PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

ADMIN

RO

NRC JPM A-1-A

TITLE: Hand Calculation Of APRM GAFs Per PT-01.8C.

SIMULATOR NOTES:

IC-189

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. Validation time: 15 minutes.

Read the following to trainee.

TASK CONDITIONS:

1. Unit Two (2) is performing a startup following refueling. GP-03 is being performed.
2. Plant conditions:

   Reactor pressure 929 psig

   Mode Switch Start/Hot Stby

   Reactor power must be determined as read on APRMs at H12-P608
3. GP-03 directs verification of APRM GAFs prior to transfer of the Mode Switch to Run.
4. Heat Balance on the process computer is unavailable due to low feedwater flow.
5. The Reactor Engineer has calculated core thermal power to be 239.7 MWt per 0PT-01.8D

INITIATING CUE:

You are directed to perform 0PT-01.8C to calculate APRM GAFs. Determine if GAFs are acceptable for transferring the Mode Switch to Run, or state any action(s) required prior to transferring the Mode Switch.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain a current revision of 0PT-01.8C.
Current Revision of 0PT-01.8C obtained and verified, if applicable.

SAT/UNSAT

START TIME: ____

Step 2 – Record the date, time and Unit on Form 1.
Date, Time and Unit recorded on Form 1.

SAT/UNSAT

NOTE: Thermal power of 239.7 MWt from 0PT-01.8D is given as an initial condition.

Step 3 – Record the results of 0PT-01.8D, Core Thermal Power Calculation, obtained from the Reactor Engineer on form 1.
239.7 MWt Recorded.

SAT/UNSAT

Step 4 – Calculate percent rated CTP (desired reading) by dividing 239.7 by 2923, and multiplying times 100%, and record results on Form 1
Determines percent rated CTP is approximately 8.2% (±0.1%).

**** CRITICAL STEP ** SAT/UNSAT**

NOTE: APRM readings will be obtained at back panel H12-P608.

APRM #1 -7.6%, APRM #2- 7.4%, APRM #3 – 8.4%, APRM #4 – 8.5%
(ALL ± 0.1%)

Step 5 – Obtain APRM Readings from Panel P608 and record on Form 1

APRM readings are recorded on Form 1

****CRITICAL STEP**SAT/UNSAT**

Step 6 – Calculate the AGAF for each APRM Channel by dividing % rated CTP by APRM reading, and record results on Form 1.

APRM AGAFs determined to be ≤1.00 for APRM Channels 3 and 4
APRM AGAFs determined to be >1.00 for APRM Channels 1 and 2

**** CRITICAL STEP ** SAT/UNSAT**

PROMPT: If examinee requests independent verification for the AGAF calculations, inform examinee the independent verification is complete.

Step 7 – Determine GP-03 requires three APRM to be Operable (GAF ≤1.00). Determine GP-03 allows conservative GAF adjustments if required and that adjustment of APRMs 1 & 2 would be conservative. Determine the Reactor engineer should be contacted for GAF adjustments prior to turbine roll.

Determine APRMs 1 and 2 (at least 1 of 2) must be adjusted to achieve a GAF of ≤1.0 prior to transferring the Mode switch to Run.

**** CRITICAL STEP ** SAT/UNSAT**

COMPLETION TIME: ____

TERMINATING CUE:	When AGAFs have been calculated, and the examinee determines acceptance criteria and required actions of 0GP-03, this JPM is complete.

*** Comments required for any step evaluated as UNSAT.**

RELATED TASKS:

212201B101, Transfer The Reactor Mode Switch To Run Per GP-03

K/A REFERENCE AND IMPORTANCE RATING:

GEN 2.1.33 3.4/4.0

REFERENCES:

0PT-01.8C

0GP-03

TOOLS AND EQUIPMENT:

Calculator.

SAFETY FUNCTION (from NUREG 1123):

Administrative – Conduct Of Operations

Validation Time: 15 Minutes

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual X Unit: 2

Setting: Control Room ___ Simulator X (N/A for Admin or In-Plant JPMs)

Time Critical: Yes ___ No X Time Limit N/A

Alternate Path: Yes ___ No X

EVALUATION

Trainee:_____

JPM: Pass _____ Fail _____

Comments:_____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. Unit Two (2) is performing a startup following refueling. GP-03 is being performed.
2. Plant conditions:

   Reactor pressure 929 psig

   Mode Switch Start/Hot Stby

   Reactor power must be determined as read on APRMs at H12-P608
3. GP-03 directs verification of APRM GAFs prior to transfer of the Mode Switch to Run.
4. Heat Balance on the process computer is unavailable due to low feedwater flow.
5. The Reactor Engineer has calculated core thermal power to be 239.7 MWt per 0PT-01.8D

INITIATING CUE:

You are directed to perform 0PT-01.8C to calculate APRM GAFs. Determine if GAFs are acceptable for transferring the Mode Switch to Run, or state any action(s) required prior to transferring the Mode Switch.

Progress Energy

BRUNSWICK NUCLEAR PLANT

C
Continuous Use

DATE COMPLETED _____
UNIT _____ % PWR_____GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more):
____ Routine surveillance
____ WR/WO # _____
____ Other (explain)_____
_____
_____
_____

FREQUENCY:
A. As required by 1/2PT-01.11 with the process computer not available.

B. As deemed necessary by the Reactor Engineer.

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-01.8C

HAND CALCULATIONS OF AGAFs

REVISION 13

1.0 PURPOSE

The purpose of this procedure is to establish a hand method for calculating the APRM gain adjustment factors (AGAFs) to support the requirements of 1/2PT-01.11 with the process computer not available.

2.0 ACCEPTANCE CRITERIA

This procedure is acceptable when the data has been collected, the calculations have been performed, and the mathematics have been independently verified as correct.

3.0 SPECIAL TOOLS AND EQUIPMENT

Electronic calculator

4.0 DEFINITIONS

The APRM gain adjustment factor (AGAF) for the iAPRM channel is defined as:

$$AGAFi = \frac{\text{Desired reading for iAPRM}}{\text{Actual reading for iAPRM}}$$

Where the desired reading is found by dividing the actual core thermal power by the rated core thermal power and then multiplying by 100%.

The actual reading of the iAPRM is from the iAPRM in percent power.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The AGAFs are not valid if the APRM reading changes significantly from the value used to obtain the AGAFs prior to calibration.

5.2 Independent verification is required in this procedure.

6.0 PREREQUISITES

6.1 The plant should be brought to a steady state operating condition and held until the calculations are completed.

6.2 Normally the AGAFs are obtained from the process computer. This procedure is used when the process computer is out of service.

7.0 ANNUNCIATIONS EXPECTED

None

8.0 PROCEDURE

Initials

8.1 **RECORD** the date, time, and unit on Form 1. _____

8.2 **PEFORM** 0PT-01.8D, Core Thermal Power Calculation, **AND RECORD** results on Form 1. _____

8.3 **CALCULATE** the percent of rated CTP (desired reading) as follows **AND RECORD** results on Form 1. _____

% Rated CTP = (CTP ÷ Rated MWt) x 100%

8.4 **RECORD** the APRM readings from Panel 608 on Form 1. _____

8.5 **CALCULATE** the AGAF for each APRM channel as follows **AND RECORD** results on Form 1. _____

$$AGAFi = \frac{\text{\% of rated CTP}}{\text{iAPRM reading in \% power}}$$

8.6 **INDEPENDENTLY VERIFY** the AGAF calculation for each APRM is correct **AND SIGN** on Form 1. _____

9.0 DATA ANALYSIS

N/A

10.0 GENERAL COMMENTS

_____

_____

_____

_____

_____

	Initials	Name (Print)
PT was performed by	_____	_____
	_____	_____

PT has been satisfactorily completed

Responsible Engineering Manager _____
(Signature)

PT has NOT been satisfactorily completed

Responsible Engineering Manager _____
(Signature)

Reviewed By: _____
(Signature)

Corrective Action Required

a. ( ) None
b. ( ) WR/WO No. _____
c. ( ) Other (Explain)

FORM 1
Page 1 of 1
AGAF Calculation Sheet

A. Date_____ Time_____ Unit _____

B. Core Thermal Power (CTP)_____ MWt

C. Percent of Rated Core Thermal Power (desired reading):

% Rated CTP = (CTP ÷ Rated MWt) x 100% = _____ % Pwr

APRM Channel	APRM Reading % Pwr(D)	AGAFi (C/D)
1		
2		
3		
4		
AGAFi= % of rated CTP / APRM reading in % power = C / D		

Independently verify the AGAF calculations are correct.

1st verification_____ Date _____
Signature

2nd verification_____ Date _____
Signature

REVISION SUMMARY

Revision 13 is an editorial change that incorporates the Progress Energy logo. Ref. PRR 167209.

Revision 12 – Revision removes reference to 2558 MWt as rated Unit 2 thermal power. Revision supports implementation of EC 47907, Implement the Unit 2 Power Uprate Modification . Both Units are licensed to 2923 MWT.

Revision 11 - Procedure revision incorporated EC 46861, Implement Extended Power Uprate for Unit 1 only. This revision increased the rated power for Unit 1 from 2558 to 2923 Mwt.

Revision 10 - Procedure revision incorporates ESR 00-00442, implementation of the power range neutron monitoring system for Unit 1. The number of APRMs has been reduced from 6 to 4 on Unit 1. The Unit 1 APRM channel ID's changed from A-F to 1-4. Changed 0PT-01.11 to 1/2PT-01.11.which now are unit specific procedures.

Revision 9 - Procedure revision converts this document to the proper Microsoft Word 7.0 and the AP-005 format. This revision also incorporates the new Unit 2 rated power value to 2558 mwth due to implementation of Power Uprate.

Key

FORM 1
Page 1 of 1
AGAF Calculation Sheet

A. Date Today Time Now Unit 2

B. Core Thermal Power (CTP) 2397 MWt

C. Percent of Rated Core Thermal Power (desired reading):

% Rated CTP = (CTP ÷ Rated MWt) x 100% = 8.2 ± 0.1 % Pwr

APRM Channel	APRM Reading % Pwr(D)	AGAFi (C/D)
1	7.6 ± 0.1%	1.04 to 1.09
2	7.4 ± 0.1%	1.05 to 1.11
3	8.4 ± 0.1%	0.95 to 1.00
4	8.5 ± 0.1%	0.94 to 0.99

AGAFi= % of rated CTP / APRM reading in % power = C / D

Independently verify the AGAF calculations are correct.

1st verification _____ Date _____
Signature

2nd verification _____ Date _____
Signature

Key

Key

Progress Energy

BRUNSWICK NUCLEAR PLANT

C
Continuous Use

PLANT OPERATING MANUAL

VOLUME IV

GENERAL PLANT OPERATING PROCEDURE

UNIT
0

0GP-03

UNIT STARTUP AND SYNCHRONIZATION

REVISION 67

Key

Key

5.1 Transferring The Reactor Mode Switch To RUN (Continued)

CAUTION

Mechanical vacuum pumps should **NOT** be operated above 5% reactor power; otherwise, a hydrogen explosion may occur.

5.1.5 **INCREASE** reactor power to 6-10% by withdrawing control rods, following the 0GP-10 designated sequence, in accordance with 1(2)OP-07. ____

NOTE: During Low Power operations, one Feedwater Flow instrument may indicate flow before the other Feedwater Flow instrument due to pipe flow characteristics. The Process computer requires both Feedwater Line flows to perform a valid Heat Balance calculation.

NOTE: **IF** the APRM GAFs require adjustment in the following step, **AND** the process computer is **NOT** available or the process computer can not perform a Heat Balance calculation, **THEN** 0PT-01.8C, 0PT-01.8D, or 1(2)OP-09, should be used as necessary.

CAUTION

APRM indicated power levels should **NOT** be reduced by gain adjustments below 20% reactor power; otherwise, non-conservative APRM readings (GAF greater than 1.00) may result from adjustment as power is increased. Reactor Engineering shall be contacted for any GAF adjustments made prior to turbine synchronization.

CAUTION

Three APRMs are required to be operable. Each APRM channel provides input to both RPS Trip Systems.

R25 5.1.6 **ENSURE** APRM GAFs are less than or equal to 1.00 for all operable APRMs. ____

Key

TASK CONDITIONS:

1. Unit Two (2) is performing a startup following refueling. GP-03 is being performed.
2. Plant conditions:

   Reactor pressure 929 psig

   Mode Switch Start/Hot Stby

   Reactor power must be determined as read on APRMs at H12-P608
3. GP-03 directs verification of APRM GAFs prior to transfer of the Mode Switch to Run.
4. Heat Balance on the process computer is unavailable due to low feedwater flow.
5. The Reactor Engineer has calculated core thermal power to be 239.7 MWt per 0PT-01.8D

INITIATING CUE:

You are directed to perform 0PT-01.8C to calculate APRM GAFs. Determine if GAFs are acceptable for transferring the Mode Switch to Run, or state any action(s) required prior to transferring the Mode Switch.

Progress Energy

BRUNSWICK NUCLEAR PLANT

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DATE COMPLETED _____
UNIT _____ % PWR_____GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more):
____ Routine surveillance
____ WR/WO # _____
____ Other (explain)_____
_____
_____
_____

FREQUENCY:
A. As required by 1/2PT-01.11 with the process computer not available.

B. As deemed necessary by the Reactor Engineer.

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-01.8C

HAND CALCULATIONS OF AGAFs

REVISION 13

1.0 PURPOSE

The purpose of this procedure is to establish a hand method for calculating the APRM gain adjustment factors (AGAFs) to support the requirements of 1/2PT-01.11 with the process computer not available.

2.0 ACCEPTANCE CRITERIA

This procedure is acceptable when the data has been collected, the calculations have been performed, and the mathematics have been independently verified as correct.

3.0 SPECIAL TOOLS AND EQUIPMENT

Electronic calculator

4.0 DEFINITIONS

The APRM gain adjustment factor (AGAF) for the iAPRM channel is defined as:

$$AGAFi = \frac{\text{Desired reading for iAPRM}}{\text{Actual reading for iAPRM}}$$

Where the desired reading is found by dividing the actual core thermal power by the rated core thermal power and then multiplying by 100%.

The actual reading of the iAPRM is from the iAPRM in percent power.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The AGAFs are not valid if the APRM reading changes significantly from the value used to obtain the AGAFs prior to calibration.

5.2 Independent verification is required in this procedure.

6.0 PREREQUISITES

6.1 The plant should be brought to a steady state operating condition and held until the calculations are completed.

6.2 Normally the AGAFs are obtained from the process computer. This procedure is used when the process computer is out of service.

7.0 ANNUNCIATIONS EXPECTED

None

8.0 PROCEDURE

Initials

8.1 **RECORD** the date, time, and unit on Form 1. _____

8.2 **PEFORM** 0PT-01.8D, Core Thermal Power Calculation, **AND RECORD** results on Form 1. _____

8.3 **CALCULATE** the percent of rated CTP (desired reading) as follows **AND RECORD** results on Form 1. _____

% Rated CTP = (CTP÷ Rated MWt) x 100%

8.4 **RECORD** the APRM readings from Panel 608 on Form 1. _____

8.5 **CALCULATE** the AGAF for each APRM channel as follows **AND RECORD** results on Form 1. _____

$$AGAFi = \frac{\text{\% of rated CTP}}{\text{iAPRM reading in \% power}}$$

8.6 **INDEPENDENTLY VERIFY** the AGAF calculation for each APRM is correct **AND SIGN** on Form 1. _____

9.0 DATA ANALYSIS

N/A

10.0 GENERAL COMMENTS

_____

_____

_____

_____

_____

	Initials	Name (Print)
PT was performed by	_____	_____
	_____	_____

PT has been satisfactorily completed

Responsible Engineering Manager _____
(Signature)

PT has NOT been satisfactorily completed

Responsible Engineering Manager _____
(Signature)

Reviewed By: _____
(Signature)

Corrective Action Required

a. ( ) None
b. ( ) WR/WO No. _____
c. ( ) Other (Explain)

FORM 1
Page 1 of 1
AGAF Calculation Sheet

A. Date_____ Time_____ Unit _____

B. Core Thermal Power (CTP)_____ MWt

C. Percent of Rated Core Thermal Power (desired reading):

% Rated CTP = (CTP÷ Rated MWt) x 100% = _____ % Pwr

APRM Channel	APRM Reading % Pwr(D)	AGAFi (C/D)
1		
2		
3		
4		

AGAFi= % of rated CTP / APRM reading in % power = C / D

Independently verify the AGAF calculations are correct.

1st verification_____ Date _____
Signature

2nd verification_____ Date _____
Signature

REVISION SUMMARY

Revision 13 is an editorial change that incorporates the Progress Energy logo. Ref. PRR 167209.

Revision 12 – Revision removes reference to 2558 MWt as rated Unit 2 thermal power. Revision supports implementation of EC 47907, Implement the Unit 2 Power Uprate Modification . Both Units are licensed to 2923 MWT.

Revision 11 - Procedure revision incorporated EC 46861, Implement Extended Power Uprate for Unit 1 only. This revision increased the rated power for Unit 1 from 2558 to 2923 Mwt.

Revision 10 - Procedure revision incorporates ESR 00-00442, implementation of the power range neutron monitoring system for Unit 1. The number of APRMs has been reduced from 6 to 4 on Unit 1. The Unit 1 APRM channel ID's changed from A-F to 1-4. Changed 0PT-01.11 to 1/2PT-01.11.which now are unit specific procedures.

Revision 9 - Procedure revision converts this document to the proper Microsoft Word 7.0 and the AP-005 format. This revision also incorporates the new Unit 2 rated power value to 2558 mwth due to implementation of Power Uprate.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

ADMIN

RO/SRO

NRC ADMIN JPM A-1-B

TITLE: Control Operator Daily Surveillance Report

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. Validation Time: RO 15 minutes SRO 20 minutes

Read the following to trainee.

TASK CONDITIONS:

1. Unit Two (2) is operating at approximately 75% power in support of scheduled activities. A downpower was performed on the previous shift from 100%.
2. Plant conditions:

   Reactor power 75%

   Mode Switch Run

   All equipment is Operable

INITIATING CUE:

You have just assumed the watch as the Unit Two (2) Reactor Operator and have been directed to perform a portion of the Unit Two (2) Control Operator Daily Surveillance Report to support shift activities. Complete pages 34, 35, and 45 of 2OI-03.2 for Sunday, Dayshift, 07-13 readings.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

NOTE: The current copy is utilized due to the procedure being used for a seven day period.

START TIME: ____

Step 1 - Obtain a current copy of 2OI-03.2

Current copy obtained.

SAT/UNSAT

JE: **When the candidate has located the correct procedure, the examiner Will provide the applicable pages of 2OI-03.2 to the candidate.**

Step 2 Complete items on pages 34, 35, and 45 of 2OI-03.2 for Sunday, Dayshift.

NOTE: Item 33 on page 35 of 78 will not be obtained by the candidate. This item is required to be taken at 1700. The initiating cue is to obtain 07-13 readings.

Items on pages 34, 35, and 45 of 2OI-03.2 for Sunday, Dayshift completed.

SAT/UNSAT

'ep 3 - Identify the following items as needing evaluation for exceeding acceptance criteria:

Item 30	Suppression Pool Level	-43" (downscale)
Item 32	Division II Backup Nitrogen (2-RNA-PI-5267)	1710 (± 30) psig
Item 76	Feedwater Line A temperature	405.9°F (± 10°F)
Item 77	Feedwater Line B temperature	405.9°F(± 10°F)

Items identified for evaluation:

Item 30

SAT/UNSAT

Item 32

SAT/UNSAT

Item 76

SAT/UNSAT

Item 77

SAT/UNSAT

Step 4 Compare Item 30 reading to the Operating Limit and determine acceptance criteria is not met.

Determination made that Operating Limit is not met.

****CRITICAL STEP****

SAT/UNSAT

NOTE: **The operating limit in Step 32 is not met due to a greater than 50 psig drop in pressure in the previous day.**

Step 5 Compare Item 32 reading to the Operating Limit and determine acceptance criteria is not met.

Determination made that Operating Limit is not met.

****CRITICAL STEP****

SAT/UNSAT

NOTE: **Items 76 and 77 acceptance criteria are determined by referencing 2OP-32, Attachment 4.**

Step 6 Compare Item 76 reading to the Operating Limit and determine acceptance criteria is met.
(Must refer to 2OP-32 Att.4 due to power change from previous day)

Determination made that Operating Limit is met.

****CRITICAL STEP****
SAT/UNSAT

Step 7 Compare Item 77 reading to the Operating Limit and determine acceptance criteria is met.
(Must refer to 2OP-32 Att.4 due to power change from previous day)

Determination made that Operating Limit is met.

****CRITICAL STEP****
SAT/UNSAT

.ep 8 Inform SCO that Items 30 and 32 readings do not meet acceptance criteria.

SCO informed of items not meeting acceptance criteria.

****CRITICAL STEP****
SAT/UNSAT

TERMINATING CUE (CO): SCO has been notified that Items 30 and 32 of the Control Operator Daily Surveillance Report do not meet acceptance criteria.

SCO CONTINUES

ASK CONDITIONS #2

The Unit CO has completed pages 34, 35, and 45 of 2OI-03.2 for Sunday, Dayshift, 07-13 readings.

INITIATING CUE #2: SCO

As the Unit SCO, you are to review the completed Daily Surveillance Report sheets and determine whether acceptance criteria are met and identify any required compensatory measures.

Step 9 SCO determines Item 30 Level Instrument is inoperable and Suppression Pool Level must be determined by other means to maintain ECCS Systems and Suppression Pool Operability.

Determination made that other level indication must be used to ensure ECCS/Suppression Chamber Operability.

****CRITICAL STEP****
SAT/UNSAT

Step 10 SCO determines Item 32 does not meet operating limits but does not result in an Inoperability.

Determination made that Item 32 parameter does not result in an inoperability.

****CRITICAL STEP***
SAT/UNSAT

TERMINATING CUE (SCO): **SCO has determined Item 30 requires compensatory Action to satisfy surveillance requirement, and Item 32 parameter is an operating limit but does not result in an Inoperability.**

A REFERENCE AND IMPORTANCE RATING:

GEN 2.1.18 2.9/3.0

REFERENCES:

0OI-03.2

2OP-32, Attachment 4

Technical Specifications

TOOLS AND EQUIPMENT:

None

SAFETY FUNCTION (from NUREG 1123):

Administrative – Conduct Of Operations

APPLICABLE METHOD OF TESTING

Performance:	Simulate	___	Actual	X	Unit: 2
Setting:	Control Room	___	Simulator	___	(N/A for Admin or In-Plant JPMs)
Time Critical:	Yes	___	No	X	Time Limit N/A
Alternate Path:	Yes	___	No	X	

EVALUATION

JPM: Pass _____ Fail _____

Comments:

TASK CONDITIONS:

3. Unit Two (2) is operating at approximately 75% power in support of scheduled activities. A downpower was performed on the previous shift from 100%.

4. Plant conditions:

   Reactor power 75%

   Mode Switch Run

   All equipment is Operable

INITIATING CUE:

You have just assumed the watch as the Unit Two (2) Reactor Operator and have been directed to perform a portion of the Unit Two (2) Control Operator Daily Surveillance Report to support shift activities. Complete pages 34, 35, and 45 of 2OI-03.2 for Sunday, Dayshift, 07-13 readings.

TASK CONDITIONS #2

The Unit CO has completed pages 34, 35, and 45 of 2OI-03.2 for Sunday, Dayshift, 07-13 readings.

INITIATING CUE #2: SCO

As the Unit SCO, you are to review the completed Daily Surveillance Report sheets and determine whether acceptance criteria are met and identify any required compensatory measures.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

SRO

NRC ADMIN JPM A-1

TITLE: Determine Primary Containment Water Level and Evaluate PCPL-A.

SAFETY CONSIDERATIONS:
None

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.

Read the following to trainee.

TASK CONDITIONS:

1. An accident is in progress on Unit Two (2). The Unit SCO is directing actions of 2EOP-01-RVCP and EOP-02-PCCP.
2. 480 VAC Substation E7 is de-energized due to a fault. All other electrical buses are energized.
3. ERFIS is unavailable.
4. The following Containment parameter readings are available on the RTGB

   CAC-LI-2601-1, (Suppression Pool level, -10 to +6 feet) reads >+6 feet (upscale)

   CAC-LR-2602, (Suppression Pool level, -10 to +6 feet) reads -2 feet

   CAC-PI-1257-2A (Suppression Chamber pressure, 0 to 75 psig) reads 0 psig

   CAC-PI-1257-2B (Suppression Chamber pressure, 0 to 75 psig) reads >75 psig (upscale)

   CAC-PI-1230 (Drywell pressure, 0 to 75 psig) reads 67.5 psig

   CAC-PI-4176 (Drywell Pressure -5 to 245 psig) reads 72.5 psig

   CAC-PR-1257-1 (Drywell pressure, -5 to 245 psig) reads 25 psig

   CAC-LI-1216 (Drywell water level, 61 to 71 feet) reads Gauge Zero

INITIATING CUE:

You are directed to determine Primary Containment water level per EOP-01-UG, Attachment 11. Account for availability of instrumentation per AOP-36.1, Attachment 2. Determine the current region of operation (Safe/Unsafe) on Primary Containment Pressure Limit A (PCPL-A).

