



2014 Region III Exam Writers Workshop

Simulator Scenario Development

Dell McNeil RIII – Operations Branch

NUREG 1021 ES-201



- The simulator test outline and test shall be prepared in accordance with the guidelines in ES-301.
- A facility supervisor or manager shall independently review the outline and the proposed examination before they are submitted to the NRC
- An authorized representative of the facility licensee shall approve the examination outline and the proposed examination before they are submitted to the NRC for review and approval. The outline and examination should be forwarded to the NRC regional office with a cover letter signed by the facility representative.
- The materials must be complete and ready-to-use.

Facility:		Date of Examination:		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.			
	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.			
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.			
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.			
2. S I M U L A T O R	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.			
	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.			
	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.			
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.			
	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			
	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.			
4. G E N E R A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.			
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.			
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.			
	d. Check for duplication and overlap among exam sections.			
	e. Check the entire exam for balance of coverage.			
	f. Assess whether the exam fits the appropriate job level (RO or SRO).			
a. Author		Printed Name/Signature		Date
b. Facility Reviewer (*)		_____		_____
c. NRC Chief Examiner (#)		_____		_____
d. NRC Supervisor		_____		_____
Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required. * Not applicable for NRC-prepared examination outlines				

Facility – Date of Exam

Using ES-301-5 – needs to be developed with the outline.

Make sure there are enough scenarios.

Everyone but upgrades will need to be "At the Controls." The RO applicants have to be BOP.

Another form: ES-301-4

These show up later.

Facility: _____ Date of Exam: _____ Operating Test No.: _____

A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P													
<input type="checkbox"/> RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/> SRO-U	MAJ														2	2	1
<input type="checkbox"/> SRO-U	TS														0	2	2
<input type="checkbox"/> RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/> SRO-U	MAJ														2	2	1
<input type="checkbox"/> SRO-U	TS														0	2	2
<input type="checkbox"/> RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/> SRO-U	MAJ														2	2	1
<input type="checkbox"/> SRO-U	TS														0	2	2

Instructions:

- 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 serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
- 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.
- 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.

Admin Staff

Check off the license type

Event numbers from the ES-D1

Total the number of events for the applicant and enter in this column

That number has to be greater than or equal to the minimum number required for the license

Some important things to note on the form:

- watchstations
- substitutions
- verifiable actions

NUREG 1021 ES-301

Simulator Operating Test



- This is the most performance-based aspect of the operating test and is used to evaluate the applicant's ability to safely operate the plant's systems under dynamic, integrated conditions.
- The simulator test is administered in a team format with up to three applicants (or surrogates) filling the RO and SRO license positions (as appropriate) on an operating crew.

NUREG 1021 ES-301



- Each team or crew of applicants is administered a set of scenarios designed so that the examiners can individually evaluate each applicant on a range of competencies applicable to the applicant's license level.
- Each applicant must demonstrate proficiency on every competency applicable to his or her license level. The only exception is that SRO Competency Number 3, "Control Board Operations," is optional for SRO-upgrade applicants.

PRIVACY ACT INFORMATION - FOR OFFICIAL USE ONLY

Applicant Docket Number: 55-00001		Page 1 of 135			
Reactor Operator Simulator Operating Test Grading Details					
Competencies/ Rating Factors (RFs)	RF Weights	RF Scores	RF Grades	Comp. Grades	Comment Page No.
1. Interpretation/Diagnosis					
a. Recognize & Verify Status	<u>0.40</u>	<u>3</u>	<u>1.20</u>	<u>3.00</u>	_____
b. Interpret & Diagnose Conditions	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
c. Prioritize Response	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
2. Procedures/Tech Specs					
a. Reference	<u>0.30</u>	<u>3</u>	<u>0.90</u>	<u>3.00</u>	_____
b. Procedure Compliance	<u>0.40</u>	<u>3</u>	<u>1.20</u>		_____
c. Tech Spec Entry	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
3. Control Board Operations					
a. Locate & Manipulate	<u>0.40</u>	<u>3</u>	<u>1.20</u>	<u>3.00</u>	_____
b. Understanding	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
c. Manual Control	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
4. Communications					
a. Provide Information	<u>0.34</u>	<u>3</u>	<u>1.02</u>	<u>3.00</u>	_____
b. Receive Information	<u>0.33</u>	<u>3</u>	<u>0.99</u>		_____
c. Carry Out Instructions	<u>0.33</u>	<u>3</u>	<u>0.99</u>		_____

[Note: Enter RF Weights (nominal, adjusted, or 0.0 if not observed (N/O)), RF Scores (1, 2, 3, or N/O), and RF Grades from Form ES-303-3 and sum to obtain Competency Grades.]

