Draft Submittal
(Pink Paper)

CATAWBA DECEMBER 2005 EXAM

05000413/2005301 & 05000414/2005301

DECEMBER 5 - 8, 2005
DECEMBER 14, 2005 (WRITTEN)

SIMULATOR SCENARIOS

12/19/05

	APPENDIX E - REGION II OPERATING TEST JOB PERFORMANCE MEASURE QUALITY REVIEW MATRIX											
JPM#	1. Safety function	2. Dyn (D/S)	3. LOD (1-5)	4. Attributes					5. Job Content Errors		6. U/E/S	7. Explanation (See below for instructions)
				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
a											S	Scenario #1: Event # 1: Steam Dump Valve SB-24 fails open. A. This event maybe similar to one on the written examination. Keep track of this and review written to ensure it is not the same. ☐ B. I would assume that the RO does this action, decreasing turbine power, but it seems strange that this is not the BOP function. Verify this with the licensee that the RO in fact will take this action to reduce turbine load. ☐ Looks like this is the way they do business. C. Step 9 d RNO provides information concerning the isolation valves for SB-24. Where will the applicants get this information? From a print? If so, during prep week show us how they will do this, and add the print number to the scenario. ☐ Event # 2: Loss of RN Flow to the 1A KC Heat Exchanger. A. Annunciator Response procedures not sent with reference material. Will review actions during prep week. ☐ B. ES-301, ¶ 5.b, states that "An applicant should only be given credit for those events that require the applicant to perform verifiable actions that provide insight to the applicant's competence. This event, while has actions to restore flow to the KC system, it does not appear to have immediate verifiable actions. Will review actions during prep week to determine if this event meets the examiner standards. ☐ C. Add to the script that OP/6400/05, Enclosure 4.3 is being used. ☐ D. Will the SRO read this procedure (Item C, above) to the BOP or will the BOP take the procedure and do it on his own? ☐ E. Step 2..1.4 of the OP/005, may be done by the RO vice the BOP as written. F. What target load should the SRO determine the plant should go to with this event? ☐ Event # 3: Incomplete runback on a Loss of "B" Main Feedwater Pump. A. The procedure provides the TS's to review, are all these going to have actions associated with the event, and could you please add the item letter or number of the action that is being used. ☐ Event # 4: Pressure Master Fails High / Spray Valve NC-29 fails full open in automatic. A. Step 9 of AP/11, identifies all of the potential TS's that could be entered. However, the script states that NONE of these are applicable. Since this is the case, we can not take credit for this as a TS entry. Otherwise every time you looked at TS's you would get credit. Please delete the TS reference from the cover sheet. ☐

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				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
a	cont.											Scenario #1 (cont.) Event # 5: Loss of Normal Power to 1ETA with partial failure of the blackout sequencer A. In this event there is a problem with a RN pump not running. How long will we allow the DG to run before there is problems with the pump? We need to get from operations a time frame that we can justify to trip the pump if the crew takes that long to get done. B. We need to identify which TS's the crews are actually going to enter and put those specific items in the script. Include the particular line items they would have to review. This is the same comment above. C. Procedure step 20 has a lot of items to accomplish. Will we need to do all of these. Discuss with licensee during prep week. Associated with that there are two procedures, restoration of normal power, (OP/6350/01) and Aux feed water system (OP/1/6259/02) that are referenced. Will the crews have to do this? If they do we will need to attach the appropriate steps or parts of the procedure for the examiners to follow. Event # 6: Respond to one dropped control bank "C" rod. Respond to a second dropped rod. A. Procedure step 6, looks at TS's, can we identify which if any of these TS's will be entered? B. The first CRITICAL TASK, note that the second rod has dropped, the Standard is to loose, we need to tighten up how long the operator will have to identify when the second rod drops and takes action. All the examiners need to be on the same page when this needs to happen. C. We need to make sure that we get all the competencies for this event, prior to the dropping of the second rod. If we do not do this, we are in jeopardy in running another scenario. We need to observe this at the prep week to ensure that we do have enough to evaluate for the RO applicant.

CATAWBA: 2005-301 Simulator Review Comments.

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				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
a	cont.											Scenario #1 (cont.) Event # 7: Steam Generator 1C Steam Line Break Inside Containment A. In this scenario is tripping the NCPs a critical task, discuss with licensee. B. In step 10, RNO 7 a. will the BOP use Enclosure 7 to verify VX operation? What is he/she expected to do? If it is substantive, we will need to add those corresponding steps. C. What criteria is used to exit ACC numbers in the EOPs? D. In step 7 for S/G 1 C in E-2, we need to tighten up the criteria for the isolation of the S/G. We need to be able to grade on the same page. Discuss with the licensee what will be necessary to do to accomplish this clarification. E. Step 8 of E-2, speaks to dumping steam, at what temperature is the crew expected to bring the plant to? F. Are we going to expect the SRO to perform an event declaration? We have stopped doing this, recommend that we take this requirement out.

CATAWBA: 2005-301 Simulator Review Comments.

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				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
b												Scenario # 2
												Event # 1: Boration for a Power Decrease, Turbine load Decrease
											E	A. Add to the event the enclosure, in this case 4.2.
												B. Page 4 of 29, the scenario states if Automatic MU is desired, will AUTO Make up be desired at this time? OR will the crew just leave it as is. If they do go back to AUTO makeup then we will need that procedure attached so the examiner will be able to follow.
												C. Page 4 of 29 States the RO should reduce load, not sure what section of the procedure you use to do this. Please add this to the scenario script.
												Event # 2: Steam Generator 1 C Level controller fails HIGH
											S	A. This appears to be ok. What is the reason that the malfunction will not be fixed? This is ok as is just wondering what is going to be told to the applicants.
												Event # 3: Refueling Water Storage Tank Level Channel Fails High
											E	A. The title of this event does not correspond to the words in the script. The title fails HIGH, however, FWST channel III slowly decreases to zero on MC-9. This needs to be corrected. B. Add to the TS determination WHAT TS action Item the SRO applicant will enter.
												Event # 4: Pressurzier Level Channel 1 Fails low causing a loss of letdown. 1NV-2A fails in Automatic.
											E	A. Need to identify the appropriate TS action item the SRO will determine. The script states that TS 3.3.1 is the appropriate TS, now we need to add the action statement number or letter he is supposed to evaluate.
											E	B. The first examiner note on page 10 of 29, not sure what is being said about not closing the valves that did not close. Need further understanding what is expected of the applicants.
											E	C. Additionally, the second examiner note states that letdown will not be restored during this event and will not be restored during the rest of the scenario. Will this be a problem for the SRO continually trying to restore letdown.

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				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
b	(cont.)											Scenario # 2 (cont.)
											S	Event # 5: Auto makeup from boric acid pumps, diluted makeup to the VCT. A. In this event there are no identified actions associated with the SRO. It would seem that the SRO would have to contact some one concerning Work Control to look into fixing the problem with the make up system. B. Will this system be out of service for the duration of the scenario? It appears that it will not be fixed.
											U	Event # 6: Main Turbine Fails to Trip when required. A. This event is really the start of the major event. There will not be much to evaluate, on the part of the examiners other than the ability to identify the main turbine did not trip when it was supposed to have. This will not provide all the competency areas needed to evaluate for the RO applicant. Will need another component or instrument malfunction for this scenario for the RO position. You could provide a problem with hydraulic pumps in which you had to switch or stop one and start the other, starting the one not running first. This would provide a reason or link to the problem with the main turbine not tripping when it was supposed to. Discuss with licensee. B. The Critical Task associated with the above malfunction needs to have the grading criteria specified. This needs to be done to enable all examiners to grade accordingly. We will need to identify, with operations help, when does the Main Steam Isolation Valves need to be closed. Is there a plant parameter that can be used to quantify the trip criteria? Discuss with licensee.
											E	

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				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
f												Scenario # 2 (cont.) Event # 7: Large Break LOCA and Loss of Emergency Coolant Recirculation. A. Add to the event description at the top of event 7 each page that ND pump 1b fails to auto start and it trips prior to CL Recirc. And the same for 1 NI-185 fails to open. This helps us to remember what malfunctions are imbedded in the scenario. B. There is a requirement for tripping the NC pumps with a loss of subcooling, should this be considered a critical task, if not, why not? (Page 14 of 29). I thought this was an USFAR commitment. C. Page 17 of 29, talks about an orange or red path, on Integrity, we will need to look at this during prep week. May need those portions of the procedures available for the examiners. D. I would like to add to the scenario a failure of the SI injection flow meter. The applicants would have to analyze the plant situation and determine from alternate means that they do have adequate SI flow. Will look at this during prep week. E. IS there a 10 minute requirement to place the plant in cold leg recirculation? Should this be a critical task? Discuss with licensee. F. Looking at page 23 of 49, top of page is procedure step 5 a RNO, then the next step is step 5.b. The same action appears in step 5 a. RNO, is that supposed to be 5 a RNO or 5 b. It would appear that the steps do the same thing but I believe that it should have been accomplished in the RNO of step 5.a.b. Discuss with licensee. G. Could the failure of the B RN pump be identified in the scenario more clearly on page 23, either make an examiner note or bold the step? This would help the examiners to identify where this occurs so we don't miss it happening and observe the appropriate applicants performance. H. Page 27 of 29, states that the BOP will not start a make up and additional operators may be necessary. What or how are we going to control this if the BOP is directed to do this evolution? Discuss with licensee. I. Page 28 of 29, Critical Step determination, need to discuss the grading criteria associated with this Critical Step. Need to do so in order to allow standard grading criteria for all examiners.

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				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
c												Scenario # 3 Event # 1: Dilution for power increase, turbine load increase. A. Step 2.3 of OP 009 provides a calc for boron calculation. Is there a way to standardize this step so we have the calculated values the applicants would use? It would be easier than having to verify after the scenario how he did this calculation. B. Step 2..1.2, Examiner note, states if in auto or manual, this would be better to see the RO control rods in manual, we would then have something to watch him do. Would it be possible to change the initial conditions, provided this does not effect the flow of the scenario, to place rods in manual. Looking back at the other scenarios, we may need to see if this can be done also, that is with out adjusting the flow of the scenario. Will have to return to auto for event # 3. Event # 2: Loss of 1A2 Component Cooling Water Pump A. For step 14, page 8 of 37 add the appropriate TS action item letter or number. Event # 3: Power Range Detector –43 Fails high / Auto Rod Insertion. A. The removal of NI-43 from service is a NORMAL evolution. Add this to the cover page to allow credit for this evolution. To make this easier just assign it as 3 a as the event number. B. Add to the TS evaluation what action item(s) are going to be reviewed. Event # 4: Reactor Coolant Leak A. How big of a leak is this going to be? Will it allow enough time for analysis and to start a power reduction? B. Step 9, page 14 of 37, add the appropriate LCO action statements. Event # 5: Main turbine manual trip due to high vibration. Failure of rod control requires a manual power reduction to 10%. A. Is there a chance the crew will trip the reactor when rod control does not operate in automatic. Will discuss this during prep week to see if this is a possibility. It appears that this should not happen but you never know what the crews will do.

CATAWBA: 2005-301 Simulator Review Comments.

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				IC Focus	Cues	Critical Steps	Scope (N/B)	Over-lap	Job-Link	Minutia		
c	(cont.)											Scenario # 3 (cont.) Event # 6: Loss of running main feed water pump requiring reactor trip, reactor trip fails in automatic and manual (ATWS). Loss of feed water pump due to the loss of main condenser vacuum. A. Critical Task associated with Step 1 of FRS-1.0, need to address what the acceptance criteria is going to be. For example, how long does the applicants have to place rods in manual and start inserting rods. Discuss during prep week with operations input. B. Add to this event, the failure of the Emergency boration flow meter. Event # 7: The reactor coolant leak increases to a LOCA causing Safety Injection. A. Critical task associated with NCPs being tripped. Acceptance Criteria ok, within 5 minutes of loss of subcooling. Will need to trend these two parameters to ensure we grade them appropriately. B. Add to the event description the loss of 1ETB. C. Step 12, page 24 of 37, States that the B NV pump will not be on. The objectives on the first page of the scenario does not speak to this being examined, it is on the out line. Will need to add this to the objectives. D. Step 23 RNO, requires the NCPs to be turned off. This should have been done, however, it still should be a critical task as described previously in the scenario. E.

				Focus		Steps	(N/B)	lap	Link			
												QA form ES-301-5 A. For the SRO-U applicant while in the BOP position, a TS is listed as being required for that position. This block should be left blank. Would suggest to just shade these blocks rather than leaving it unshaded. B. Once we decide which scenarios we will run, we will need to fill in the TOTAL column/blocks for each examination level. C. Additionally, we should have a separate sheet for each type of group. For example, we should have forms for the following groups: Scenario X — Scenario Y U2R2R3 — U2R3R2 { these both should be on one sheet U3R4R5 — U3R5R4 { And a separate sheet for U1I1R1 — I1R1U1 D. The QA form used is not the correct revision, in that the Author and NRC reviewer do not appear on the form any more.
												Will need to identify what parameters that are to be recorded using the plant computer. These items should be such that they can be used by the NRC or the applicant to verify or dispute the grading of a particular point.

Instructions for Completing Matrix

This form is not contained in or required by NUREG-1021. Utilities are not required or encouraged to use it. The purpose of this form is to enhance regional consistency in reviewing operating tests. Check or mark any item(s) requiring comment and explain the issue in the space provided.

1. Safety function characteristics: RO & SRO-I JPMs should evaluate different safety functions for the simulator/control room, and spearately for the in-plant JPMs. SRO-Us should evaluate 5 different safety functions. One SRO-U should evaluate an engineered safety feature. At least one should be shutdown or low power, 4-6 should be alternate path for the RO/SRO-I and 2-5 for the SRO-Us.
2. Determine whether the task is dynamic (D) or static (S). A dynamic task is one that involves continuous monitoring and response to varying parameters. A static task is basically an system reconfiguration or realignmen
3. Determine level of difficulty (LOD) using established 1-5 rating scale. Levels 1 and 5 represent inappropriate (low or high) discriminatory level for the license being tested.
4. Check the appropriate box when an attribute weakness is identified:
   - The initiating cue is not sufficiently clear to ensure the operator understands the task and how to begin.
   - The JPM does not contain sufficient cues that are objective (not leading).
   - All critical steps (elements) have not been properly identified.
   - Scope of the task is either too narrow (N) or too broad (B).
   - Excessive overlap with other part of operating test or written examination.
5. . Check the appropriate box when a job content error is identified:
   - Topics not linked to job content (e.g., disguised task, not required in real job).
   - Task is trivial and without safety significance.
6. Based on the reviewer's judgment, is the JPM as written (U)nacceptable (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)satisfactory?
7. Provide a brief description of problem in the explanation column. Provide conclusion on whether JPM SET criteria satisfied (i.e., number/distribution of safety functions, A.3 and A.4 integrated with parts B/C, Admin topics per section meet ES).

1. Should attempt to have 5 ALT PATH JPMs to add flexibility to prep week and the exam.

Facility: Catawba Date of Exam: 12/05/2005 Scenario Numbers: 1 / 2 / 3 Operating Test No.: 1

QUALITATIVE ATTRIBUTES	Initials a	b*	c#
1. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.	RVK	MrK	pab
2. The scenarios consist mostly of related events.	RVK	MrK	pab
3. Each event description consists of · the point in the scenario when it is to be initiated · the malfunction(s) that are entered to initiate the event · the symptoms/cues that will be visible to the crew · the expected operator actions (by shift position) · the event termination point (if applicable)	RVK	MrK	pab
4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.	RVK	MrK	pab
5. The events are valid with regard to physics and thermodynamics.	RVK	MrK	pab
6. Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.	RVK	MrK	pab
7. If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.	RVK	MrK	pab
8. The simulator modeling is not altered.	RVK	MrK	pab
9. The scenarios have been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.	RVK	MrK	pab
10. Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.5 of ES-301.	RVK	MrK	pab
11. All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).	RVK	MrK	pab
12. Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).	RVK	MrK	pab
13. The level of difficulty is appropriate to support licensing decisions for each crew position.	RVK	MrK	pab

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes	--	--	--
1. Total malfunctions (5–8)	7 / 6 / 6	RVK	MrK	pab
2. Malfunctions after EOP entry (1–2)	2 / 3 / 2	RVK	MrK	pab
3. Abnormal events (2–4)	5 / 4 / 4	RVK	MrK	pab
4. Major transients (1–2)	1 / 1 / 2	RVK	MrK	pab
5. EOPs entered/requiring substantive actions (1–2)	2 / 2 / 2	RVK	MrK	pab
6. EOP contingencies requiring substantive actions (0–2)	0 / 1 / 1	RVK	MrK	pab
7. Critical tasks (2–3)	2 / 2 / 2	RVK	MrK	pab

Facility: Catawba Date of Exam: DECEMBER 05,2005 Operating Test No.: 1

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO 1/2	RX						1			1					1	1	0
	NOR					1			1						1	1	1
	I/C		1,3,6	2,4,5		2,6	4,5		3,5	2,4					4	4	2
	MAJ		7	7		7	7		6,7	6,7					1	1	1
	TS														0	2	2
N/A	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														1	1	1
	TS														0	2	2
SRO-I 1/2	RX				1			1							1	1	0
	NOR				1	1		1	1						1	1	1
	I/C	1-6	1,3,6		2,4-6	2,6		2-5	3,5						4	4	2
	MAJ	7	7		7	7		6,7	6,7						1	1	1
	TS	3-5			3,4			2-4							0	2	2
SRO-U 1/2	RX				1		1	1		1					1	1	0
	NOR				1			1							1	1	1
	I/C	1-6		2,4,5	2,4-6		4,5	2-5		2,4					4	4	2
	MAJ	7		7	7		7	6,7		6,7					1	1	1
	TS	3-5			3,4		1	2-4		1					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.

Author: RONALD J. KATALINICH

NRC Reviewer: RICHARD S. BALDWIN

Facility: Catawba	Date of Exam: 12-05-2005	Operating Test No.: 1

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
(RO)	RX						1		1						1	1	0
SRO-I	NOR					1				1					1	1	1
	I/C		3	3		2	2		2	2					4	4	2
SRO-U	MAJ		1	1		1	1		2	2					2	2	1
	TS														0	2	2
RO	RX				1			1	1						1	1	0
(SRO-I)	NOR				1	1		1		1					1	1	1
	I/C	6	3		4	2		4	2	2					4	4	2
SRO-U	MAJ	1	1		1	1		1	1	1					2	2	1
	TS	2			1			2							0	2	2
RO	RX				1			1							1	1	0
SRO-I	NOR				1			1							1	1	1
	I/C	6			4			4							4	4	2
(SRO-U)	MAJ	1			1			1							2	2	1
	TS	2			1			2							0	2	2
RO	RX														1	1	0
SRO-I	NOR														1	1	1
	I/C														4	4	2
SRO-U	MAJ														2	2	1
	TS														0	2	2

Instructions:

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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.

