Facility: **Columbia Generating Station**		Date of Examination: **April 2011**
Examination Level: RO **X** SRO ☐		Operating Test Number: **1**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Alternate Determination of Drywell Identified Leakage per SOP-EDR-OPS Section 5.7 – Candidate is given parameters associated with EDR-P-5 and asked to determine the calculated identified Drywell leak rate
Conduct of Operations	D, R	The RO is given a turnover sheet that states a RX S/U is in progress and then parameters that indicate the reactor is critical. He has to realize the Reactor is Critical or will be critical prior to the ECP and take actions per PPM 3.1.2 which states to: stop control rod withdrawal and notify the CRS. The candidate will fill out an attachment indicating what his next action will be and the basis for that action.
Equipment Control	M, R	The RO is given a section of OSP-INST-H101 that has 4 reading that are incorrect. Candidate is told to perform a peer check and red circle any errors found.
Radiation Control	P, R	The RO Candidate is given data for his personal dose and told he is to perform work that is in a High Radiation Area. The candidate has to calculate his maximum stay time
Emergency Procedures/Plan		

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

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

Facility: **Columbia Generating Station**		Date of Examination: **April 2011**
Examination Level: RO SRO **X**		Operating Test Number: **1**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, R	The SRO candidate is given a turnover sheet that states a RX S/U is in progress and then parameters that indicate the reactor is critical. He is cued to determine his next action. To successfully complete the JPM he has to realize the Reactor is Critical prior to the ECP and take actions per PPM 3.1.2 which states to: stop control rod withdrawal, the CRS should direct the CRO to drive control rods in the reverse order until all rods are fully inserted.
Conduct of Operations	M, R	The SRO candidate is told that I & C has determined that one required CST Level Monitoring channel is not operational. Due to the LAN Operations Log System being out of service the SRO is directed to manually complete an INOP EQUIP/LCO/RFO STATUS SHEET and make the Log entry using PPM 1.3.1 Attachments 6.4 & 6.5.
Equipment Control	P, R	The SRO candidate is given a request to allow or disallow a move of a heavy load over the Spent Fuel Pool and a copy of PPM 1.3.40 and LCS 1.9.2. PPM 1.3.40 attachment 7.5 should be referenced which has 3 requirements to satisfy. Requirement #3 will not be satisfied and the move should not be allowed.
Radiation Control	N, R	The SRO Candidate is given parameters associated with Circ Water blowdown and is asked to approve or not approve the release permit. He is required to determine if the instrumentation necessary for blowdown is available. The primary and approved alternate flow instrumentation is NOT available and the blowdown will not be approved.
Emergency Procedures/Plan	N, R	The SRO candidate is given plant data and directed to perform a QEDPS and determine the EAL. The SRO will use the electronic QEDPS program to calculate the offsite release. The calculations will show that the CDE Thyroid dose at 1.2 miles is GT the General Emergency level and a GE will be declared per 5.1.G.2.

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

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

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   LICENSED OPERATOR INITIAL TRAINING

COURSE TITLE   ADMIN JOB PERFORMANCE MEASURE

LESSON TITLE   ALTERNATE DETERMINATION OF DRYWELL IDENTIFIED LEAK RATE

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.
Lesson Plan PQD Code		
Simulator Guide PQD Code		Rev. No.
JPM PQD Code	LO001726	Rev. No. 0
Exam PQD Code		Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 07/15/10

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

ALTERNATE DETERMINATION OF DRYWELL IDENTIFIED LEAK RATE

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N / A

Setup Instructions:

The candidate should have access to a calculator.

Copy Section 5.7 of SOP-EDR-OPS for the candidate to complete.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: N/A

Task Number: RO-0892

Prerequisite Training: N/A

PPM Reference: SOP-EDR-OPS Section 5.7 Rev. 2

NUREG 1123 Ref: 2.1.20 (4.6 / 4.6)

Safety Items: N/A

Validation Time: 15 minutes

Time Critical: No

Location: Simulator / Classroom

Performance Method: Perform

JPM CHECKLIST

PROCEDURE VALIDATION:	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	At 0415 EDR-SUMP-R5 sump pump was manually started and EDR-TQ-5 reading was 0551.0. At 0430, the EDR-SUMP-R5 sump pump automatically stopped and EDR-TQ-5 reading was 0551.2. At 1630, EDR-SUMP-R5 sump pump was again manually started and had not auto started since 0430. At 1715, the EDR-SUMP-5 sump pump automatically stopped and EDR-TQ-5 reading was 0552.0.
INITIATING CUE:	You have been directed to determine the Calculated Identified Drywell Leak Rate per SOP-EDR-OPS section 5.7. When done, hand the completed procedure section to the examiner.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
RECORD START TIME: _____			
Step 5.7.1	Start EDR-P-5A/B (Rx Bldg EDR Pump) and allow it to pump down EDR-SUMP-R5 until it automatically stops (H13-P602)	Given in initial conditions, initials block	S / U
Step 5.7.2	When EDR-P-5A/B stops, then begin the drywell identified leakage monitoring period by recording the start time and the initial R5 sump pump run time:	Given in initial conditions, initials block	S / U
	Start Date/Time	Enters today date and 0430 for time	S / U
	EDR-TQ-5 Initial Reading	Enters 0551.2	S / U
Step 5.7.3	IF H13-P601.A3.5-8, LEAK DET REACTOR BLDG EQUIP SUMP LEAKAGE HIGH alarms	Not given as alarming in initial conditions – does not perform this step	S / U

ALTERNATE DETERMINATION OF DRYWELL IDENTIFIED LEAK RATE

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
Step 5.7.4	When approximately 12 hours have elapsed, then place the control switch for EDR-P-5A/B to START	Given in initial conditions	S / U
Step 5.7.5	IF EDR-P-5A/5B does NOT start	Given that it did start in initial conditions – does not initial this step	S / U
Step 5.7.6	If EDR-P-5A/5B starts, then perform the following: a. Pump EDR-SUMP-R5. b. When EDR-P-5A/B automatically stop, then end the drywell identified leakage monitoring period and record the completion time and final R5 sump pump run time	Given that pump did start Given in initial conditions Given in initial conditions	S / U
	Completion Date/Time:	Enters today date and 1715 as time	S / U
	EDR-TQ-5 Final Reading:	Enters 0552.0	S / U
Step 5.7.7	Calculate the duration of the monitoring period of this section: a. Completion Time from step 5.7.5 or 5.7.6	a. Enters 1715	S / U
	b. Start Time from step 5.7.2	b. Enters 0430	S / U
	c. Total Time (a. – b.)	c. Enters 12 hours 45 minutes	S / U

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
Step 5.7.8	Calculate EDR-P-5A/B Elapsed Run Time: a. EDR-TQ-5 Final Reading from Step 5.7.5 or 5.7.6 ___ hours	a. Enters 0552.0	S / U
	b. EDR-TQ-5 Initial Reading from Step 5.7.2 __ hours	b. Enters 0551.2	S / U
	c. Elapsed Run Time (a. – b.)	c. Calculates 0.8 as elapsed run time	S / U
Step 5.7.9	Calculate the total volume of water pumped out of EDR-SUMP-R5 during the monitoring period of this section using the Elapsed Run Time calculated in step 5.7.8, and the following formula: Pumped Volume = ERT x 60 min/hr x 66.1 gallons/min Pumped Volume = ERT x 3966 gallons/hr Pumped Volume = _____ gallons	Calculates pumped volume as 3172.8	S / U * (Accept 3172 to 3173)

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
Step 5.7.10	Determine the Calculated Identified Drywell Leak Rate using the Pumped Volume calculated in step 5.7.9, and the Total Time calculated in step 5.7.7, as follows: Calculated Identified Drywell Leak Rate = Pumped Volume / Total Time Calculated Identified Drywell Leak Rate = ___ gpm	Enters 3172.8 as pumped volume and 765 minutes as Total time (12 hours plus .75 hours = 12.75 hours x 60 min/hr = 765 min) Calculates Calculated Identified Drywell Leak Rate as 4.147 gpm	S / U S / U * (accept 4.0 to 4.2 gpm)

Termination Criteria: Candidate completes Section 5.7 up to and including step 5.7.10 and hands it to the examiner the examiner.

RECORD TERMINATION TIME: _____

Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.

RESULTS OF JPM:

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Student correctly determines the Calculated Drywell Identified Leak Rate per SOP-EDR-OPS section 5.7.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	15 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001726 Rev. 0

Initial Conditions:

At 0415 EDR-SUMP-R5 sump pump was manually started and EDR-TQ-5 reading was 0551.0.

At 0430, the EDR-SUMP-R5 sump pump automatically stopped and EDR-TQ-5 reading was 0551.2.

At 1630, EDR-SUMP-R5 sump pump was again manually started and had not auto started since 0430.

At 1715, the EDR-SUMP-5 sump pump automatically stopped and EDR-TQ-5 reading was 0552.0.

Cue:

You have been directed to determine the Calculated Identified Drywell Leak Rate per SOP-EDR-OPS section 5.7.

Complete section 5.7 (Step 5.7.11 is not required to be done) and when done, hand the completed procedure section to the examiner.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   LICENSED OPERATOR INITIAL TRAINING

COURSE TITLE   ADMIN JOB PERFORMANCE MEASURE

LESSON TITLE   DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.
Simulator Guide PQD Code		Rev. No.
JPM PQD Code	LO001587	Rev. No. 2
Exam PQD Code		Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE   5/11/06

REVISED BY   Ron Hayden   DATE   07/19/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Setup Instructions:

Make a copy of the current pull sheet from the simulator. Determine where Minimum ECP is and indicate it on copy of pull sheet by placing an '*1' next to the step and at the bottom of the column indicate that a *1 is 'Minimum ECP'. Ensure it is AFTER step indicated in initial conditions by about four control rods. Place a *2 ten rods later and make that the maximum ECP.

Fill out the pull sheet pages. The performed by column is initialed up to control rod 10-47. The verified column, the coupling check column and the full out light columns are initialed to control rod 10-47 by the verifier. Fill in response noted column with a few N's but mostly Y's.

Have a copy of PPM 3.1.2 startup flowchart available for reference.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: N/A   **Safety Items:** N/A

Task Number: RO-0156; SRO-0118   **Validation Time:** 16 minutes

Prerequisite Training: N/A   **Time Critical:** NO

PPM Reference: PPM 3.1.2 Rev. 72   **Location:** Simulator/Classroom/Table Top

NUREG 1123 Ref: 2.1.37 4.3 / 4.6   **Performance Method:** Perform

LO001587 Rev. 2

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

JPM CHECKLIST

PROCEDURE VALIDATION:	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	A plant startup is in progress. PPM 3.1.2 has been completed as follows: Step L11 has been completed, waiting at step L12 ; Step P1 has not yet been completed; Step Q11 has been completed and Step Q12 is in progress.
	CRO1 is pulling control rods and notes the following indications:
	- Time 0953 - Coolant Temp 205°F - Control rod 10-47 - Control rod position 18 - Neutron level 8,000 CPS and rising - Period 145 seconds and stable
	Control rods have been pulled steadily since starting Group 1 of the Pull Sheet. Control rod motion stopped approximately 1 minute ago.
INITIATING CUE:	Using the given information, PPM 3.1.2, and the supplied pull sheets, determine your next action.
	When you have determined your next action, write it on the page provided along with the basis for the decision and hand it to the examiner.

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

Comments	Element	Standard	Sat/Unsat
RECORD START TIME: _____			
Criticality will be determined using the criteria on Startup Flow Chart 3.1.2 page 1 Note N6: Criticality usually occurs in the source range between $1x10^3$ and $1x10^4$ cps. For purposes of this procedure, criticality shall be identified by increasing neutron level, a constant steady period and no simultaneous control rod motion. The information given identifies 8000 cps and rising (which is between the $1x10^3$ and $1x10^4$ cps) and a constant steady period with no rod motion – these are indications of a critical reactor.			
If the SRO Position being evaluated	Using given information, determines that the reactor is critical or will be critical before the minimum ECP has been reached.	Directs the Reactor Operator to (stop control rod withdrawal and to) drive control rods in the reverse order until all control rods are fully inserted.	S / U *
If the RO position being evaluated	Using given information, determines that the reactor is critical or will be critical before the minimum ECP has been reached.	Notifies the CRS that he has stopped control rod withdrawal due to reactor critical outside ECP.	S / U *
SRO Candidate: To pass the JPM the candidate must state that direction is to be given to the RO to drive control rods in the reverse order until they all are inserted. **RO Candidate: To pass the JPM the candidate must state that control rod withdrawal must be stopped and that the CRS must be informed that the reactor is critical prior to the indicated minimum ECP.**			
RECORD TERMINATION TIME: _____			
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.			

LO001587 Rev. 2

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

RESULTS OF JPM:

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Candidate determines early criticality and correctly identifies actions for being critical outside of the ECP per PPM 3.1.2.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	16 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001587 Rev. 2

Initial Conditions:

A plant startup is in progress. PPM 3.1.2 has been completed as follows: Step L11 has been completed, waiting at step L12 ; Step P1 has not yet been completed; Step Q11 has been completed and Step Q12 is in progress.

The following indications are observed:

- Time   0953
- Coolant Temp   205° F
- Control rod   10-47
- Control rod position   18
- Neutron level   8,000 CPS and rising
- Period   145 seconds and stable

Control rods have been steadily pulled since starting Group 1 of the Pull Sheet. Control rod motion stopped approximately 1 minute ago.

Cue:

Using the given information, PPM 3.1.2, and the supplied pull sheets, determine your next action.

When you have determined your next action, write it on the page provided along with the basis for the decision and hand it to the examiner.

NEXT ACTION TO BE TAKEN: _____

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BASIS FOR ACTION: _____

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ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   LICENSED OPERATOR INITIAL TRAINING

COURSE TITLE   ADMIN JOB PERFORMANCE MEASURE

LESSON TITLE   REVIEW SURVEILLANCE PROCEDURE OSP-INST-H101

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.	
Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001633	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 5/29/08

REVISED BY   Ron Hayden   DATE 07/20/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Setup Instructions:

Print out a blank OSP-INST-H101 and fill in readings. At least one reading should be out of spec. Have a calculator available.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: N/A   **Safety Items:** N/A

Task Number: RO-0577   **Validation Time:** 20 minutes

Prerequisite Training: N/A   **Time Critical:** NO

PPM Reference: OSP-INST-H101 Rev. 69   **Location:** Any

NUREG 1123 Ref: 2.2.12   3.7 / 4.1   **Performance Method:** Perform

JPM CHECKLIST

PROCEDURE VALIDATION:	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	Columbia is operating at rated power. CRO2 has just completed filling out the OSP-INST-H101 checks and has asked you for a peer check.
INITIATING CUE:	When you have completed your peer check of the Shift and Daily Instrument Checks (OPS-INST-H101) give them to the examiner. Circle any errors that you may find during your peer check.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
		RECORD START TIME: _____	
		Reviews OSP-INST-H101 and compares actual values with acceptance criteria. Finds and circles out-of-tolerance readings:	S / U
Page 8 Step 3	Acceptance criteria is LT 40 psig of each other	Reactor pressure MS-LR/PR-623A is reading 1025 and MS-LR/PR-623B is reading 980 which is 45 psig of each other	S / U *
Page 11 Step 9	Acceptance criteria is LE 58.5 and to log value	Acceptance criteria requires a logged value – instead initials are entered	S / U *
Page 14 step 17	Acceptance criteria is GT 100°F	CMS-TE-21 (137) + CMS-TE-22 (111) + CMS-TE-23 (120) = GT 100. Value should be 122 but 102 is logged instead	S / U *
Page 18 step 30	Mode Switch Interlock Testing – Only required in MODE 3, otherwise N/A	Instead of step being N/A'ed, initials are logged without the N/A	S / U *
Termination Criteria: Candidate hands the examiner the completed OSP-INST-H101's.			
		RECORD TERMINATION TIME: _____	
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.			

LR001633 Rev. 1

RESULTS OF JPM:
REVIEW SURVEILLANCE PROCEDURE OPS-INST-H101

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Candidate circles the four errors found during the review.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	15 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LR001633 Rev. 1

Initial Conditions:

Columbia is operating at rated power.

CRO2 has just completed filling out the OSP-INST-H101 checks and has asked you for a peer check.

Cue:

When you have completed your peer check of the Shift and Daily Instrument Checks (OPS-INST-H101) give them to the examiner.

Circle any errors that you may find during your peer check.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   OPERATIONS TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   DETERMINATION OF STAY TIME IN A HIGH RADIATION AREA (ADMIN)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code   Rev. No.
Simulator Guide PQD Code   Rev. No.
JPM PQD Code   LR001794   Rev. No.   3
Exam PQD Code   Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE   10/24/06

REVISED BY   Ron Hayden   DATE   07/20/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE
                    Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

Candidate needs access to a set of procedures that includes GEN-RPP-06.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: N/A   **Safety Items:** N/A

Task Number: RO-0557; SRO-0026   **Validation Time:** 10 Minutes

Prerequisite Training: N/A   **Time Critical:** NO

PPM Reference: GEN-RPP-06 Rev. 6;   **Location:** Classroom

GEN-RPP-11 Rev. 6

NUREG 1123 Ref: 2.3.4 (3.2 / 3.7)   **Performance Method:** Perform

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	You have been selected to work with maintenance on a valve in a High Radiation Area. The job is expected to take five hours. You have an accumulated dose of 1600 mrem for the calendar year. The work area dose rate is at the minimum value for the High Radiation Area.
INITIATING CUE:	Determine your personal maximum stay time for the job that will not exceed the allowable Annual Administrative Dose Hold Point value.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
RECORD START TIME: _____			
	Determines radiation Admin limit	Determines a 2 rem TEDE Admin limit is applicable	S / U *
	Determines the minimum High Radiation Area dose rate	Determines the minimum High Radiation Area dose rate is 100 mrem/hr	S / U *
	Calculates dose remaining to reach admin limit of 2 rem (2000 mrem)	Calculates 400 mrem (2000 – 1600 = 400) remains to reach limit	S / U *
	Calculates maximum stay time	Calculates stay time: 400 mrem divided by 100 mrem/hr equals 4 hrs	S / U *
	Documents maximum stay time	On Student Information Card documents maximum stay time of 4.0 hours	S / U *

Termination Criteria: Candidate fills in answer to JPM and hands JPM Information Card to examiner.

RECORD TERMINATION TIME: _____

Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.

RESULTS OF JPM:
DETERMINATION OF MAXIMUM STAY TIME

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Candidate determines that 4.0 hours is his personal maximum stay time if 2 rem used and 2.0 hours if 1800 mrem used and that is indicated on the bottom of the cue sheet handed back to the examiner.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

Initial Conditions:

You have been selected to work with maintenance on a valve in a High Radiation Area.

The job is expected to take five hours.

You have an accumulated dose of 1600 mrem for the calendar year.

The work area dose rate is at the minimum value for the High Radiation Area.

Cue:

Determine your personal __maximum__ stay time for the job that will not exceed the allowable Annual Administrative Dose Hold Point value.

Write your answer at the bottom of this page and hand it to the examiner.

My MAXIMUM stay time for this job is: _____

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   LICENSED OPERATOR INITIAL TRAINING

COURSE TITLE   ADMIN JOB PERFORMANCE MEASURE

LESSON TITLE   DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001587	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 5/11/06

REVISED BY   Ron Hayden   DATE 07/19/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE
                          Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Setup Instructions:

Make a copy of the current pull sheet from the simulator. Determine where Minimum ECP is and indicate it on copy of pull sheet by placing an '*1' next to the step and at the bottom of the column indicate that a *1 is 'Minimum ECP'. Ensure it is AFTER step indicated in initial conditions.

Have a copy of PPM 3.1.2 startup flowchart available for reference.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: N/A

Safety Items: N/A

Task Number: RO-0156; SRO-0118

Validation Time: 16 minutes

Prerequisite Training: N/A

Time Critical: NO

PPM Reference: PPM 3.1.2 rev. 72

Location: Simulator/Plant/Table Top

NUREG 1123 Ref: 2.1.37 4.3/4.6

Performance Method: Perform

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

JPM CHECKLIST

PROCEDURE VALIDATION:	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.

INITIAL CONDITIONS:	A plant startup is in progress. PPM 3.1.2 has been completed as follows: Step L11 has been completed, waiting at step L12 ; Step P1 has not yet been completed; Step Q11 has been completed and Step Q12 is in progress.
	
	You are the RO pulling control rods and you note the following indications:
	
	    • Time 0953
	    • Coolant Temp 205°F
	    • Control rod 10-47
	    • Control rod position 18
	    • Neutron level 8,000 CPS and rising
	    • Period 145 seconds and stable
	
	You have been pulling control rods steadily since starting Group 1 of the Pull Sheet. Control rod motion stopped approximately 1 minute ago.

INITIATING CUE:	Using the given information, PPM 3.1.2, and the supplied pull sheets, determine your next action. When you have determined your next action, write it on the page provided along with the basis for the decision and hand it to the examiner.

LO001587 Rev. 1

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	RECORD START TIME: _____		
Criticality will be determined using the criteria on Startup Flow Chart 3.1.2 page 1 Note N6: Criticality usually occurs in the source range between $1x10^3$ and $1x10^4$ cps. For purposes of this procedure, criticality shall be identified by increasing neutron level, a constant steady period and no simultaneous control rod motion. The information given identifies 8000 cps and rising (which is between the $1x10^3$ and $1x10^4$ cps) and a constant steady period with no rod motion – these are indications of a critical reactor.			
If the SRO Position being evaluated	Using given information, determines that the reactor is critical or will be critical before the minimum ECP has been reached.	Directs the Reactor Operator to (stop control rod withdrawal and to) drive control rods in the reverse order until all control rods are fully inserted.	S / U *
If the RO position being evaluated	Using given information, determines that the reactor is critical or will be critical before the minimum ECP has been reached.	Notifies the CRS that he has stopped control rod withdrawal due to reactor critical outside ECP.	S / U *
SRO Candidate: To pass the JPM the candidate must state that direction is to be given to the RO to drive control rods in the reverse order until they all are inserted. **RO Candidate: To pass the JPM the candidate must state that control rod withdrawal must be stopped and that the CRS must be informed that the reactor is critical prior to the indicated minimum ECP.**			
	RECORD TERMINATION TIME: _____		
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.			

DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)

RESULTS OF JPM:

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Candidate determines early criticality and correctly identifies actions for being critical outside of the ECP per PPM 3.1.2.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	16 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001587 Rev. 1

STUDENT JPM INFORMATION CARD

Initial Conditions:

A plant startup is in progress. PPM 3.1.2 has been completed as follows: Step L11 has been completed, waiting at step L12 ; Step P1 has not yet been completed; Step Q11 has been completed and Step Q12 is in progress.

The following indications are observed:

- Time   0953
- Coolant Temp   205° F
- Control rod   10-47
- Control rod position   18
- Neutron level   8,000 CPS and rising
- Period   145 seconds and stable

Control rods have been steadily pulled since starting Group 1 of the Pull Sheet. Control rod motion stopped approximately 1 minute ago.

Cue:

Using the given information, PPM 3.1.2, and the supplied pull sheets, determine your next action.

When you have determined your next action, write it on the page provided along with the basis for the decision and hand it to the examiner.

NEXT ACTION TO BE TAKEN: _____

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BASIS FOR ACTION: _____

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ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE LICENSED OPERATOR INITIAL TRAINING

COURSE TITLE JOB PERFORMANCE MEASURE - ADMIN

LESSON TITLE COMPLETE INOP EQUIPMENT/LCO/RFO STATUS SHEET (ADMIN)

LESSON LENGTH .5 HRS MAXIMUM STUDENTS 1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code _____ Rev. No. _____
Simulator Guide PQD Code _____ Rev. No. _____
JPM PQD Code LO001727 Rev. No. 0
Exam PQD Code _____ Rev. No. _____

DIVISION TITLE Nuclear Training

DEPARTMENT Operations Training

PREPARED BY Ron Hayden DATE 3/17/11

REVISED BY DATE

TECHNICAL REVIEW BY DATE

INSTRUCTIONAL REVIEW BY DATE

APPROVED BY DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

　　N/A

Setup Instructions:

　　Have a copy of the following for each student:

　　　　PPM 1.3.1

　　　　Tech Spec and Bases

　　　　LCS

　　Provide each candidate with a blank Attachment 6.4 and Attachment 6.5 of PPM 1.3.1.

JPM Instructions:

Verify the current revisions of each drawing against the JPM. If the drawings are a different revision than listed in the JPM, ensure the JPM is still technically correct. If the JPM is not technically correct, the JPM should be revised.

The evaluator document results on the "Results of JPM" page.

Tools/Equipment: N/A

Safety Items: N/A

Task Number: SRO-0096

Validation Time: 15 minutes

Prerequisite Training: N/A

Time Critical: NO

PPM Reference: PPM 1.3.1 Rev. 95

Location: CLASSROOM OR SIMULATOR

NUREG 1123 Ref: 2.1.18 3.6 / 3.8

Performance Method: PERFORM

LO001727 Rev. 0

JPM CHECKLIST

PROCEDURE VALIDATION:	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	Columbia is operating at rated power with no equipment out of service. Information Services is conducting a server upgrade which has temporarily made the LAN Operations Log System computer unavailable.
	At 0830, I & C called and notified the Shift Manager that during performance of ISP-CONT-X301, Accident Monitoring Instrumentation CST – Level Monitoring – CC, it was determined that only one of the two channels (COND-LI-40A) passed the surveillance and is operable. COND-LI-40B will not indicate level and failed the surveillance.
	The I & C technicians are currently on their way to their shop to discuss this situation with their supervisor.
INITIATING CUE:	The Shift Manager has directed you to complete an INOP EQUIP/LCO/RFO STATUS SHEET and make the corresponding Log entry by completing PPM 1.3.1 Attachment 6.4 and 6.5. The WO# for this is 02002814 and the INOP/LCO/LCS reference for this is 10,130. When you have completed the assigned task, present the completed forms to your examiner.

LO001727 Rev. 0

COMPLETE INOP/LCO STATUS SHEET AND INOP LOG

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	RECORD START TIME: _____		
Attachment 6.4	Completes PPM 1.3.1 Attachment 6.4 as follows:		
	LCO, RFO, MRE, INOP (circle one)	Circles RFO	S / U *
	Inoperable Equipment/ Component:	Adds COND-LI-40B (may add description)	S / U *
	Unavailable Yes/No Explain:	No entry required	S / U
	LCO/RFO/MRE Number:	Adds LCS 1.3.3.1	S / U *
	WR#; PER# and System Engineer Notified	No entry required	S / U
	Description of Problem:	Adds verbiage indicating the level indicator does not indicate level	S / U
	Component Declared Inop, Time/Date:	Adds a date and a time	S / U
	Init LCO/RFO Actions Comp, Time/Date:	No entry required	S / U
	Applicable Mode:	Mode 1 and Mode 2	S / U *
	Mode Change Allowed: Yes/No	No entry required	S / U
	CR Log Entry: Yes/No	No entry required	S / U
	Component Declared Operable Time/Date	No entry required	S / U

COMPLETE INOP/LCO STATUS SHEET AND INOP LOG

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
Attachment 6.5	Completes PPM 1.3.1 Attachment 6.5 as follows: WO#	Enters 02002814 (given in cue)	S / U
	EPN	COND-LI-40B	S / U *
	LCO/RFO#	Enters 1.3.3.1	S / U *
	INOP/LCO/LCS	Enters 10,130 (given in cue)	S / U
	Time/Date INOP	Enters a time and date	S / U
	Time/Date required OPER	Enters date which indicates is 30 days from today	S / U *

Termination Criteria: Candidate hands the examiner the completed attachments.

RECORD TERMINATION TIME: _____

Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical steps; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.

COMPLETE INOP/LCO STATUS SHEET AND INOP LOG

RESULTS OF JPM:

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Candidate completes PPM 1.3.1 Attachment 6.4 and 6.5 with the required information.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	15 Minutes / N / A	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001727 Rev. 0

Initial Conditions:

Columbia is operating at rated power with no equipment out of service. Information Services is conducting a server upgrade which has temporarily made the LAN Operations Log System computer unavailable.

At 0830, I & C called and notified the Shift Manager that during performance of ISP-CONT-X301, Accident Monitoring Instrumentation CST – Level Monitoring – CC, it was determined that only one of the two channels (COND-LI-40A) passed the surveillance and is operable. COND-LI-40B will not indicate level and failed the surveillance.

The I & C technicians are currently on their way to their shop to discuss this situation with their supervisor.

Cue:

The Shift Manager has directed you to complete an INOP EQUIP/LCO/RFO STATUS SHEET and make the corresponding Log entry by completing PPM 1.3.1 Attachments 6.4 and 6.5. The WO# for this is 02002814 and the INOP/LCO/LCS reference for this is 10,130.

When you have completed the assigned task, present the completed forms to your examiner.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   LICENSED OPERATOR INITIAL TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE - ADMIN

LESSON TITLE   DETERMINATION IF MOVEMENT OF HEAVY LOAD OVER SPENT FUEL POOL CAN OCCUR

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.
Simulator Guide PQD Code		Rev. No.
JPM PQD Code	LO001630	Rev. No. 1
Exam PQD Code		Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 5/27/08

REVISED BY   Ron Hayden   DATE 07/19/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

DETERMINE IF LOAD CAN BE MOVED OVER SPENT FUEL POOL

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Setup Instructions:

Have a copy of the following for each student:

Have access to PPM 1.3.40 (Specifically pages 1-7 and attachment 7.5

LCS Book (Specifically LCS 1.9.2 including graph)

JPM Instructions:

Verify the current revisions of each drawing against the JPM. If the drawings are a different revision than listed in the JPM, ensure the JPM is still technically correct. If the JPM is not technically correct, the JPM should be revised.

The evaluator document results on the "Results of JPM" page.

Tools/Equipment: N/A **Safety Items:** N/A

Task Number: SRO-0059; SRO-0096 **Validation Time:** 15 minutes

Prerequisite Training: N/A **Time Critical:** NO

PPM Reference: PPM 1.3.40 Rev. 21 **Location:** CLASSROOM OR SIMULATOR

LCS 1.9.2 Rev. 44

NUREG 1123 Ref: 2.2.18 2.6 / 3.9 **Performance Method:** PERFORM

DETERMINE IF LOAD CAN BE MOVED OVER SPENT FUEL POOL

JPM CHECKLIST

PROCEDURE VALIDATION:	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	Columbia is shutdown for a refueling outage with the following plant parameters given: Fuel shuffle has been completed with core verification taking place. The Spent Fuel Pool has been verified to be subcritical for GT 24 Hrs. The following equipment is OOS: RHR-P-2C HPCS System including the HPCS-DG RRA-RIS-3 Reactor Building In-Plant Air Particulate Monitor REA-RIS-609A/B & C/D Reactor Building Exhaust Plenum RMS PRM-RE-1A, 1B & 1C Reactor Building Low, Intermediate, and High Range Stack Monitor TRA-RIS-1 Turbine Building In-Plant Air Particulate Monitor No alternate sampling method has been identified/is available
INITIATING CUE:	The on-shift Mechanical Maintenance Supervisor has just requested permission for a load of 1190 lbs to be carried 5 feet over the Spent Fuel Pool. On the next page, indicate your intention of allowing the move over the Spent Fuel Pool by initialing where indicated OR indicate your intention of disallowing the move over the Spent Fuel Pool and your associated reason. When done, hand the completed sheet to the examiner.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
		RECORD START TIME: _____	
	Refers to PPM 1.3.40 Attachment 7.5 and determines:	#1 is answered yes – the requirement is satisfied (SPF is subcritical for GT 24 hours – given in initial conditions)	S / U
		#2 is answered yes – the load meets height and weight restrictions of LCS 1.9.2 (1190 lbs at a height of 5 ft. puts you in the 'permitted' area)	S / U
		#3 is answered NO as there are no operational instruments to monitor an offsite release	S / U *
Termination Criteria: Candidate hands the examiner the completed attached sheet.				
		RECORD TERMINATION TIME: _____	
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.				

