main Turbine Operating Limits), **THEN GO TO** step 4.4.	__ **GO TO** Step 4.7.
4.4 __ Verify step 4.31 complete.	1. __ Trip Rx. 2. __ Exit this procedure.
4.5 __ Trip Turbine.	
4.6 __ Exit this procedure.	
4.7 __ **IAAT** a Reactor shutdown is desired **THEN GO TO** step 4.8.	__ **GO TO** Step 4.10.
4.8 __ Verify step 4.31 complete.	1. __ Trip Rx. 2. __ Exit this procedure.
4.9 __ **GO TO** OP/1/A/1102/004 (Operation At Power).	
4.10 __ Verify Rx Power ≈ 15%.	1. __ Reduce CTPD SET window to 15% CTP on LCP. 2. __ Verify Rx Power lowers to ≈ 15%.
4.11 __ **WHEN** plant conditions allow, **AND** cause of load rejection has been determined, **THEN** continue.	

IF AT ANY TIME:

(4.3) Main Turbine approaches operating limits per Encl 5.1 … (determine if rapid bus transfer logic reset)

(4.7) Reactor shutdown desired ...(determine if rapid bus transfer logic reset)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.12 __ Notify SOC of pending unit synchronization.	
4.13 __ Place PCB-20 synchronizing switch in ON.	
4.14 __ Verify automatic SPEED MATCH is desired.	__ **GO TO** Step 4.17.
4.15 __ Select SPEED MATCH on SELECT SPEED TARGET.	
4.16 __ **GO TO** Step 4.19.	
4.17 __ Select 1800 RPM on SELECT SPEED TARGET.	
4.18 __ Use TURBINE SPEED CHANGER to adjust generator speed until slow clockwise rotation of SYNCHROSCOPE pointer is established.	
4.19 __ Using Voltage Adjuster AUTO, adjust T1 OUTPUT VOLTS to match SWITCHYARD VOLTS when the synchroscope pointer is vertical.	
4.20 __ **WHEN** synchroscope pointer is ≈ 5° before vertical, **THEN** close PCB-20.	
4.21 __ Place PCB-20 synchronizing switch in OFF.	
4.22 Establish Generator load of ≈ 35 MW_e by using <u>one</u> of the following: __ LOAD REFERENCE DEMAND __ TURBINE MASTER	
4.23 __ Place PCB-21 synchronizing switch in SYNCH.	
4.24 __ Close PCB-21.	
4.25 __ Place PCB-21 synchronizing switch in OFF.	

IF AT ANY TIME:

(4.3) Main Turbine approaches operating limits per Encl 5.1 … (determine if rapid bus transfer logic reset)

(4.7) Reactor shutdown desired ... (determine if rapid bus transfer logic reset)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.26 __ Verify TURBINE AUTO LOAD PERMISSIVE satisfied.	__ Take action to repair or meet TURBINE AUTO LOAD PERMISSIVE.
4.27 __ Place TURBINE MASTER in AUTO.	
4.28 __ Press TURBINE LOAD pushbutton.	
4.29 Verify the following: A. __ TBVs close B. __ MW_e increases to ≈ 135 MW_e C. __ TURBINE LOAD pushbutton lamp extinguished	__ Notify SPOC to investigate and repair.
4.30 __ Verify Auxiliary Transformer 1T supplying unit loads.	__ **GO TO** Step 4.32.
4.31 Restore rapid bus transfer logic as follows: A. Place the following Unit 1 AUTO/MAN transfer switches in MAN: __ MFB1 AUTO/MAN __ MFB2 AUTO/MAN __ 1TA AUTO/MAN __ 1TB AUTO/MAN B. Place the following Unit 1 AUTO/MAN transfer switches in AUTO: __ MFB1 AUTO/MAN __ MFB2 AUTO/MAN __ 1TA AUTO/MAN __ 1TB AUTO/MAN	
4.32 Verify the following open: __ Turbine Stop Valves __ Reheat/Intercept Valves __ Turbine Control Valves (as required)	__ Notify SPOC to investigate and repair.
4.33 __ Verify restoration to unit power operation is desired.	__ **GO TO** OP/1/A/1102/004 (Operation at Power) enclosure for power reduction.

IF AT ANY TIME:

(4.3) Main Turbine approaches operating limits per Encl 5.1 … (determine if rapid bus transfer logic reset)

(4.7) Reactor shutdown desired ... (determine if rapid bus transfer logic reset)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.34 __ Verify MSRs in service per the section for Turbine Online Operation in the enclosure for Startup of Moisture Separators of OP/1/A/1106/014 (Moisture Separator Reheaters).	__ Place MSRs in service per the section for Turbine Online Operation in the enclosure for Startup of Moisture Separators of OP/1/A/1106/014 (Moisture Separator Reheaters).
4.35 __ Verify OP/1/A/1102/001 (Controlling Procedure for Unit Startup) in progress prior to load rejection.	__ **GO TO** Step 4.37.
4.36 __ Complete <u>all</u> remaining applicable steps of OP/1/A/1102/001 (Controlling Procedure for Unit Startup) to support power increase.	
4.37 __ Verify a Maneuvering Plan available for power increase.	__ Obtain/develop a Maneuvering Plan per PT/0/A/1103/020 (Power Maneuvering Predictions).
4.38 Select desired rate per the Maneuvering Plan as follows: A. Select Rate Set option: __ %MIN __ %HR B. __ Adjust thumbwheel for desired rate.	

NOTE

- Operation with CRDs in restricted region is limited to 2 hours.
- Rx power may be increased while performing corrective actions to keep CRDs within limits.

4.39 __ Verify CRD Groups within limits.	__ Initiate actions as necessary to position CRD Groups in limits within 2 hours.
4.40 __ Notify SOC of pending load increase.	
4.41 __ Set desired set point in CTPD SET.	

IF AT ANY TIME:

(4.3) Main Turbine approaches operating limits per Encl 5.1 … (determine if rapid bus transfer logic reset)

(4.7) Reactor shutdown desired ... (determine if rapid bus transfer logic reset)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.42 __ Set HIGH alarm on NI recorder at ≈ 2% above highest expected operating power.	
4.43 __ **WHEN** Rx power is ≈ 25%, **THEN GO TO** OP/1/A/1102/004 (Operation at Power) enclosure for Power Escalation.	

• • • END • • •

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Enclosure 5.1

Main Turbine Operating Limits {3}

1. Turbine should **NOT** be operated above 1200 rpm with back pressure > 5″ Hg. absolute.
2. Low Load Operation Limits:
   - Exhaust hood temperatures should be maintained ≤ 175°F during low load operation. With > 125°F exhaust hood temperatures, load should be increased slowly until temperature is below 125°F.
   - When exhaust hood temperature is ≤ 125°F, turbine is available for normal load increase.
   - Operation below 5% load (45 MW_e) should be minimized to prevent moisture erosion.
3. At 1800 rpm, minimum turbine oil cooler outlet temperature is 100°F. Normal operating oil cooler outlet temperature is 110°F to 120°F.
4. Maximum oil temperature rise across journal bearings is 50°F. Any oil drain temperature > 150°F is abnormal and should be reported to Unit Operations Manager or Operations Duty Engineer.
5. Maximum oil temperature rise across thrust bearing is 45°F. Maximum metal temperature is 190°F. Normal operating metal temperatures are 140°F to 175°F for active plate and 125°F to 150°F for inactive plate.
6. Minimum allowed cold gas temperature is 30°C when generator is on line.
7. If turbine bearing vibration exceeds 6 mils with turbine operating at rated speed, the Component Engineering turbine engineer should be notified to notify Nuclear Mutual Limited of adverse condition.
8. If turbine bearing vibration exceeds 7 mils with turbine operating at rated speed, Mechanical Maintenance should be notified to analyze vibration data:
   - If turbine bearing vibration (bearings 1-10) exceeds 10 mils for greater than 15 minutes while operating at rated speed, the turbine should be tripped.
   - If turbine bearing vibration (bearings 1-10) exceeds 12 mils while operating at rated speed, the turbine should be tripped immediately.