Author: _____

NRC Reviewer: _____

Facility: Catawba	Date of Examination: December 5, 2005	Operating Test No.: 1

Competencies	APPLICANTS															
	RO				BOP				SRO-U/I				N/A			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	1,3, 6,7	2,6, 7	3,5, 6,7		2,4, 5,7	4,5, 7	2,4, 6,7		1-7	2-7	2-7					
Comply With and Use Procedures (1)	1,3, 6,7	1,2, 6,7	1,3, 5,6, 7		2,4, 5,7	1,4, 5,7	1,2, 4,6, 7,		1-7	1-7	1-7					
Operate Control Boards (2)	1,3, 6,7	1,2, 6,7	1,3, 5,6, 7		2,4, 5,7	1,4, 5,7	1,2, 4,6, 7		n/a	n/a	n/a					
Communicate and Interact	1-7	1-7	1-7		1-7	1-7	1-7		1-7	1-7	1-7					
Demonstrate Supervisory Ability (3)	n/a	n/a	n/a		n/a	n/a	n/a		1-7	1-7	1-7					
Comply With and Use Tech. Specs. (3)	n/a	n/a	n/a		n/a	n/a	n/a		3,4, 5	3,4	2,3, 4					

Notes:
(1)Includes Technical Specification compliance for an RO.
(2)Optional for an SRO-U.
(3)Only applicable to SROs.

Instructions:

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Facility: Catawba Date of Examination: December 5,2005

Item	Task Description	Initials a	b*	c#
1. WRITTEN	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	RJC	MTL	MJB / [illegible]
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.	RJC	MTL	MJB / [illegible]
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	RJC	MTL	MJB / [illegible]
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	RJC	MTL	MJB / [illegible]
2. SIMULATOR	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	RJC	MTL	MJB / [illegible]
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.	RJC	MTL	MJB / [illegible]
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.	RJC	MTL	MJB / [illegible]
3. W/T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.	RJC	MTL	MJB / [illegible]
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1)the tasks are distributed among the topics as specified on the form (2)at least one task is new or significantly modified * (3)no more than one task is repeated from the last two NRC licensing examinations	RJC	MTL	MJB / [illegible]
	c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.	RJC	MTL	MJB / [illegible]
4. GENERAL	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.	RJC	MTL	MJB / [illegible]
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	RJC	MTL	MJB / [illegible]
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	RJC	MTL	MJB / [illegible]
	d. Check for duplication and overlap among exam sections.	RJC	MTL	MJB / [illegible]
	e. Check the entire exam for balance of coverage.	RJC	MTL	MJB / [illegible]
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	RJC	MTL	MJB / [illegible]

	Printed Name/Signature	Date
a. Author	RONALD J. ICATALINICH / Ronald J. Katalinich	10/18/05
b. Facility Reviewer (*)	Michael T. Lee / MT Lee	10/18/05
c. NRC Chief Examiner (#)	MARK A. BATES / Mark A. Bates / RICHARD S. BALDWIN / Richard S. Baldwin	11/1/2005
d. NRC Supervisor	JAMES H. MOORMAN III / [illegible]	11-10-05

Note:# Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.

* Initially 2 JPMs were repeated from 2003 NRC exam. Licensee will replace or significantly modify.

Facility: Catawba	Date of Examination: 12/05/2005	Operating Test Number: 1

	1. General Criteria	Initials a	Initials b*	Initials c#
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).	RJK	MTL	MRB PJS
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.	RJK	MTL	MRB PJS
* c.	The operating test shall not duplicate items from the applicants' audit test(s). (see section D.1.a.)	RJK	MTL	MRB PJS
** d.	Overlap with the written examination and between different parts of the operating test is within acceptable limits.	RJK	MTL	MRB PJS
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.	RJK	MTL	MRB PJS
	2. Walk-Through Criteria	--	--	--
a.	Each JPM includes the following, as applicable: • initial conditions • initiating cues • references and tools, including associated procedures • reasonable and validated time limits (average time allowed for completion) and specific designation if deemed to be time-critical by the facility licensee • operationally important specific performance criteria that include: – detailed expected actions with exact criteria and nomenclature – system response and other examiner cues – statements describing important observations to be made by the applicant – criteria for successful completion of the task – identification of critical steps and their associated performance standards – restrictions on the sequence of steps, if applicable	RJK	MTL	MRB PJS
b.	Ensure that any changes from the previously approved systems and administrative walk-through outlines (Forms ES-301-1 and 2) have not caused the test to deviate from any of the acceptance criteria (e.g., item distribution, bank use, repetition from the last 2 NRC examinations) specified on those forms and Form ES-201-2.	RJK	MTL	MRB PJS
	3. Simulator Criteria	--	--	--
	The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.	RJK	MTL	MRB PJS

	Printed Name / Signature	Date
a. Author	RONALD J. KATALINICH / Ronald J. Katalinich	10/18/05
b. Facility Reviewer(*)	Michael T. Lee / MT Lee	10/18/05
c. NRC Chief Examiner (#)	MARK A. BATES / Mark A. Bates RICHARD S. BALDWIN / Richard S. Baldwin	11/10/2005
d. NRC Supervisor	JAMES H. MOORMAN III / James H. Moorman III	11-10-05

NOTE: * The facility signature is not applicable for NRC-developed tests.
Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.

* Verify during prep week that EDG Tech Spec JPM was not on Admit Exam.
** Will be re-verified when written exam completed

Simulation Facility: Catawba **Scenario No.: NRC 3** **Op-Test No: 1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Objectives: To evaluate the applicants' ability to operate using facility procedures. The crew will initiate a 10%/hour power increase. A breaker trip requires the BOP to respond to a loss of the running KC pump. A failure of Power Range channel N43 will result in automatic rod insertion; the RO will stop the rod insertion and the BOP will remove the channel from service. The reactor coolant system develops a leak that will require increased charging flow and isolation of letdown to stabilize pressurizer level. The RO will trip the main turbine on high vibration then manually reduce power per the abnormal procedures. A massive loss of condenser vacuum results in a trip of the running main feedwater pump where the required manual reactor trip is unsuccessful and places the unit in an ATWS condition. Upon a successful reactor shutdown the leak will increase to a medium sized LOCA. The crews will respond to the LOCA and maintain safety injection flow while initiating a cooldown and depressurization.

Initial Conditions: 45% power, MOL, Equilibrium Xe.
NCS Boron Concentration 1255 ppm.

Turnover:

- One week ago Steam Generator 1A developed a 2 GPD tube leak that has remained stable. Secondary chemistry is taking grab samples per their procedures.
- 1EMF-71, S/G A Leakage, is out of service due to a loss of signal problem.
- Charging pump 1A is tagged for motor cooler leak. It has been out of service for 12 hours and is scheduled to be repaired by midnight.
- Initiate a power increase at 10% per hour per OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.1 Power Increase completed to step 2.28.

Event No.	Malf. No./ Position	Event Type*	Event Description
1	BOP RO	R N	Dilution for power increase. Turbine lead increase.
2	BOP SRO (TS)	C	Loss of 1A2 Component Cooling pump
3	RO SRO (TS)	I	Power Range Detector N-43 Fails High / Auto Rod Insertion

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

Event No.	Malf. No./ Position	Event Type*	Event Description
4	BOP SRO (TS)	C	Reactor coolant leak
5	RO	C	Main turbine manual trip due to high vibration. Failure of rod control requires a manual power reduction to 10%.
6	ALL	M	Loss of the running main feedwater pump requiring reactor trip. Reactor trip fails in automatic and manual (ATWS). Additional failures: Failure of auxiliary feedwater pumps to auto start.
7	ALL	M	The reactor coolant leak increases to a LOCA causing a safety injection. Additional failures: No high head injection pumps (NV) available.

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

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 1

Event Description: Dilution for power increase. Turbine load increase.

Time	Position	Applicant's Actions or Behavior
	BOP/RO	Per the turnover and power increase plan, the BOP will begin the dilution, the RO will set the turbine load target and load rates while withdrawing control banks for temperature control.
	BOP	**Refer to OP/1/A/6150/009, Boron Concentration Control.**
Step 2.2	BOP	Ensure the following valve control switches in "AUTO": • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-181A (B/A Blender Otlt To VCT)
Step 2.3	BOP	Adjust the total makeup batch counter to the desired volume of reactor makeup water to be added.
Step 2.4	BOP	Place the "NC MAKEUP MODE SELECT" switch to the "DILUTE" position.
Step 2.5	BOP	Adjust the controller for 1NV-242A (RMWST To B/A Blender Ctrl) to the desired flow.
Step 2.6	BOP	Ensure 1NV-242A (RMWST To B/A Blender Ctrl) controller in "AUTO".
Step 2.7	BOP	Ensure at least one reactor makeup water pump is in "AUTO" or "ON".
		Procedure Note: If necessary, dilution can be manually secured at any time by placing the "NC MAKEUP CONTROL" switch to the "STOP" position.
Step 2.8	BOP	Place the "NC MAKEUP CONTROL" switch in the "START" position.
Step 2.9	BOP	Verify the following valves open: • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-181A (B/A Blender Otlt To VCT)
Step 2.10	BOP	IF in "AUTO", verify the reactor makeup water pump starts.
Step 2.11	BOP	WHEN the desired volume of reactor makeup water is reached on the total makeup batch counter, ensure the following valves close. 1NV-242A (RMWST To B/A Blender Ctrl)

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 1 **Event Description: Dilution for power increase. Turbine load increase.**		
		1NV-181A (B/A Blender Otlt To VCT)
Step 2.12	BOP	IF automatic makeup is desired, perform one of the following: 2.12.1 IF it is desired to change the blender outlet boron concentration, refer to Enclosure 4.1 (Automatic Makeup). OR 2.12.2 IF makeup at the previous concentration is acceptable AND the system was previously aligned per Enclosure 4.1 (Automatic Makeup), perform the following: 2.12.2.1 Place the "NC MAKEUP MODE SELECT" switch in "AUTO". 2.12.2.2 Place the "NC MAKEUP CONTROL" switch to the "START" position.
	SRO	Directs RO to increase load at a rate of 2 MW/min or 10% per hour. **EXAMINER NOTE: IF rods are in AUTOMATIC, the RO will ensure reactor control maintains T-Avg within ±1°F with T-Ref.** **If rods are in manual, the RO maintains T-Avg within ±2°F with T-Ref. (From Limits and Precautions of OP/1/A/6100/003, Controlling Procedure for Unit Operations)**
	RO	**Refer to OP/1/B/6300/001, Turbine Generator, Enclosure 4.2**
	SRO	Direct RO to increase load at a rate of approximately 2 MW/min or 10% per hour.
Step 2.2.1	RO	Depress the "Load Rate" pushbutton and verify it illuminates.
Step 2.2.2	RO	Input the desired load rate on the numeric keypad and verify the load rate appears on the Variable Display.
Step 2.2.3	RO	Depress the "Enter" pushbutton and verify "Load Rate" light goes off.
Step 2.2.4	RO	Depress the "Target" pushbutton and verify it illuminates.
Step 2.2.5	RO	Input the desired load target on the numeric keypad and verify the load target appears on the Target Display.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 1 Event Description: Dilution for power increase. Turbine load increase.		
Step 2.2.6	RO	Depress the "Enter" pushbutton and verify "Load Rate" light goes off.
Step 2.2.7	RO	Verify new load target appears on Target Display.
Step 2.2.8	RO	To start load increase, depress the "Go" pushbutton and verify it illuminates.
Step 2.2.9	ALL	S/G blowdown changes should be coordinated with Secondary Chemistry.

GO TO Event #2 as directed by examiner

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 2

Event Description: Loss of 1A2 Component Cooling pump

Time	Position	Applicant's Actions or Behavior
	ALL	The following annunciators light: 1AD-20 and 21 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" 1AD-6 Rows C, D, and E 1-4 for KC flow to NCP motor bearing and thermal bearing coolers LOW. Crew determines that 1A2 KC pump has tripped. **OP/1/B/6100/010G (Annunciator Response for 1AD-6)** **SUPPLEMENTARY ACTIONS:** IF alarm is due to a loss of KC flow, refer to AP/1/A/5500/21 (Loss of Component Cooling).
	SRO	**Enters AP/1/A/5500/021 Loss of KC and directs actions.**
		CAUTION: Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within 10 minutes will cause damage to the NC pump seals resulting in NC inventory loss.
Step 1	RO/BOP	Monitor Enclosure 1 (Foldout page).
Step 2	BOP	Verify at least one KC pump - ON. BOP notes that no KC pumps are running and informs SRO.
Step 2 RNO	BOP	Perform the following: a. Start at least one KC pump. BOP attempts to start the remaining 1A1 KC pump, determines pump will not start then selects and starts either "B" train KC pump. OR BOP starts a "B" train KC pump. **EXAMINER NOTE:** 1A1 KC pump will not start manually. b. IF no KC pump can be started, THEN: Step does not apply.
Step 3	ALL	IF AT ANY TIME all KC pumps are lost, THEN RETURN TO step 2.
Step 4	BOP	Verify both KC surge tank levels - 50% - 90% AND STABLE.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 2

Event Description: Loss of 1A2 Component Cooling pump

Time	Position	Applicant's Actions or Behavior
Step 5	BOP	Start additional KC pump(s) as necessary to supply any KC loads presently in service.
	ALL	CAUTION: A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which will result in shaft seizure.
Step 6	BOP/RO	Verify KC flow to NC pumps as follows: • 1AD-20, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" – DARK • 1AD-21, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK.
Step 7	BOP	Verify KC available as follows: a. Verify the following Train A KC non-essential header isolation valves OPEN: • 1KC-230A (Rx Bldg Non-Ess Hdr Isol) • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol). b. Verify the following Train B KC non-essential header isolation valves OPEN: • 1KC-228B (Rx Bldg Non-Ess Hdr Isol) • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-53B (Aux Bldg Non-Ess Hdr Isol) • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol). c. Start additional KC pump(s) as necessary to supply any KC loads presently in service.
Step 8	BOP	Verify KC surge tank levels normal as follows: a. Verify both KC surge tank levels - 50% - 90% AND STABLE. b. GO TO Step 12.
Step 12	BOP	Ensure KC heat exchanger outlet mode switches - PROPERLY ALIGNED. BOP aligns "B" train for KC TEMP and "A" train for MINIFLOW.
Step 13	ALL	Determine and correct cause of loss of KC.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 2

Event Description: Loss of 1A2 Component Cooling pump

Time	Position	Applicant's Actions or Behavior
Step 14	SRO	**Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:** • SLC 16.9-7 (Boration Systems Flow Path - Shutdown) • SLC 16.9-8 (Boration Systems Flow Path - Operating) • SLC 16.9-9 (Boration Systems Pumps - Shutdown) • SLC 16.9-10 (Boration Systems Charging Pumps - Operating) • 3.5.2 (ECCS - Operating) • 3.5.3 (ECCS - Shutdown) • 3.6.6 (Containment Spray System) • 3.7.5 (Auxiliary Feedwater (AFW) System) • 3.7.7 (Component Cooling Water (CCW) System). SRO determines that 3.7.7 applies.
Step 15	SRO	Determine required notifications: REFER TO RP/0/A/5000/001 (Classification Of Emergency) REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
Step 16	ALL	IF KC Hx leak to RN is suspected, THEN perform the following: • Notify Radiation Protection that a potential unmonitored release may have occurred. • Notify Station Management to evaluate a KC Hx to RN leak.
Step 17	BOP	Verify KC surge tanks level as follows: • Greater than 50% • Stable or increasing.
Step 18	ALL	WHEN plant conditions permit, THEN: • Return KC pumps to normal operation. REFER TO OP/1/A/6400/005 (Component Cooling Water System). • Return NV Pump 1A to normal cooling as applicable. REFER TO Enclosure 4 (Alternate Cooling To NV Pump 1A).
Step 19	BOP/RO	Verify 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK.
Step 20	BOP/RO	IF desired to restore letdown flow through the NV demineralizers, THEN momentarily place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) to the "DEMIN" position and return to "AUTO".
Step 21	ALL	Determine long term plant status. RETURN TO procedure in affect.

GO TO Event #3 as directed by examiner

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 3

Event Description: Power Range Detector N-43 Fails High / Auto Rod Insertion

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: Step 1 is an Immediate Actions step and is required to be performed from memory.
	RO	RO note the following annunciators for the failed excore N43: 1AD-02-A/1, 3 and 8 1AD-02-B/1,2,3 and 8 1AD-02-E 8 RO notes the following Status Light displays: **P/R HI FLUX RATE N43 - LIT** **P/R Hi FLUX HI STPT N43 - LIT** RO notes large Power Mismatch and Control Rods stepping in Automatic and informs SRO.
	SRO	**AP/1/A/5500/016, Malfunction of Nuclear Instrumentation System, Case IV Power Range Malfunction is entered.**
Step 1	RO	Verify all rod motion - STOPPED. RO notes that control banks are inserting, selects manual a informs SRO
Step 1 RNO	RO	IF unwarranted rod motion is occurring, THEN place "CRD BANK SELECT" to manual.
Step 2	RO	Verify 1AD-2, E/8 "OVER POWER ROD STOP" - DARK. RO notes that light is LIT and informs SRO
Step 2 RNO	RO	Adjust Turbine load to maintain T-Avg at T-Ref.
Step 3	RO	Identify failed P/R channel: • N-41 OR • N-42 OR • N-43 OR • N-44. RO notes N43 failed and informs SRO.
Step 4	ALL	Ensure unaffected channels - OPERABLE.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 3

Event Description: Power Range Detector N-43 Fails High / Auto Rod Insertion

Time	Position	Applicant's Actions or Behavior
Step 5	SRO	Request IAE to place the following bistables in the tripped condition. REFER TO Model W/O #91002943: • OT DELTA T • OP DELTA T
Step 6	BOP	Perform the following actions at the Miscellaneous Control And Indication Panel: a. Place the appropriate "ROD STOP BYPASS" switch to the affected channel position. b. Verify the affected nuclear overpower rod stop channel bypassed status light (1SI-19) - LIT. c. Place "POWER MISMATCH BYPASS" switch to the affected channel position.
Step 7	BOP	Perform the following actions at the Detector Current Comparator panel: a. Place "UPPER SECTION" channel defeat switch to the affected channel. b. Verify the "CHANNEL DEFEAT" light for the upper section - LIT. c. Place "LOWER SECTION" channel defeat switch to the affected channel. d. Verify the "CHANNEL DEFEAT" light for the lower section - LIT.
Step 8	BOP	At the Comparator And Rate panel, place the "COMPARATOR CHANNEL DEFEAT" switch to the affected channel position.
Step 9	BOP	De-energize the affected channel as follows: a. Remove the control power fuses at Power Range A drawer. NOTE Replacement of the affected P/R control power fuses shall not occur without authorization of the Superintendent of Operations or his designee. b. Request the OSM to maintain the control power fuses under his control. c. Verify the affected Power Range cabinet shows no physical signs of damage.
Step 10	ALL	Ensure affected channel bistables are in the required state. REFER TO Enclosure 1 (P/R Bistables That Must Be Tripped).
Step 11	RO	Ensure "NIS RECORDER" – SELECTED TO AN OPERABLE P/R CHANNEL.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 3

Event Description: Power Range Detector N-43 Fails High / Auto Rod Insertion

Time	Position	Applicant's Actions or Behavior
Step 12	ALL	Determine and correct cause of P/R malfunction.
Step 13	SRO	**Ensure compliance with appropriate Tech Specs:** • 3.2.4 (Quadrant Power Tilt Ratio (QPTR)) • 3.3.1 (Reactor Trip System (RTS) Instrumentation). SRO determines that 3.3.1 applies.
Step 14	SRO	Determine required notifications: • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
Step 15	ALL	Notify Reactor Group Engineer of occurrence.
Step 16	ALL	WHEN the affected P/R channel is repaired, THEN ensure IAE returns the channel to service.
Step 17	ALL	Determine long term plant status. RETURN TO procedure in effect.