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain a current revision of EOP-01-UG and AOP-36.1.

Current Revision of EOP-01-UG and AOP-36.1 obtained and verified, if applicable.

SAT/UNSAT*

START TIME: ____

Step 2 – Determine suppression pool water level instruments cannot be used to determine primary containment water level since CAC-LI-2601-1 is above +6 feet and CAC-LR-2602 is powered from E7 and is de-energized.

Determine suppression pool water level instruments cannot be used to determine primary containment water.

****CRITICAL STEP** SAT/UNSAT***

Step 3 – Determine suppression chamber pressure instruments cannot be used to determine primary containment water level since CAC-PI-1257-2B is not less than 75 psig and CAC-PI-1257-2A is powered from E7 and is de-energized

Determine suppression chamber pressure instruments cannot be used to determine primary containment water.

****CRITICAL STEP** SAT/UNSAT***

Step 4 – Determine primary containment water level should be calculated using CAC-PI-1230 and CAC-PI-4176. since both instruments have power and suppression chamber pressure is not less than 75 psig. Determine CAC-PR-1257-1 is powered from E7 and should not be used.

Determine primary containment water level should be calculated using CAC-PI-1230 and CAC-PI-4176

****CRITICAL STEP** SAT/UNSAT***

Step 5 – Calculate primary containment water level to be 2.3 ft/psi (72.5 – 67.5) + 28.5 ft.
Primary containment water level calculated to be 40 feet.

**** CRITICAL STEP ** SAT/UNSAT***

Step 6 – Determine operation to be in the safe region of PCPL-A using the PCPL-A graph, calculated primary containment water level and CAC-PI-4176 for drywell pressure, (or by using CAC-PI-1230).

Determine *PCPL-A is in the Safe region.*

**** CRITICAL STEP ** SAT/UNSAT***

COMPLETION TIME: ____

TERMINATING CUE: When primary containment water level is calculated, and PCPL-A is determined to be in the Safe region, this JPM is complete.

*** Comments required for any step evaluated as UNSAT.**

RELATED TASKS:

200602B501, Determine Primary Containment water level per EOP-01-UG

K/A REFERENCE AND IMPORTANCE RATING:

2.1.7 3.7/4.4 Ability to evaluate plant performance and make operational judgements based on operating characteristics/reactor behavior/instrument interpretation.

REFERENCES:

0EOP-01-UG

0AOP-36.1

TOOLS AND EQUIPMENT:

Student may use calculator.

SAFETY FUNCTION (from NUREG 1123):

A.1 Conduct Of Operations

Validation Time: 15 Minutes

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ☒ Unit: 2

Setting: Control Room ___ Simulator____ (N/A for Admin or In-Plant JPMs)

Time Critical: Yes ___ No ☒ Time Limit N/A

Alternate Path: Yes ___ No ☒

EVALUATION

Trainee:_____

JPM: Pass _____ Fail _____

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

JPM SRO -A-1

Key

TASK CONDITIONS:

1. An accident is in progress on Unit Two (2). The Unit SCO is directing actions of 2EOP-01-RVCP and EOP-02-PCCP.
2. 480 VAC Substation E7 is de-energized due to a fault. All other electrical buses are energized.
3. ERFIS is unavailable.
4. The following Containment parameter readings are available on the RTGB

   CAC-LI-2601-1, (Suppression Pool level, -10 to +6 feet) reads >+6 feet (upscale)

   INOP PWR → CAC-LR-2602, (Suppression Pool level, -10 to +6 feet) reads -2 feet

   INOP PWR → CAC-PI-1257-2A (Suppression Chamber pressure, 0 to 75 psig) reads 0 psig

   CAC-PI-1257-2B (Suppression Chamber pressure, 0 to 75 psig) reads >75 psig (upscale)

   CAC-PI-1230 (Drywell pressure, 0 to 75 psig) reads 67.5 psig

   CAC-PI-4176 (Drywell Pressure -5 to 245 psig) reads 72.5 psig

   INOP PWR → CAC-PR-1257-1 (Drywell pressure, -5 to 245 psig) reads 25 psig

   CAC-LI-1216 (Drywell water level, 61 to 71 feet) reads Gauge Zero

INITIATING CUE:

You are directed to determine Primary Containment water level per EOP-01-UG, Attachment 11. Account for availability of instrumentation per AOP-36.1, Attachment 2. Determine the current region of operation (Safe/Unsafe) on Primary Containment Pressure Limit A (PCPL-A).

Key

ATTACHMENT 2
Page 3 of 4
Unit 2 Critical Instruments and Components

480V SUBSTATION E7

Parameter	Instrument	Range	Location	Remote Ckt.
Rx Water Level	B21-LT-N026A & B21-LI-R604A	0 to +210 in.	H12-P601	Ckt. 4 - Emer. 120 VAC Dist. Pnl. 32A
Rx Water Level (Note 1)	B21-LT-N027A & B21-LI-R605A	+150 to 550 in.	H12-P603	Ckt. 5 - Emer. 120 VAC Dist. Pnl. 2AB
Drywell Pressure	CAC-PT-2685 & CAC-PI-2685-1	0 to 2 psig	XU-51	Ckt. 7 - Emer. 120 VAC Dist. Pnl. 2A Ckt. 9 - Emer. 120 VAC Dist. Pnl. 2A
Drywell Pressure	CAC-PT-4175 CAC-PR-1257-1	-5 to 245 psig	XU-51	Ckt. 4 - Emer. 120 VAC Dist. Pnl. 32A Ckt. 19 - Emer. 120 VAC Dist. Pnl. 32A
Suppression Chamber Pressure	CAC-PT-1257-2A & CAC-PI-1257-2A	0 to 75 psig	XU-51	Ckt. 7 - Emer. 120 VAC Dist. Pnl. 2A Ckt. 9 - Emer. 120 VAC Dist. Pnl. 2A
Suppression Pool Level	CAC-LT-2602 CAC-LR-2602	-10 to +6 feet	XU-51	Ckt. 4 - Emer. 120 VAC Dist. Pnl. 32A Ckt. 24 - Emer. 120 VAC Dist. Pnl. 32A
Suppression Pool Level	CAC-LT-4177 & CAC-LI-4177	-42 to -18 in.	XU-51	Ckt. 7 - Emer. 120 VAC Dist. Pnl. 2A Ckt. 9 - Emer. 120 VAC Dist. Pnl. 2A
Div. I SPTMS (Note 1)	CAC-TR-4426-1A & 1B		XU-3	Ckt. 13 - Emer. 120 VAC Dist. Pnl. 2A

NOTE 1: These instruments can be powered from 2E8, but must be manually transferred.

JPM SRO 4-1

Key

JPM SRO A-1

ATTACHMENT 11

PRIMARY CONTAINMENT WATER LEVEL CALCULATION

1. Suppression Pool water level instruments may be used for levels up to +2 feet.

NA

A. CAC-LI-2601-1 (XU-51) → Reads >+6 Feet (upscale)

B. CAC-LR-2602 (XU-51). → INOP No Power

2. IF Suppression Chamber pressure is less than 75 psig, THEN CALCULATE Primary Containment water level as follows:

Suppression Chamber Pressure is greater than 75#

NA

P_1 = Suppression Chamber pressure plus head of water

CAC-PI-1257-2A (XU-51) INOP- No Power

CAC-PI-1257-2B (P601) >75 psig (upscale)

P_2 = Drywell pressure at greater than 85 ft elevation

CAC-PI-1230 (P601)

$$PC_{wl} = \frac{2.3 \text{ feet}}{\text{psi}} (P_1 - P_2) + 5.3 \text{ feet}$$

TIME					
P_1 (psig)					
P_2 (psig)					
$P_1 - P_2$					
	x 2.3	x 2.3	x 2.3	x 2.3	x 2.3
x 2.3					
+5.3	+ 5.3	+ 5.3	+ 5.3	+ 5.3	+ 5.3
PC_{wl} (ft)					

Key

JPM SRO A-1

ATTACHMENT 11 (Cont'd)

3. IF Suppression Chamber pressure is greater than 75 psig, THEN CALCULATE Primary Containment water level as follows:

P_1 = Primary Containment pressure plus head of water

CAC-PI-4176 (XU-51) 72.5 psig

CAC-PR-1257-1 (XU-51) Inop - No Power

P_2 = Drywell pressure at greater than 85 ft elevation

CAC-PI-1230 (P601) 67.5 psig

P_1 measured using CAC-PI-4176

$$PC_{wl} = \frac{2.3 \text{ feet}}{\text{psi}} (P_1 - P_2) + 28.5 \text{ feet}$$

P_1 measured using CAC-PR-1257-1

$$PC_{wl} = \frac{2.3 \text{ feet}}{\text{psi}} (P_1 - P_2) + 30.5 \text{ feet}$$

Using PI-4176

TIME	NOW				
P_1 (psig)	72.5				
P_2 (psig)	67.5				
$P_1 - P_2$	5.0				
	x 2.3	x 2.3	x 2.3	x 2.3	x 2.3
x 2.3	11.5				
+28.5	+ 28.5	+28.5	+ 28.5	+28.5	+28.5
PC_{wl} (ft)	40				

Key

JPM SRO A-1

ATTACHMENT 11 (Cont'd)

Using PR-1257-1 INOP - No Power

TIME					
P_1 (psig)					
P_2 (psig)					
$P_1 - P_2$					
	x 2.3	x 2.3	x 2.3	x 2.3	x 2.3
x 2.3					
+30.5	+ 30.5	+ 30.5	+ 30.5	+ 30.5	+30.5
PC_{wl} (ft)					

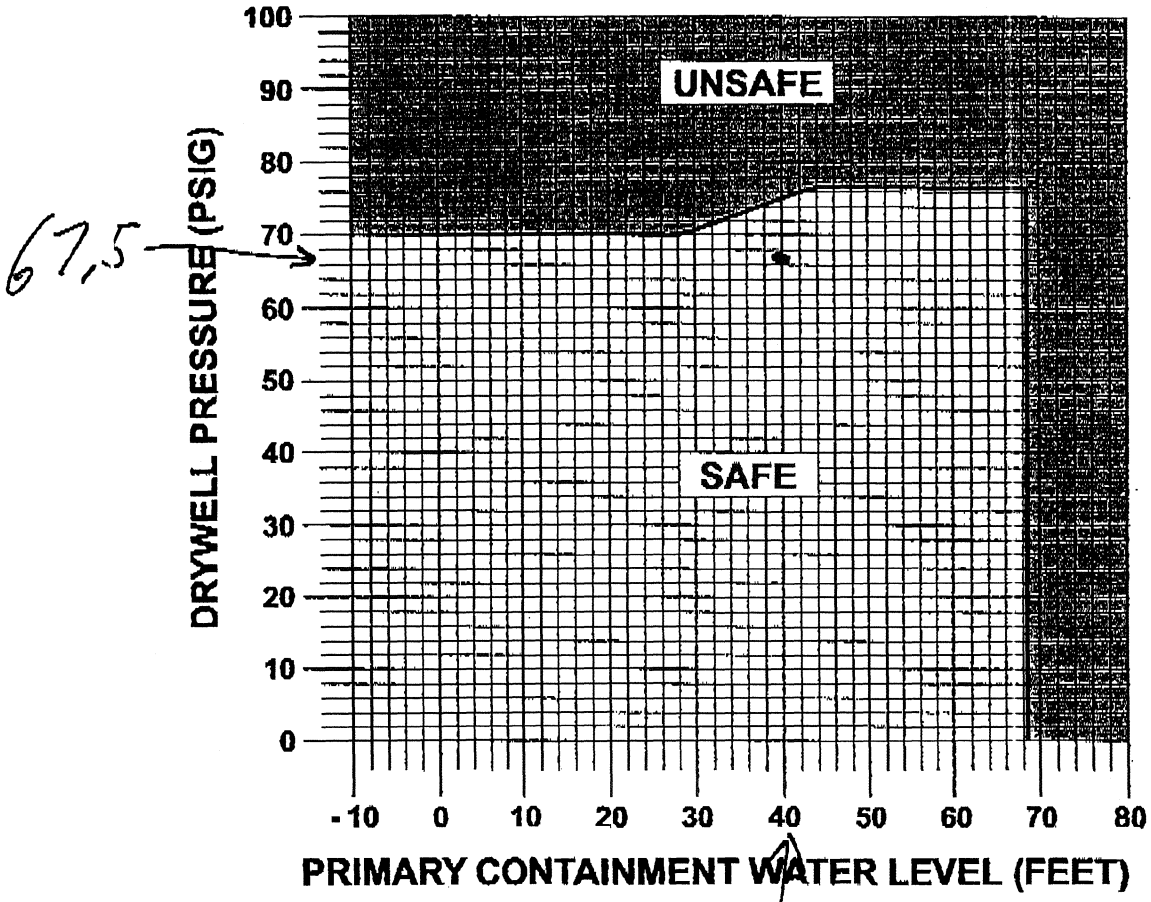
4. IF drywell water level is greater than 60.5 feet, THEN USE CAC DRYWELL WATER LEVEL INDIC, CAC-LI-1216 on P601.

Key

JTM SRO A-1

ATTACHMENT 5 (Cont'd)

FIGURE 2
PRIMARY CONTAINMENT PRESSURE LIMIT-A



If using the following instrument:	PCPL-A is:
CAC-PI-1230	70 psig
CAC-PI-4176	Use the graph
CAC-PR-1257-1	Use the graph

SAFE

TASK CONDITIONS:

1. An accident is in progress on Unit Two (2). The Unit SCO is directing actions of 2EOP-01-RVCP and EOP-02-PCCP.

2. 480 VAC Substation E7 is de-energized due to a fault. All other electrical buses are energized.

3. ERFIS is unavailable.

4. The following Containment parameter readings are available on the RTGB

   CAC-LI-2601-1, (Suppression Pool level, -10 to +6 feet) reads >+6 feet (upscale)

   CAC-LR-2602, (Suppression Pool level, -10 to +6 feet) reads -2 feet

   CAC-PI-1257-2A (Suppression Chamber pressure, 0 to 75 psig) reads 0 psig

   CAC-PI-1257-2B (Suppression Chamber pressure, 0 to 75 psig) reads >75 psig (upscale)

   CAC-PI-1230 (Drywell pressure, 0 to 75 psig) reads 67.5 psig

   CAC-PI-4176 (Drywell Pressure -5 to 245 psig) reads 72.5 psig

   CAC-PR-1257-1 (Drywell pressure, -5 to 245 psig) reads 25 psig

   CAC-LI-1216 (Drywell water level, 61 to 71 feet) reads Gauge Zero

INITIATING CUE:

You are directed to determine Primary Containment water level per EOP-01-UG, Attachment 11. Account for availability of instrumentation per AOP-36.1, Attachment 2. Determine the current region of operation (Safe/Unsafe) on Primary Containment Pressure Limit A (PCPL-A).

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

ADMIN

RO/SRO

NRC JPM A-2

TITLE: Generate a Clearance for maintenance activities on the 2C TBCCW pump.

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.

Read the following to trainee.

TASK CONDITIONS:

1. The 2C TBCCW has been removed from service for maintenance activities to repack the shaft on the pump.

2. The pump must be vented and drained.

3. The manual suction (2-TCC-V7) and discharge (2-TCC-V13) valves for the 2C TBCCW pump are leaking by and cannot be used as an isolation for the pump.

4. The on-line Operations Experience (OE) database is not available for reference.

INITIATING CUE:

Generate a proposed clearance boundary for the 2C TBCCW pump to support repacking of the pump. PASSPORT is not available and the Clearance checklist must be filled out manually.

Complete Attachment 4 of OPS-NGGC-1301. The Attachment 4 columns for Sequence, Type, Position, and Equipment/Component are to be filled in.

NOTE: Procedure OPS-NGGC-1301 should be made available. In addition to the procedural references available for JPM performance, the examinee may choose to reference plant prints/drawings. If requested, prompt the applicant to use aperture cards to print drawings

Examiner's Note: Drawings D-2033, Sht.1, LL-92018 and LL-09218 reflect the boundary/blocking valves and power supplies needed to develop the clearance proposal.

Step 1 – Obtain references and determine the required blocking points:

References obtained for blocking points identification SAT/UNSAT

Step 2 – Identify required blocking points for 2C TBCCW Pump Clearance.

The following Blocking Points Identified:

1.	MCC 2TH COMPT D17	****CRITICAL STEP** SAT/UNSAT**
2.	MCC 1TH COMPT D16	****CRITICAL STEP** SAT/UNSAT**
3.	MCC 2TH COMPT D20	****CRITICAL STEP** SAT/UNSAT**
4.	MCC 2TH COMPT D21	****CRITICAL STEP** SAT/UNSAT**
5.	MCC 1TH COMPT D20	****CRITICAL STEP** SAT/UNSAT**
6.	MCC 1TH COMPT D21	****CRITICAL STEP** SAT/UNSAT**
7.	2-TCC-V3 HANDWHEEL	****CRITICAL STEP** SAT/UNSAT**
8.	2-TCC-V14 HANDWHEEL	****CRITICAL STEP** SAT/UNSAT**
9.	2-TCC-V4 HANDWHEEL	****CRITICAL STEP** SAT/UNSAT**
10.	2-TCC-V15 HANDWHEEL	****CRITICAL STEP** SAT/UNSAT**
11.	2-TCC-V249 HANDWHEEL	****CRITICAL STEP** SAT/UNSAT**
12.	2-TCC-V252 HANDWHEEL	****CRITICAL STEP** SAT/UNSAT**

Step – 3 Determines clearance sequence as follows:

a. Tags 1 & 2 may be applied in either order but they must be the first blocking points tagged.

****CRITICAL STEP**SAT/UNSAT**

NOTE: Tags 3, 4, 5, and 6 may be sequenced prior to tags 7, 8, 9, and 10. That is, the candidate may sequence all of the valve power supplies prior to the first handwheel tag, which is acceptable.

b. The following pairs of tags may be applied in any order. The electrical tag must be applied first.

-Tags 3 and 7 are paired and Tag 3 must be applied first

SAT/UNSAT

-Tags 4 and 8 are paired and Tag 4 must be applied first

SAT/UNSAT

-Tags 5 and 9 are paired and Tag 5 must be applied first

SAT/UNSAT

-Tags 6 and 10 are paired and Tag 6 must be applied first

SAT/UNSAT

c. Tags 11 & 12 must be applied next in any order.

SAT/UNSAT

Step 4 – Identify sequence Items 1 through 12 Type as RED.

Sequence Items 1 through 12 Type Identified as RED

****CRITICAL STEP**SAT/UNSAT**

Step 5 – Identifies Unit 2 Mode Switch for 2C TBCCW Pump for Clearance Information Tag (CIT)

SAT/UNSAT

Step 6 - Identifies Unit 1 Mode Switch for 2C TBCCW Pump for Clearance Information Tag (CIT)

SAT/UNSAT

TERMINATING CUE: When the blocking points and sequence have been determined the JPM is complete.

COMMENTS:

K/A REFERENCE AND IMPORTANCE RATING:

2.2.13 3.6/3.8

Knowledge of tagging and clearance procedures

REFERENCES:

OPS-NGGC-1301, Revision 17

Prints: D-2033, Sht.1, LL-92018 and LL-09218

TOOLS AND EQUIPMENT:

NONE

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

A.2 - Equipment Control

Time Required for Completion: 30 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance:	Simulate	_	Actual	X	Unit:	2
Setting:	Control Room	___	Simulator	___		
Time Critical:	Yes	___	No	X	Time Limit	N/A
Alternate Path:	Yes	___	No	X		

EVALUATION

JPM: Pass ____ Fail ____

ATTACHMENT 4
Sheet 1 of 1
OPERATIONS CLEARANCE Checklist

Clearance No.
PAGE 1 of 1

INT NAME (PRINT) INT NAME (PRINT)
___ _____ ___ _____
___ _____ ___ _____
___ _____ ___ _____

* Independent Verification Required? Yes/No If No, N/A the Blocks

Seq	Action	Type	Tag Id	Position	Equipment/Component	Completed By	IV By
1		RED		OFF/ LOCKED	MCC 2TH COMPT D17 2C TBCCW PP MTR BKR		
2		RED		OFF/ LOCKED	MCC 1TH COMPT D16 2C TBCCW PP MTR BKR (Alternate Feed)		
3		RED		OFF/ LOCKED	MCC 2TH COMPT D20 2-TCC-V3 MTR BKR		
4		RED		OFF/ LOCKED	MCC 2TH COMPT D21 2-TCC-V14 MTR BKR		
5		RED		OFF/ LOCKED	MCC 1TH COMPT D20 2-TCC-V4 MTR BKR		
6		RED		OFF/ LOCKED	MCC 1TH COMP D21 2-TCC-V15 MTR BKR		
7		RED		CLOSED	2-TCC-V3 HANDWHEEL		
8		RED		CLOSED	2-TCC-V14 HANDWHEEL		
9		RED		CLOSED	2-TCC-V4 HANDWHEEL		
10		RED		CLOSED	2-TCC-V15 HANDWHEEL		
11		RED		OPEN	2-TCC-V249 HANDWHEEL		
12		RED		OPEN	2-TCC-V252 HANDWHEEL		
13*		CIT		CIT HUNG	2C TBCCW PUMP MODE SELECTOR SWITCH – UNIT 2 RTGB		
14		CIT		CIT HUNG	2C TBCCW PUMP MODE SELECTOR SWITCH – UNIT 1 RTGB		

TASK CONDITIONS:

1. The 2C TBCCW has been removed from service for maintenance activities to repack the shaft on the pump.

2. The pump must be vented and drained.

3. The manual suction (2-TCC-V7) and discharge (2-TCC-V13) valves for the 2C TBCCW pump are leaking by and cannot be used as an isolation for the pump.

4. The on-line Operations Experience (OE) database is not available for reference.

INITIATING CUE:

Generate a proposed clearance boundary for the 2C TBCCW pump to support repacking of the pump. PASSPORT is not available and the Clearance checklist must be filled out manually.

Complete Attachment 4 of OPS-NGGC-1301. The Attachment 4 columns for Sequence, Type, Position, and Equipment/Component are to be filled in.

ATTACHMENT 4
Sheet 1 of 1
Operations Clearance Checklist

Clearance No._____

Page ____ of ____

Checklist Type: Hang; Lift; Boundary Change (Circle one)

INT	NAME (PRINT)	INT	NAME (PRINT)
____	_____	____	_____
____	_____	____	_____
____	_____	____	_____

* Independent Verification Required? YES/NO If NO, N/A the Blocks

Seq	Action	Type	Tag Id	Position	Equipment/Component	Completed. By	Verified By *

Continued Y / N

QA RECORD

9.3.1.1 Administrative (Cont.)

11. The Personal Clearance Preparer shall identify any significant loss of function incurred by clearance activities and document the loss of function in the clearance Special Instructions. Some potential examples of significant loss of function may include disabled annunciators, defeated protective relays, defeated trip functions, disabled indicators, disabled meters or gauges, masked annunciators, or loss of monitoring capabilities.

12. For systems where a pump or fan is affected by a clearance, the clearance should be installed and removed in the sequence listed in the table below to prevent damage to equipment. Deviations from the sequence and specific instructions below are allowed for safety, ALARA, or if the deviation would not impact personnel or equipment safety.

Clearance Installation	Clearance Removal
Secure pump/fan and hang a tag on its control switch.	Remove tags from handwheels of valves and reposition manual valves as required. For pumps, open the suction valve before opening the discharge valve.
Remove the power source for the pump/fan prime mover (open breaker, remove fuse, shut steam supply valve and so forth) and place tag on the power source.	Remove tags on power sources to valves and restore the power supply as required.
Reposition valves from control switches, as required by the clearance, and place tags on the control switches. Include tags for switches in alternate locations if applicable.	Remove tags from valve control switches and reposition valves as required.
Remove power source (electrical, air, hydraulic, and so forth) from valves, if applicable, and tag the power source removed.	Remove the tag from the power source for the pump/fan prime mover. Restore the power source as directed by restoration lineup.
Reposition manual valves as required by the clearance and place tag on handwheels of the valves covered by the clearance. For pumps, shut the discharge valve before shutting the suction valve.	Remove the tag on pump/fan control switch and reposition the switch as required.