LO001630 Rev. 1

DETERMINE IF LOAD CAN BE MOVED OVER SPENT FUEL POOL

RESULTS OF JPM:
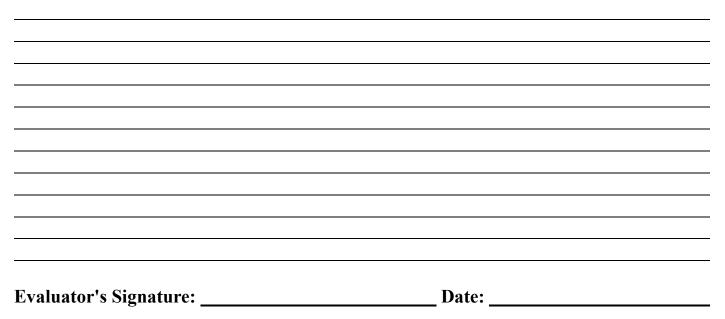
Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Candidate indicates that the move of 1190 lbs 5 ft. over the spent fuel pool is NOT allowed due to answering question #3 of PPM 1.3.40 Attachment 7.5 "NO" as the requirement for monitoring instrumentation is NOT satisfied.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	15 Minutes / N / A	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

STUDENT JPM INFORMATION CARD

Initial Conditions:

Columbia is shutdown for a refueling outage with the following plant parameters given:

Fuel shuffle has been completed with core verification taking place

The Spent Fuel Pool has been verified to be subcritical for GT 24 Hrs

The following equipment is OOS:

    RHR-P-2C

    HPCS System including the HPCS-DG

    RRA-RIS-3 Reactor Building In-Plant Air Particulate Monitor

    REA-RIS-609A/B & C/D Reactor Building Exhaust Plenum RMS

    PRM-RE-1A, 1B & 1C Reactor Building Low, Intermediate, and High Range Stack Monitor

    TRA-RIS-1 Turbine Building In-Plant Air Particulate Monitor

    No alternate sampling method has been identified/is available

Cue:

The on-shift Mechanical Maintenance Supervisor has just requested permission for a load of 1190 lbs to be carried 5 feet over the Spent Fuel Pool.

On the next page, indicate your intention of allowing the move over the Spent Fuel Pool by initialing where indicated OR indicate your intention of disallowing the move over the Spent Fuel Pool and the reason for disapproval.

When done, hand the completed sheet to the examiner.

NRC SRO ADMIN JPM EXAM

YES – I would give permission for the 1190 lb load to be moved 5 foot over the Spent Fuel Pool as requested by the on-shift Mechanical Maintenance Supervisor.

_____
Initials

NO – I would NOT give permission for the 1190 lb load to be moved 5 foot over the Spent Fuel Pool as requested by Mechanical Maintenance Supervisor for the following reason:

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ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	INITIAL LICENSED OPERATOR TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE – SRO ADMIN
LESSON TITLE	APPROVAL OF CW AND PLANT SERVICE WATER BLOWDOWN (Faulted)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.
Simulator Guide PQD Code		Rev. No.
JPM PQD Code	LO001725	Rev. No. 0
Exam PQD Code		Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Chris Maxwell   DATE 7/15/10

REVISED BY   N/A   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

Each candidate should have access to PPM 12.2.9
Each candidate should have access to SOP-CW-OPS

JPM Instructions:

Verify the current revisions of each procedure against the JPM. If the procedures are a different revision than listed in the JPM, ensure the JPM is still technically correct. If the JPM is not technically correct, the JPM should be revised.

The evaluator document results on the "Results of JPM" page.

Tools/Equipment: None　　　　　　**Safety Items:** None

Task Number: SRO-0091　　　　　　**Validation Time:** 10 minutes

Prerequisite Training: N/A　　　　　**Time Critical:** NO

PPM Reference: PPM 12.2.9 Rev. 34　　**Location:** CLASSROOM OR SIMULATOR

　　　　　　　　SOP-CW-OPS Rev. 11

NUREG 1123 Ref: 2.3.6 2.0 / 3.8　　**Performance Method:** PERFORM

JPM CHECKLIST

PROCEDURE VALIDATION	Regarding procedure copies for evaluator and student, if the procedure revision is different from that listed on the JPM, verify that the critical task steps are the same. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	- Columbia is operating at 100% power. - CW and TSW Halogenation has just been completed. - CW-PHR-1 is in service. - CBD-FR-10 was removed from service and Danger Tagged this morning. - CBD-FI-1A is isolated for calibration. - Halogen concentration has been verified LT 0.1 ppm in two samples taken 20 minutes apart. - CW pH has been verified to be between 6.5 and 9.0.
INITIATING CUE:	Chemistry is requesting approval to commence CW Blowdown per PPM 12.2.9. Complete PPM 12.2.9 to step 11.4.1.When your decision is made, check a box on the answer sheet to indicate whether you would approve or would not approve CW Blowdown. If not approved is selected, provide the bases for your disapproval. When done, hand the completed sheet to the examiner.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
RECORD START TIME: _____			
PPM 12.2.9 Step 11.3	Verify NPDES required flow instrumentation is available per SOP-CW-OPS (N/A the other).	Refers to SOP-CW-OPS step 5.8.3	

Comments	Element	Standard	Sat/Unsat
SOP-CW-OPS step 5.8.3	Verify the following NPDES monitoring instruments or approved alternate instruments/methods are in service prior to initiating Blowdown: Primary Instruments: CW-PHR-1 (pH recorder) (CW-PNL-1); CBD-FR-10 (CW Blowdown Flow) (H13-P840). Approved Alternate Instrument/Method: Grab samples every 8 hours; CBD-FI-1A (CBD Flow) (H13-P840).	Identifies Primary pH Instrument, CW-PHR-1, is in service. Identifies the primary instrument, CBD-FR-10 is NOT in service (has been removed from service and is danger tagged). Identifies the approved alternate instrument/method, CBD-FI-1A, is also NOT in service (has been isolated for calibration).	S / U S / U * S / U *
PPM 12.2.9 Step 11.3	Verify NPDES required flow instrumentation is available per SOP-CW-OPS (N/A the other).	Does not initial instrumentation available with Circ Water pumps in operation signoff.	S / U *
EVALUATOR: Step 11.4 may not be performed if the SRO determines that the blowdown will not be recommended based on step 11.3.			
PPM 12.2.9 Step 11.4	Determine NPDES required pH monitoring method to be used. CW-PHR-1 is in service. Grab Samples required every eight hours.	Determines CW-PHR-1 is in service per the initial conditions and initials that line and N/A's the other.	S / U
Step 11.4.1	Approve blowdown.	Determines the conditions required to initiate CW Blowdown have NOT been met and places a mark in the "NOT APPROVED" block on the answer sheet. Bases indicates that the required flow instrumentation is NOT available.	S / U * S / U *
Termination Criteria: Candidate hands the completed answer sheet to the examiner.			
RECORD TERMINATION TIME: _____			

LO001725 Rev. 0

Comments	Element	Standard	Sat/Unsat
Transfer the following information to the "Results of JPM" page: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time. The marked up procedure and remaining JPM pages may be discarded.			

RESULTS OF JPM:
APPROVAL OF CIRCULATING AND PLANT SERVICE WATER BLOWDOWN

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Places a mark in the "NOT APPROVED" block on the answer sheet and includes verbiage that indicated the required flow instrumentation is not available.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	LO001725 Rev. 0

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

Initial Conditions:

- Columbia is operating at 100% power.

- CW and TSW Halogenation has just been completed.

- CW-PHR-1 is in service.

- CBD-FR-10 was removed from service and Danger Tagged this morning.

- CBD-FI-1A is isolated for calibration.

- Halogen concentration has been verified LT 0.1 ppm in two samples taken 20 minutes apart.

- CW pH has been verified to be between 6.5 and 9.0.

Cue:

Chemistry is requesting approval to commence CW Blowdown per PPM 12.2.9. Complete PPM 12.2.9 to step 11.4.1 to decide to either approve or not approve blowdown.

When your decision is made, check the corresponding box on the answer sheet provided. If 'NOT APPROVED' is selected, provide the bases for your disapproval.

When done, hand the completed answer sheet to the examiner.

SRO ADMIN JPM ANSWER SHEET

[ ] **APPROVED**

[ ] **NOT APPROVED:** _____

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When completed, hand this sheet to the examiner.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   INITIAL LICENSED OPERATOR TRAINING

COURSE TITLE   ADMIN JOB PERFORMANCE MEASURE

LESSON TITLE   PERFORM QEDPS AND DETERMINE EAL (TC) (ADMIN)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code   Rev. No. _____

Simulator Guide PQD Code   Rev. No. _____

JPM PQD Code   LO001728   Rev. No. 0

Exam PQD Code   Rev. No. _____

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 04/18/11

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

   N/A

Special Setup Instructions:

   Have QEDPS loaded on a computer.
   Computer is turned on and QEDPS shortcut is on desktop.
   Have computer set up at NRC table in classroom.
   Have PPM 13.8.1 available.
   Have PPM 13.1.1 flow chart available.

   Candidate is given initial cue at the NRC table. Candidate will enter data into QEDPS. The time critical portion of the JPM starts when the QEDPS run button is selected which displays the dose/dose rate screen of the program.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None   **Safety Items:** None

Task Number: SRO-0638, 0233   **Validation Time:** 10 Minutes to enter data and 5 to make classification determination

Prerequisite Training: N/A   **Time Critical:** Yes 15 Minutes to make classification

PPM Reference: PPM 13.8.1 Rev. 29   **Location:** Simulator/Classroom

                   PPM 13.1.1 Rev. 36

NUREG 1123 Ref: 2.4.41 (2.9 / 4.6)   **Performance Method:** Perform

LO001728 Rev. 0

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	Events have occurred at Columbia and have resulted in the following: The reactor scrammed one hour and 55 minutes ago A release is underway from the turbine building and has been ongoing for one hour and fifteen minutes Wind Speed is 2 mph Wind Direction is from 300° TB HVAC flow rate is 335000 cfm The Turbine Building Intermediate Range monitor indicates 10 pmu The Stability Class is E
INITIATING CUE:	The Shift Manager has directed you to perform a QEDPS and make an EAL recommendation based on the results. Inform the Shift Manager when the QEDPS has been completed and of your EAL recommendations by filling in the information on the attached sheet. When completed hand the sheet to your examiner.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	**RECORD START TIME:** _____
	Calculates Offsite dose projection	Accesses the QEDPS program and enters data to calculate the Thyroid CDE dose at 1.2 miles to be 7767 mr	S / U *
	The time critical portion of the JPM starts after the data has been entered and the RUN button has been selected which will display the QEDPS Dose/Dose Rate screen.
	**WHEN the RUN button is depressed inform the candidate that the JPM is now time critical and the time starts now. Time Critical Start:_____**
	Classifies event and recommends GE EAL based on Thyroid CDE at 1.2 miles being GT 5 R	Fills in attached sheet: Recommends a GE per EAL 5.1.G.2 based on Thyroid CDE at 1.2 miles being GT 5 Rem within 15 minutes	S / U *
	**Termination Criteria: Candidate hands in the attached sheet with EAL Recommendation and Bases for the EAL recommendation completed.**
	**RECORD TERMINATION TIME:** _____
	**Transfer the following information to the "Results of JPM" page: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical steps; Total JPM time. The marked up procedure and remaining JPM pages may be discarded.**

LO001728 Rev. 0

RESULTS OF JPM:
PERFORM QEDPS AND DETERMINE EAL

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Performs QEDPS to calculate thyroid CDE dose at 1.2 miles is GT GE Level. Declares a GE per EAL 5.1.G.2 due to Thyroid CDE dose at 1.2 miles being GT 5 Rem within 15 minutes of completing the QEDPS.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	8 Minutes / 15 Minutes	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001728 Rev. 0

STUDENT JPM INFORMATION CARD

Initial Conditions:

Events have occurred at Columbia and have resulted in the following:

- The reactor scrammed one hour and 55 minutes ago
- A release is underway from the Turbine Building and has been ongoing for one hour and fifteen minutes
- Wind Speed is 2 mph
- Wind Direction is from 300°
- TB HVAC flow rate is 335000 cfm
- The Turbine Building Intermediate Range monitor indicates 10 pmu
- Stability Class is E

Cue:

> The Shift Manager has directed you to perform a QEDPS and make an EAL recommendation based on the results.
>
> Inform the Shift Manager when the QEDPS has been completed and of your EAL recommendations by filling in the information on the attached sheet.
>
> When completed, hand the sheet to your examiner.

LO001728 Rev. 0

ATTACHED SHEET

EAL Recommendation (include specific EAL number):

_____

_____

Bases for the EAL Recommendation:

_____

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Facility: <u>COLUMBIA GENERATING STATION</u>   Date of Examination: <u>April 2011</u>

Exam Level: RO X   SRO-I X   SRO-U X   Operating Test No.: <u>1</u>

Control Room Systems[@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. LPCS-P-2 Fails, Start LPCS-P-1, SW-V-12A Fails to Auto Open (LO001722) (IC 171)	N, A, S	8 R, SRO/I, SRO-U
b. Manually Initiate Containment Isolations (TIP Fails to Isolate) (LO001599) (IC 171)	D, A, S, L, EN	5 R, SRO/I, SRO-U
c. SRV Fails open does not close requiring a scram (ATWS occurs to aid in performance of other JPM but is not part of this JPM. This JPM is ended when MODE switch goes to shutdown. (LO001717) (IC 172)	M, A, S	3 R, SRO/I
d. ATWS – Install RPS Jumpers per PPM 5.5.11 (LO001685) (IC 172)	P, D, S	7 R, SRO/I
e. Rx Building Ventillation Trouble – Start SGT (LO001602) (IC 173)	M, A, S	9 R, SRO/I
f. Slow close the MSIVs (LR001792) (IC 173)	D, L, S	4 R, SRO/I
g. Start ASD Channel 1A2 – Uncontrolled rise in RRC/P speed (LO001718) (IC 174)	M, S, A	1 R, SRO/I
h. Transfer SM-7 from Startup Power to Backup Power (LR001943) (IC 174)	D, S	6 R

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. Vent Scram Air Header EOP 5.5.11 Tab D (LO001593)	D, E, R	1 R, SRO/I, SRO-U
j. Start RCIC from RSD – RPV/L LT –147" requires ED (LR001846)	D, P, A, E, R, L	2 R, SRO/I, SRO-U
k. CR EVAC - Start DG-2 and Trip HPCS per Attachment 7.5 (LO001719)	N, R, E, L, EN	6 R, SRO/I, SRO-U

@   All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

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

Actual JPM count:

(A) – 6 / 6 / 3
(C) - None
(D) – 6 / 5 / 3
(E) – 3 / 3 / 3
(EN) – 2 / 2 / 1
(L) – 4 / 4 / 3
(N) (M) – 5 / 5 / 2
(P) – 2 / 2 / 1
(R) – 3 / 3 / 3
(S) – 8 / 7 / 2

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   INITIAL LICENSED OPERATOR TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   LPCS-P-2 fails, Start LPCS-P-1, SW-V-12A Fails to Auto Open (Faulted, Sim)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.
Simulator Guide PQD Code		Rev. No.
JPM PQD Code	LO001723	Rev. No. 0
Exam PQD Code		Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 07/07/10

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

Start LPCS-P-1, SW-V-12A Fails to Auto open

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Fail SW-V-12A Auto open feature off

Special Setup Instructions:

N/A

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None

Task Number: RO-0463

Prerequisite Training: None

PPM Reference: SOP-LPCS-SP Rev. 3

NUREG 1123 Ref: 400000 A4.01 (3.1 / 3.0)

Safety Items: None

Validation Time: 5 Minutes

Time Critical: No

Location: Simulator

Performance Method: Perform

Start LPCS-P-1, SW-V-12A Fails to Auto open

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical steps re-verified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	LPCS-P-2 is known to be failing. All prerequisites of SOP-LPCS-SP have been verified.
INITIATING CUE:	The CRS has directed you to start LPCS-P-1 in suppression Pool mixing per SOP-LPCS-SP. Allow SW-P-1A to auto start. Inform the CRS when LPCS is in Suppression Pool mixing and system operation has been verified.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
**RECORD START TIME:** _____
NOTE: This section assumes the LPCS System is in Standby Status.   NOTE: SW-P-1A may be allowed to auto start following LPCS-P-1 start.
Step 5.1.1 This step may be performed any time after LPCS-P-1 is started	Verify SW-P-1A running	Observes SW-P-1A not running after associated time delay Observes SW-V-2A closed Observes SW-V-12A closed	S / U
**CUE: If candidate informs CRS that SW-A is not running, direct the candidate to: "Take the necessary actions to start SW-P-1A".**
		Student may attempt to manually start SW by taking the control switch for SW-P-1A to START but notes that SW-P-1A did not start Takes the control switch for SW-V-12A to OPEN and notes valve starts to open and SW-P-1A does start Verifies proper system operation in that SW-P-1A start, SW-V-12A and SW-V-2A fully open and normal flow is observed	S / U *

Start LPCS-P-1, SW-V-12A Fails to Auto open

Comments	Element	Standard	Sat/Unsat
Step 5.1.2	If LPCS-SYS-1 is required to be operable, then enter LPCS-SYS-1 as inoperable, but available, in the Plant Logging System	Informs CRS that LPCS-SYS-1 should be entered as inoperable, but available, in the Plant Logging System	S / U
CAUTION: To minimize cavitation and increased pump hydraulic loads/vibrations, minimize operating with LPCS-FCV-11 (Minimum Flow) as its only discharge path.			
Step 5.1.3	Start LPCS-P-1	Turns the control switch clockwise to START	S / U *
Step 5.1.4	Verify LPCS-FCV-11 opens during low flow conditions (approximately 800 gpm) (Minimum Flow Bypass)	Observes LPCS-FCV-11's red light lit and green light out when flow is LT 800 gpm	S / U
Step 5.1.5	Throttle open LPCS-V-12 for approximately 6400 gpm (Test Bypass to Suppression Pool)	Turns control switch for LPCS-V-12 clockwise to OPEN until flow reaches approximately 6400 gpm	S / U *
Step 5.1.6	Verify LPCS-FCV-11 closes (approximately 800 gpm)	Observes LPCS-FCV-11's green light lit and red light out when flow is greater than 800 gpm	S / U
Step 5.1.7	Notify HP that radiological conditions may have changed	Notifies HP that radiological conditions may have changed	S / U
Step 5.1.8	Monitor Suppression Pool temperatures	Monitors Suppression pool temperature	S / U
Termination Criteria: Student informs CRS that LPCS has been placed in suppression pool mixing and system operation has been verified.			
RECORD TERMINATION TIME: _____			
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.			

Start LPCS-P-1, SW-V-12A Fails to Auto open

RESULTS OF JPM:

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: LPCS has been placed in Suppression Pool mixing per SOP-LPCS-SP and SW-P-1A has been started.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	8 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

Initial Conditions: It is known that LPCS-P-2 is failing.

All prerequisites of SOP-LPCS-SP have been verified.

Cue:

The CRS has directed you to start LPCS-P-1 in suppression Pool mixing per SOP-LPCS-SP.

Allow SW-P-1A to auto start.

Inform the CRS when LPCS is in Suppression Pool mixing and system operation has been verified.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   INITIAL LICENSED OPERATOR TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   MANUALLY INITIATES CONTAINMENT ISOLATIONS FOR THE TIP SYSTEM (SIMULATOR) (ALT PATH)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.	
Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001599	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 05/18/06

REVISED BY   Ron Hayden   DATE 07/07/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

    Reset to IC-14.
    Ensure GDS screen on P601 is displayed.
    Fail TIP-V-5 open.
    Trip both RFW pumps.
    Ensure RPV level drops to LT -50".
    After scram place mode switch in shutdown.

Special Setup Instructions:

    None

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None   **Safety Items:** None

Task Number: RO-0314   **Validation Time:** 15 Minutes

Prerequisite Training: N/A   **Time Critical:** No

PPM Reference: ABN-TIPS Rev. 1   **Location:** Simulator

NUREG 1123 Ref: 223002 A2.03 A3.01 A3.02   **Performance Method:** Perform

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	The plant was operating at full power when both RFW pumps tripped. RPV level dropped to less than –50 inches.
INITIATING CUE:	The CRS has directed you to ensure all isolations for –50 inches RPV level signal per EOP 5.1.1. Another licensed operator will verify initiations and DG starts. Inform the CRS when EOP isolations for –50 inches have been verified.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	RECORD START TIME: _____		
Candidate is not given any reference material to start this JPM. Candidate may refer to GDS screen or quick card to determine required isolations. GDS will indicate TIP-V-5 is opened. The indicating lights for the valve on P601 will also indicate valve is opened.			
CUE: When informed that TIP-V- 5 is opened, inform the candidate "You are directed to take the necessary actions to isolate the penetration per ABN-TIPS" and hand the candidate his procedure copy.			
	Identifies all isolations are not complete	Refers to GDS screen or quick card and notes TIP-V-5 is not closed and informs the CRS	S / U *
CUE: When note is read, inform candidate that no TIP operations are being performed.			
NOTE: If the failure to isolate occurred during TIP operation, this procedure may be entered at step 4.5.			
CUE: When step is read, inform candidate that the TIP Drive Unit Breakers are all closed			
Step 4.1	If necessary, Then CLOSE the following TIP Drive Unit Breakers:…..	Cued that all breakers are closed – not performed	S / U

Comments	Element	Standard	Sat/Unsat
Step 4.2 (The Manual Drive switch is labeled MANUAL)	Verify the following for each Drive Control Unit (A through E) (H13-P607): • The Mode switch is in the OFF position • The Manual Drive switch is in the OFF position • The Manual Valve Control switch is in the CLOSED position	Observes the Mode switch for each drive is in the OFF position (a thru e) Observes the Manual Drive switch for each drive is in the OFF position (a thru e) Observes the Manual Valve Control switch is in the CLOSED position	S / U S / U S / U
Step 4.3	Place the MODE switch to the MAN position for each Drive Control Unit (A through E)	Turns the Mode switch for each drive (a thru e) to the MAN position	S / U
Step 4.4	Verify the following: • The READY light is illuminated	Observes the READY light illuminated for each drive	S / U
	• The IN-SHIELD light is illuminated. (If any detectors are NOT IN-SHIELD, proceed to the following step)	Observes the In-Shield light illuminated for each drive	S / U
CUE: Inform candidate that the detector position is at the posted IN-SHIED location			
	• The detector position is at the posted IN-SHIELD location, ± 1"	Cued that the detectors are at the In-Shield posted position	S / U
Step 4.5	REFER to Technical Specification 3.6.1.3	Refers CRS to applicable Tech Spec	S / U
Step 4.6	If any detector is not in-shield, then retract each affected detector to the IN-SHIELD position as follows: • Place the Manual Drive Control switch on the appropriate Drive Control Unit to the REV position • Verify the IN-SHIELD light is illuminated	Recognizes that all detectors are IN-SHIELD – not performed	S / U

LO001599 Rev. 1

Comments	Element	Standard	Sat/Unsat
Step 4.7	If the detector is still not IN-SHIELD, then consider manually cranking the affected detector to the IN-SHIELD position from the Drive Mechanism per PPM 10.27.74	Recognizes that all detectors are IN-SHIELD – not performed	S / U
Step 4.8	If the detector is still not IN-SHIELD **OR the isolation valve has failed to close**, then isolate the affected TIP line(s) as follows:		
CUE: IF asked, the CRS/Shift Manager gives permission to fire the squib valve (Candidate may already assume he has permission from last communication/cue).			
Step 4.8.1	Obtain permission from the CRS/Shift Manager to fire the applicable squib valve(s)	Requests permission to fire the squib valve	S / U
Step 4.8.2	Place the key lock valve control switch (key number 31,32,33,34,35) on the appropriate valve control drawer to the FIRE position for the channel(s) that did not isolate	Obtains a key from the key locker outside the Shift Managers office. Places the TIP shear valve (TIP-V-5) to the FIRE position.	S / U S / U *
Step 4.8.3	Verify the applicable squib Monitor lights are illuminated	Observes the squib and shear valve monitor lights illuminated for TIP-V-5	S / U
Termination Criteria: Inform the Candidate that the termination point for the JPM has been reached. **Do not permit candidate to go to front panel to verify steps 4.8.4 and 4.8.5.**			
RECORD TERMINATION TIME: _____			
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.			

LO001599 Rev. 1

RESULTS OF JPM:

MANUALLY INITIATES CONTAINMENT ISOLATIONS FOR THE TIP SYSTEM

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: The line associated with TIP-V-5 has been isolated per ABN-TIP.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	15 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001599 Rev. 1

LO001599 Rev. 1

Initial Conditions:

The plant was operating at full power when both RFW pumps tripped.

RPV level dropped to less than –50 inches.

Cue:

The CRS has directed you to ensure all isolations for a -50 inch RPV level signal per EOP 5.1.1.

Another licensed operator will verify initiations and DG starts.

Inform the CRS when EOP isolations for -50 inches have been verified.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   OPERATIONS TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   REACTOR SCRAM REQUIRED DUE TO A STUCK OPEN SAFETY RELIEF VALVE   (FAULTED) (SIM)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.
Lesson Plan PQD Code		
Simulator Guide PQD Code		
JPM PQD Code	LO001717	0
Exam PQD Code		

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE   07/07/10

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

A 100% power IC
Snap an IC with the following malfunctions:

                                        <ACTION>Insert override OVR-RRS021D to ON</ACTION>
                                        <DESCRIPTION>MS-RV-3A SAFETY RELIEF OPEN</DESCRIPTION>

                                        <ACTION>Insert override OVR-RRS021C to OFF</ACTION>
                                        <DESCRIPTION>MS-RV-3A SAFETY RELIEF OFF</DESCRIPTION>

                                        Fail of MS-RV-3A's Red light; Fail off MS-RV-3A's green light; Fail on the SRV OPEN and the SRV TAILPIPE TEMP HIGH Annunciators

Special Setup Instructions:

    N/A

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None   **Safety Items:** Safety glasses, fuse pullers

Task Number: RO-1063   **Validation Time:** 12 Minutes

Prerequisite Training: N/A   **Time Critical:** N/A

PPM Reference: ABN-SRV Rev. 3   **Location:** Simulator

NUREG 1123 Ref: 239002 A2.03 (4.1 / 4.2)   **Performance Method:** Perform

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks re-verified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	With Columbia operating at full power, Safety Relief Valve MS-RV-3A opened. Main Generator output has dropped by 75 MWe.
INITIATING CUE:	The CRS has directed you to perform the actions associated with ABN-SRV to close Safety Relief Valve, MS-RV-3A. Inform the CRS when the SRV is closed.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	RECORD START TIME: _____		
CUE: Cue response of simulated actions based on procedure and student actions			
Step 4.1	Verify the SRV is open by one or more of the following: • Rising tail pipe temperature at MS-TR-614 on H13-P614 • Rising Supp. Pool temperature or level • Reduction in Main Gen. output (~70 MWe)	A reduction in Generator output was given in Initial Conditions but may also check tail pipe temperature, SP level or SP temperature	S / U
Step 4.2	If reactor power is LE 90%, then place the control switch for the open SRV to OFF.	Observes Reactor Power at GT 90% and does not perform this step	S / U
Step 4.3	If reactor power is GT 90%, then perform the following:		
Step 4.3.1	Place control switch for the open SRV to OPEN	Turns the control switch for MS-RV-3A to OPEN	S / U *
Step 4.3.2	Reduce reactor power to LE 90% with RRC flow per PPM 3.2.4	Lowers reactor power to LE 90% with RRC flow using the Master Controller Lower P/B	S / U *
Step 4.3.3	Place the control switch for the open SRV to OFF	Turns the control switch for MS-RV-3A to OFF	S / U *
NOTE: The following three steps may be performed in any order or simultaneously			

Comments	Element	Standard	Sat/Unsat
ROLEPLAY – When step 4.4 is verbalized/reached, inform the candidate that another reactor operator will place RHR in Suppression Pool Cooling			
Step 4.4	Place one loop of RHR (B preferred) in Suppression Pool Cooling per SOP-RHR-SPC	Cued not to perform this step	S / U
NOTE: Division 1 (A) ADS SRV open demand signal is indicated by the SRV red light lit on H13-P628 and H13-P601 vertical section			
NOTE: Division 2 (B) ADS SRV open demand signal is indicated by the SRV red light lit on H13-P631 and H13-P601 vertical section			
NOTE: Actual SRV position from the SRV LVDT is indicated on H13-P601, horizontal section			
Step 4.5	If the open SRV is an ADS SRV, then verify the ADS SRV control switch is in AUTO on both of the following panels	Notes that the open SRV is NOT an ADS SRV and does not perform this step	S / U
Step 4.6 Fuse pullers and safety glasses in drawer next to the EOP Support Procedure drawer	IF the SRV remains open, then remove the fuse(s) listed on Attachment 7.1 for the open SRV	Refers to Attachment 7.1 and using fuse pullers, removes fuses associated with MS-RV-3A: Removes fuse BB-F21 in H13-P628	S / U *
		Removes fuse BB-F22 in H13-P628	S / U *
CUE: If candidate informs the CRS that flow reduction and scram are required then cue candidate: "Reduce RRC flow to 60 Mlbm/hr and scram the reactor"			
Step 4.7	If the SRV remains open, then reduce RRC flow to 60 Mlbm/hr per PPM 3.2.4, and SCRAM the reactor per PPM 3.3.1	Observes MS-RV-3A indication and notes valve is still open as the red light still illuminated, and the green light still out Student may informs the CRS that MS-SRV-3A is still open and ABN-SRV now requires a flow reduction and insertion of a manual scram or Student lowers RRC flow to 60 Mlbm/hr using Master Controller Lower P/B and inserts a manual scram by taking the mode switch to the shutdown position.	S / U *
Termination Criteria: When the MODE switch is taken to SHUTDOWN, inform the student that the termination point of the JPM has been reached.			

Comments	Element	Standard	Sat/Unsat

RECORD TERMINATION TIME: _____

Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.