GO TO Event #4 as directed by examiner

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 4

Event Description: **Reactor Coolant leak**

Time	Position	Applicant's Actions or Behavior
	ALL	Annunciator alarms 1AD-13 F/5, HVAC PANEL TROUBLE 1AD-19 C/9, VQ CONTAINMENT PRESSURE ALERT 1AD-06 F/8, PZR LO PRESS CONTROL Pressurizer level decreasing to less than program. Charging flow increasing.
	SRO	**Enters AP/1/A/5500/010 Reactor Coolant Leak Case II, NC System Leak**
Step 1	ALL	Monitor Enclosure 2 (Case II NC System Leak Foldout Page).
Step 2	BOP	Verify Pzr level - STABLE OR INCREASING. BOP notes PZR level decreasing and informs SRO.
Step 2 RNO a, b, c	BOP	Perform the following: a. Maintain charging flow less than 180 GPM. b. Manually throttle 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to stabilize Pzr level. c. IF Pzr level is stable OR increasing, THEN GO TO Step 3. BOP notes PZR level still decreasing and informs SRO.
		EXAMINER NOTE: The leak is large enough to require letdown flow reduction in the next step.
Step 2 RNO d	BOP	IF Pzr level continues to decrease, THEN: 1) Reduce letdown flow to 45 GPM as follows: a) IF 1NV-10A (Letdn Orif 1B Otlt Cont Isol) open, THEN perform the following: (1) Manually control 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG. (2) Throttle 1NV-849 (Letdn Flow Var Orif Ctrl) for 45 GPM letdown flow. (3) WHEN 45 GPM letdown flow established, THEN adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG. (4) WHEN letdown pressure is stable at 350 PSIG, THEN place 1NV-148 (Letdn Press Control) in "AUTO".

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 4

Event Description: **Reactor Coolant leak**

Time	Position	Applicant's Actions or Behavior
Step 2 RNO d.1)b)	BOP	b) IF 1NV-13A (Letdn Orif 1A Otlt Cont Isol) open, THEN ... Step does not apply.
Step 2 RNO d.2)	BOP	2) IF Pzr level continues to decrease, THEN ensure the following valves closed: • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) • 1NV-13A (Letdn Orif 1A Otlt Cont Isol).
Step 2 RNO d.3)	BOP	3) IF Pzr level is stable OR increasing, THEN GO TO Step 3.
Step 3	ALL	IF AT ANY TIME Pzr level decreases in an uncontrolled manner or cannot be maintained greater than 4%, THEN perform Step 2.
Step 4	BOP/RO	Verify Pzr/NC pressure – TRENDING TO OR STABLE AT DESIRED PRESSURE.
Step 5	ALL	Dispatch operator(s) to locate and isolate NC System leak.
Step 6	BOP	Verify proper VC/YC system operation. REFER TO Enclosure 14 (Control Room Ventilation System Verification).
Step 7	ALL	IF AT ANY TIME 1AD-7, I/1 "VCT LO LVL" alarm is lit, THEN ... Step does not apply.
Step 8	ALL	Determine NC leak rate by any of the following methods: • Compare charging flow and letdown flow OR • Monitor OAC NV Graphic OR • Initiate OAC Program "NSNCLEAK" OR • Monitor OAC point EROPLEAK OR • Monitor OAC point C1P0976 (Gross NC System Leak Rate, Ten Min Run Avg).

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 4 Event Description: **Reactor Coolant leak**		
Time	Position	Applicant's Actions or Behavior
Step 9	SRO	**Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:** • 3.4.4 RCS Loops-Modes 1 and 2 • 3.4.5 RCS Loops-Mode 3 • 3.4.6 RCS Loops-Mode 4 • 3.4.12 Low Temperature Overpressure Protection (LTOP) System • 3.4.13 (RCS Operational Leakage) • 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage) • 3.5.5 (Seal Injection Flow) • 3.6.3 Containment Isolation Valves • 3.7.17 (Secondary Specific Activity) • SLC 16.7-9 (Standby Shutdown System). SRO determines that 3.4.13 and SLC 16.7-9 apply.

GO TO Event #5 as directed by examiner

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 5

Event Description: **Main turbine manual trip due to high vibration. Failure of rod control requires a manual power reduction to 10%.**

Time	Position	Applicant's Actions or Behavior
	RO	Annunciator alarm 1AD-01 E/8 TURB GEN HI VIBRATION **Annunciator Actions:** IF all of the following conditions are met, trip the turbine and refer to AP/1/A/5500/002 (Turbine Generator Trip): • Reactor power less than 69% (NOT P-9). • Turbine at rated speed. • Any bearing vibration exceeds 12 mils.
	SRO	**Enters AP/1/A/5500/002, Turbine Trip and directs actions.**
		EXAMINER NOTE: Steps 1, 2 and 3 are Immediate Actions steps and are required to be performed from memory.
Step 1	RO	Verify reactor power - LESS THAN 69%
Step 2	RO	Verify Turbine Trip: • All turbine stop valves – CLOSED
Step 3	RO	Verify reactor response: • Control rods - IN "AUTO" AND STEPPING IN • P/R neutron flux - DECREASING. RO notes that the control rods are not inserting, performs RNO actions and informs SRO.
Step 3 RNO	RO	IF T-Avg is greater than 1.5°F higher than T-Ref, THEN: a. Ensure "CRD BANK SELECT" switch - IN MANUAL. b. Operate control rods until one of the following is met: • Reactor power is less than 10% OR • T-Avg is less than 560°F.
Step 4	BOP	Ensure C heater drain pumps - OFF.
Step 5	ALL	Monitor Enclosure 4 (Rod Insertion Limit Boration).

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 5

Event Description: **Main turbine manual trip due to high vibration. Failure of rod control requires a manual power reduction to 10%.**

Time	Position	Applicant's Actions or Behavior
Step 6	RO	WHEN reactor power is less than 20%, THEN: a. Ensure "CRD BANK SELECT" switch - IN MANUAL. b. IF reactor power is less than or equal to 5%, THEN:... Step does not apply. c. IF reactor power is greater than 5% power, THEN: 1) Maintain control rods above insertion limits. 2) Operate control rods to stabilize reactor power between 6%-10%.
Step 7	RO	Verify proper steam dump operation as follows: a. "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT. b. Steam dump valves - MODULATING. c. T-Avg - DECREASING TO T-REF.
Step 8	RO	Ensure the generator is tripped as follows: a. Ensure the following breakers and MODs - OPEN: • "GEN DE-EXC BKR" (relay) • "EXC FIELD BKR" • MOD 1BG and 1BT • MOD 1AG and 1AT • Generator Breaker 1A and 1B. b. Verify "MAN/AUTO REG" select switch "MAN" mode light - LIT.
Step 9	BOP	Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs - CLOSED. b. Normal Pzr spray valves - CLOSED.
Step 10	BOP	Verify Pzr level – TRENDING TO PROGRAM.
Step 11	RO	Verify S/G N/R levels - TRENDING TO OR STABLE AT 39%.
Step 12	RO	Verify reactor power - GREATER THAN 5%.
Step 13	ALL	IF AT ANY TIME reactor power is less than or equal to 5%, THEN perform Step 12.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 5

Event Description: **Main turbine manual trip due to high vibration. Failure of rod control requires a manual power reduction to 10%.**

Time	Position	Applicant's Actions or Behavior
Step 14	RO	Stabilize reactor power as follows: a. Maintain control rods above insertion limits. b. Operate control rods in manual to stabilize reactor power between 6%-10%. c. Verify all atmospheric steam dump valves - CLOSED. d. Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT. e. Verify condenser steam dump valves - MODULATING. f. Maintain reactor power between 6%-10%.
		EXAMINER NOTE: **The loss of vacuum will occur at approximately 30% power thereby causing the loss of the feedwater pump and requiring a reactor trip leading to event #6.**

GO TO Event #6 as directed by examiner

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 6

Event Description: **Loss of the running main feedwater pump requiring reactor trip. Reactor trip fails in automatic and manual (ATWS).**

Time	Position	Applicant's Actions or Behavior
	BOP/RO	Low vacuum alarms and verification of the low vacuum condition with control board meters. **EXAMINER NOTE**: The intent is that the crew not have sufficient time to address the vacuum leak using AP/1/A/5500/023 (Loss of Condenser Vacuum).
	BOP	Reports that 1A feedwater pump has tripped on low vacuum.
	SRO	**References AP/1/A/5500/006 Loss of SG Feedwater, Case I, Loss of CF supply to S/Gs.**
		EXAMINER NOTE: Step 1 is an Immediate Actions step and is required to be performed from memory.
Step 1	RO	Verify reactor power - LESS THAN 5%. RO notes reactor power >5% and informs SRO.
Step 1 RNO	RO	IF AT ANY TIME all CF supply to S/G(s) lost, THEN perform the following: a. Manually trip reactor. b. GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
	SRO	**Enters EP/1/A/5000/E-0 and directs actions.**
		EXAMINER NOTE: Steps 2 through 5 are Immediate Actions steps and are required to be performed from memory.
Step 1	ALL	Monitor Enclosure 1 (Foldout Page).
Step 2	RO	Verify Reactor Trip: • All rod bottom lights - LIT • All reactor trip and bypass breakers OPEN • I/R amps - DECREASING. RO reports that both reactor trip breakers are closed.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 6

Event Description: **Loss of the running main feedwater pump requiring reactor trip. Reactor trip fails in automatic and manual (ATWS).**

Time	Position	Applicant's Actions or Behavior
Step 2 RNO	RO	Perform the following: a. Manually trip reactor. b. IF reactor will not trip, THEN concurrently: • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). • GO TO EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS). RO reports that the reactor trip breakers will not open.
	SRO	**Transitions to EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS) and directs actions.**
		EXAMINER NOTE: Steps 1 and 2 are Immediate Actions steps and are required to be performed from memory.
Step 1		CAUTION: ... Caution does not apply.
Step 1	RO	Verify Reactor Trip: • All rod bottom lights - LIT • All reactor trip and bypass breakers - OPEN • I/R amps - DECREASING. RO notes reactor trip breakers are closed and I/R amps are not decreasing and informs SRO.
Step 1 RNO **CRITICAL TASK**	RO	Perform the following: a. Manually trip the reactor. b. IF reactor will not trip, THEN manually insert rods. **STANDARD: Operator notes the need for a manual reactor trip and following the failure of that trip, inserts control rods in manual to bring the reactor subcritical.**
Step 2	RO	Verify Turbine Trip: • All turbine stop valves - CLOSED OR • Both of the following: o All MSIVs - CLOSED o All MSIV bypass valves - CLOSED.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 6

Event Description: **Loss of the running main feedwater pump requiring reactor trip. Reactor trip fails in automatic and manual (ATWS).**

Time	Position	Applicant's Actions or Behavior
Step 3	BOP	Verify CA pumps are running as follows: a. Motor driven CA pumps - ON. b. 3 S/G N/R levels - GREATER THAN 11%. BOP notes no CA pumps are running and informs SRO.
Step 3 a. RNO	BOP	a. Manually start motor driven CA pump(s).
Step 3 b.	RO/BOP	b. 3 S/G N/R levels - GREATER THAN 11%.
Step 4	BOP	Initiate emergency boration of NC System as follows: a. Ensure at least one NV pump - ON. b. Open 1NV-236B (Boric Acid To NV Pumps Suct). c. Ensure both boric acid transfer pump switches - IN THE "ON" POSITION. d. Verify emergency boration flow - GREATER THAN OR EQUAL TO 30 GPM. e. Verify the following charging line isolation valves - OPEN: • 1NV-312A (Chrg Line Cont Isol) • 1NV-314B (Chrg Line Cont Isol). f. Verify Pzr pressure - LESS THAN 2335 PSIG.
Step 5	BOP	Verify the following Monitor Light Panel Group 5 St lights - LIT: • I/2 • I/3 • I/10 • H/11.
Step 6	BOP	Verify S/I status as follows: a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT. BOP notes S/I is not actuated and informs SRO.
Step 6 a. RNO	BOP	a. Perform the following: 1) IF AT ANY TIME an S/I signal exists OR occurs while in this procedure, THEN perform Step 6.b. 2) GO TO Step 7.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 6

Event Description: **Loss of the running main feedwater pump requiring reactor trip. Reactor trip fails in automatic and manual (ATWS).**

Time	Position	Applicant's Actions or Behavior
Step 7	RO	Verify the following trips have occurred: a. Reactor Trip. b. Turbine Trip. RO notes reactor has not tripped and informs SRO.

Step 7a RNO	ALL	a. Dispatch operator to open the following:
		• Reactor trip breakers
		• Reactor trip bypass breakers
		• The following breakers for CRD M/G sets:
		  • "MOTOR" Breaker
		  • "GENERATOR" Breaker.
		EXAMINER NOTE: NLO will complete the task **two minutes** after the phone call is made.

Step 7b	RO	Verify the following trips have occurred: b. Turbine Trip.
Step 8	ALL	Verify the reactor is subcritical as follows: a. All of the following conditions exist: • P/R channels - LESS THAN 5% • W/R NEUTRON POWER channels - LESS THAN 5% • I/R SUR - NEGATIVE. b. GO TO Step 17.
Step 17	ALL	17. Ensure all malfunctioning NC pumps - STOPPED.
Step 18	BOP	Ensure adequate shutdown margin as follows: a. Ensure the following signals - RESET: 1) Phase A Containment Isolations 2) KC NC NI NM St signals. b. Obtain current NC boron concentration from Primary Chemistry. c. WHEN current NC boron concentration is obtained, THEN perform shutdown margin calculation. REFER TO OP/0/A/6100/006 (Reactivity Balance Calculation). d. WHEN following conditions are satisfied, THEN stop NC System boration: • Adequate shutdown margin is obtained • Uncontrolled cooldown has been stopped.
Step 19	ALL	Implement RP/0/A/5000/001 (Classification Of Emergency).

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 6

Event Description: **Loss of the running main feedwater pump requiring reactor trip. Reactor trip fails in automatic and manual (ATWS).**

Time	Position	Applicant's Actions or Behavior
Step 20	ALL	RETURN TO procedure and step in effect.
		EXAMINER NOTE: The crew should return to E-0 step 3 **The LOCA is inserted here and the unit will automatically safety inject.**
	SRO	**Transitions to EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).**

GO TO Event #7 as directed by examiner

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
	SRO	**Enters EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection) and directs operators.**

Step 1
CRITICAL STEP
	ALL	Monitor Enclosure 1 (Foldout Page).
		EXAMINER NOTE: This criterion will be met early in this event. It is listed here since the exact E-0 procedure step where it is likely to occur is unknown.
		NC Pump Trip Criteria:
		• IF the following conditions are satisfied, THEN trip all NC pumps while maintaining injection flow:
		  • At least one NV or NI pump - ON
		  • NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F.
		STANDARD: The reactor coolant pumps are tripped within 5 minutes of loss of subcooling.

		EXAMINER NOTE: Steps 2 through 5 are Immediate Action steps and must be performed from memory.
Step 2	RO	Verify Reactor Trip: • All rod bottom lights – LIT • All reactor trip and bypass breakers – OPEN • I/R amps – DECREASING
Step 3	RO	Verify Turbine Trip: • All turbine stop valves – CLOSED OR Both of the following: • All MSIVs - CLOSED • All MSIV bypass valves - CLOSED.
		EXAMINER NOTE: A malfunction on the 1ETB buss results in a coincident LOCA and Blackout. The diesel will energize and load LOCA loads. The BOP may observe the 10 second delay until the diesel breaker closes in and energizes the buss before responding.
Step 4	BOP	Verify 1ETA and 1ETB – ENERGIZED.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 5	BOP	Verify S/I is actuated: a. "SAFETY INJECTION ACTUATED" status light (1SI-13) – LIT b. E/S load sequencer actuated status lights (1SI-14) – LIT
Step 6	RO	Announce "Unit 1 Safety Injection".
Step 7	SRO	Implement RP/0/A/5000/01 (Classification Of Emergency).
Step 8	RO	Verify all Feedwater Isolation status lights (1SI-5) – LIT
Step 9	BOP	Verify Phase A Containment Isolation status as follows: a. Phase A "RESET" lights – DARK b. Monitor Light Panel Group 5 St lights – LIT
Step 10	ALL	Verify proper Phase B actuation as follows: a. Containment pressure – HAS REMAINED LESS THAN 3 PSIG b. IF AN ANY TIME containment pressure exceeds 3 PSIG while in this procedure, THEN perform Step 10.a.
Step 11	RO	Verify proper CA pump status as follows: a. Motor driven CA pumps – ON b. 3 S/G N/R levels - GREATER THAN 11%.
Step 12	BOP	Verify all of the following S/I pumps – ON: • NV pumps • ND pumps • NI pumps BOP notes that only "B" NV pump not running on "B train and informs SRO. (1A is previously tagged out.)