FOR MANUAL VALVES *

ATTACHMENT 11
Sheet 2 of 5
Boundary Device Tagging Guidelines

Boundary Device	Restrictions	Tagout Method
Motor Operated Valve	- Some Limitorque operated valves are prone to drift if in manual - If primary use of valve is flow control, monitor for seat leakage - If manual torquing is required, untorque valve prior to stroking electrically	- Position valve from control switch - Place a CIT or clearance tag on control switch as required - Place tag on power supply - Place tag on valve handwheel that indicates valve position (handwheel should only be manually engaged if leak by is present - If torqued, refer to site procedures for additional requirements
Hydraulic Operated Valve (Fails Closed)	- Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	- Position valve from control switch - Place a CIT or clearance tag on control switch as required - Place tag on power supply to hydraulic pump - If the operator has a handwheel or other manual positioning device that could open the valve, it should also be tagged - If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary
R 2.2.1 Hydraulic Operated Valve (Fails Open)	- Normally not used as a boundary device - Either a manual positioning device or a mechanical gag is required (SOER 85-5) - Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	- Position valve from control switch - Place a CIT or clearance tag on control switch as required - Place tag on power supply to hydraulic pump - If the operator has a handwheel or other manual positioning device it should be tagged - If a mechanical gag is installed, it should be tagged - If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary

TASK CONDITIONS:

1. The 2C TBCCW has been removed from service for maintenance activities to repack the shaft on the pump.

2. The pump must be vented and drained.

3. The manual suction (2-TCC-V7) and discharge (2-TCC-V13) valves for the 2C TBCCW pump are leaking by and cannot be used as an isolation for the pump.

4. The on-line Operations Experience (OE) database is not available for reference.

INITIATING CUE:

Generate a proposed clearance boundary for the 2C TBCCW pump to support repacking of the pump. PASSPORT is not available and the Clearance checklist must be filled out manually.

Complete Attachment 4 of OPS-NGGC-1301. The Attachment 4 columns for Sequence, Type, Position, and Equipment/Component are to be filled in.

ATTACHMENT 4
Sheet 1 of 1
Operations Clearance Checklist

Clearance No._____

Page ____ of ____

Checklist Type: Hang; Lift; Boundary Change (Circle one)

INT	NAME (PRINT)	INT	NAME (PRINT)
____	_____	____	_____
____	_____	____	_____
____	_____	____	_____

* Independent Verification Required? YES/NO If NO, N/A the Blocks

Seq	Action	Type	Tag Id	Position	Equipment/Component	Completed. By	Verified By *

Continued Y / N

QA RECORD

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

ADMIN

RO

NRC JPM A-3

TITLE: Determine Stay Time limitations for performing work in a High Radiation Area.

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.

TASK CONDITIONS:

Two workers will be performing a lube check and coupling alignment on the Unit One (1) RWCU Pump 1B.

Worker #1 has accumulated 1640 mr this year.

Worker #2 has accumulated 1655 mr this year.

The elevator is out of service

The following times for each worker have been estimated for performance of the job.

1. Traversing Southwest stairwell 20' – 50' Rx Bldg 12 minutes
2. Staging time in access area outside the RWCU room 6 minutes
3. Staging time in area directly inside room access door 12 minutes
4. Work time at the "B" RWCU pump 2 hours

It has been estimated that a total of 30 mr per person will be accumulated once the job is completed. This includes de-staging and use of stairs to return to the maintenance shop.

INITIATING CUE:

Using the information above and the provided radiological survey using best ALARA practices:

1. Determine the total dose accumulated in performance of the job on the Unit One (1) "B" RWCU pump for both workers. (assume the same task times for both workers)
2. Determine if any Brunswick dose limitations will be exceeded.

PERFORMANCE CHECKLIST

NOTE: Provide the examinee the attached survey map. Each substep is a CRITICAL STEP.

Step 1 - Determines dose for each worker as follows:

a. Traversing SW stairwell 20' – 50' Rx Bldg (SW is the lowest dose stairwell)

(12 min) .2 Hr X 5 mr/hr = **1 mr**

Estimate 1 millirem dose accumulation ****CRITICAL TASK****
SAT/UNSAT

b. Staging time in access area outside the RWCU room

(6 min) .1 Hr X 10 mr/hr = **1 mr**

Estimate 1 millirem dose accumulation. ****CRITICAL TASK****
SAT/UNSAT

c. Staging time in area directly inside room access door

(12 min) .2 Hr X 75 mr/hr = **15 mr**

Estimate 5 millirem dose accumulation. ****CRITICAL TASK****
SAT/UNSAT

d. Work time at the "B" RWCU pump

2 Hrs X 150 mr/hr = **300 mr**

Estimate 300 millirem dose accumulation. ****CRITICAL TASK****
SAT/UNSAT

e. An additional **30** mr will be accumulated once the job is done for de-staging activities.

Total = 1 + 1 + 15 + 300 + 30 = **347 mr**

**** CRITICAL STEP****
SAT/UNSAT

Step 2 – Determines that Worker #2 would exceed the Brunswick administrative limit of 2 REM per calendar year if the estimated dose were accumulated.

Worker #1	1640 mr + 347 mr	= 1987 mr (< 2R limit)
Worker #2	1655 mr + 347 mr	= 2002 mr (> 2R limit)

**** CRITICAL STEP****

SAT/UNSAT

TERMINATING CUE: When the total dose for each worker has been determined and the administrative limits addressed, the JPM is complete.

Comments

K/A REFERENCE AND IMPORTANCE RATING:

2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. (2.9)

2.3.1 Knowledge of 10CFR20 and related facility radiation control requirements (2.6)

REFERENCES:

TOOLS AND EQUIPMENT:

Calculator.

SAFETY FUNCTION (from NUREG 1123):

A.3 Radiation Control

Validation Time: 15 Minutes

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual X Unit: 1

Setting: Control Room ___ Simulator___ (N/A for Admin or In-Plant JPMs)

Time Critical: Yes ___ No X Time Limit N/A

Alternate Path: Yes ___ No X

EVALUATION

JPM: Pass _____ Fail _____

_____

_____

_____

TASK CONDITIONS:

Two workers will be performing a lube check and coupling alignment on the Unit One (1) RWCU Pump 1B.

Worker #1 has accumulated 1640 mr this year.

Worker #2 has accumulated 1655 mr this year.

The elevator is out of service

The following times for each worker have been estimated for performance of the job.

1. Traversing Southwest stairwell 20' – 50' Rx Bldg	12 minutes
2. Staging time in access area outside the RWCU room	6 minutes
3. Staging time in area directly inside room access door	12 minutes
4. Work time at the "B" RWCU pump	2 hours

It has been estimated that a total of 30 mr per person will be accumulated once the job is completed. This includes de-staging and use of stairs to return to the maintenance shop.

INITIATING CUE:

Using the information above and the provided radiological survey using best ALARA practices:

1. Determine the total dose accumulated in performance of the job on the Unit 1B RWCU pump for both workers. (assume the same task times for both workers).

2. Determine if any Brunswick dose limitations will be exceeded.

BRUNSWICK NUCLEAR PLANT
RADIOLOGICAL SURVEY

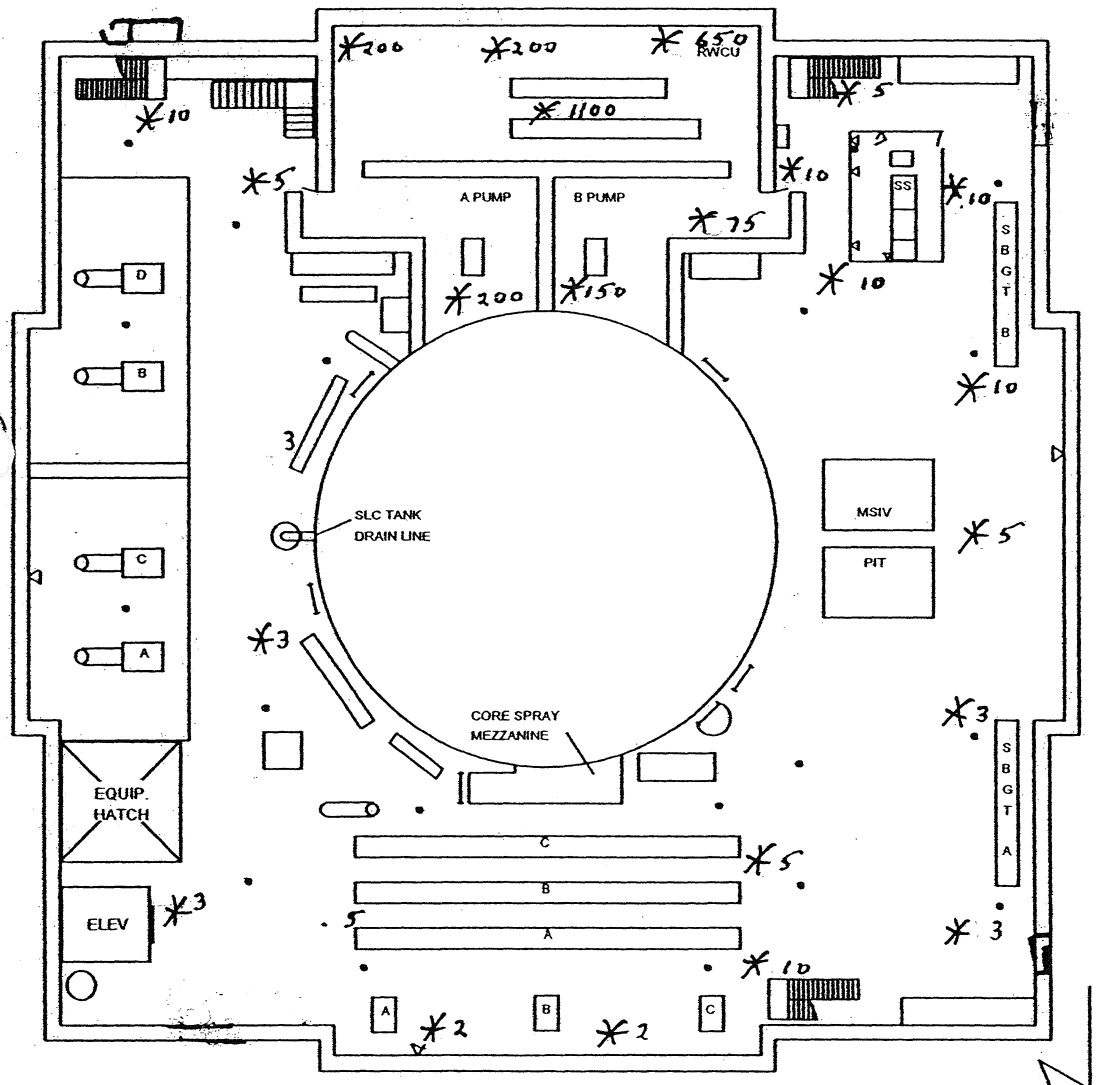
SURVEY NO. 07 - 132 R

		DOSE RATE		CONTAMINATION	
DATE: TODAY	TIME: 0600	INST. TYPE	TELETECTOR	β ☐ α ☐	β ☐ α ☐
SURVEYOR	M. Murray	SERIAL NO.	T117B	INST/SN	
SIGNATURE	M Murray	β FACTOR		EFF.	
REVIEWED	B. Bergin	RX POWER	100	BKGD. CPM	CPM
		H2 SCFM	38		

UNIT 1 BLDG RB EL 50' AREA RWCU PUMP/HX AREA RWP NO. 111348-04

COMPONENT OR TAG NO. 1B RWCU PUMP WR/JO 17324-02

WORK PERFORMED PUMP LUBE CHECK / COUPLING ALIGNMENT



△ INDICATES ELECTRICAL OUTLETS

*Dose listed in mr/hr

SMEAR RESULTS IN DPM/100 CM² B=BETA IN mRAD/HR/100CM ² M=CPM/MASLIN	
NO.	RESULTS

RA -RADIATION AREA
HRA -HIGH RADIATION AREA
LHRA -LOCKED HIGH RADIATION AREA
RCA -RADIATION CONTROL AREA

CA -CONTAMINATION AREA
HCA -HIGH CONTAMINATION AREA
AA -AIRBORNE AREA
—×××— ROPE BOUNDARY

DOSE RATES IN mR/HR
n° -NEUTRON (mRem/Hr)

5.0 PREREQUISITES

N/A

6.0 PRECAUTIONS AND LIMITATIONS

N/A

7.0 SPECIAL TOOLS AND EQUIPMENT

N/A

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

R2.1 9.1 Adult Occupational Dose Limits

9.1.1 Whole Body - The more limiting of a total effective dose equivalent equal to 5 rem or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye equal to 50 rem.

9.1.2 Skin - A shallow dose equivalent equal to 50 rem.

9.1.3 Lens of Eye - A lens dose equivalent equal to 15 rem.

9.1.4 Extremities - A shallow dose equivalent equal to 50 rem.

9.2 Occupational Dose to Minors

Minors shall not be employed to work in radiation control areas, although they may enter as visitors.

9.3 Progress Energy Annual Administrative Dose Limits

9.3.1 0.5 rem Progress Energy dose if non-Progress Energy dose for the current year has not been determined. No dose extension is permitted.

9.3.2 2 rem Progress Energy dose not to exceed 4 rem total dose if non-Progress Energy dose for the current year has been determined.

TASK CONDITIONS:

Two workers will be performing a lube check and coupling alignment on the Unit One (1) RWCU Pump 1B.

Worker #1 has accumulated 1640 mr this year.

Worker #2 has accumulated 1655 mr this year.

The elevator is out of service

The following times for each worker have been estimated for performance of the job.

1. Traversing Southwest stairwell 20' – 50' Rx Bldg 12 minutes
2. Staging time in access area outside the RWCU room 6 minutes
3. Staging time in area directly inside room access door 12 minutes
4. Work time at the "B" RWCU pump 2 hours

It has been estimated that a total of 30 mr per person will be accumulated once the job is completed. This includes de-staging and use of stairs to return to the maintenance shop.

INITIATING CUE:

Using the information above and the provided radiological survey using best ALARA practices:

1. Determine the total dose accumulated in performance of the job on the Unit 1B RWCU pump for both workers. (assume the same task times for both workers).
2. Determine if any Brunswick dose limitations will be exceeded.

BRUNSWICK NUCLEAR PLANT
RADIOLOGICAL SURVEY

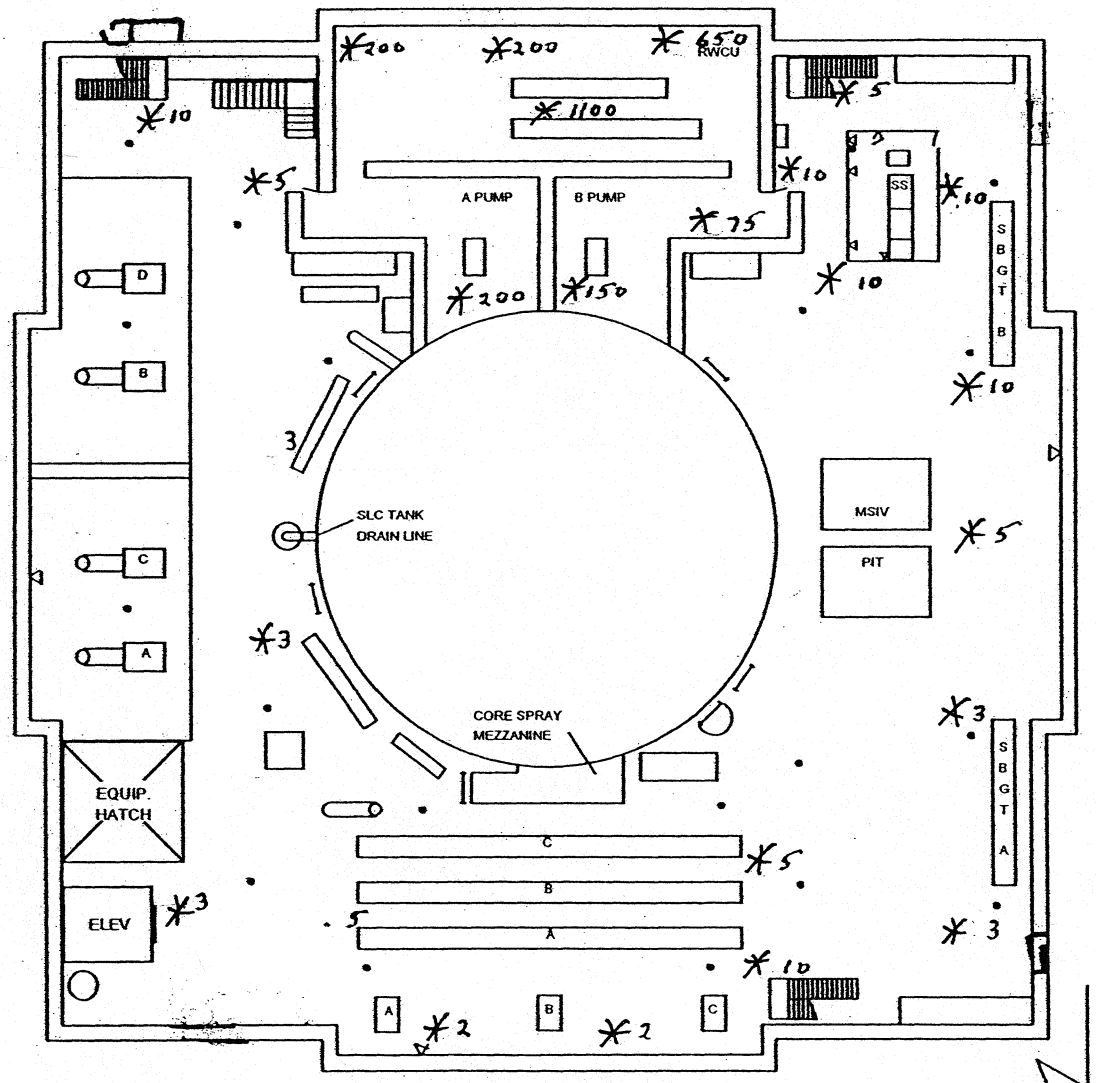
SURVEY NO. 07 - 132 R

		DOSE RATE		CONTAMINATION	
DATE: TODAY	TIME: 0600	INST. TYPE	TELETECTOR	β ☐ α ☐	β ☐ α ☐
SURVEYOR	M. Murray	SERIAL NO.	T117B	INST/SN	
SIGNATURE	M Murray	β FACTOR		EFF.	
REVIEWED	B- Bolgio	RX POWER	100	BKGD. CPM	CPM
		H2 SCFM	38		

UNIT 1 BLDG RB EL 50' AREA RWCU PUMP/HX AREA RWP NO. 111348-04

COMPONENT OR TAG NO. 1B RWCU PUMP WR/JO 17324-02

WORK PERFORMED PUMP LUBE CHECK / COUPLING ALIGNMENT



SMEAR RESULTS
IN DPM/100 CM²
B=BETA IN mRAD/HR/100CM ²
M=CPM/MASLIN

NO.	RESULTS

△ INDICATES ELECTRICAL OUTLETS

*Dose listed in mr/hr

RA -RADIATION AREA
HRA -HIGH RADIATION AREA
LHRA -LOCKED HIGH RADIATION AREA
RCA -RADIATION CONTROL AREA

CA -CONTAMINATION AREA
HCA -HIGH CONTAMINATION AREA
AA -AIRBORNE AREA
—×××— ROPE BOUNDARY

DOSE RATES IN mR/HR
n° -NEUTRON (mRem/Hr)

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION
JOB PERFORMANCE MEASURE

SRO
NRC ADMIN JPM A-3

TITLE: Determine Off-Site Release Per PEP-03.4.7 And Complete Notification Form.

Validated By Kent Crocker/ 7-24-07
7-24-07

SIMULATOR NOTES:

1. Perform this JPM **PRIOR** to the first applicant's performance and **AFTER** the last applicant's performance. This information will bound the actual applicant performance results.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. This JPM may be performed in any location with a computer loaded with the Rascal 3.0.4 program.
3. The Attachment 5 data specifies three release points being the Main Stack, Unit 2 Turbine Building, and Unit 1 Turbine Building
4. The release at the site boundary should be approximately 1.267E+08 mrem TEDE and 1.4203E+09 mrem CDE.

TASK CONDITIONS:

1. The site is in a General Emergency due to a failure of 2 out of 3 fission product barriers with a potential for the loss of the third barrier on Unit Two (2). Fuel failure exists with an unisolable steam line break in the Turbine Building.

EXAMINER NOTE: Provide Specific Time for blank in task condition 2 which is 15 minutes prior to actual time

2. The Unit 2 reactor was successfully scrammed at _____ .

3. Attachment 5 of PEP-3.4.7 has been filled out for data entry. (Give examinee Attachment 5. Fill out current time and current date with time of shutdown as 15 minutes ago)

4. A follow-up Emergency Notification has been completed with the exception of lines 15 and 16 for the Shift Superintendent (SEC) approval.

INITIATING CUE:

You are directed by the Shift Superintendent (SEC) to perform an initial dose calculation per PEP 03.4.7, Automation of Off-site dose projection procedure.

You are to transfer the projected dose data to lines 15 and 16 of the attached follow-up notification form in accordance with PEP-02.6.21.

Once lines 15 & 16 are completed, you are to give the Emergency Notification form to the Shift Superintendent (SEC) for approval.

ATTACHMENT 5

Data Sheet for Dose Projection Inputs

CHARACTERISTIC	TIME			
Main Stack	Release Rate (μCi/cc)	4.2E5		
	Flow Rate (CFM)	42000		
Turbine Building	#1 Release Rate (μCi/cc)	2.2E6		
	#1 Flow Rate (CFM)	15000		
	#2 Release Rate (μCi/cc)	2.2E6		
	#2 Flow Rate (CFM)	15000		
Reactor Building	Release Rate (μCi/cc)	3.5E2		
	Flow Rate (CFM)	0		
Torus Vent	Release Rate (μCi/cc)	0		
Core Uncovered	Time (1) lost/ (2) Returned	10 Minutes		
Effective Filtration	Yes / No	Yes		
Release Height	Ground	Yes		
	Elevated	No		
Release Duration	Anticipated Length of Time	1 Hours		
Shutdown	Date			
	Time			
Met Data Wind Speed	Upper	15 MPH		
	Lower	13 MPH		
Met Data Direction	Upper	68 DEG		
	Lower	67 DEG		
Stability	Class	E		
Seabreeze	Yes / No	No		
Precipitation		None		

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain a current revision of PEP-03.4.7.
Current Revision ofPEP-03.4.7 obtained.

****CRITICAL STEP**SAT/UNSAT**

Step 2 - Access Rascal 3.0.4 program.
Rascal Program accessed.

****CRITICAL STEP** SAT/UNSAT**

NOTE: IAW PEP-03.4.7, a separate dose projection is to be performed for each release point with the results being entered on Attachment 6 of the procedure and, subsequently, totaled.

NOTE: The Unit 2 Turbine Building Dose Projection begins with Step 3
The Unit 1 Turbine Building Dose Projection begins with Step 29
The Stack Dose Projection begins with Step 56

TURBINE BUILDING #2 Dose Projection:

Step 3 – Select Source Term to Dose Model (STDose).
ST Dose selected.

****CRITICAL STEP** SAT/UNSAT**

Step 4 – Click on the Event Type button.
Event Type selected.

****CRITICAL STEP** SAT/UNSAT**

Step 5 – Select Nuclear Power Plant and then OK.
NPP and OK selected.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03..4.7, Steps 7.7.3 – 7.7.5 are N/A due to not being the source.

Step 6 – Select Event Location.
Event Location selected.

****CRITICAL STEP** SAT/UNSAT**

Step 7 – Using the drop down box under sites select Brunswick Unit 2.
Brunswick Unit 2 selected.

****CRITICAL STEP** SAT/UNSAT**

Step 8 – Click on the Source Term button.
Source Term selected.

****CRITICAL STEP** SAT/UNSAT**

Step 9 – Select Monitored Releases – Mixtures and then select OK.
Monitored Releases - Mixtures selected.

****CRITICAL STEP** SAT/UNSAT**

Step 10 – Select Reactor Shutdown YES and enter today as the date and 15 minutes ago as the time.
YES selected and date and time entered.

****CRITICAL STEP** SAT/UNSAT**

Step 11 – Enters Sample ID as current date and time in the format of mmddyyhhmm.
Sample ID is entered.

****CRITICAL STEP** SAT/UNSAT**

Step 12 – Enters Sample time as current date and the time the sample was taken.
Sample time is entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.9.3.3, 7.9.3.5, and 7.9.3.6 are N/A based on those locations not being the release points.

NOTE:	Candidate must ensure that the correct units are selected. May have to select something different than the default. Concentration is in µCi/cc which is the same as µCi/cm^3. Flow rate is in CFM which is ft^3/min.

Step 13 – Enters effluent gross concentration as 2.2E6 µCi/cc.
2.2E6 µCi/cm^3 entered.