• • • END • • •

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REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-700

Place ICS In Auto following Loss Of Auto Power

CANDIDATE ____

EXAMINER ____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Place ICS In Auto following Loss Of Auto Power

Alternate Path:

Yes

Facility JPM #:

CRO-700

K/A Rating(s):
System: BW/A02
K/A: AA1.1
Rating: 4.0/3.8

Task Standard:

Use AP/23 (Loss Of ICS Power) Enclosure 5.5 (Placing ICS In Auto) to place the ICS in AUTO following a Loss Of Auto Power.

Preferred Evaluation Location:

Simulator __X__ In-Plant ______

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

AP/23 (Loss Of ICS Power) Enclosure 5.5 (Placing ICS In Auto)

Validation Time: 20 minutes

Time Critical: NO

==

Candidate: ____
NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall Snap 210
2. Import files for CRO-700
3. Go to RUN

Tools/Equipment/Procedures Needed:

AP/23 (Loss Of ICS Power) Enclosure 5.5 (Placing ICS In Auto)

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:

ICS AUTO power lost

AP/23 (Loss of ICS Power) in progress

ICS AUTO power has been restored

INITIATING CUES:

The SRO directs you to perform Enclosure 5.5 (Placing ICS in AUTO) to place ALL ICS H/A stations in AUTO.

START TIME: _______

Note: All operations will be performed on the ICS stations located on 1UB1.

STEP 1: Step 1 Perform a pre-job briefing for AP/1/A/1700/023 from the pre-job briefing database. STANDARD: State that a pre-job briefing should be performed. Continue to Step 2. ***Cue: Inform candidate that the pre-job briefing has been performed.*** **Note: Candidate will obtain setpoint information from the OAC during this JPM.** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 2 Ensure RATE SET to 0.0. STANDARD: Ensure RATE SET thumbwheel located is set to 0.0. Continue to Step 3. COMMENTS:	___ SAT ___ UNSAT

STEP 3:	Step 3 Verify THP setpoint at ≈ THP by comparing the following: • O1E2089 (TURB HDR PRESS SETPOINT) • O1E2088 (ICS SELECTED TURB HDR PRESS) **RNO** Ensure the following in HAND: • TURBINE MASTER • 1A TURBINE BYPASS VALVES • 1B TURBINE BYPASS VALVES • Adjust THP setpoint to ≈ THP at the TURBINE MASTER.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Call up the appropriate OAC display (enter GD AP28) and determine THP setpoint NOT at ≈ THP and perform **RNO**. Verify the above stations are in HAND. Use the Setpoint knob on the TURBINE MASTER to match THP setpoint to ≈ THP while monitoring on the OAC. Continue to Step 4.	
COMMENTS:		
STEP 4:	Step 4 Place TURBINE MASTER in AUTO.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	TURBINE MASTER is placed in AUTO by depressing the Auto pushbutton on the TURBINE MASTER Bailey station. Continue to Step 5.	
COMMENTS:		

STEP 5:	Step 5 Verify Main Turbine controlling THP.	___ SAT ___ UNSAT
STANDARD:	Verify Main Turbine controlling THP by observing THP being maintained at setpoint. Continue to Step 6.	
COMMENTS:		
STEP 6:	Step 6 Verify all TBVs are closed.	___ SAT ___ UNSAT
STANDARD:	Verify all TBVs closed by observing the Green closed indication. Continue to Step 7.	
COMMENTS:		
STEP 7:	Step 7 Ensure all TBVs in AUTO: • 1A TURBINE BYPASS VALVES • 1B TURBINE BYPASS VALVES	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Place TBVs in AUTO by depressing the red AUTO pushbutton and verify the red AUTO light illuminates and the white HAND light extinguishes. Continue to Step 8.	
COMMENTS:		

STEP 8:	Step 8 Verify Tave setpoint at ≈ Tave by comparing the following: • O1E2087 (ICS TAVE SETPOINT) • O1E2086 (ICS SELECTED TAVE) **RNO** Ensure the following: • DIAMOND in HAND • 1A FDW MASTER in HAND • 1B FDW MASTER in HAND	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Call up the appropriate OAC display (enter GD AP28) and determine Tave setpoint NOT at ≈ Tave and perform **RNO**. Verify the above stations are in HAND. Adjust Tave setpoint to ≈ Tave at the REACTOR MASTER while monitoring on the OAC. Continue to Step 9.	
COMMENTS:		
STEP 9:	Step 9 Ensure DIAMOND in MANUAL.	___ SAT ___ UNSAT
STANDARD:	Verify DIAMOND in MANUAL by observing MANUAL light illuminated on DIAMOND panel. Continue to Step 10.	
COMMENTS:		
STEP 10:	Step 10 Place REACTOR MASTER in AUTO.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	REACTOR MASTER is placed in AUTO by depressing the Auto pushbutton on the REACTOR MASTER Bailey station and verify the red AUTO light illuminates and the white HAND light extinguishes. Continue to Step 11.	
COMMENTS:		

STEP 11:	Step 11 Verify Neutron Error is 0 ± 1%.	___ SAT ___ UNSAT
STANDARD:	Verify Neutron Error is 0 ± 1% by observing Neutron Error meter on 1UB1. Continue to Step 12.	
COMMENTS:		
STEP 12:	Step 12 Place DIAMOND in AUTO.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Place DIAMOND in AUTO by depressing the AUTO pushbutton on the DIAMOND panel pushbutton and verify the AUTO light illuminates and the HAND light extinguishes. Verify plant parameters do not change. Continue to Step 13.	
COMMENTS:		
STEP 13:	Step 13 Verify STM GENERATOR MASTER Measured Variable is on the caret.	___ SAT ___ UNSAT
STANDARD:	Place selector switch to Measured Variable and verify the pointer on the STM GENERATOR MASTER is on the caret. Continue to Step 14.	
COMMENTS:		

STEP 14:	Step 14 Place STM GENERATOR MASTER in AUTO.	**CRITICAL STEP**
STANDARD:	STM GENERATOR MASTER is placed in AUTO by depressing the Auto pushbutton on the STM GENERATOR MASTER Bailey station and verify the red AUTO light illuminates and the white HAND light extinguishes. Continue to Step 15.	___ SAT ___ UNSAT
COMMENTS:		
STEP 15:	Step 15 Verify Delta Tc setpoint at ≈ Delta Tc by comparing the following: • O1E2091 (ICS DELTA TC SETPOINT) • O1P1608 (RCS NARROW RANGE DELTA TC)	___ SAT
STANDARD:	Verify Delta Tc setpoint at ≈ Delta Tc by comparing the above points on the OAC. Continue to Step 16.	___ UNSAT
COMMENTS:		
STEP 16:	Step 16 Place DELTA Tc station in AUTO.	**CRITICAL STEP**
STANDARD:	The DELTA Tc station is placed in AUTO by depressing the Auto pushbutton on the DELTA Tc Bailey station and verifying the red AUTO light illuminates and the white HAND light extinguishes. Continue to Step 17.	___ SAT ___ UNSAT
COMMENTS:		