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 12.a RNO	BOP	Perform the following for the affected train(s): a. Reset ECCS. b. Reset D/G load sequencer. c. Manually start affected pump. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. BOP attempts to start "B" NV pump unsuccessfully.
Step 13	BOP	Verify all KC pumps – ON. BOP notes previously tripped 1A2 KC pump not running and informs SRO.
Step 13 RNO	BOP	Perform the following for affected train(s): a. Reset ECCS. b. Reset D/G load sequencer. c. Manually start affected pump. d. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. BOP attempts to start 1A2 KC pump unsuccessfully.
Step 14	BOP	Verify all Unit 1 and Unit 2 RN pumps – ON
Step 15	BOP	Verify proper ventilation systems operation as follow: • REFER TO Enclosure 2 (Ventilation System Verification) • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification)
Step 16	RO	Verify all S/G pressures – GREATER THAN 775 PSIG.
Step 17a.	BOP/RO	Verify proper S/I flow as follows: a. "NV S/I FLOW" – INDICATING FLOW

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 17.a RNO	BOP	Manually start NV pump(s) and align valves. Neither NV pump can be started by the BOP.
Step 17b.	BOP	NC Pressure – LESS THAN 1620 PSIG.
Step 17c.	BOP	NI pumps - INDICATING FLOW.
Step 17d.	BOP	NC pressure - LESS THAN 285 PSIG. BOP notes NC pressure > 285 psig and informs SRO.
Step 17d RNO	BOP	Perform the following: 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. 2) IF the ND pump miniflow valve(s) cannot be opened, THEN perform the following for affected train(s): a) Reset ECCS. b) Reset D/G load sequencer. c) Stop ND pump. d) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. e) IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart the ND pump. 3) GO TO Step 18.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 18	RO	Control S/G levels as follows: a. Verify total CA flow – GREATER THAN 450 GPM. b. WHEN at least one S/G N/R level is greater than 11% (29% ACC), THEN throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.
Step 19	RO	Verify all CA isolation valves – OPEN.
Step 20	BOP	Verify S/I equipment status based on monitor light panel – IN PROPER ALIGNMENT. BOP notes 1A/1B NV pumps and 1A2 KC pump "out of alignment" and informs SRO.
Step 20 RNO	BOP	Manually align equipment.
	RO	NOTE: Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.
Step 21	RO	Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).
Step 22	BOP	Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs – CLOSED. b. Normal Pzr spray valves – CLOSED. c. At least one Pzr PORV isolation valve- OPEN.
Step 23	RO	Verify NC subcooling based on core exit T/Cs – GREATER THAN 0°F. RO notes that subcooling is less than zero.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 23 RNO	RO/BOP	IF any NV OR NI pump is on, THEN: a. Ensure all NC pumps - OFF. b. Maintain seal injection flow. **EXAMINER NOTE:** This is the same as criterion #2 of Enclosure 1 and may already be complete.
Step 24	RO	Verify main steamlines are intact as follows: • All S/G pressures – STABLE OR INCREASING • All S/Gs – PRESSURIZED.

Step 25	RO/BOP	Verify S/G tubes are intact as follows:
		• Verify the following EMF trip 1 lights – DARK:
		  • 1EMF-33 (Condenser Air Ejector Exhaust)
		  • 1EMF-34 (S/G Sample)
		  • 1EMF-26 (Steamline 1A)
		  • 1EMF-27 (Steamline 1B)
		  • 1EMF-28 (Steamline 1C)
		  • 1EMF-29 (Steamline 1D)
		• All S/G levels – STABLE OR INCREASING IN A CONTROLLED MANNER

Step 26	BOP	Verify NC System is intact as follows: • Containment pressure - LESS THAN 1 PSIG. BOP notes that Containment pressure is greater than 1 psig and informs SRO.
Step 26 RNO	SRO	Concurrently: • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). • GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).
	SRO	**Transitions to EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant) and directs actions.**

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 1	ALL	Monitor Enclosure 1 (Foldout Page).
Step 2	RO	Verify main steamlines are intact as follows: • All S/G pressures - STABLE OR INCREASING • All S/Gs - PRESSURIZED.
Step 3	RO	Control intact S/G levels as follows: a. Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC). b. Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%.
Step 4	BOP	Verify secondary radiation is normal as follows: a. Ensure the following signals - RESET: 1) Phase A Containment Isolations 2) CA System valve control 3) KC NC NI NM St signals. b. Align all S/Gs for Chemistry sampling. c. Perform at least one of the following: • Notify Chemistry to sample all S/Gs for activity. OR • Notify RP to frisk all cation columns for activity. d. Verify the following EMF trip 1 lights - DARK: • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-34 (S/G Sample) • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D). e. WHEN activity results are reported, THEN verify all S/Gs indicate no activity.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 5	BOP	Verify Pzr PORV and isolation valve status as follows: a. Power to all Pzr PORV isolation valves - AVAILABLE. b. All Pzr PORVs - CLOSED. c. At least one Pzr PORV isolation valve - OPEN. d. IF AT ANY TIME a Pzr PORV opens due to high pressure, THEN, after Pzr pressure decreases to less than 2315 PSIG, ensure the valve closes or is isolated.
Step 6	RO/BOP	Verify S/I termination criteria as follows: a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F. b. Verify secondary heat sink as follows: • N/R level in at least one intact S/G - GREATER THAN 11% (29% ACC) OR • Total feed flow to all intact S/Gs - GREATER THAN 450 GPM. c. NC pressure - STABLE OR INCREASING. d. Pzr level - GREATER THAN 11% (20% ACC). BOP notes that subcooling is less than zero and informs SRO.
Step 6.a RNO	SRO	GO TO Step 6.f.
Step 6 f and g	ALL	f. Monitor S/I termination criteria. REFER TO Enclosure 2 (S/I Termination Criteria). g. IF AT ANY TIME S/I termination criteria is met while in this procedure, THEN RETURN TO Step 6.
Step 7	BOP	Verify proper NS pump operation as follows: a. At least one NS pump - ON. BOP notes all NS pumps are off and informs SRO.
Step 7 RNO	ALL	a. Perform the following: 1) IF AT ANY TIME an NS pump(s) starts while in this procedure, THEN perform Step 7. 2) GO TO Step 8.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 8	BOP	Verify criteria to stop operating ND pumps as follows: a. NC pressure - GREATER THAN 285 PSIG. b. NC pressure - STABLE OR INCREASING. c. At least one ND pump - ON. d. ND pumps suction - ALIGNED TO FWST. e. Ensure S/I - RESET: 1) ECCS. 2) D/G load sequencers. 3) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. f. Stop ND pumps. g. IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart ND pumps.
Step 9	RO/BOP	Verify NC and S/G pressures as follows: a. All S/G pressures - STABLE OR INCREASING. b. NC pressure - STABLE OR DECREASING.
Step 10	BOP	Verify conditions to stop operating D/Gs as follows: a. At least one D/G - ON. b. Verify 1ETA is energized by offsite power as follows: • "D/G 1A BKR TO ETA" - OPEN • 1ETA - ENERGIZED. c. WHEN S/I is reset, THEN dispatch operator to stop 1A D/G and place in standby readiness. REFER TO OP/1/A/6350/002 (Diesel Generator Operation). d. Verify 1ETB is energized by offsite power as follows: • "D/G 1B BKR TO ETB" - OPEN • 1ETB - ENERGIZED. BOP informs SRO that 1B D/G is supplying 1ETB.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 10 RNO d.	BOP	d. Perform the following: 1) Attempt to restore offsite power to affected switchgear. REFER TO AP/1/A/5500/007 (Loss of Normal Power). 2) IF 1ETA is energized from offsite power, THEN GO TO Step 10.f. **EXAMINER NOTE**: It is not expected that the crew will address the power issue at this time.
Step 10.f RNO	BOP	f. Ensure S/I – RESET: 1) ECCS 2) D/G load sequencers 3) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment on.
Step 11	BOP	Obtain containment H_2 concentration as follows: a. Ensure operator has been dispatched to secure all ice condenser air handling units. REFER TO Enclosure 3 (Securing All Ice Condenser Air Handling Units). b. Verify containment H_2 analyzers – IN SERVICE. c. Verify containment H_2 concentration - LESS THAN 6%. d. Verify containment H_2 concentration - LESS THAN 0.5%. e. WHEN ice condenser air handling units are off AND H_2 concentration is less than 6%, THEN energize the H_2 igniters (1MC-7).

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 12	BOP	Initiate evaluation of plant status as follows: a. Verify S/I systems - ALIGNED FOR INJECTION MODE. b. Verify Cold Leg Recirc capability as follows: 1) At least one ND pump - AVAILABLE. 2) Verify power to all of the following valves - AVAILABLE: • 1FW-27A (ND Pump 1A Suct From FWST) • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1ND-28A (ND Supply To NV & 1A NI Pmps) • 1FW-55B (ND Pump 1B Suct From FWST) • 1NI-184B (ND Pump 1B Cont Sump Suct) • 1NI-332A (NI Pump Suct X-Over From ND) • 1NI-333B (NI Pump Suct From ND) • 1NI-334B (NI Pump Suct X-Over From ND) • 1NI-136B (ND Supply To NI Pump 1B) • 1NI-115A (NI Pump 1A Miniflow Isol) • 1NI-144A (NI Pump 1B Miniflow Isol) • 1NI-147B (NI Pump Miniflow Hdr To FWST Isol). 3) Verify the "ENABLE" lights for the following switches - LIT: • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A" • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B". c. Verify auxiliary building radiation is normal as follows: • EMF-41 (Aux Bldg Ventilation) trip light - DARK • All area monitor EMF trip 1 lights - DARK.
Step 12d and e	ALL	d. WHEN the TSC is activated AND staffed, THEN: 1) Notify the Reactor Engineer to assess core damage. REFER TO RP/0/A/5000/015 (Core Damage Assessment). 2) Notify Chemistry to obtain current NC boron concentration. 3) WHEN ND is aligned for Cold Leg Recirc, THEN notify Chemistry to obtain current containment sump boron concentration. e. Notify station management to evaluate starting additional plant equipment to assist in recovery.
Step 13	BOP/ SRO	Verify NC System cooldown and depressurization is required as follows: a. NC pressure - GREATER THAN 285 PSIG. b. GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
	ALL	Determines NC pressure is greater than 285 psig and transitions to EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).
Step 1	ALL	Monitor Enclosure 1 (Foldout Page).
Step 2	BOP	Ensure S/I - RESET: a. ECCS. b. D/G load sequencers. c. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
Step 3	BOP	Ensure the following containment isolation signals - RESET: • Phase A • Phase B.
Step 4	BOP	Verify proper NS pump operation as follows: a. At least one NS pump - ON.
Step 4 RNO	BOP	a. Perform the following: 1) IF AT ANY TIME an NS pump(s) starts while in this procedure, THEN perform Step 4. 2) GO TO Step 5.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 5	BOP	Initiate evaluation of plant status as follows: a. Verify S/I systems - ALIGNED FOR INJECTION MODE. b. Verify Cold Leg Recirc capability as follows: 1) At least one ND pump - AVAILABLE. 2) Verify power to all of the following valves - AVAILABLE: • 1FW-27A (ND Pump 1A Suct From FWST) • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1ND-28A (ND Supply To NV & 1A NI Pmps) • 1FW-55B (ND Pump 1B Suct From FWST) • 1NI-184B (ND Pump 1B Cont Sump Suct) • 1NI-332A (NI Pump Suct X-Over From ND) • 1NI-333B (NI Pump Suct From ND) • 1NI-334B (NI Pump Suct X-Over From ND) • 1NI-136B (ND Supply To NI Pump 1B). 3) Verify power to all of the following valves - AVAILABLE. • 1NI-115A (NI Pump 1A Miniflow Isol) • 1NI-144A (NI Pump 1B Miniflow Isol) • 1NI-147B (NI Pump Miniflow Hdr To FWST Isol). • 4) Verify the "ENABLE" lights for the following switches - LIT: • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A" • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B". c. Verify auxiliary building radiation is normal as follows: • EMF-41 (Aux Bldg Ventilation) trip 1 light - DARK • All area monitor EMF trip 1 lights - DARK. d. WHEN the TSC is activated AND staffed, THEN: 1) Notify the Reactor Engineer to assess core damage. REFER TO RP/0/A/5000/015 (Core Damage Assessment). 2) Notify Chemistry to obtain current NC boron concentration. 3) WHEN ND is aligned for Cold Leg Recirc, THEN notify Chemistry to obtain current containment sump boron concentration. e. Notify station management to evaluate starting additional plant equipment to assist in recovery.
Step 6	BOP	Establish VI to containment as follows: • Ensure 1VI-77B (VI Cont Isol) - OPEN • Verify VI pressure - GREATER THAN 85 PSIG.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 7	BOP	Verify all AC busses are energized by offsite power as follows: A Train: • "FTA B/O NORM FDR FRM ATC" - CLOSED • "D/G 1A BKR TO ETA" - OPEN • 1ETA - ENERGIZED. B Train: • "FTB B/O NORM FDR FRM ATD" - CLOSED • "D/G 1B BKR TO ETB" - OPEN • 1ETB - ENERGIZED. BOP notes B train is not energized from offsite power and informs SRO.
Step 7 RNO	BOP	a. Restore offsite power while continuing with this procedure. REFER TO AP/1/A/5500/007 (Loss of Normal Power). b. Manually start the following equipment: • Start all available CRD vent fans. • Dispatch operator to start available VI compressors.
Step 8	BOP	Place all Pzr heaters in manual and off.
Step 9	BOP	Verify criteria to stop operating ND pumps as follows: a. At least one ND pump - ON. BOP notes all ND pumps are off and informs SRO.
Step 9 RNO	SRO	GO TO Step 9.f.
Step 9.f	ALL	IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart ND pumps.
Step 10	RO	Control intact S/G levels as follows: a. Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC). b. Throttle feed flow to maintain N/R level in all intact S/Gs between 11% (29% ACC) and 50%.

Op-Test No.: 1 NRC Scenario No.: 3 Event No.: 7

Event Description: The reactor coolant leak increases to a LOCA causing a safety injection.

Time	Position	Applicant's Actions or Behavior
Step 11	ALL	Monitor shutdown margin during cooldown as follows: a. Notify station management to monitor shutdown margin during NC System cooldown. b. Request periodic NC boron samples from Primary Chemistry. NOTE Sample results are not required prior to initiating cooldown in subsequent steps. c. WHEN each NC boron sample obtained, THEN: 1) Perform shutdown margin calculation. REFER TO OP/0/A/6100/006 (Reactivity Balance Calculation). 2) Verify NC boron concentration - GREATER THAN OR EQUAL TO REQUIRED BORON CONCENTRATION.
Step 12	BOP	WHEN "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) is lit, THEN: a. Depress ECCS steam pressure "BLOCK" pushbuttons. b. Verify main steam isolation blocked status lights (1SI-13) - LIT. c. Verify MSIVs on all intact S/Gs - OPEN.
		NOTE After the low steamline pressure main steam isolation signal is blocked Main Steam Isolation will occur if the high steam pressure rate setpoint is exceeded.
Step 13	RO	Initiate NC System cooldown to Cold Shutdown as follows: a. IF ND is in RHR mode, THEN initiate cooldown with ND System while maintaining cooldown rate based on NC T-Colds as close as possible without exceeding 100°F in an hour. b. Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT. RO notes C-9 is DARK and informs SRO.
Step 13 RNO	RO	b. Perform the following: 1) Dump steam from intact S/G(s) PORV while maintaining cooldown rate based on NC T-Colds as close as possible without exceeding 100°F in an hour. 2) GO TO Step 14.

Terminate scenario at direction of the examiner.

Event Classification: 4.4.S.1 (SAE) per 4.4.S.1-1

Simulation Facility: Catawba **Scenario No.: NRC-2** **Op-Test No: 1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Objectives: To evaluate the applicants' ability to use station procedures to borate and reduce turbine load. Abnormal events include: S/G level program fails high requiring manual control of steam generator level. A failed pressurizer level channel leads to a loss of letdown and a malfunction of automatic makeup which causes a dilution event requiring manual termination. A main turbine loss of lube oil pressure results in a turbine trip first out annunciator. The turbine fails to trip requiring a reactor trip and closure of the main steam isolation valves. Emergency events include: A large break LOCA and failure of the recirculation paths requiring the crew to enter contingency action procedures. During the major event the BOP must take manual actions to establish cold leg injection flow from ND. Actions by the crew establish a flow path from the containment sump to the reactor coolant system.

Initial Conditions: 66% power, MOL, Equilibrium Xe.
NCS Boron Concentration 1162 ppm

Turnover:

- One week ago Steam Generator 1A developed a 2 GPD tube leak that has remained stable. Secondary chemistry is taking grab samples per their procedures.
- 1EMF-71, S/G A Leakage, is out of service due to a loss of signal problem.
- Charging pump 1A is tagged for motor cooler leak. Additional problems have required that a shutdown to Mode 3 be started.
- Initiate a power decrease at 20% per hour per OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.2 Power Decrease in progress to step 2.13.

Event No.	Malf. No./ Position	Event Type*	Event Description
1	BOP RO	R N	Boration for power decrease Turbine Load Decrease
2	RO	I	Steam Generator 1C level controller fails high
3	SRO (TS)		Refueling Water Storage Tank Level channel fails high
4	BOP SRO (TS)	I	Pressurizer Level Channel 1 fails low causing loss of letdown. 1NV-2A Fails in Automatic.
5	BOP	C	Automatic makeup from boric acid pumps, diluted makeup to volume control tank.
6	RO	C	Main turbine fails to trip when required

Event No.	Malf. No./ Position	Event Type*	Event Description
7	ALL	M	Large LOCA and Loss of Emergency Coolant Recirculation Additional failures: ND pump 1B fails to start in auto ND pump 1B trips prior to Cold Leg Recirc 1NI-185A Fails to open
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Op-Test No.: 1 NRC Scenario No.: 2 Event No.: 1 **Event Description: Boration for load decrease / Turbine Load Decrease**		
Time	Position	Applicant's Actions or Behavior
	BOP/RO	Per the turnover and power decrease plan, the BOP will begin the boration, the RO will set the turbine load target and load rates while inserting control banks for temperature control.
	BOP	Refer to OP/1/A/6150/009, Boron Concentration Control.
Step 2.2	BOP	Ensure the following valve control switches in "AUTO": • 1NV-238A (B/A Xfer Pmp To Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt)
Step 2.3	BOP	Adjust the boric acid batch counter to the desired volume of boric acid to be added.
Step 2.4	BOP	Place the "NC MAKEUP MODE SELECT" switch in "BORATE".
Step 2.5	BOP	Adjust the controller for 1NV-238A (B/A Xfer Pmp to Blender Ctrl) controller to the desired flow.
Step 2.6	BOP	Ensure 1NV-238A (B/A Xfer Pmp to Blender Ctrl) controller in "AUTO".
Step 2.7	BOP	**NOTE**: If necessary, boration can be manually secured at any time by placing the "NC MAKEUP CONTROL" switch to the "STOP" position. Ensure at least one boric acid transfer pump in "AUTO" or "ON".
Step 2.8	BOP	Place the "NC MAKEUP CONTROL" switch in "START" position.
Step 2.9	BOP	Verify the following valves open: • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt)

Op-Test No.: 1 NRC Scenario No.: 2 Event No.: 1 **Event Description: Boration for load decrease / Turbine Load Decrease**		
Step 2.10	BOP	If in "AUTO", verify the boric acid transfer pump starts.
Step 2.11	BOP	Verify proper flow by observing the boric acid flow totalizer.
Step 2.12	BOP	When the desired volume of boric acid is reached on the boric acid batch counter, ensure the following valves close: • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt)

Step 2.13	BOP	IF desired, flush the makeup line as follows:
		• Open the following valves:
		  • 1NV-242A (RMWST To B/A Blender Ctrl)
		  • 1NV-186A (B/A Blender Otlt To VCT Otlt)
		• Ensure one reactor makeup water pump is in "ON".
		• WHEN ~20 gallons of makeup water have been flushed through the makeup line, close the following valves:
		  • 1NV-242A (RMWST To B/A Blender Ctrl)
		  • 1NV-186A (B/A Blender Otlt To VCT Otlt)
		  •
		• Place the following valve control switches in "AUTO":
		  • 1NV-242A (RMWST To B/A Blender Ctrl)
		  • 1NV-186A (B/A Blender Otlt To VCT Otlt)
		• IF NOT required for current plant operation, place the reactor makeup water pump started in earlier step in "AUTO".