****CRITICAL STEP** SAT/UNSAT**

Step 14 – Enters effluent flow rate as 15000 cfm.
15000 ft^3/min entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: The program default isotopic mixture percentages for Noble Gases and Halogens are 98% and 2%, respectively. The percentages will require the candidate to change the values.

Step 15 – Selects Noble gases to 99% and Halogens to 1% and then clicks on OK.
Percentages are entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.9.5, 7.9.6, 7.9.7, 7.9.8, 7.9.9, and 7.9.10 are N/A based on source of release.

Step 16 – Clicks on the release path button.
Release path panel pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 17 – Selects not an isolated path with a release height of 0 meters and considers building wake effects as YES.
Not an Isolated path selected, release height entered as 0, and YES selected for building wake effects.

****CRITICAL STEP** SAT/UNSAT**

Step 18 – Enters the start of release as the sample time.
Enters the sample time as the start of the release.

****CRITICAL STEP** SAT/UNSAT**

NOTE: The release duration is specified in the conditions provided.

Step 19 – Selects release duration as 1 hour and then selects OK.
Selects release duration and enters 1 hour.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.10.3, 7.10.4 and 7.10.5 are N/A due to those locations not being the source of the release.

Step 20 – Clicks on Meteorology button.
Meteorology screen pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 21 – From data set type, selects actual observations and forecasts and then enter new data.
Enter new data selected.

****CRITICAL STEP** SAT/UNSAT**

Step 22 – Selects enter new data.
Enter new data selected.

****CRITICAL STEP** SAT/UNSAT**

Step 23 – Enters the following data; type = obs, date = today, time = sample time, degrees of ground level, wind speed at ground level, stability class = E. After data is entered select OK.
Data entered and OK selected.

****CRITICAL STEP** SAT/UNSAT**

Step 24 – Select Save and Process data button.
Save and Process data screen pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 25 – Enter new name as date and time (mmddyyhhmm), then click on OK.
Enters file name and selects OK.

****CRITICAL STEP** SAT/UNSAT**

Step 26 – Close screens and select calculate doses.
Calculate doses selected.

****CRITICAL STEP** SAT/UNSAT**

Step 27 – Select distance of calculation as close in, default value for end of calculations as 6 hours, and enter a case description of BNP and the hour (i.e. BNP1230). Then selects OK.
Close in selected, 6 hours selected, and BNPhhhh entered.

****CRITICAL STEP** SAT/UNSAT**

The results for the Unit 2 Turbine Building release are:

NOTE: Values from the Rascal program are in Rem and the form requires mrem.

NOTE: TEDE values are:
Site Boundary (0.5 miles) is 6.2E7 mrem.
2 miles is 1.4E7 mrem.
5 miles is 4.4E6
10 miles is 1.4E6
Adult Thyroid CDE (mrem) values are:
Site Boundary (0.5 miles) is 7.1E8 mrem.
2 miles is 1.2E8 mrem.
5 miles is 2.9E7
10 miles is 8.7E6

NOTE: Attachment 6 has only one line for Turbine Building. The candidate should either total Unit 1 and Unit 2 Turbine Building results prior to entering on Attachment 6 or enter both sets of data in the same table fields.

Step 28 – Record the values obtained on Attachment 6.

Values recorded on Attachment 6

****CRITICAL STEP** SAT/UNSAT**

TURBINE BUILDING #1 Dose Projection:

Step 29 Using the "File" pull down, Select "New Case"
New Case Selected

****CRITICAL STEP** SAT/UNSAT**

Step 30 – Select Source Term to Dose Model (STDose).
ST Dose selected.

****CRITICAL STEP** SAT/UNSAT**

Step 31 – Click on the Event Type button.
Event Type selected.

****CRITICAL STEP** SAT/UNSAT**

Step 32 – Select Nuclear Power Plant and then OK.
NPP and OK selected.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03..4.7, Steps 7.7.3 – 7.7.5 are N/A due to not being the source.

Step 33 – Select Event Location.
Event Location selected.

****CRITICAL STEP** SAT/UNSAT**

Step 34 – Using the drop down box under sites select Brunswick Unit 2.
Brunswick Unit 2 selected.

****CRITICAL STEP** SAT/UNSAT**

Step 35 – Click on the Source Term button.
Source Term selected.

****CRITICAL STEP** SAT/UNSAT**

Step 36 – Select Monitored Releases – Mixtures and then select OK.
Monitored Releases - Mixtures selected.

****CRITICAL STEP** SAT/UNSAT**

Step 37 – Select Reactor Shutdown YES and enter today as the date and 15 minutes ago as the time.

YES selected and date and time entered.

****CRITICAL STEP** SAT/UNSAT**

Step 38 – Enters Sample ID as current date and time in the format of mmddyyhhmm.

Sample ID is entered.

****CRITICAL STEP** SAT/UNSAT**

Step 39 – Enters Sample time as current date and the time the sample was taken.

Sample time is entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.9.3.3, 7.9.3.5, and 7.9.3.6 are N/A based on those locations not being the release points.

NOTE:	Candidate must ensure that the correct units are selected. May have to select something different than the default. Concentration is in µCi/cc which is the same as µCi/cm^3. Flow rate is in CFM which is ft^3/min.

Step 40 – Enters effluent gross concentration as 2.2E6 µCi/cc.
2.2E6 µCi/cm^3 entered.

****CRITICAL STEP** SAT/UNSAT**

Step 41 – Enters effluent flow rate as 15000 cfm.
15000 ft^3/min entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: The program default isotopic mixture percentages for Noble Gases and Halogens are 98% and 2%, respectively. The percentages will require the candidate to change the values.

Step 42 – Selects Noble gases to 99% and Halogens to 1% and then clicks on OK.
Percentages are entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.9.5, 7.9.6, 7.9.7, 7.9.8, 7.9.9, and 7.9.10 are N/A based on source of release.

Step 43 – Clicks on the release path button.
Release path panel pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 44 – Selects not an isolated path with a release height of 0 meters and considers building wake effects as YES.
Not an Isolated path selected, release height entered as 0, and YES selected for building wake effects.

****CRITICAL STEP** SAT/UNSAT**

Step 45 – Enters the start of release as the sample time.
Enters the sample time as the start of the release.

****CRITICAL STEP** SAT/UNSAT**

NOTE: The release duration is specified in the conditions provided.

Step 46 – Selects release duration as 1 hour and then selects OK.
Selects release duration and enters 1 hour.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.10.3, 7.10.4 and 7.10.5 are N/A due to those locations not being the source of the release.

Step 47 – Clicks on Meteorology button.
Meteorology screen pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 48 – From data set type, selects actual observations and forecasts and then enter new data.
Enter new data selected.

****CRITICAL STEP** SAT/UNSAT**

Step 49 – Selects enter new data.
Enter new data selected.

****CRITICAL STEP** SAT/UNSAT**

Step 50 – Enters the following data; type = obs, date = today, time = sample time, degrees of ground level, wind speed at ground level, stability class = E. After data is entered select OK.
Data entered and OK selected.

****CRITICAL STEP** SAT/UNSAT**

Step 51 – Select Save and Process data button.
Save and Process data screen pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 52 – Enter new name as date and time (mmddyyhhmm), then click on OK.
Enters file name and selects OK.

****CRITICAL STEP** SAT/UNSAT**

Step 53 – Close screens and select calculate doses.
Calculate doses selected.

****CRITICAL STEP** SAT/UNSAT**

Step 54 – Select distance of calculation as close in, default value for end of calculations as 6 hours, and enter a case description of BNP and the hour (i.e. BNP1230). Then selects OK.
Close in selected, 6 hours selected, and BNPhhhh entered.

****CRITICAL STEP** SAT/UNSAT**

The results for the Unit 1 Turbine Building release are:

NOTE: Values from the Rascal program are in Rem and the form requires mrem.

NOTE: TEDE values are:
Site Boundary (0.5 miles) is 6.2E7 mrem.
2 miles is 1.4E7 mrem.
5 miles is 4.4E6
10 miles is 1.4E6
Adult Thyroid CDE (mrem) values are:
Site Boundary (0.5 miles) is 7.1E8 mrem.
2 miles is 1.2E8 mrem.
5 miles is 2.9E7
10 miles is 8.7E6

NOTE: Attachment 6 has only one line for Turbine Building. The candidate should either total Unit 1 and Unit 2 Turbine Building results prior to entering on Attachment 6 or enter both sets of data in the same table fields.

Step 55 – Record the values obtained on Attachment 6.

Values recorded on Attachment 6

****CRITICAL STEP** SAT/UNSAT**

MAIN STACK Dose Projection:

Step 56 - Using the "File" pull down, Select "New Case"
New Case Selected

****CRITICAL STEP** SAT/UNSAT**

Step 57 – Select Source Term to Dose Model (STDose).
ST Dose selected.

****CRITICAL STEP** SAT/UNSAT**

Step 58 – Click on the Event Type button.
Event Type selected.

****CRITICAL STEP** SAT/UNSAT**

Step 59 – Select Nuclear Power Plant and then OK.
NPP and OK selected.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03..4.7, Steps 7.7.3 – 7.7.5 are N/A due to not being the source.

Step 60 – Select Event Location.
Event Location selected.

****CRITICAL STEP** SAT/UNSAT**

Step 61 – Using the drop down box under sites select Brunswick Unit 2.
Brunswick Unit 2 selected.

****CRITICAL STEP** SAT/UNSAT**

Step 62 – Click on the Source Term button.
Source Term selected.

****CRITICAL STEP** SAT/UNSAT**

Step 63 – Select Monitored Releases – Mixtures and then select OK.
Monitored Releases - Mixtures selected.

****CRITICAL STEP** SAT/UNSAT**

Step 64 – Select Reactor Shutdown YES and enter today as the date and 15 minutes ago as the time.
YES selected and date and time entered.

****CRITICAL STEP** SAT/UNSAT**

Step 65 – Enters Sample ID as current date and time in the format of mmddyyhhmm.
Sample ID is entered.

****CRITICAL STEP** SAT/UNSAT**

Step 66 – Enters Sample time as current date and the time the sample was taken.
Sample time is entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.9.3.4, 7.9.3.5, and 7.9.3.6 are N/A based on those locations not being the release points.

NOTE:	Candidate must ensure that the correct units are selected. May have to select something different than the default. Concentration is in µCi/cc which is the same as µCi/cm^3. Flow rate is in CFM which is ft^3/min.

Step 67 – Enters effluent gross concentration as 4.2E5 µCi/cc.
4.2E5 µCi/cm^3 entered.

****CRITICAL STEP** SAT/UNSAT**

Step 68 – Enters effluent flow rate as 42000 cfm.
42000 ft^3/min entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: The program default isotopic mixture percentages for Noble Gases and Halogens are 98% and 2%, respectively. The percentages will require the candidate to change the values.

Step 69 – Selects Noble gases to 99% and Halogens to 1% and then clicks on OK.
Percentages are entered.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.9.5, 7.9.6, 7.9.7, 7.9.8, 7.9.9, and 7.9.10 are N/A based on data provided.

Step 70 – Clicks on the release path button.
Release path panel pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 71 – Selects Isolated Stack with a release height of 100 meters.
Isolated Stack with a release height of 100 meters selected.

****CRITICAL STEP** SAT/UNSAT**

Step 72 – Selects **NO** for plume rise.
NO selected for plume rise.

****CRITICAL STEP** SAT/UNSAT**

Step 73 – Selects **NO** for Seabreeze.
NO selected for Seabreeze.

****CRITICAL STEP** SAT/UNSAT**

Step 74 – Enters the start of release as the sample time.
Enters the sample time as the start of the release.

****CRITICAL STEP** SAT/UNSAT**

NOTE: The release duration is specified in the conditions provided.

Step 75 – Selects release duration as 1 hour and then selects OK.
Selects release duration and enters 1 hour.

****CRITICAL STEP** SAT/UNSAT**

NOTE: 0PEP-03.4.7, Steps 7.10.3, 7.10.4 and 7.10.5 are N/A due to those locations not being the source of the release.

Step 76 – Clicks on Meteorology button.
Meteorology screen pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 77 – From data set type, selects actual observations and forecasts and then enter new data.
Enter new data selected.

****CRITICAL STEP** SAT/UNSAT**

Step 78 – Selects enter new data.
Enter new data selected.

****CRITICAL STEP** SAT/UNSAT**

Step 79 – Enters the following data; type = obs, date = today, time = sample time, degrees of Upper level, wind speed at Upper level, stability class = E. After data is entered select OK.
Data entered and OK selected.

****CRITICAL STEP** SAT/UNSAT**

Step 80 – Select Save and Process data button.
Save and Process data screen pops up.

****CRITICAL STEP** SAT/UNSAT**

Step 81 – Enter new name as date and time (mmddyyhhmm), then click on OK.
Enters file name and selects OK.

****CRITICAL STEP** SAT/UNSAT**

Step 82 – Close screens and select calculate doses.
Calculate doses selected.

****CRITICAL STEP** SAT/UNSAT**

Step 83 – Select distance of calculation as close in, default value for end of calculations as 6 hours, and enter a case description of BNP and the hour (i.e. BNPhhmm1230). Then selects OK.
Close in selected, 6 hours selected, and BNPhhmm entered.

****CRITICAL STEP** SAT/UNSAT**

The results for the Main Stack release are:

NOTE: Values from the Rascal program are in Rem and the form requires mrem.

NOTE: TEDE values are:
Site Boundary (0.5 miles) is 2.7E6 mrem.
2 miles is 2.3E6 mrem.
5 miles is 9.9E5 mrem
10 miles is 3.6E5 mrem
Adult Thyroid CDE (mrem) values are:
Site Boundary (0.5 miles) is 3.0E5 mrem.
2 miles is 1.3E7 mrem.
5 miles is 5.7E6
10 miles is 2.1E6

Step 84 – Record the values obtained for the Stack release on Attachment 6.

Values recorded on Attachment 6

****CRITICAL STEP** SAT/UNSAT**

Step 85 – Total the columns on Attachment 6 and record the results in the applicable fields.

NOTE: The totals for Attachment 6 are:

TEDE
Site Boundary (0.5 miles) is 1.267E8 mrem
2 miles is 3.03E7 mrem
5 miles is 9.79E6 mrem
10 miles is 3.16E6 mrem

Adult Thyroid CDE (mrem) values are:
Site Boundary (0.5 miles) is 1.4203E9 mrem
2 miles is 2.53E8 mrem
5 miles is 6.37E7 mrem
10 miles is 1.95E7 mrem

Totals recorded on Attachment 6

****CRITICAL STEP** SAT/UNSAT**

NOTE: Instructions for completion of Lines 15 & 16 of the Notification Form are contained in PEP-02.6.21, Attachment 2.

Step 86 – Complete line 15 of the Emergency Notification form.
Projection period is 6 hours.
Estimated release duration is 1 hour.
Enters time and date.

****CRITICAL STEP ** SAT/UNSAT**

NOTE: Values from the Rascal program are in Rem and the form requires mrem.

NOTE: TEDE values are:
Site Boundary (0.5 miles) is 1.307E8 mrem.
2 miles is 3.13E7 mrem.
5 miles is 9.99E6
10 miles is 3.16E6
Adult Thyroid CDE (mrem) values are:
Site Boundary (0.5 miles) is 1.2803E9 mrem.
2 miles is 2.43E8 mrem.
5 miles is 6.27E7
10 miles is 1.91E7

Step 87 – Complete line 16 of the Emergency Notification form.
TEDE and CDE data transferred from dose projection to Notification Form for Site Boundary, 2 Miles, 5 Miles and 10 Miles.

**** CRITICAL STEP ** SAT/UNSAT**

Step 88 - Notifies Shift Superintendent of results.
Shift Superintendent notified of off-site dose projection results and given the Emergency Notification form for approval.

****CRITICAL STEP** SAT/UNSAT**

TERMINATING CUE: When the offsite dose projection has been performed and lines 15 & 16 of the Emergency Notification form are filled in, this JPM is complete.

COMMENTS:

K/A REFERENCE AND IMPORTANCE RATING:

GEN 2.3.10 2.9/3.3
Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure

REFERENCES:

0PEP-03.4.7
0PEP-02.1

TOOLS AND EQUIPMENT:

Computer loaded with Rascal 3.0.4.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

A.3 Radiation Control

Time Required for Completion: _15_ Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual _X_ Unit: _2__

Setting: Control Room ___ Simulator___ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No _X_ Time Limit _N/A__

Alternate Path: Yes ___ No _X_

JPM: Pass _____ Fail _____

TASK CONDITIONS:

1. The site is in a General Emergency due to a failure of 2 out of 3 fission product barriers with a potential for the loss of the third barrier on Unit Two (2). Fuel failure exists with an unisolable steam line break in the Turbine Building.

EXAMINER NOTE: Provide Specific Time for blank in task condition 2 which is 15 minutes prior to actual time

2. The Unit 2 reactor was successfully scrammed at _____ .

3. Attachment 5 of PEP-3.4.7 has been filled out for data entry. (Give examinee Attachment 5. Fill out current time and current date with time of shutdown as 15 minutes ago)

4. A follow-up Emergency Notification has been completed with the exception of lines 15 and 16 for the Shift Superintendent (SEC) approval.

INITIATING CUE:

You are directed by the Shift Superintendent (SEC) to perform an initial dose calculation per PEP 03.4.7, Automation of Off-site dose projection procedure.

You are to transfer the projected dose data to lines 15 and 16 of the attached follow-up notification form in accordance with PEP-02.6.21.

Once lines 15 & 16 are completed, you are to give the Emergency Notification form to the Shift Superintendent (SEC) for approval.

Handout for applicant

ATTACHMENT 5

Data Sheet for Dose Projection Inputs

CHARACTERISTIC	TIME			
Main Stack	Release Rate (μCi/cc)	4.2E5		
	Flow Rate (CFM)	42000		
Turbine Building	#1 Release Rate (μCi/cc)	2.2E6		
	#1 Flow Rate (CFM)	15000		
	#2 Release Rate (μCi/cc)	2.2E6		
	#2 Flow Rate (CFM)	15000		
Reactor Building	Release Rate (μCi/cc)	3.5E2		
	Flow Rate (CFM)	0		
Torus Vent	Release Rate (μCi/cc)	0		
Core Uncovered	Time (1) lost/ (2) Returned	10 Minutes		
Effective Filtration	Yes / No	Yes		
Release Height	Ground	Yes		
	Elevated	Yes		
Release Duration	Anticipated Length of Time	1 Hours		
Shutdown	Date			
	Time			
Met Data Wind Speed	Upper	15 MPH		
	Lower	13 MPH		
Met Data Direction	Upper	68 DEG		
	Lower	67 DEG		
Stability	Class	E		
Seabreeze	Yes / No	No		
Precipitation		None		

Summary Report

Case description: bnp0835
Run date/time: 07/24/2007 08:40

Maximum Dose Values (rem) - Close-In

Dist from release miles (kilometers)	0.1 (0.16)	0.2 (0.32)	0.3 (0.48)	0.5 (0.8)	0.7 (1.13)	1. (1.61)	1.5 (2.41)	2. (3.22)
Total EDE	4.8E+05	1.8E+05	1.1E+05	6.2E+04	4.3E+04	3.0E+04	2.0E+04	1.4E+04
Thyroid CDE	7.7E+06	2.5E+06	1.4E+06	7.1E+05	4.6E+05	2.9E+05	1.7E+05	1.2E+05
Acute Lung	3.4E+05	1.1E+05	6.1E+04	3.1E+04	2.0E+04	1.3E+04	8.0E+03	5.7E+03
Total Acute Bone	1.7E+05	7.9E+04	5.3E+04	3.3E+04	2.5E+04	1.9E+04	1.2E+04	9.0E+03
Inhalation CEDE	2.8E+05	9.0E+04	5.0E+04	2.5E+04	1.7E+04	1.1E+04	6.3E+03	4.3E+03
Cloud Shine	1.1E+05	5.9E+04	4.2E+04	2.8E+04	2.1E+04	1.6E+04	1.1E+04	7.9E+03
Period Gnd Shine	5.3E+04	1.7E+04	9.6E+03	4.9E+03	3.2E+03	2.0E+03	1.3E+03	9.4E+02
4-day Ground Shine	9.8E+04	3.2E+04	1.8E+04	9.0E+03	5.9E+03	3.8E+03	2.3E+03	1.6E+03

Notes:
1. Doses exceeding PAGs are underlined.
2. Early-Phase PAGs: TEDE - 1 rem, Thyroid CDE - 5 rem
3. *** indicates values less than 0.1 mrem
   To view all values - use Detailed Results | Numeric Table
4. Total EDE = CEDE Inhalation + Cloud Shine + 4-Day Ground Shine
5. Total Acute Bone = Bone Inhalation + Cloud Shine + Period Ground Shine

Maximum Dose Values (rem) - To 10 miles

Dist from release miles (kilometers)	3 (4.8)	4 (6.4)	5 (8.0)	7 (11.3)	10 (16.1)
Total EDE	2.4E+03	7.9E+03	4.4E+03	2.3E+03	1.4E+03
Thyroid CDE	3.1E+04	4.4E+04	2.9E+04	1.5E+04	8.7E+03
Acute Lung	1.5E+03	2.2E+03	1.5E+03	7.8E+02	4.4E+02
Total Acute Bone	1.1E+03	6.1E+03	3.2E+03	1.7E+03	1.0E+03
Inhalation CEDE	1.2E+03	1.7E+03	1.1E+03	5.8E+02	3.3E+02
Cloud Shine	8.5E+02	5.7E+03	2.9E+03	1.5E+03	9.4E+02
Period Gnd Shine	2.4E+02	3.4E+02	2.3E+02	1.2E+02	6.0E+01
4-day Ground Shine	4.2E+02	5.9E+02	3.9E+02	2.0E+02	1.1E+02

Notes:
1. Doses exceeding PAGs are underlined.
2. Early-Phase PAGs: TEDE - 1 rem, Thyroid CDE - 5 rem
3. *** indicates values less than 0.1 mrem
   To view all values - use Detailed Results | Numeric Table
4. Total EDE = CEDE Inhalation + Cloud Shine + 4-Day Ground Shine
5. Total Acute Bone = Bone Inhalation + Cloud Shine + Period Ground Shine

Case Summary

Event Type Nuclear Power Plant

Location
Name: Brunswick - Unit 2
City, county, state: Southport, Brunswick, NC

Summary Report

Lat / Long / Elev:	33.9583° N, 78.0106° W, 5 m
Time zone:	Eastern
Population (2000):	1,074 / 6,771 / 25,619 (2 / 5 / 10 mi)

Reactor Parameters

Reactor power:	2923 MW(t)
Average fuel burn-up:	32500 MWD / MTU
Containment type:	BWR Mark I
Containment volume:	1.64E+05 ft^3
Design pressure:	62 psig
Design leak rate:	0.50 %/d
Coolant volume:	3.22E+04 gal
Assemblies in core:	560

Source Term

Type:	Monitored Release - Mixtures
Shutdown:	07/24/2007 08:20
Sample ID:	0724070835
Sample taken:	07/24/07 08:35
Gross concentration:	2.20E+06 $\mu Ci/cm^3$
Flow rate:	1.50E+04 ft^3/min

User defined percentages

Noble gases:	99.000%
Halogens:	1.000%
Alkali metals:	0.000%
Tellurium group:	0.000%
Barium, Strontium:	0.000%
Noble metals:	0.000%
Lanthanides:	0.000%
Cerium group:	0.000%

Release Pathway

Type:	Direct to Atmosphere
Release point:	Not an isolated stack
Release height:	0. m
Building wake effects:	Computed

Release timings

To atmosphere start:	07/24/2007 08:35
To atmosphere duration:	0 days, and 01:00

Meteorology

Type:	Actual Observations
Data set name:	0724070835
Data set desc:	BRUN Dir=67 Spd=13 Stab=E Precp=N

Summary of data at release point:	Type	Dir deg	Speed mph	Stability class	Precip	Temp °F
07/24/2007 08:30	Obs	067	13.0	E	None	

Calculations

Case description:	bnp0835
End of calculations:	07/24/2007 14:35
Distance of calculation:	Close-in + to 10 miles
Close-in distances:	0.1, 0.2, 0.3, 0.5, 0.7, 1.0, 1.5, 2.0 miles