RESULTS OF JPM:
STUCK OPEN SRV REQUIRES REACTOR SCRAM

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: MS-RV-3A fuses have been removed, RRC flow has been reduced and a Reactor Scram has been inserted per ABN-SRV.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	12 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

Initial Conditions:

With Columbia operating at full power, Safety Relief Valve MS-RV-3A opened

Main Generator output has dropped by 75 MWe

Cue:

The CRS has directed you to perform the actions associated with ABN-SRV to close Safety Relief Valve, MS-RV-3A

Inform the CRS when the SRV is closed

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   OPERATIONS TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   RESPOND TO A HYDRAULIC ATWS AND INSTALL RPS AND RSCS JUMPERS PER PPM 5.5.11 (SIMULATOR)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.
Lesson Plan PQD Code		
Simulator Guide PQD Code		
JPM PQD Code	LO001685	Rev. No. 1
Exam PQD Code		Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 6/11/09

REVISED BY   Ron Hayden   DATE 07/07/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

A power IC with a 100% Hydraulic ATWS inserted.

Special Setup Instructions:

Start the second CRD Pump and activate trigger to put both suction and drive filters on line

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: Four jumpers for PPM 5.5.11   **Safety Items:** Safety glasses

Task Number: RO-0678   **Validation Time:** 6 Minutes

Prerequisite Training: N/A   **Time Critical:** No

PPM Reference: PPM 5.5.11 Rev. 5   **Location:** Simulator

NUREG 1123 Ref: 212000 A4.01 (4.6 / 4.6)   **Performance Method:** Perform

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	The plant has experienced a Hydraulic ATWS. PPM 5.1.1 was entered and exited to PPM 5.1.2 RPV Control, ATWS. The SDV HIGH LEVEL TRIP control switch is in BYPASS and the scram cannot be reset.
INITIATING CUE:	The CRS has directed you to override the RPS trip signals per Attachment 6.1 of PPM 5.5.11. Inform the CRS when the scram is ready to be reset.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
START THIS JPM at the drawing table.			
RECORD START TIME: _____			
Candidate should NOT be allowed to verify the first two actions done due to performance of other JPM.			
Step 1	Gets PPM 5.5.11 form EOP drawer and performs the following at H13-P611	Performs the following at P611	S / U
Step 1.1	Install a jumper between RPS-RLY-K9B, terminal stud 2, and RPS-RLY-K12F, Terminal stud 4	Install a jumper between RPS-RLY-K9B, terminal stud 2, and RPS-RLY-K12F, Terminal stud 4	S / U *
Step 1.2	Install a jumper between RPS-RLY-K9D, terminal stud 2, and RPS-RLY-K12H, Terminal stud 4	Install a jumper between RPS-RLY-K9D, terminal stud 2 and RPS-RLY-K12H, Terminal stud 4	S / U *
Step 2	Perform the following at H13-P609	Performs the following at P609	S / U
step 2.1	Install a jumper between RPS-RLY-K9A, terminal stud 2, and RPS-RLY-K12E, Terminal stud 4	Install a jumper between RPS-RLY-K9A, terminal stud 2 and RPS-RLY-K12E, Terminal stud 4	S / U *
step 2.2	Install one jumper between RPS-RLY-K9C, terminal stud 2, and RPS-RLY-K12G, Terminal stud 4	Install a jumper between RPS-RLY-K9C, terminal stud 2 and RPS-RLY-K12G, Terminal stud 4	S / U *

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	**CUE: When the candidate informs you that the scram is ready to be reset inform him that the ATC operator is completing the remainder of TAB B. The ATC operator is now ready to drive control rods. Bypass all RSCS rod blocks to facilitate driving control rods manually per PPM 5.5.11 Attachment 6.2 and inform the CRS when the RSCS rod blocks have been bypassed.**		
Attachment 6.2	Bypass RSCS by installing one jumper from terminal 7 to terminal 8 on each of the following Baily Alarm Cards on H13-P613 • AHH (MS-PS-654A) • AGG (MS-PS-654B)	At H13-P613: • install a jumper between terminal 7 and terminal 8 on Baily Alarm Card AHH • install a jumper between terminal 7 and terminal 8 on Baily Alarm Card AGG	S / U * S / U *
	**Termination Criteria: The candidate informs the CRS that the Attachment 6.2 is complete.**		
	**RECORD TERMINATION TIME:** _____		
	**Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical steps; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.**		

RESULTS OF JPM:

INSTALL RPS JUMPERS PER PPM 5.5.11

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: PPM 5.5.11 Tab B Attachment 6.1 and Attachment 6.2 have been performed.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	6 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

Initial Conditions:

The plant has experienced a Hydraulic ATWS.

PPM 5.1.1 was entered and exited to PPM 5.1.2 RPV Control, ATWS.

The SDV HIGH LEVEL TRIP control switch is in BYPASS and the scram cannot be reset.

Cue:

The CRS has directed you to override the RPS trip signals per Attachment 6.1 of PPM 5.5.11.

Inform the CRS when the scram is ready to be reset.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   INITIAL LICENSED OPERATOR TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   RB HVAC FAILURE; START SGT (ALT PATH) (SIMULATOR)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS 1

INSTRUCTIONAL MATERIALS INCLUDED

			Rev. No.	
Lesson Plan PQD Code			Rev. No.	
Simulator Guide PQD Code			Rev. No.	
JPM PQD Code	LO001724		Rev. No.	0
Exam PQD Code			Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 07/07/10

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Any IC where REA-FN-1B is running.

Special Setup Instructions:

Insert malfunctions to prevent REA-FN-1A from auto/manually starting.
Trip REA-FN-1B.
Insert malfunction to prevent ROA-FN-1B from auto tripping.
Insert malfunction to prevent SGT-V-5B-2 from auto opening.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None

Task Number: RO-0491; RO-0383

Prerequisite Training: N/A

PPM Reference: ARP 4.812.R2 9-1; SOP-SGT-START-DIV/2-QC Rev. 0

NUREG 1123 Ref: 295035 EA1.01 (3.6/3.6)
295035 EA1.02 (3.8/3.8)

Safety Items: None

Validation Time: 10 Minutes

Time Critical: No

Location: Simulator

Performance Method: Perform

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	The 'RX BLDG HVAC DIV1 and DIV2 Board R Trouble' alarms have just annunciated. The alarms were acknowledged on P851 S1 and S2.
INITIATING CUE:	The CRS has directed you to investigate and respond to the Reactor Building HVAC annunciators.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	RECORD START TIME: _____		
Note: The candidate may refer to ARP 4.812.R2.9-1 or ARP 4.812.R1.10-3.			
Note: The following four elements are for ARP 4.812.R2.9-1, and are N/A if a different ARP is selected.			
	Responds to the back panel 4.812.R2 and notes annunciator 'RX BLDG EXH FAN B TRIP' (9-1) is illuminated	Refers to ARP 4.812.R2.9-1	S / U
ARP step 1	Verify REA-FN-1B tripped	Checks REA-FN-1B tripped – red light out, green light lit	S / U
ARP Step 2	If required, then start REA-FN-1A	Turns control switch to START for REA-FN-1A and notes it will not start	S / U
ARP Step 3	If neither Reactor Building Exhaust Fan can be started, then perform the following: a. Refer to SOP-SGT-START-DIV1(2)-QC, Standby Gas Treatment Start – Quick Card	Refers to SOP-SGT-START-DIV1(2)-QC, Standby Gas Treatment Start – Quick Card	S / U
Note: The following three elements are for ARP 4.812.R1.10-3, and are N/A if a different ARP is selected.			
	Responds to the back panel 4.812.R1 and notes annunciator 'BOTH RX BLDG EXH FANS NOT RUNNING' (10-3) is illuminated	Refers to ARP 4.812.R1.10-3	S / U

LO001724 Rev. 0

Comments	Element	Standard	Sat/Unsat
ARP step 1	If a Reactor Building Supply Fan is running, then immediately start one Reactor Building Exhaust Fan	Recognizes ROA-FN-1B is running, then turns the control switch to START for REA-FN-1A and notes it will not start	S / U
ARP step 2	If neither Reactor Building Exhaust Fan can be started, then perform the following: a. Refer to SOP-SGT-START-DIV1(2)-QC, Standby Gas Treatment Start – Quick Card	Refers to SOP-SGT-START-DIV1(2)-QC, Standby Gas Treatment Start – Quick Card	S / U
CUE: If candidate decides to start the 'A' SGT train, cue candidate to use the 'B' SGT Train			
Quick Card Step 3.1.1 2H OK	IF necessary, then place the following fans PTL: • ROA-FN-1A • ROA-FN-1B • REA-FN-1A • REA-FN-1B	Places the control switch for the following fans in PTL: • ROA-FN-1A • ROA-FN-1B • REA-FN-1A • REA-FN-1B	S / U S / U * S / U S / U
Step 3.1.2	If necessary, then close the following valves: • ROA-V-1 • ROA-V-2 • REA-V-1 • REA-V-2	May or may not turn the control switch for the following to Close: • ROA-V-1 • ROA-V-2 • REA-V-1 • REA-V-2	S / U
Step 3.1.3	Momentarily turn SGT-FN-1B2 fan control switch from AUTO to PTL SYS. START	Momentarily turn SGT-FN-1B2 fan control switch from AUTO to PTL SYS. START	S / U *

Comments	Element	Standard	Sat/Unsat
Step 3.1.4	Verify the following:	Observes the following:	
	• Main Heaters energize as indicated by Main Heater ON light and B2 amp meters	Main Heater ON light illuminated and B2 amp meter indicates on scale	S / U
	• SGT-V-5B2 Opens	Notes that SGT-V-5B2 did not auto open (Fan may start prior to manually opening valve)	S / U
		Takes control switch clockwise to the OPEN position and observes red light lit and green light out	S / U *
	• SGT-FN-1B2 STARTS	SGT-FN-1B2 red light lit, green light out	S / U
Note: to prevent a fan trip flow should be GT 750 CFM and LT 5378 CFM			
Step 3.1.5	If required to operate in manual flow control, then refer to SOP -SGT-START	Observes auto flow control maintaining flow and should not take manual control (OK if he does)	S / U

Termination Criteria: Candidate informs the CRS that REA-FN-1B tripped, REA-FN-1A would not start, SGT 'B' train was started and is operating and SGT-V-5B-2 did not auto open.

Note: If candidate continues with the ARP actions after SGT is started, inform the candidate that the termination point of the JPM has been reached.

RECORD TERMINATION TIME: _____

Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.

RESULTS OF JPM:

RB HVAC FAILURE; START SGT

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Reactor Building Ventilation has been secured; SGT B train has been started per SOP-SGT-START-DIV/2-QC

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

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Evaluator's Signature: _____ **Date:** _____

LO001724 Rev. 0

Initial Conditions:

The 'RX BLDG HVAC DIV1 and DIV2 Board R Trouble' alarms have just annunciated. The alarms were acknowledged on P851 S1 and S2.

Cue:

The CRS has directed you to investigate and respond to the Reactor Building HVAC annunciators.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   OPERATIONS TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   SLOW CLOSE THE INBOARD MSIVs (SIMULATOR)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.	
Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LR001792	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE 9/12/06

REVISED BY   Ron Hayden   DATE 07/07/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Go to a 100% IC set. Take MODE switch to shutdown. Trip both RFW pumps when RPV level is about 36". Load the LOCAL CAEP file. Start both CRD pumps and initiate trigger 26 to place both suction and discharge filters into service. Initiate RCIC and set for level control. Allow plant to stabilize.

Special Setup Instructions:

   N/A

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None   **Safety Items:** None

Task Number: RO-0736   **Validation Time:** 10 Minutes

Prerequisite Training: N/A   **Time Critical:** No

PPM Reference: SOP-MSIV-OPS Section 5.3 Rev. 13   **Location:** Simulator

NUREG 1123 Ref: 239001 A4.01 (4.2 / 4.0)   **Performance Method:** Perform

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	Columbia has just scrammed. TDAS is NOT available.
INITIATING CUE:	The CRS has directed you to slow close the inboard MSIVs. Timing of the closure of the MSIVs will be performed by your evaluator. Inform the CRS when the Inboard MSIVs are closed.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	RECORD START TIME: _____		
CAUTION: Do not fast close MSIVs in non-emergency situations, unless authorized by the Shift Manager			
CAUTION: If steam flow in any Main Steam line exceeds 4.7 x 106 lbm/hr, a high steam flow Group 1 isolation will occur.			
CAUTION: If one Main Steam line is isolated, limit operating reactor power to LE 75%. There is no GE analysis for operating greater than rated steam flow. Operating with steam flow GT rated flow may cause flow induced vibrations in the operating steam lines. It is postulated that the high vibrations may cause a steam line to fail to close when required, in one of the three operational steam lines.			
Step 5.3.1	If isolating one Main Steam line, then verify reactor power is LE 75%	Isolating all MSIVs (does not perform)	S / U
Step 5.3.2	If isolating multiple Main Steam lines, then verify the reactor is shutdown	Verifies Reactor is shutdown from review of turnover sheet or observation of plant conditions	S / U
NOTE: Timing of MSIVs is required each time the MSIVs are slow closed, except ….			
NOTE: It is acceptable to close the MSIVs with water in the steam line, provided the MSIVs are not being timed for surveillance requirements (stroke time will be slower than normal).			
	IF TDAS is available, then START and STOP the TDAS recorder(s) as necessary during MSIV closure, to monitor the TDAS data points specified below. (20 samples per second, real time plot). N/A when closing MSIVs following a scram.	TDAS Given as not available in Initial Conditions. This is also N/A'ed after a scram (not performed)	S / U

Comments	Element	Standard	Sat/Unsat
NOTE: The recorded data is for information only, to be used for monitoring and trending purposes, there is no specific acceptance criteria.			
NOTE: The Manual slow closure closing stroke time shall be measured from the time when the slow close pushbutton is depressed until the red (open) light extinguishes.			
NOTE: If PDIS is available the MSIV stroke times should be determined using PDIS, if PDIS is not available stopwatch data is acceptable.			
Step 5.3.4	Perform the following to CLOSE MS-V-22A:		
Step 5.3.4a	Place MS-V-22A control switch in the OPEN SLOW TEST position	Places MS-V-22A control switch in the OPEN SLOW TEST position	S / U *
NOTE: The following step allows the MSIV to SLOW CLOSE fully.			
ROLEPLAY: When each MSIV is closed, inform the candidate that closing time was between 55 and 60 seconds (vary reading for each MSIV)			
Step 5.3.4b (2H)	Depress and hold the TEST pushbutton for MS-V-22A	Depress and Holds the TEST pushbutton for MS-V-22A	S / U *
Step 5.3.4c	Record the closing time from full open to closed	Records the closing time from full open to closed	S / U
Step 5.3.4d (2H)	When MS-V-22A is closed for GT 10 seconds, then place MS-V-22A control switch to CLOSE	When MS-V-22A is closed for GT 10 seconds, places MS-V-22A control switch to the closed position	S / U *
Step 5.3.4e	Release the TEST pushbutton	Releases the TEST pushbutton	S / U *

Comments	Element	Standard	Sat/Unsat
Step 5.3.5	Perform the following to CLOSE MS-V-22B:		
Step 5.3.5a	Place MS-V-22B control switch in the OPEN SLOW TEST position	Places MS-V-22B control switch in the OPEN SLOW TEST position	S / U *
NOTE: The following step allows the MSIV to SLOW CLOSE fully.			
Step 5.3.5b (2H)	Depress and hold the TEST pushbutton for MS-V-22B	Depress and Holds the TEST pushbutton for MS-V-22B	S / U *
Step 5.3.5c	Record the closing time from full open to closed	Records the closing time from full open to closed	S / U
Step 5.3.5d (2H)	When MS-V-22B is closed for GT 10 seconds, then place MS-V-22B control switch to CLOSE	When MS-V-22B is closed for GT 10 seconds, places MS-V-22B control switch to the closed position	S / U *
Step 5.3.5e	Release the TEST pushbutton	Releases the TEST pushbutton	S / U *

Termination Criteria: When MS-V-22B is closed inform the candidate that the termination point of the JPM has been reached.

RECORD TERMINATION TIME: _____

Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.

RESULTS OF JPM:
SLOW CLOSE THE INBOARD MSIVs

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Inboard MSIVs MS-V-22A and MS-V22B have been slow closed per SOP-MSIV-OPS.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

Initial Conditions: Columbia has just scrammed.

TDAS is NOT available.

Cue:

The CRS has directed you to slow close the Inboard MSIVs.

Timing of the closure of the MSIVs will be performed by your evaluator.

Inform the CRS when the Inboard MSIVs are closed.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   OPERATIONS TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   Restore ASD Channel 1A2; Inadvertent RRC Flow Increase (Faulted) (Sim)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001718	Rev. No.	0
Exam PQD Code		Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE   07/08/10

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:
Reset to a 40 to 50% power IC.
Reduce each loops flow to 34%.

Insert a fault on RRC-P-1A channel 1A2 and then delete the fault.
Go to panels and turn OFF the lower pushbutton for individual Loop A controller.
Load the following into the IC set: IOR OVR-RFC029P ON to insert on TRIGGER 1.
Write an Event file that when the red ASD light illuminates for 1A2 channel (X02O127R & gt 0)
This will depresses the RAISE P/B for RRC-P-1A when the channel starts.

Special Setup Instructions:

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None

Safety Items: None

Task Number: RO-1162; RO-0083

Validation Time: 10 Minutes

Prerequisite Training: N/A

Time Critical: No

PPM Reference: SOP-RRC-ASD Rev. 8; ABN-POWER Rev. 12

Location: Simulator

NUREG 1123 Ref: 202001 A2.05 (3.8 / 4.0)

Performance Method: Perform

LO001718 Rev. 0

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	Columbia was operating at full power when ASD Drive Channel 1A2 tripped. The channel has been repaired and is ready to be returned to service. A downpower has been performed and power is approximately 42%. SOP-RRC-ASD Section 5.6.3 steps a thru f have been completed by OPS2 who is standing by in the ASD building.
INITIATING CUE:	The CRS has directed you to restore ASD Channel 1A2 to service. Inform the CRS when both ASD channels for RRC-P-1A are running and E-CB-ASD1/3/1 (Division A Heaters) has been verified off.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
RECORD START TIME: _____			
Step 5.6.3g	Verify ASD Drive Channel 1A2 FAULT lamp is extinguished	Observes the fault lamp for drive 1A2 is not illuminated	S / U
Step 5.6.3h	Verify the READY lamp for ASD Drive Channel 1A2 is illuminated (H13-P602)	Observes white ready light on P602 is illuminated for channel 1A2	S / U
NOTE: The following step may require maneuvering the plant, per PPM 3.2.1, in order to maintain RRC flows balanced while reducing pump frequency to start the stopped ASD drive channel.			
Step 5.6.3i	Verify the frequency of ASD Drive Channel 1A1 is LE 35 Hz (H13-P602)	Observes the Actual Hz for RRC-P-1A on Individual Loop A Control RRC-M/A-R676A is LE 35 Hz	S / U
CAUTION: A decrease in pump frequency of -4 Hz, followed by the pump returning to its original speed, may occur when the ASD drive channel is returned to service. The duration of this transient is expected to be approximately one second.			
NOTE: A momentary "GTO FREEZE" alarm may be expected upon channel start. This alarm may be cleared by depressing the local reset pushbutton. An actual "GTO FREEZE" alarm will cause the channel to fault and trip.			
Step 5.6.3j	Depress the ASD Start button for ASD Drive Channel 1A2 (H13-P602)	Depress the ASD Start button for ASD Drive 1A2	S / U *
Step 5.6.3k	Verify the run lamp is illuminated for ASD Drive Channel 1A2 (H13-P602)	Observes the red lamp for ASD Drive Channel 1A2 (NO.2) is illuminated	S / U

Comments	Element	Standard	Sat/Unsat
Fault occurs when channel Start button is depressed	Acknowledges various alarms and notes that the speed for RRC-P-1A is going up without operator demand		S / U *
	May informs the CRS that RRC-P-1A speed is rising without demand		S / U
CUE: If CRS is informed of the rise in RRC-P-1A speed, only provide the repeat back– do not give any direction.			
ABN-POWER – Immediate Actions	If RRC pump speed is rising for one pump and cannot be controlled, then stop the affected RRC pump.	May attempt to stop the rising pump speed by depressing the lower button for RRC-P-1A but notes that this does not stop pump speed increase.	S / U
		Depresses the STOP pushbutton for RRC-P-1A and verifies it stops.	S / U *
Termination Criteria: When the student informs the CRS that RRC-P-1A was tripped due to speed rising without operator action inform the student that the termination point of the JPM has been reached.			
RECORD TERMINATION TIME: _____			
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.			

RESULTS OF JPM:
RESTORE ASD CHANNEL; INADVERTENT RRC FLOW INCREASE

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: ASD Channel 1A2 is started per SOP-RRC-ASD and RRC-P-1A is stopped per immediate action step of ABN-POWER.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

Initial Conditions:

Columbia was operating at power when ASD Drive Channel 1A2 tripped. The channel has been repaired and is ready to be returned to service.

A downpower has been performed and power is approximately 42%.

SOP-RRC-ASD Section 5.6.3 steps a thru f have been completed by OPS2 who is standing by in the ASD building.

Cue:

The CRS has directed you to restore ASD Channel 1A2 to service.

Inform the CRS when both ASD channels for RRC-P-1A are running and E-CB-ASD1/3/1 (Division A Heaters) has been verified off.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE **OPERATIONS TRAINING**

COURSE TITLE JOB PERFORMANCE MEASURE

LESSON TITLE TRANSFER SM-7 TO TR-B FROM SM-1 (Simulator)

LESSON LENGTH .5 HRS MAXIMUM STUDENTS 1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.
Lesson Plan PQD Code		
Simulator Guide PQD Code		
JPM PQD Code	LR001943	1
Exam PQD Code		

DIVISION TITLE Nuclear Training

DEPARTMENT Operations Training

PREPARED BY Ron Hayden DATE 09/02/09

REVISED BY Ron Hayden DATE 07/08/10

TECHNICAL REVIEW BY DATE

INSTRUCTIONAL REVIEW BY DATE

APPROVED BY DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Reset to an IC with SM-7 being powered from SM-1, SM-8 is not powered from TR-B and power is available from TR-B.

Special Setup Instructions:

N/A

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None   **Safety Items:** None

Task Number: RO-1244   **Validation Time:** 10 minutes

Prerequisite Training: N/A   **Time Critical:** No

PPM Reference: SOP-ELEC-4160V-OPS Section 5.7 Rev. 5   **Location:** Simulator

NUREG 1123 Ref: 262001 A4.01 (3.4 / 3.7)   **Performance Method:** Perform

LR001943 Rev. 1

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks reverified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	Columbia is operating at power.
INITIATING CUE:	The Control Room Supervisor has directed you transfer SM-7 from SM-1 to the Backup Transformer. Inform the CRS when the SM-7 is powered from the Backup Transformer and the CB-B7 Sync Selector Switch is in the OFF position.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
	RECORD START TIME: _____		
CAUTION: SM-7 should not be operated on TR-B longer than absolutely necessary. SM-7 should be transferred back to SM-1 as soon as practicable.			
CAUTION: Do not allow TR-B to supply SM-7 and SM-8 at the same time.			
NOTE: It may be necessary to transfer SM-7 to the Backup Transformer (TR-B) to start a large plant load…			
NOTE: The controls and indications necessary to perform this section are located at H13-P800 (Bd C).			
Step 5.7.1	Verify E-CB-TRB Closed	Observes red light illuminated and green light extinguished for E-CB-TRB	S / U
Step 5.7.2	Verify the following: • TR-B voltage GE 115 KV • SM-8 is not being supplied from TR-B	Observes TRB voltage GT 115 and CB-B8 is opened with green light illuminated and red]light extinguished	S / U
Step 5.7.3	Verify E-CB-B7 white LOCKOUT CIRCUIT AVAIL light illuminated	Observes the white LOCKOUT CIRCUIT AVAIL light illuminated on CB-B7	S / U
Step 5.7.4	Verify E-CB-B7 READY TO XFR light illuminated	Verifies READY TO XFR light illuminated on CB-B7	S / U
Step 5.7.5	Verify E-CB-B7 green light illuminated and green flag displayed	Observes green light illuminated and green flag displayed on CB-B7	S / U

LR001943 Rev. 1

Comments	Element	Standard	Sat/Unsat
Step 5.7.6	Verify E-CB-7/1 white LOCKOUT CIRCUIT AVAIL light illuminated	Observes the white LOCKOUT CIRCUIT AVAIL light illuminated on CB-7/1	S / U
Step 5.7.7	Verify E-CB-7/1 red light illuminated	Observes red lights illuminated on CB-7/1	S / U
Step 5.7.8	Place E-CB-B7 Sync Selector switch in MANUAL	Places the Sync selector switch for CB-B7 in the MANUAL position	S / U *
Step 5.7.9	Verify voltage present on both incoming and running buses	Observes voltage present on both incoming and running buses	S / U
NOTE: The blue Sync Permit light for E-CB-B7 is illuminated from initiation of breaker closure until closure actually occurs NOTE: E-CB-7/1 should automatically trip when E-CB-B7 closes NOTE: H13-800.C.1.1-7, BKR 7-1 TRIP will alarm when the following step is performed NOTE: H13-800.C4.3-5 TR-B REV PWR RELAY may alarm when the following step is performed			
Step 5.7.10	Close E-CB-B7	Takes the control switch for CB-B7 to the close position	S / U *
Step 5.7.11	Verify E-CB-7/1 auto trips	Observes green light illuminates and red light extinguishes on CB-7/1	S / U
Step 5.7.12	Place E-CB-7/1 control switch in TRIP	Takes control switch for CB-7/1 to the TRIP position	S / U *
Step 5.7.13	Verify E-CB-7/1 green light illuminated and green flag displayed	Observes the green light illuminated and green flag displayed on CB-7/1	S / U
Step 5.7.14	Place E-CB-B7 Sync Selector switch in OFF	Takes the Sync Selector switch for CB-B7 to the OFF position	S / U
Termination Criteria: Student informs CRS that SM-7 is powered from TR-B and the Sync Selector Switch is in OFF for CB-B7.			

RECORD TERMINATION TIME: _____

Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.

LR001943 Rev. 1

RESULTS OF JPM:
TRANSFER SM-7 FROM SM-1 TO TR-B

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: SM-7 is powered from TR-B per SOP-ELEC-4160V-OPS and the Sync Selector Switch is in OFF.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LR001943 Rev. 1

Initial Conditions:

Columbia is operating at power.

Cue:

> # The Control Room Supervisor has directed you transfer SM-7 from SM-1 to the Backup Transformer.
>
> # Inform the CRS when the SM-7 is powered from the Backup Transformer and the CB-B7 Sync Selector Switch is in the OFF position.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   INITIAL LICENSED OPERATOR TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   INSERT CONTROL RODS BY VENTING SCRAM AIR HEADER (Plant)

LESSON LENGTH   .5 HRS   MAXIMUM STUDENTS   1

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.	
Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001593	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Ron Hayden   DATE   5/22/06

REVISED BY   Ron Hayden   DATE   07/08/10

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

N/A

JPM Instructions:

Verify the current procedure against the JPM. If the procedure is a different revision than listed in the JPM, ensure the critical steps still match. If the critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: Pre-staged EOP Tools   **Safety Items:** None

Task Number: RO-0680   **Validation Time:** 9 Minutes

Prerequisite Training: N/A   **Time Critical:** NO

PPM Reference: PPM 5.5.11 Rev. 5   **Location:** PLANT

NUREG 1123 Ref: 295037 EA1.05 (3.9/4.0)   **Performance Method:** SIMULATE

JPM CHECKLIST

PROCEDURE VALIDATION	Regarding procedure copies for evaluator and student, if the procedure revision is different from that listed on the JPM, verify that the critical task steps are the same. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	A scram has been initiated and the blue scram lights are extinguished at H13-P603. Reactor pressure is stable at 930 psig and Reactor Power is 38%.
INITIATING CUE:	The CRS has directed you to insert control rods by venting the Scram Air Header per PPM 5.5.11 Tab D. Inform the CRS when Tab D has been completed. The performance of this JPM will be simulated. Control manipulations will not be performed.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
RECORD START TIME: _____			
PPM 5.1.1 Tab D is given to candidate			
	Close CRD-V-95, Scram Air Header Isolation	Turns handwheel for CRD-V-95 clockwise to close valve	S / U *
	Close CRD-V-729, CRD-PI-13 Isolation	Turns handwheel for CRD-V-729 clockwise to close valve	S / U *
Note/Caution: Pressurized air will be released when drain plug is removed from CRD-PI-13 which could cause personnel injury			
CUE: Inform candidate that the drain line plug is removed if rotated in proper direction.			
Step Q-3	Remove instrument drain plug for CRD-PI-13	Using pre-staged wrench, rotates instrument drain plug counterclockwise on CRD-PI-13 until drain plug is removed	S / U *
Cue: When CRD-V-729 is rotated in the counter-clockwise direction, inform the candidate that air can be heard venting from the drain line.			
When CRD-V-729 is fully open, inform the candidate that air can no longer be heard venting.			
Step Q-4	Open CRD-V-729, CRD-PI-13 isolation	Turns handwheel for CRD-V-729 counter-clockwise to open the valve	S / U *

LO001593 Rev. 1

Comments	Element	Standard	Sat/Unsat
CUE: When CRD-PI-13 is checked, indicate 0 psig on the gauge face. **When the Control Room is contacted, inform the candidate that no further rod motion is observed.**			
	When scram air header is fully depressurized and no further rod motion observed	Verifies CRD-PI-13 indicates the air header is depressurized Contacts the Control Room to verify the status of rod motion.	S / U S / U
	Restore system alignment as follows:		
step 1	Close CRD-V-729	Turns handwheel for CRD-V-729 clockwise until valve is closed	S / U *
step 2	Install instrument drain plug for CRD-PI-13	Turns the instrument drain plug for CRD-PI-13 clockwise to install it	S / U *
step 3	Open CRD-V-729	Turns handwheel counter-clockwise for CRD-V-729	S / U *
step 4	Open CRD-V-95	Turns handwheel counter-clockwise for CRD-V-95	S / U *
Termination Criteria: Student informs CRS that actions to vent Scram Air Header have been completed.			
   RECORD TERMINATION TIME: _____			
Transfer the following information to the "Results of JPM" page: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical steps; Total JPM time. The marked up procedure and remaining JPM pages may be discarded.			

RESULTS OF JPM:
INSERT CONTROL ROD BY VENTING SCRAM AIR HEADER

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: The scram air header has been vented and PPM 5.5.11 Tab D has been completed.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001593 Rev. 1

Initial Conditions:

A scram has been initiated and the blue scram lights are extinguished at H13-P603.

Reactor pressure is stable at 930 psig and Reactor Power is 38%.

Cue:

The CRS has directed you to insert control rods by venting the Scram Air Header per PPM 5.5.11 Tab D.

Inform the CRS when actions for Tab D have been completed.

THE PERFORMANCE OF THIS JPM WILL BE SIMULATED.

CONTROL MANIPULATIONS

WILL NOT BE PERFORMED.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   LICENSED OPERATOR/STA REQUALIFICATION TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   CONTROL ROOM EVACUATION – ED ON RPV LEVEL (Faulted) (Plant)

LESSON LENGTH   .5 HRS

INSTRUCTIONAL MATERIALS INCLUDED

		Rev. No.	
Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001740	Rev. No.	0
Exam PQD Code		Rev. No.	