Step 2.14	BOP	IF automatic makeup is desired, refer to Enclosure 4.1 (Automatic Makeup).
	SRO/RO	The power decrease will begin at Step 2.12 of the Controlling Procedure for Unit Operation Enclosure 4.2, Power Decrease. The RO will refer to OP/1/B/6300/001, Turbine Generator, Enclosure 4.2, Step 2.4.
	SRO	Direct RO to reduce load at a rate of approximately 4 MW/min or 20% per hour to Mode 3.

Op-Test No.: 1 NRC Scenario No.: 2 Event No.: 1

Event Description: Boration for load decrease / Turbine Load Decrease

Step 2.4.1	RO	Depress the "Load Rate" pushbutton and verify it illuminates.
Step 2.4.2	RO	Input the desired load rate on the numeric keypad and verify the load rate appears on the Variable Display.
Step 2.4.3	RO	Depress the "Target" pushbutton and verify it illuminates.
Step 2.4.4	RO	Input the desired load target the numeric keypad and verify the load target appears on the Target Display.
Step 2.4.5	RO	To start load decrease, depress the "Go" pushbutton and verify it illuminates.
	RO	During power decrease, RO monitors rod position and adjusts Bank D height as needed to approximate the recommended rod positions of the shutdown plan.

GO to Event #2 at direction of the examiner

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 2 **Event Description: Steam Generator 1C level controller fails high**		
Time	Position	Applicant's Actions or Behavior
	ALL	Symptoms for failure include: Increasing S/G level Increased Setpoint pen display on recorder Increased control valve positions Annunciator alarms on 1AD-4: A/3, S/G C FLOW MISMATCH CF>STM B/3, S/G C LEVEL DEVIATION B/5, FCV or BFCV DEVIATION RO determines that level is increasing due to valves opening. May take manual control at this point. RO informs SRO
	SRO	**Implements AP/1/A/5500/006 (Loss of S/G Feedwater) Case III (DFCS Not In Auto) and directs actions.**
Step 1	ALL	IF AT ANY TIME S/G levels approaching: • 83% N/R level (S/G HI-HI Level Turb Trip) OR • 11% N/R level (S/G LO-LO Level Rx Trip). THEN: a. Manually trip reactor. b. GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
Step 2	RO	Verify the following: • At least one CF pump - IN SERVICE. • 1AD-3, C/6 "CF ISOL TRN A" - DARK. • 1AD-3, D/6 "CF ISOL TRN B" - DARK.
Step 3	ALL	IF AT ANY TIME both CF pumps fail to manual control, THEN ensure all CF main feed reg and feed reg bypass valves in manual.
Step 4	BOP/RO	Verify CF pump speed controller for service CF pump(s): • In auto • Responding adequately.
		EXAMINER NOTE: RO may have already taken valve to manual by this point.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 2

Event Description: Steam Generator 1C level controller fails high

Time	Position	Applicant's Actions or Behavior
Step 5		Verify all S/G CF control valves: • In auto • Responding adequately. RO notes that 1C controls are not responding adequately and informs SRO.
Step 5 RNO	RO	Perform the following for the affected S/G(s): a. Ensure affected controller(s) in manual. b. IF AT ANY TIME S/G level not on program, THEN adjust CF flow to obtain a slight trend in the appropriate direction. c. IF AT ANY TIME control valve adjustment is required, THEN attempt to maintain CF/SM D/P constant during CF control valve adjustments.
Step 6	RO	Verify the following: • S/G level(s) - STABLE • S/G level(s) - APPROXIMATELY AT PROGRAM • Malfunction - CORRECTED. Determines that level program has increase to ~85% and that malfunction has not been corrected. SRO goes to RNO step.
Step 6 RNO	RO	Perform the following: a. Continue to control CF/SM D/P and S/G CF Flow rates to stabilize level in affected S/G(s) approximately at program level. b. WHEN all the following conditions met: • S/G level(s) - STABLE • S/G level(s) - APPROXIMATELY AT PROGRAM • Malfunction - CORRECTED. THEN GO TO Step 7. c. Do not continue in this procedure until all conditions met.
	RO	RO will continue to control S/G 1C level in manual.

GO to Event #3 at direction of the examiner

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 3 **Event Description: Refueling Water Storage Tank Level channel fails high**		
Time	Position	Applicant's Actions or Behavior
	BOP	Symptoms include: Annunciator 1AD-9 B/8, FWST AT MAKEUP LEVEL FWST Channel III slowly decreases towards zero on MC-9 BOP informs SRO
	SRO	**Annunciator Response Supplemental actions:** **IF** a channel failure has occurred, perform the following: 4.1 Refer to Tech Spec 3.3.2 for minimum operable channel requirements. 4.2 Issue the appropriate Model W/Os to have IAE provide emergency repairs on the affected channel(s): • 98615490 - 1FW LT5120: Repair CH 3 FWST Level 4.3 Initiate a work request to have the channel repaired. SRO determines that T.S. 3.3.2 actions are required.

GO to Event #4 at direction of the examiner

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 4

Event Description: Pressurizer Level Channel 1 fails low causing loss of letdown. 1NV-2A Fails in Automatic.

Time	Position	Applicant's Actions or Behavior
	ALL	Recognizes Pressurizer Level Channel I has failed LOW, letdown flow is lost and informs SRO.
	SRO	**Implements AP/1/A/5500/12 (Loss of Charging or Letdown) Case II (Loss of Letdown) and directs actions.**
Step 1	BOP	Verify all Pzr level channels – INDICATING THE SAME. Determines that channel I has failed low and informs SRO.
Step 1 RNO	BOP	IF the controlling channel is failed low, THEN place "PZR LEVEL CTRL SELECT" switch in any alternate operable position.
Step 2	RO	Stop any power changes.
Step 3	BOP	Ensure the following letdown isolation valves – CLOSED. • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) • 1NV-13A (Letdn Orif 1A Otlt Cont Isol)
Step 4	BOP	Verify PZR level – GREATER THAN 17%.
Step 5	BOP	Control charging to stabilize Pzr level at program level while maintaining seal injection flow.
Step 6	BOP	Ensure "PZR HEATER GROUP 1C" – ON.
Step 7	BOP	Control VCT level as follows: a. Verify NC System makeup – SET FOR DESIRED BORON CONCENTRATION b. Verify "NC MAKEUP MODE SELECT" – IN AUTOMATIC.
Step 8	SRO	Determine and correct cause of loss of letdown.
Step 9	BOP	Verify proper VC/YC system operation. REFER TO Enclosure 5 (Control Room Ventilation System Verification).

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 4

Event Description: Pressurizer Level Channel 1 fails low causing loss of letdown. 1NV-2A Fails in Automatic.

Time	Position	Applicant's Actions or Behavior
Step 10	BOP	Ensure "PZR LEVEL TO REC SEL" is selected to an operable channel.
Step 11	SRO **TECH** **SPEC**	Ensure compliance with appropriate Tech Specs: • 3.3.1 (Reactor Trip system (RTS) Instrumentation) • 3.3.3 (Post Accident Monitoring (PAM) Instrumentation) • 3.3.4 (Remote Shutdown System) • 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits) • 3.4.12 (Low Temperature Overpressure Protection(LTOP) System) • 3.6.3 (Containment Isolation Valves) SRO determines that T.S. 3.3.1 applies for the failed level channel.
		EXAMINER NOTE: Both valves are open in the next step: 1NV-2A failed to close on the level channel failure. The crew may or may not close this valve to satisfy the failed automatic action. With this valve open, the crew can restore normal letdown without extensive extra required actions. The intent of the scenario is to NOT restore letdown.
Step 12	BOP	Verify at least one of the following valves – CLOSED: • 1NV-1A (NC Letdn To Regen Hx Isol) OR • 1NV-2A (NC Letdn To Regen Hx Isol). BOP notes both valves open and informs SRO.
Step 12 RNO	SRO	GO TO Step 17.
		EXAMINER NOTE: By this time, an automatic makeup to the VCT should have occurred and that will be the start of Event 5.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 5

Event Description: Automatic makeup from boric acid pumps, diluted makeup to Volume Control Tank

Time	Position	Applicant's Actions or Behavior
		Notes the following annunciators lit after the VCT makeup starts and informs SRO. **1AD-7 I/3 "BA FLOW DEVIATION"** **1AD-7 J/3 "TOTAL MAKEUP FLOW DEVIATION"**
	BOP	**Annunciator Response 1AD-7 I/3 listed automatic actions:** Valves 1NV-181A (B/A Blender Otlt To VCT) and 1NV-186A (B/A Blender Otlt To VCT Otlt) closed. **Annunciator Response Actions:** 1. Verify the Boric Acid Xfer Pump switch is in "AUTO". 2. IF necessary take manual control of Reactor Makeup Control System per OP/1/A/6150/009 (Boron Concentration Control). BOP notes that 1NV-186A is still open and informs SRO.
	BOP	Verify the Boric Acid Xfer Pump switch is in "AUTO" If necessary take manual control of Reactor Makeup Control System per OP/1/A/6150/009.

GO to Event #6 at direction of the examiner

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 6

Event Description: Main turbine fails to trip when required

Time	Position	Applicant's Actions or Behavior
	ALL	Symptoms: Any Turbine Trip alarm on 1AD-1 - LIT 1AD-1 A/9, BEARING OIL LO PRESS TURB TRIP RO determines that there is no oil pressure and that high vibration exists and informs SRO.
		EXAMINER NOTE: Steps 1 and 2 are Immediate Action steps and are required to be performed from memory.
Step 1	RO	Verify reactor power - LESS THAN 69%.
Step 2	RO	Verify Turbine Trip: • All turbine stop valves - CLOSED RO notes turbine has not tripped and informs SRO.
Step 2 RNO **CRITICAL STEP**	RO	Perform the following: a. Manually trip turbine. b. IF turbine will not trip, THEN: 1) Depress the "MANUAL" pushbutton on the turbine control panel. 2) Rapidly unload turbine by simultaneously depressing the "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons. 3) IF turbine will not runback, THEN: a) Manually trip reactor. b) Close: • All MSIVs • All MSIV bypass valves. c) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). **STANDARD: Operator isolates the steam supply to the turbine following a reactor trip to prevent an uncontrolled cooldown.**
		EXAMINER NOTE: In performing the immediate actions of AP/002, Turbine Trip, the SRO will go directly to EP/1/A/5000/E-0, Reactor Trip or Safety Injection.

GO to Event #7 at direction of the examiner

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7 **Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.**		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: Steps 2 through 5 are Immediate Action steps and are required to be performed from memory.
	SRO	**Enters EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection) and directs operators.**
Step 1	ALL	Monitor Enclosure 1 (Foldout Page)
Step 2	RO	Verify Reactor Trip: • All rod bottom lights – LIT • All reactor trip and bypass breakers – OPEN • I/R amps – DECREASING

Step 3	RO	Verify Turbine Trip:
		• All turbine stop valves – CLOSED
		OR
		• Both of the following:
		  • All MSIVs - CLOSED
		  • All MSIV bypass valves - CLOSED.

Step 4	BOP	Verify 1ETA and 1ETB – ENERGIZED.
Step 5	BOP	Verify S/I is actuated: a. "SAFETY INJECTION ACTUATED" status light (1SI-13) – LIT b. E/S load sequencer actuated status lights (1SI-14) – LIT
Step 6	RO	Announce "Unit 1 Safety Injection".
Step 7	SRO	Implement RP/0/A/5000/01 (Classification Of Emergency).
Step 8	RO	Verify all Feedwater Isolation status lights (1SI-5) – LIT
Step 9	BOP	Verify Phase A Containment Isolation status as follows: a. Phase A "RESET" lights – DARK b. Monitor Light Panel Group 5 St lights – LIT

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 10	BOP	Verify proper Phase B actuation as follows: a. Containment pressure – HAS REMAINED LESS THAN 3 PSIG. BOP notes containment pressure is greater than 3 psig and informs SRO.
Step 10 a RNO 1,2,3	BOP	Perform the following: NOTE This time may be used later to determine when to align ND Aux spray. 1) Record approximate time of reactor trip. _____ 2) Verify NS pumps – INDICATING FLOW. 3) IF flow is not indicated, THEN... **Step does not apply.**
Step 10 a. RNO 4)	BOP	4) Verify Phase B Isolation has actuated as follows: a) Phase B Isolation "RESET" lights - DARK. b) IF Phase B Isolation "RESET" lights are lit, THEN... **Step does not apply.** c) Verify following monitor light panel lights - LIT: • Group 1 Sp lights • Group 5 Sp lights • Group 5 St lights L/11 and L/12. d) IF monitor light panel not in correct alignment, THEN... e) IF NS pump(s) did not start, THEN... **Steps do not apply.**
Step 10 a. RNO 5, 6, 7 & 8	RO	**EXAMINER NOTE:** The pumps may already be shutdown per Enclosure 1 criteria. 5) Stop all NC pumps. 6) Maintain seal injection flow. 7) WHEN 9 minutes has elapsed, THEN verify proper VX system operation. REFER TO Enclosure 7 (VX System Operation). 8) GO TO Step 11.
Step 11	RO	Verify proper CA pump status as follows: a. Motor driven CA pumps – ON b. 3 S/G N/R levels – GREATER THAN 11%