STEP 17: Step 17 Verify 1A FDW MASTER Measured Variable is on the caret. STANDARD: Place selector switch to Measured Variable and verify the pointer on the 1A FDW MASTER is on the caret. Continue to Step 18. COMMENTS:	___ SAT ___ UNSAT
STEP 18: Step 18 Verify 1B FDW MASTER Measured Variable is on the caret. STANDARD: Place selector switch to Measured Variable and verify the pointer on the 1B FDW MASTER is on the caret. Continue to Step 19. COMMENTS:	___ SAT ___ UNSAT
NOTE 1A FDW MASTER and 1B FDW MASTER should both be placed in AUTO simultaneously. STEP 19: Step 19 Place the following in AUTO: • 1A FDW MASTER • 1B FDW MASTER STANDARD: The 1A FDW MASTER and 1B FDW MASTER is placed in AUTO simultaneously by depressing the Auto pushbuttons on both the 1A FDW MASTER and 1B FDW MASTER Bailey stations and verifying the red AUTO lights illuminate and the white HAND lights extinguish. Continue to Step 20. ***Note: Simultaneous operation is not critical.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

CAUTION Changing Total FDW flow will result in Rx power change. Total FDW flow should be maintained as near constant as possible by adjusting FDW pump speed and FDW control valve positions. STEP 20: Step 20 Verify lowest FDW VALVE ΔP ≈ 35 psid. STANDARD: Verify lowest FDW VALVE ΔP ≈ 35 psid by observing the FDW VALVE ΔP gauge. Continue to Step 21. COMMENTS:	___ SAT ___ UNSAT
STEP 21: Step 21 Verify 1A MAIN FDW PUMP Measured Variable is on the caret. STANDARD: Place selector switch to Measured Variable and verify the pointer on the 1A MAIN FDW PUMP is on the caret. Continue to Step 22. COMMENTS:	___ SAT ___ UNSAT
STEP 22: Step 22 **IAAT** 1A MAIN FDW PUMP Measured Variable is on the caret, **AND** desired in AUTO, **THEN** place 1A MAIN FDW PUMP in AUTO. STANDARD: Place 1A MAIN FDW PUMP in AUTO by depressing the AUTO pushbutton and verify the red AUTO light illuminates and the white HAND light extinguishes. Continue to Step 23. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 23:	Step 23 Verify 1B MAIN FDW PUMP Measured Variable is on the caret.	___ SAT
STANDARD:	Place selector switch to Measured Variable and verify the pointer on the 1B MAIN FDW PUMP is on the caret. Continue to Step 24.	___ UNSAT
COMMENTS:		
STEP 24:	Step 24 **IAAT** 1B MAIN FDW PUMP Measured Variable is on the caret, **AND** desired in AUTO, **THEN** perform the following: • Adjust 1B MAIN FDW PUMP bias as required using O1E2092 (FWT 1B BIAS). • Place 1B MAIN FDW PUMP in AUTO.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Place 1B MAIN FDW PUMP in AUTO by depressing the AUTO pushbutton and verify the red AUTO light illuminates and the white HAND light extinguishes. Continue to Step 25.	
COMMENTS:		
STEP 25:	Step 25 Verify 1FDW-32 Measured Variable is on the caret.	___ SAT
STANDARD:	Place selector switch to Measured Variable and verify the pointer on the 1FDW-32 controller is on the caret. Continue to Step 26.	___ UNSAT
COMMENTS:		

STEP 26: Step 26 Verify 1FDW-35 Measured Variable is on the caret. STANDARD: Place selector switch to Measured Variable and verify the pointer on the 1FDW-35 controller is on the caret. Continue to Step 27. COMMENTS:	___ SAT ___ UNSAT
NOTE 1FDW-32 and 1FDW-35 should both be placed in AUTO simultaneously. STEP 27: Step 27 Place the following in AUTO: • 1FDW-32 • 1FDW-35 STANDARD: The 1FDW-32 and 1FDW-35 is placed in AUTO simultaneously by depressing the Auto pushbuttons on both the 1FDW-32 and 1FDW-35 Bailey stations and verifying the red AUTO lights illuminate and the white HAND lights extinguish. Continue to Step 28. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 28: Step 28 Verify 1FDW-41 Measured Variable is on the caret. STANDARD: Place selector switch to Measured Variable and verify the pointer on the 1FDW-41 controller is on the caret. Continue to Step 29. COMMENTS:	___ SAT ___ UNSAT

STEP 29:	Step 29 Verify 1FDW-44 Measured Variable is on the caret.	___ SAT ___ UNSAT
STANDARD:	Place selector switch to Measured Variable and verify the pointer on the 1FDW-44 controller is on the caret. Continue to Step 30.	
COMMENTS:		

NOTE
1FDW-41 and 1FDW-44 should both be placed in AUTO simultaneously.

STEP 30:	Step 30 Place the following in AUTO: • 1FDW-41 • 1FDW-44	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	The 1FDW-41 and 1FDW-44 is placed in AUTO simultaneously by depressing the Auto pushbuttons on both the 1FDW-41 and 1FDW-44 Bailey stations and verifying the red AUTO lights illuminate and the white HAND lights extinguish. Continue to Step 31.	
COMMENTS:		

STEP 31:	Step 31 Slowly adjust the following as required by unit operation: • Tave • THP • Delta Tc	___ SAT ___ UNSAT
STANDARD:	Adjust the above on 1UB1 as required by unit operation. Continue to Step 32.	
COMMENTS:		

STEP 32: Step 32 Ensure CTPD SET at desired value. STANDARD: Ensure CTPD SET at desired value on 1UB1. COMMENTS:	___ SAT ___ UNSAT

END TASK

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	The setpoint and the parameter have to be matched to prevent a plant transient as the ICS is place in AUTO.
4	Required to place the ICS in AUTO.
7	Required to place the ICS in AUTO.
8	The setpoint and the parameter have to be matched to prevent a plant transient as the ICS is place in AUTO.
10	Required to place the ICS in AUTO.
12	Required to place the ICS in AUTO.
14	Required to place the ICS in AUTO.
16	Required to place the ICS in AUTO.
19	Required to place the ICS in AUTO.
22	Required to place the ICS in AUTO.
24	Required to place the ICS in AUTO.
27	Required to place the ICS in AUTO.
30	Required to place the ICS in AUTO.

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

INITIAL CONDITIONS:

ICS AUTO power lost

AP/23 (Loss of ICS Power) in progress

ICS AUTO power has been restored

INITIATING CUES:

The SRO directs you to perform Enclosure 5.5 (Placing ICS in AUTO) to place ALL ICS H/A stations in AUTO.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- This enclosure should be performed by an RO with the CR SRO following along if possible. The CR SRO should be informed prior to placing ICS stations in AUTO.
- Encl 5.6 (Measured Variable Information) contains information on Measured Variable interpretation.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. __ Perform a pre-job briefing for AP/1/A/1700/023 from the pre-job briefing database.	
2. __ Ensure RATE SET to 0.0.	
3. __ Verify THP setpoint at ≈ THP by comparing the following: • O1E2089 (TURB HDR PRESS SETPOINT) • O1E2088 (ICS SELECTED TURB HDR PRESS)	1. Ensure the following in HAND: __ TURBINE MASTER __ 1A TURBINE BYPASS VALVES __ 1B TURBINE BYPASS VALVES 2. __ Adjust THP setpoint to ≈ THP at the TURBINE MASTER.
4. __ Place TURBINE MASTER in AUTO.	
5. __ Verify Main Turbine controlling THP.	__ **GO TO** Step 7.
6. __ Verify <u>all</u> TBVs are closed.	1. __ Ensure <u>both</u> TBVs in HAND. 2. <u>Slowly</u> close <u>all</u> open TBVs: __ 1A TURBINE BYPASS VALVES __ 1B TURBINE BYPASS VALVES