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Chris Maxwell   DATE   3/23/11

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

   N/A

Special Setup Instructions:

   N/A

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None   Safety Items: None

Task Number: RO-0117, SRO-0251   Validation Time: 10 Minutes

Alternate Path: Yes   Time Critical: No

PPM Reference: ABN-CR-EVAC Attachment 7.11   Location: Plant
                     Rev. 18

NUREG 1123 Ref: 295016AK2.01 (4.4/4.5)   Performance Method: Simulate

Task Standard: Three SRVs have been opened on the RSD and three SRVs have been opened on the ARSD panels.

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks re-verified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	The Control Room has been evacuated due to fire. The immediate and subsequent operator actions of ABN-CR-EVAC have been completed. RCIC is running. Operators have been dispatched to perform all actions outside the Remote and Alternate Remote Shutdown Panels. ABN-CR-EVAC Flow Chart has been completed to Match Mark A-2.
INITIATING CUE:	The CRS has directed you to perform Attachment 7.11 of PPM ABN-CR-EVAC and establish level control +13 to +54 inches. Inform the CRS when level control has been established in the ordered level band. The performance of this JPM will be simulated. Control manipulations will not be performed.

* Items are Critical Steps

Time	Step	Element	Standard	Cue	Sat/Unsat
CAUTION: RCIC is not fire-protected and may become inoperable due to a Control Room fire					
CUE: If student asks what RPV level is PRIOR to simulated manipulation of the Power Transfer Switches, indicate on the RPV level instrument that RPV level is –130".					
	1	Step 7.11.1 - Monitor operating status of RCIC as follows:			
	2	Step 7.11.1a- Verify RCIC-E/S-1R power supply is energized (red 24 VDC & 48 VDC indicating lights at the bottom of C61-P001 illuminated)	Checks both red lights illuminated at bottom of C61-P001	The red lights are on	S / U
	3	Step 7.11.1b - Verify RCIC-FIC-1R is in AUTO with the setpoint at 600 gpm	Observes RCIC-FIC-1R is in the AUTO position with setpoint at 600 gpm	The black lever is under the 'A' and the red line is through the middle of 60	S / U
	4	Step 7.11.1c - Verify RCIC flow control RCIC-FIR-1R Power Transfer switch is in EMERG	Observes that the RCIC flow control RCIC-FIR-1R Power Transfer switch is in the EMERG position	The indicated power transfer switch has the black arrow on the pistol grip pointed towards EMERG	S / U

LO001740 Rev. 0

Time	Step	Element	Standard	Cue	Sat/Unsat
	5	Step 7.11.2 - When adequate personnel are available, then start a plot of RPV cooldown rate on Attachments 7.22 - 7.25	Verbalizes step (to CRS)	The RPV Cooldown rate plot has been started	S / U
	6	Step 7.11.3 - If RCIC is already operating, then align RCIC control switches as follows: RCIC-V-13 OPEN RCIC-V-46 OPEN RCIC-V-45 OPEN RCIC-P-4 START RCIC-P-2 START	Simulates placing the control switches to positions indicated: RCIC-V-13 to OPEN RCIC-V-46 to OPEN RCIC-V-45 to OPEN RCIC-P-4 to START RCIC-P-2 to START	For RCIC-V-13 – the white pointer on the control switch is pointing to OPEN For RCIC-V-46 - the white pointer on the control switch is pointing to OPEN For RCIC-V-45 - the white pointer on the control switch is pointing to OPEN For RCIC-P-4 - the white pointer on the control switch is pointing to START For RCIC-P-2 - the white pointer on the control switch is pointing to START	S / U *
	7	Step 7.11.4 - At C61-P001 (RSD) place the following five (5) power transfer switches to EMERG: **3, 4, 9, 10, 14**	At P61-P001 simulates placing the following five (5) power transfer switches to the EMERG position: **3, 4, 9, 10, 14**	As each of the indicated power transfer switches are simulated being repositioned, indicate that the black arrow on the pistol grip is pointed towards EMERG	S / U *

Time	Step	Element	Standard	Cue	Sat/Unsat
CUE: If the student checks the indications for the components associated power transfer switches 3, 4, 9, 10 and 14, they are as follows <u>after</u> the power transfer switch is placed in EMERG: • **RCIC-V-1, 8, 10, 13, 45, 46, 68, 69: red light is ON, green light is OFF** • **RCIC-V-19, 22, 31: green light is ON, red light is OFF** • **RCIC-P-2 and RCIC-P-4: red light is ON, green light is OFF**					
CAUTION: Low turbine speeds (LT 2100 rpm) may result in low steam flow conditions in the exhaust line and check valve damage.					
	8	Step 7.11.5 - If RCIC is not operating….	RCIC is operating – Does not perform this step		S / U
CUE: If RPV Level is checked, indicate that RPV level is as you see it (should be indicating downscale) If RPV Pressure is checked, indicate on the RPV Pressure meter that pressure is 900 psig					
	9	Step 7.11.6 – Adjust the flow controller setpoint as required to maintain RCIC turbine speed GT 2100 rpm and flow GE 300 and LE 600 gpm, and maintain RPV level between +13 and 54.5"	Verbalizes intent to maintain speed GT 2100 rpm and flow between 300 and 600 gpm	Indicate 3400 rpm on the Turbine Speed meter Indicate 590 gpm on the RCIC Flow meter	S / U
CUE: If the student reports RPV level as downscale (-147") to the CRS, then provide the following: Perform steps associated with an Emergency Depressurization per the ABN-CR-EVAC flowchart. Inform the CRS when the steps have been completed.					
	10		After receiving the cue: Student informs CRS that RPV level is off scale low (LT –147") and may recognize that an ED is required		S / U
NOTE: Do not allow student to open door C239 between the RSP and the ARSP as it will cause a security alarm.					
CUE: If the student attempts to use door C239, prompt them to use the doors that are used during normal (non-emergency) conditions.					
CUE: If checked <u>PRIOR</u> to switch manipulation the green lights are lit and the red lights are out for each SRV at the RSD and at the ARSD panels					

Time	Step	Element	Standard	Cue	Sat/Unsat
	11	Emergency Depressurization Step 1. - Open six (6) SRVs	At the RSD panel simulates taking the control switches for MS-RV-4A, V-4B, and V-4C to the open position	As each control is simulated being turned: red light is lit, green light is off	S / U *
			At the ARSD panel simulates taking the control switches for MS-RV-3D, V-5B, and V-5C to the open position	As each control is simulated being turned: red light is lit, green light is off	S / U *

Termination Criteria: When the control switches for the 6 SRVs have been placed in open, inform the student that the termination point of the JPM has been reached.

RECORD TERMINATION TIME: _____

Transfer the following information to the "Results of JPM" page: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical steps; Total JPM time. The marked up procedure and remaining JPM pages may be discarded.

LO001740 Rev. 0

RESULTS OF JPM:

CONTROL ROOM EVACUATION (ED ON RPV LEVEL)

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Three SRVs have been opened on the RSD and three SRVs have been opened on the ARSD panels.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001740 Rev. 0

Initial Conditions:

The Control Room has been evacuated due to fire

The immediate and subsequent operator actions of ABN-CR-EVAC have been completed

RCIC is running

Operators have been dispatched to perform all actions outside the Remote and Alternate Remote Shutdown Panels

ABN-CR-EVAC Flow Chart has been completed to Match Mark A-2

Cue:

The CRS has directed you to perform Attachment 7.11 of PPM ABN-CR-EVAC and establish level control +13 to +54 inches

Inform the CRS when level control has been established in the ordered level band

THE PERFORMANCE OF THIS JPM WILL BE SIMULATED

CONTROL MANIPULATIONS WILL NOT BE PERFORMED

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE   LICENSED OPERATOR/STA REQUALIFICATION TRAINING

COURSE TITLE   JOB PERFORMANCE MEASURE

LESSON TITLE   CONTROL ROOM EVACUATION – START DG-2 (TC) (Plant)

LESSON LENGTH   .5 HRS

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.
Simulator Guide PQD Code		Rev. No.
JPM PQD Code	LO001741	Rev. No. 0
Exam PQD Code		Rev. No.

DIVISION TITLE   Nuclear Training

DEPARTMENT   Operations Training

PREPARED BY   Chris Maxwell   DATE   3/24/11

REVISED BY   DATE

TECHNICAL REVIEW BY   DATE

INSTRUCTIONAL REVIEW BY   DATE

APPROVED BY   DATE

Operations Training Manager

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

This JPM is started at the DG-2 Room door. Read the candidate the Initial conditions and the initiating cue and then hand him Attachment 7.5.

JPM Instructions:

Verify Current Procedure against JPM and ensure procedure critical steps match if procedure is different revision than listed in JPM. If critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0117, SRO-0251

Validation Time: 10 Minutes

Prerequisite Training: N/A

Time Critical: Yes – 10 minutes

PPM Reference: ABN-CR-EVAC Attachment 7.5 Rev. 18

Location: Plant

NUREG 1123 Ref: 295016AK2.01 (4.4/4.5)

Performance Method: Simulate

JPM CHECKLIST

PROCEDURE VALIDATION	Procedure copies for evaluator and student, if procedure revision is different from that listed on JPM, critical tasks re-verified. Evaluator copy may be used for marking step completion, and comments.
INITIAL CONDITIONS:	The Control Room has been evacuated due to fire. The immediate and subsequent operator actions of ABN-CR-EVAC have been completed.
INITIATING CUE:	The CRS has directed you to perform Attachment 7.5 of PPM ABN-CR-EVAC. Inform the CRS when Attachment 7.5 has been completed. The performance of this JPM will be simulated. Control manipulations will not be performed. This is a time critical JPM and your time starts now.

* Items are Critical Steps

Comments	Element	Standard	Sat/Unsat
NOTE: This JPM is started at the DG-2 Room door. <center>RECORD START TIME: _____</center>			
NOTE: Phone number for RSD is 2649 or 2569, SM-8 is 2550.			
Step 7.5.1	Depress the Emergency Stop Pushbutton (E-CP-DG/RP2)	Simulates depressing the red Emergency Stop Pushbutton	S / U *
CUE: When the Diesel Engine Mode Selector Switch is placed in MAINT: • **The amber light (Maintenance Mode) illuminates** • **The white light (Standby Mode) extinguishes** • **'DIESEL NOT IN AUTO START (MAINT)' alarm is received on the local alarm panel.**			
Step 7.5.2	Place the Diesel Engine Mode Selector Switch to MAINT	Simulates turning the Diesel Engine Mode Selector Switch Counter Clockwise to the MAINT position	S / U *
CUE: When the lockout relay is reset: • **The white light (Lockout Circuit Available) illuminates** • **The Lockout Relay window just above the switch changes from orange to black.**			
Step 7.5.3	Reset the Lockout Relay (DG-RLY-86/DG2)	Simulates turning the lockout relay counter-clockwise to reset it	S / U *
CAUTION: DG-2 Engine Control Selector Switch is to be placed in the LOCAL position prior to placing DG-RMS-DG2/FTS56B in the EMERG position to prevent transferring a potentially faulted circuit, resulting in a loss of DG control circuitry			

Comments	Element	Standard	Sat/Unsat
Step 7.5.4	Verify the Engine Control Selector Switch is in the LOCAL position	Observes the Engine Control Selector Switch is in the CONTROL ROOM position and turns it to LOCAL	S / U *
Step 7.5.5	Place the remote transfer switch DG-RMS-DG2/FTS56B in the EMERG position (E-CP-DG2/RP2)	Simulates placing the remote transfer switch DG-RMS-DG2/FTS56B in the EMERG position (turns Clockwise)	S / U *

NOTE: Standby for direction from the CRS to initiate DG-2 Auto Fast-start and loading. Placing the Diesel Engine Mode Selector Switch to Auto will initiate the DG-2 Auto Fast-start and loading.

CUE: After next step is verbalized:
- **Inform the candidate as the CRS to place the Diesel Engine Mode Selector Switch to AUTO**

CUE: When the Diesel Engine Mode Selector Switch is placed in AUTO:
- **The amber light (Maintenance Mode) extinguishes**
- **The white light (Standby Mode) illuminates.**

CUE: If Diesel Engine Mode Selector Switch is correctly placed in AUTO:
- **Inform the candidate that DG-2 is running**

Comments	Element	Standard	Sat/Unsat
Step 7.5.6	When directed by the CRS, then place the Diesel Engine Mode Selector Switch to AUTO	When cued, simulates placing the Diesel Engine Mode Selector Switch to AUTO (turns clockwise)	S / U *
Step 7.5.7	If DG-2 failed to Auto start, then start DG-2 by depressing the Diesel Engine 1B1/1B2 START pushbutton (E-CP-DG/RP2)	Cued that DG-2 is running and does not perform this step	S / U

NOTE: Generator output voltage has to be at least 3910 volts for the generator output breaker (E-CB-DG2/8) to close

CUE: (At E-CB-DG2/8) The red light is illuminated, the green light is extinguished.

Comments	Element	Standard	Sat/Unsat
Step 7.5.8	If E-CB-DG2/8 did not automatically close, then perform the following:	Cued that E-CB-DG2/8 is closed and does not perform this step	S / U

Comments	Element	Standard	Sat/Unsat
Step 7.5.8a	Place DG-RMS-99/DG2/8/L in MAN (Local Synchronization Mode Selector) (E-CP-DG/RP2)	Does not perform	S / U
Step 7.5.8b	Place DG-RMS-DG2/CS/L to CLOSE (E-CB-DG2/8 Local control) (E-CP-DG/RP2)	Does not perform	S / U
Step 7.5.9	Notify the CRS that DG-2 has started, or report abnormal condition	Contact the CRS in the RSD room and reports DG-2 started	S / U
Termination Criteria: Student informs the CRS that DG-2 has started.			
RECORD TERMINATION TIME: _____			
Transfer the following information to the "Results of JPM" page: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time. The marked up procedure and remaining JPM pages may be discarded.			

RESULTS OF JPM:

CONTROL ROOM EVACUATION (ED ON RPV LEVEL)

Examinee (Please Print): _____

Evaluator (Please Print): _____

Task Standard: Attachment 7.5 of ABN-CR-EVAC has been performed and the required time critical steps have been performed within the time constraints.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	10 Minutes / 10 Minutes	

COMMENTS:

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Evaluator's Signature: _____ **Date:** _____

LO001741 Rev. 0

STUDENT JPM INFORMATION CARD

Initial Conditions:

The Control Room has been evacuated due to fire

The immediate and subsequent operator actions of ABN-CR-EVAC have been completed

Cue:

The CRS has directed you to perform Attachment 7.5 of PPM ABN-CR-EVAC.

Inform the CRS when Attachment 7.5 has been completed.

**THE PERFORMANCE OF THIS JPM
WILL BE SIMULATED.**

**CONTROL MANIPULATIONS
<u>WILL NOT</u> BE PERFROMED.**

**This is a
TIME CRITICAL JPM
and your time starts now.**

Facility: Columbia			NRC Exam Scenario No: 1

Examiners: _____   Operators: _____

_____   _____

_____   _____

Initial conditions: The plant is operating at 90% power (Due to economic dispatch).

Shift Directions: Reactor Power is to be raised to allow the Main Turbine to be placed into Governor Valve Optimization. When the DEH 'OKAY TO SELECT' light illuminates, stop the power increase and place the Main Turbine into Governor Valve Optimization. A Reactivity brief for the power increase has been held and power is to be increased immediately following shift turnover. There are no pre-conditioning limits. Control Room HVAC planned maintenance is scheduled. Immediately following shift turnover, swap CR HVAC Supply Fans to WMA-FN-51A running and WMA-FN-51B in standby per SOP-HVAC/CR-OPS. The power increase and fan swap are to be performed concurrently.

Event No.	Timeline	Event Type*	Event Description
1.	T = 0	R (SRO/ATC)	Increase power with flow.
2.	T = 15	C (SRO/BOP)	Swap Control Room HVAC Fans – WMA-AD-51A1 does not auto open and WMA-FN-51A trips (Tech Spec).
3.	T = 10	N (BOP)	Place the Main Turbine in Governor Valve Optimization when the OKAY TO SELECT light illuminates.
4.	T = 15	C (SRO)	HPCS-P-1 becomes inoperable due to loss of oil (Tech Spec).
5.	T = 25	C (SRO/BOP)	DEH pressure slowly lowers due to a failing DEH pump. The standby DEH pump does not auto start but may be manually started. DEH pressure is restored.
6.	T = 35	C (ALL)	Lowering TSW system pressure, Standby pump does not start due to discharge valve failing to auto open. Manual actions to open the valve are successful and the standby pump starts. TSW system pressure continues to lower. RRC flow lowered to 60 Mlbm/hr and a manual scram is inserted.

7.	T = 45	M, C (ALL)	Loss of Startup Power when the Main Turbine Trips, MSIVs close, LOCA.
8.	T = 50	C (BOP)	RCIC Trips and cannot be reset.
9.	T = 70		Attempts RPV level restoration but Emergency Depressurization is required when RPV Level cannot be maintained GT -183" and return RPV level to GT –161"(Critical Task).

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

The scenario starts with Columbia at 90% power due to economic dispatch.

After the crew takes the shift, power is to be raised to allow the Main Turbine to be placed into Governor Valve Optimization. The crew will raise power with flow at the rate of 10 Mwe/ minute.

At the same time, the BOP operator will swap operating Control Room Supply Fans per SOP-HVAC/CR-OPS. The Air Inlet damper for the fan being placed into service will not auto open. When manually opened, fan WMA-FN-51A will trip and Technical Specifications will be referenced.

When the OK to select light illuminates (at approximately 97% power), the crew will place the Main Turbine into Governor Valve Optimization per SOP-MT-GV/Optimization.

After the BOP Operator has been directed to place the Main Turbine in Governor Valve Optimization, the next event will start with a call to the SRO from OPS2 stating that oil was found all over the floor in the HPCS Pump Room. Investigation revealed that the oil came from HPCS-P-1 and ran down the side of the pump and onto the floors and that the oil reservoir on HPCS-P-1 indicates empty. The crew will declare HPCS Inoperable, enter Tech Spec 3.5.1B and direct the control power fuses for HPCS-P-1 be removed. The LPCS, RCIC and ADS A/B systems should be protected per PPM 1.3.83.

The next event is a failure of DEH-P-1A to maintain DEH pressure. The DEH Warning and the DEH Low Pressure alarms will annunciate. The crew will respond and as pressure continues to drop they will note that DEH-P-1B should have auto started but did not. DEH-P-1B will be manually started which will restore DEH system pressure.

The next event is a loss of Plant Service Water. TSW System pressure will begin to lower. The crew will respond to annunciation and note the lowering pressure. ABN-TSW will be entered and the standby TSW pump will be started. When started, the discharge valve will fail to auto open but will be able to be opened by operation of the control switch. TSW pressure will return to normal but will again begin to drop. The crew will eventually recognize a complete loss of TSW is occurring, lower core flow to 60 Mlbm/hr, and insert a manual reactor scram.

When the Main Turbine trips, the Startup Transformer will lockout causing a loss of power. SM-7 and SM-8 will be repowered from the Backup Transformer. The MSIVs will close and pressure control will be via SRVs. Wetwell and Drywell sprays will be initiated as necessary.

Additionally, when the Main turbine trips a LOCA will start. Due to the loss of Startup power, a loss of Condensate and Feed occurs. When RCIC is started, it will trip and will not reset.

CRD and SLC should be started in an attempt to maintain RPV level but will not be sufficient to prevent continued RPV level drop. If HPCS-P-1 fuses are reinstalled the pump will seize (due to lack of oil) shortly after being started.

When RPV level drops to -161" the crew will initiate an Emergency Depressurization. RPV level will be returned with low pressure ECCS Systems.

The scenario will be terminated when the Emergency Depressurization has performed and RPV level is being returned to normal band.

Event No. 1

Description: Raise Reactor Power with flow.

This event is initiated by the turnover information.

Time	Position	Applicants Actions or Behavior
T = 0	SRO	Directs the ATC to increase reactor power, at the rate of 10 MWE/minute, until the "OK to Select" light on DEH illuminates to allow the Main Turbine to be placed into Governor Valve Optimization.
	ATC	Increases reactor power with RRC flow as directed at the rate directed.

COMMENTS:

Event No. 2

Description: Swap Control Room HVAC Supply Fans with WMA-AD-51A1 not opening and WMA-FN-51A tripping on over current (Tech Spec). This event is initiated by turnover information and is commenced after the MT has been placed in Governor Valve Optimization.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: Damper malfunctions is active at the beginning of the scenario. **BOOTH OPERATOR: Have panel P826-06 displayed so damper position can be determined.**		
ROLEPLAY: If time is a consideration, contact the SRO as production and inform him that the system engineer is standing by at the WMA fan for the swap.		
T = 15	SRO	Directs BOP operator to swap Control Room HVAC Supply Fans per SOP-HVAC/CR-OPS
Steps per SOP	BOP	Verifies both Remote Air Intakes are unisolated
		StartsWMA-FN-51A by placing control switch to ON
		Verify WMA-AD-51A1 open – **Recognizes it is NOT open**
		May inform the SRO that the air damper did not open and ask permission to open it
	SRO	If asked, directs WMA-AD-51A1 be opened
	BOP	Takes control switch for WMA-AD-51A1 to open and recognizes it does open.
BOOTH OPERATOR: When the Air Damper is full open, Activate <u>TRIGGER 1</u> to trip WMA-FN-51A.		

	BOP	Responds to annunciators and refers to ARP.
		Recognizes WMA-FN-51A tripped and ensures WMA-AD-51A1 closed.
		Informs the SRO of tripped WMA fan.
	SRO	Refers to TS 3.7.3 (and BASES) – Control Room Emergency Filtration (CREF) System Technical Specification and notes Condition A is applicable (One CREF subsystem inoperable for reasons other than Condition B – Restore CREF subsystem to OPERABLE status in 7 days).
		May also refers to TS 3.7.4 – Control Room Air Conditioning System and notes Condition A is applicable (One control room AC subsystem inoperable – Restore control room AC subsystem to operable in 30 days).

ROLEPLAY: If asked to investigate, wait two minutes and report that WMA-FN-51A's fan motor is hot to the touch.

COMMENT:

Event No. 3		

Description: Place the Main Turbine into Governor Valve Optimization.

This event is initiated when power has been raised sufficiently to illuminate the 'OK TO SELECT' light on the DEH monitor.

Time	Position	Applicants Actions or Behavior
T = 10	SRO	When the "OK to Select" light illuminates, directs the BOP operator to place the Main Turbine into Governor Valve Optimization.
	BOP	Refers to SOP-MT-GV/Optimization and performs the following:
Step 5.1.2		Enter Governor Valve Optimization as follows:
a.		Verify LOAD TARGET is set at 1370 MW **(LOAD TARGET is at 1370)**
b.		If VPL DEMAND is not at 100%, Then set VPL DEMAND to 100% as follows: **(VPL DEMAND is at 100%)**
c.		Verify Optimize Valve Mode OKAY TO SELECT light illuminated
d.		Select OPTIMIZED VALVE MODE
e.		Select YES
f.		Verify GV-1 moves to approximately 50-55% as GV-4 throttles
g.		Set VPL DEMAND approximately 10% above GV DEMAND as follows:
1)		Select VPL TARGET
2)		Enter value that is approximately 10% above GV DEMAND **(enters 90)**
3)		Select OK
4)		Select GO
5)		Select YES
6)		Verify GO illuminated
h.		Verify VPL DEMAND ramps to VPL TARGET value
i.		Verify final VPL DEMAND indicates approximately 10% above GV DEMAND

COMMENTS:

Event No. 4		
Description: HPCS-P-1 Loss of oil makes HPCS Inoperable (Tech Spec). This event is initiated by a call to the SRO from OPS2 after the power increase has been stopped and the BOP operator has been directed to place the MT in Governor Valve Optimization.		

Time	Position	Applicants Actions or Behavior
T = 15		**ROLEPLAY: As OPS2, call the SRO at x2432 and inform him that oil was found all over the floor in the HPCS Pump Room. Investigation revealed the oil came from the HPCS-P-1 oil reservoir due to a crack in the pumps casing. Oil ran down the side of the pump and onto the floor. The oil reservoir on HPCS-P-1 is empty. No oil has entered the floor sump. You have placed oil absorbent pads in the oil and all oil is contained.**
	SRO	Updates/Briefs Crew on OPS2 report.
		Declares HPCS-P-1 Inoperable.
		Refers to Technical Specification 3.5.1 Condition B (Verify by admin means that RCIC System is OPERABLE when RCIC System is required to be OPERABLE – Immediately AND Restore HPCS System to OPERABLE status within 14 days.
		Directs HPCS-P-1 control fuses be removed/breaker racked out.
ROLEPLAY: If SRO contacts production and then delays in declaring HPCS inop, contact as production and inform him that the HPCS pump reservoir is empty and is due to a crack down the side of the pump.		
BOOTH OPERATOR: If directed, wait two minutes then **ACTIVATE TRIGGER 11** to rack out HPCS-P-1 Breaker and inform the Control Room when completed.		
	SRO/BOP	May refer to PPM 1.3.83 and protect LPCS, RCIC and ADS A/B due to HPCS being declared inoperable.
COMMENT:		

Event No. 5

Description: DEH-P-1A fails causing a DEH pressure drop with a failure of DEH-P-1B to auto start.

This event is triggered by activating **TRIGGER 2** after Technical Specifications for the WMA fan have been referenced and a brief has been conducted (it takes 3 minutes to get low pressure alarm).

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: Activate TRIGGER 2.		
T = 25	BOP	Announce the DEH Pump Press Low and DEH Warning annunciators.
		Observes DEH-PI-21 and informs SRO of pressure drop and it continues to drop.
		Refers to Alarm Response Procedures and notes DEH-P-1B should have started but is still not running.
		May start DEH-P-1B without direction from SRO.
		May reports to SRO that the standby pump did not auto start as it should have done and wait for direction.
	SRO	Directs start of standby pump (if not already started).
		Refers to ABN-DEH-LEAK.
		Directs OPS 3 to check system for indications of failure.
	SRO	Notifies PSRO/Work Control.
		Conducts brief.

ROLEPLAY: A minute after being sent, report back as OPS 3 that there doesn't seem to be anything wrong with DEH-P-1A. If asked, report that DEH-P-1B operation looks good. If asked, DEH reservoir level is normal (at 25 inches).		
	SRO	Direct DEH-P-1A be secured.
	BOP	Secures DEH-P-1A as directed.

COMMENTS:

Event No. 6

Description: Loss of TSW System pressure.
This event is triggered by activating **TRIGGER 3** after the power reduction has been stopped and a brief has been conducted.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: Activate TRIGGER 3		
T=25	BOP	Responds to TSW to TG Building pressure low annunciator (and others as they occur) and refers to the Alarm Response Procedure. Sends OPS4 to check pressure locally.
ROLEPLAY: OPS4 will report pressure same as control room reading on TSW-PI-28. Wait two minutes and report same reading.		
		Observes TSW pressure on TSW-PI-28 and informs SRO of pressure and that trend is down slow. NOTE: If TSW-P-1A is not manually started, when TSW pressure reaches 80 psig, TSW-P-1A will auto start.
	SRO	Directs investigation of TSW System. Enters ABN-TSW. May direct starting TSW-P-1A if not already running.
	BOP	Starts TSW-P-1A if directed.

		When TSW-P-1A starts, recognizes low running amps and that TSW-V-53A did not open.
		Informs SRO and takes control switch for TSW-V-53A to open and verifies valve opens.
		Reports valve opens to SRO and that TSW pressure is returning to normal.
BOOTH OPERATOR: A minute after TSW-V-53A is full open, Activate <u>TRIGGER 4</u> which begins a failure of TSW-P-1A to maintain system pressure.		
	BOP	The low pressure annunciators will again annunciate.
		Recognizes TSW pressure again beginning to lower and reports pressure and trend to SRO.
	SRO	As pressure continues to lower, recognizes that TSW system pressure will not be restored.
		Updates crew on planned reactor scram.
		May directs core flow be reduced to 60 Mlbm/hr.
	ATC	Reduces core flow if directed and informs SRO of power/pressure/level when completed.
	SRO	Directs a manual reactor scram be inserted.
	ATC	Performs immediate scram actions:
		Announces "Listen Up for the Scram Report" and places MODE switch to shutdown.
		Reports to SRO that the MODE switch in SHUTDOWN, APRMs are downscale, what current Reactor Pressure is and trend, that current RPV level is and trend, an EOP entry on RPV level exists.
		Reports All-Rods-In.
COMMENTS:		

Event No. 7

Description: Startup Transformer lockout causes a loss of Condensate and Feed and closure of the MSIVs. LOCA starts on a three minute time delay from when MT trips. Spray Wetwell and Drywell.

This event is active from the start of the scenario and occurs when the Main Turbine trips and Startup power closes in.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: EVENT trigger 6 is a lockout of TR-S.		
T=35	SRO	Enters PPM 5.1.1 and directs restoration of RPV level to -50 inches to +54 inches.
	ATC	Investigates electrical panels and reports a lockout of the Startup Transformer. Reports that SM-7 and SM-8 are both powered by the Backup Transformer. Observes both DGs started and may verify Service Water operation. Recognizes CAS compressors not running and directs OPS3 to reset/restart CAS.
BOOTH OPERATOR: If CAS reset is directed, activate <u>TRIGGERS 23, 24 and 25.</u>		
	BOP	Observes Reactor Pressure going up and notes MSIVs closed. Updates crew that MSIVs are closed and he has pressure control with the SRVs at 800 to 1000 psig.
	SRO	Directs pressure control with SRVs. Recognizes loss of Condensate and Feed and directs RCIC and CRD be started to maintain RPV level.

	BOP/ATC	Recognizes Drywell pressure rise and informs SRO of EOP entry when Drywell Pressure reaches 1.68 psig.
	SRO	Re-enters PPM 5.1.1 and enters PPM 5.2.1 on high Drywell pressure. Directs 1.68 psig actuations be verified.
	BOP	Reports Wetwell pressure when it reaches 2 psig.
	SRO	Directs Wetwell sprays be initiated with a RHR Loop.
	BOP	Uses Wetwell spray quick card and places RHR in wetwell sprays. Reports completion to SRO.
	BOP	Reports Wetwell pressure when it reaches 12 psig.
	SRO	Recognizes that RRC Pumps are not running and directs Drywell cooling fans be secured.
	BOP	Verifies Drywell cooling fans are off if directed to do so and reports completion to SRO.
	SRO	Verifies operation within DSIL. Directs Drywell Sprays be initiated.

	BOP	Uses Drywell Spray quick card and initiates drywell sprays as directed.
		Reports completion to SRO and informs him that sprays are effective.
Comments:		

Event No. 8		

Description: RCIC trips when started.

This event is active from the start of the scenario and is automatically initiated when RCIC-V-13 opens.