PRIVACY ACT INFORMATION - FOR OFFICIAL USE ONLY

Applicant Docket Number: 55-00001		Page 2 of 135			
Senior Reactor Operator Simulator Operating Test Grading Details					
Competencies/ Rating Factors (RFs)	RF Weights	RF Scores	RF Grades	Comp. Grade s	Comment Page No.
1. Interpretation/Diagnosis					
a. Recognize & Attend	<u>0.20</u>	<u>3</u>	<u>0.60</u>	<u>3.00</u>	_____
b. Ensure Accuracy	<u>0.20</u>	<u>3</u>	<u>0.60</u>		_____
c. Understanding	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
d. Diagnose	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
2. Procedures					
a. Reference	<u>0.30</u>	<u>3</u>	<u>0.90</u>	<u>3.00</u>	_____
b. EOP Entry	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
c. Correct Use	<u>0.40</u>	<u>3</u>	<u>1.20</u>		_____
3. Control Board Operations					
a. Locate & Manipulate	<u>0.34</u>	<u>3</u>	<u>1.02</u>	<u>3.00</u>	_____
b. Understanding	<u>0.33</u>	<u>3</u>	<u>0.99</u>		_____
c. Manual Control	<u>0.33</u>	<u>3</u>	<u>0.99</u>		_____
4. Communications					
a. Clarity	<u>0.40</u>	<u>3</u>	<u>1.20</u>	<u>3.00</u>	_____
b. Crew & Others Informed	<u>0.40</u>	<u>3</u>	<u>1.20</u>		_____
c. Receive Information	<u>0.20</u>	<u>3</u>	<u>0.60</u>		_____
5. Directing Operations					
a. Timely & Decisive Action	<u>0.30</u>	<u>3</u>	<u>0.90</u>	<u>3.00</u>	_____
b. Oversight	<u>0.30</u>	<u>3</u>	<u>0.90</u>		_____
c. Solicit Crew Feedback	<u>0.20</u>	<u>3</u>	<u>0.60</u>		_____
d. Monitor Crew Activities	<u>0.20</u>	<u>3</u>	<u>0.60</u>		_____
6. Technical Specifications					
a. Recognize and Locate	<u>0.40</u>	<u>3</u>	<u>1.20</u>	<u>3.00</u>	_____
b. Compliance	<u>0.60</u>	<u>3</u>	<u>1.80</u>		_____

NUREG 1021 ES-301

Responsibilities



The facility licensee is responsible for the following activities

- Prepare proposed examination outlines.
- Submit the reference materials necessary for the NRC regional office to prepare and/or review the requested examinations.
- Prepare and review the final operating tests in accordance with the previously approved examination outline.
- Submit the tests to the NRC's regional office in accordance with ES-201.
- Make the simulation facility available, as necessary, for NRC examiners to prepare for the operating tests.

NUREG 1021 ES-301



- Meet with the NRC examination team in the regional office or at the facility, when and as necessary, to review the proposed operating tests and discuss potential changes.
- Revise the operating test outlines and the final tests as applicable and as agreed upon by the NRC regional office.
- The NRC retains final authority to approve the operating tests.

NUREG 1021 ES-301

GENERAL GUIDELINES



- Use the same simulator scenario all day, if possible. The same JPMs and simulator scenarios shall not be repeated on subsequent days.
- Operating tests may not duplicate test items from the applicants' audit test.
- The facility licensee shall identify for the NRC chief examiner those simulator events that are similar to those that were tested on the audit examination.
- Sufficient operating test materials shall be developed to ensure that all applicants can be tested with the available personnel according to the schedule agreed upon by the NRC's regional office and the facility licensee.
- To the extent permitted for each part of the operating test, select and modify testing materials (i.e., JPMs and simulator scenarios) from your facility's examination banks.

NUREG 1021 ES-301



- Consider the K/As associated with normal, abnormal, and emergency tasks and evolutions as a source of topics for use in evaluating applicant competency in each part of the operating test.
- The K/As associated with the tasks and questions planned for the operating test should have importance factors of at least 2.5.
- The K/As should be appropriate to the plant-specific requirements for the applicant's license level. Your facility licensee's site-specific task list may be used to supplement or override, on a case-by-case basis, selected individual items in the NRC's K/A catalogs.
- When selecting and developing scenarios for the operating test, ensure that the materials contribute to the test's overall capacity to differentiate between those applicants who are competent to safely operate the plant and those who are not.
- SRO applicants, whether upgrade or instant, will be examined for the highest on-shift position for which the SRO's license is applicable

NUREG 1021 ES-301



The following guidelines should be used to differentiate the SRO operating test from that of an RO:

- ✓ In directing licensed activities, the SRO must evaluate plant performance and make operational judgments accordingly.
- ✓ In directing licensed activities, the SRO must have a broader and more thorough knowledge of facility administrative controls and methods, including limitations imposed by the regulations and the facility's technical specifications and their bases.
- ✓ The SRO may be assigned responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and fuel handling systems) and are not normally operated by licensed operators. Because the SRO may have these additional responsibilities, the SRO license applicant should demonstrate knowledge of the designs of such systems as they relate to maximum permissible concentrations, effluent release rates, and other radiological considerations.