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. Ensure <u>all</u> TBVs in AUTO: __1A TURBINE BYPASS VALVES __1B TURBINE BYPASS VALVES	
8. __ Verify T_{ave} setpoint at ≈ T_{ave} by comparing the following: • O1E2087 (ICS TAVE SETPOINT) • O1E2086 (ICS SELECTED TAVE)	1. Ensure the following: __ DIAMOND in MANUAL __ 1A FDW MASTER in HAND __ 1B FDW MASTER in HAND 2. __ Adjust T_{ave} setpoint to ≈ T_{ave} at the REACTOR MASTER.
9. __Ensure DIAMOND in MANUAL.	
10. __Place REACTOR MASTER in AUTO.	
11. __Verify Neutron Error is 0 ± 1%.	1. __ Notify WCC/SPOC to investigate and repair the Neutron Error signal. 2. __ **WHEN** Neutron Error is 0 ± 1%, **THEN** continue this enclosure.
12. __Place DIAMOND in AUTO.	
13. __Verify STM GENERATOR MASTER Measured Variable is on the caret.	Ensure the following in HAND: __ 1A FDW MASTER __ 1B FDW MASTER
14. __Place STM GENERATOR MASTER in AUTO.	
15. __Verify Delta T_c setpoint at ≈ Delta T_c by comparing the following: • O1E2091 (ICS DELTA TC SETPOINT) • O1P1608 (RCS NARROW RANGE DELTA TC)	1. Ensure the following in HAND: __ 1A FDW MASTER __ 1B FDW MASTER 2. __ Adjust Delta T_c setpoint to ≈ Delta T_c at the DELTA T_c station.
16. __Place DELTA T_c station in AUTO.	
17. __Verify 1A FDW MASTER Measured Variable is on the caret.	1. __ Notify WCC/SPOC to investigate and repair 1A FDW MASTER. 2. __ **WHEN** 1A FDW MASTER is repaired, **THEN** continue this enclosure.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. __ Verify 1B FDW MASTER Measured Variable is on the caret.	1. __ Notify WCC/SPOC to investigate and repair 1B FDW MASTER. 2. __ **WHEN** 1B FDW MASTER is repaired, **THEN** continue this enclosure.

NOTE

1A FDW MASTER and 1B FDW MASTER should both be placed in AUTO simultaneously.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19. Place the following in AUTO: __ 1A FDW MASTER __ 1B FDW MASTER	

CAUTION

Changing Total FDW flow will result in Rx power change. Total FDW flow should be maintained as near constant as possible by adjusting FDW pump speed and FDW control valve positions.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. __ Verify lowest FDW VALVE ΔP $\approx$ 35 psid.	__ Adjust the following control stations as required to maintain FDW flow and Rx power $\approx$ constant until the lowest FDW VALVE $\Delta P \approx 35$ psid: • 1A MAIN FDW PUMP • 1B MAIN FDW PUMP • 1FDW-32 • 1FDW-41 • 1FDW-35 • 1FDW-44

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. ___ Verify 1A MAIN FDW PUMP Measured Variable is on the caret.	___ Notify WCC/SPOC to investigate and repair 1A MAIN FDW PUMP Measured Variable.
22. ___ **IAAT** 1A MAIN FDW PUMP Measured Variable is on the caret, **AND** desired in AUTO, **THEN** place 1A MAIN FDW PUMP in AUTO.	
23. ___ Verify 1B MAIN FDW PUMP Measured Variable is on the caret.	___ Notify WCC/SPOC to investigate and repair 1B MAIN FDW PUMP Measured Variable.
24. ___ **IAAT** 1B MAIN FDW PUMP Measured Variable is on the caret, **AND** desired in AUTO, **THEN** perform the following: A. ___ Adjust 1B MAIN FDW PUMP bias as required using O1E2092 (FWT 1B BIAS). B. ___ Place 1B MAIN FDW PUMP in AUTO.	
25. ___ Verify 1FDW-32 Measured Variable is on the caret.	1. ___ Notify WCC/SPOC to investigate and repair 1FDW-32. 2. ___ **WHEN** 1FDW-32 has been repaired, **THEN** continue this enclosure.
26. ___ Verify 1FDW-35 Measured Variable is on the caret.	1. ___ Notify WCC/SPOC to investigate and repair 1FDW-35. 2. ___ **WHEN** 1FDW-35 has been repaired, **THEN** continue this enclosure.

NOTE

1FDW-32 and 1FDW-35 should both be placed in AUTO simultaneously.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27. Place the following in AUTO: ___ 1FDW-32 ___ 1FDW-35	

IF AT ANY TIME:

(22) 1A MAIN FDW PUMP Measured Variable in on the caret **AND** desired in AUTO…
(place 1A MAIN FDW PUMP in AUTO)

(24) 1B MAIN FDW PUMP Measured Variable in on the caret **AND** desired in AUTO…
(balance MFDWPs suction flows and place 1B MAIN FDW PUMP in AUTO)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28. __ Verify 1FDW-41 Measured Variable is on the caret.	1. __ Notify WCC/SPOC to investigate and repair 1FDW-41. 2. __ **WHEN** 1FDW-41 has been repaired, **THEN** continue this enclosure.
29. __ Verify 1FDW-44 Measured Variable is on the caret.	1. __ Notify WCC/SPOC to investigate and repair 1FDW-44. 2. __ **WHEN** 1FDW-44 has been repaired, **THEN** continue this enclosure.

NOTE

1FDW-41 and 1FDW-44 should both be placed in AUTO simultaneously.

30. Place the following in AUTO: __ 1FDW-41 __ 1FDW-44	
31. Slowly adjust the following as required by unit operation: __ T_{ave} __ THP __ Delta T_c	
32. __ Ensure CTPD SET at desired value.	
33. __ **WHEN** directed by CR SRO, **THEN** return to Section 4B (Loss of ICS AUTO Power Only).	

• • • END • • •

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REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-800

Perform Required Actions for an Intake Canal Dam Failure

CANDIDATE: ____________________

EXAMINER: ____________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Perform required actions for an Intake Canal dam failure

Alternate Path:

No

Facility JPM #:

NEW

K/A Rating(s):

System: 075
K/A: A2.01
Rating: 3.0*/3.2

Task Standard:

AP/13 (Dam Failure) is correctly implemented for a failed Intake Canal Dam.

Preferred Evaluation Location:

Simulator __X__ In-Plant ______

Preferred Evaluation Method:

Perform __X__ Simulate ______

References:

AP/13, Dam Failure

Validation Time: 20 minutes

Time Critical: No

===

Candidate: ________________________________
NAME

Time Start: _________
Time Finish: _________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: _________________________ _____________________________/________
NAME SIGNATURE DATE

===

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. Recall Snap 209
2. Import CRO-800 files
3. Place simulator in RUN

Tools/Equipment/Procedures Needed:

AP/1/A/1700/13, Dam Failure

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:

Intake Dam failure has occurred.

Unit has been manually tripped.

Subsequent Actions of AP/13, Dam Failure have been completed up to step 4.6.

INITIATING CUES:

Control Room Supervisor directs you continue with AP/13, Dam Failure beginning at step 4.6.