Summary Report

Case description: bnp0835
Run date/time: 07/24/2007 09:07

Maximum Dose Values (rem) - Close-In

Dist from release miles (kilometers)	0.1 (0.16)	0.2 (0.32)	0.3 (0.48)	0.5 (0.8)	0.7 (1.13)	1. (1.61)	1.5 (2.41)	2. (3.22)
Total EDE	4.8E+05	1.8E+05	1.1E+05	6.2E+04	4.3E+04	3.0E+04	2.0E+04	1.4E+04
Thyroid CDE	7.7E+06	2.5E+06	1.4E+06	7.1E+05	4.6E+05	2.9E+05	1.7E+05	1.2E+05
Acute Lung	3.4E+05	1.1E+05	6.1E+04	3.1E+04	2.0E+04	1.3E+04	8.0E+03	5.7E+03
Total Acute Bone	1.7E+05	7.9E+04	5.3E+04	3.3E+04	2.5E+04	1.9E+04	1.2E+04	9.0E+03
Inhalation CEDE	2.8E+05	9.0E+04	5.0E+04	2.5E+04	1.7E+04	1.1E+04	6.3E+03	4.3E+03
Cloud Shine	1.1E+05	5.9E+04	4.2E+04	2.8E+04	2.1E+04	1.6E+04	1.1E+04	7.9E+03
Period Gnd Shine	5.3E+04	1.7E+04	9.6E+03	4.9E+03	3.2E+03	2.0E+03	1.3E+03	9.4E+02
4-day Ground Shine	9.8E+04	3.2E+04	1.8E+04	9.0E+03	5.9E+03	3.8E+03	2.3E+03	1.6E+03

Notes:
1. Doses exceeding PAGs are underlined.
2. Early-Phase PAGs: TEDE - 1 rem, Thyroid CDE - 5 rem
3. *** indicates values less than 0.1 mrem
   To view all values - use Detailed Results | Numeric Table
4. Total EDE = CEDE Inhalation + Cloud Shine + 4-Day Ground Shine
5. Total Acute Bone = Bone Inhalation + Cloud Shine + Period Ground Shine

Maximum Dose Values (rem) - To 10 miles

Dist from release miles (kilometers)	3 (4.8)	4 (6.4)	5 (8.0)	7 (11.3)	10 (16.1)
Total EDE	2.4E+03	7.9E+03	4.4E+03	2.3E+03	1.4E+03
Thyroid CDE	3.1E+04	4.4E+04	2.9E+04	1.5E+04	8.7E+03
Acute Lung	1.5E+03	2.2E+03	1.5E+03	7.8E+02	4.4E+02
Total Acute Bone	1.1E+03	6.1E+03	3.2E+03	1.7E+03	1.0E+03
Inhalation CEDE	1.2E+03	1.7E+03	1.1E+03	5.8E+02	3.3E+02
Cloud Shine	8.5E+02	5.7E+03	2.9E+03	1.5E+03	9.4E+02
Period Gnd Shine	2.4E+02	3.4E+02	2.3E+02	1.2E+02	6.0E+01
4-day Ground Shine	4.2E+02	5.9E+02	3.9E+02	2.0E+02	1.1E+02

Notes:
1. Doses exceeding PAGs are underlined.
2. Early-Phase PAGs: TEDE - 1 rem, Thyroid CDE - 5 rem
3. *** indicates values less than 0.1 mrem
   To view all values - use Detailed Results | Numeric Table
4. Total EDE = CEDE Inhalation + Cloud Shine + 4-Day Ground Shine
5. Total Acute Bone = Bone Inhalation + Cloud Shine + Period Ground Shine

Case Summary

Event Type Nuclear Power Plant

Location
Name: Brunswick - Unit 2
City, county, state: Southport, Brunswick, NC

Summary Report

Lat / Long / Elev:	33.9583° N, 78.0106° W, 5 m
Time zone:	Eastern
Population (2000):	1,074 / 6,771 / 25,619 (2 / 5 / 10 mi)

Reactor Parameters

Reactor power:	2923 MW(t)
Average fuel burn-up:	32500 MWD / MTU
Containment type:	BWR Mark I
Containment volume:	1.64E+05 ft^3
Design pressure:	62 psig
Design leak rate:	0.50 %/d
Coolant volume:	3.22E+04 gal
Assemblies in core:	560

Source Term

Type:	Monitored Release - Mixtures
Shutdown:	07/24/2007 08:20
Sample ID:	0724070835
Sample taken:	07/24/07 08:35
Gross concentration:	2.20E+06 $\mu Ci/cm^3$
Flow rate:	1.50E+04 ft^3/min

User defined percentages

Noble gases:	99.000%
Halogens:	1.000%
Alkali metals:	0.000%
Tellurium group:	0.000%
Barium, Strontium:	0.000%
Noble metals:	0.000%
Lanthanides:	0.000%
Cerium group:	0.000%

Release Pathway

Type:	Direct to Atmosphere
Release point:	Not an isolated stack
Release height:	0. m
Building wake effects:	Computed

Release timings

To atmosphere start:	07/24/2007 08:35
To atmosphere duration:	0 days, and 01:00

Meteorology

Type:	Actual Observations
Data set name:	0724070835
Data set desc:	BRUN Dir=67 Spd=13 Stab=E Precp=N

Summary of data at release point:	Type	Dir deg	Speed mph	Stability class	Precip	Temp °F
07/24/2007 08:30	Obs	067	13.0	E	None	

Calculations

Case description:	bnp0835
End of calculations:	07/24/2007 14:35
Distance of calculation:	Close-in + to 10 miles
Close-in distances:	0.1, 0.2, 0.3, 0.5, 0.7, 1.0, 1.5, 2.0 miles

Summary Report

Case description: bnp0835
Run date/time: 07/24/2007 09:22

Maximum Dose Values (rem) - Close-In

Dist from release miles (kilometers)	0.1 (0.16)	0.2 (0.32)	0.3 (0.48)	0.5 (0.8)	0.7 (1.13)	1. (1.61)	1.5 (2.41)	2. (3.22)
Total EDE	2.7E+03	2.8E+03	2.8E+03	2.7E+03	2.6E+03	2.7E+03	2.7E+03	2.3E+03
Thyroid CDE	***	***	***	3.0E+02	2.8E+03	8.2E+03	1.3E+04	1.3E+04
Acute Lung	***	***	***	1.3E+01	1.2E+02	3.6E+02	5.5E+02	6.0E+02
Total Acute Bone	2.7E+03	2.8E+03	2.8E+03	2.7E+03	2.5E+03	2.4E+03	2.2E+03	1.8E+03
Inhalation CEDE	***	***	***	1.1E+01	1.0E+02	2.9E+02	4.5E+02	4.7E+02
Cloud Shine	2.7E+03	2.8E+03	2.8E+03	2.7E+03	2.5E+03	2.3E+03	2.1E+03	1.7E+03
Period Gnd Shine	***	***	***	2.1E+00	1.9E+01	5.7E+01	8.7E+01	9.8E+01
4-day Ground Shine	***	***	***	3.8E+00	3.5E+01	1.0E+02	1.6E+02	1.7E+02

Notes:
1. Doses exceeding PAGs are underlined.
2. Early-Phase PAGs: TEDE - 1 rem, Thyroid CDE - 5 rem
3. *** indicates values less than 0.1 mrem
   To view all values - use Detailed Results | Numeric Table
4. Total EDE = CEDE Inhalation + Cloud Shine + 4-Day Ground Shine
5. Total Acute Bone = Bone Inhalation + Cloud Shine + Period Ground Shine

Maximum Dose Values (rem) - To 10 miles

Dist from release miles (kilometers)	3 (4.8)	4 (6.4)	5 (8.0)	7 (11.3)	10 (16.1)
Total EDE	6.6E+02	1.3E+03	9.9E+02	7.5E+02	3.6E+02
Thyroid CDE	6.4E+03	7.7E+03	5.7E+03	4.3E+03	2.1E+03
Acute Lung	3.0E+02	3.6E+02	2.8E+02	2.1E+02	1.1E+02
Total Acute Bone	4.0E+02	9.6E+02	7.5E+02	5.7E+02	2.8E+02
Inhalation CEDE	2.3E+02	2.8E+02	2.1E+02	1.6E+02	7.9E+01
Cloud Shine	3.4E+02	8.9E+02	7.0E+02	5.3E+02	2.6E+02
Period Gnd Shine	4.8E+01	5.9E+01	4.5E+01	3.5E+01	1.7E+01
4-day Ground Shine	8.5E+01	1.0E+02	7.8E+01	6.0E+01	2.9E+01

Notes:
1. Doses exceeding PAGs are underlined.
2. Early-Phase PAGs: TEDE - 1 rem, Thyroid CDE - 5 rem
3. *** indicates values less than 0.1 mrem
   To view all values - use Detailed Results | Numeric Table
4. Total EDE = CEDE Inhalation + Cloud Shine + 4-Day Ground Shine
5. Total Acute Bone = Bone Inhalation + Cloud Shine + Period Ground Shine

Case Summary

Event Type Nuclear Power Plant

Location
Name: Brunswick - Unit 2
City, county, state: Southport, Brunswick, NC

Summary Report

Lat / Long / Elev:	33.9583° N, 78.0106° W, 5 m
Time zone:	Eastern
Population (2000):	1,074 / 6,771 / 25,619 (2 / 5 / 10 mi)

Reactor Parameters

Reactor power:	2923 MW(t)
Average fuel burn-up:	32500 MWD / MTU
Containment type:	BWR Mark I
Containment volume:	1.64E+05 ft^3
Design pressure:	62 psig
Design leak rate:	0.50 %/d
Coolant volume:	3.22E+04 gal
Assemblies in core:	560

Source Term

Type:	Monitored Release - Mixtures
Shutdown:	07/24/2007 08:20
Sample ID:	0724070835
Sample taken:	07/24/07 08:35
Gross concentration:	4.20E+05 $\mu Ci/cm^3$
Flow rate:	4.20E+04 ft^3/min

User defined percentages

Noble gases:	99.000%
Halogens:	1.000%
Alkali metals:	0.000%
Tellurium group:	0.000%
Barium, Strontium:	0.000%
Noble metals:	0.000%
Lanthanides:	0.000%
Cerium group:	0.000%

Release Pathway

Type:	Direct to Atmosphere
Release point:	Isolated stack
Stack height:	100. m
Plume rise:	Not computed

Release timings

To atmosphere start:	07/24/2007 08:35
To atmosphere duration:	0 days, and 01:00

Meteorology

Type:	Actual Observations
Data set name:	0724070835
Data set desc:	BRUN Dir=68 Spd=15 Stab=E Precp=N

Summary of data at release point:	Type	Dir deg	Speed mph	Stability class	Precip	Temp °F
07/24/2007 08:30	Obs	068	15.0	E	None	

Calculations

Case description:	bnp0835
End of calculations:	07/24/2007 14:35
Distance of calculation:	Close-in + to 10 miles
Close-in distances:	0.1, 0.2, 0.3, 0.5, 0.7, 1.0, 1.5, 2.0 miles

* Results recorded as mrem.

Multiple Release Point Calculation Sheet

RELEASE CHARACTERISTIC	TIME	TEDE (.5 Mile)	TEDE (2 Mile)	TEDE (5 Mile)	TEDE (10 Mile)	Total Curies
Main Stack		2.7E6	2.3E6	9.9E5	3.6E5	
Turbine Building		u-1 6.2E7 u-2 6.2E7	u-1 1.4E7 u-2 1.4E7	u-1 4.4E6 u-2 4.4E6	u-1 1.4E6 u-2 1.4E6	
Reactor Building						
Torus Vent						
Other						
(1) TEDE SUM TOTAL		1.267E8	3.03E7	9.79E6	3.16E6	
(2) CURIE SUM TOTAL						(2)
	TIME	Thyroid CDE (.5 Mile)	Thyroid CDE (2 Mile)	Thyroid CDE (5 Mile)	Thyroid CDE (10 Mile)	
Main Stack		3.0E5	1.3E7	5.7E6	2.1E6	
Turbine Building		u-1 7.1E8 u-2 7.1E8	u-1 1.2E8 u-2 1.2E8	u-1 2.9E7 u-2 2.9E7	u-1 8.7E6 u-2 8.7E6	
Reactor Building						
Torus Vent						
Other						
(3) Thyroid CDE TOTAL		1.4203E9	2.53E8	6.37E7	1.95E7	

NOTE: TEDE and Thyroid CDE Summation are in units of REM and must be converted to Units of mrem prior to entering the information onto the Emergency Notification Form (0PEP-02.6.21). ((1) or (3)___ Rem x 1000 = ____ mrem)

(1) Each TEDE Column Total corresponds to line 16 (TEDE) of the Emergency Notification Form (0PEP-02.6.21).
(2) Enter the Sum of Total Curies on line 14 MAGNITUDE: (Other) of the Emergency Notification Form (0PEP-02.6.21).
(3) Thyroid CDE Column Total corresponds to line 16 (Thyroid CDE) of the Emergency Notification Form (0PEP-02.6.21).

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [A] DRILL [B] ACTUAL EVENT MESSAGE # 1+

2. [A] INITIAL [B] FOLLOW-UP NOTIFICATION: TIME____ DATE___/___/___ AUTHENTICATION # ___

3. SITE: Brunswick Confirmation Phone # (___) ___

4. EMERGENCY CLASSIFICATION: [A] UNUSUAL EVENT [B] ALERT [C] SITE AREA EMERGENCY [D] GENERAL EMERGENCY

BASED ON EAL # 12.04.01 EAL DESCRIPTION: Loss of any two-out-of-three fission product barriers with a potential loss of the third barrier

5. PROTECTIVE ACTION RECOMMENDATIONS: [A] NONE

[B] EVACUATE A, B, C, D, E

[C] SHELTER F, G, H, K

[D] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.

[E] OTHER ___

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

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

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

9. METEOROLOGICAL DATA: Wind Direction* from 68 degrees Wind Speed* 15 mph

(*Not Required for Initial Notifications) Precipitation* None Stability Class* [A] [B] [C] [D] [E] [F] [G]

10. [A] DECLARATION [B] TERMINATION Time ___ Date TODAY/___/___

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

12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)

[A] U1 ___% Power Shutdown at Time ___ Date __/__/__

[B] U2 ___% Power Shutdown at Time ___ Date __/__/__

13. REMARKS: On-site facilities are being activated. Off-site logistical and technical support will be needed.

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)

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

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

MAGNITUDE: Noble Gases: N/A Iodines: N/A Particulates: N/A Other: ___

FORM: [A] Airborne Start Time ___ Date TODAY/___/___ Stop Time ___ Date __/__/__

[B] Liquid Start Time ___ Date __/__/__ Stop Time ___ Date __/__/__

15. PROJECTION PARAMETERS: Projection period: 6 Hours Estimated Release Duration 1 Hours

Projection performed: Time ___ Date __/__/__

16. PROJECTED DOSE:

DISTANCE	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site boundary	1.367 E8	1.4203 E9
2 Miles	3.03 E7	2.53 E8
5 Miles	9.79 E6	6.37 E7
10 Miles	3.16 E6	1.95 E7

17. APPROVED BY: ___ Title ___ Time ___ Date __/__/__

NOTIFIED BY: ___ RECEIVED BY: ___ Time ___ Date __/__/__

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

SRO

NRC ADMIN JPM A-4

TITLE: Event Classification/PAR

TASK CONDITIONS:

The following conditions exist in Unit Two (2) which had been operating at 100% power.

TIME 1200

1. A Tornado has hit the site causing a Station Blackout.
2. Emergency Diesel Generators #1, #3, and #4 tripped immediately after starting and can not be re-started.
3. A scram signal occurred and numerous control rods did not insert, current power level is 7%.
4. Drywell Pressure is 1.1 psig and slowly rising.
5. Reactor Water Level is being maintained 170" to 200".
6. The current Wind Speed is 6 MPH from 45 degrees.
7. Weather Stability Class is "D". There is no precipitation.

INITIATING CUE:

Based on the above conditions, you are to determine the event classification and complete the required notification paperwork per 0PEP-02.1, Initial Emergency Actions.

This is a time critical JPM.

EXAMINER NOTE: The 15 minute clock will not start until the applicant states they understand the task conditions. No procedures can be referenced prior to the clock starting.

15 Minute Clock Start Time_____.

Time of Declaration _____ .

Time Notification Form is provided _____.

Step 1 – Reviews the given conditions and within 15 minutes determines that a Site Area Emergency declaration is required per 0PEP-02.1, Attachment 1, Step 05.03.01

> **Within 15 minutes** Declares SITE AREA EMERGENCY per Att.1 Step 05.03.01
>
> **CRITICAL TASK**
> SAT/UNSAT

PROMPT: 5 Minutes after the declaration of the Site Area Emergency, provide the second set of conditions for evaluation to the candidate.

TIME of updated conditions :_____

TASK CONDITIONS – SECOND SET

1. Reactor power is 3%.
2. Emergency Diesel Generator #3 has been returned to service and has energized Emergency Bus E-3.
3. Reactor Water Level is being maintained 170" to 200"
4. Drywell Pressure is 1.1 psig and stable.
5. SLC Pump 2A is in-service, injecting Boron into the Reactor vessel.
6. The current Wind Speed is 6 MPH from 45 degrees.
7. Weather Stability Class is "D". There is no precipitation.
8. Security supervision has just notified the control room that two terrorists have taken control of the DG building.
9. A loss of control power annunciator to #4 Emergency Diesel Generator has just alarmed.

INITIATING CUE:

Based on the above conditions, you are to determine any impact on the event classification and complete the required notification paperwork per 0PEP-02.1, Initial Emergency Actions.

Step 2 – Review the given conditions and within 15 minutes determines that a General Emergency declaration is required per 0PEP-02.1, Attachment 1, Step 11.04.01.

15 Minute Clock Start Time_____.

Time of Declaration _____ .

Within 15 minutes Declares GENERAL EMERGENCY per Att.1 step 11.04.01.

CRITICAL TASK
SAT/UNSAT

NOTE: The 14-minute time limit in the following step is based on the allowance of 1 minute for the Emergency Communicator to contact off-site agencies.

NOTE: In the following notification steps, two potential sequences exist.

Sequence 1: If the candidate reports the events separately, clocks are running for each event, with a 14 minute notification time requirement for each event.

Sequence 2: The candidate may choose to only make the report for the General Emergency. If this option is used, the notification with the required Protective Action Recommendations (PARs) must be completed within 14 minutes of the declaration of the first event. In this case, the notification will be for a General Emergency.

Step 3 - Within 14 minutes of the declaration of the Site Area Emergency, provide the completed Emergency Notification Form to the evaluator for transmittal. Critical items on notification form are #1, 2, 4, 5, 6, 7, 8, 10, 11, 12 , 17.

Emergency Notification Form provided.

****CRITICAL TASK***
*SAT/UNSAT

NOTE: If the applicant refers to Att. 4 of 0PEP-02.1.1 for Hostile events, state that another operator is addressing those actions.

NOTE: See description above for one, versus two, notifications.

Step 4 – Completes Emergency Notification Form for the General Emergency Declaration with associated Protective Action Recommendations (PARs) within 14 minutes of the emergency declaration. Critical items on notification form are #1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 17

Within 14 minutes *of General Emergency declaration, completes Emergency Notification Form with associated Protective Action Recommendations.*
Evacuate –A,B,C,D and Shelter- E,F,G,H,&K

Time of declaration _____.

Time Notification Form is provided _____.

****CRITICAL STEP****

SAT/UNSAT

NOTE: The Applicant should provide you the completed notification form within the specified time frames. (see keys provided)

Terminating CUE: The JPM is complete once the declarations are made and the *Nuclear Power Plant Emergency Notification Forms are* provided.

K/A REFERENCE AND IMPORTANCE RATING:
2.4.44/4.0 Knowledge of Emergency Plan Protective Action Recommendations

REFERENCES:
0PEP-02.1, Rev 50

TOOLS AND EQUIPMENT:
None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):
A.4 - Emergency Procedures/Plan

APPLICABLE METHOD OF TESTING

Performance: Simulate **X** Actual ___ Unit: 2

Setting: Control Room ___ Simulator ___

Time Critical: Yes X No ___ Time Limit: 15 minutes for each declaration and 14 minutes for each notification form

Alternate Path: Yes ___ No X

EVALUATION

JPM: Pass _____ Fail _____

Comments:

_____

_____

_____

TASK CONDITIONS:

The following conditions exist in Unit Two (2) which had been operating at 100% power.

TIME 1200

1. A Tornado has hit the site causing a Station Blackout.
2. Emergency Diesel Generators #1, #3, and #4 tripped immediately after starting and can not be re-started.
3. A scram signal occurred and numerous control rods did not insert, current power level is 7%.
4. Drywell Pressure is 1.1 psig and slowly rising.
5. Reactor Water Level is being maintained 170" to 200".
6. The current Wind Speed is 6 MPH from 45 degrees.
7. Weather Stability Class is "D". There is no precipitation.

INITIATING CUE:

Based on the above conditions, you are to determine the event classification and complete the required notification paperwork per 0PEP-02.1, Initial Emergency Actions.

This is a time critical JPM.

TIME of updated conditions :_____

TASK CONDITIONS – SECOND SET

1. Reactor power is 3%.
2. Emergency Diesel Generator #3 has been returned to service and has energized Emergency Bus E-3.
3. Reactor Water Level is being maintained 170" to 200"
4. Drywell Pressure is 1.1 psig and stable.
5. SLC Pump 2A is in-service, injecting Boron into the Reactor vessel.
6. The current Wind Speed is 6 MPH from 45 degrees.
7. Weather Stability Class is "D". There is no precipitation.
8. Security supervision has just notified the control room that two terrorists have taken control of the DG building.
9. A loss of control power annunciator to #4 Emergency Diesel Generator has just alarmed.

INITIATING CUE:

Based on the above conditions, you are to determine any impact on the event classification and complete the required notification paperwork per 0PEP-02.1, Initial Emergency Actions.

This is a time critical JPM.

KEY - Event 1

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [X] DRILL [B] ACTUAL EVENT MESSAGE # 01

2. [X] INITIAL [B] FOLLOW-UP NOTIFICATION: TIME____ DATE__/__/__ AUTHENTICATION # ____

3. SITE: Brunswick Confirmation Phone # (__)____

4. EMERGENCY CLASSIFICATION: [A] UNUSUAL EVENT [B] ALERT [X] SITE AREA EMERGENCY [D] GENERAL EMERGENCY

BASED ON EAL # 05.03.01 EAL DESCRIPTION: Failure of the Reactor Protection System to initiate and complete a scram and failure of Standby Liquid Control to bring the reactor to a subcritical condition.

5. PROTECTIVE ACTION RECOMMENDATIONS: [X] NONE

[B] EVACUATE ____

[C] SHELTER ____

[D] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.

[E] OTHER ____

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

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

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

9. METEOROLOGICAL DATA: Wind Direction* from 45 degrees Wind Speed* 6 mph

(*Not Required for Initial Notifications) Precipitation* None Stability Class* [A] [B] [C] [X] [E] [F] [G]

10. [X] DECLARATION [B] TERMINATION Time Per JPM Date TODAY / __

11. AFFECTED UNIT(S): [1] [X]

12. UNIT STATUS: [A] U1 __% Power Shutdown at Time ____ Date __/__/__

(Unaffected Unit(s) Status Not Required for Initial Notifications) [X] U2 7 % Power Shutdown at Time ____ Date __/__/__

13. REMARKS: On-site facilities are being activated; off-site support not required at this time.

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)

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

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

MAGNITUDE: Noble Gases: N/A Iodines: N/A Particulates: N/A Other: ____

FORM: [A] Airborne Start Time ____ Date __/__/__ Stop Time ____ Date __/__/__

[B] Liquid Start Time ____ Date __/__/__ Stop Time ____ Date __/__/__

15. PROJECTION PARAMETERS: Projection period: ____ Hours Estimated Release Duration ____ Hours

Projection performed: Time ____ Date __/__/__

16. PROJECTED DOSE:

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

17. APPROVED BY: Name Title SEC Time Per JPM clock Date TODAY / __

NOTIFIED BY: ____ RECEIVED BY: ____ Time ____ Date __/__/__

KEY - Event 2

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [ ] DRILL [B] ACTUAL EVENT MESSAGE # Ø2

2. [ ] INITIAL [B] FOLLOW-UP NOTIFICATION: TIME____ DATE__/__/__ AUTHENTICATION # ____

3. SITE: Brunswick Confirmation Phone # (__)____

4. EMERGENCY CLASSIFICATION: [A] UNUSUAL EVENT [B] ALERT [C] SITE AREA EMERGENCY [ ] GENERAL EMERGENCY

BASED ON EAL # 11.04.01 EAL DESCRIPTION: A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.

5. PROTECTIVE ACTION RECOMMENDATIONS: [A] NONE

[ ] EVACUATE Zones A, B, C, D

[ ] SHELTER Zones E, F, G, H, K

[D] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.