Time	Position	Applicants Actions or Behavior
T=35	SRO	Enters (and re-enters) PPM 5.1.1 and directs restoration of RPV level to -50" to +54" with RCIC and CRD.
	BOP	Arms and Depresses RCIC initiation pushbutton. Verifies RCIC start and recognizes RCIC trip annunciator and RCIC not running. Refers to RCIC quick card and attempts to reset the RCIC Turbine trip. Notes RCIC-V-1 does not open on reset attempt. Reports RCIC trip to SRO. Directs OPS2 investigate RCIC pump trip and attempt to reset.

ROLE-PLAY – Three minutes after request to reset trip report that the mechanical over speed trip will not reset and that the mechanics have been contacted to investigate.

Comments:

Event No. 9

Description: RPV Level restoration attempt but Emergency Depressurization is performed when RPV level cannot be maintained GT -183".

Critical Task is to initiate an Emergency Depressurization and return RPV level GT TAF.

Time	Position	Applicants Actions or Behavior
T=45	SRO	Recognizes RCIC not available and directs both CRD pumps be started.
	ATC	Starts both CRD pumps and directs OPS2 perform ABN-CRD MAXFLOW to place both CRD drive and suction filters on line.

BOOTH OPERATOR: Wait two minutes then <u>ACTIVATE TRIGGER 26</u> and when valves have repositioned, report completion.

	BOP/ATC	Reports RPV level continuing to drop.
	SRO	Directs SLC be initiated and injected in an attempt to maintain RPV level.
	ATC	Uses SLC initiation quick card to swap keys, operate both pumps control switches, and verifies system operation. Reports SLC injection at 80 gpm.
	BOP/ATC	Reports RPV level as it continues to drop to -50".
	SRO	Directs -50" actuation be verified.
	SRO	Recognizes RPV level trending down and may direct HPCS-P-1 fuses be re-installed.

BOOTH OPERATOR: Wait two minutes then Activate <u>TRIGGER 8</u> to Rack In HPCS-P-1 breaker and report completion.

	SRO	Directs injection with HPCS-P-1.
	BOP	Starts HPCS-P-1 and opens HPCS-V-4. Reports injection flow with HPCS.

BOOTH OPERATOR: When HPCS-P-1 is started Activate <u>TRIGGER 9</u> to insert HPCS-P-1 shaft seizure (on a 45 second time delay).

	BOP	Reports HPCS-P-1 trip and RPV level trend drop. Reports RPV level when it reaches -129".
	SRO	Directs ADS be inhibited (may have directed prior to -129").
	BOP	Takes ADS division inhibit switches to inhibit and reports completion to SRO. Reports RPV level as it transitions to Fuel Zone. Reports RPV level when it reaches Top Of Active Fuel at -161".
	SRO	Updates crew that An Emergency Depressurization is required. Exits the pressure leg of PPM 5.1.1 and enters PPM 5.1.3, RPV Depressurization.
	SRO	Directs 7 SRVs be opened (ADS preferred).
	BOP	Opens 7 SRVs, ADS preferred and reports completion to SRO.
	SRO	Directs both loop of RHR be aligned for injection.

	BOP	Removes RHR from sprays and Suppression Pool cooling and allows injection valves to open at 470 psig. Reports injection when RPV pressure drops below low pressure ECCS pump injection pressures. Reports RPV level as it turns and begins to rise.
	SRO	Directs RPV level restoration to -50" to +54".
	BOP	Restores RPV level as directed.

Comments:

TERMINATION CRITERIA: The scenario will be terminated when sprays have been removed and RPV level is being returned to normal band.

TURNOVER INFORMATION

Initial Conditions

Columbia is operating at 90% power (due to economic dispatch).

Shift Directions

Reactor Power is to be raised to allow the Main Turbine to be placed into Governor Valve Optimization.

When the DEH 'OKAY TO SELECT' light illuminates, stop the power increase and place the Main Turbine into Governor Valve Optimization.

A Reactivity brief for the power increase has been held and power is to be increased immediately following shift turnover. There are no pre-conditioning limits.

Control Room HVAC planned maintenance is scheduled.

Immediately following shift turnover, swap CR HVAC Supply Fans to WMA-FN-51A running and WMA-FN-51B in standby per SOP-HVAC/CR-OPS.

The power increase and fan swap are to be performed concurrently.

SIMULATOR SETUP INSTRUCTIONS

Reset to IC #3 on the ILC Training Pack.

Set up a 100 rpm RFW pump differential.

On DEH – ensure the LOAD TARGET is set at 1370.

On DEH – ensure VPL DEMAND is set at 100.

BOOTH OPERATOR: Display P826-06 so damper WMA-AD-51A1 position can be determined for Event .

SCHEDULE FILE

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<!-- This file contains a Thunder Simulations Schedule -->
<SCHEDULE>
     <ITEM row = 1>
          <TIME>1</TIME>
          <ACTION>Insert malfunction MAL-DEH015B</ACTION>
          <DESCRIPTION>DEH-P-1B FAIL AUTO START</DESCRIPTION>
     </ITEM>
     <ITEM row = 2>
          <TIME>1</TIME>
          <ACTION>Insert malfunction MOV-TSW004F to FAIL_AUTO_OPEN</ACTION>
          <DESCRIPTION>TSW-V-53A DISCHARGE VALVE</DESCRIPTION>
     </ITEM>
     <ITEM row = 3>
          <TIME>1</TIME>
          <ACTION>Insert malfunction MOV-RWB001F to FAIL_AUTO_OPEN</ACTION>
          <DESCRIPTION>WMA-AD-51A-1 AIR SUPPLY DAMPER</DESCRIPTION>
     </ITEM>
     <ITEM row = 4>
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          <ACTION>Insert malfunction MOT-RWB007G on event 1</ACTION>
          <DESCRIPTION>WMA-FN-51A OVERCURRENT</DESCRIPTION>
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          <ACTION>Insert remote LOA-EPS195 after 3 to DISCONNECT on event 1</ACTION>
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        <DESCRIPTION>MC-7F DISC WMA-FN-51A</DESCRIPTION>
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        <EVENT>2</EVENT>
        <ACTION>Insert malfunction PMP-DEH003H in 300 on event 2</ACTION>
        <DESCRIPTION>DEH-P-1A REDUCED HEAD</DESCRIPTION>
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        <EVENT>3</EVENT>
        <ACTION>Insert malfunction PMP-TSW002H in 300 on event 3</ACTION>
        <DESCRIPTION>TSW-P-1B REDUCED HEAD</DESCRIPTION>
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        <DESCRIPTION>TSW-P-1A REDUCED HEAD</DESCRIPTION>
</ITEM>
     <ITEM row = 9>
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        <ACTION>insert malfunction BKR-OED002 to TRIP on event 6</ACTION>
        <DESCRIPTION>> 230 KV STARTUP BREAKER TRIPS</DESCRIPTION>
   </ITEM>
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    <ITEM row = 10>
            <TIME>1</TIME>
            <EVENT>6</EVENT>
            <ACTION>insert malfunction MAL-RRS004C after 180 to 1.5 in 300 on event 6</ACTION>
            <DESCRIPTION>> RECIRC LINE RUPTURES</DESCRIPTION>
    </ITEM>
<ITEM row = 11>
        <TIME>1</TIME>
        <EVENT>7</EVENT>
        <ACTION>Insert malfunction MOV-RCI001F after 30 to CLOSE on event 7</ACTION>
        <DESCRIPTION>RCIC-V-1 CLOSES</DESCRIPTION>
</ITEM>
<ITEM row = 12>
            <TIME>1</TIME>
            <EVENT>8</EVENT>
        <ACTION>Insert remote LOA-EPS374 to RACKED-IN on event 8</ACTION>
        <DESCRIPTION>SM-4 BKR HPCS RACKED IN</DESCRIPTION>
</ITEM>
<ITEM row = 13>
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            <EVENT>9</EVENT>
        <ACTION>Insert malfunction PMP-CSS001S after 45 on event 9</ACTION>
        <DESCRIPTION>HPCS-P-1 SHAFT SEIZURE</DESCRIPTION>
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<ITEM row = 14>
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        <EVENT>11</EVENT>
        <ACTION>Insert remote LOA-EPS374 to RACKED-OUT on event 11</ACTION>
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        <DESCRIPTION>SM-4 BKR HPCS RACKOUT</DESCRIPTION>
    </ITEM>
    <ITEM row = 15>
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            <ACTION>Schedule Local.sch</ACTION>
            <DESCRIPTION>>TRIGGERS FOR LOCAL ACTIONS</DESCRIPTION>
    </ITEM>
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            <ACTION>Event Events/NRC#1.evt</ACTION>
            <DESCRIPTION>>Event triggers for the scenario</DESCRIPTION>
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EVENT FILE

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<!-- This file contains a Thunder Simulations Event -->
<EVENT>

    <TRIGGER id="6" description="SM-1 STARTUP BKR SHUTTING INITIATES TRIGGER 6">X8CO230R &gt 0</TRIGGER>
    <TRIGGER id="7" description="RCIC-V-13 OPENING INITIATES TRIGGER 7">X01O256R &gt 0</TRIGGER>

</EVENT>
```

Facility: Columbia NRC Exam Scenario No: 2

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial conditions: The plant is operating at 100% power. RWCU-P-1A was shutdown 30 minutes ago. Both Filter Demins have been removed from service and are being backwashed.

Shift Directions: Immediately following shift turnover, the ATC operator is to perform a quick restart of RWCU-P-1A. OPS 3 has been briefed on the evolution and is on station standing by to assist.

Concurrently with RWCU-P-1A restoration, place RHR-P-2C in Suppression Pool Mixing at 7000 gpm to allow Suppression Pool sampling, per SOP-RHR-SPC. Allow service water to auto start. OPS 2 and OPS 4 have reported RHR-P-2C and SW-P-1B are ready to start and are on station waiting for the pump starts. Health Physics has been notified. Notify Chemistry when RHR-P-2C is in Suppression Pool mixing.

Event No.	Timeline	Event Type*	Event Description
1.	T = 0	N (SRO/ATC)	Restart RWCU-P-1A per SOP-RWCU-START.
2.	T = 0	N (SRO/BOP)	Place RHR-P-2C in Suppression Pool Mixing per SOP-RHR-SPC.
3.	T = 20	C (SRO/ATC)	CRD-P-1A trips. Standby pump does not start initially start (Tech Spec).
4.	T = 30	C (SRO/BOP)	Shaft Seizure and Trip of RHR-P-2C. (Tech Spec).
5.	T = 40	C, R (SRO/ATC)	ASD Channel 1A/2 Fault (Tech Spec).
6.	T = 45	M, C (ALL)	ASD UPS trouble caused by a trip of power feeding inverters requiring insertion of a manual scram.
7.	T = 50	M, C (ALL)	Hydraulic ATWS; Reduced SLC; Lower RPV Level (Critical Task).
8.	T = 55		When level is lowered, Scram / Reset / Scram inserts control rods (Critical Task); RPV level is restored.

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

The scenario starts with Columbia at full power. The first and second events are initiated by the turnover.

The first event is for the ATC Operator to place RWCU-P-1A back in service per the quick restart procedure.

The second event, is for the BOP Operator to place RHR-P-2C in Suppression Pool mixing to facilitate sampling.

After the RWCU pump is in service, the next event is a trip of the running CRD pump. ABN-CRD will be entered and the standby pump will attempt to be started but the breaker will not close in. Tech Specs will be entered when the accumulator low pressure alarms annunciate. Field investigation will identify and correct the problem with the standby pumps breaker and the standby pump will eventually be started. CRD pressure will return and Tech Specs will be exited.

The next event is a trip of RHR-P-2C which was running in Suppression Pool mixing. The lineup will be secured and Tech Specs will be referenced.

The next event is an alarm and fault of ASD channel A2 which causes a runback of RRC-P-1A to 51 Hz. A RRC High Flow Delta alarm annunciates. Tech Spec 3.4.1 will be addressed and RRC flows will be matched. The crew will respond to the ASD fault per SOP-RRC-ASD.

After Tech Specs have been addressed and flows are matched, an ASD UPS trouble alarm will annunciate. The crew will refer to ABN-ASD-UPS. OPS4 will report that ASD is on battery power which will require the crew to reduce flow to 60 Mlbm/hr and insert a manual reactor scram.

All control rods will not insert due to a Hydraulic ATWS. PPM 5.1.2 will be entered and will direct SLC initiation. When started, only approximately 20 gpm flow will develop. The crew should continue normal SLC injection but may start lining up SLC injection with RCIC.

PPM 5.5.6, Bypass MSIV Isolations and PPM 5.5.1, making ECCS injection valves closed and throttleable, will be performed. RPV injection will stopped and prevented and level be lowered to below -65". Injection will be re-initiated and direction will be to maintain RPV level between -80" to -140".

PPM 5.5.11 will be performed to insert control rods. When RPV level is being maintained at a lowered level, the next scram/reset/scram will be successful in inserting all control rods.

SLC injection will be secured, PPM 5.1.2 will be exited, and RPV level will be returned to -50" to +13" level band.

The scenario will be terminated when RPV level is being returned to normal.

Event No. 1

Description: Restart RWCU-P-1A per SOP-RWCU-START section 5.3.

This event is initiated by the Turnover Information.

Time	Position	Applicants Actions or Behavior
T = 0	SRO	Directs ATC to place RWCU-P-1A in service per SOP-RWCU-START.
Steps per the SOP 5.3.1	ATC	Refers to SOP-RWCU-START section 5.3. Verify RWCU-V-1 OPEN (RWCU Suction Inboard Iso.) (H13-P601) – Notes that valve is closed and opens RWCU-V-1
5.3.2		Verify RWCU-V-4 OPEN (RWCU Suction Outboard Iso.) (H13-P601) – Notes that valve is closed and opens RWCU-V-4
5.3.3		If in MODE 4 or 5 …… (in MODE 1 – does not perform)
5.3.4		Step 5.3.4 - Verify RWCU-V-104 CLOSED (RWCU-System Bypass) - Notes valve is throttled and closes RWCU-V-104
5.3.5		Step 5.3.5 – If starting RWCU-P-1A, and plant is in Modes 1, 2, or 3, Then perform the following:
a		Verify RWCU-V-44 OPEN (RWCU Demin Bypass) – Notes valve is closed and opens RWCU-V-44
b		Establish communications with operator at RWCU-V-13A – contacts OPS 3 on the phone
BOOTH OPERATOR – When directed , close RWCU-V-13A and report completion.		
c	OPS3	Close RWCU-V-13A – Directs OPS3 to close RWCU-V-13A
d		Place and Hold RWCU-RMS-P/1A to start – takes control switch to start and holds it there

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BOOTH OPERATOR – Throttle RWCU-V-13A to 0.04 percent open at first		
e	OPS3	Throttle open RWCU-V-13A until RWCU-Pump Flow Low annunciator clears.
f	ATC	Verify RWCU-FI-609 system flow is GT 70 gpm – observes flow indication GT 70 gpm.
g		Release RWCU-RMS-P/1A – releases the control switch.
BOOTH OPERATOR – When directed to, fully open RWCU-V-13A		
h		Fully Open RWCU-V-13A – Directs OPS3 to fully open valve and observes system flow increase.
5.3.6		If starting RWCU-P-1A in Modes 4 or 5… (Does not perform)
5.3.7		If starting RWCU-P-1B… (Does not perform)
5.3.8		If starting RWCU-P-1B… (Does not perform)
5.3.9		Place filter demineralizers in service… Informs SRO that RWCU-P-1A has been started per SOP-RWCU-START.
COMMENTS:		

Event No. 2

Description: RHR-P-2C is placed into Suppression Pool Mixing to support chemistry sampling.

This event is initiated by the Turnover Information.

Time	Position	Applicants Actions or Behavior
T = 0	SRO	Directs BOP Operator to place RHR-P-2C into Suppression Pool mixing per SOP-RHR-SPC.
Steps per SOP-RHR-SPC	BOP	Refers to SOP-RHR-SP-SPC and performs section 5.5:
		Notify HP….. **(already done per turnover)**.
		Verify SW-P-1B running **(allow to auto start provided in turnover).**
		IF RHR-SYS-C is required to be operable, then enter RHR-SYS-C as inoperable , but available, in the Plant Logging System. Informs the SRO.
		Start RHR-P-2C.
		Verify RHR-FCV-64C opens during low flow conditions (approximately 800 gpm) (Minimum Flow Bypass) (H13-P601).
		CAUTION: RHR-V-21 should be opened just enough to achieve the desired flow, to minimize the amount of time required to realign following an auto initiation signal and the amount of drain down following a LOP/LOCA. Restrict RHR-V-21 approximately 20 seconds open (7000 gpm).
		Throttle open RHR-V-21 for approximately 20 seconds / 7000 gpm (Suppression Pool Test Return) (H13-P601).
		Verify RHR-FCV-64C closes (approximately 800 gpm).
		Monitor Suppression Pool temperatures.
		Informs SRO that RHR-C has been placed in Suppression Pool Mixing.

COMMENTS:

Event No. 3		
Description: CRD-P-1A trips, CRD-P-1B does not initially start (will be eventually started). This event is initiated after RHR-C is in Suppression Pool mixing and RWCU-DM-1A is placed in service and is initiated by activating **TRIGGER 1.**		

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: **ACTIVATE TRIGGER 1 (Be prepared to remove malfunction and override as noted later in event).**		
T = 20	ATC	Acknowledges CRD Pump Abnormal Operation alarm. Observes and reports CRD-P-1A tripped and not running. Refers to ARP and refers SRO to ABN-CRD.
	SRO	Refers to ABN-CRD and directs CRD-FC-600, the CRD Flow controller, be placed in Manual at zero output.
	ATC	Places CRD-FC-600 in Manual and depresses closes pushbutton for zero output.
	SRO	Directs CRD-P-1B be started.
	ATC	Places the control switch for CRD-P-1B to START. Recognizes CRD-P-1B does not start and informs the SRO.
	SRO	Directs investigation of CRD-P-1A and CRD-P-1B.
	ATC	Reports multiple Control Rod Drive Accumulator alarms as they occur.

	SRO	Sets Charging Water Header Pressure at 940 psig as a Key Parameter.

BOOTH OPERATOR: If the applicable Tech Spec has been identified prior to reaching charging water header pressure of 940 psig, it is not necessary to wait until 940 psig to continue.

	ATC	Reports Charging Water Header Pressure at 940 psig.
	SRO	Refers to Tech Spec 3.1.5 B.1 which requires restoration of charging water header pressure to GE 940 psig within 20 minutes from discovery of Condition B concurrent with charging water header pressure LT 940 psig AND declare the associated control rod scram time 'slow' or declare the control rod inoperable.

BOOTH OPERATOR: When the SRO has referred to the correct Tech Specs, call x2171 and inform the CRO that it appears that the closed fuse block for CRD-P-1B breaker is not seated properly. Request permission to attempt to properly seat the closed fuse block. When permission is granted, <u>REMOVE THE MALFUNCTION "BKR-CRD002"</u> (CRD-P-1B breaker fail as is). Wait a minute and report that the fuse block has been removed and reinstalled and seems to be seated properly and you are standing by for an attempt to start CRD-P-1B.

	SRO	Directs CRD-P-1B pump start be attempted.

BOOTH OPERATOR: When CRD-P-1B is started, <u>REMOVE OVERRIDE "OVR-CRD001A"</u> (Charging water header pressure meter).

	ATC	Takes control switch for CRD-P-1B to start and recognizes it does start and informs the SRO. Nulls CRD-FC-600 by opening it until red needle comes to mid scale and then places the controller in AUTO. Reports charging water header pressure restoration and clearing of control rod accumulator alarms as they clear.

COMMENTS:

Event No. 4		
Description: Shaft Seizure and Trip of RHR-P-2C.		
This event is triggered by activating **TRIGGER 2** after CRD-P-1B has been re-started.		
Time	**Position**	**Applicants Actions or Behavior**
BOOTH OPERATOR: <u>ACTIVATE TRIGGER 2.</u>		
T = 30	BOP	Acknowledges RHR C PMP OVERLOAD and RHR C OUT OF SERVICE alarms and refers to ARP. Recognizes RHR-P-2C is not running and informs SRO.
	SRO	Directs restoration of RHR-C to standby status per SOP-RHR-STBY.
	BOP	Refers to SOP-RHR-STBY and verifies the following (H13-P601). • RHR B AND C MANUAL INITIATION in DISARMED. • RHR-RMS-S56 (HIGH DRYWELL PRESS OR RX LOW LEVEL • SEAL IN) SEALED IN light EXTINGUISHED. • RHR-V-111C OPEN (Manual RPV Injection) • RHR-V-21 CLOSED and in AUTO (Suppression Pool Cooling/Test Return). Recognizes RHR-V-21 is opened and takes C/S to closed until red light goes out and then releases C/S back to AUTO. • RHR-V-42C CLOSED and in AUTO (LPCI Injection). • RHR-V-4C OPEN and in OPEN with its key REMOVED • (Pump Suction from Supp Pool). • RHR-FCV-64C CLOSED and in AUTO (Minimum Flow Bypass).

		Verify the following in NORMAL with its key REMOVED (H13-P618). • RHR-RMS-S103C (RHR-FCV-64C Min Flow Bypass). • RHR-RMS-S101C (RHR-V-42C Bypass Low Press Logic). • RHR-RMS-S44B (RHR-B/C Pump Test Pwr Avail Logic). • RHR-RMS-S70 (Logic Test DG-2/DW Clg Inhibit). • RHR-RMS-S107 (RHR-V-42C Override ECCS Logic).
		Verify RHR-P-3 Running and in START (RHR B/C Water Leg).
		Verify H13-P601.A2-6.5, RHR C PUMP DISCH PRESS HIGH/LOW alarm is clear.
		Verify the Standby Service Water System B is available to support RHR Loop C System operation. May request direction to secure SW-P-1B.
		Verify RHR-P-2C OFF and in AUTO. Notes red flag is displayed and may take RHR-P-2C C/S to STOP to display green flag.
		Verify RHR-P-2C LOCKOUT CIRCUIT AVAIL light LIT. Notes light is not illuminated.
		Verify appropriate RHR C annunciator and BISI alarms are clear, based on plant conditions.
		IF RHR Loop C is required to be Operable, then LOG RHR-LPCI-C as available and/or Operable in the Plant Logging System (M-Rule).

		SRO	Refers to Technical Specifications and notes TS 3.5.1 A is applicable which requires restoration to operable status within 7 days.
			May protect systems per PPM 1.3.83 (RHR-A, RHR-B and LPCS).
			Conducts Brief.

ROLEPLAY: If asked to investigate RHR-P-2C, report nothing appears wrong with pump or breaker.

COMMENTS:

Event No. 5		
Description: ASD Channel 1A2 fault. This event is triggered by activating **TRIGGER 3** after RHR-P-2C Tech Spec call is made.		
Time	**Position**	**Applicants Actions or Behavior**
BOOTH OPERATOR: ACTIVATE TRIGGER 3.		

T = 30	ATC	Reports ASD Channel 1A/2 alarm and Fault annunciators.
		
		Refers to ARP for fault alarm (602.A13 5-3) and verifies:
		
		      RRC-MA-R676A is in manual
		
		      RRC-P-1A runback to approximately 51 Hz
		
		Reports power drop due to RRC pump runback to 51 Hz. Reports RPV power/level/pressure.
		
		Checks ASD video Display Unit for source of alarm.

	BOP	Sends OPS4 to investigate at the ASD Building.
ROLEPLAY: Two minutes after being sent to investigate, call x2171 and report as OPS4 that there is a GTO freeze alarm on Channel 1A2. Also inform them that there is a slight electrical smell in the building but you see nothing wrong. If asked – the alarm cannot be reset.		

	SRO	Directs actions per ARP for high delta flow.
		Tech Spec 3.4.1, flow mismatch, is applicable until flows are matched.
		Directs RO to match RRC loop flows by lowering RRC loop B flow.
		Refers to ABN-POWER.
		Notifies PSRO/Work Control.
		May direct performance of PPM OSP-RRC-D701, Jet Pump Operability and RRC loop Flow mismatch.
	ATC	Reduces RRC-P-1B speed as directed to match RRC loop flows.

COMMENTS:

Event No. 6

Description: ASD UPS trouble alarm. ASD-PP1/3 becomes de-energized requiring flow reduction and manual scram insertion.

This event is initiated by activating **TRIGGER 4** and should be initiated when RRC loop flows are matched or as directed.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: **ACTIVATE TRIGGER 4**.		
T = 40	ATC	Reports ASD UPS Trouble Alarm and refers to ARP. Refers SRO to ABN-ASD-INV.
	SRO	Directs actions per ARP for ASD UPS Trouble. Refers to ABN-ASD-INV.
	BOP	Sends OPS4 to investigate.
BOOTH OPERATOR: A minute after being sent to investigate, report that the breaker supplying the input to E-PP-ASD 1/3 is opened and E-PP-ASD 1/3 is de-energized. Also – there is a small amount of smoke coming from the breaker but there is no fire.		
	SRO	Determines that IN-ASD/1A and 1B panels are on battery power and that normal AC power is not going to be restored to the inverters. Conducts brief. Directs that RRC flow be reduced to 60 Mlbm/hr per ABN-ASD-INV step 4.2.

	ATC	Recognizes that ASD operation for 'ASD-A' is in Manual and 'ASD-B' is in Auto (if not previously taken to manual). May place RRC-B ASD controller in manual or operate it in AUTO to lower flow.
		Lowers RRC flow to 60 Mlbm/hr as directed and reports completion to SRO.
	SRO	Directs a manual scram of reactor.
	RO	Inserts a manual scram and performs immediate scram actions:
		Announces "Listen Up for the Scram Report".
		Places MODE switch to shutdown.
		Reports APRMs are NOT downscale.
		Reports current RPV pressure and trend.
		Reports current RPV level and trend.
		Verifies all rods inserted and recognizes all rods NOT inserted.
		Reports EOP entry on failure to scram.

COMMENTS:

Event No. 7		
Description: Hydraulic ATWS. Lower RPV level. This event is active at the beginning of the scenario and occurs automatically when a manual scram is inserted.		
Critical Task is to lower RPV level and establish an Lowered Level.		
Time		
T = 50	ATC	Continues with immediate scram actions after recognizing all control rods did not insert: • Depress the manual scram pushbuttons • Initiate ARI and verifies valves opened • Insert SRMs and IRMs Reports reactor power at approximately 50%.
	SRO	Enters PPM 5.1.1 and directs/verifies that the Mode Switch has been placed in SHUTDOWN and exits PPM 5.1.1 and enters PPM 5.1.2, RPV Control ATWS. Directs BOP to: • Inhibit ADS and take manual control of HPCS • Verify all actuations for +13, -50, and 1.68 psig as they occur. • Verify pressure is being maintained by the bypass valves

	BOP	Takes both ADS control switches to the INHIBIT position and acknowledges associated BISIs.
		Arms and Depresses the HPCS system initiation P/B while holding the control switch for HPCS-P-1 to STOP.
		Closes HPCS-V-4 when it get fully opened.
		Reports completion to SRO.
	SRO	Directs bypassing the MSIV isolation interlocks per PPM 5.5.6.
	SRO	Performs PPM 5.5.6:
		At H13-P609 places MS-RMS-S84 to BYPASS
		At H13-P611 places MS-RMS-S85 to BYPASS
		Updates Crew to completion of PPM 5.5.6.
	SRO	Directs SLC initiation.

		ATC	Initiates SLC per the quick card:
			Swaps keys and places two switches to OPER.
			Verifies squib valves fire.
			Verifies RWCU-V-4 closure.
			Verifies flow and SLC tank level.
			Reports abnormal SLC flow at about 18 gpm and initial tank level.
		SRO	Directs RCIC-V-1 be closed.
		BOP	Closes RCIC-V-1, verifies RCIC trip annunciator and reports completion to SRO.
		SRO	Directs performance of PPM 5.5.1.
		BOP	Performs PPM 5.5.1:
			At H13-P625 places HPCS-RMS-S25 in OVERRIDE
			At H13-P629 places LPCS-RMS-S21 in OVERRIDE
			At H13-P629 places RHR-RMS-S105 in OVERRIDE
			At H13-P618 places RHR-RMS-S106 in OVERRIDE
			At H13-P618 places RHR-RMS-S107 in OVERRIDE
			Updates crew to completion of PPM 5.5.1, and that the ECCS injection valves are closed and throttleable.

	SRO	Direct the ATC to:
		Stop and prevent all injection into the RPV except by Boron injection systems, RCIC, and CRD.
		Lower level to a band less than –65" but greater than –183" (preferred band is –80" to –140").
		Re-commences feeding at -65".
	ATC	Uses Quick Cards to stops and prevent condensate and feedwater and lines up on the startup flow control valves as directed.
		Reports EOP entry on low RPV water level.
		Reports Reactor Power as it drops due to lowering level.
		When Reactor Power is LT 5%, marks RPV level to establish an LL.
		Maintains RPV level between LL and –183" as directed (–80" to –140").

COMMENTS:

Event No. 8

Description: Insert Control Rods by performing PPM 5.5.11. This event is completed as level is being lowered and the ATWS will clear when RPV level has been lowered and in being controlled at the lowered level band.

Critical Task is to Insert Control Rods.

Time	Position	Applicants Actions or Behavior
T = 55	SRO	Directs PPM 5.5.11 be performed to insert control rods.

BACK PANEL OPERATOR: Be standing next to Board S to get direction from BOP operator to perform Attachment 6.1.

	BOP	Performs PPM 5.5.11 and:
		
		    Determines that no RPS scram lights are lit
		
		    Removes one TB1 ARI fuse and one TB2 ARI fuse in H13-P650.
		
		    Determines that some or all blue scram valve lights are lit.
		
		    Determines Tab B should be performed:
		
		    Places the SDV HIGH LEVEL TRIP control switch to BYPASS on P603.
		
		Determines the scram cannot be reset.
		
		    Overrides RPS trip signals per Attachment 6.1.
		
		    Directs Instructor to perform back panel operations associated with Attachment 6.1 (may also direct Attachment 6.2 at this point)

BACK PANEL OPERATOR: Take direction from the BOP operator to perform back panel steps of Attachment 6.1. Wait three minutes and then Activate <u>TRIGGER 28</u> to install RPS jumpers.

When completed, circle slash the steps and inform the BOP operator that they have been completed by standing next to Board S and giving the crew an update:

"UPDATE READY - Attachment 6.1 of PPM 5.5.11 has been completed, END OF UPDATE."

	BOP	Continues with Tab B actions:
		
		      Reset the scram by depressing reset pushbuttons.
		
		      Ensures both CRD pumps are running (CRD-P-1A cannot be started due to trip at beginning of scenario).

	BOP	Determines drive header pressure can be established and directs OPS2 to close CRD-V-34.

BOOTH OPERATOR: Wait one minute and then to close CRD-V-34 take LOA-CRD014 from '1' to '0' and inform the control room that CRD-V-34 is closed.

BACK PANEL OPERATOR: Be standing next to Board S to get direction from BOP operator to perform Attachment 6.2.

	BOP	Directs Back Panel Operator to perform Attachment 6.2 to bypass all RSCS rod blocks.

BACK PANEL OPERATOR: Take direction from the BOP operator to perform back panel steps of Attachment 6.2. Wait two minutes and then Activate <u>TRIGGER 30</u> to install jumpers.

When completed, circle slash the two steps at the bottom of the page and inform the BOP operator that they have been completed by standing next to Board S and giving the crew an update:

"UPDATE READY - Attachment 6.2 of PPM 5.5.11 has been completed, END OF UPDATE."

BOOTH OPERATOR: When RPV Level has been lowered and is being maintained: TO CLEAR ATWS: When both scram discharge volume vents and drains are fully open, set the four ATWS malfunctions to a severity of sixty.

	BOP	Manually starts to drive control rods by starting at 10-43 and inserting every other rod in every other row.
		Reports success in driving control rods to SRO.
		When the Scram Discharge Volume has been drained for more than 2 minutes initiates a manual scram by depressing the four red manual scram pushbuttons.
		If rods do not insert continues scram/reset/scram Tab B and raises SDV drain time by 2 minutes.
		Determines All Rods are in and informs the SRO.
		Installs the one TB1 ARI fuse and the one TB2 ARI fuse previously removed in TAB A.
	SRO	Directs SLC be stopped.
	ATC/BOP	Takes control switches out of OPER and observes both SLC pumps stop.
	SRO	Exits PPM 5.1.2 and re-enters PPM 5.1.1.
		Directs RPV level be raised to -50" to +54" band with available systems.

	ATC	Raises RPV level into band as directed.

TERMINATION POINT – The scenario will be terminated when RPV level is being returned to the directed band.

Comments:

TURNOVER INFORMATION

Initial Conditions:

The plant is operating at 100% power. RWCU-P-1A was shutdown 30 minutes ago per SOP-RWCU-Shutdown section 5.1. Both RWCU Filter Demins have been removed from service and are being backwashed.

Shift Directions:

Immediately following shift turnover, the ATC operator is to perform a quick restart of RWCU-P-1A. OPS 3 has been briefed on the evolution and is on station standing by to assist.

Concurrently with RWCU-P-1A restoration, place RHR-P-2C in Suppression Pool Mixing at 7000 gpm to allow Suppression Pool sampling, per SOP-RHR-SPC. Allow service water to auto start. OPS 2 and OPS 4 have reported RHR-P-2C and SW-P-1B are ready to start and are on station waiting for the pump starts. Health Physics has been notified. Notify Chemistry when RHR-P-2C is in Suppression Pool mixing.

NRC EXAM SCENARIO #2

Columbia Generating Station NRC Exam – April, 2011

SIMULATOR SETUP INSTRUCTIONS

Reset to IC-4.

Set up a 100 rpm differential on RFW pumps.

Flag alarmed annunciators.

Have the RWCU demineralizer screen displayed, ready to close RWCU-V-13A (RWU02 screen).

SCHEDULE FILE