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 12	BOP	Verify all of the following S/I pumps – ON: • NV pumps • ND pumps • NI pumps Notes that 1B ND pump failed to start, 1A NV pump is previously known off (tagged) and informs SRO.
Step 12. RNO	BOP	Perform the following for the affected train(s): a. Reset ECCS. b. Reset D/G load sequencer. c. Manually start affected pump. d. IF AT ANY TIME A B/O occurs, THEN restart S/I equipment previously on. BOP manually starts the 1B ND pump and informs SRO.
Step 13	BOP	Verify all KC pumps – ON.
Step 14	BOP	Verify all Unit 1 and Unit 2 RN pumps – ON.
Step 15	BOP	Verify proper ventilation systems operation as follows: • REFER TO Enclosure 2 (Ventilation System Verification) • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification)
Step 16	RO	Verify all S/G pressures – GREATER THAN 775 PSIG.
		EXAMINER NOTE: S/G pressures may be less than 775 psig at this point, if so the SRO will transition to Step 16 RNO and then go to Step 17.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 17	BOP	Verify proper S/I flow as follows: a. "NV S/I FLOW" – INDICATING FLOW b. NC Pressure – LESS THAN 1620 PSIG c. NI pumps – INDICATING FLOW. d. NC pressure – LESS THAN 285 psig. e. ND pumps - INDICATING FLOW TO C-LEGS.
Step 18	RO	Control S/G levels as follows: a. Verify total CA flow – GREATER THAN 450 GPM. b. WHEN at least one S/G N/R level is greater than 11% (29% ACC), THEN throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.
Step 19	RO	Verify all CA isolation valves – OPEN.
Step 20	BOP	Verify S/I equipment status based on monitor light panel – IN PROPER ALIGNMENT. NV pump 1A as previously noted.
Step 21	RO	NOTE: Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance. Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).
Step 22	BOP	Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs – CLOSED. b. Normal Pzr spray valves – CLOSED. c. At least one Pzr PORV isolation valve - OPEN.
Step 23	RO	Verify NC subcooling based on core exit T/Cs – GREATER THAN 0°F. Determines that NC subcooling is less than 0°F and informs SRO.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 23 RNO	BOP	IF any NV OR NI pump is on, THEN: a. Ensure all NC pumps – OFF. b. Maintain seal injection flow.
Step 24	RO	Verify main steamlines are intact as follows: • All S/G pressures – STABLE OR INCREASING • All S/Gs – PRESSURIZED.
Step 25	RO/BOP	Verify S/G tubes are intact as follows: • Verify the following EMF trip 1 lights – DARK: • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-34 (S/G Sample) • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D) • All S/G levels – STABLE OR INCREASING IN A CONTROLLED MANNER
Step 26	BOP	Verify NC System is intact as follows: • Containment pressure – LESS THAN 1 PSIG. BOP notes that containment pressure is greater than 1 psig and informs SRO.
Step 26 RNO	ALL	• Implement EP/1/A/5000/F-0 (Critical Safety Status Trees). • **GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).** **EXAMINER NOTE:** A LARGE LOCA will create low temperatures on NC loop RTD's. A RED or ORANGE path may exist on "NC System Integrity"
	SRO	Transitions to EP/1/A/5000/FR-P.1 (Response to Imminent Pressurized Thermal Shock)
Step 1	RO	Verify NC pressure – GREATER THAN 285 PSIG. RO notes pressure less than 285 psig and informs SRO.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 1 RNO	SRO	IF ND flow to C-Legs is greater than 675 GPM, THEN RETURN TO procedure and step in effect.
	SRO	Transitions back to EP/1/A/5000/E-1 (Loss of Reactor Or Secondary Coolant).
Step 1	ALL	Monitor Enclosure 1 (Foldout Page).
Step 2	RO	Verify main steamlines are intact as follows: • All S/G pressures - STABLE OR INCREASING • All S/Gs - PRESSURIZED.
Step 3	RO	Control intact S/G levels as follows: • Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC). • Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%.
Step 4	ALL	Verify secondary radiation is normal as follows: a. Ensure the following signals - RESET: 1) Phase A Containment Isolations 2) CA System valve control 3) KC NC NI NM St signals. b. Align all S/Gs for Chemistry sampling. c. Perform at least one of the following: • Notify Chemistry to sample all S/Gs for activity. OR • Notify RP to frisk all cation columns for activity. d. Verify the following EMF trip 1 lights - DARK: • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-34 (S/G Sample) • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D). d. WHEN activity results are reported, THEN verify all S/Gs indicate no activity.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 5	BOP	Verify Pzr PORV and isolation valve status as follows: a. Power to all Pzr PORV isolation valves – AVAILABLE. b. All Pzr PORVs – CLOSED. c. At least one Pzr PORV isolation valve – OPEN. d. IF AT ANY TIME a Pzr PORV opens due to high pressure, THEN, after Pzr pressure decreases to less than 2315 PSIG, ensure the valve closes or is isolated.
Step 6.a	RO	Verify S/I termination criteria as follows: a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F. RO notes that subcooling is less than zero and informs SRO.
Step 6.a RNO	SRO	GO TO Step 6f.
Step 6 f & g.	ALL	f. Monitor S/I termination criteria. REFER TO Enclosure 2 (S/I Termination Criteria). g. IF AT ANY TIME S/I termination criteria is met while in this procedure, THEN RETURN TO Step 6.
		EXAMINER NOTE: At this point, it is expected that containment pressure will be below 2.4 psig. If not, the SRO will go to Step 8 and return to Step 7 when pressure has dropped to less than 2.4 psig.
Step 7 a, b, c	BOP	Verify proper NS pump operation as follows: a. At least one NS pump - ON. b. Verify the following valves – OPEN: • 1FW-27A (ND Pump 1A Suct From FWST) • 1FW-55B (ND Pump 1B Suct From FWST) c. Containment pressure - LESS THAN 2.4 PSIG.
Step 7 d.	BOP	Verify operating NS pump(s) - HAVE REMAINED RUNNING SINCE INITIAL PHASE B SIGNAL.
Step 7 e.	BOP	Ensure S/I - RESET: 1) ECCS. 2) D/G load sequencers 3) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
Step 7 f. & g.	BOP	Reset NS. Stop NS pumps.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 7 h.	BOP	Close the following valves: • 1NS-29A (NS Spray Hdr 1A Cont Isol) • 1NS-32A (NS Spray Hdr 1A Cont Isol) • 1NS-15B (NS Spray Hdr 1B Cont Isol) • 1NS-12B (NS Spray Hdr 1B Cont Isol).
Step 8	BOP	Verify criteria to stop operating ND pumps as follows: a. NC pressure – GREATER THAN 285 PSIG. BOP notes pressure is less than 285 psig and informs SRO.
Step 8 RNO	SRO	GO TO Step 10.
Step 10	BOP	Verify conditions to stop operating D/Gs as follows: a. At least one D/G - ON. b. Verify 1ETA is energized by offsite power as follows: • "D/G 1A BKR TO ETA" – OPEN • 1ETA - ENERGIZED. c. WHEN S/I is reset, THEN dispatch operator to stop 1A D/G and place in standby readiness. REFER TO OP/1/A/6350/002 (Diesel Generator Operation). d. Verify 1ETB is energized by offsite power as follows: • "D/G 1B BKR TO ETB" – OPEN • 1ETB - ENERGIZED. e. WHEN S/I is reset, THEN dispatch operator to stop 1B D/G and place in standby readiness. REFER TO OP/1/A/6350/002 (Diesel Generator Operation). f. Ensure S/I - RESET: 1) ECCS. 2) D/G load sequencers. 3) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
Step 11	BOP	Obtain containment H2 concentration as follows: a. Ensure operator has been dispatched to secure all ice condenser air handling units. REFER TO Enclosure 3 (Securing All Ice Condenser Air Handling Units). b. Verify containment H2 analyzers - IN SERVICE. Notes H2 analyzers are not in service and informs SRO.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 11.b RNO	BOP	b. Perform the following: 1) Dispatch operator to place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control System). 2) WHEN H2 analyzers are in service, THEN perform Steps 11.c through 11.e. 3) GO TO Step 12.
Step 12	BOP	Initiate evaluation of plant status as follows: a. Verify S/I systems - ALIGNED FOR INJECTION MODE. b. Verify Cold Leg Recirc capability as follows: 1) At least one ND pump - AVAILABLE. 2)Verify power to all of the following valves - AVAILABLE: • 1FW-27A (ND Pump 1A Suct From FWST) • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1ND-28A (ND Supply To NV & 1A NI Pmps) • 1FW-55B (ND Pump 1B Suct From FWST) • 1NI-184B (ND Pump 1B Cont Sump Suct) • 1NI-332A (NI Pump Suct X-Over From ND) • 1NI-333B (NI Pump Suct From ND) • 1NI-334B (NI Pump Suct X-Over From ND) • 1NI-136B (ND Supply To NI Pump 1B) • 1NI-115A (NI Pump 1A Miniflow Isol) • 1NI-144A (NI Pump 1B Miniflow Isol) • 1NI-147B (NI Pump Miniflow Hdr To FWST Isol). 3)Verify the "ENABLE" lights for the following switches - LIT: • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A" • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B". c. Verify auxiliary building radiation is normal as follows: • EMF-41 (Aux Bldg Ventilation) trip 1 light - DARK • All area monitor EMF trip 1 lights - DARK. d. WHEN the TSC is activated AND staffed, THEN: 1) Notify the Reactor Engineer to assess core damage. REFER TO RP/0/A/5000/015 (Core Damage Assessment). 2) Notify Chemistry to obtain current NC boron concentration. 3) WHEN ND is aligned for Cold Leg Recirc, THEN notify Chemistry to obtain current containment sump boron concentration. e. Notify station management to evaluate starting additional plant equipment to assist in recovery.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: At 42% FWST level, 1B ND pump will fail and cannot be started for the rest of the scenario. If noted at any time prior to ES-1.3 by the BOP, it is expected that he inform the SRO. **EXAMINER NOTE:** A transition to cold leg recirculation will occur at 37% FWST level. That should have occurred by this point in the E-1 procedure. Your guide will now begin with EP- ES-1.3 (Transfer to CLR).
	ALL	Crew notes Annunciator AD-09/D-4, FWST 2/4 LO LEVEL is lit. FWST levels are reading 37% and informs SRO. Per Enclosure 1 criteria, the crew is to transition to EP/1/A/5000/ES-1.3 Transfer to Cold Leg Recirculation.
	SRO	**Enters EP/1/A/5000/ES-1.3 Transfer to Cold Leg Recirculation**
Step 1	ALL	Monitor Enclosure 1 (Foldout Page).
		CAUTION S/I recirculation flow to NC System must be maintained at all times. NOTE • Steps 2 through 7 should be performed without delay. • CSF should not be implemented prior to completion of Step 7.
Step 2	BOP	Verify containment sump level - GREATER THAN 3.5 FT.
Step 3	BOP	Verify KC flow to ND heat exchangers - GREATER THAN 5000 GPM.
Step 4	BOP	Ensure S/I - RESET: a. ECCS. b. D/G load sequencers. c. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
Step 5.a		Align S/I system for recirc as follows: a. Verify following valves - OPEN: • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1NI-184B (ND Pump 1B Cont Sump Suct). BOP notes 1NI-185A has not opened and informs SRO.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 5.a RNO	BOP	1) Manually open affected valve(s). BOP notes valve 1NI-185A will not open and informs SRO. 2) IF valve(s) will not open, THEN: a) Stop the ND pump(s) associated with a closed containment sump suction valve(s). b) Close the associated ND pump(s) suction valve from the FWST: • 1FW-27A (ND Pump 1A Suct From FWST) c) WHEN the ND pump(s) suction valve from the FWST is closed, THEN perform the following: (1) Attempt to manually open the affected containment sump suction valve(s). • 1NI-185A (ND Pump 1A Cont Sump Suct) BOP opens 1NI-185A. (2) IF affected containment sump suction valve will not open, THEN... **Step does not apply.** 1) IF both containment sump suction valves are closed, THEN... **Step does not apply.**
Step 5.b.	BOP	Verify following valves - CLOSED: • 1FW-27A (ND Pump 1A Suct From FWST) • 1FW-55B (ND Pump 1B Suct From FWST).
Step 5.c	BOP	Verify ND pumps - ON. BOP notes that 1A ND pump is off per procedure actions and 1B ND pump is off.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 5.c RNO	ALL	c. Perform the following: 1) Start ND pump(s) with suction aligned to an open containment sump suction valve. BOP notes no ND pumps can be started and informs SRO. 2) IF no ND pump can be started OR no ND train can be aligned for recirc, THEN: a) IF a valid red OR orange path procedure is in effect, THEN...**Step does not apply.** b) GO TO EP/1/A/5000/ECA-1.1 (Loss Of Emergency Coolant Recirculation).
	SRO	**Enters EP/1/A/5000/ECA-1.1 Loss of Emergency Coolant Recirculation and directs actions.**
Step 1		IF loss of Emergency Coolant Recirculation is due to sump blockage.... **STEP does not apply**
Step 2	ALL	Monitor Enclosure 1 (Foldout Page).
Step 3		Restore recirc capability as follows: Verify all of the following pumps - AVAILABLE TO BE OPERATED FROM THE CONTROL ROOM: • ND pumps • NV pumps • NI pumps. BOP notes that neither ND pump can be operated from the control room or the NV pump 1A which was previously tagged out. BOP informs SRO.
Step 3 a. RNO	SRO	IF power is available to the affected essential bus(s), THEN dispatch operator and maintenance to determine and correct cause of pump failure. REFER TO EM/1/A/5200/005 (Troubleshooting Cause For ND, NI, or NV Pump(s) Failing to Start).
Step 3b.	BOP	Verify the following valves - AVAILABLE TO BE OPERATED FROM THE CONTROL ROOM: • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1NI-184B (ND Pump 1B Cont Sump Suct).
Step 3c.	BOP	Verify containment sump level - GREATER THAN 3.5 FT.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 3.d.	ALL	Verify Cold Leg Recirc capability - RESTORED. Crew determines that CLR not restored and informs SRO.
		EXAMINER NOTE: The following step will be the return point once cold leg Recirc capability is restored.
Step 3.d. RNO	ALL	Perform the following: 1) Continue attempts to restore recirc capability as follows: • Power restoration • Local valve operation • Obtain maintenance assistance as required. REFER TO EM/1/A/5200/006 (Troubleshooting Cause For FW, ND, NI, or NV Valves(s) Failing to Operate). • Other actions as specified by station management. 2) WHEN emergency coolant recirc capability is restored during this procedure, THEN:... **Step does not apply.** 3) GO TO STEP 4.
Step 4	BOP	Ensure S/I - RESET: a. ECCS. b. D/G load sequencers. c. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
Step 5	BOP	Depress the "DEFEAT" pushbuttons on the following switches: • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A" • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B".
Step 6	BOP	Verify adequate FWST level as follows: a. FWST level - GREATER THAN 5%. b. IF AT ANY TIME FWST level is less than 5%, THEN GO TO Step 33. **Step does not apply.**
Step 7 a.	BOP	Determine NS requirements as follows: a. Verify following NS pump suction valves - OPEN: • 1NS-20A (NS Pump 1A Suct From FWST) • 1NS-3B (NS Pump 1B Suct From FWST).

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 7 b & c.	SRO	b. Determine number of NS pumps required from the following table: From the table, SRO determines no NS pumps are required. c. Verify the number of NS pumps on - EQUAL TO NUMBER REQUIRED.
Step 8	BOP	Verify criteria to align NS for recirc as follows: a. Any NS pump - ON. BOP notes no NS pumps on and informs SRO.
Step 8 RNO	SRO	GO TO Step 9.
Step 9	BOP	Align NS spray valves as follows: a. Verify NS Pump 1A - ON. BOP notes pump is off and informs SRO.
Step 9 a. RNO	BOP	Perform the following: 1) Ensure NS Train A - RESET. 2) Close the following valves: • 1NS-29A (NS Spray Hdr 1A Cont Isol) • 1NS-32A (NS Spray Hdr 1A Cont Isol).
Step 9b.	BOP	Align NS spray valves as follows: a. Verify NS Pump 1A - ON. BOP notes pump is off and informs SRO.
Step 9 b. RNO	BOP	Perform the following: 1) Ensure NS Train B - RESET. 2) Close the following valves: • 1NS-15B (NS Spray Hdr 1B Cont Isol) • 1NS-12B (NS Spray Hdr 1B Cont Isol).
Step 9c.	ALL	IF AT ANY TIME NS pumps are stopped or started, THEN: • Ensure associated NS Train - RESET. • Close associated spray valves after securing a pump. • Open associated spray valves prior to starting a pump.

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 10	BOP	Initiate makeup to FWST. REFER TO OP/1/A/6200/014 (Refueling Water System). **EXAMINER NOTE:** This procedure requires calculations and local operator actions. The crew may mention needing additional help. It is not expected that the BOP start the makeup.
Step 11	RO	Control intact S/G levels as follows: • Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC). Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%.
Step 12	ALL	Monitor shutdown margin during cooldown as follows: a. Notify station management to monitor shutdown margin during NC System cooldown. b. Request periodic NC boron samples from Primary Chemistry.
Step 12c.	ALL	NOTE Sample results are not required prior to initiating cooldown in subsequent steps. WHEN each NC boron sample obtained, THEN:... **Sample results will not be returned during the scenario.**
		EXAMINER NOTE: As the next step is read, maintenance will report that 1A ND pump is available to be started. Per previous instructions from SRO, the crew should return to Step 3.d.2. RNO
Step 13	BOP	WHEN "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) is lit, THEN: a. Depress ECCS steam pressure "BLOCK" pushbuttons. b. Verify main steam isolation blocked status lights (1SI-13) - LIT.
Step 3.d.2	BOP	2) WHEN emergency coolant recirc capability is restored during this procedure, THEN: a) IF transfer to Cold Leg Recirc is required, THEN perform the following: (1) Ensure the following valves - OPEN: • 1NS-29A (NS Spray Hdr 1A Cont Isol) • 1NS-32A (NS Spray Hdr 1A Cont Isol) • 1NS-15B (NS Spray Hdr 1B Cont Isol) • 1NS-12B (NS Spray Hdr 1B Cont Isol). (2) GO TO EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).
	SRO	**Transitions to EP/1/A/5000/ES-1.3, Transfer to Cold Leg Recirculation at Step 1.**

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 1	ALL	Monitor Enclosure 1 (foldout page)
		CAUTION S/I recirculation flow to NC System must be maintained at all times. NOTE • Steps 2 through 7 should be performed without delay. • CSF should not be implemented prior to completion of Step 7.
Step 2	BOP	Verify containment sump level - GREATER THAN 3.5 FT.
Step 3	BOP	Verify KC flow to ND heat exchangers - GREATER THAN 5000 GPM.
Step 4	BOP	Ensure S/I - RESET: a. ECCS. b. D/G load sequencers. c. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
Step 5 a,b	BOP	Align S/I system for recirc as follows: a. Verify following valves - OPEN: • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1NI-184B (ND Pump 1B Cont Sump Suct). b. Verify following valves - CLOSED: • 1FW-27A (ND Pump 1A Suct From FWST) • 1FW-55B (ND Pump 1B Suct From FWST).
	BOP	Verify ND pumps - ON. BOP reports no ND pumps on and informs SRO.
Step 5 c. RNO **CRITICAL STEP**	BOP	Perform the following: 1) Start ND pump(s) with suction aligned to an open containment sump suction valve. BOP starts 1A ND pump and informs SRO. 2) IF no ND pump can be started, THEN...**Step does not apply**. **STANDARD: Crew re-establishes core cooling prior to exceeding orange path conditions on the Core Cooling critical safety function.**

Op-Test No.:1 NRC Scenario No.: 2 Event No.: 7

Event Description: Large LOCA and Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
Step 5 d	BOP	d. Isolate NI pump miniflow as follows: (1) Verify NC pressure – LESS THAN 1620 PSIG. (2) Close the following valves: • 1NI-115A (NI Pump 1A Miniflow Isol) • 1NI-144A (NI Pump 1B Miniflow Isol). (3) Place "PWR DISCONN FOR 1NI-147B" switch in "ENABLE" (4) Close 1NI-147B (NI Pump Miniflow Hdr to FWST Isol.
Step 5 e thru 5 i	BOP	e. Close the following valves: • 1ND-32A (ND Train 1A Hot Leg Inj Isol) • 1ND-65B (ND Train 1B Hot Leg Inj Isol) f. Verify at least one of the following NV pump miniflow valves – CLOSED • 1NV-203A (NV Pumps A&B Recirc Isol) • 1NV-202B (NV Pumps A&B Recirc Isol) g. Align ND train discharges to NI and NV pump suctions as follows: (1) Open the following valves: • 1NI-332A (NI Pump Suct X-Over From ND) • 1NI-333B (NI Pump Suct From ND) (2) Ensure 1NI-334B (NI Pump Suct X-Over From ND) – OPEN (3) Open the following valves: • 1ND-28A (ND Supply To NV & 1A NI Pmps) • 1ND136B (ND Supply To NI Pump 1B) h. Isolate FWST from NV and NI pumps as follows: (1) Place "PWR DISCON FOR 1NI-100B" switch in "ENABLE". (2) Close 1NI-100B (NI Pmps Suct From FWST) (3) Close the following valves: • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST) i. Verify proper recirc flow as follows: • "NV S/I FLOW" – INDICATING FLOW • NI pumps – INDICATING FLOW • ND pumps – INDICATING FLOW.

Terminate scenario when proper recirc flow is verified.

Event Classification: 4.1.A.1 (Alert) per 4.1.N (Loss 5 points)

Simulation Facility: Catawba **Scenario No.: NRC-1** **Op-Test No: 1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Objectives: To evaluate the applicants' ability to respond to the following malfunctions: A steam dump valve fails open requiring a power reduction to less than 100%. An RN valve fails closed, isolating flow to the KC heat exchanger, requiring a transfer to the other KC train. A loss of main feedwater pump runback fails requiring manual turbine load reduction. The pressure master and one spray valve fail requiring manual control by the BOP. 1ETA power is lost, the sequencer stops loading requiring the BOP to manually start required loads. The crew will respond to one dropped control rod. An additional dropped control rod will require a manual reactor trip. This transient results in a steam line break in containment results in a safety injection. Additional failures require the crew to manually start containment spray and other safety injection equipment. The crew must isolate auxiliary feedwater to the faulted steam generator and terminate safety injection.

Initial Conditions: 100% power, BOL, Equilibrium Xe.
NCS Boron Concentration 1374 ppm.

Turnover:

- One week ago Steam Generator 1A developed a 2 GPD tube leak that has remained stable. Secondary chemistry is taking grab samples per their procedures.
- 1EMF-71, S/G A Leakage, is out of service due to a loss of signal problem.
- Charging pump 1A is tagged for motor cooler leak. It has been out of service for 12 hours and is scheduled to be repaired by midnight.
- York County is under a winter storm watch.

Event No.	Malf. No./ Position	Event Type*	Event Description
1	RO	C	Steam Dump valve SB-24 fails open requiring a reactor power reduction.
2	BOP	C	Loss of RN flow to 1A KC Heat Exchanger
3	RO SRO (TS)	C	Incomplete runback on a Loss of "B" Main Feedwater pump
4	BOP SRO (TS)	I	Pressure Master Fails High/ Spray Valve 1NC-29 fails full open in automatic.
5	BOP SRO (TS)	C	Loss of Normal Power to 1ETA with partial failure of the blackout sequencer.
6	RO	C	Respond to one dropped control bank "C" rod. Respond to a second dropped rod.

Event No.	Malf. No./ Position	Event Type*	Event Description
7	ALL	M	Steam Generator 1C Steam line Break Inside Containment Additional Failures: NS pump 1A and 1B fail to auto start. D/G LOCA Sequencer 1A fails to actuate.