[E] OTHER____

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

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

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

9. METEOROLOGICAL DATA: Wind Direction* from 45 degrees Wind Speed* 6 mph

(*Not Required for Initial Notifications) Precipitation* None Stability Class* [A] [B] [C] [ ] [E] [F] [G]

10. [ ] DECLARATION [B] TERMINATION Time Per JPM Date TODAY/__/__

11. AFFECTED UNIT(S): [ ] [ ]

12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)

[ ] U1 __% Power Shutdown at Time 1200 Date TODAY/__/__

[ ] U2 3 % Power Shutdown at Time ____ Date __/__/__

13. REMARKS: On-site and off-site facilities are being activated

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)

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

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

MAGNITUDE: Noble Gases: N/A Iodines: N/A Particulates: N/A Other: ____

FORM: [A] Airborne Start Time ____ Date __/__/__ Stop Time ____ Date __/__/__

[B] Liquid Start Time ____ Date __/__/__ Stop Time ____ Date __/__/__

15. PROJECTION PARAMETERS: Projection period: ____ Hours Estimated Release Duration ____ Hours

Projection performed: Time ____ Date __/__/__

16. PROJECTED DOSE:

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

17. APPROVED BY: Name Title SEC Time Per JPM clock Date TODAY/__/__

NOTIFIED BY: ____ RECEIVED BY: ____ Time ____ Date __/__/__

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC PLANT JPM P-1

TITLE: **Station Blackout: Crosstie of 4KV E-Buses (E2 - E4)**

SAFETY CONSIDERATIONS:

1. Standard electrical precautions when working around energized electrical equipment.
2. Hard Hat, safety glasses, and ear protection are required in the Diesel Building.

EVALUATOR NOTES: (Do not read to trainee)

1. For the applicable procedure section **WILL** be provided to the trainee.
2. Validation time was 20 minutes

Read the following to trainee.

TASK CONDITIONS:

1. A complete Loss of Offsite Power has occurred in both Unit (One) 1 and Unit Two (2).
2. Diesel Generators 1, 3 and 4 cannot be started.
3. Diesel Generator 2 is running, tied to Bus E2, and has been locally verified to be operating properly.
4. The Electric Fire pump is under clearance and the Diesel Fire pump is running.
5. Fire Pmp Mot Fdr Bkr on E2 and E4 are tagged out.
6. All RBCCW pump control switches on Unit Two (2) are OFF.
7. You are expected to state the location of the ASSD equipment bag.

NOTE:	**DO NOT READ THIS TO APPLICANT:** The examinee must state the location of the ASSD equipment bag which is located outside of the U2 cable spread room across from the elevator in the ASSD cabinet.

INITIATING CUE:

You are directed by the Control Operator to perform the Auxiliary Operator actions associated with cross-tying 4.16 KV Emergency Switchgear E2 to E4 in accordance with AOP-36.2, Section 3.2.12. You are to inform the Control Room when the crosstie breakers between E2 and E4 are closed.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain current revision of 0AOP-36.2 Section 3.2.12.

Current revision of 0AOP-36.2 Section 3.2.12 obtained.

SAT / UNSAT

NOTE:	Steps 3.2.12.1 and .2 are N/A because this information was provided in the initial conditions. The applicant will begin performance at step 3.2.12.3

PROMPT:	If requested, indicate to examinee that the overcurrent relays on the E4 slave breaker are reset and the DG lockout relays (86DP & 86DB) are reset. (Recommend inform examinee devices as currently seen)

Step 2 - CHECK the deenergized E Bus for indication of a lockout or phase overcurrent trip as follows:

a. IF Bus E2 is deenergized, THEN CHECK the following:

Determines this step is N/A because E2 is energized.

SAT/UNSAT

Step 3 – IF Bus E4 is deenergized, THEN CHECK the following:

- Lockout Relay 86DP on Compt AK2, DIESEL GEN 4 BKR (Row D1)

Lockout Relay 86DP is reset at E4, Compt AK2, Row D1.

SAT/UNSAT

Step 4 – Verify Lockout Relay 86DB on Compt AK1, *SWGR E4 AUX COMPT* (Row C1)

Lockout Relay 86DB is reset at E4, Compt AK1, Row C1.

SAT/UNSAT

Step 5 – Verify Time Overcurrent Relays 51A, 51B, and 51C on Compt AJ9, *INCM LINE FROM SWGR 2C* (Row A1)

Timed Overcurrent Relays are reset at E4, Compt AJ9, Row A1.

SAT/UNSAT

NOTE: The applicant determines that procedure Step 3.2.12.4 is "N/A" due to no indication of a lockout or phase overcurrent.

NOTE: The applicant notes that the procedure steps 3.2.12.5 and 6 are N/A (they may still initial) because the information is stated in the initial conditions. The applicant should continue at step 3.2.12.7

Step 6 - IF Unit One (1) is Blacked Out, AND Bus E2 is to be reenergized, THEN ENSURE that the following breakers are open, AND REMOVE their control power fuses:

Recognizes that this step does not apply because E4 is being re-energized and proceeds to the step 3.2.12.8.

SAT/UNSAT

PROMPT: If requested, as each breaker is opened, indicate breaker is open as indicated by green mechanical open indicator.

Step 7 – IF Unit Two (2) is Blacked Out AND Bus E4 is to be reenergized, THEN ENSURE the following breakers are open, AND REMOVE their control power fuses:

- On Bus E4

Row	Compt	Component	Bkr Open	Norm C/P Fuses	Alt C/P Fuses
E1	AK3	RHR PUMP 2B			
F1	AK4	RHR SERV WTR PMP 2B			
G1	AK5	CORE SPRAY PMP 2B			
H1	AK6	CONV SERV WTR PMP 1A			
J1	AK8	CRD PUMP 2B			
K1	AK9	RHR SERV WTR PMP 1B			
L1	AL0	RHR PUMP 1B			
M1	AL1	NUC SERV WTR PMP 2B			
N1	AL2	CONV SERV WTR PMP 2B			
O1	AL3	FIRE PMP ALT FDR BKR			

**** CRITICAL STEP ** SAT/UNSAT**

Step 8 - IF Unit Two (2) is Blacked Out AND Bus E4 is to be reenergized, THEN ENSURE the following breakers are open, AND REMOVE their control power fuses:

On Bus E2

Row	Compt	Component	Bkr Open	Norm C/P Fuses	Alt C/P Fuses
F1	AG9	RHR PUMP 2D			
G1	AH0	CORE SPRAY PMP 1B			

**** CRITICAL STEP ** SAT/UNSAT**

NOTE: TEM30 keys from the ASSD equipment bag will be used for the SS-B switches. The keys cannot be removed while the switch is in SBO.

Step 9 –PLACE the Control Selector Switch, SS-B, in SBO using E Bus Cross-Tie Breaker key (TEM30) for the following cross-tie breaker:

Bus E2, Compt AH9, *TIE BREAKER TO EMERG SWGR E4 (*Row-P1)

Selector switch at E2 –AH9, SS-B in SBO position.

**** CRITICAL STEP ** SAT/UNSAT**

Step 10 – PLACE the Control Selector Switch, SS-B, in SBO using E Bus Cross-Tie Breaker key (TEM30) for the following cross-tie breaker:

Bus E4, Compt AL5, *TIE BREAKER TO EMERG SWGR E2*(Row-Q1)

Selector switch at E4-AL5, SS-B in SBO position.

**** CRITICAL STEP ** SAT/UNSAT**

NOTE: The following notes appear prior to the next procedure step 3.2.12.10

NOTE: A LOCA signal will NOT trip E Bus cross-tie breakers when the cross-tie breaker Control Selector Switch, SS-B, is in SBO.

NOTE: The E Bus cross-tie breakers must be closed in order from the energized E Bus toward the de-energized E Bus due to the bus undervoltage circuit configuration.

NOTE: The appropriate annunciator BUS E4 UNDERVOLTAGE (UA-18 2-1) or BUS E2 UNDERVOLTAGE (UA-16 2-1) should clear upon restoration of power to Bus E4(E2).

NOTE:	The breaker at E2 must be closed first or the breaker at E4 will trip on undervoltage. If this occurs, provide prompt that the operator hears the breaker close and then trip. IF this is performed in the proper order, report that the applicant hears the breaker close and stay closed

Step 11 - IF Bus E2 is energized, THEN CROSS-TIE Bus E2 to Bus E4 as follows:

On Bus E2, **CLOSE** Compt AH9, *TIE BREAKER TO EMERGSWGR E4* (Row-P1), by placing the Local Breaker Control Switch, *CS-1*, in *CLOSE*.

*On Bus E2, **CLOSES** Compt AH9, TIE BREAKER TO EMERGSWGR E4 (Row-P1), by placing the Local Breaker Control Switch, CS-1, in CLOSE.*

**** CRITICAL STEP ** SAT/UNSAT**

Step 12

On Bus E4, **CLOSE** Compt AL5, *TIE BREAKER TO EMERGSWGR E2* (Row-Q1), by placing the Local Breaker Control Switch, *CS-1*, in *CLOSE*.

*On Bus E4, **CLOSES** Compt AL5, TIE BREAKER TO EMERGSWGR E2 (Row-Q1), by placing the Local Breaker Control Switch, CS-1, in CLOSE.*

**** CRITICAL STEP ** SAT/UNSAT**

PROMPT:

If requested, indicate that cross-tie breakers AL5 and AH9 are closed as indicated by red light lit at respective compartments, and E4 voltage is approximately 4160 V as indicated by voltmeter at PT compartment.

Tell applicant they hear noise indicating breaker closes when they place the appropriate switch to close.

Step 13 – **IF** Bus E4 is energized, **THEN CROSS-TIE** Bus E4 to Bus E2 as follows:

Recogizes that this step does not apply (see note above)

SAT/UNSAT

Step 14 – Inform Control Room that E2-E4 crosstie breakers are closed.
Control Room informed.

SAT/UNSAT

TERMINATING CUE: When breakers AH9 and AL5 have been closed to energize Bus E4, this JPM is complete.

*** Comments required for any step evaluated as UNSAT.**

LIST OF REFERENCES

RELATED TASKS:

200055B504
Perform the actions associated with a Loss of Off-Site Power and On-Site Power (Station Blackout) per AOP-36.2.

K/A REFERENCE AND IMPORTANCE RATING:

262001 A4.04 3.6/3.7

REFERENCES:

0AOP-36.2, Section 3.2.12, Rev. 32

TOOLS AND EQUIPMENT:

1. Plant page (or)
2. Radio
3. Racking tool and PPE for 480V Breakers

SAFETY FUNCTION (from NUREG 1123, Rev 2):

N/A (Emergency and Abnormal Plant Evolutions Section)

Time Required for Completion: 20 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance: Simulate ☒ Actual ___ Unit: 2

Setting: Control Room ___ Simulator___ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ☒ Time Limit N/A

Alternate Path: Yes ___ No ☒

EVALUATION

Trainee:_____

JPM: Pass _____ Fail _____

Comments:

_____

_____

_____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. A complete Loss of Offsite Power has occurred in both Unit (One) 1 and Unit Two (2).

2. Diesel Generators 1, 3 and 4 cannot be started.

3. Diesel Generator 2 is running, tied to Bus E2, and has been locally verified to be operating properly.

4. The Electric Fire pump is under clearance and the Diesel Fire pump is running.

5. Fire Pmp Mot Fdr Bkr on E2 and E4 are tagged out.

6. All RBCCW pump control switches on Unit Two (2) are OFF.

7. You are expected to state the location of the ASSD equipment bag.

INITIATING CUE:

You are directed by the Control Operator to perform the Auxiliary Operator actions associated with cross-tying 4.16 KV Emergency Switchgear E2 to E4 in accordance with AOP-36.2, Section 3.2.12. You are to inform the Control Room when the crosstie breakers between E2 and E4 are closed.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE
IN PLANT

NRC IN-PLANT JPM P-2

LESSON TITLE: Control Room Evacuation IAW AOP-32, Placing the RHR Service Water System in Operation

SAFETY CONSIDERATIONS:

1. Operating equipment and energized electrical equipment hazards.
2. Hearing protection is required in this area when equipment is operating.
3. Safety Glasses, Hard Hat, and approved footwear must be worn while in the area of this JPM.

EVALUATOR NOTES: (Do not read to performer)

1. The applicable procedure section **WILL** be provided to the performer, once it is demonstrated he/she knows the correct procedure.
2. Validation time was 20 minutes

TASK CONDITIONS:

1. The Shift Superintendent has made the determination that Control Room evacuation is required.
2. All immediate actions associated with AOP-32, PLANT SHUTDOWN FROM OUTSIDE CONTROL ROOM, are complete.
3. Remote shutdown equipment has been distributed and communication between the Remote Shutdown Stations is established.
4. NORMAL/LOCAL switches listed in Table 1 and 2 have been placed in LOCAL IAW AOP-32.
5. The RHRSW System is accessible and in standby IAW OP-43.
6. The Station 4 Operator is available in the Diesel Building for starting and stopping loads required by this procedure.
7. This JPM will be performed on Unit Two (2).

INITIATING CUE:

You are directed by the Unit SCO to perform ALL Station 2 (Reactor Building Operator) actions, including Remote Shutdown Panel actions, associated with placing the 'B' Loop RHRSW System in operation from outside the Control Room per 0AOP-32, Step 3.2.11.2. Inform the Unit SCO when all required actions have been completed.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 – Obtain current revision of AOP-32.
Obtains current revision of AOP-32.

SAT/UNSAT*

EXAMINER NOTE: Procedure step 3.2.11.1 is N/A. Applicant begins at procedure step 3.2.11.2.

PROMPT: Provide MCC Valve light indications commensurate with Performer actions.

PROMPT: SW-V105 Green light is on, red light is off prior to manipulation. During valve opening, indicate that the Green and Red lights are on. When the valve is fully opened, indicate the Red light is On and the Green light is OFF.

Step 2 – OPEN SW-V105, NUCLEAR SERVICE WATER SUPPLY VALVE, at MCC 2XB Compartment DM1, Row H3.
SW-V105 is opened.

****CRITICAL STEP**SAT/UNSAT***

PROMPT: SW-V141 Green light is on, red light is off.

Step 3 – CLOSE SW-V141, WELL WATER SUPPLY VALVE, at the Remote Shutdown Panel.
SW-V141 is verified closed.

SAT/UNSAT*

PROMPT: SW-V143 Red light is OFF, green light is ON.

Step 4 – CLOSE SW-V143, WELL WATER SUPPLY VALVE, at the Remote Shutdown Panel.
SW-V143 is closed.

SAT/UNSAT*

PROMPT: E11-F002B Red light is ON, green light is OFF.

Step 5 – OPEN or VERIFY OPEN E11-F002B, RHR HEAT EXCHANGER 'B' SERVICE WATER DISCHARGE VALVE, at MCC 2XB Compartment DN9, Row G4.
E11-F002B is verified opened.

SAT/UNSAT*

PROMPT: Respond as the Station 4 (Diesel Generator) Operator in the following step. After one minute report that both Unit Two (2) NSW Pumps have been started.

Step 6 – Contact the Station 4 (Diesel Generator) Operator and direct starting both Unit Two (2) NSW pumps by placing their local START/STOP switches to START.
Both Unit 2 NSW pumps are started.

****CRITICAL STEP****SAT/UNSAT***

PROMPT: Respond as the Station 4 (Diesel Generator) Operator in the following step. After one minute report that the RHR Service Water Booster Pump has been started.

Step 7 – Contact the Station 4 (Diesel Generator) Operator and direct starting the 'B' or 'D' RHR Service Water Booster Pump by placing the local START/STOP switch to START.

The RHR SW Booster Pump is started.

****CRITICAL STEP**SAT/UNSAT***

PROMPT: If directed, respond as the Station 4 Operator that you are monitoring RHR Service Water Booster Pump amperage.

PROMPT: The next step will require the Performer to throttle open E11-F068B until amperage on the running Service Water Booster Pump reaches 80 amps. As the Station 4 Operator, provide cues of rising pump current as the valve is throttled open. The Performer should secure throttling the valve when pump amperage reaches 80 amps.

PROMPT: When the control switch for the E11-F068B is placed in the OPEN position, prompt that the Green light is ON and the Red light is ON (valve throttled).

Step 8 – THROTTLE OPEN E11-F068B, RHR HEAT EXCHANGER 'B' SERVICE WATER DISCHARGE VALVE, at MCC 2XB Compartment DN1, Row K4, until amperage on the running RHR Service Water Booster Pump reaches 80 amps.

E11-F068B is throttled open until pump amperage reaches 80 amps.

****CRITICAL STEP**SAT/UNSAT***

EXAMINER NOTE: Applicant may not perform the following step due to it not being required for RHRSW to be in-service.

PROMPT: SW-V117 Green light is ON, Red light is OFF. During stroking of the valve if asked, indicate that Green light and Red light are both on, When the valve is fully open, indicate that the Green light is OFF and the Red light is ON.

Step 9 – OPEN SW-V117, NUCLEAR SERVICE WATER TO VITAL HEADER VALVE, at MCC 1(2) XB Compartment DP2, Row G2.
SW-V117 is opened.

SAT/UNSAT*

PROMPT: If contacted, report as the Station 3 Operator that the supply of Service Water to running equipment is adequate.

Step 10 –Notify the Unit SCO that the RHR Service Water System is in operation.
The Unit SCO is notified.

SAT/UNSAT*

TERMINATING CUE: When the RHR Service Water System is in operation and the Unit SCO is notified, this JPM is complete.

LIST OF REFERENCES

RELATED TASKS:

200604B504

Perform MCC Operator Actions For Placing Suppression Pool Cooling In Service Per ASSD-002 or AOP-32.

K/A REFERENCE AND IMPORTANCE RATING:

219000 A4.12 (4.1/4.1)

Ability to manually operate and/or monitor in the control room: Suppression pool temperature

REFERENCES:

AOP-32, PLANT SHUTDOWN FROM OUTSIDE CONTROL ROOM

TOOLS AND EQUIPMENT:

Equipment from the Remote Shutdown Equipment Locker.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

Safety Function 5: Containment Integrity

Time Required for Completion: 20 Minutes (approximate).

Time Taken: ____

APPLICABLE METHOD OF TESTING

Performance: Simulate ✓ Actual __ Unit: 2

Setting: Control Room ___ Simulator __ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✓ Time Limit N/A

Alternate Path: Yes ___ No ✓

EVALUATION

Performer:_____

JPM: Pass _____ Fail _____

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. The Shift Superintendent has made the determination that Control Room evacuation is required.
2. All immediate actions associated with AOP-32, PLANT SHUTDOWN FROM OUTSIDE CONTROL ROOM, are complete.
3. Remote shutdown equipment has been distributed and communication between the Remote Shutdown Stations is established.
4. NORMAL/LOCAL switches listed in Table 1 and 2 have been placed in LOCAL IAW AOP-32.
5. The RHRSW System is accessible and in standby IAW OP-43.
6. The Station 4 Operator is available in the Diesel Building for starting and stopping loads required by this procedure.
7. This JPM will be performed on Unit Two (2).

INITIATING CUE:

You are directed by the Unit SCO to perform ALL Station 2 (Reactor Building Operator) actions, including Remote Shutdown Panel actions, associated with placing the 'B' Loop RHRSW System in operation from outside the Control Room per 0AOP-32, Step 3.2.11.2. Inform the Unit SCO when all required actions have been completed.

3.0 OPERATOR ACTIONS

3.2.11 **PERFORM** the following to place RHR loop B in Suppression Pool Cooling:

1. **PERFORM** the following to fill and vent RHR Loop B:

   a. Station 2, **ENSURE** *RHR PUMP B AND D SUPPRESSION POOL SUCTION VALVE, E11-F020B,* is open at MCC 1(2)XB. Compt DN6, Row G1. ☐

   b. Station 2, **ENSURE** *RHR PUMP B SUPPRESSION POOL SUCTION VALVE, E11-F004B*, is open at MCC 1(2)XB Compt DK9, Row M1. ☐

   c. Station 2, **ENSURE** *RHR PUMP D SUPPRESSION POOL SUCTION VALVE, E11-F004D*, is open at MCC 1(2)XB Compt DL0, Row M3. ☐

   d. Station 3, **ENSURE** RHR loop B keep fill station is in service (located 50 foot El.West). ☐

   e. Station 3, **OPEN** *REACTOR VESSEL HEAD SPRAY VENT VALVE, E11-V85* (located at vessel head spray station 66' El., West), until a solid stream of water is observed flowing from the vent line, **THEN CLOSE** the vent valve. ☐

   f. Station 3, **OPEN** *LOOP B RHR SYSTEM HIGH POINT VENT VALVES, E11-V79* and *E11-V80* (located RHR Hx B room El. 20', South), until a solid stream of water is flowing from the vent line, **THEN CLOSE** the vent valves. ☐

2. **PERFORM** the following to place the RHR Service Water System in operation:

   a. Station 2, **OPEN** *NUCLEAR SERVICE WATER SUPPLY VALVE, SW-V105*, at MCC 1(2)XB Compt DM1, Row H3. ☐

3.0 OPERATOR ACTIONS

b. Station 1, **CLOSE** the following valves:

- *RHR VITAL SERVICE WATER HEADER WELL WATER SUPPLY VALVE, SW-V141* ☐
- *SERVICE WATER HEADER WELL WATER SUPPLY VALVE, SW-V143.* ☐

c. Station 2, **ENSURE** *RHR HEAT EXCHANGER B SERVICE WATER DISCHARGE VALVE, E11-F002B*, is open at MCC 1(2)XB Compt DN9, Row G4. ☐

d. Station 4, **ENSURE** both Nuclear Service Water Pumps to the affected unit are operating:

NSW Pump	Location	
1A	4160 Bus E1, AF9	☐
1B	4160 Bus E2, AH6	☐
2A	4160 Bus E3, AJ3	☐
2B	4160 Bus E4, AL1	☐

e. Station 4, **START** *RHR SERVICE WATER BOOSTER PUMP B* or *D:*

RHR SW Pump	Location	
1B	4160 Bus E4, AK9	☐
1D	4160 Bus E2, AH4	☐
2B	4160 Bus E4, AK4	☐
2D	4160 Bus E2, AG8	☐

f. Station 4, **MONITOR** the amperage on the Service Water Booster Pump that was started. ☐

g. Station 2, **THROTTLE OPEN** *RHR HEAT EXCHANGER B SERVICE WATER DISCHARGE VALVE, E11-F068B*, at MCC 1(2)XB Compt DN1, Row K4, until the amperage on the running RHR service water pump reaches 80 amps. ☐

3.0 OPERATOR ACTIONS

h. Station 2, **OPEN** *NUCLEAR SERVICE WATER TO VITAL HEADER VALVE, SW-V117*, at MCC 1(2)XB Compt DP2, Row G2. ☐

NOTE:	Position indication for *SW-V106* is located on MCC 1(2)XA Compt DE3, Row K3.

i. Station 3, **IF** necessary to increase flow, **THEN THROTTLE** *SERVICE WATER TO RBCCW ISOLATION VALVE, SW-V106*, at MCC 1(2)XA Compt DH9, Row I1. ☐

3. **PERFORM** the following to place the RHR System in operation:

a. Station 2, **START** *B RHR ROOM COOLER FAN* at MCC 1(2)XB Compt 1-DP5(2-BV9), Row D2(C1). ☐

b. Station 2, **CLOSE** *RHR HEAT EXCHANGER B INLET VALVE, E11-F047B*, at MCC 1(2)XB Compt DM7, Row N2. ☐

c. Station 2, **CLOSE** *RHR HEAT EXCHANGER B BYPASS VALVE, E11-F048B*, at MCC 1(2)XB Compt DM8, Row N3. ☐

d. Station 2, **ENSURE** *RHR HEAT EXCHANGER B OUTLET VALVE, E11-F003B*, is open at MCC 1(2)XB Compt DK8, Row N1. ☐

e. Station 2, **OPEN** *RHR SUPPRESSION POOL DISCHARGE ISOLATION VALVE, E11-F028B*, at MCC 1(2)XB-2 Compt DM5, Row B4. ☐

TASK CONDITIONS:

1. The Shift Superintendent has made the determination that Control Room evacuation is required.
2. All immediate actions associated with AOP-32, PLANT SHUTDOWN FROM OUTSIDE CONTROL ROOM, are complete.
3. Remote shutdown equipment has been distributed and communication between the Remote Shutdown Stations is established.
4. NORMAL/LOCAL switches listed in Table 1 and 2 have been placed in LOCAL IAW AOP-32.
5. The RHRSW System is accessible and in standby IAW OP-43.
6. The Station 4 Operator is available in the Diesel Building for starting and stopping loads required by this procedure.
7. This JPM will be performed on Unit Two (2).

INITIATING CUE:

You are directed by the Unit SCO to perform ALL Station 2 (Reactor Building Operator) actions, including Remote Shutdown Panel actions, associated with placing the 'B' Loop RHRSW System in operation from outside the Control Room per 0AOP-32, Step 3.2.11.2. Inform the Unit SCO when all required actions have been completed.