START TIME: _______

STEP 1: Step 4.6: Ensure only one CCW pump operating. STANDARD: Locate CCW pumps on 1AB3 and stop all but one by rotating the pump switches to the TRIP position. Verify red lights off and green lights on. Continue to Step 4.7 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
CAUTION Continued operation of the RCPs will provide heat load with limited cooling capacity and may result in RCP damage due to inadequate LPSW flow. RCP restart when directed by EP/1 (EOP) should consider these factors. STEP 2: Step 4.7: Stop all RCPs. STANDARD: The control switches for RCPs 1A1, 1A2, 1B1, 1B2 are located by the candidate on 1AB1 and rotated to the TRIP position. The candidate verifies the RCPs are stopped by red run lights off and/or "0" amps indicated. Continue to Step 4.8 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 3: Step 4.8 Dispatch an operator to open the following valve(s) on all operable SSW headers: • HPSW-900 (B HDR SIPHON SEAL WATER (SSW) SYSTEM CONN) • HPSW-901 (A HDR SIPHON SEAL WATER (SSW) SYSTEM CONN) STANDARD: Dispatch an operator to open HPSW-900 and HPSW-901. Continue to Step 4.9 ***Cue: Inform the candidate that an operator has been dispatched.*** COMMENTS:	___ SAT ___ UNSAT
STEP 4: Step 4.9: Verify CCW-8 is open. STANDARD: Determine that CCW-8 (located on 2AB3) is CLOSED by observing the Green CLOSED light is illuminated. Continue to Step 4.17 RNO COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 4.17: Dispatch an operator to open 1DP-F5C (CCW-8 BKR (EMERG CCW DISCH TO TAILRACE)) STANDARD: Dispatch an operator to open 1DP-F5C. Continue to Step 4.18 ***Cue: An operator has been sent to open 1DP-F5C.*** **Note: Using time compression breaker will be opened.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 6: Step 4.18: Stop all Unit 1 ESV pumps: • 1A ESV PUMP • 1C ESV PUMP • 1B ESV PUMP STANDARD: Locate the Unit 1 ESV pumps switches on 1AB3. Turn each switch to stop. Verify red light off and green light on. Continue to Step 4.19 COMMENTS:	___ SAT ___ UNSAT
NOTE The EWST will be used as CCWP sealing water and to cool the following: • HPI pump motor coolers • TDEFDW Pump • Operating CCWP motors STEP 7: Step 4.19: Place the following switches in OFF: • A HPSW PUMP • B HPSW PUMP STANDARD: A and B HPSW pump switches located on 1AB3 are placed in the OFF position. Continue to Step 4.20 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 8:	Step 4.20: **IAAT** any of the following is full open: • HPSW-900 (B HDR SIPHON SEAL WATER (SSW) SYSTEM CONN) • HPSW-901 (A HDR SIPHON SEAL WATER (SSW) SYSTEM CONN), **THEN** perform Steps 4.21 - 4.23.	___ SAT ___ UNSAT
STANDARD:	Determine that HPSW-900 is full open. Continue to Step 4.21	
Cue: Inform candidate that HPSW 900 is full open.		
COMMENTS:		
STEP 9:	Step 4.21: Ensure the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT in DISABLE.	___ SAT ___ UNSAT
STANDARD:	Locate the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT switch on 1AB3. Place the switch in disable. Continue to Step 4.22	
COMMENTS:		

<u>STEP 10</u>:	Step 4.22: Stop the following pumps: • A LPSW PUMP • B LPSW PUMP • C LPSW PUMP	**CRITICAL STEP** ___ SAT ___ UNSAT
<u>STANDARD</u>:	Locate the LPSW pumps switches on 1AB3 and rotate the switches to the trip position. Verify red lights off and green lights on. Continue to Step 4.23	
<u>COMMENTS</u>:		
<u>STEP 11</u>:	Step 4.23: Maintain EWST level >70,000 gallons and < OVERFLOW by cycling HPSW JOCKEY PUMP as necessary.	___ SAT ___ UNSAT
<u>STANDARD</u>:	Monitor EWST level, FULL light, and the OVERFLOW light located on 1AB3. Determine that the HPSW JOCKEY PUMP should remain in operation until the OVERFLOW light is lit. Continue to Step 4.24	
<u>COMMENTS</u>:		
<u>STEP 12</u>:	Step 4.24: Dispatch an operator to place 1LPSW-138 & 1HPSW-184 TDEFDWP COOLING BYPASS VALVE switch in BYPASS	___ SAT ___ UNSAT
<u>STANDARD</u>:	An operator should be dispatched to place 1LPSW-138 & 1HPSW-184 TDEFDWP COOLING BYPASS VALVE switch in BYPASS Continue to Step 4.25	
Cue: Inform the candidate that an operator has been dispatched.		
<u>COMMENTS</u>:		

STEP 13: Step 4.25: Ensure an operator has been dispatched to the CCW Intake. STANDARD: Determine that an operator has been dispatched to the CCW Intake. Continue to Step 4.26 ***Cue: Inform the candidate that an operator has been dispatched to the intake.*** COMMENTS:	___ SAT ___ UNSAT
STEP 14: Step 4.26: Notify operator at CCW Intake to isolate SSW to all stopped CCW pumps per Encl 5.4 (NLO Actions at CCW Intake). | √ | CCW Pump | | | 1A | | | 1B | | | 1C | | | 1D | STANDARD: Notify operator at CCW Intake to isolate SSW to all stopped CCW pumps. Continue to Step 4.27 ***Cue: Inform the candidate that the operator has been notified.*** COMMENTS:	___ SAT ___ UNSAT
STEP 15: Step 4.27: **IAAT** RCP seal injection is lost, **THEN** dispatch an operator to perform AP/25 (SSF EOP) to operate the SSF RCMU system. STANDARD: Determine that RCP seal injection has **not** been lost by observing SEAL INLET HDR FLOW flow gauge on 1UB1. Continue to Step 4.28 COMMENTS:	___ SAT ___ UNSAT

STEP 16: Step 4.28 **IAAT** all the following exist: • Loss of power occurred on Unit 1 • Power has been restored to Unit 1 • Keowee Lake Level > 775' **THEN** perform Steps 4.29 - 4.36 to start one CCW pump. STANDARD: Determine power has not been lost on Unit 1 perform RNO step Continue to Step 4.28 RNO ***Cue: If asked as the SRO, inform candidate that a loss of power has not occurred on Unit 1.*** COMMENTS:	___ SAT ___ UNSAT
STEP 17: Step 4.28 RNO **GO TO** Step 4.37. STANDARD: **GO TO** Step 4.37. Continue to Step 4.37 COMMENTS:	___ SAT ___ UNSAT
STEP 18: Step 4.37 **IAAT** Keowee Lake Level ≤ 775', **AND** CCW-8 Bkr is open, **THEN** perform Steps 4.38 - 4.40. STANDARD: Determine Keowee Lake Level is ≤ 775' by observing tailrace level gauge located on 2AB3 or on the OAC. Determine that CCW-8 breaker is open by observing valve indicating lights to be extinguished on 2AB3. Continue to Step 4.38 COMMENTS:	___ SAT ___ UNSAT

STEP 19: Step 4.38 Stop all CCW pumps. STANDARD: Locate the CCW pump switches on 1AB3 and stop all running CCW pumps by rotating the switches to the TRIP position. Continue to Step 4.39 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 20: Step 4.39 Initiate Encl 5.3 (Cross-connect CCW Intake and Discharge Piping). STANDARD: Begin Encl 5.3 (Cross-connect CCW Intake and Discharge Piping). Continue to Step 4.40 ***Cue: Indicate that Encl 5.3 (Cross-connect CCW Intake and Discharge Piping) will be performed by another RO.*** COMMENTS:	___ SAT ___ UNSAT
NOTE Similar instructions are provided in Unit 2 and 3 procedures. The same operator should be used for these tasks. STEP 21: Step 4.40 Notify the operator performing Encl 5.4 (NLO Actions at CCW Intake) to isolate SSW to all Unit 1 CCW pumps. STANDARD: The operator performing Encl 5.4 (NLO Actions at CCW Intake) is notified to isolate SSW to all Unit 1 CCW pumps. Continue to Step 4.41 ***Cue: Indicate the operator has been notified to isolate SSW to all Unit 1 CCW pumps.*** COMMENTS:	___ SAT ___ UNSAT

STEP 22: Step 4.41 STANDARD: The TSC is notified to replenish Unit 2 CCW intake lines. Continue to Step 4.42 ***Cue: Indicate that the TSC has been notified.*** COMMENTS:	___ SAT ___ UNSAT
STEP 23: Step 4.42 Notify Emergency Coordinator to review Encl 5.5 (Dam Failure Considerations). STANDARD: The Emergency Coordinator is notified to review Encl 5.5 (Dam Failure Considerations). Continue to Step 4.43 ***Cue: Inform the candidate that the Emergency Coordinator has been notified.*** COMMENTS: **END TASK**	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	Reduces the amount of lost inventory.
2	Reduces RCS heat load and prevents RCP damage from inadequate LPSW.
5	CCW-8 breaker must be opened to prevent inadvertent operation after flooding.
7	Reduce the amount of lost inventory.
10	Reduce the amount of lost inventory.
19	Reduce the amount of lost inventory.