```
<!-- This file contains a Thunder Simulations Schedule -->
<SCHEDULE>

     <ITEM row = 1>
          <TIME>1</TIME>
          <ACTION>Insert malfunction BKR-CRD002 to FA_AS_IS</ACTION>
          <DESCRIPTION>CRD-P-1B BREAKER</DESCRIPTION>
     </ITEM>

       <ITEM row = 2>
              <TIME>1</TIME>
              <ACTION>insert malfunction MAL-CRD007A1 to 100</ACTION>
              <DESCRIPTION>> Hydraulic ATWS</DESCRIPTION>
       </ITEM>

       <ITEM row = 3>
              <TIME>1</TIME>
              <ACTION>insert malfunction MAL-CRD007A2 to 90</ACTION>
              <DESCRIPTION>> Hydraulic ATWS</DESCRIPTION>
       </ITEM>

       <ITEM row = 4>
              <TIME>1</TIME>
              <ACTION>insert malfunction MAL-CRD007B1 to 100</ACTION>
              <DESCRIPTION>> Hydraulic ATWS</DESCRIPTION>
       </ITEM>

       <ITEM row = 5>
              <TIME>1</TIME>
              <ACTION>insert malfunction MAL-CRD007B2 to 90</ACTION>
              <DESCRIPTION>> Hydraulic ATWS</DESCRIPTION>
       </ITEM>

       <ITEM row = 6>
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              <ACTION>insert malfunction PMP-SLC001F to 100</ACTION>
              <DESCRIPTION>>SLC-P-1A REDUCED FLOW</DESCRIPTION>
       </ITEM>

       <ITEM row = 7>
              <TIME>1</TIME>
              <ACTION>insert malfunction PMP-SLC002F to 50</ACTION>
              <DESCRIPTION>>SLC-P-1B REDUCED FLOW</DESCRIPTION>
       </ITEM>

     <ITEM row = 8>
          <TIME>1</TIME>
          <EVENT>1</EVENT>
          <ACTION>Insert malfunction BKR-CRD001 to TRIP on event 1</ACTION>
          <DESCRIPTION>CRD-P-1A BREAKER</DESCRIPTION>
     </ITEM>

     <ITEM row = 9>
          <TIME>1</TIME>
          <EVENT>1</EVENT>
          <ACTION>Insert override OVR-CRD006D to OFF on event 1</ACTION>
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```
            <DESCRIPTION>CRD-P-1A C/S START OFF</DESCRIPTION>
      </ITEM>

      <ITEM row = 10>
            <TIME>1</TIME>
            <EVENT>1</EVENT>
            <ACTION>Insert override OVR-CRD001A to 930 in 300 on event 1</ACTION>
            <DESCRIPTION>CHARGING HEADER PRESSURE METER SIGNAL</DESCRIPTION>
      </ITEM>
      <ITEM row = 11>
            <TIME>1</TIME>
            <EVENT>2</EVENT>
            <ACTION>Insert malfunction PMP-RHR003S after 2 on event 2</ACTION>
            <DESCRIPTION>RHR-P-2C SHAFT SEIZURE</DESCRIPTION>
      </ITEM>

      <ITEM row = 12>
            <TIME>1</TIME>
            <EVENT>2</EVENT>
            <ACTION>Insert remote LOA-RHR023 from 1 to 0 on event 2</ACTION>
            <DESCRIPTION>RHR-V-85C RHR-P-3 ISOLATION VLV</DESCRIPTION>
      </ITEM>

      <ITEM row = 13>
            <TIME>1</TIME>
            <EVENT>3</EVENT>
            <ACTION>Insert malfunction MAL-RFC006R after 1 on event 3</ACTION>
            <DESCRIPTION>ASD CH A2 GROUND FAULT</DESCRIPTION>
      </ITEM>

      <ITEM row = 14>
            <TIME>1</TIME>
            <EVENT>4</EVENT>
            <ACTION>Insert malfunction ANN-602A13C05 to ON on event 4</ACTION>
            <DESCRIPTION>ASD UPS TROUBLE</DESCRIPTION>
      </ITEM>

            <ITEM row = 15>
                  <TIME>1</TIME>
                  <ACTION>Schedule Local.sch</ACTION>
                  <DESCRIPTION>>TRIGGERS FOR LOCAL ACTIONS</DESCRIPTION>
      </ITEM>