3.0 OPERATOR ACTIONS

3.2.11 **PERFORM** the following to place RHR loop B in Suppression Pool Cooling:

1. **PERFORM** the following to fill and vent RHR Loop B:

   a. Station 2, **ENSURE** *RHR PUMP B AND D SUPPRESSION POOL SUCTION VALVE, E11-F020B,* is open at MCC 1(2)XB. Compt DN6, Row G1. ☐

   b. Station 2, **ENSURE** *RHR PUMP B SUPPRESSION POOL SUCTION VALVE, E11-F004B*, is open at MCC 1(2)XB Compt DK9, Row M1. ☐

   c. Station 2, **ENSURE** *RHR PUMP D SUPPRESSION POOL SUCTION VALVE, E11-F004D*, is open at MCC 1(2)XB Compt DL0, Row M3. ☐

   d. Station 3, **ENSURE** RHR loop B keep fill station is in service (located 50 foot El.West). ☐

   e. Station 3, **OPEN** *REACTOR VESSEL HEAD SPRAY VENT VALVE, E11-V85* (located at vessel head spray station 66' El., West), until a solid stream of water is observed flowing from the vent line, **THEN CLOSE** the vent valve. ☐

   f. Station 3, **OPEN** *LOOP B RHR SYSTEM HIGH POINT VENT VALVES, E11-V79* and *E11-V80* (located RHR Hx B room El. 20', South), until a solid stream of water is flowing from the vent line, **THEN CLOSE** the vent valves. ☐

2. **PERFORM** the following to place the RHR Service Water System in operation:

   a. Station 2, **OPEN** *NUCLEAR SERVICE WATER SUPPLY VALVE, SW-V105*, at MCC 1(2)XB Compt DM1, Row H3. ☐

3.0 OPERATOR ACTIONS

b. Station 1, **CLOSE** the following valves:

- *RHR VITAL SERVICE WATER HEADER WELL WATER SUPPLY VALVE, SW-V141* ☐
- *SERVICE WATER HEADER WELL WATER SUPPLY VALVE, SW-V143.* ☐

c. Station 2, **ENSURE** *RHR HEAT EXCHANGER B SERVICE WATER DISCHARGE VALVE, E11-F002B*, is open at MCC 1(2)XB Compt DN9, Row G4. ☐

d. Station 4, **ENSURE** both Nuclear Service Water Pumps to the affected unit are operating:

NSW Pump	Location	
1A	4160 Bus E1, AF9	☐
1B	4160 Bus E2, AH6	☐
2A	4160 Bus E3, AJ3	☐
2B	4160 Bus E4, AL1	☐

e. Station 4, **START** *RHR SERVICE WATER BOOSTER PUMP B* or *D:*

RHR SW Pump	Location	
1B	4160 Bus E4, AK9	☐
1D	4160 Bus E2, AH4	☐
2B	4160 Bus E4, AK4	☐
2D	4160 Bus E2, AG8	☐

f. Station 4, **MONITOR** the amperage on the Service Water Booster Pump that was started. ☐

g. Station 2, **THROTTLE OPEN** *RHR HEAT EXCHANGER B SERVICE WATER DISCHARGE VALVE, E11-F068B*, at MCC 1(2)XB Compt DN1, Row K4, until the amperage on the running RHR service water pump reaches 80 amps. ☐

3.0 OPERATOR ACTIONS

h. Station 2, **OPEN** *NUCLEAR SERVICE WATER TO VITAL HEADER VALVE, SW-V117*, at MCC 1(2)XB Compt DP2, Row G2. ☐

NOTE:	Position indication for *SW-V106* is located on MCC 1(2)XA Compt DE3, Row K3.

i. Station 3, **IF** necessary to increase flow, **THEN THROTTLE** *SERVICE WATER TO RBCCW ISOLATION VALVE, SW-V106*, at MCC 1(2)XA Compt DH9, Row I1. ☐

3. **PERFORM** the following to place the RHR System in operation:

a. Station 2, **START** *B RHR ROOM COOLER FAN* at MCC 1(2)XB Compt 1-DP5(2-BV9), Row D2(C1). ☐

b. Station 2, **CLOSE** *RHR HEAT EXCHANGER B INLET VALVE, E11-F047B*, at MCC 1(2)XB Compt DM7, Row N2. ☐

c. Station 2, **CLOSE** *RHR HEAT EXCHANGER B BYPASS VALVE, E11-F048B*, at MCC 1(2)XB Compt DM8, Row N3. ☐

d. Station 2, **ENSURE** *RHR HEAT EXCHANGER B OUTLET VALVE, E11-F003B*, is open at MCC 1(2)XB Compt DK8, Row N1. ☐

e. Station 2, **OPEN** *RHR SUPPRESSION POOL DISCHARGE ISOLATION VALVE, E11-F028B*, at MCC 1(2)XB-2 Compt DM5, Row B4. ☐

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC PLANT JPM P-3

LESSON TITLE: Operation of the Recirculation Pump Seal Injection System - Staging the Reactor Recirculation Pump Seals.

SAFETY CONSIDERATIONS:

1. Use caution in the vicinity of operating equipment.
2. Use caution in vicinity of energized electrical equipment.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section WILL be provided to the trainee.
2. Validation time: 15 minutes.

Read the following to trainee.

TASK CONDITIONS:

1. All applicable prerequisites are met.
2. The CRD System is in operation per OP-08 and seal purge supply is available.
3. The "2A" Reactor Recirc Pump has been isolated.
4. All clearances associated with the recirculation loop have been cancelled.
5. Actions necessary to fill and vent the pump casing and seal cavities have just been completed.

INITIATING CUE:

You are directed by the Control Operator on Unit Two (2) to perform the auxiliary operator actions associated with staging the "2A" Reactor Recirc Pump seals per OP-02, Section, 8.5 and inform the Control Room when the required actions are complete.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the Comments.

Step 1 - Obtain a current revision of 2OP-02, Section 8.5

Current Revision of 2OP-02, Section 8.5 obtained and verified, if applicable.

SAT/UNSAT*

NOTE: Steps 1 and 2 of 2OP-02, Section 8.5 are not applicable (N/A)

Step 2 - Determine that this procedure should be started at step 8.5.2.3.

Procedure started at step 8.5.2.3.

SAT/UNSAT*

PROMPT: When examinee checks position of B32-V43, inform him valve closed as indicated by the inability to turn handwheel in the clockwise direction.

Step 3 - Verify closed the "2A" Recirc Pump seal injection flow controller bypass valve.

Isolation valve B32-V43 closed or verified closed.

SAT/UNSAT*

PROMPT: When the candidate positions the B32-V45 (V46) he should communicate moving the handwheel in the clockwise direction. Inform the candidate that the valve is moving in the clockwise direction and, then, stops rotating and that the valve is closed.

Step 4 - Close either the seal injection flow controller upstream or downstream isolation valve for the "2A" Recirc Pump.

Isolation valve B32-V45 OR B32-V46 closed.

**** CRITICAL STEP ** SAT/UNSAT***

PROMPT: When requested, inform trainee that the Seal Staging Valve, B32-V14, and the Seal Injection Valve, B32-V22, have been OPENED from the control room.

Step 5 - Request the control room to OPEN

A. Seal Staging Valve, B32-V14 AND

B. Seal Injection Valve, B32-V22.

Control room operator requested to open Seal Staging Valve B32-V14 and Seal Injection Valve, B32-V22.

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: The following step would be performed from the control room and is not required at this time.

Step 6 - **IF,** during the performance of the next step, Seal No. 1 cavity pressure exceeds 1000 psig, **THEN MOMENTARILY THROTTLE OPEN** *DISCH BYPASS VLV, B32-F032A*, to reduce Seal No. 1 cavity pressure to less than 800 psig.

Continues to next step N/A

NOTE: The valve that was selected in JPM step 4 MUST be throttled open in this step.

PROMPT: As trainee throttles OPEN the B32-V45 OR V46, inform him as the control room that seal cavity pressure #1 is rising and is at 750 psig.

Step 7 - Slowly throttle open EITHER the seal injection flow controller upstream isolation valve, B32-V45 OR the seal injection flow controller downstream isolation valve, B32-V46 to maintain Seal No. 1 cavity pressure at 400 to 800 psig for the "A" recirculation pump.

Isolation valve B32-V45 OR B32-V46 throttled open to maintain #1 seal pressure between 400 and 800 psig.

**** CRITICAL STEP ** SAT/UNSAT***

PROMPT: AFTER B32-V45 OR V46 has been throttled OPEN, inform trainee that 30 minutes has elapsed and the control room reports that seal cavity #1pressure is 780 psig and seal cavity #2 pressure is 400 psig.

Step 8 - After 30 minutes has elapsed, check seal staging to verify that seal cavity #2 pressure is equal to ½ the #1 seal cavity pressure, within 0.1 times seal cavity #1 pressure.

Verifies seal cavity #2 pressure is between 312 and 468 psig.

SAT/UNSAT

Step 9 - If Reactor Recirculation pump seals fail to stage satisfactorily based on pressure results, then attempt to stage the seals as directed.

Trainee determines seals are staged correctly and proceeds to step 8.5.2.5 of the procedure.

Examiner Note: Applicant determines that step 8.5.2.4 does not apply because the seals are staged properly

SAT/UNSAT

Step 10 - Contact main control room and request that procedure steps 8.5.2.5 and 5.5.2.6 be performed.

Control room contacted to perform steps.

**** CRITICAL STEP ** SAT/UNSAT***

Examiner Note: Inform the candidate that Steps 8.5.2.5 and 8.5.2.6 have been completed.

Step 11 - Ensure Seal Injection Flow Controller Upstream Isolation valve, B32-V45 is OPEN.

Seal Injection Flow Controller Upstream Isolation valve, B32-V45 is verified OPEN or OPENED.

**** CRITICAL STEP ** SAT/UNSAT***

Step 12 - Ensure Seal Injection Flow Controller Downstream Isolation valve, B32-V46 is OPEN.

Seal Injection Flow Controller Downstream Isolation valve, B32-V46 is verified OPEN or OPENED.

**** CRITICAL STEP ** SAT/UNSAT***

Step 13 -Contact the main control room and inform them you have completed the AO actions for staging the Reactor Recirculation pump "2A" seals and they should finish the remaining three steps.

Control room notified that AO portions of staging the seals for the "2A" Reactor Recirculation pump are complete.

SAT/UNSAT*

TERMINATING CUE: When the control room has been notified that the AO portions of this procedure are complete, this JPM may be terminated.

* Comments required for any step evaluated as UNSAT.

LIST OF REFERENCES

RELATED TASKS:

202 201 B1 01
Perform Fill, Vent, And Stage Reactor Recirculating Pump Seals Per OP-02

K/A REFERENCE AND IMPORTANCE RATING:

202001 A4.11 3.2/3.3
Ability to manually operate Reactor Recirculation Seal Flow

REFERENCES:

2OP-02, Rev 126

TOOLS AND EQUIPMENT:

None

SAFETY FUNCTION (from NUREG 1123, Rev 1.):

1 - Reactivity Control (Recirculation System)

APPLICABLE METHOD OF TESTING

Performance: Simulate X Actual ___ Unit: 2

Setting: Control Room ___ Simulator ___ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No X Time Limit N/A

Alternate Path: Yes ___ No X

Comments:

EVALUATION

Candidate's Name _____

JPM: PASS _____ FAIL _____

TASK CONDITIONS:

1. All applicable prerequisites are met.
2. The CRD System is in operation per OP-08 and seal purge supply is available.
3. The "2A" Reactor Recirc Pump has been isolated.
4. All clearances associated with the recirculation loop have been cancelled.
5. Actions necessary to fill and vent the pump casing and seal cavities have just been completed.

INITIATING CUE:

You are directed by the Control Operator on Unit Two (2) to perform the auxiliary operator actions associated with staging the "2A" Reactor Recirc Pump seals per OP-02, Section, 8.5 and inform the Control Room when the required actions are complete.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC SIM JPM S-1

TITLE: UNCOUPLED CONTROL ROD

SIMULATOR SETUP:

IC – 191

Have the following procedures available for pre-JPM review:

0PT-14.1: Control Rod Operability Checks
OPS-NGGC-1306: Reactivity Management Program
2OP-08: Control Rod Drive Hydraulic System Operating Procedure

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section WILL be provided to the trainee.
2. The procedures listed above may be reviewed by the candidate immediately prior to entry into the simulator.
3. Validation Time: 15 minutes
4. This an ALTERNATE PATH JPM

TASK CONDITIONS:

1. Unit Two (2) is operating at 100% power.
2. PT-14.1, Control Rod Operability Check is due to be performed. This is the first performance of the PT this month.
3. Partially withdrawn control rod testing is not required.
4. The Reactor Engineer has determined no power reductions are required for rod movement, and inadvertent control rod double notch will not result in a Technical Specification thermal limit violation.
5. A second licensed operator is available to monitor control rod movement.
6. Failed Fuel management is not in effect.

INITIATING CUE:

You are directed by the Unit SCO to perform PT-14.1 beginning at step 7.3.2 and inform him when the test is complete.

NOTE: Sequence is assumed unless denoted in the Comments.

PROMPT: **WHEN** the candidate accesses the Control Rod Position Edit on the Plant Process Computer, the examiner will provide a Position Edit Printout to the candidate.

Step 1 - Obtain control rod position edit from process computer or manually determine using RPIS

Control rod position edit obtained from process computer or rod positions manually determined using RPIS.

SAT/UNSAT

Step 2 - Ensure CRD Drive water pressure is 260 to 275 psid.

Drive water pressure is 260-275 psid.

SAT/UNSAT

Step 3 - IF reactor power is greater than the LPSP of RWM, THEN PERFORM the following steps for each control rod at position 48:

Determines reactor power is >LPSP of RWM (given in initial conditions by #1 and #4)

SAT/UNSAT

Step 4 – Select desired control rod and verify selection by documenting on Attachment 2

Selects 02-19 and documents on Att. 2

SAT/UNSAT

NOTE: The following 3 steps may be first performed and then documented on Att.2

Step 5 – Insert the withdrawn control rod one notch and document indicated control rod position changes on Attachment 2

Rod 02-19 is inserted from position 48 to 46 using Rod Movement Control Switch. and recorded on Att. 2

** **CRITICAL STEP** **

SAT/UNSAT

Step 6 – Using either single notch or continuous withdraw, Reposition control rod 02-19 to position 48 and document on Attachment 2.

Control rod 02-19 positioned back to position 48 using either notch or continuous withdraw and documented on Att. 2

** **CRITICAL STEP** **

SAT/UNSAT

Step 7 - MAINTAIN the continuous withdraw signal for approximately 3 to 5 seconds (if applied in Step 7.3.5.3) OR APPLY a separate notch or continuous withdraw signal, AND PERFORM the following:

A. CONFIRM annunciator ROD OVER TRAVEL (A-05 4-2) does NOT alarm AND DOCUMENT on Attachment 2.

Confirms annunciator does NOT alarm AND documents on Attachment 2.

****CRITICAL STEP**** SAT/UNSAT

B. CONFIRM rod position indication on four-rod display is NOT lost AND DOCUMENT on Attachment 2.

Confirms rod position indication on four-rod display is NOT lost AND documents on Attachment 2.

SAT/UNSAT

Step 8 - IF required, THEN RECORD stall flow indicated on FLOW INDICATOR, C11(C12)-FT-R604, on Attachment 2.

Records stall flow on Att. 2

SAT/UNSAT

Step 9 - CONFIRM FULL OUT indication on full-core display is illuminated AND DOCUMENT on Attachment 2.

Full out indication of full core display recorded on Attachment 2.

SAT/UNSAT

NOTE: The following step will be N/A

Step 10 - IF double-clutching or drive water differential pressure greater than 325 psid was required to move control rod, THEN DOCUMENT on Attachment 2 in Comments column.

Determines that no comments are required

SAT/UNSAT

Step 11 – Select desired control rod and verify selection by documenting on Attachment 2

Selects 02-23 and documents on Att. 2

SAT/UNSAT

NOTE: The following 3 steps may be first performed and then documented on Att.2

Step 12 – Insert the withdrawn control rod one notch and document indicated control rod position changes on Attachment 2

Rod 02-23 is inserted from position 48 to 46 using Rod Movement Control Switch. and recorded on Att. 2

**** CRITICAL STEP ****

SAT/UNSAT

Step 13 – Using either single notch or continuous withdraw, Reposition control rod 02-23 to position 48 and document on Attachment 2.

Control rod 02-23 positioned back to position 48 using either notch or continuous withdraw and documented on Att. 2

**** CRITICAL STEP ****

SAT/UNSAT

Step 14 - MAINTAIN the continuous withdraw signal for approximately 3 to 5 seconds (if applied in Step 7.3.5.3) OR APPLY a separate notch or continuous withdraw signal, AND PERFORM the following:

A. CONFIRM annunciator ROD OVER TRAVEL (A-05 4-2) does NOT alarm AND DOCUMENT on Attachment 2.

Confirms annunciator does NOT alarm AND documents on Attachment 2.

CRITICAL STEP SAT/UNSAT

B. CONFIRM rod position indication on four-rod display is NOT lost AND DOCUMENT on Attachment 2.

Confirms rod position indication on four-rod display is NOT lost AND documents on Attachment 2.

SAT/UNSAT

Step 15 - IF required, THEN RECORD stall flow indicated on FLOW INDICATOR, C11(C12)-FT-R604, on Attachment 2.

Records stall flow on Att. 2

SAT/UNSAT

Step 16 - CONFIRM FULL OUT indication on full-core display is illuminated AND DOCUMENT on Attachment 2.

Full out indication of full core display recorded on Attachment 2.

SAT/UNSAT

NOTE: The following step will be N/A

Step 17 - IF double-clutching or drive water differential pressure greater than 325 psid was required to move control rod, THEN DOCUMENT on Attachment 2 in Comments column.

Determines that no comments are required

SAT/UNSAT

Step 18 – Select desired control rod and verify selection by documenting on Attachment 2

Selects 02-27 and documents on Att. 2

SAT/UNSAT

NOTE: The following 3 steps may be first performed and then documented on Att.2

Step 19 – Insert the withdrawn control rod one notch and document indicated control rod position changes on Attachment 2

Rod 02-27 is inserted from position 48 to 46 using Rod Movement Control Switch. and recorded on Att. 2

**** CRITICAL STEP ****

SAT/UNSAT

Step 20 – Using either single notch or continuous withdraw, Reposition control rod 02-27 to position 48 and document on Attachment 2.

Control rod 02-27 positioned back to position 48 using either notch or continuous withdraw and documented on Att. 2

**** CRITICAL STEP ****

SAT/UNSAT

PROMPT: If candidate notifies the Unit SCO that the control rod is uncoupled, then direct the candidate to take appropriate actions IAW approved procedures.

Step 21 - MAINTAIN the continuous withdraw signal for approximately 3 to 5 seconds (if applied in Step 7.3.5.3) OR APPLY a separate notch or continuous withdraw signal, AND PERFORM the following:

A. CONFIRM annunciator ROD OVER TRAVEL (A-05 4-2) alarms AND DOCUMENT on Attachment 2.

Rod overtravel reported to SCO. APP A-05 4-2 referenced.

** **CRITICAL STEP** **

SAT/UNSAT

PROMPT: **DELETE** rod uncoupled malfunction, when an insert signal is given to attempt to recouple Control rod 02-27.

Step 22 - Attempt to recouple control rod by inserting a single notch, followed by a full withdrawal.

Rod 02-27 is inserted to position 46, then withdrawn to position 48.
(Per Annunciator response for 2-A-5 4-2, Action 3)

** **CRITICAL STEP** **

SAT/UNSAT

Step 23 - Determine rod 02-27 coupling attempt successful and inform Unit SCO.
Determined coupling attempt successful.

** **CRITICAL STEP** **

SAT/UNSAT

TERMINATING CUE: When control rod 02-27 is determined to be coupled, this JPM is complete.

RELATED TASKS:

201002B201, Conduct Control Rod Operability Check Per PT-14.1

K/A REFERENCE AND IMPORTANCE RATING:

201003 A2.02 3.7/3.8
Ability to predict impacts of and use procedures to mitigate consequences of an uncoupled rod.

REFERENCES:

0PT-14.1, Revision 60
2APP-A-05, Revision 52

TOOLS AND EQUIPMENT:

None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

1 - Reactivity Control

APPLICABLE METHOD OF TESTING

Performance:	Simulate	___	Actual	X		Unit:	2
Setting:	Control Room	___	Simulator	X		In-Plant:	___
Time Critical:	Yes	___	No	X		Time Limit	N/A
Alternate Path:	Yes	X	No	____			

EVALUATION

Performer:

JPM: Pass _____ Fail _____

Comments:

TASK CONDITIONS:

1. Unit Two (2) is operating at 100% power.
2. PT-14.1, Control Rod Operability Check is due to be performed. This is the first performance of the PT this month.
3. Partially withdrawn control rod testing is not required.
4. The Reactor Engineer has determined no power reductions are required for rod movement, and inadvertent control rod double notch will not result in a Technical Specification thermal limit violation.
5. A second licensed operator is available to monitor control rod movement.
6. Failed Fuel management is not in effect.

INITIATING CUE:

You are directed by the Unit SCO to perform PT-14.1 beginning at step 7.3.2 and inform him when the test is complete.

Progress Energy

BRUNSWICK NUCLEAR PLANT

C
Continuous Use

DATE COMPLETED _____
UNIT _____ % PWR_____ GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more)
_____ Routine Surveillance
_____ WO # _____
_____ Other (explain)_____
_____
_____
_____

FREQUENCY:

A. Once per 7 days for withdrawn control rods when reactor power is greater than LPSP for RWM.

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-14.1

CONTROL ROD OPERABILITY CHECK

REVISION 60

7.0 PROCEDURAL STEPS

Initials

7.1 **OBTAIN** permission from the Unit SCO to perform this test. Y

7.2 **CONFIRM** all prerequisites listed in Section 4.0 are met. Y

NOTE:	It is **NOT** necessary to exercise control rods in the sequence listed on Attachment 2.
NOTE:	Control rods with restrictions for movement may be highlighted in yellow on Attachment 2.

7.3 CRD Exercise

7.3.1 **IDENTIFY** all control rods with restrictions **AND** the applicable restrictions, for operability testing in the Comments block on Attachment 2. N/A / N/A
Ind.Ver.

7.3.2 **OBTAIN** a control rod position edit from the PPC **OR MANUALLY DETERMINE** current control rod positions using RPIS. /
Ind.Ver.

7.3.3 **IF** failed fuel management is in effect, **THEN** reactor power level is in accordance with 0ENP-24.0 limits for testing **OR** is less than the maximum power level for testing recommended by the Reactor Engineer. ____

7.3.4 **ENSURE** CRD drive water pressure is at 260 to 275 psid. ____

7.0 PROCEDURAL STEPS

Initials

NOTE: Steps in this procedure for which no Initial line is provided are steps performed multiple times and are documented separately on Attachment 2.

CAUTION

Each withdrawn control rod should be inserted one notch **AND** repositioned to the initial position prior to selection of another control rod for exercising.

7.3.5 **IF** reactor power is greater than the LPSP of RWM, **THEN PERFORM** the following steps for each control rod at position 48:

NOTE: CRD drive water differential pressure increases may be necessary to move control rods.

NOTE: CRD stall flow check may be performed at rated conditions coincident with Steps 7.3.5.1 through 7.3.5.5.

NOTE: Control rod selection shall be concurrently verified and documented prior to rod movement.

1. **SELECT** desired control rod **AND VERIFY** selection by documenting on Attachment 2.

NOTE: Steps 7.3.5.2 through 7.3.5.4 may first be performed and then documented on Attachment 2.

2. **INSERT** the withdrawn control rod one notch **AND DOCUMENT** indicated control rod position changes on Attachment 2.

NOTE: **WHEN** withdrawing control rod to *FULL OUT*, a continuous withdraw signal may be applied and held until approximately 3 to 5 seconds after control rod has reached position 48 in order to check for rod overtravel. The control rod drive may also be held for 60 seconds in the continuous withdraw mode to purge any air from the drive.

3. **USING** either single notch or continuous withdraw, **REPOSITION** the inserted control rod to position 48 **AND DOCUMENT** the indicated control rod position changes on Attachment 2.

4. **MAINTAIN** the continuous withdraw signal for approximately 3 to 5 seconds (if applied in Step 7.3.5.3) **OR APPLY** a separate notch or continuous withdraw signal, **AND PERFORM** the following:

   a. **CONFIRM** annunciator *ROD OVER TRAVEL* (A-05 4-2) does **NOT** alarm **AND DOCUMENT** on Attachment 2.

   b. **CONFIRM** rod position indication on four-rod display is **NOT** lost **AND DOCUMENT** on Attachment 2.

NOTE:	**IF** a control rod drive stall flow is greater than or equal to 5 gpm, **THEN** 1(2)OP-07, Section 8, may be used for flushing collet piston annulus seals. **IF** flushing does **NOT** reduce stall flow below 5 gpm, **THEN** a WR is required.
NOTE:	Stall flows should be obtained with drive water differential pressure approximately 260 psid.