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

INITIAL CONDITIONS:

Intake Dam failure has occurred.

Unit has been manually tripped.

Subsequent Actions of AP/13, Dam Failure have been completed up to step 4.6.

INITIATING CUES:

Control Room Supervisor directs you continue with AP/13, Dam Failure beginning at step 4.6.

NSD 703 (R04-01) Sim-3 Brief 115 6cw HLP SR HLP class

OTC MASTER FILE

Duke Power Company

PROCEDURE PROCESS RECORD

INFORMATION ONLY

(1) ID No AP/1/A/1700/013

Revision No 020

PREPARATION

(2) Station OCONEE NUCLEAR STATION

(3) Procedure Title Dam Failure

(4) Prepared By David P. Garland (Signature) David P. Garland Date 12-08-04

(5) Requires NSD 228 Applicability Determination?

☒ Yes (New procedure or revision with major changes)
☐ No (Revision with minor changes)
☐ No (To incorporate previously approved changes)

(6) Reviewed By HEWoodall (QR) Date 12-9-04

Cross-Disciplinary Review By (MCE) R. Scott Manning (QR)NA ______ Date 12-9-04

Reactivity Mgmt Review By ______ (QR)NA HEW Date ______

Mgmt Involvement Review By ______ (Ops Supt) NA HEW Date ______

(7) Additional Reviews

Reviewed By ______ Date ______

Reviewed By ______ Date ______

(8) Temporary Approval *(if necessary)*

By ______ (OSM/QR) Date ______

By ______ (QR) Date ______

(9) Approved By DBG Date 12/9/04

PERFORMANCE *(Compare with control copy every 14 calendar days while work is being performed.)*

(10) Compared with Control Copy ______ Date ______

Compared with Control Copy ______ Date ______

Compared with Control Copy ______ Date ______

(11) Date(s) Performed ______

Work Order Number (WO#) ______

COMPLETION

(12) Procedure Completion Verification:

☐ Unit 0 ☐ Unit 1 ☐ Unit 2 ☐ Unit 3 Procedure performed on what unit?

☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
☐ Yes ☐ NA Required enclosures attached?
☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?
☐ Yes ☐ NA Charts, graphs, etc. attached, dated, identified, and marked?
☐ Yes ☐ NA Procedure requirements met?

Verified By ______ Date ______

(13) Procedure Completion Approved ______ Date ______

(14) Remarks *(Attach additional pages, if necessary)*

SUMMARY OF CHANGES: (DESCRIPTION AND REASON)

General Changes

Old Step	New Step	Description	Reason
Encl 5.1, Step 8	Encl 5.1, Step 8	Change step to Close 2LPSW-21 and deleted 2LPSW-565 and 2LPSW-566. Step reads as follows: Notify Unit 2 to position the following valves: ___Close 2LPSW-18 ___Close 2LPSW-21 ___Close 2LPSW-24 ___Close 2LPSW-15	When the RB Aux Modification (NSM 23107) was installed during 2EOC20 RFO, 2LPSW-565 and 2LPSW-566 were eliminated. Changes to AP/13 Encl 5.1 (LPSW Recirc Lineup) were not made due to an error in NEDL. Reference PIP # 04-8516.
N/A	Appendix Item 7	Added a new appendix.	To document calc reference related to valve alignment.

PCR Numbers Incorporated

2004-7669

Duke Power Company Oconee Nuclear Station **Dam Failure**	Procedure No. AP/**1**/A/1700/013 Revision No. 020 Electronic Reference No. OX002RGQ

1. Entry Conditions

Any Keowee dam/dike failure has occurred or is imminent

2. Automatic Systems Actions

- Possible trip of Main Turbine and FDWP turbines on loss of vacuum
- Possible anticipatory Rx trip

3. Immediate Manual Actions

None

4. Subsequent Actions

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.1 __ Ensure Rx is tripped.	
4.2 __ Verify CCW Intake Canal intact.	__ **GO TO** Step 4.6.
4.3 __ Depress CCW DAM FAILURE pushbutton.	
4.4 __ Dispatch an individual to the area of the dam failure to report damage to the Control Rooms.	
4.5 __ **GO TO** Step 4.45.	
4.6 __ Ensure only one CCW pump operating.	

CAUTION

Continued operation of the RCPs will provide heat load with limited cooling capacity and may result in RCP damage due to inadequate LPSW flow. RCP restart when directed by EP/1 (EOP) should consider these factors.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.7 __ Stop all RCPs.	
4.8 Dispatch an operator to open the following valve(s) on all operable SSW headers: __ HPSW-900 (B HDR SIPHON SEAL WATER (SSW) SYSTEM CONN) (T-1/M-48, 10' S., 15' up) __ HPSW-901 (A HDR SIPHON SEAL WATER (SSW) SYSTEM CONN) (T-1/J-26, SE, 10' up)	

NOTE

- CCW-8 must be de-energized prior to submersion by lake water. This should be accomplished within 1 hour of initiation of the event.
- CCW Emergency Discharge Siphon Flow may have been established automatically as a result of loss of power.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.9 __ Verify CCW-8 is open.	__ **GO TO** Step 4.17.
4.10 __ Verify 1CCW 1-6 are closed.	__ Ensure 1CCW 1-6 throttled.
4.11 __ Verify 2CCW-7 is closed.	__ Ensure 2CCW-7 throttled.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.12 ___ Verify 3CCW-93 is closed.	___ Ensure 3CCW-93 throttled.
4.13 ___ Close CCW-8.	
4.14 Ensure the following: ___ 1CCW 1-6 are closed. ___ 1CCW 1-6 switch in PULL TO LOCK.	
4.15 Notify Unit 2 to ensure the following: ___ 2CCW-7 is closed. ___ 2CCW-7 switch in PULL TO LOCK.	
4.16 Notify Unit 3 to ensure the following: ___ 3CCW-93 is closed. ___ 3CCW-93 switch in PULL TO LOCK.	
4.17 ___ Dispatch an operator to open 1DP-F5C (CCW-8 BKR (EMERG CCW DISCH TO TAILRACE)) (T-3/L-24).	
4.18 Stop <u>all</u> Unit 1 ESV pumps: ___ 1A ESV PUMP ___ 1C ESV PUMP ___ 1B ESV PUMP	

<u>NOTE</u>

The EWST will be used as CCWP sealing water and to cool the following:

- HPI pump motor coolers
- TDEFDW Pump
- Operating CCWP motors

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.19 Place the following switches in OFF: ___ A HPSW PUMP ___ B HPSW PUMP	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.20 __ **IAAT** any of the following is full open: • HPSW-900 (B HDR SIPHON SEAL WATER (SSW) SYSTEM CONN) • HPSW-901 (A HDR SIPHON SEAL WATER (SSW) SYSTEM CONN), **THEN** perform Steps 4.21 - 4.23.	__ **GO TO** Step 4.24.
4.21 __ Ensure the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT in DISABLE.	
4.22 Stop the following pumps: __ A LPSW PUMP __ B LPSW PUMP __ C LPSW PUMP	

NOTE

The intent is to maintain adequate cooling water inventory while preventing loss through the EWST overflow.