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

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 1

Event Description: **Steam Dump valve SB-24 fails open requiring a reactor power reduction.**

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: Responses are in AP/1/A/5500028, Secondary Steam Leak Steam leak causes the following indications: • Reactor power greater than turbine power • Turbine losing Megawatts • Temp Error meter indicating a negative temperature swing. • Eventual Thermal Power Best Estimate increasing greater than initial power value. Operator determines that a steam load has been placed on the reactor and informs SRO.
	ALL	Recognize symptoms of a steam leak and/or 1SB-24 open and informs SRO.
	SRO	**Enters AP/1/A/5500/028 (Steam Leak) and directs actions.**
Step 1	ALL	Monitor enclosure 1 (Foldout Page)
Step 2	RO	Verify turbine ONLINE
Step 3	RO	Verify the following: • Reactor power - LESS THAN OR EQUAL TO 100% POWER • T-Avg - WITHIN 1.5°F OF T-Ref. **EXAMINER NOTE:** Crew may have already taken actions to reduce actual power to less than 100% so SRO would not be required to transition to RNO. RO reports power >100% and informs SRO.
Step 3 RNO	RO	Perform the following: a. Select "MANUAL" on turbine control panel b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load to maintain: • Reactor power - LESS THAN OR EQUAL TO 100% POWER. • T-Avg - WITHIN 1.5°F OF T-Ref. RO reduces turbine load to reduce power to less than 100%.
Step 4	RO	Verify proper reactor response as follows: • Control rods - IN "AUTO" AND STEPPING IN • P/R neutron flux - DECREASING.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 1

Event Description: **Steam Dump valve SB-24 fails open requiring a reactor power reduction.**

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: If crew has placed the rod control system in manual, the SRO will GO TO Step 4 RNO, otherwise they will continue with Step 5.
Step 4 RNO	RO	IF T-Avg is greater than 1.5°F higher THEN manually insert control rods as required to maintain T-Avg within 1°F of T-Ref.
Step 5	ALL	IF AT ANY TIME reactor power is greater than 100%, THEN perform Step 3 RNO.
Step 6	BOP	Verify Pzr level - STABLE OR INCREASING.
Step 7	ALL	IF AT ANY TIME while in this procedure Pzr level is decreasing in an uncontrolled manner, THEN RETURN TO Step 6. Step does not apply.
Step 8	ALL	IF AT ANY TIME VCT level goes below 23%, THEN align NV pump suction to FWST as follows: Step does not apply.
Step 9 a.	RO/BOP	Attempt to identify and isolate leak as follows: Verify the following conditions - NORMAL: • Containment temperature • Containment pressure • Containment humidity • Containment floor & equipment sump level. BOP verifies all containment parameters are normal.
		EXAMINER NOTE: The SRO may have already dispatch operators to isolate the steam dump valve.
Step 9 b.	SRO	Dispatch operators to locate and identify source of steam leak.
Step 9 c.	RO/BOP	Verify S/G PORV(s) – CLOSED.
Step 9 d.	RO/BOP	Verify condenser dump valves - CLOSED. RO notes that 1SB-24 indicates open and notifies SRO.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 1

Event Description: **Steam Dump valve SB-24 fails open requiring a reactor power reduction.**

Time	Position	Applicant's Actions or Behavior
Step 9 d. RNO	RO/SRO	Perform the following: 1) Select "OFF RESET" on the following switches: • "STEAM DUMP INTLK BYP TRN A" • "STEAM DUMP INTLK BYP TRN B" 2) IF valve will not close, THEN dispatch operator to close affected condenser dump valve isolation valve. RO notes the valve is still open and informs SRO. SRO dispatches operators to isolate 1SB-24. **EXAMINER NOTE:** Isolation valves are 1SB-23 and 1SB-25. Either one can be used.
Step 9 e.	RO/BOP	Verify atmospheric dump valves - CLOSED.
Step 9 f.	BOP	Verify CA PMP #1 - OFF.
Step 9 g.	SRO	IF leak is suspected to be in a doghouse, THEN ... Step does not apply.
Step 10	SRO	Determine required notifications: • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements)
Step 11	SRO	Notify RP of leak.
Step 12	SRO	Verify - LEAK ISOLATED. **EXAMINER NOTE:** The local operator actions to isolate the valve will be successful. A phone call will be made when local actions are completed. (5 minute delay on response)
Step 13	SRO	Determine long term plant status. RETURN TO procedure and step in effect.

GO to Event #2 at direction of the examiner

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 2

Event Description: **Loss of RN flow to 1A KC Heat Exchanger**

Time	Position	Applicant's Actions or Behavior
	BOP/RO	OAC alarms displayed for increasing 1A KC heat exchanger outlet temperature. As temperature increases, annunciator 1AD-10, B1, KC HX A OUTLET HI-HI TEMP will alarm.
	BOP	**Annunciator response Immediate actions:** 1. Verify actual Hi-Hi temperature. 2. Verify proper operation of 1RN-291 (KC Hx 1A Outlet Throttle Valve). Operators note no flow through 1A KC Hx.
	BOP	**Annunciator response supplemental actions:** 1. IF high temperature persists, place "B" train in service and isolate "A" train per OP/1/A/6400/005 (Component Cooling System). 2. Reduce heat loads on KC System as necessary. 3. Refer to AP/1/A/5500/21 (Loss of Component Cooling).
		EXAMINER NOTE: The crew may respond per AP/1/A/5500/021 (Loss of Component Cooling), but the end result will require a swap of KC trains per the OP.
	SRO	Directs the BOP to transfer to "B" train of KC cooling per the operating procedure. **OP/1/A/6400/005, Component Cooling System**
Step 2.1.1	BOP	Complete the following steps to ensure the RN System has minimum flow protection: 2.1.1.1 IF a Unit 2 KC Hx discharge valve is in the "MINIFLOW" position, ensure the associated inlet valve is open: • 2RN-287A (KC Hx 2A Inlet Isol) • 2RN-347B (KC Hx 2B Inlet Isol)
Step 2.1.1 Cont.	BOP	2.1.1.2 IF no Unit 2 KC Hxs are available for RN miniflow, align NS Hx(s) per OP/0/A/6400/006 F (Nuclear Service Water System Flush Procedure) as necessary to maintain RN flow ≥ 8600 gpm.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 2

Event Description: **Loss of RN flow to 1A KC Heat Exchanger**

Time	Position	Applicant's Actions or Behavior
Step 2.1.2 to 2.1.4	BOP	2.1.2 Ensure 1RN-347B (KC Hx 1B Inlet Isol) is open. 2.1.3 Ensure "KC HX 1B OTLT MODE" is in "KC TEMP". 2.1.4 IF letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), stabilize letdown hx outlet temp by placing 1KC-132 (Letdn Hx Otlt Temp Ctrl) in manual.
Step 2.1.5	BOP	Start either KC Train 1B pump: • "KC PMP B1" OR • "KC PMP B2"
Step 2.1.6	BOP	Adjust the following flow controllers on 1MC11 to zero gpm flow: • 1KC-149 (KF Hx 1A Cool Wtr Otlt) • 1KC-156 (KF Hx 1B Cool Wtr Otlt)
Step 2.1.6	BOP	Stop all KC Train 1A pumps: • "KC PMP A1" • "KC PMP A2"
Step 2.1.8	BOP	Place "KC HX 1A OTLT MODE" in "MINIFLOW" position.
Step 2.1.9	BOP	Perform the following for the KF cooling loops that are in service: Adjust 1KC-149 (KF Hx 1A Cool Wtr Otlt) flow controller on 1MC11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature < 125°F.
Step 2.1.10	BOP	IF KC flow requirement is > 5700 gpm, perform the following: 2.1.10.1 Ensure 1KC-C40B (Train B Miniflow Isol) is closed. 2.1.10.2 IF KC flow is > 5700 gpm, start the remaining KC Train 1B pump: • "KC PMP B1" • "KC PMP B2"
Step 2.1.11	BOP/RO	IF letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), WHEN KC flow and temperature have stabilized, return 1KC-132 (Letdn Hx Otlt Temp Ctrl) to automatic.

Op-Test No.: 1 **NRC Scenario No.:** 1 **Event No.:** 2

Event Description: **Loss of RN flow to 1A KC Heat Exchanger**

Time	Position	Applicant's Actions or Behavior
Step 2.1.12	BOP	Secure any NS Hx that was aligned for RN miniflow in step 2.1.1.2.

GO to Event #3 at direction of the examiner

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 3

Event Description: **Incomplete runback on a Loss of "B" Main Feedwater pump**

Time	Position	Applicant's Actions or Behavior
	ALL	Observes that "B" feedwater pump turbine has tripped and informs SRO.
	ALL	**Recognize conditions for AP/1/A/5500/003 (Load Rejection) Case 1 (Switchyard Available) and inform SRO, and perform immediate actions.**
		EXAMINER NOTE: Steps 1 and 2 are Immediate Action steps and are required to be performed from memory.
Step 1	RO	Verify turbine load – DECREASING IN AUTOMATIC RO determines runback has malfunctioned and informs SRO.
Step 1 RNO	RO	Perform the following: a. Select "MANUAL" on turbine control panel. b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load as required.
Step 2	RO	Verify proper reactor response: • Control rods – IN "AUTO" AND STEPPING IN • P/R neutron flux – DECREASING
Step 3	RO	Verify proper steam dump operation as follows: a. Verify T-Ref instrumentation – AVAILABLE. b. "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) – LIT c. Verify the following: • "C-7A LOSS OF LOAD INTLK COND DUMP" status light (1SI-18) – LIT • Steam dump valves – MODULATING d. T-Avg – DECREASING TO T-REF
Step 4	BOP	Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs – CLOSED b. Normal Pzr spray valves – CLOSED

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 3

Event Description: **Incomplete runback on a Loss of "B" Main Feedwater pump**

Time	Position	Applicant's Actions or Behavior
Step 5	BOP	Verify proper CM System operation as follows: a. WHEN reactor power is less than 75%, THEN ensure both C-Htr drain pumps – OFF. b. Verify reactor power – GREATER THAN 56% PRIOR TO THE EVENT. c. Verify standby hotwell pump(s) – ON d. Verify standby condensate booster pump(s) – ON
Step 6	BOP	Verify the following generator alarms – DARK: • 1AD-11, C/1 "GEN BKR A OVER CURRENT" • 1AD-11, F/1 "GEN BKR B OVER CURRENT"
Step 7	RO	Verify S/G levels are adequate as follows: • All S/G low level alert alarms (1AD-4) – DARK • All S/G low CF flow alarms (1AD-4) – DARK
Step 8	BOP	Verify AS header pressure – GREATER THAN OR EQUAL TO 140 PSIG.
Step 9	RO/BOP	Monitor Enclosure 3 (Rod Insertion Limit Boration).
Step 10	RO	Verify reactor power – LESS THAN 30% Determines that power is greater than 30% and informs SRO.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 3

Event Description: **Incomplete runback on a Loss of "B" Main Feedwater pump**

Time	Position	Applicant's Actions or Behavior
Step 10 RNO	SRO	Perform the following: a. IF the runback target load is less than 30%, THEN: ... Determines this step is N/A and continues. b. WHEN the appropriate runback target load is reached, THEN: 1) Stabilize unit at current power level 2) Maintain control rods above insertion limits 3) Adjust the following as required to maintain T-Avg within 1°F of T-Ref: • Turbine load • Control rods • Boron Concentration c. GO TO Step 12.
Step 12	RO/BOP	Verify the following PCBs - CLOSED: • Generator breaker 1A • Generator breaker 1B • PCB 14 • PCB 15 • PCB 17 • PCB 18.
Step 13	RO	Adjust power factor as necessary. REFER TO Unit 1 Revised Data Book Figure 43.
Step 14	ALL	WHEN the appropriate runback target load is reached, THEN: • Stabilize unit at appropriate power level. • Maintain control rods above insertion limits. • Adjust the following as required to maintain T-Avg within 1°F of T-Ref • Turbine load • Control rods • Boron concentration.
Step 15	RO	Notify System Operating Center (SOC) using the red dispatcher telephone of current unit status.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 3

Event Description: **Incomplete runback on a Loss of "B" Main Feedwater pump**

Time	Position	Applicant's Actions or Behavior
Step 16	ALL	Determine and correct cause of Load Rejection.
Step 17.a	BOP	Shut down unnecessary plant equipment as follows: a. Restore CM and CF as follows: 1) Verify C-htr drain pumps – ON. Determines C-htr drain pumps are OFF and notifies SRO.
Step 17.a.1) RNO	BOP	WHEN time and manpower permit, THEN complete the shutdown of the C-htr drain pumps. REFER TO OP/1/B/6250/004 (Feedwater Heater Vents, Drains, and Bleed System).
Step 17.a.2)	BOP/ SRO	Verify both CF Pumps – IN SERVICE Determines 1B CF pump is not in service and informs SRO.
Step 17.a.2 RNO	SRO	GO TO Step 17 b.
Step 17.b	BOP	b. RC pump(s) and cooling tower fans. REFER TO OP/1/B/6400/001A (Condenser Circulating Water System).
Step 18	RO	Reset steam dump valves as follows: a. Verify reactor power – STABLE. b. Verify steam dump valves – IN "T-AVG" MODE. c. Verify steam dump valves – CLOSED. **EXAMINER NOTE:** SRO Mayb transition to RNO based on 1SB-24 failure, however actions have already been taken earlier in scenario. d. Reset steam dump valves. e. Verify the following status lights (1SI-18) – DARK. • "C-7A LOSS OF LOAD INTLK COND DUMP" • "C-7B LOSS OF LOAD INTLK ATMOS DUMP" f. IF "T-AVG" mode of operation is available, THEN ensure steam dump valves in "T-AVG" mode. g. Verify "STM DUMP CTRL" – IN AUTOMATIC.
Step 19	RO	Verify reactor power – GREATER THAN 15%.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 3

Event Description: **Incomplete runback on a Loss of "B" Main Feedwater pump**

Time	Position	Applicant's Actions or Behavior
Step 20	BOP	Verify CA Pumps – OFF.
Step 21	RO	Verify reactor power change – GREATER THAN OR EQUAL TO 15% IN A 1 HOUR PERIOD.
Step 22	ALL	Notify the following sections to take appropriate samples: • Radiation Protection to sample and analyze gaseous effluents. REFER TO Selected Licensee Commitments Manual, Section 16.11-6. • Primary Chemistry to sample for isotopic analysis of iodine. REFER TO Tech Specs 3.4.16 (Sample must be taken between 2 hours and 6 hours following last power change greater than or equal to 15% rated thermal power within a 1 hour period).
Step 23	SRO	**Ensure compliance with appropriate Tech Specs**: • 3.1.1 (Shutdown Margin (SDM)) • 3.1.6 (Control Bank Insertion Limits) • 3.8.1 (AC Sources – Operating) 3.1.6 may apply but Enclosure 3 actions should address this.
Step 24	ALL	Notify Reactor Group Engineer of occurrence.
Step 25	ALL	Determine long term plant status. RETURN TO OP/1/A/6100/003 (Controlling Procedure for Unit Operation).

GO to Event #4 at direction of the examiner

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 4 Event Description: **Pressure Master Fails High/ Spray Valve NC-29 fails full open in automatic.**		
Time	Position	Applicant's Actions or Behavior
	ALL	Crew notes the following annunciators on 1AD-06 as the pressure master begins to decrease its control setpoint: C/8, PZR Hi Press DEV Control OAC alarms for spray valve actuation C/12, PORV NC34A ACTUATED D/10, PZR LO PRESS PORV NC34 BLOCKED D/11, PZR LO PRESS PORV NC32 & NC36 BLOCKED BOP informs SRO that pressurizer spray valves are open and places them in manual and attempts to close. Notes that pressurizer master output has failed to "0" output on display.
		EXAMINER NOTE: Steps 1 and 2 are Immediate Action steps and are required to be performed from memory.
	SRO	**Enters AP/1/A/5500/011, Pressurizer Pressure Anomalies Case 1 based in annunciator symptoms.**
Step 1	BOP	Verify all Pzr pressure channels - INDICATING THE SAME.
Step 2	BOP	Verify all Pzr PORVs - CLOSED.
Step 3	BOP	Verify Pzr spray valve(s) - CLOSED. BOP notes spray valves open and informs SRO.
Step 3 RNO	BOP	Perform the following: a. Manually close affected spray valve(s). b. IF affected spray valve(s) will not close, THEN perform the following: Step 3b is NOT required.
Step 4	BOP	4. Verify all Pzr heaters - ENERGIZED. Determines that heaters are off and informs SRO.
Step 4 RNO	BOP	IF Pzr pressure is less than 2220 PSIG, THEN ensure all Pzr heaters are energized. BOP ensures PZR heaters are on.
Step 5	BOP	Ensure 1NV-37A (NV Supply To Pzr Aux Spray) - CLOSED.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 4

Event Description: **Pressure Master Fails High/ Spray Valve NC-29 fails full open in automatic.**

Time	Position	Applicant's Actions or Behavior
Step 6	BOP	Verify NC pressure - STABLE OR INCREASING. Based on actions of step 4, pressure should start to recover.
Step 7	BOP	WHEN NC pressure is stable, THEN: • Stabilize unit at appropriate power level. • Adjust the following as required to maintain T-Avg within 1°F of T-Ref: o Turbine load o Control rods o Boron concentration.
Step 8	SRO	IF a Pzr pressure channel failed high, THEN notify IAE to fail the following Step does not apply
Step 9	SRO	**Ensure compliance with appropriate Tech Specs:** 3.3.1 (Reactor Trip System (RTS) Instrumentation) 3.3.2 (Engineered Safety Features Actuation System (ESFAS) Instrumentation) 3.3.3 (Post Accident Monitoring (PAM) Instrumentation) 3.3.4 (Remote Shutdown System) 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits) 3.4.4 (RCS Loops - MODES 1 and 2) 3.4.5 (RCS Loops - MODE 3) 3.4.6 (RCS Loops - MODE 4) 3.4.9 (Pressurizer) 3.4.10 (Pressurizer Safety Valves) 3.4.11 (Pressurizer Power Operated Relief Valves (PORVs)) 3.4.13 (RCS Operational Leakage). SRO should determine that **none** of these specs.
Step 10	BOP	Ensure "PZR PRESS TO REC SELECT" is selected to an operable channel.
Step 11	SRO	Determine long term plant status. RETURN TO procedure in effect.