</SCHEDULE>
```

Run #3 As-Given

Facility: Columbia		NRC Exam Scenario No: 2	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	

Initial conditions: The plant is operating at 100% power. RWCU-P-1A was shutdown 30 minutes ago. Both Filter Demins have been removed from service and are being backwashed.

Shift Directions: Immediately following shift turnover, the ATC operator is to perform a quick restart of RWCU-P-1A. OPS 3 has been briefed on the evolution and is on station standing by to assist.

Concurrently with RWCU-P-1A restoration, place RHR-P-2C in Suppression Pool Mixing at 7000 gpm to allow Suppression Pool sampling, per SOP-RHR-SPC. Allow service water to auto start. OPS 2 and OPS 4 have reported RHR-P-2C and SW-P-1B are ready to start and are on station waiting for the pump starts. Health Physics has been notified. Notify Chemistry when RHR-P-2C is in Suppression Pool mixing.

Event No.	Timeline	Event Type*	Event Description
1.	T = 0	N (SRO/ATC)	Restart RWCU-P-1A per SOP-RWCU-START.
2.	T = 0	N (SRO/BOP)	Place RHR-P-2C in Suppression Pool Mixing per SOP-RHR-SPC.
3.	T = 20	C (SRO/ATC)	CRD-P-1A trips. Standby pump does not start initially start (Tech Spec).
4.	T = 30	C (SRO/BOP)	Shaft Seizure and Trip of RHR-P-2C. (Tech Spec).
5.	T = 40	C, R (SRO/ATC)	ASD Channel 1A/2 Fault (Tech Spec).
6.	T = 45	M, C (ALL)	ASD UPS trouble caused by a trip of power feeding inverters requiring insertion of a manual scram.
7.	T = 50	M, C (ALL)	Hydraulic ATWS; Reduced SLC; Lower RPV Level (Critical Task).
8.	T = 55		When level is lowered, Scram / Reset / Scram inserts control rods (Critical Task); RPV level is restored.

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

The scenario starts with Columbia at full power. The first and second events are initiated by the turnover.

The first event is for the ATC Operator to place RWCU-P-1A back in service per the quick restart procedure.

The second event, is for the BOP Operator to place RHR-P-2C in Suppression Pool mixing to facilitate sampling.

After the RWCU pump is in service, the next event is a trip of the running CRD pump. ABN-CRD will be entered and the standby pump will attempt to be started but the breaker will not close in. Tech Specs will be entered when the accumulator low pressure alarms annunciate. Field investigation will identify and correct the problem with the standby pumps breaker and the standby pump will eventually be started. CRD pressure will return and Tech Specs will be exited.

The next event is a trip of RHR-P-2C which was running in Suppression Pool mixing. The lineup will be secured and Tech Specs will be referenced.

The next event is an alarm and fault of ASD channel A2 which causes a runback of RRC-P-1A to 51 Hz. A RRC High Flow Delta alarm annunciates. Tech Spec 3.4.1 will be addressed and RRC flows will be matched. The crew will respond to the ASD fault per SOP-RRC-ASD.

After Tech Specs have been addressed and flows are matched, an ASD UPS trouble alarm will annunciate. The crew will refer to ABN-ASD-UPS. OPS4 will report that ASD is on battery power which will require the crew to reduce flow to 60 Mlbm/hr and insert a manual reactor scram.

All control rods will not insert due to a Hydraulic ATWS. PPM 5.1.2 will be entered and will direct SLC initiation. When started, only approximately 20 gpm flow will develop. The crew should continue normal SLC injection but may start lining up SLC injection with RCIC.

PPM 5.5.6, Bypass MSIV Isolations and PPM 5.5.1, making ECCS injection valves closed and throttleable, will be performed. RPV injection will stopped and prevented and level be lowered to below -65". Injection will be re-initiated and direction will be to maintain RPV level between -80" to -140".

PPM 5.5.11 will be performed to insert control rods. When RPV level is being maintained at a lowered level, the next scram/reset/scram will be successful in inserting all control rods.

SLC injection will be secured, PPM 5.1.2 will be exited, and RPV level will be returned to -50" to +13" level band.

The scenario will be terminated when RPV level is being returned to normal.

Event No. 1

Description: Restart RWCU-P-1A per SOP-RWCU-START section 5.3.

This event is initiated by the Turnover Information.

Time	Position	Applicants Actions or Behavior
T = 0	SRO	Directs ATC to place RWCU-P-1A in service per SOP-RWCU-START.
Steps per the SOP 5.3.1	ATC	Refers to SOP-RWCU-START section 5.3. Verify RWCU-V-1 OPEN (RWCU Suction Inboard Iso.) (H13-P601) – Notes that valve is closed and opens RWCU-V-1
5.3.2		Verify RWCU-V-4 OPEN (RWCU Suction Outboard Iso.) (H13-P601) – Notes that valve is closed and opens RWCU-V-4
5.3.3		If in MODE 4 or 5 …… (in MODE 1 – does not perform)
5.3.4		Step 5.3.4 - Verify RWCU-V-104 CLOSED (RWCU-System Bypass) - Notes valve is throttled and closes RWCU-V-104
5.3.5		Step 5.3.5 – If starting RWCU-P-1A, and plant is in Modes 1, 2, or 3, Then perform the following:
a		Verify RWCU-V-44 OPEN (RWCU Demin Bypass) – Notes valve is closed and opens RWCU-V-44
b		Establish communications with operator at RWCU-V-13A – contacts OPS 3 on the phone
BOOTH OPERATOR – When directed , close RWCU-V-13A and report completion.		
c	OPS3	Close RWCU-V-13A – Directs OPS3 to close RWCU-V-13A
d		Place and Hold RWCU-RMS-P/1A to start – takes control switch to start and holds it there

BOOTH OPERATOR – Throttle RWCU-V-13A to 0.04 percent open at first		
e	OPS3	Throttle open RWCU-V-13A until RWCU-Pump Flow Low annunciator clears.
f	ATC	Verify RWCU-FI-609 system flow is GT 70 gpm – observes flow indication GT 70 gpm.
g		Release RWCU-RMS-P/1A – releases the control switch.
BOOTH OPERATOR – When directed to, fully open RWCU-V-13A		
h		Fully Open RWCU-V-13A – Directs OPS3 to fully open valve and observes system flow increase.
5.3.6		If starting RWCU-P-1A in Modes 4 or 5... (Does not perform)
5.3.7		If starting RWCU-P-1B... (Does not perform)
5.3.8		If starting RWCU-P-1B... (Does not perform)
5.3.9		Place filter demineralizers in service... Informs SRO that RWCU-P-1A has been started per SOP-RWCU-START.
COMMENTS:		

Event No. 2		
Description: RHR-P-2C is placed into Suppression Pool Mixing to support chemistry sampling. This event is initiated by the Turnover Information.		
Time	**Position**	**Applicants Actions or Behavior**
T = 0	SRO	Directs BOP Operator to place RHR-P-2C into Suppression Pool mixing per SOP-RHR-SPC.
Steps per SOP-RHR-SPC	BOP	Refers to SOP-RHR-SP-SPC and performs section 5.5:
		Notify HP..... **(already done per turnover).**
		Verify SW-P-1B running **(allow to auto start provided in turnover).**
		IF RHR-SYS-C is required to be operable, then enter RHR-SYS-C as inoperable , but available, in the Plant Logging System. Informs the SRO.
		Start RHR-P-2C.
		Verify RHR-FCV-64C opens during low flow conditions (approximately 800 gpm) (Minimum Flow Bypass) (H13-P601).
		CAUTION: RHR-V-21 should be opened just enough to achieve the desired flow, to minimize the amount of time required to realign following an auto initiation signal and the amount of drain down following a LOP/LOCA. Restrict RHR-V-21 approximately 20 seconds open (7000 gpm).
		Throttle open RHR-V-21 for approximately 20 seconds / 7000 gpm (Suppression Pool Test Return) (H13-P601).
		Verify RHR-FCV-64C closes (approximately 800 gpm).
		Monitor Suppression Pool temperatures.
		Informs SRO that RHR-C has been placed in Suppression Pool Mixing.
COMMENTS:		

Event No. 3

Description: CRD-P-1A trips, CRD-P-1B does not initially start (will be eventually started).

This event is initiated after RHR-C is in Suppression Pool mixing and RWCU-DM-1A is placed in service and is initiated by activating **TRIGGER 1.**

Time	Position	Applicants Actions or Behavior
colspan	**BOOTH OPERATOR:** **ACTIVATE TRIGGER 1 (Be prepared to remove malfunction and override as noted later in event).**	
T = 20	ATC	Acknowledges CRD Pump Abnormal Operation alarm. Observes and reports CRD-P-1A tripped and not running. Refers to ARP and refers SRO to ABN-CRD.
	SRO	Refers to ABN-CRD and directs CRD-FC-600, the CRD Flow controller, be placed in Manual at zero output.
	ATC	Places CRD-FC-600 in Manual and depresses closes pushbutton for zero output.
	SRO	Directs CRD-P-1B be started.
	ATC	Places the control switch for CRD-P-1B to START. Recognizes CRD-P-1B does not start and informs the SRO.
	SRO	Directs investigation of CRD-P-1A and CRD-P-1B.
	ATC	Reports multiple Control Rod Drive Accumulator alarms as they occur.

	SRO	Sets Charging Water Header Pressure at 940 psig as a Key Parameter.

BOOTH OPERATOR: If the applicable Tech Spec has been identified prior to reaching charging water header pressure of 940 psig, it is not necessary to wait until 940 psig to continue.

	ATC	Reports Charging Water Header Pressure at 940 psig.

	SRO	Refers to Tech Spec 3.1.5 B.1 which requires restoration of charging water header pressure to GE 940 psig within 20 minutes from discovery of Condition B concurrent with charging water header pressure LT 940 psig AND declare the associated control rod scram time 'slow' or declare the control rod inoperable.

Not done (handwritten)

BOOTH OPERATOR: When the SRO has referred to the correct Tech Specs, call x2171 and inform the CRO that it appears that the closed fuse block for CRD-P-1B breaker is not seated properly. Request permission to attempt to properly seat the closed fuse block. When permission is granted, **REMOVE THE MALFUNCTION "BKR-CRD002"** (CRD-P-1B breaker fail as is). Wait a minute and report that the fuse block has been removed and reinstalled and seems to be seated properly and you are standing by for an attempt to start CRD-P-1B.

	SRO	Directs CRD-P-1B pump start be attempted.

BOOTH OPERATOR: When CRD-P-1B is started, **REMOVE OVERRIDE "OVR-CRD001A"** (Charging water header pressure meter).

	ATC	Takes control switch for CRD-P-1B to start and recognizes it does start and informs the SRO.
		Nulls CRD-FC-600 by opening it until red needle comes to mid scale and then places the controller in AUTO.
		Reports charging water header pressure restoration and clearing of control rod accumulator alarms as they clear.

COMMENTS:

Event No. 4

Description: ~~Shaft Seizure and Trip of RHR-P-2C.~~
This event is triggered by activating **TRIGGER 2** after CRD-P-1B has been re-started.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: ACTIVATE TRIGGER 2.		
T = 30	~~BOP~~	~~Acknowledges RHR C PMP OVERLOAD and RHR C OUT OF SERVICE~~ ~~alarms and refers to ARP.~~
		~~Recognizes RHR-P-2C is not running and informs SRO.~~
	~~SRO~~	~~Directs restoration of RHR-C to standby status per SOP-RHR-STBY.~~
	~~BOP~~	Refers to SOP-RHR-STBY and verifies ~~the following (H13-P601).~~
		• ~~RHR B AND C MANUAL INITIATION in DISARMED.~~
		• ~~RHR-RMS-S56 (HIGH DRYWELL PRESS OR RX LOW LEVEL~~
		• SEAL IN) ~~SEALED IN light EXTINGUISHED.~~
		• ~~RHR-V-111C OPEN (Manual RPV Injection)~~
		• ~~RHR-V-21 CLOSED and in AUTO (Suppression Pool Cooling/Test~~ Return).
		~~Recognizes RHR-V-21 is opened and takes C/S to closed until red light~~ ~~goes out and then releases C/S back to AUTO.~~
		• ~~RHR-V-42C CLOSED and in AUTO (LPCI Injection).~~
		• ~~RHR-V-4C OPEN and in OPEN with its key REMOVED~~
		• ~~(Pump Suction from Supp Pool).~~
		• ~~RHR-FCV-64C CLOSED and in AUTO (Minimum Flow Bypass).~~

Not Done (handwritten annotation in left margin)

		Verify the following in NORMAL with its key REMOVED (H13-P618). • RHR-RMS-S103C (RHR-FCV-64C Min Flow Bypass). • RHR-RMS-S101C (RHR-V-42C Bypass Low Press Logic). • RHR-RMS-S44B (RHR-B/C Pump Test Pwr Avail Logic). • RHR-RMS-S70 (Logic Test DG-2/DW Clg Inhibit). • RHR-RMS-S107 (RHR-V-42C Override ECCS Logic).
		Verify RHR-P-3 Running and in START (RHR B/C Water Leg).
		Verify H13-P601.A2-6.5, RHR C PUMP DISCH PRESS HIGH/LOW alarm is clear.
Not done		Verify the Standby Service Water System B is available to support RHR Loop C System operation. May request direction to secure SW-P-1B.
		Verify RHR-P-2C OFF and in AUTO. Notes red flag is displayed and may take RHR-P-2C C/S to STOP to display green flag.
		Verify RHR-P-2C LOCKOUT CIRCUIT AVAIL light LIT. Notes light is not illuminated.
		Verify appropriate RHR C annunciator and BISI alarms are clear, based on plant conditions.
		IF RHR Loop C is required to be Operable, then LOG RHR-LPCI-C as available and/or Operable in the Plant Logging System (M-Rule).

SRO   ~~Refers to Technical Specifications and notes TS 3.5.1.A is applicable which requires restoration to operable status within 7 days.~~

Not done

~~May protect systems per PPM 1.3.83 (RHR-A, RHR-B and LPCS).~~

~~Conducts Brief.~~

ROLEPLAY: If asked to investigate RHR-P-2C, report nothing appears wrong with pump or breaker.

COMMENTS:

Event No. 5

Description: ~~ASD Channel 1A2 fault.~~
This event is triggered by activating **TRIGGER 3** after RHR-P-2C Tech Spec call is made.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: ACTIVATE TRIGGER 3.		
T = 30	~~ATC~~	~~Reports ASD Channel 1A/2 alarm and Fault annunciators.~~
		~~Refers to ARP for fault alarm (602.A13-5-3) and verifies:~~
		~~RRC-MA-R676A is in manual~~
		~~RRC-P-1A runback to approximately 51 Hz~~
	Not done	~~Reports power drop due to RRC pump runback to 51 Hz. Reports RPV power/level/pressure.~~
		~~Checks ASD video Display Unit for source of alarm.~~
	~~BOP~~	~~Sends OPS4 to investigate at the ASD Building.~~

ROLEPLAY: Two minutes after being sent to investigate, call x2171 and report as OPS4 that there is a GTO freeze alarm on Channel 1A2. Also inform them that there is a slight electrical smell in the building but you see nothing wrong. If asked – the alarm cannot be reset.

	SRO	~~Directs actions per ARP for high delta flow.~~
		~~Tech Spec 3.4.1, flow mismatch, is applicable until flows are matched.~~
		~~Directs RO to match RRC loop flows by lowering RRC loop B flow.~~
Not done		~~Refers to ABN-POWER.~~
		~~Notifies PSRO/Work Control.~~
		~~May direct performance of PPM OSP-RRC-D701, Jet Pump Operability and RRC loop Flow mismatch.~~
	ATC	~~Reduces RRC-P-1B speed as directed to match RRC loop flows.~~

COMMENTS:

Event No. 6		
~~Description: ASD UPS trouble alarm. ASD-PP1/3 becomes de-energized requiring flow reduction and manual scram insertion.~~ ~~This event is initiated by activating **TRIGGER 4** and should be initiated when RRC loop flows are matched or as directed.~~		

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: ACTIVATE TRIGGER 4.		
~~T = 40~~	~~ATC~~	~~Reports ASD UPS Trouble Alarm and refers to ARP.~~ ~~Refers SRO to ABN-ASD-INV.~~
Not done	~~SRO~~	~~Directs actions per ARP for ASD UPS Trouble.~~ ~~Refers to ABN-ASD-INV.~~
	~~BOP~~	~~Sends OPS4 to investigate.~~
BOOTH OPERATOR: A minute after being sent to investigate, report that the breaker supplying the input to E-PP-ASD 1/3 is opened and E-PP-ASD 1/3 is de-energized. Also – there is a small amount of smoke coming from the breaker but there is no fire.		
	~~SRO~~	~~Determines that IN-ASD/1A and 1B panels are on battery power and that normal AC power is not going to be restored to the inverters.~~ ~~Conducts brief.~~ ~~Directs that RRC flow be reduced to 60 Mlbm/hr per ABN-ASD-INV step 4.2.~~

	ATC	Recognizes that ASD operation for 'ASD-A' is in Manual and 'ASD-B' is in Auto (if not previously taken to manual). May place RRC-B ASD controller in manual or operate it in AUTO to lower flow.
		Lowers RRC flow to 60 Mlbm/hr as directed and reports completion to SRO.
	SRO	Directs a manual scram of reactor.
Not done	RO	Inserts a manual scram and performs immediate scram actions.
		Announces "Listen Up for the Scram Report".
		Places MODE switch to shutdown.
		Reports APRMs are NOT downscale.
		Reports current RPV pressure and trend.
		Reports current RPV level and trend.
		Verifies all rods inserted and recognizes all rods NOT inserted.
		Reports EOP entry on failure to scram.

COMMENTS:

Event No. 7

Description: Hydraulic ATWS. Lower RPV level.
This event is active at the beginning of the scenario and occurs automatically when a manual scram is inserted.

Critical Task is to lower RPV level and establish an Lowered Level.

Time		
T = 50	ATC	Continues with immediate scram actions after recognizing all control rods did not insert: • Depress the manual scram pushbuttons • Initiate ARI and verifies valves opened • Insert SRMs and IRMs Reports reactor power at approximately 50%.
	SRO	Enters PPM 5.1.1 and directs/verifies that the Mode Switch has been placed in SHUTDOWN and exits PPM 5.1.1 and enters PPM 5.1.2, RPV Control ATWS. Directs BOP to: • Inhibit ADS and take manual control of HPCS • Verify all actuations for +13, -50, and 1.68 psig as they occur. • Verify pressure is being maintained by the bypass valves

	BOP	Takes both ADS control switches to the INHIBIT position and acknowledges associated BISIs.	
		Arms and Depresses the HPCS system initiation P/B while holding the control switch for HPCS-P-1 to STOP.	
		Closes HPCS-V-4 when it get fully opened.	
		Reports completion to SRO.	
	SRO	Directs bypassing the MSIV isolation interlocks per PPM 5.5.6.	
	SRO	Performs PPM 5.5.6:	
		At H13-P609 places MS-RMS-S84 to BYPASS	
		At H13-P611 places MS-RMS-S85 to BYPASS	
		Updates Crew to completion of PPM 5.5.6.	
	SRO	Directs SLC initiation.	

		ATC	Initiates SLC per the quick card:
			Swaps keys and places two switches to OPER.
			Verifies squib valves fire.
			Verifies RWCU-V-4 closure.
			Verifies flow and SLC tank level.
			Reports abnormal SLC flow at about 18 gpm and initial tank level.
		SRO	Directs RCIC-V-1 be closed.
		BOP	Closes RCIC-V-1, verifies RCIC trip annunciator and reports completion to SRO.
		SRO	Directs performance of PPM 5.5.1.
		BOP	Performs PPM 5.5.1:
			At H13-P625 places HPCS-RMS-S25 in OVERRIDE
			At H13-P629 places LPCS-RMS-S21 in OVERRIDE
			At H13-P629 places RHR-RMS-S105 in OVERRIDE
			At H13-P618 places RHR-RMS-S106 in OVERRIDE
			At H13-P618 places RHR-RMS-S107 in OVERRIDE
			Updates crew to completion of PPM 5.5.1, and that the ECCS injection valves are closed and throttleable.

	SRO	Direct the ATC to:
		Stop and prevent all injection into the RPV except by Boron injection systems, RCIC, and CRD.
		Lower level to a band less than –65" but greater than –183" (preferred band is –80" to –140").
		Re-commences feeding at -65".
	ATC	Uses Quick Cards to stops and prevent condensate and feedwater and lines up on the startup flow control valves as directed.
		Reports EOP entry on low RPV water level.
		Reports Reactor Power as it drops due to lowering level.
		When Reactor Power is LT 5%, marks RPV level to establish an LL.
		Maintains RPV level between LL and –183" as directed (–80" to –140").

COMMENTS:

Event No. 8		

Description: Insert Control Rods by performing PPM 5.5.11.

This event is completed as level is being lowered and the ATWS will clear when RPV level has been lowered and in being controlled at the lowered level band.

Critical Task is to Insert Control Rods.

Time	Position	Applicants Actions or Behavior
T = 55	SRO	Directs PPM 5.5.11 be performed to insert control rods.

BACK PANEL OPERATOR: Be standing next to Board S to get direction from BOP operator to perform Attachment 6.1.

	BOP	Performs PPM 5.5.11 and:
		Determines that no RPS scram lights are lit
		Removes one TB1 ARI fuse and one TB2 ARI fuse in H13-P650.
		Determines that some or all blue scram valve lights are lit.
		Determines Tab B should be performed:
		Places the SDV HIGH LEVEL TRIP control switch to BYPASS on P603.
		Determines the scram cannot be reset.
		Overrides RPS trip signals per Attachment 6.1.
		Directs Instructor to perform back panel operations associated with Attachment 6.1 (may also direct Attachment 6.2 at this point)

BACK PANEL OPERATOR: Take direction from the BOP operator to perform back panel steps of Attachment 6.1. Wait three minutes and then Activate <u>TRIGGER 28</u> to install RPS jumpers.

When completed, circle slash the steps and inform the BOP operator that they have been completed by standing next to Board S and giving the crew an update:

"UPDATE READY - Attachment 6.1 of PPM 5.5.11 has been completed, END OF UPDATE."

	BOP	Continues with Tab B actions:
		
		   Reset the scram by depressing reset pushbuttons.
		
		   Ensures both CRD pumps are running (CRD-P-1A cannot be started due to trip at beginning of scenario).

	BOP	Determines drive header pressure can be established and directs OPS2 to close CRD-V-34.

BOOTH OPERATOR: Wait one minute and then to close CRD-V-34 take LOA-CRD014 from '1' to '0' and inform the control room that CRD-V-34 is closed.

BACK PANEL OPERATOR: Be standing next to Board S to get direction from BOP operator to perform Attachment 6.2.

	BOP	Directs Back Panel Operator to perform Attachment 6.2 to bypass all RSCS rod blocks.

BACK PANEL OPERATOR: Take direction from the BOP operator to perform back panel steps of Attachment 6.2. Wait two minutes and then Activate <u>TRIGGER 30</u> to install jumpers.

When completed, circle slash the two steps at the bottom of the page and inform the BOP operator that they have been completed by standing next to Board S and giving the crew an update:

"UPDATE READY - Attachment 6.2 of PPM 5.5.11 has been completed, END OF UPDATE."

BOOTH OPERATOR: When RPV Level has been lowered and is being maintained: TO CLEAR ATWS: When both scram discharge volume vents and drains are fully open, set the four ATWS malfunctions to a severity of sixty.

		BOP	Manually starts to drive control rods by starting at 10-43 and inserting every other rod in every other row.
			Reports success in driving control rods to SRO.
			When the Scram Discharge Volume has been drained for more than 2 minutes initiates a manual scram by depressing the four red manual scram pushbuttons.
			If rods do not insert continues scram/reset/scram Tab B and raises SDV drain time by 2 minutes.
			Determines All Rods are in and informs the SRO.
			Installs the one TB1 ARI fuse and the one TB2 ARI fuse previously removed in TAB A.
		SRO	Directs SLC be stopped.
		ATC/BOP	Takes control switches out of OPER and observes both SLC pumps stop.
		SRO	Exits PPM 5.1.2 and re-enters PPM 5.1.1.
			Directs RPV level be raised to -50" to +54" band with available systems.

	ATC	Raises RPV level into band as directed.

TERMINATION POINT – The scenario will be terminated when RPV level is being returned to the directed band.

Comments:

TURNOVER INFORMATION

Initial Conditions:

The plant is operating at 100% power. RWCU-P-1A was shutdown 30 minutes ago per SOP-RWCU-Shutdown section 5.1. Both RWCU Filter Demins have been removed from service and are being backwashed.

Shift Directions:

Immediately following shift turnover, the ATC operator is to perform a quick restart of RWCU-P-1A. OPS 3 has been briefed on the evolution and is on station standing by to assist.

Concurrently with RWCU-P-1A restoration, place RHR-P-2C in Suppression Pool Mixing at 7000 gpm to allow Suppression Pool sampling, per SOP-RHR-SPC. Allow service water to auto start. OPS 2 and OPS 4 have reported RHR-P-2C and SW-P-1B are ready to start and are on station waiting for the pump starts. Health Physics has been notified. Notify Chemistry when RHR-P-2C is in Suppression Pool mixing.

SIMULATOR SETUP INSTRUCTIONS

Reset to IC-4.

Set up a 100 rpm differential on RFW pumps.

Flag alarmed annunciators.

Have the RWCU demineralizer screen displayed, ready to close RWCU-V-13A (RWU02 screen).

SCHEDULE FILE

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```

Facility: Columbia   NRC Exam Scenario No: 3

Examiners: _____   Operators: _____

_____   _____

_____   _____

Initial Conditions:	Columbia is operating at 90% power due to economic dispatch. RHR-P-2A is running in Suppression Pool Cooling per SOP-RHR-SPC at 7000 gpm. OSP-ELEC-M701, the DG-1 Monthly Operability Test Surveillance is in progress and step 7.3.23 has been completed. SM-7 has been transferred to TR-B. DG-1 has been running at IDLE speed for GT 10 minutes. PDIS is unavailable. OPS 2 is standing by at extension 4740 in DG-1 Room.
Shift Directions:	Immediately after shift turnover, the BOP Operator is to secure RHR Loop A from Suppression Pool Cooling up to the step of verifying RHR Loop A in a standby lineup (another operator will perform that step). HP has been notified. After, the BOP Operator is to continue with OSP-ELEC-M701, starting at step 7.3.24.

Additionally, raise reactor power to 95% with flow. A reactivity brief for the power increase has been held. There are no pre-conditioning limits. The power increase will be performed concurrently with securing RHR Loop A and the DG surveillance. |

Event No.	Timeline	Event Type*	Event Description
1.	T = 0	R (SRO/ATC)	Raise Reactor Power to 95%.
2.	T = 0	N (SRO/BOP)	Secure RHR Loop A from Suppression Pool Cooling.
3.	T = 10	C (SRO/BOP)	Continue with OSP-ELEC-M701, DG-1 Monthly surveillance. When DG-1 is paralleled with SM-1, MVAR meter deflects and remains left of zero requiring the DG-1 output breaker to be opened (Tech Spec).
4.	T = 20	R, C (SRO/ATC)	Drifting Control Rod sticks at a position GT position 00 requiring a RRC flow reduction to LE 80 Mlbm/hr (Tech Spec).
5.	T=25	M, C (ALL)	Lowering CAS system pressure that continues to lower causing MSIV closure (a manual scram should be inserted prior to MSIV closure).
6.	T=30	C (SRO/ATC)	Hydraulic ATWS – 7 Control Rods fail to insert.

7.	T=35	C (ALL)	RCIC Steam Line Steam Leak.
8.	T=45	M (ALL)	Failure of RCIC-V-8 and RCIC-V-63 to fully close (unisolable leak).
9.	T=60		ATWS Emergency Depressurization (PPM 5.1.5) when two areas exceed their Max Safe Operating Temperature (Critical Task).

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

The scenario starts with Columbia at 90% power. RHR-P-2A is in Suppression Pool Cooling and a DG-1 monthly surveillance is in progress.

After the Crew takes the shift, reactor power will be raised to 95% with flow at the rate of 10 Mwe/ minute.

In conjunction with the power increase, RHR Loop A will be secured from Suppression Pool Cooling. After, the DG-1 Monthly surveillance will continue. When DG-1 is paralleled with SM-7 the MVAR meter will deflect and remain downscale. The operator will attempt to restore MVARs on scale but will not be successful. In response the output breaker will be opened. Technical Specification 3.8.1 Condition B will be entered.

The next event is a drifting control rod. The ATC operator will acknowledge drift alarm and note that control rod 18-15 is drifting into the core. The continuous insert pushbutton will be depressed in an attempt to insert the rod. The control rod will stick in a position greater than 00. ABN-ROD will be entered and in response to the stuck control rod, recirc flow will be lowered to less than or equal to 80 Mlbm/hr. Technical Specification 3.1.3 Condition A will be entered.

The next event is lowering CAS system pressure. The standby compressors will start but CAS pressure will continue to lower. The crew will enter ABN-CAS and take actions for lowering pressure. The crew will eventually determine that a complete loss of air is apparent and initiate a manual scram.

When the scram is initiated, 7 total control rods will fail to insert. PPM 5.1.1 will be entered on low RPV level and exited to PPM 5.1.2, RPV Control ATWS. Due to the loss of air, rods cannot be inserted via scram/reset/scram.

When the MSIVs close, pressure control will be via SRVs. The crew should initiate RCIC (if the steam leak is not apparent). When RCIC stream leak does occur, the crew should lower RPV pressure with SRVs to facilitate feeding with the Condensate Booster Pumps. RPV level will be returned to normal level band.

As a result of the MSIV closure, a RCIC steam line break will occur, RCIC-V-8 and RCIC-V-63, Steam line admission valves fail to isolate on the isolation signal. The crew will attempt to close the valves but they will not close. The crew will enter PPM 5.3.1 and the RCIC pump room will exceed its Max Safe temperature.

The leak will eventually spread to a second area, the RHR-A Pump Room. When that area exceeds its Max Safe temperature, it will require the crew to initiate an emergency depressurization. PPM 5.1.2 pressure leg will be exited and PPM 5.1.5, RPV Emergency Depressurization – ATWS will be entered.

The crew will terminate and prevent injection and open 7 SRV's. When MSCP has been reached, injection will be recommenced if necessary.

The scenario will be terminated when the ED is performed and RPV level is in the normal band.

Event No. 1

Description: Increase reactor power with flow to 100% power.

This event is initiated by the turnover information.

Time	Position	Applicants Actions or Behavior
T=0	SRO	Directs the RO to increase reactor power to 100% power with RRC flow at the rate of 10 Mwe/minute.
	ATC	Increases reactor power with RRC flow as directed at the rate directed.

COMMENTS:

Event No. 2		
Description: Remove RHR Loop A from Suppression Pool Cooling.		
This event is initiated by the turnover information.		
Time	Position	Applicants Actions or Behavior
	SRO	Directs BOP to remove RHR Loop A from Suppression Pool Cooling.
SOP-RHR-SPC steps	BOP	Refers to SOP-RHR-SPC section 5.2.
5.2.1		Notify HP the actions to…..(Given as complete in turnover information)
5.2.2		Verify RHR-V-3A open.
NOTE: RHR-V-24A may be closed concurrently with opening RHR-V-48A.		
5.2.3	2H	Verify RHR-V-48A open.
5.2.4	2H	Close RHR-V-24A.
5.2.5		Stop RHR-P-2A.
5.2.6		Verify RHR-V-64A closed.
5.2.7		Verify RHR Loop A in Standby Lineup per SOP-RHR-STBY (Cues that another operator will perform).
COMMENTS:		

Event No. 3		
Description: Continue with OSP-ELEC-M701, DG-1 Monthly surveillance. This event is initiated by the turnover information and is started when RHR Loop A is removed from SPC.		
Time	Position	Applicants Actions or Behavior
	SRO	Directs BOP to continue with DG-1 Monthly surveillance.
Step 7.3.24		Place Engine Speed Selector switch to RATED (E-CP-DG/RP1).
BOOTH OPERATOR: When directed to go to RATED speed turn LOA-DGN026 from IDLE to RATED and inform the control room.		
Step 7.3.25		Log the time.
Step 7.3.26	BOP	Verify the following (H13-P800): • After steady-state conditions are reached, generator maintains voltage GE 3910 volts and LE 4400 volts • After steady-state conditions are reached, generator maintains frequency GE 58.8 Hz and LE 61.2 Hz
Step 7.3.27		Reset target for DG-RLY-59/DG1 (E-CP-DG/CP1).
ROLEPLAY: When directed report target for DG-RLY-59/DG1 has been reset.		
		CAUTION - Synchronization of the Diesel Generator with the Sync Selector Switch in the manual position may be performed only if the emergency operating mode of the diesel generator is required and a seismic condition exists or there is a fire in the Control Room. Manual synchronization of the diesel generator requires CRS/Shift Manager authorization.
Step 7.3.28		Place CB-DG1/7 Sync Selector to MAN CHECK (H13-P800).
Step 7.3.29		Raise or Lower frequency with the Diesel Gen 1 Governor control switch until synchronizing scope is running SLOW in the FAST (CW) direction (H13-P800).
		NOTE: Due to Diesel Generator voltage regulator design, it is possible to have indicated generator output voltage near bus voltage and, when paralleled, have the diesel generator in an overexcited condition with the MVAR meter deflected upscale GT 2.0 MVAR (right of zero). This results from continuing to attempt to raise generator output voltage beyond the no load capacity of the static exciter voltage regulator. To recover, the Voltage Regulator Control Switch should be placed in the LOWER position until MVAR indication comes back to the normal operating range. To minimize the possibility of overexciting the diesel generator, the operator should not attempt to raise generator output voltage after an increase in generator output voltage is no longer observed.

		NOTE: PDIS signals X301 (SM-7 voltage) and X251 (DG1 voltage) should be used to determine the incoming voltage is slightly higher than the running voltage as well as noting when an increase in generator output voltage is no longer observed.
Step 7.3.30		Raise or lower using the Diesel Gen 1 Voltage Regulator control switch until generator (incoming) Kilovolts is slightly higher than bus (running) Kilovolts on the Bus 7 Sync Voltage meter (H13-P800).
Step 7.3.31		If available, then verify signal X251 (DG1 voltage) is slightly higher than X301 (SM-7 voltage) **(not available)**.
		CAUTION - Failure to raise load to at least 0.1 MW after output breaker closure may result in a reverse power trip.
		CAUTION - Exceeding 5.15 MW (30 min limit) may cause significant generator damage.
Caution that gives actions for malfunction		**CAUTION - If the DG MVAR meter deflects and stays left of zero after adjusting Diesel Gen 1 Voltage Regulator, it is an indication of an under-excited generator. KW load should be reduced to LT 200 KW, and the diesel generator output breaker should be tripped by opening E-CB-DG1/7.**
		NOTE: DG-1 is required to operate for GE 60 minutes at a load GE 4000 KW and LE 4400 KW.
		NOTE: Depending on the electric plant configuration, H13-P800.C1-3.3, BUS 7 PARALLEL OPER or H13-P800.C1-1.1, DG-1 IMPROPER PARALLELING alarm may annunciate and remain for the duration of the test.
BOOST OPERATOR: When CB-DG1/7 closes, Activate <u>TRIGGER 1.</u>		
Step 7.3.32		When sync scope is about 5 minutes before the 12 o'clock position, then place and hold CB-DG1/7 control switch in the close position until breaker closes (should require only one revolution of sync scope) (H13-P800). a. Immediately verify MVARs are zero or slightly positive. (Adjust Diesel Gen 1 Voltage Regulator control switch, if necessary).
		Recognizes MVAR meter is downscale. Attempts to adjust MVARs by manipulation of the voltage regulator.
		Recognizes that MVARs are not changing. May inform the SRO of situation before taking action or may take action first based on caution statement.

		Adjusts KW load to LT 200 (if necessary) by taking Governor to LOWER.
		Takes CB-DG1/7 control switch to TRIP to open DG1/7.

BOOTH OPERATOR: When the output breaker is opened <u>REMOVE MVAR METER OVERRIDE "IND-DGN005".</u>

| | BOP | Informs SRO. |

ROLEPLAY: A minute after the output breaker is opened, call x2432 and as the System Engineer, inform the Control Room that you observed the situation with MVARs and request that DG-1 be emergency tripped to facilitate investigation.

	SRO	Directs BOP to emergency trip DG-1.
	BOP	Depresses the DG-1 Emergency Trip pushbutton.
	SRO	Refers to Tech Spec 3.8.1 Condition B and directs Offsite power alignment operability surveillance 3.8.1.1 be performed within 1 hour and once per 8 hours thereafter AND Declare required feature(s), supported by the inoperable DG, inoperable when the redundant required feature(s) are inoperable within 4 hours AND Determine OPERABLE DG(s) are not inoperable due to common cause failure within 24 hours OR Perform SR 3.8.1.2 for OPERABLE DG(s) within 24 hours AND Restore required DG to OPERABLE status within 72 hours and 6 days OR Establish risk management actions for the alternate AC sources within 72 hours AND Restore required DG to operable status within 14 days.

COMMENTS:

Event No. 4

Description: Drifting Control Rod sticks at a position GT position 00 requiring a RRC flow reduction to LE 80 Mlbm/hr (Tech Spec). This event is triggered by activating **TRIGGER 2** after Technical Specifications have been referenced and a brief has been conducted.

Time	**Position**	**Applicants Actions or Behavior**
BOOTH OPERATOR: Activate <u>TRIGGER 2.</u> Have camera set to observe when continuous insert P/B is depressed as TRIGGER 3 will then be initiated.		
T=15	ATC	Acknowledges drift annunciator and refers to ARP. Scans full core display and recognizes control rod 18-15 has its associated drift light illuminated.
		Performs immediate operator actions of ABN-ROD: Selects Control Rod 18-15 and observes that it is drifting in. a. Depresses the continuous insert pushbutton b. Drives the control rod full in
BOOTH OPERATOR: When the operator depresses the continuous insert pushbutton, Activate <u>TRIGGER 3.</u>		
	ATC	Recognizes that Control Rod 18-15 is not moving in any longer and informs the SRO.
	SRO	Refers to ABN-ROD subsequent actions and directs that core flow be reduced to LE 80 Mlbm/hr.

	ATC	Reduces core flow with ASD master controller to LE 80 Mlbm/hr and reports final power, pressure and level when completed.
	SRO	Notifies the SNE of Control Rod drift and directs a MON Run be initiated.

ROLEPLAY: When directed to do a MON Run inform the SRO that no thermal limits have been exceeded. If asked – there are no other stuck control rods.

	SRO	Refers to Technical Specification 3.1.3 Condition A: A.1 Verify stuck control rod separation criteria are met immediately AND Disarm the associated control rod drive within 2 hours AND Perform SR 3.1.3.2 for each withdrawn OPERABLE control rod within 24 hours AND Perform SR 3.1.1.1 within 72 hours. Directs disarming the control rod per SOP-CRD-HCU section 5.8.

BOOTH OPERATOR: No action is required if directed to isolate control rod 18-15.

COMMENTS:

Event No. 5

Description: Lowering CAS System Pressure. This event is triggered by activating **TRIGGER 4** after brief is completed on stuck control rod or as directed. It takes just about three minutes to get the first alarm. It takes 14 minutes to get an MSIV isolation scram.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: Activate TRIGGER 4.		
	BOP	Acknowledges STANDBY AIR COMP ON annunciator and notes all three CAS compressors are running. Refers to ARP and observes CAS pressure on CAS-PI-1 and recognizes it is 100 psig and trending down slowly. Informs SRO of pressure and trend and refers him to ABN-CAS.
	SRO	Updates crew on ABN-CAS entry. Directs OPS3 investigation. Directs PA announcement be made per ABN-CAS.
ROLEPLAY: If directed to investigate report all three CAS compressors running and loaded. NOTE: No feedback will be given as to the source of CAS line rupture.		
	BOP	Makes announcement per ABN-CAS as directed.
NOTE: At any time during the event a manual scram may be inserted if it is determined that a complete loss of air is apparent.		
	SRO	Sets CAS pressure as a key parameter.

	BOP	Reports CAS low pressure alarm, Service Air low pressure alarm, receiver low pressure alarm and SA header isolation as they occur.
	SRO	Directs ATC to verify RFW-V-118 is closed and to place RFW-LIC-620 in MANUAL and fully open RFW-FCV-10A/10B.
	ATC	Ensures RFW-V-118 is closed and places RFW-LIC-620 in MANUAL and fully opens RFW-FCV-10A/10B.
	BOP	Reports CAS pressure and trend as it lowers and key parameter met if one was directed.
	SRO	Determines that CAS pressure trend is not going to be reversed and briefs crew on manual scram. Directs a manual reactor scram.
	BOP	When MSIVs close, updates crew that they are closed and that he has pressure control at 800 to 1000 psig with SRVs. Places MSIV control switches to the closed position.
	SRO	Acknowledges update and directs pressure band. Will eventually give a 500 to 600 psig pressure band to facilitate feeding with the Condensate Booster Pumps.

COMMENTS:

Event No. 6

Description: Hydraulic ATWS – 7 Control Rods Fail to Insert.

This event is active at the beginning of the scenario.

Time	Position	Applicants Actions or Behavior
	ATC	Inserts a manual scram and performs immediate scram actions: Announces "Listen Up for the Scram Report". Places MODE switch to shutdown. Reports to SRO that the MODE switch in SHUTDOWN, APRMs are downscale, current Reactor Pressure is and trend, current RPV level is and trend, an EOP entry on RPV level exists, and that all rods are NOT full in. Does not continue with immediate scram actions as APRMs are downscale. Reports that there are 7 control rods that indicate not full in (18-03, 18-15, 22-07, 10-19, 26-35, 14-43 and 50-47) and are GT position 02.
	SRO	Repeats back the Scram report. Updates crew and enters PPM 5.1.1 and exits to PPM 5.1.2. Directs ADS be inhibited and to take manual control of HPCS. Directs ATC to perform PPM 3.3.1 and insert the control rods.
	BOP	Inhibits ADS and arms and depresses HPCS while holding HPCS-P-1 to stop. Closes HPCS-V-4 when it gets full open.
	ATC	May recognizes the loss of control air effects on inserting control rods and may direct OPS2 to lineup to vent the overpiston areas for the rods.

BOOTH OPERATOR: Acknowledge direction to lineup to vent overpiston area but no action will be taken prior to the end of the scenario.

	SRO	Announces that rapid injection may cause fuel damage per EOP caution. Directs RPV level be maintained with outside shroud systems (Table 5).
	SRO	If MSIVs are still open, may direct PPM 5.5.6 be performed.
	BOP	Performs PPM 5.5.6: At H13-P609 places MS-RMS-S84 to BYPASS At H13-P611 places MS-RMS-S85 to BYPASS Updates Crew to completion of PPM 5.5.6.
	SRO	Directs ARI be initiated per PPM 5.1.2.
	ATC	Initiates ARI and reports no effect on control rod positions.

COMMENTS:

Event No. 7 and No. 8

Description: RCIC Steam Leak causes RCIC pump Room to exceed Max Safe operating Temperature Value.

This event is initiated by activating **TRIGGER 5** and will be initiated when level control directions have been given.

Time	Position	Applicants Actions or Behavior
	SRO	Recognizes MSIV are closed and directs RPV level be maintained with RCIC and CRD.
	BOP	Arms and depresses RCIC.
	SRO	If the determination that the reactor is shutdown has been made, direction may be given to reduce RPV pressure to facilitate feeding with the Condensate System.
	BOP	Opens SRVs as necessary to reduce RPV pressure to band given
	ATC	Feeds RPV with Condensate System when pressure has been lowered.
colspan	**BOOTH OPERATOR: Activate TRIGGER 5 when level control directions have been given.**	
	BOP	Reports EOP entry on Secondary Pressure dP High.
	SRO	Enters PPM 5.3.1 on Secondary Pressure dP High.
	BOP	Reports RCIC Area high temperature alarms and eventual EOP entry on Leak Det RCIC Equip Area Temp Hi-Hi and refers to ARP.

	SRO	Directs investigation to value of temperature.
	BOP	Reports that RCIC Pump Room (LD-TE-4B) is in alarm and will eventually report that it has exceeded Max Safe operating temperature.
	BOP	Identifies and reports isolation signal for RCIC and that RCIC-V-8 and RCIC-V-63 failed to close the valves.
	SRO	Re-enters PPM 5.3.1 and directs that RCIC manual isolation be attempted.
	BOP/ATC	Obtains keys 11 and 14 and attempts to close RCIC-V-8 and RCIC-V-63. Reports both valves will not close.
	SRO	If RCIC was initially directed for RPV level maintenance, recognizes that RCIC is tripped and is not injecting and determines that RPV Pressure should be reduced to facilitate RPV level maintenance with the Condensate Booster Pumps. Directs RPV Pressure be lowered and maintained 500 to 600 psig. Directs RPV level maintenance with the Condensate Booster Pumps from -50" to +54".
	BOP	Opens SRVs as necessary to reduce RPV pressure as directed.
	ATC	When necessary, opens RFW-V-118 to maintain RPV level as directed.

Comments:

Event No. 9

Description: Initiate an Emergency Depressurization per PPM 5.1.5 when two areas exceed their Max Safe operating values. This event was initiated when **TRIGGER 5** was initiated and is on a 5 minute time delay.

Critical Task is to initiate an Emergency Depressurization when two areas exceed their Max Safe Operating Values.

Time	Position	Applicants Actions or Behavior
	BOP	Identifies and reports RHR-A high temperature alarms and eventual LEAK DET RHR HX and Pump Rooms Temp Hi Hi as EOP re-entry conditions.
	SRO	Re-enters PPM 5.3.1.
	BOP	As RHR-A temperature rises, when temperature reaches 210°F, reports that two areas have exceeded their Max Safe Operating Values (RCIC and the RHR 'A' pump room).
	SRO	Recognizes that an emergency depressurization is required. Updates crew and enters PPM 5.1.5 and direct termination of all injection except RCIC, SLC and CRD. May directs PPM 5.5.1 to stop and prevent ECCS injection or may direct injection valves be held closed if ECCS initiation signal is present.
	ATC	Stop and prevents Condensate as directed by closing RFW-V-118. Performs PPM 5.5.1 if directed and reports completion.
	SRO	Directs initiation of emergency depressurization by opening 7 SRVs, ADS preferred.

	BOP	Opens 7 ADS SRVs and reports completion to SRO.
	SRO	Sets a key parameter of 188 psig RPV pressure.
	BOP	Reports RPV pressure when it reaches 188 psig.
	SRO	When RPV/P drops to MSCP (188 psig), direct throttling injection using the Condensate Booster Pump to maintain level.
	ATC	When directed, injects using the Condensate Booster Pumps.

Comments:

TERMINATION CRITERIA: The scenario will be terminated when an Emergency Depressurization has been performed and RPV level is in the normal band.

TURNOVER INFORMATION

Initial Conditions:

Columbia is operating at 90% power due to economic dispatch. RHR-P-2A is running in Suppression Pool Cooling per SOP-RHR-SPC at 7000 gpm. OSP-ELEC-M701, the DG-1 Monthly Operability Test Surveillance is in progress and step 7.3.23 has been completed. SM-7 has been transferred to TR-B. DG-1 has been running at IDLE speed for GT 10 minutes. PDIS is unavailable. OPS 2 is standing by at extension 4740 in DG-1 Room.

Shift Directions:

Immediately after shift turnover, the BOP Operator is to secure RHR Loop A from Suppression Pool Cooling up to the step of verifying RHR Loop A in a standby lineup (another operator will perform that step). HP has been notified. After, the BOP Operator is to continue with OSP-ELEC-M701, starting at step 7.3.24.

Additionally, raise reactor power to 95% with flow. A reactivity brief for the power increase has been held. There are no pre-conditioning limits.

The power increase will be performed concurrently with securing RHR Loop A and the DG surveillance.

SIMULATOR SETUP INSTRUCTIONS

Reset to IC-5.

Flag alarms that are illuminated.

Adjust RFW pump speed to give a 100 rpm differential.

Place Procedure podium and phone next to DG-1 at H13-P800.

Have a camera set up to view DG-1 surveillance and the closing of the DG output breaker.

Have LOA-DGN026 up and ready to be put in RATED.

Have IND-DGN005 ready to be pulled up and removed when the DG output breaker is opened.

SCHEDULE FILE

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     <ITEM row = 3>
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Appendix D   **NRC EXAM SCENARIO #3**   FORM ES-D-1
                    Columbia Generating Station NRC Exam – April, 2011

Facility: Columbia   NRC Exam Scenario No: 3

Examiners: _____   Operators: _____

           _____   _____

           _____   _____

Initial Conditions: Columbia is operating at 90% power due to economic dispatch. RHR-P-2A is running in Suppression Pool Cooling per SOP-RHR-SPC at 7000 gpm. OSP-ELEC-M701, the DG-1 Monthly Operability Test Surveillance is in progress and step 7.3.23 has been completed. SM-7 has been transferred to TR-B. DG-1 has been running at IDLE speed for GT 10 minutes. PDIS is unavailable. OPS 2 is standing by at extension 4740 in DG-1 Room.

Shift Directions: Immediately after shift turnover, the BOP Operator is to secure RHR Loop A from Suppression Pool Cooling up to the step of verifying RHR Loop A in a standby lineup (another operator will perform that step). HP has been notified. After, the BOP Operator is to continue with OSP-ELEC-M701, starting at step 7.3.24.

Additionally, raise reactor power to 95% with flow. A reactivity brief for the power increase has been held. There are no pre-conditioning limits. The power increase will be performed concurrently with securing RHR Loop A and the DG surveillance.

Event No.	Timeline	Event Type*	Event Description
1.	T = 0	R (SRO/ATC)	Raise Reactor Power to 95%.
2.	T = 0	N (SRO/BOP)	Secure RHR Loop A from Suppression Pool Cooling.
3.	T = 10	C (SRO/BOP)	Continue with OSP-ELEC-M701, DG-1 Monthly surveillance. When DG-1 is paralleled with SM-1, MVAR meter deflects and remains left of zero requiring the DG-1 output breaker to be opened (Tech Spec).
4.	T = 20	R, C (SRO/ATC)	Drifting Control Rod sticks at a position GT position 00 requiring a RRC flow reduction to LE 80 Mlbm/hr (Tech Spec).
5.	T=25	M, C (ALL)	Lowering CAS system pressure that continues to lower causing MSIV closure (a manual scram should be inserted prior to MSIV closure).
6.	T=30	C (SRO/ATC)	Hydraulic ATWS – 7 Control Rods fail to insert.

7.	T=35	C (ALL)	RCIC Steam Line Steam Leak.
8.	T=45	M (ALL)	Failure of RCIC-V-8 and RCIC-V-63 to fully close (unisolable leak).
9.	T=60		ATWS Emergency Depressurization (PPM 5.1.5) when two areas exceed their Max Safe Operating Temperature (Critical Task).

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

The scenario starts with Columbia at 90% power. RHR-P-2A is in Suppression Pool Cooling and a DG-1 monthly surveillance is in progress.

After the Crew takes the shift, reactor power will be raised to 95% with flow at the rate of 10 Mwe/ minute.

In conjunction with the power increase, RHR Loop A will be secured from Suppression Pool Cooling. After, the DG-1 Monthly surveillance will continue. When DG-1 is paralleled with SM-7 the MVAR meter will deflect and remain downscale. The operator will attempt to restore MVARs on scale but will not be successful. In response the output breaker will be opened. Technical Specification 3.8.1 Condition B will be entered.

The next event is a drifting control rod. The ATC operator will acknowledge drift alarm and note that control rod 18-15 is drifting into the core. The continuous insert pushbutton will be depressed in an attempt to insert the rod. The control rod will stick in a position greater than 00. ABN-ROD will be entered and in response to the stuck control rod, recirc flow will be lowered to less than or equal to 80 Mlbm/hr. Technical Specification 3.1.3 Condition A will be entered.

The next event is lowering CAS system pressure. The standby compressors will start but CAS pressure will continue to lower. The crew will enter ABN-CAS and take actions for lowering pressure. The crew will eventually determine that a complete loss of air is apparent and initiate a manual scram.

When the scram is initiated, 7 total control rods will fail to insert. PPM 5.1.1 will be entered on low RPV level and exited to PPM 5.1.2, RPV Control ATWS. Due to the loss of air, rods cannot be inserted via scram/reset/scram.

When the MSIVs close, pressure control will be via SRVs. The crew should initiate RCIC (if the steam leak is not apparent). When RCIC stream leak does occur, the crew should lower RPV pressure with SRVs to facilitate feeding with the Condensate Booster Pumps. RPV level will be returned to normal level band.

As a result of the MSIV closure, a RCIC steam line break will occur, RCIC-V-8 and RCIC-V-63, Steam line admission valves fail to isolate on the isolation signal. The crew will attempt to close the valves but they will not close. The crew will enter PPM 5.3.1 and the RCIC pump room will exceed its Max Safe temperature.

The leak will eventually spread to a second area, the RHR-A Pump Room. When that area exceeds its Max Safe temperature, it will require the crew to initiate an emergency depressurization. PPM 5.1.2 pressure leg will be exited and PPM 5.1.5, RPV Emergency Depressurization – ATWS will be entered.

The crew will terminate and prevent injection and open 7 SRV's. When MSCP has been reached, injection will be recommenced if necessary.

The scenario will be terminated when the ED is performed and RPV level is in the normal band.

Event No. 1

Description: Increase reactor power with flow to 100% power.

This event is initiated by the turnover information.

Time	Position	Applicants Actions or Behavior
T=0	SRO	Directs the RO to increase reactor power to 100% power with RRC flow at the rate of 10 Mwe/minute.
	ATC	Increases reactor power with RRC flow as directed at the rate directed.

COMMENTS:

Event No. 2

Description: Remove RHR Loop A from Suppression Pool Cooling.

This event is initiated by the turnover information.

Time	Position	Applicants Actions or Behavior
	SRO	Directs BOP to remove RHR Loop A from Suppression Pool Cooling.
SOP-RHR-SPC steps	BOP	Refers to SOP-RHR-SPC section 5.2.
5.2.1		Notify HP the actions to…..(Given as complete in turnover information)
5.2.2		Verify RHR-V-3A open.

NOTE: RHR-V-24A may be closed concurrently with opening RHR-V-48A.		
5.2.3	2H	Verify RHR-V-48A open.
5.2.4	2H	Close RHR-V-24A.
5.2.5		Stop RHR-P-2A.
5.2.6		Verify RHR-V-64A closed.
5.2.7		Verify RHR Loop A in Standby Lineup per SOP-RHR-STBY (Cues that another operator will perform).
COMMENTS:		

NRC EXAM SCENARIO #3
Columbia Generating Station NRC Exam – April, 2011

Event No. 3

Description: Continue with OSP-ELEC-M701, DG-1 Monthly surveillance.

This event is initiated by the turnover information and is started when RHR Loop A is removed from SPC.

Time	Position	Applicants Actions or Behavior
	SRO	Directs BOP to continue with DG-1 Monthly surveillance.
Step 7.3.24		Place Engine Speed Selector switch to RATED (E-CP-DG/RP1).
BOOTH OPERATOR: When directed to go to RATED speed turn LOA-DGN026 from IDLE to RATED and inform the control room.		
Step 7.3.25		Log the time.
Step 7.3.26	BOP	Verify the following (H13-P800): • After steady-state conditions are reached, generator maintains voltage GE 3910 volts and LE 4400 volts • After steady-state conditions are reached, generator maintains frequency GE 58.8 Hz and LE 61.2 Hz
Step 7.3.27		Reset target for DG-RLY-59/DG1 (E-CP-DG/CP1).
ROLEPLAY: When directed report target for DG-RLY-59/DG1 has been reset.		
		CAUTION - Synchronization of the Diesel Generator with the Sync Selector Switch in the manual position may be performed only if the emergency operating mode of the diesel generator is required and a seismic condition exists or there is a fire in the Control Room. Manual synchronization of the diesel generator requires CRS/Shift Manager authorization.
Step 7.3.28		Place CB-DG1/7 Sync Selector to MAN CHECK (H13-P800).
Step 7.3.29		Raise or Lower frequency with the Diesel Gen 1 Governor control switch until synchronizing scope is running SLOW in the FAST (CW) direction (H13-P800).
		NOTE: Due to Diesel Generator voltage regulator design, it is possible to have indicated generator output voltage near bus voltage and, when paralleled, have the diesel generator in an overexcited condition with the MVAR meter deflected upscale GT 2.0 MVAR (right of zero). This results from continuing to attempt to raise generator output voltage beyond the no load capacity of the static exciter voltage regulator. To recover, the Voltage Regulator Control Switch should be placed in the LOWER position until MVAR indication comes back to the normal operating range. To minimize the possibility of overexciting the diesel generator, the operator should not attempt to raise generator output voltage after an increase in generator output voltage is no longer observed.

		NOTE: PDIS signals X301 (SM-7 voltage) and X251 (DG1 voltage) should be used to determine the incoming voltage is slightly higher than the running voltage as well as noting when an increase in generator output voltage is no longer observed.
Step 7.3.30		Raise or lower using the Diesel Gen 1 Voltage Regulator control switch until generator (incoming) Kilovolts is slightly higher than bus (running) Kilovolts on the Bus 7 Sync Voltage meter (H13-P800).
Step 7.3.31		If available, then verify signal X251 (DG1 voltage) is slightly higher than X301 (SM-7 voltage) **(not available)**.
		CAUTION - Failure to raise load to at least 0.1 MW after output breaker closure may result in a reverse power trip.
		CAUTION - Exceeding 5.15 MW (30 min limit) may cause significant generator damage.
Caution that gives actions for malfunction		**CAUTION - If the DG MVAR meter deflects and stays left of zero after adjusting Diesel Gen 1 Voltage Regulator, it is an indication of an under-excited generator. KW load should be reduced to LT 200 KW, and the diesel generator output breaker should be tripped by opening E-CB-DG1/7.**
		NOTE: DG-1 is required to operate for GE 60 minutes at a load GE 4000 KW and LE 4400 KW. NOTE: Depending on the electric plant configuration, H13-P800.C1-3.3, BUS 7 PARALLEL OPER or H13-P800.C1-1.1, DG-1 IMPROPER PARALLELING alarm may annunciate and remain for the duration of the test.
BOOK OPERATOR: When CB-DG1/7 closes, Activate <u>TRIGGER 1.</u>		
Step 7.3.32		When sync scope is about 5 minutes before the 12 o'clock position, then place and hold CB-DG1/7 control switch in the close position until breaker closes (should require only one revolution of sync scope) (H13-P800). a. Immediately verify MVARs are zero or slightly positive. (Adjust Diesel Gen 1 Voltage Regulator control switch, if necessary).
		Recognizes MVAR meter is downscale. Attempts to adjust MVARs by manipulation of the voltage regulator.
		Recognizes that MVARs are not changing. May inform the SRO of situation before taking action or may take action first based on caution statement.

		Adjusts KW load to LT 200 (if necessary) by taking Governor to LOWER. Takes CB-DG1/7 control switch to TRIP to open DG1/7.

BOOTH OPERATOR: When the output breaker is opened <u>REMOVE MVAR METER OVERRIDE</u> "IND-DGN005".

	BOP	Informs SRO.

ROLEPLAY: A minute after the output breaker is opened, call x2432 and as the System Engineer, inform the Control Room that you observed the situation with MVARs and request that DG-1 be emergency tripped to facilitate investigation.

	SRO	Directs BOP to emergency trip DG-1.
	BOP	Depresses the DG-1 Emergency Trip pushbutton.
	SRO	Refers to Tech Spec 3.8.1 Condition B and directs Offsite power alignment operability surveillance 3.8.1.1 be performed within 1 hour and once per 8 hours thereafter AND Declare required feature(s), supported by the inoperable DG, inoperable when the redundant required feature(s) are inoperable within 4 hours AND Determine OPERABLE DG(s) are not inoperable due to common cause failure within 24 hours OR Perform SR 3.8.1.2 for OPERABLE DG(s) within 24 hours AND Restore required DG to OPERABLE status within 72 hours and 6 days OR Establish risk management actions for the alternate AC sources within 72 hours AND Restore required DG to operable status within 14 days.

COMMENTS:

Event No. 4

Description: Drifting Control Rod sticks at a position GT position 00 requiring a RRC flow reduction to LE 80 Mlbm/hr (Tech Spec).

This event is triggered by activating **TRIGGER 2** after Technical Specifications have been referenced and a brief has been conducted.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: Activate TRIGGER 2. Have camera set to observe when continuous insert P/B is depressed as TRIGGER 3 will then be initiated.		
T=15	ATC	Acknowledges drift annunciator and refers to ARP. Scans full core display and recognizes control rod 18-15 has its associated drift light illuminated.
		Performs immediate operator actions of ABN-ROD: Selects Control Rod 18-15 and observes that it is drifting in. a. Depresses the continuous insert pushbutton b. Drives the control rod full in
BOOTH OPERATOR: When the operator depresses the continuous insert pushbutton, Activate TRIGGER 3.		
	ATC	Recognizes that Control Rod 18-15 is not moving in any longer and informs the SRO.
	SRO	Refers to ABN-ROD subsequent actions and directs that core flow be reduced to LE 80 Mlbm/hr.

	ATC	Reduces core flow with ASD master controller to LE 80 Mlbm/hr and reports final power, pressure and level when completed.
	SRO	Notifies the SNE of Control Rod drift and directs a MON Run be initiated.

ROLEPLAY: When directed to do a MON Run inform the SRO that no thermal limits have been exceeded. If asked – there are no other stuck control rods.

	SRO	Refers to Technical Specification 3.1.3 Condition A: A.1 Verify stuck control rod separation criteria are met immediately AND Disarm the associated control rod drive within 2 hours AND Perform SR 3.1.3.2 for each withdrawn OPERABLE control rod within 24 hours AND Perform SR 3.1.1.1 within 72 hours. Directs disarming the control rod per SOP-CRD-HCU section 5.8.

BOOTH OPERATOR: No action is required if directed to isolate control rod 18-15.

COMMENTS:

Event No. 5

Description: Lowering CAS System Pressure.

This event is triggered by activating **TRIGGER 4** after brief is completed on stuck control rod or as directed. It takes just about three minutes to get the first alarm. It takes 14 minutes to get an MSIV isolation scram.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: Activate TRIGGER 4.		
	BOP	Acknowledges STANDBY AIR COMP ON annunciator and notes all three CAS compressors are running.
		Refers to ARP and observes CAS pressure on CAS-PI-1 and recognizes it is 100 psig and trending down slowly.
		Informs SRO of pressure and trend and refers him to ABN-CAS.
	SRO	Updates crew on ABN-CAS entry.
		Directs OPS3 investigation.
		Directs PA announcement be made per ABN-CAS.
ROLEPLAY: If directed to investigate report all three CAS compressors running and loaded. NOTE: No feedback will be given as to the source of CAS line rupture.		
	BOP	Makes announcement per ABN-CAS as directed.
NOTE: At any time during the event a manual scram may be inserted if it is determined that a complete loss of air is apparent.		
	SRO	Sets CAS pressure as a key parameter.

	BOP	Reports CAS low pressure alarm, Service Air low pressure alarm, receiver low pressure alarm and SA header isolation as they occur.
	SRO	Directs ATC to verify RFW-V-118 is closed and to place RFW-LIC-620 in MANUAL and fully open RFW-FCV-10A/10B.
	ATC	Ensures RFW-V-118 is closed and places RFW-LIC-620 in MANUAL and fully opens RFW-FCV-10A/10B.
	BOP	Reports CAS pressure and trend as it lowers and key parameter met if one was directed.
	SRO	Determines that CAS pressure trend is not going to be reversed and briefs crew on manual scram. Directs a manual reactor scram.
	BOP	When MSIVs close, updates crew that they are closed and that he has pressure control at 800 to 1000 psig with SRVs. Places MSIV control switches to the closed position.
	SRO	Acknowledges update and directs pressure band. Will eventually give a 500 to 600 psig pressure band to facilitate feeding with the Condensate Booster Pumps.

COMMENTS:

Event No. 6

Description: Hydraulic ATWS – 7 Control Rods Fail to Insert.

This event is active at the beginning of the scenario.

Time	Position	Applicants Actions or Behavior
	ATC	Inserts a manual scram and performs immediate scram actions:
		Announces "Listen Up for the Scram Report".
		Places MODE switch to shutdown.
		Reports to SRO that the MODE switch in SHUTDOWN, APRMs are downscale, current Reactor Pressure is and trend, current RPV level is and trend, an EOP entry on RPV level exists, and that all rods are NOT full in.
		Does not continue with immediate scram actions as APRMs are downscale.
		Reports that there are 7 control rods that indicate not full in (18-03, 18-15, 22-07, 10-19, 26-35, 14-43 and 50-47) and are GT position 02.
	SRO	Repeats back the Scram report.
		Updates crew and enters PPM 5.1.1 and exits to PPM 5.1.2.
		Directs ADS be inhibited and to take manual control of HPCS.
		Directs ATC to perform PPM 3.3.1 and insert the control rods.
		Secured Scenario Here
	~~BOP~~	~~Inhibits ADS and arms and depresses HPCS while holding HPCS-P-1 to stop. Closes HPCS-V-4 when it gets full open.~~
	~~ATC~~	~~May recognizes the loss of control air effects on inserting control rods and may direct OPS2 to lineup to vent the overpiston areas for the rods.~~

BOOTH OPERATOR: Acknowledge direction to lineup to vent overpiston area but no action will be taken prior to the end of the scenario.

	SRO	~~Announces that rapid injection may cause fuel damage per EOP caution.~~ ~~Directs RPV level be maintained with outside shroud systems (Table 5).~~
	SRO	~~If MSIVs are still open, may direct PPM 5.5.6 be performed.~~
	BOP *Not done*	~~Performs PPM 5.5.6:~~ ~~At H13-P609 places MS-RMS-S84 to BYPASS~~ ~~At H13-P611 places MS-RMS-S85 to BYPASS~~ ~~Updates Crew to completion of PPM 5.5.6.~~
	SRO	~~Directs ARI be initiated per PPM 5.1.2.~~
	ATC	Initiates ARI and reports no effect on control rod positions.

COMMENTS:

Event No. 7 and No. 8

Description: RCIC Steam Leak causes RCIC pump Room to exceed Max Safe operating Temperature Value.

This event is initiated by activating **TRIGGER 5** and will be initiated when level control directions have been given.

Time	Position	Applicants Actions or Behavior
	SRO	Recognizes MSIV are closed and directs RPV level be maintained with RCIC and CRD.
	BOP	Arms and depresses RCIC.
Not done	SRO	If the determination that the reactor is shutdown has been made, direction may be given to reduce RPV pressure to facilitate feeding with the Condensate System.
	BOP	Opens SRVs as necessary to reduce RPV pressure to band given.
	ATC	Feeds RPV with Condensate System when pressure has been lowered.

BOOTH OPERATOR: Activate TRIGGER 5 when level control directions have been given.

Time	Position	Applicants Actions or Behavior
	BOP	Reports EOP entry on Secondary Pressure dP High.
	SRO	Enters PPM 5.3.1 on Secondary Pressure dP High.
	BOP	Reports RCIC Area high temperature alarms and eventual EOP entry on Leak Det RCIC Equip Area Temp Hi-Hi and refers to ARP.

	SRO	Directs investigation to value of temperature.
	BOP	Reports that RCIC Pump Room (LD-TE-4B) is in alarm and will eventually report that it has exceeded Max Safe operating temperature.
	BOP	Identifies and reports isolation signal for RCIC and that RCIC-V-8 and RCIC-V-63 failed to close the valves.
	SRO	Re-enters PPM 5.3.1 and directs that RCIC manual isolation be attempted.
	BOP/ATC	Obtains keys 11 and 14 and attempts to close RCIC-V-8 and RCIC-V-63. Reports both valves will not close.
Not done	SRO	If RCIC was initially directed for RPV level maintenance, recognizes that RCIC is tripped and is not injecting and determines that RPV Pressure should be reduced to facilitate RPV level maintenance with the Condensate Booster Pumps. Directs RPV Pressure be lowered and maintained 500 to 600 psig. Directs RPV level maintenance with the Condensate Booster Pumps from -50" to +54".
	BOP	Opens SRVs as necessary to reduce RPV pressure as directed.
	ATC	When necessary, opens RFW-V-118 to maintain RPV level as directed.

Comments:

Event No. 9

Description: ~~Initiate an Emergency Depressurization per PPM 5.1.5 when two areas exceed their Max Safe operating values.~~

~~This event was initiated when~~ **TRIGGER 5** ~~was initiated and is on a 5 minute time delay.~~

Critical Task is to initiate an Emergency Depressurization when two areas exceed their Max Safe Operating Values.

Time	Position	Applicants Actions or Behavior
	~~BOP~~	~~Identifies and reports RHR-A high temperature alarms and eventual LEAK DET RHR HX and Pump Rooms Temp Hi Hi as EOP re-entry conditions.~~
	~~SRO~~	~~Re-enters PPM 5.3.1.~~
	~~BOP~~	~~As RHR-A temperature rises, when temperature reaches 210°F, reports that two areas have exceeded their Max Safe Operating Values (RCIC and the RHR 'A' pump room).~~
	~~SRO~~ *Not done*	~~Recognizes that an emergency depressurization is required.~~ ~~Updates crew and enters PPM 5.1.5 and direct termination of all injection except RCIC, SLC and CRD.~~ ~~May directs PPM 5.5.1 to stop and prevent ECCS injection or may direct injection valves be held closed if ECCS initiation signal is present.~~
	~~ATC~~	~~Stop and prevents Condensate as directed by closing RFW-V-118.~~ ~~Performs PPM 5.5.1 if directed and reports completion.~~
	~~SRO~~	~~Directs initiation of emergency depressurization by opening 7 SRVs, ADS preferred.~~

	~~BOP~~	~~Opens 7 ADS SRVs and reports completion to SRO.~~
	~~SRO~~	~~Sets a key parameter of 188 psig RPV pressure.~~
Not done	~~BOP~~	~~Reports RPV pressure when it reaches 188 psig.~~
	~~SRO~~	~~When RPV/P drops to MSCP (188 psig), direct throttling injection using the Condensate Booster Pump to maintain level.~~
	~~ATC~~	~~When directed, injects using the Condensate Booster Pumps.~~

Comments:

TERMINATION CRITERIA: The scenario will be terminated when an Emergency Depressurization has been performed and RPV level is in the normal band.

TURNOVER INFORMATION

Initial Conditions:

Columbia is operating at 90% power due to economic dispatch. RHR-P-2A is running in Suppression Pool Cooling per SOP-RHR-SPC at 7000 gpm. OSP-ELEC-M701, the DG-1 Monthly Operability Test Surveillance is in progress and step 7.3.23 has been completed. SM-7 has been transferred to TR-B. DG-1 has been running at IDLE speed for GT 10 minutes. PDIS is unavailable. OPS 2 is standing by at extension 4740 in DG-1 Room.

Shift Directions:

Immediately after shift turnover, the BOP Operator is to secure RHR Loop A from Suppression Pool Cooling up to the step of verifying RHR Loop A in a standby lineup (another operator will perform that step). HP has been notified. After, the BOP Operator is to continue with OSP-ELEC-M701, starting at step 7.3.24.

Additionally, raise reactor power to 95% with flow. A reactivity brief for the power increase has been held. There are no pre-conditioning limits.

The power increase will be performed concurrently with securing RHR Loop A and the DG surveillance.

SIMULATOR SETUP INSTRUCTIONS

Reset to IC-5.

Flag alarms that are illuminated.

Adjust RFW pump speed to give a 100 rpm differential.

Place Procedure podium and phone next to DG-1 at H13-P800.

Have a camera set up to view DG-1 surveillance and the closing of the DG output breaker.

Have LOA-DGN026 up and ready to be put in RATED.

Have IND-DGN005 ready to be pulled up and removed when the DG output breaker is opened.

NRC EXAM SCENARIO #3

Columbia Generating Station NRC Exam – April, 2011

Appendix D

SCHEDULE FILE