4.23 __ Maintain EWST level >70,000 gallons and < OVERFLOW by cycling HPSW JOCKEY PUMP as necessary.	
4.24 __ Dispatch an operator to place 1LPSW-138 & 1HPSW-184 TDEFDWP COOLING BYPASS VALVE switch in BYPASS (T-1/D-25, 24' E, SG FDW Panel 1 SGFP).	

IF AT ANY TIME:

(4.20) HPSW-900 or HPSW-901 is full open … (stop LPSW pumps and cycle HPSW Jockey Pump as necessary)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Similar instructions are provided in Unit 2 and 3 procedures. The same operator should be used for these tasks.

4.25 __ Ensure an operator has been dispatched to the CCW Intake.

4.26 __ Notify operator at CCW Intake to isolate SSW to all stopped CCW pumps per Encl 5.4 (NLO Actions at CCW Intake). **(PS)**

	CCW Pump
	1A
	1B
	1C
	1D

IF AT ANY TIME:

(4.20) HPSW-900 <u>or</u> HPSW-901 is full open … (stop LPSW pumps and cycle HPSW Jockey Pump as necessary)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.27 __ **IAAT** RCP seal injection is lost, **THEN** dispatch an operator to perform AP/25 (SSF EOP) to operate the SSF RCMU system.	
4.28 __ **IAAT** all the following exist: • Loss of power occurred on Unit 1 • Power has been restored to Unit 1 • Keowee Lake Level > 775' {6} **THEN** perform Steps 4.29 - 4.36 to start one CCW pump.	__ **GO TO** Step 4.37.
4.29 __ Ensure Pressurizer Heaters are in AUTO. {4}	

NOTE

- At least one CCW Pump discharge valve is required to remain open prior to establishing forced flow.
- The adjacent CCW Pumps discharge valve must be closed to prevent excessive torque on the starting pumps discharge valve. The 1A and 1B CCW Pumps are adjacent, and the 1C and 1D CCW Pumps are adjacent.
- Similar instructions are provided in Unit 2 and 3 procedures. The same operator should be used for these tasks.

4.30 __ Notify the operator performing Encl 5.4 (NLO Actions at CCW Intake) to open the SSW valves for the CCW pump to be started:

✓	CCW Pump
	1A
	1B
	1C
	1D

IF AT ANY TIME:

(4.20) HPSW-900 or HPSW-901 is full open… (stop LPSW pumps and cycle HPSW Jockey Pump as necessary)

(4.27) RCP seal injection is lost … (dispatch an operator to operate SSF RCMU)

(4.28) Loss of power occurred on Unit 1, power is restored, and Keowee Lake Level > 775' {6}… (restart a CCW pump)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4.31 __ Place the CCW Pump switches in the trip position:

✓	CCW Pump
	1A
	1B
	1C
	1D

4.32 __ Verify the 1A or 1B CCW Pump is to be started.

__ **GO TO** Step 4.34.

4.33 __ Verify both of the following CCW pump discharge valves are closed: {5}.

Pump	✓	Valve
1A		1CCW-10
1B		1CCW-11

__ Dispatch an operator to close the discharge valves from the breaker switch (Unit 1 Equipment rm):

Pump	✓	Valve	Breaker
1A		1CCW-10	1XS1-F2C
1B		1CCW-11	1XS2-F2D

4.34 Verify the 1C or 1D CCW Pump is to be started.

__ **GO TO** Step 4.36.

4.35 __ Verify both of the following CCW pump discharge valves are closed: {5}.

Pump	✓	Valve
1C		1CCW-12
1D		1CCW-13

__ Dispatch an operator to close the discharge valves from the breaker switch (Unit 1 Equipment rm):

Pump	✓	Valve	Breaker
1C		1CCW-12	1XS3-2E
1D		1CCW-13	1XS1-F3C

IF AT ANY TIME:

(4.20) HPSW-900 or HPSW-901 is full open… (stop LPSW pumps and cycle HPSW Jockey Pump as necessary)

(4.27) RCP seal injection is lost … (dispatch an operator to operate SSF RCMU)

(4.28) Loss of power occurred on Unit 1, power is restored, and Keowee Lake Level > 775' {6}… (restart a CCW pump)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.36 __ **WHEN** SSW is aligned to the pump, **AND** the discharge valves are closed, **THEN** start the CCW pump.	
4.37 __ **IAAT** Keowee Lake Level ≤ 775' {6}, **AND** CCW-8 Bkr is open, **THEN** perform Steps 4.38 - 4.40.	__ **GO TO** Step 4.41.
4.38 __ Stop <u>all</u> CCW pumps.	

CAUTION

If CCW Intake and Discharge piping is **NOT** cross-connected within 4 hours of the Reactor trip, long term availability of CCW inventory **CANNOT** be assured. {3}

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.39 __ Initiate Encl 5.3 (Cross-connect CCW Intake and Discharge Piping).	

NOTE

Similar instructions are provided in Unit 2 and 3 procedures. The same operator should be used for these tasks.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.40 __ Notify the operator performing Encl 5.4 (NLO Actions at CCW Intake) to isolate SSW to <u>all</u> Unit 1 CCW pumps.	
4.41 __ Notify TSC to replenish Unit 2 CCW intake lines.	
4.42 __ Notify Emergency Coordinator to review Encl 5.5 (Dam Failure Considerations).	
4.43 __ **WHEN** secondary heat removal systems are near depletion, **THEN** initiate AP/25 (SSF EOP) in preparation for feeding the SGs with SSF ASW.	
4.44 __ **WHEN** conditions permit, **THEN EXIT** this procedure.	

••• END •••

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

Continued operation of the RCPs will provide heat load with limited cooling capacity and may result in RCP damage due to inadequate LPSW flow. RCP restart when directed by EP/1 (EOP) should consider these factors.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.45 __ Stop <u>all</u> RCPs.	
4.46 __ Ensure <u>all</u> CCW pumps are stopped.	
4.47 __ Ensure 1CCW 1-6 are open.	
4.48 Ensure <u>all</u> condenser outlet valves indicate closed (GD AP13): __ O1D0273 (1CCW-20 CONDENSER 1A OUTLET 1) __ O1D0275 (1CCW-21 CONDENSER 1A OUTLET 2) __ O1D0277 (1CCW-22 CONDENSER 1B OUTLET 1) __ O1D0279 (1CCW-23 CONDENSER 1B OUTLET 2) __ O1D0281 (1CCW-24 CONDENSER 1C OUTLET 1) __ O1D0283 (1CCW-25 CONDENSER 1C OUTLET 2)	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

CCW-8 should open after the CCW DAM FAILURE pushbutton is pressed and the first Waterbox Emergency Discharge valve (1CCW-1-6) opens. If CCW-8 does not open, it should be left closed in preparation for CCW recirculation.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.49 __ Verify CCW-8 is open.	1. __ **IF** emergency CCW siphon flow has **NOT** been established on Unit 1, **THEN** notify Unit 2 that emergency CCW siphon flow has **NOT** been established on Unit 1. 2. __ **GO TO** Step 4.51.
4.50 __ Notify Unit 2 that emergency CCW siphon flow has been established on Unit 1.	
4.51 __ Dispatch operators to perform Encl 5.2 (CCW Inventory Conservation).	

NOTE

Unit 2 CR will decide which unit will establish CCW recirculation. Unit 1 will only supply CCW recirculation when directed by Unit 2.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.52 __ **IAAT** Unit 2 CR has directed Unit 1 to supply CCW recirculation, **THEN** perform Steps 4.53 - 4.67 to start <u>one</u> CCW Pump and establish recirculation.	__ **GO TO** Step 4.68.