GO to Event #5 at direction of the examiner

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 5

Event Description: **Loss of Normal Power to 1ETA with partial failure of the blackout sequencer.**

Time	Position	Applicant's Actions or Behavior
	ALL	Symptoms for the power failure: D/G starting or running status lights (1SI-15) - LIT "BLACKOUT LOAD SEQ ACTUATED TRN A" status light (1SI-14) - LIT Informs SRO that the 1ETA buss has lost power and diesel generator 1A is starting and re-energizing 1ETA
	SRO	**Enters AP/1/A/5500/007, Loss of Normal Power, Case I, Loss of Normal Power to an Essential Train.**
Step 1	ALL	Monitor Enclosure 1
Step 2	BOP	Verify affected bus - ENERGIZED.
Step 3	SRO/ BOP	Verify proper diesel generator operation as follows: a. Dispatch operator to affected D/G room(s) to monitor D/G operation. REFER TO OP/1/A/6350/002 (Diesel Generator Operation). b. Verify RN cooling flow to the affected D/G. BOP determines that 1A D/G does not have any RN flow and determines that there are NO RN pumps in service.
		EXAMINER NOTE: Candidates may refer to AP/0/A/5500/020 (Loss of Nuclear Service Water) to start an RN pump.
Step 3b RNO	SRO/ BOP	Notify dispatched operator to manually open RN isolation valve for the affected D/G: • 1RN-232A (1A D/G Hx Inlet Isol) (DB-562, DD-38) This valve will already be open and the BOP should determine that no RN pumps are running. Another RN pump should be started to establish RN system flow to the D/G.
Step 4	BOP	Stop any dilutions in progress.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 5

Event Description: **Loss of Normal Power to 1ETA with partial failure of the blackout sequencer.**

Time	Position	Applicant's Actions or Behavior
Step 5	RO	Verify CA Pump #1 - ON.
Step 6	RO	Maintain reactor power less than or equal to 100%.
Step 7	BOP	Verify S/I status as follows: a. S/I - HAS ACTUATED. SI is not actuated and crew goes to step 8 per step 7 RNO.
Step 8	BOP	Verify ND System status as follows: Step does not apply
Step 9	BOP	Verify B/O busses are energized as follows: a. 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" - DARK. b. 1AD-11, K/4 "4KV B/O BUS FTB VOLTAGE LO" - DARK.
Step 10	BOP	Verify B/O loads in service as follows: a. Maintain D/G load less than 5750 KW. b. Ensure proper B/O sequencer(s) loading as follows: • REFER TO Enclosure 2 (Blackout Loads) • Dispatch operator to ensure all required in plant loads are energized or on. REFER TO Enclosure 3 (Local Blackout Loads). c. Restore spent fuel pool cooling. REFER TO OP/1/A/6200/005 (Spent Fuel Cooling System).
Step 11	BOP	Verify 6.9KV busses - ENERGIZED.
Step 12	BOP	Verify "YV OPERABLE" light - LIT.
Step 13	RO	Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 5

Event Description: **Loss of Normal Power to 1ETA with partial failure of the blackout sequencer.**

Time	Position	Applicant's Actions or Behavior
Step 14	BOP	Stop unnecessary loads placed on affected bus by the sequencer as follows: a. Reset affected D/G load sequencer(s). b. Establish normal control room ventilation. REFER TO OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System). c. Stop unnecessary loads.
Step 15	ALL	Determine and correct cause of blackout.
Step 16	SRO	IF spent fuel pool instrumentation is failed low... Step does not apply
Step 17	SRO	**Ensure compliance with appropriate Tech Specs:** • 3.8.1 (A.C. Sources - Operating) • 3.8.2 (A.C. Sources - Shutdown) • 3.8.7 (Inverters - Operating) • 3.8.8 (Inverters - Shutdown) • 3.8.9 (Distribution Systems - Operating) • 3.8.10 (Distribution Systems - Shutdown). SRO determines that 3.8.1 applies.
Step 18		Determine required notifications: • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
Step 19	SRO	Restore power to affected bus as follows: Until the cause the normal feeder breaker opening is known, the SRO should determine from the BOP that 6.9 KV busses are all energized. No additional actions are required.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 5

Event Description: **Loss of Normal Power to 1ETA with partial failure of the blackout sequencer.**

Time	Position	Applicant's Actions or Behavior
Step 20	ALL	Ensure plant systems returned to normal as follows: a. WHEN normal power is available, THEN return plant electrical systems normal. REFER TO OP/1/A/6350/001 (Normal Power Checklist). b. WHEN CA is no longer needed to feed S/Gs, THEN shutdown the CA System following the automatic start and return CA System to standby readiness. REFER TO OP/1/A/6250/002 (Auxiliary Feedwater System). c. Verify "DRPI B ON EMERG POWER" (1SI-3) - DARK. d. Verify NF System - IN OPERATION. e. Verify the following switches in "DISCON": • "PWR DISCON FOR 1NI-173A" • "PWR DISCON FOR 1NI-178B". f. Ensure Boric Acid Transfer pumps 1A and 1B - RESET. g. Ensure the following valves - OPEN: • 1IASV5080 (Upper PAL Air Sup C/I) • 1IASV5160 (Lower PAL Air Sup C/I). h. Restart an FW Recirc Pump as needed. REFER TO OP/1/A/6200/014 (Refueling Water System). i. Return Auxiliary Building Ventilation to normal. REFER TO OP/0/A/6450/003 (Auxiliary Building Ventilation System). j. IF the Emergency Seal Oil Pump is running, THEN return the Main Seal Oil Pump to service. REFER TO OP/1/B/6300/004 (Generator Seal Oil System). Crew returns these systems to normal as time allows.
Step 21	SRO	Determine long term plant status. RETURN TO procedure in effect.

GO to Event #6 at direction of the examiner

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 6

Event Description: **Respond to one dropped control bank "C" rod.**
Respond to a second dropped rod.

Time	Position	Applicant's Actions or Behavior
	RO	Notes Rod P8 has dropped and informs SRO.
	SRO	**Enters AP/1/A/5500/014 (Control Rod Misalignment), Case II (Dropped Control Rod) is required.**
		EXAMINER NOTE: Step 1 is an Immediate Action and is required to be performed from memory.
Step 1	RO	Verify only one rod – DROPPED OR MISALIGNED
Step 2	RO	Ensure "CRD BANK SELECT" switch – IN MANUAL.
Step 3	RO	Adjust turbine load to maintain T-Avg within 1°F of T-Ref.
Step 4	RO	Verify 1AD-2, A/10 "ROD CONTROL URGENT FAILURE" - DARK.
Step 5	RO	Use OAC point C1P1385 (Reactor Thermal Power, Best) to determine reactor power in subsequent steps.
Step 6	SRO	Verify the following - WITHIN TECH SPEC LIMITS: • AFD (Tech Spec 3.2.3) • QPTR (Tech Spec 3.2.4).
		EXAMINER NOTE: At this point, the second rod should be dropped which will require the RO to manually trip reactor.
CRITICAL TASK	RO	Notes a second rod has dropped and re-performs Step 1 immediate action of AP/14 (including RNO) from memory. **STANDARD: RO takes action to trip the reactor upon recognition of a second dropped rod.**
		EXAMINER NOTE: Step 1 and 2 is an Immediate Action step and are required to be performed from memory.
Step 1	RO	Verify only one rod – DROPPED OR MISALIGNED Determines 2 rods a re dropped and performs RNO.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 6 Event Description: **Respond to one dropped control bank "C" rod.** **Respond to a second dropped rod.**		
Step 1 RNO	RO	IF two or more rods are misaligned by greater than 24 steps, THEN: a. Manually trip Reactor. b. GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection)
	SRO	**Transitions to EP/1/A/5000/E-0 Reactor Trip or Safety Injection.**
		EXAMINER NOTE: The following steps are the Immediate action steps for the RO and BOP positions. See Event #7 when the steam line fails.
Step 1	ALL	Monitor Enclosure 1 (Foldout Page)
		EXAMINER NOTE: Steps 2 through 5 are Immediate Action steps and are required to be performed from memory.
Step 2	RO	Verify Reactor Trip: • All rod bottom lights – LIT • All reactor trip and bypass breakers – OPEN • I/R amps – DECREASING

Step 3	RO	Verify Turbine Trip:
		• All turbine stop valves – CLOSED
		OR
		• Both of the following:
		  • All MSIVs - CLOSED
		  • All MSIV bypass valves - CLOSED.

Step 4	BOP	Verify 1ETA and 1ETB – ENERGIZED.
		Steam Line Break occurs here, GO TO EVENT #7.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7 Event Description: **Steam Generator 1C Steam line Break Inside Containment**		
Time	Position	Applicant's Actions or Behavior
Step 5	BOP	Verify S/I is actuated: a. "SAFETY INJECTION ACTUATED" status light (1SI-13) – LIT b. E/S load sequencer actuated status lights (1SI-14) – LIT BOP notes "A" E/S load sequencer light not lit and informs SRO.
Step 5 RNO	BOP	b. Manually initiate S/I.
Step 6	RO	Announce "Unit 1 Safety Injection".
Step 7	SRO	Implement RP/0/A/5000/01 (Classification Of Emergency).
Step 8	RO	Verify all Feedwater Isolation status lights (1SI-5) – LIT
Step 9	BOP	Verify Phase A Containment Isolation status as follows: a. Phase A "RESET" lights – DARK b. Monitor Light Panel Group 5 St lights – LIT
Step 10	ALL	Verify proper Phase B actuation as follows: a. Containment pressure – HAS REMAINED LESS THAN 3 PSIG. BOP notes containment pressure is greater than 3 psig and informs SRO.
Step 10 a RNO 1,2,3	BOP	Perform the following: NOTE This time may be used later to determine when to align ND Aux spray. 1) Record approximate time of reactor trip. _____ 2) Verify NS pumps – INDICATING FLOW. 3) IF flow is not indicated, THEN manually initiate Phase B Isolation for affected train(s). BOP determines that NO spray pumps are running and manually initiates a Phase B Isolation on both trains.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7

Event Description: **Steam Generator 1C Steam line Break Inside Containment**

Time	Position	Applicant's Actions or Behavior
Step 10 a. RNO 4)	BOP	4) Verify Phase B Isolation has actuated as follows: a) Phase B Isolation "RESET" lights - DARK. b) IF Phase B Isolation "RESET" lights are lit, THEN... Step does not apply. c) Verify following monitor light panel lights - LIT: • Group 1 Sp lights • Group 5 Sp lights • Group 5 St lights L/11 and L/12. d) IF monitor light panel not in correct alignment, THEN..... Step does not apply. e) IF NS pump(s) did not start, THEN perform the following for the affected train(s): (1) Reset ECCS. (2) Reset D/G load sequencer. (3) Manually start affected NS pump. (4) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. BOP resets and starts both NS pumps.
Step 10 a. RNO 5 &6	RO	**EXAMINER NOTE:** The pumps may have already been shutdown per Enclosure 1 criteria. 5) Stop all NC pumps. 6) Maintain seal injection flow.
Step 10 a. RNO 7.	BOP	7) WHEN 9 minutes has elapsed, THEN verify proper VX system operation. REFER TO Enclosure 7 (VX System Operation).
Step 10 a. RNO 8	SRO	8) GO TO Step 11.
Step 11	RO	Verify proper CA pump status as follows: a. Motor driven CA pumps – ON b. 3 S/G N/R levels – GREATER THAN 11%

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7

Event Description: **Steam Generator 1C Steam line Break Inside Containment**

Time	Position	Applicant's Actions or Behavior
Step 12	BOP/ SRO	Verify all of the following S/I pumps – ON: • NV pumps • ND pumps • NI pumps BOP reports the previously tagged NV pump 1A.
Step 13	BOP	Verify all KC pumps – ON.
Step 14	BOP	Verify all Unit 1 and Unit 2 RN pumps – ON.
Step 15	BOP	Verify proper ventilation systems operation as follows: • REFER TO Enclosure 2 (Ventilation System Verification) • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification)
Step 16	RO	Verify all S/G pressures – GREATER THAN 775 PSIG. RO reports that S/G 1C is less than 775 psig
Step 16 RNO	RO	Perform the following: a. Verify the following valves - CLOSED: • All MSIVs • All MSIV bypass valves • All S/G PORVs. b. IF any valve is open, THEN: 1) Manually initiate Main Steam Isolation. 2) IF any valve is still open, THEN manually close valve.
Step 17	BOP	Verify proper S/I flow as follows: a. "NV S/I FLOW" – INDICATING FLOW b. NC Pressure – LESS THAN 1620 PSIG c. NI pumps – INDICATING FLOW. d. NC pressure – LESS THAN 285 psig. BOP notes pressure is greater than 285 psig and informs SRO.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7

Event Description: **Steam Generator 1C Steam line Break Inside Containment**

Time	Position	Applicant's Actions or Behavior
Step 17d. RNO	BOP	Perform the following: 1) Ensure ND pump miniflow valve on operating ND pumps(s) - OPEN 2) If the ND pump miniflow valves cannot be opened, THEN ... **STEP does not apply** 3) GO TO Step 18
Step 18	RO	Control S/G levels as follows: a. Verify total CA flow – GREATER THAN 450 GPM. b. WHEN at least one S/G N/R level is greater than 11% (29% ACC), THEN throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.
Step 19	RO	Verify all CA isolation valves – OPEN.
Step 20	BOP	Verify S/I equipment status based on monitor light panel – IN PROPER ALIGNMENT.
	RO	NOTE: Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.
Step 21	RO	Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).
Step 22	BOP	Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs – CLOSED. b. Normal Pzr spray valves – CLOSED. c. At least one Pzr PORV isolation valve - OPEN.
Step 23	RO	Verify NC subcooling based on core exit T/Cs – GREATER THAN 0°F.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7

Event Description: **Steam Generator 1C Steam line Break Inside Containment**

Time	Position	Applicant's Actions or Behavior
Step 24	RO	Verify main steamlines are intact as follows: • All S/G pressures – STABLE OR INCREASING • All S/Gs – PRESSURIZED. RO notes that S/G 1C is faulted and informs SRO.
	SRO	Transitions to Step 24 RNO and directs actions.
Step 24 RNO	ALL	• Implement EP/1/A/5000/F-0 (Critical Safety Status Trees). • **GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).**
Step 1	RO/BOP	Monitor Enclosure 1 (Foldout Page).
Step 2	RO/BOP	Maintain any faulted S/G or secondary break isolated during subsequent recovery actions unless needed for NC System cooldown.
Step 3	RO	Verify the following valves - CLOSED: • All MSIVs • All MSIV bypass valves.
Step 4	RO	Verify at least one S/G pressure - STABLE OR INCREASING. RO may state that the intact S/Gs are decreasing to the cooldown from 1C S/G. The RNO action is to be used only if ALL are faulted.
Step 5	RO	Identify faulted S/G(s) as follows: • Verify any S/G pressure – DECREASING IN AN UNCONTROLLED MANNER OR • Verify any S/G - DEPRESSURIZED. RO determines that 1C S/G is faulted and informs SRO.
Step 6	RO	Verify at least one intact S/G - AVAILABLE FOR NC SYSTEM COOLDOWN.

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7

Event Description: **Steam Generator 1C Steam line Break Inside Containment**

Time	Position	Applicant's Actions or Behavior
Step 7 for 1C S/G **CRITICAL STEP**	RO	Isolate all faulted S/G(s) as follows: • S/G 1C: a. Verify S/G 1C Feedwater Isolation status light (1SI-5) - LIT. b. Verify S/G 1C PORV - CLOSED. c. Close the following valves: 1) 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V). 2) 1CA-46B (CA Pmp B Disch To S/G 1C Isol). 3) 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol). d. Verify CA Pump 1A or 1B - AVAILABLE. e. Dispatch operator to unlock and close 1SA-4 (1C S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) f. Verify the following blowdown isolation valves - CLOSED: 1) 1BB-60A (S/G 1C Bldwn Cont Isol Insd). 2) 1BB-149B (S/G 1C Bldwn Cont Isol Byp). 3) 1BB-61B (S/G 1C Bldwn Cont Isol Otsd). **STANDARD: Close 1CA-46B and 1CA-50A to isolate the feed sources from the 1B CA pump and the CAPT to the faulted S/G (1C).**
		EXAMINER NOTE: Step 8 will be required at some point. Depending on how fast crew reached this step; this is the point where Enclosure 4 of E-0 is no longer used for temperature control.
Step 8	RO	WHEN NC T-Hots start to increase, THEN dump steam from intact S/G PORVs to stabilize NC T-Hots. T-Hots may be increasing by this time. If so, the RO takes manual control of intact S/G PORVs to stabilize temperatures.
Step 9	BOP	Verify the following annunciators - DARK. • 1AD-5, H/4 "CACST LO LEVEL" • 1AD-8, B/1 "UST LO LEVEL".

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7

Event Description: **Steam Generator 1C Steam line Break Inside Containment**

Time	Position	Applicant's Actions or Behavior
Step 10	BOP	Verify secondary radiation is normal as follows: a. Ensure the following signals - RESET: 1) Phase A Containment Isolations 2) CA System valve control 3) KC NC NI NM St signals. b. Align all S/Gs for chemistry sampling. c. Perform at least one of the following: • Notify Chemistry to periodically sample all S/Gs for activity. OR • Notify RP to periodically frisk all cation columns for activity. d. Verify the following EMF trip 1 lights DARK: • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D). e. Verify the S/G(s) fault – INSIDE CONTAINMENT. f. WHEN activity results reported, THEN verify all S/Gs indicate no activity.
Step 11	ALL	Verify S/I termination criteria as follows: a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F. b. Verify secondary heat sink as follows: • N/R level in at least one intact S/G - GREATER THAN 11% (29% ACC) OR • Total feed flow to all intact S/Gs - GREATER THAN 450 GPM. c. NC pressure - STABLE OR INCREASING. d. Pzr level - GREATER THAN 11% (20% ACC). e. GO TO EP/1/A/5000/ES-1.1 (Safety Injection Termination). All determine that S/I termination criteria is met (ACC values for PZR level) and transition to ES-1.1.
	SRO	**Transitions to EP/1/A/5000/ES-1.1 (Safety Injection Termination).**
Step 1	RO/BOP	Monitor Enclosure 1 (Foldout Page).

Op-Test No.: 1 NRC Scenario No.: 1 Event No.: 7

Event Description: **Steam Generator 1C Steam line Break Inside Containment**

Time	Position	Applicant's Actions or Behavior
Step 2	BOP	Ensure S/I - RESET: a. ECCS. b. D/G load sequencers. c. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
Step 3	BOP	Ensure the following containment isolation signals - RESET: • Phase A • Phase B.
Step 4	BOP	Establish VI to containment as follows: • Ensure 1VI-77B (VI Cont Isol) - OPEN. • Verify VI pressure - GREATER THAN 85 PSIG.
Step 5	BOP	Ensure only one NV pump - ON.
Step 6	BOP	Verify NC pressure - STABLE OR INCREASING.
Step 7	BOP	Verify VI pressure - GREATER THAN 50 PSIG.
Step 8	BOP	Isolate NV S/I flowpath as follows: a. Verify the following valves - OPEN: • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). b. Verify the following valves - OPEN: • 1NV-203A (NV Pumps A&B Recirc Isol) • 1NV-202B (NV Pmps A&B Recirc Isol). c. Close the following valves: • 1NI-9A (NV Pmp C/L Inj Isol) • 1NI-10B (NV Pmp C/L Inj Isol).

Terminate scenario at direction of examiner.

Event Classification: 4.6.A.1 (Alert) per 4.6.A.1-1