```
<!-- This file contains a Thunder Simulations Schedule -->
<SCHEDULE>
  <ITEM row = 1>
    <TIME>1</TIME>
    <ACTION>Insert remote LOA-DGN023 to PARALLEL</ACTION>
    <DESCRIPTION>DG1 EXCITATION MODE SELECTOR</DESCRIPTION>
  </ITEM>

  <ITEM row = 2>
    <TIME>1</TIME>
    <ACTION>Insert remote LOA-DGN026 to IDLE</ACTION>
    <DESCRIPTION>DG1 ENGINE SPEED SELECTOR</DESCRIPTION>
  </ITEM>

  <ITEM row = 3>
    <TIME>1</TIME>
    <ACTION>Insert malfunction MAL-RMC005-1019 after 1</ACTION>
    <DESCRIPTION>ROD 10-19 STUCK</DESCRIPTION>
  </ITEM>

  <ITEM row = 4>
    <TIME>1</TIME>
    <ACTION>Insert malfunction MAL-RMC005-1443 after 1</ACTION>
    <DESCRIPTION>ROD 14-43 STUCK</DESCRIPTION>
  </ITEM>

  <ITEM row = 5>
    <TIME>1</TIME>
    <ACTION>Insert malfunction MAL-RMC005-1803 after 1</ACTION>
    <DESCRIPTION>ROD 18-03 STUCK</DESCRIPTION>
  </ITEM>

  <ITEM row = 6>
    <TIME>1</TIME>
    <ACTION>Insert malfunction MAL-RMC005-2207 after 1</ACTION>
    <DESCRIPTION>ROD 22-07 STUCK</DESCRIPTION>
  </ITEM>

  <ITEM row = 7>
    <TIME>1</TIME>
    <ACTION>Insert malfunction MAL-RMC005-2635 after 1</ACTION>
    <DESCRIPTION>ROD 26-35 STUCK</DESCRIPTION>
  </ITEM>
```

NRC EXAM SCENARIO #3

Columbia Generating Station NRC Exam – April, 2011

Appendix D

```
<ITEM row = 8>
  <TIME>1</TIME>
  <ACTION>Insert malfunction MAL-RMC005-5047 after 1</ACTION>
  <DESCRIPTION>ROD 50-47 STUCK</DESCRIPTION>
</ITEM>

<ITEM row = 9>
  <TIME>1</TIME>
  <ACTION>Insert malfunction MOV-RCIO16F to FAIL_AS_IS</ACTION>
  <DESCRIPTION>RCIC-V-8 STEAM SUPPLY LINE OUTBOARD I</DESCRIPTION>
</ITEM>

<ITEM row = 10>
  <TIME>1</TIME>
  <ACTION>Insert malfunction MOV-RCIO12F to FAIL_AS_IS</ACTION>
  <DESCRIPTION>RCIC-V-63 STM SUPPLY LINE INBOARD ISOL</DESCRIPTION>
</ITEM>

<ITEM row = 11>
  <TIME>1</TIME>
  <EVENT>1</EVENT>
  <ACTION>Insert override IND-DGN005 to -4 on event 1</ACTION>
  <DESCRIPTION>DG1 VAR METER SIGNAL (M)</DESCRIPTION>
</ITEM>

<ITEM row = 12>
  <TIME>1</TIME>
  <EVENT>1</EVENT>
  <ACTION>Insert override OVR-DGN014B on event 1</ACTION>
  <DESCRIPTION>DIESEL GEN 1 VOLTAGE REGULATOR RAISE</DESCRIPTION>
</ITEM>

<ITEM row = 13>
  <TIME>1</TIME>
  <EVENT>1</EVENT>
  <ACTION>Insert override OVR-DGN014A on event 1</ACTION>
  <DESCRIPTION>DIESEL GEN 1 VOLTAGE REGULATOR LOWER</DESCRIPTION>
</ITEM>

<ITEM row = 14>
  <TIME>1</TIME>
  <EVENT>2</EVENT>
  <ACTION>Insert malfunction MAL-RMC004-1815 to IN on event 2</ACTION>
  <DESCRIPTION>ROD 1815 DRIFTS</DESCRIPTION>
</ITEM>
```

```
<ITEM row = 15>
    <TIME>1</TIME>
    <EVENT>3</EVENT>
    <ACTION>Insert malfunction MAL-RMC005-1815 on event 3</ACTION>
    <DESCRIPTION>ROD 1815 STUCK</DESCRIPTION>
</ITEM>

<ITEM row = 16>
    <TIME>1</TIME>
    <EVENT>4</EVENT>
    <ACTION>Insert malfunction MAL-CAS004 after 1 to 250 in 600 on event 4</ACTION>
    <DESCRIPTION>LEAK DNSTRM OF CAS DRYER A/B</DESCRIPTION>
</ITEM>

<ITEM row = 17>
    <TIME>1</TIME>
    <EVENT>5</EVENT>
    <ACTION>Insert malfunction MAL-RCI004 after 1 to 100000 in 360 on event 5</ACTION>
    <DESCRIPTION>RUPT STM LIN UPSTRM OF RCIC-V-45</DESCRIPTION>
</ITEM>

<ITEM row = 18>
    <TIME>1</TIME>
    <EVENT>5</EVENT>
    <ACTION>Insert malfunction XMT-SCN010A after 300 to 300 in 720 on event 5</ACTION>
    <DESCRIPTION>LD-TE-18C FIXED OUTPUT RHR PUMP RM A AMB</DESCRIPTION>
</ITEM>

<ITEM row = 19>
    <TIME>1</TIME>
    <EVENT>5</EVENT>
    <ACTION>Insert malfunction XMT-SCN011A after 310 to 300 in 720 on event 5</ACTION>
    <DESCRIPTION>LD-TE-18D FIXED OUTPUT RHR PUMP RM A AMB</DESCRIPTION>
</ITEM>

<ITEM row = 20>
    <TIME>1</TIME>
    <ACTION>Schedule Local.sch</ACTION>
    <DESCRIPTION></DESCRIPTION>
</ITEM>

</SCHEDULE>
```

Facility: Columbia Generating Station   Date of Exam: April 2011   Operating Test Number: 1

Applicant	Event Type	Scenario 1 SRO	Scenario 1 ATC	Scenario 1 BOP	Scenario 2 SRO	Scenario 2 ATC	Scenario 2 BOP	Scenario 3 SRO	Scenario 3 ATC	Scenario 3 BOP	Scenario 4 SRO	Scenario 4 ATC	Scenario 4 BOP	Total	R	I	U
RO ☐ SRO-I ☐ SRO-U ☐ Upgrade	RX	1,6			5									3	1	1	0
	NOR				1,2									2	1	1	1
	I/C	5,6,7			3,4,5,6,7									8	4	4	2
	MAJ	7			6,7									3	2	2	1
	TS	2,4			3,4,5									5	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐ Reactor Operators #1 & #4	RX					5								1	1	1	0
	NOR			3		2								2	1	1	1
	I/C			2,5,6,7,8		3,5,7								8	4	4	2
	MAJ			7		6,7								3	2	2	1
	TS													0	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐ Reactor Operators #2 & #5	RX					5								1	1	1	0
	NOR			3		2				2				3	1	1	1
	I/C			2,5,6,7,8		3,5,7				3,5,7,8				12	4	4	2
	MAJ			7		6,7				5,8				5	2	2	1
	TS													0	0	2	2

ES-301 Transient and Event Checklist Form ES-301-5

Facility: Columbia Generating Station Date of Exam: April 2011 Operating Test Number: 1

APPLICANT	EVENT TYPE	Scenario 1 CREW POSITION SRO	ATC	BOP	Scenario 2 CREW POSITION SRO	ATC	BOP	Scenario 3 CREW POSITION SRO	ATC	BOP	Scenario 4 CREW POSITION SRO	ATC	BOP	TOTAL	R	I	U
RO ☐ SRO-I ☐ SRO-U ☐ Reactor Operators #3	RX		1,6											2	1	1	0
	NOR			1										1	1	1	1
	I/C		6,7	4,7										4	4	4	2
	MAJ		7	6,7										3	2	2	1
	TS													0	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐ Reactor Operator #6	RX		1,6											2	1	1	0
	NOR			1										1	1	1	1
	I/C		6,7	4,7										4	4	4	2
	MAJ		7	6,7										5	2	2	1
	TS													0	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐ Instants #1	RX					5		1,4						3	1	1	0
	NOR			2		2		2						3	1	1	1
	I/C			4,5,6,7,8		3,5,7		4,5,6,7,8						13	4	4	2
	MAJ			7		6,7		5,8						5	2	2	1
	TS							3,4						2	0	2	2

ES-301 Transient and Event Checklist Form ES-301-5

Facility: Columbia Generating Station   Date of Exam: April 2011   Operating Test Number: 1

APPLICANT	EVENT TYPE	Scenario 1 SRO	Scenario 1 ATC	Scenario 1 BOP	Scenario 2 SRO	Scenario 2 ATC	Scenario 2 BOP	Scenario 3 SRO	Scenario 3 ATC	Scenario 3 BOP	Scenario 4 SRO	Scenario 4 ATC	Scenario 4 BOP	TOTAL	R	I	U
RO ☐ SRO-I ☐ SRO-U ☐ Instant #2 & #4	RX		1,6		5			1,4						5	1	1	0
	NOR				1,2			2						3	1	1	1
	I/C		6,7		3,4,5,6,7			3,4,5,6,7,8						13	4	4	2
	MAJ		7		6,7			5,8						5	2	2	1
	TS				3,4,5			3,4						5	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐ Instant #3, #5 & #6	RX	1,6							1,4					4	1	1	0
	NOR						1							1	1	1	1
	I/C	5,6,7					4,7		4,5,6,7					9	4	4	2
	MAJ	7					6,7		4					5	2	2	1
	TS	2,4												2	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐ Instant #7	RX		1,6		5									3	1	1	0
	NOR				1,2					2				3	1	1	1
	I/C		6,7		3,4,5,6,7					3,5,7,8				11	4	4	2
	MAJ		7		6,7					5,8				5	2	2	1
	TS				3,4,5									3	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must do one scenario, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Columbia Generating Station   Date of Examination: April 2011   Operating Test No.: 1

Competencies	APPLICANTS																
	RO ☐ SRO-I ☐ **SRO-U X**				**RO #1/#4 X** SRO-I ☐ SRO-U ☐				**RO #2/#5 X** SRO-I ☐ SRO-U ☐				**RO #3/#6 X** SRO-I ☐ SRO-U ☐			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	SRO	SRO			BOP	ATC			BOP	ATC	BOP		ATC	BOP		
Interpret/Diagnose Events and Conditions	3,5,6 7,8	3,4,5 6,7,8			2,4,5 6,7,8 9	1,3,5 6,7,8			2,4,5 6,7,8 9	1,3,5 6,7,8	2,3 5,7,8 9		1,6 7,9	2,4,7 8		
Comply With and Use Procedures (1)	1,5,6 7	3,4,5 6,7,8			2,4,5 ,6,7, 8,9	1,3,5 6,7,8			2,4,5 ,6,7, 8,9	1,3,5 6,7,8	2,3,5 8,9		1,6,7 9	2,4,7 8		
Operate Control Boards (2)					2,4,5 6,7,8 9	1,3,5 6,7,8			2,4,5 6,7,8 9	1,3,5 6,7,8	2,3,5 8,9		1,6,7 9	2,4,6 7		
Communicate and Interact	5,6,7 8,9	3,4,5 6,7,8			2,4,5 6,7,8 9	1,3,5 6,7,8			2,4,5 6,7,8 9	1,3,5 6,7,8	3,5,8 9		6,7,9	4,7,8		
Demonstrate Supervisory Ability (3)	1,3,5 6,7,8 9	3,4,5 6,7,8														
Comply With and Use Tech. Specs. (3)	3,4	4,5														

Facility: Columbia Generating Station   Date of Examination: April 2011   Operating Test No.: 1

APPLICANTS

Competencies	RO / SRO-I #1 X / SRO-U — SCENARIO				RO / SRO-I #2/4 X / SRO-U ☐ — SCENARIO				RO / SRO-I #3/5/6 X / SRO-U ☐ — SCENARIO				RO ☐ / SRO-I #7 X / SRO-U ☐ — SCENARIO			
	1 BOP	2 ATC	3 SRO	4	1 ATC	2 SRO	3 SRO	4	1 SRO	2 BOP	3 ATC	4	1 ATC	2 SRO		4
Interpret/Diagnose Events and Conditions	2,4 5,6 7,8,9	1,3 5,6 7,8	1,3,4 5,6,7 8,9		1,6 7,9	3,4,5 6,7,8	1,3,4 5,6,7 8,9		3,5,6 7,8	2,4,7 8	1,4,6 9		1,6 7,9	3,4,5 6,7,8	2,3 5,7,8 9	
Comply With and Use Procedures (1)	2,4,5 6,7, 8,9	1,3,5 6,7,8	1,3,4 5,6 8,9		1,6,7 9	3,4,5 6,7,8	1,3,4 5,6 8,9		1,5,6 7	2,4,7 8	1,4,5 6,9		1,6,7 9	3,4,5 6,7,8	2,3,5 8,9	
Operate Control Boards (2)	2,4,5 6,7, 8,9	1,3,5 6,7,8			1,6,7 9					2,4,6 7	1,4,5 6,9		1,6,7 9		2,3,5 8,9	
Communicate and Interact	2,4,5 6,7, 8,9	1,3,5 6,7,8	3,4,5 6,7,8 9		6,7,9	3,4,5 6,7,8	3,4,5 6,7,8 9		5,6,7 8,9	4,7,8	4,5,6 9		6,7,9	3,4,5 6,7,8	3,5,8 9	
Demonstrate Supervisory Ability (3)			1,3,4 5,6,8 9			3,4,5 6,7,8	1,3,4 5,6,8 9		1,3,5 6,7,8 9					3,4,5 6,7,8		
Comply With and Use Tech. Specs. (3)			3,4			4,5	3,4		3,4					4,5		

Notes:
(1)   Includes Technical Specification compliance for an RO.
(2)   Optional for an SRO-U.
(3)   Only applicable to SROs.