NOTE

- At least one CCW Pump discharge valve is required to remain open prior to establishing forced flow.
- The adjacent CCW Pumps discharge valve must be closed to prevent excessive torque on the starting pumps discharge valve. The 1A and 1B CCW Pumps are adjacent, and the 1C and 1D CCW Pumps are adjacent.

4.53 __ Determine which CCW Pump will be started.

✓	CCW Pump
	1A
	1B
	1C
	1D

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4.54 __ Place all CCW Pump switches in the trip position:

	CCW Pump
	1A
	1B
	1C
	1D

4.55 __ Verify the 1A or 1B CCW Pump is to be started.

RESPONSE NOT OBTAINED: __ **GO TO** Step 4.57.

4.56 __ Verify both of the following CCW pump discharge valves are closed: {5}.

Pump	✓	Valve
1A		1CCW-10
1B		1CCW-11

RESPONSE NOT OBTAINED: __ Locally close the discharge valves from the breaker switch (Unit 1 Equipment rm):

Pump	✓	Valve	Breaker
1A		1CCW-10	1XS1-F2C
1B		1CCW-11	1XS2-F2D

4.57 __ Verify the 1C or 1D CCW Pump is to be started.

RESPONSE NOT OBTAINED: **GO TO** Step 4.59.

4.58 __ Verify both of the following CCW pump discharge valves are closed: {5}.

Pump	✓	Valve
1C		1CCW-12
1D		1CCW-13

RESPONSE NOT OBTAINED: __ Locally close the discharge valves from the breaker switch (Unit 1 Equipment rm):

Pump	✓	Valve	Breaker
1C		1CCW-12	1XS3-2E
1D		1CCW-13	1XS1-F3C

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

CCW pump amps and temperatures will read higher than normal when started with this plant configuration. CCWP motor stator temperature limit is 284°F.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.59 __ Start the selected CCW Pump.	
4.60 __ Verify the started CCW pump discharge valve opened.	1.__ Stop the operating CCW pump. 2.__ **GO TO** Step 4.54 to attempt to start a different CCW pump.
4.61 __ Verify CCW-9 is open.	1.__ Stop the operating CCW pump. 2.__ Notify Security to meet an operator at the IRW gate to provide access to CCW-9 at the Southwest corner of the Protected Area. 3. Dispatch an operator to perform the following: A. __ Obtain the CCW-9 IRW Gate Key from the security box in Unit 3 Control Room storage area. B. __ Open CCW-9 (EMERGENCY CCW DISCHARGE TO INTAKE) (between protected area fences). C. __ Notify Unit 1 CR when CCW-9 is open. 4.__ **WHEN** notified that CCW-9 is open, **THEN GO TO** Step 4.53 to restart a CCW pump.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.62 ___ Verify CCW-8 is closed.	1. ___ Stop the operating CCW pump. 2. ___ Dispatch an operator to open 1DP-F5C (CCW-8 BKR (EMERG CCW DISCH TO TAILRACE)) (T-3/L-24). 3. ___ Dispatch two operators to close CCW-8 (EMERGENCY CCW DISCHARGE TO TAILRACE) (Beside tailrace 3' N of 8' drain pipe under middle valve pit cover). 4. ___ **WHEN** CCW-8 is closed, **THEN GO TO** Step 4.53 to restart a CCW pump.

NOTE

CCW-8 must be de-energized prior to submersion by lake water. This should be accomplished within 1 hour of initiation of the event.

4.63 ___ Ensure an operator has been dispatched to open 1DP-F5C (CCW-8 BKR (EMERG CCW DISCH TO TAILRACE)) (T-3/L-24).

4.64 Ensure the discharge valves on all stopped CCW pumps are closed:

CCW Pump	✓	Valve
1A		1CCW-10
1B		1CCW-11
1C		1CCW-12
1D		1CCW-13

4.65 ___ Notify Unit 2 and Unit 3 to ensure all Unit 2 and Unit 3 CCW pump discharge valves are closed.

IF AT ANY TIME:

(4.52) Unit 1 is to supply CCW recirculation … (start a CCW pump and align for recirculation)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

The purpose of the following steps is to force CCW inlet flow to the other two units through the CCW inlet cross-connects to establish > 7″ vacuum for TBV operability. Unit 2 and Unit 3 personnel will provide information about the effects of the following actions on their condenser vacuum.

4.66 __ Throttle 1CCW 1-6 as necessary to establish > 7″ vacuum on Unit 2 and Unit 3.

4.67 __ **WHEN** condenser vacuum on <u>all</u> three units is being maintained > 7″ vacuum,
THEN stop adjusting 1CCW 1-6.

NOTE

CCW pump discharge valves act as throttle valves from the breaker switches unless the respective CCW pump switch is positioned to TRIP.

4.68 __ **IAAT** another unit is to supply CCW recirculation,
AND requests <u>all</u> Unit 1 CCW pump discharge valves closed,
THEN perform the following:

A. Dispatch an operator to close the following valves from the breaker switches (Unit 1 Equipment Rm):

✓	Valve	Breaker
	1CCW-10	1XS1-F2C
	1CCW-13	1XS1-F3C
	1CCW-11	1XS2-F2D
	1CCW-12	1XS3-2E

B. __ Monitor Unit 1 condenser vacuum while CCW recirculation is established on another unit.

C. __ Communicate condenser vacuum changes to the unit supplying CCW recirculation flow.

IF AT ANY TIME:

(4.52) Unit 1 is to supply CCW recirculation … (start a CCW pump and align for recirculation)

(4.68) another unit is to supply CCW recirculation and requests <u>all</u> Unit 1 CCW pump discharge valves closed … (dispatch an operator to close the valves, monitor vacuum)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.69 __ Verify TDEFDW PUMP is operating.	__ **GO TO** Step 4.73.

NOTE
LPSW return from the MDEFDWP motor coolers is lost out the CCW discharge when these pumps are operating even after completion of Encl 5.1 (LPSW Recirc Lineup).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.70 __ Verify MDEFDWPs are **NOT** required to feed SGs.	__ **GO TO** Step 4.72.
4.71 Stop the following: __ 1A MDEFDWP __ 1B MDEFDWP	
4.72 __ Dispatch an operator to place 1LPSW-138 & 1HPSW-184 TDEFDWP COOLING BYPASS VALVE switch in the BYPASS position (T-1/D-25, 24' E, SG FDW Panel 1 SGFP).	

NOTE
EWST will be used to cool HPI Pump Motor Coolers and TDEFDW Pump.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.73 Place the following switches in OFF: __ A HPSW PUMP __ B HPSW PUMP	

NOTE
The intent is to maintain adequate cooling water inventory while preventing loss through the EWST overflow.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.74 __ Maintain EWST level >70,000 gallons and < OVERFLOW by cycling HPSW JOCKEY PUMP as necessary.	

IF AT ANY TIME:

(4.52) Unit 1 is to supply CCW recirculation … (start a CCW pump and align for recirculation)

(4.68) another unit is to supply CCW recirculation and requests <u>all</u> Unit 1 CCW pump discharge valves closed … (dispatch an operator to close the valves, monitor vacuum)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.75 __ **IAAT** operating MDEFDWP motor stator temperatures > 210°F, **THEN** consult Station Management for guidance about stopping MDEFDWPs.	
4.76 __ Notify Emergency Coordinator to review Encl 5.5 (Dam Failure Considerations).	
4.77 __ Initiate Encl 5.1 (LPSW Recirc Lineup).	
4.78 __ **WHEN** conditions permit, **THEN EXIT** this procedure.	

• • • END • • •

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