5. **IF** required, **THEN RECORD** stall flow indicated on *FLOW INDICATOR, C11(C12)-FT-R604,* on Attachment 2.

6. **CONFIRM** *FULL OUT* indication on full-core display is illuminated **AND DOCUMENT** on Attachment 2.

7. **IF** double-clutching or drive water differential pressure greater than 325 psid was required to move control rod, **THEN DOCUMENT** on Attachment 2 in Comments column.

NOTE:	Partially withdrawn control rods are only required to be tested once per 31 days. (SR 3.1.3.3)

7.3.6 **IF** testing of partially withdrawn control rods is **NOT** approved by the Reactor Engineer **OR** the Unit SCO has determined testing of these control rods at the 7-day frequency is **NOT** desired, **THEN GO TO** Step 7.3.8. _____

7.0 PROCEDURAL STEPS

Initials

7.4 **IF** stall flow for a fully withdrawn control rod is greater than or equal to 5 gpm, **THEN PERFORM** CRD Collet Piston Annulus Flush in accordance with 1(2)OP-07. _____

7.5 **IF** stall flow for a fully withdrawn control rod remains greater than or equal to 5 gpm, **AND** the control rod does **NOT** have an outstanding WO or WR identifying this condition, **THEN PERFORM** Stop Piston Worn Seals Test in accordance with 1(2)OP-07. _____

7.6 **OBTAIN** Control Rod Position Edit (810 Display) **OR MANUALLY DETERMINE** current control rod positions using RPIS. _____

7.7 **VERIFY** each control rod is repositioned to the position required by the Reactor Engineer. ___/___ Ind.Ver.

7.8 **IF** stall flow for a fully withdrawn control rod can **NOT** be reduced below 5 gpm, **THEN INITIATE** a WR against the control rod **AND RECORD** WR number on Attachment 2. _____

7.9 **IF** drive water differential pressure greater than 325 psid was required for any control rod movement, **THEN INITIATE** a WR **AND RECORD** the number on Attachment 2. _____

7.10 **ENSURE** required information has been recorded on the cover page. _____

7.11 **NOTIFY** the Unit SCO when this test is complete or found to be unsatisfactory. _____

ATTACHMENT 2
Page 1 of 8
Control Rod Operability Check
Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
02-19	XX / XX	XX	XX	XX	XX	XX	XX	XX		N/A
02-23	XX / XX	XX	XX	XX	XX	XX	XX	XX		N/A
02-27	XX / XX	XX	XX							
02-31	/									
02-35	/									
06-11	/			WILL ALARM →	REFERS TO ANNUNCIATOR RESPONSE					A-5 4-2
06-15	/									
06-19	/									
06-23	/									
06-27	/									
06-31	/									
06-35	/									
06-39	/									
06-43	/									
10-07	/									
10-11	/									
10-15	/									

*Concurrent Verification of rod selection required prior to rod movement.

ROD OVER TRAVEL

AUTO ACTIONS

NONE

CAUSE

1. Rod uncoupling from drive mechanism.
2. Circuit malfunction.

OBSERVATIONS

1. Four rod group display shows dark window for rod which has over traveled.
2. "ROD DRIFT" indication on full core display.
3. ROD DRIFT (A-05 3-2) alarm.
4. A change in neutron monitoring indication meter reading when rod is not being moved by operator.
5. No change in local neutron monitoring indication when attempting to withdraw rod if it is uncoupled and stuck in core.

ACTIONS

1. Check the position of the control rod to verify that annunciator is correct.

> **NOTE:** An inoperable control rod may be bypassed in the RWM or the RWM may be bypassed as allowed by LCO 3.3.2.1, if required, to allow insertion of the inoperable control rod and continued operation.

2. With reactor power below RWM low power setpoints, within 3 hours, fully insert the control rod and disarm (electrically or hydraulically) within 4 hours in accordance with Technical Specification 3.1.3.

> **NOTE:** Check CRD binding by monitoring for high drive water differential pressure (C12-PDI-R602 on RTGB Panel H12-P603) during the single notch insertion.

3. With reactor power above the RWM low power setpoints, attempt recoupling by a single notch insertion, followed by a full withdrawal to recheck coupling. If recoupling is not accomplished, fully insert the control rod within 3 hours and disarm the control rod within 4 hours in accordance with Technical Specification 3.1.3.
4. If the affected control rod was fully inserted, notify the Nuclear Engineer.
5. Refer to Technical Specification 3.1.3 for rod operability specifications.

ACTIONS (Continued)

NOTE: If recoupling is accomplished, the control rod may be returned to normal service, but it should be restricted to notch control rod withdrawal.

6. Prepare a WR/JO to rebuild the control rod drive mechanism during the next scheduled outage.
7. If recoupling is accomplished, place a caution tag on RTGB Panel P603 limiting the recoupled rod to notch withdrawal.

DEVICE/SETPOINTS

RMCS Auxiliary Relay C12A-K3	Energized

POSSIBLE PLANT EFFECTS

1. Over travel is indicative of rod uncoupling from its drive mechanism. Uncoupling could result in a stuck rod condition.
2. With the control rod drive mechanism fully withdrawn, and the uncoupled rod stuck in the fully inserted position, the rod could free fall out of the core or cause an unexpected positive reactivity addition and result in fuel damage.

REFERENCES

1. LL-9364 - 75
2. Technical Specification 3.1.3
3. Technical Specification 3.3.2.1

TASK CONDITIONS:

1. Unit Two (2) is operating at 100% power.
2. PT-14.1, Control Rod Operability Check is due to be performed. This is the first performance of the PT this month.
3. Partially withdrawn control rod testing is not required.
4. The Reactor Engineer has determined no power reductions are required for rod movement, and inadvertent control rod double notch will not result in a Technical Specification thermal limit violation.
5. A second licensed operator is available to monitor control rod movement.
6. Failed Fuel management is not in effect.

INITIATING CUE:

You are directed by the Unit SCO to perform PT-14.1 beginning at step 7.3.2 and inform him when the test is complete.

Progress Energy

BRUNSWICK NUCLEAR PLANT

C
Continuous Use

DATE COMPLETED _____
UNIT _____ % PWR_____ GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more)
_____ Routine Surveillance
_____ WO # _____
_____ Other (explain)_____
_____
_____
_____

FREQUENCY:

A. Once per 7 days for withdrawn control rods when reactor power is greater than LPSP for RWM.

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-14.1

CONTROL ROD OPERABILITY CHECK

REVISION 60

1.0 PURPOSE

1.1 This test is performed to determine operability of the CRD System in conformance with requirements specified in Technical Specifications SR 3.1.3.2, SR 3.1.3.3, and SR 3.1.3.5.

1.2 This test provides instructions for exercising control rods that are fully inserted.

1.3 This test provides instructions for obtaining control rod drive stall flows on fully withdrawn control rods for trending information.

2.0 REFERENCES

2.1 Technical Specifications

2.2 UFSAR, Section 3.9.4

2.3 1(2)OP-07, Reactor Manual Control System Operating Procedure

2.4 1(2)OP-08, CRD Hydraulic System Operating Procedure

2.5 SD-07, Reactor Manual Control System

2.6 SD-08, CRD Hydraulic System

2.7 General Electric Service Information Letter No. 52

2.8 0AI-59, Jumpering Wire Removal and Designated Jumper

2.9 OPS-NGGC-1306, Reactivity Management Program

2.10 0ENP-24.0, Reactor Engineering Guidelines

2.11 NCR 173772, Unit 2 Control Rod Misposition

3.0 PRECAUTIONS AND LIMITATIONS

3.1 A control rod should be returned to the required position before exercising the next control rod.

3.2 During performance of this procedure, the guidance in 1(2)OP-07 applies for increasing CRD drive water differential pressure to move control rods.

3.3 Control rod selection shall be concurrently verified and documented prior to rod movement.

3.0 PRECAUTIONS AND LIMITATIONS

3.4 Management involvement is required for pre-job briefings for control rod movement for the purpose of power suppression testing.

3.5 Stall flows for fully withdrawn control rods are obtained in accordance with the following schedule:

- First performance of month, CRDs on pages 1 and 2 of Attachment 2
- Second performance of month, CRDs on pages 3 and 4 of Attachment 2
- Third performance of month, CRDs on pages 5 and 6 of Attachment 2
- Fourth performance of month, CRDs on pages 7 and 8 of Attachment 2

4.0 PREREQUISITES

4.1 No other testing or maintenance in progress that will adversely affect the performance of this test.

4.2 Rod Position Information System (RPIS) and Reactor Manual Control System (RMCS) in operation in accordance with 1(2)OP-07.

4.3 CRD Hydraulic System in operation in accordance with 1(2)OP-08.

4.4 Reactor Engineer has provided information for control rods requiring reduced reactor power for movement.

4.5 Reactor Engineer has identified any control rods used for suppressing fuel leaks.

4.6 Reactor Engineer has determined inadvertent control rod double notch on withdrawal will not result in a technical specification thermal limit violation.

4.7 A second licensed operator or other qualified member of technical staff is required for performance of this test in accordance with OPS-NGGC-1306.

5.0 SPECIAL TOOLS AND EQUIPMENT

None

6.0 ACCEPTANCE CRITERIA

NOTE:	**IF** any control rod can **NOT** be moved with drive water pressure, **THEN** it must be considered inoperable.
NOTE:	**IF** unable to observe control rod position changes due to rod position indication failures, **THEN** the affected control rod must be considered inoperable **AND** the actions of TS 3.1.3.C implemented.

6.1 This test may be considered satisfactory when the following criteria are met:

6.1.1 For each fully withdrawn control rod, control rod drives can be inserted at least one notch with drive water pressure (SR 3.1.3.2).

NOTE:	Partially withdrawn control rods are only required to be tested once per 31 days. (SR 3.1.3.3)

6.1.2 For each partially withdrawn control rod, control rod drives can be inserted at least one notch with drive water pressure (SR 3.1.3.3).

NOTE:	Coupling integrity is confirmed by observing annunciator *ROD OVER TRAVEL* (A-05 4-2) does **NOT** alarm **AND** rod position indication on the four-rod display is **NOT** lost when a fully withdrawn control rod is given a withdraw signal.

6.1.3 For each fully withdrawn control rod, coupling integrity is verified by observing the drives do not go to the withdrawn overtravel position when the control rod is withdrawn to *FULL OUT* (SR 3.1.3.5).

6.1.4 For each control rod fully inserted which was tested, control rod drives can be withdrawn at least one notch with drive water pressure.

6.1.5 The control rod drive stall flows are less than 5 gpm or a WR is prepared.

6.1.6 The control rod position changes during the movement of the control rod drive.

6.1.7 Control rod reed switch position *48* corresponds to control rod position indicated by *FULL OUT* on the select matrix or a WR is prepared.

6.1.8 The control rod drive water differential pressures required to move control rods are less than or equal to 325 psid or a WR is prepared.

7.0 PROCEDURAL STEPS

Initials

7.1 **OBTAIN** permission from the Unit SCO to perform this test. Y

7.2 **CONFIRM** all prerequisites listed in Section 4.0 are met. Y

NOTE:	It is **NOT** necessary to exercise control rods in the sequence listed on Attachment 2.
NOTE:	Control rods with restrictions for movement may be highlighted in yellow on Attachment 2.

7.3 CRD Exercise

7.3.1 **IDENTIFY** all control rods with restrictions **AND** the applicable restrictions, for operability testing in the Comments block on Attachment 2. N/A / N/A Ind.Ver.

7.3.2 **OBTAIN** a control rod position edit from the PPC **OR** **MANUALLY DETERMINE** current control rod positions using RPIS. / Ind.Ver.

7.3.3 **IF** failed fuel management is in effect, **THEN** reactor power level is in accordance with 0ENP-24.0 limits for testing **OR** is less than the maximum power level for testing recommended by the Reactor Engineer. ____

7.3.4 **ENSURE** CRD drive water pressure is at 260 to 275 psid. ____

7.0 PROCEDURAL STEPS

Initials

NOTE: Steps in this procedure for which no Initial line is provided are steps performed multiple times and are documented separately on Attachment 2.

CAUTION

Each withdrawn control rod should be inserted one notch **AND** repositioned to the initial position prior to selection of another control rod for exercising.

7.3.5 **IF** reactor power is greater than the LPSP of RWM, **THEN PERFORM** the following steps for each control rod at position 48:

NOTE: CRD drive water differential pressure increases may be necessary to move control rods.

NOTE: CRD stall flow check may be performed at rated conditions coincident with Steps 7.3.5.1 through 7.3.5.5.

NOTE: Control rod selection shall be concurrently verified and documented prior to rod movement.

1. **SELECT** desired control rod **AND VERIFY** selection by documenting on Attachment 2.

NOTE: Steps 7.3.5.2 through 7.3.5.4 may first be performed and then documented on Attachment 2.

2. **INSERT** the withdrawn control rod one notch **AND DOCUMENT** indicated control rod position changes on Attachment 2.

NOTE: **WHEN** withdrawing control rod to *FULL OUT*, a continuous withdraw signal may be applied and held until approximately 3 to 5 seconds after control rod has reached position 48 in order to check for rod overtravel. The control rod drive may also be held for 60 seconds in the continuous withdraw mode to purge any air from the drive.

3. **USING** either single notch or continuous withdraw, **REPOSITION** the inserted control rod to position 48 **AND DOCUMENT** the indicated control rod position changes on Attachment 2.

4. **MAINTAIN** the continuous withdraw signal for approximately 3 to 5 seconds (if applied in Step 7.3.5.3) **OR APPLY** a separate notch or continuous withdraw signal, **AND PERFORM** the following:

   a. **CONFIRM** annunciator *ROD OVER TRAVEL* (A-05 4-2) does **NOT** alarm **AND DOCUMENT** on Attachment 2.

   b. **CONFIRM** rod position indication on four-rod display is **NOT** lost **AND DOCUMENT** on Attachment 2.

NOTE:	**IF** a control rod drive stall flow is greater than or equal to 5 gpm, **THEN** 1(2)OP-07, Section 8, may be used for flushing collet piston annulus seals. **IF** flushing does **NOT** reduce stall flow below 5 gpm, **THEN** a WR is required.
NOTE:	Stall flows should be obtained with drive water differential pressure approximately 260 psid.

5. **IF** required, **THEN RECORD** stall flow indicated on *FLOW INDICATOR, C11(C12)-FT-R604,* on Attachment 2.

6. **CONFIRM** *FULL OUT* indication on full-core display is illuminated **AND DOCUMENT** on Attachment 2.

7. **IF** double-clutching or drive water differential pressure greater than 325 psid was required to move control rod, **THEN DOCUMENT** on Attachment 2 in Comments column.

NOTE:	Partially withdrawn control rods are only required to be tested once per 31 days. (SR 3.1.3.3)

7.3.6 **IF** testing of partially withdrawn control rods is **NOT** approved by the Reactor Engineer **OR** the Unit SCO has determined testing of these control rods at the 7-day frequency is **NOT** desired, **THEN GO TO** Step 7.3.8. ____

7.0 PROCEDURAL STEPS

Initials

NOTE:	A power reduction may be required to perform Step 7.3.7.

7.3.7 **IF** approved by the Reactor Engineer, **THEN PERFORM** the following steps for each withdrawn control rod that is **NOT** at position 48:

NOTE:	CRD drive water differential pressure increases may be necessary to move control rods.
NOTE:	**IF** a control rod double notches during withdrawal, **THEN** the rod should be **IMMEDIATELY REINSERTED** to the required position and a WR written using tag number 1/2-B11-CR(xx-yy).
NOTE:	Control rod selection shall be concurrently verified and documented prior to rod movement.

1. **SELECT** desired control rod **AND VERIFY** selection by documenting on Attachment 2.

NOTE:	Steps 7.3.7.2 and 7.3.7.3 may first be performed and then documented on Attachment 2.

2. **INSERT** the withdrawn control rod one notch **AND DOCUMENT** indicated control rod position changes on Attachment 2.

3. **CONFIRM** the control rod moved in Step 7.3.7.2 is at the position required by the Reactor Engineer **OR REPOSITION** control rod in accordance with the Reactor Engineer **AND DOCUMENT** control rod position changes on Attachment 2.

4. **IF** double clutching or drive water differential pressure greater than 325 psid was required to move control rod, **THEN DOCUMENT** on Attachment 2 in Comments column.

7.0 PROCEDURAL STEPS

Initials

CAUTION

Control rods inserted to suppress power around leaking fuel are **NOT** to be notch tested.

7.3.8 **IF** approved by the Reactor Engineer, **THEN PERFORM** the following steps for each fully inserted control rod: _____

NOTE: **IF** a control rod double notches during withdrawal, **THEN** the rod should be **IMMEDIATELY REINSERTED** to the required position and a WR written using tag number 1/2-B11-CR(xx-yy).

NOTE: CRD drive water differential pressure increases may be necessary to move control rods.

NOTE: Control rod selection shall be concurrently verified and documented prior to rod movement.

1. **SELECT** desired control rod **AND VERIFY** selection by documenting on Attachment 2.

NOTE: Steps 7.3.8.2 and 7.3.8.3 may first be performed and then documented on Attachment 2.

2. **WITHDRAW** control rod one notch **AND DOCUMENT** indicated control rod position changes on Attachment 2.

3. **REPOSITION** control rod to *FULL IN* **OR** to the position required by the Reactor Engineer **AND DOCUMENT** indicated control rod position changes on Attachment 2.

4. **IF** double clutching or drive water differential pressure greater than 325 psid was required to move control rod, **THEN DOCUMENT** on Attachment 2 in Comments column.

7.0 PROCEDURAL STEPS

Initials

7.4 **IF** stall flow for a fully withdrawn control rod is greater than or equal to 5 gpm, **THEN PERFORM** CRD Collet Piston Annulus Flush in accordance with 1(2)OP-07. _____

7.5 **IF** stall flow for a fully withdrawn control rod remains greater than or equal to 5 gpm, **AND** the control rod does **NOT** have an outstanding WO or WR identifying this condition, **THEN PERFORM** Stop Piston Worn Seals Test in accordance with 1(2)OP-07. _____

7.6 **OBTAIN** Control Rod Position Edit (810 Display) **OR MANUALLY DETERMINE** current control rod positions using RPIS. _____

7.7 **VERIFY** each control rod is repositioned to the position required by the Reactor Engineer. ___/___ Ind.Ver.

7.8 **IF** stall flow for a fully withdrawn control rod can **NOT** be reduced below 5 gpm, **THEN INITIATE** a WR against the control rod **AND RECORD** WR number on Attachment 2. _____

7.9 **IF** drive water differential pressure greater than 325 psid was required for any control rod movement, **THEN INITIATE** a WR **AND RECORD** the number on Attachment 2. _____

7.10 **ENSURE** required information has been recorded on the cover page. _____

7.11 **NOTIFY** the Unit SCO when this test is complete or found to be unsatisfactory. _____

ATTACHMENT 1
Page 1 of 1
Certification and Review Form

General Comments and Recommendations _____

_____

_____

	Initials	Name (Print)
Performed by:	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Exceptions to satisfactory performance _____

_____

_____

Corrective action required _____

_____

_____

Test procedure has been satisfactorily completed.

Unit SCO: _____ _____
Signature Date

Test procedure has **NOT** been satisfactorily completed.

Unit SCO: _____ _____
Signature Date

Test has been reviewed by:

Shift Superintendent: _____ _____
Signature Date

ATTACHMENT 2
Page 1 of 8

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
02-19	/									
02-23	/									
02-27	/									
02-31	/									
02-35	/									
06-11	/									
06-15	/									
06-19	/									
06-23	/									
06-27	/									
06-31	/									
06-35	/									
06-39	/									
06-43	/									
10-07	/									
10-11	/									
10-15	/									

*Concurrent Verification of rod selection required prior to rod movement.

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
10-19	/									
10-23	/									
10-27	/									
10-31	/									
10-35	/									
10-39	/									
10-43	/									
10-47	/									
14-07	/									
14-11	/									
14-15	/									
14-19	/									
14-23	/									
14-27	/									
14-31	/									
14-35	/									
14-39	/									
14-43	/									

* Concurrent Verification of rod selection required prior to rod movement.

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
14-47	/									
18-03	/									
18-07	/									
18-11	/									
18-15	/									
18-19	/									
18-23	/									
18-27	/									
18-31	/									
18-35	/									
18-39	/									
18-43	/									
18-47	/									
18-51	/									
22-03	/									
22-07	/									
22-11	/									

* Concurrent Verification of rod selection required prior to rod movement.

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
22-15	/									
22-19	/									
22-23	/									
22-27	/									
22-31	/									
22-35	/									
22-39	/									
22-43	/									
22-47	/									
22-51	/									
26-03	/									
26-07	/									
26-11	/									
26-15	/									
26-19	/									
26-23	/									
26-27	/									

* Concurrent Verification of rod selection required prior to rod movement.

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
26-31	/									
26-35	/									
26-39	/									
26-43	/									
26-47	/									
26-51	/									
30-03	/									
30-07	/									
30-11	/									
30-15	/									
30-19	/									
30-23	/									
30-27	/									
30-31	/									
30-35	/									
30-39	/									

* Concurrent Verification of rod selection required prior to rod movement.

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
30-43	/									
30-47	/									
30-51	/									
34-03	/									
34-07	/									
34-11	/									
34-15	/									
34-19	/									
34-23	/									
34-27	/									
34-31	/									
34-35	/									
34-39	/									
34-43	/									
34-47	/									
34-51	/									
38-07	/									
38-11	/									

* Concurrent Verification of rod selection required prior to rod movement.

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
38-15	/									
38-19	/									
38-23	/									
38-27	/									
38-31	/									
38-35	/									
38-39	/									
38-43	/									
38-47	/									
42-07	/									
42-11	/									
42-15	/									
42-19	/									
42-23	/									
42-27	/									
42-31	/									
42-35	/									

* Concurrent Verification of rod selection required prior to rod movement.

Control Rod Operability Check

Frequency: Weekly (Daily When Required)

	*CORRECT ROD SELECTED AND VERIFIED	ROD MOVEMENT	REPOSITION ROD	OVERTRAVEL ANNUNCIATOR DOES NOT ALARM	4-ROD DISPLAY POSITION INDICATION NOT LOST	STALL FLOW	FULL OUT LIGHT	VERIFIED CORRECT ROD MOVED AND REPOSITIONED		
ROD NO.	7.3.5.1 or 7.3.7.1 or 7.3.8.1 (Initial)	7.3.5.2 or 7.3.7.2 or 7.3.8.2 (Initial)	7.3.5.3 or 7.3.7.3 or 7.3.8.3 (Initial)	7.3.5.4.a (Initial)	7.3.5.4.b (Initial)	7.3.5.5 (Flow)	7.3.5.6 (Initial)	(Initial)	WR or WO Number	Comments
42-39	/									
42-43	/									
42-47	/									
46-11	/									
46-15	/									
46-19	/									
46-23	/									
46-27	/									
46-31	/									
46-35	/									
46-39	/									
46-43	/									
50-19	/									
50-23	/									
50-27	/									
50-31	/									
50-35	/									

* Concurrent Verification of rod selection required prior to rod movement.

REVISION SUMMARY

Revision 60 incorporates PRR 217342 to structure procedure more efficiently and improve the ability to use the procedure in accordance with expectations for Continuous Use procedures. PRR 215244 was also incorporated to address a minor procedure use issue during a Job Performance Measure (JPM) administered during recent Licensed Operator Requalification (LOR) exams.

Revision 59 is an Editorial Correction to clarify Step 7.4.6.

Revision 58 removes CAPR designation incorporated in Revision 56.

Revision 57 is an Editorial Correction to add a new Precaution and Limitation regarding management involvement in pre-job briefings for control rod movement for the purpose of power suppression testing in accordance with AR 173722.

Revision 56 incorporates CAPR NCR 173772 adding steps for rod selection verification and documentation prior to rod movement.

Revision 55 incorporates recommended corrective action in accordance with NCR 154776 to add criteria for determining control rod coupling integrity. A note has been added stating that steps that do not have a sign off line are steps performed multiple times and documented on the attachment.

Revision 54 adds a new sign-off step for confirmation that power level is in accordance with 0ENP-24.0, Reactor Engineering Guidelines or is less than the maximum power level for testing recommended by the Reactor Engineer. Procedure has also been converted to Word 2002.

Revision 53 is an Editorial Correction to delete reference to 0AP-038 and replace it with reference to OPS-NGGC-1306, Reactivity Management Program.

Revision 52 removes the special testing requirements for Unit 1 control rod 26-47 which existed for Cycle 13. This revision also incorporates PassPort Work Management terminology.

Revision 51 is an Administrative correction for a typographical error which inadvertently changed control rod 50-31 to non-existent control rod 40-31 on Attachment 2.

Revision 50 changes the method of satisfying Tech Spec SR 3.1.3.3 for Unit 1 Control Rod 26-47 only.