NUREG 1021 ES-301



- Incorporate facility-specific and industry-generic operating experience into the operating test whenever possible. Documentation such as LERs, SERs, and service information letters are readily available sources of operationally oriented plant anomalies.
- Evaluate the dominant accident sequences (DASs) for the facility to determine whether they are suitable for testing, on a sampling basis, during the dynamic simulator or walk-through tests. DASs are those sequences that contribute significantly to the frequency of core damage as determined by your facility licensee's (PRA) or (IPE).
- The PRA/IPE (Probabilistic Risk Assessment/Individual Plant Examination) should also be used to identify risk-important operator actions. Chapter 13, "Operational Perspectives," of NUREG-1560, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," identifies a number of important human actions that may be appropriate for evaluation on the operating test

NUREG 1021 ES-301

Specific Instructions for the “Simulator Operating Test”



- Based on the anticipated crew compositions, determine the number of scenarios and scenario sets necessary to rotate each RO and SRO-I applicant into the “at-the-controls” position.
- The crews and scenarios will have to be planned so that every SRO applicant (U and I) fills the supervisory role and every RO applicant rotates through the balance-of-plant (BOP) position for at least one scenario.
- SRO-U applicants are given credit for their previous RO license evaluation and experience and are normally not required to manipulate the controls.

NUREG 1021 ES-301



- Administer the same scenario on the same day to all the crews of applicants.
- You should have a spare scenario.
- The simulator operating tests (i.e., scenario sets) will be constructed by selecting and modifying scenarios from existing facility licensee or NRC scenario banks and by developing new scenarios.
- In order to maintain test integrity, every applicant shall be tested on at least one new or significantly modified scenario that he or she has not had the opportunity to rehearse or practice.
- Any scenarios that are extracted from your facility licensee bank must be altered to the degree necessary to prevent the applicants from immediately recognizing the scenarios based on the initial conditions or other cues.

NUREG 1021 ES-301



- The initial conditions, normal operations, malfunctions, and major transients should be varied among the scenarios and should include startup, low-power, and full-power situations. Region III likes to also see an electrical malfunction during the scenario set.
- Develop new scenarios or modify existing scenarios. The should conform with the qualitative and quantitative attributes described in that Appendix D and enumerated on Form ES-301-4, "Simulator Scenario Quality Checklist."
- The quantitative attribute target ranges that are specified on the form are not absolute limitations; some scenarios may be an excellent evaluation tool, but may not fit within the ranges. A scenario that does not fit into these ranges shall be evaluated to ensure that the level of difficulty is appropriate.
- Whenever possible, the critical tasks should be distributed so that each applicant is required to respond.

Facility: _____ Date of Exam: _____ Scenario Numbers: / / Operating Test No.: 2011201

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.			
2.	The scenarios consist mostly of related events.			
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)			
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.			
5.	The events are valid with regard to physics and thermodynamics.			
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.			
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.			
8.	The simulator modeling is not altered.			
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.			
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.			
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).			
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).			
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.			
Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes		
1.	Total malfunctions (5B8)	/	/	
2.	Malfunctions after EOP entry (1B2)	/	/	
3.	Abnormal events (2B4)	/	/	
4.	Major transients (1B2)	/	/	
5.	EOPs entered/requiring substantive actions (1B2)	/	/	
6.	EOP contingencies requiring substantive actions (0B2)	/	/	
7.	Critical tasks (2B3)	/	/	

Admin

Realistic

Related Events

Event Descriptions

One non-mechanistic failure

Laws of Nature

Reasonable Sequence

Time Compression

No Sim Software Changes

Validated Scenarios

Enough Scenarios

All competencies (Another Form)

Enough events for evaluation

LOD is satisfactory

Qualitative Attributes

NUREG 1021 ES-301



- At a minimum, each scenario set must require each applicant to respond to the types of evolutions, failures, technical specification (TS) evaluations, and transients in the quantities identified for the applicant's license level on Form ES-301-5, "Transient and Event Checklist." The required instrument and component failures should normally be completed before starting the major transient; those that are initiated after the major transient should be carefully reviewed because they may require little applicant action and provide little insight regarding their performance.
- Any normal evolution, component failure, or abnormal event (other than a reactor trip or other automatic power reduction) that requires the operator to perform a *controlled* power or reactivity change will qualify as a reactivity manipulation.
- Each scenario set must also allow the examiner to evaluate the applicant's performance on each competency and rating factor that is germane to the applicant's license level.

Facility: _____ Date of Examination: _____ Operating Test No.: _____

Competencies	APPLICANTS																							
	RO				SRO-I				SRO-U				RO				SRO-I				SRO-U			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO				SCENARIO							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Interpret/Diagnose Events and Conditions																								
Comply With and Use Procedures (1)																								
Operate Control Boards (2)																								
Communicate and Interact																								
Demonstrate Supervisory Ability (3)																								
Comply With and Use Tech. Specs. (3)																								

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

Admin staff

Select License

Enter the ES-D-1 Event Numbers

Instructions

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.

NUREG 1021 ES-301



- To minimize the need to run an additional scenario if an applicant makes a single, uncompensated error related to a rating factor (refer to Section D.3.n of ES-302), it is recommended that each applicant be given multiple opportunities to demonstrate competence in any particular area.
- If you normally operate with and are required by technical specifications to have more than two ROs in the control room, the chief examiner may authorize the use of additional surrogates to fill out the crews.
- Appendix D provides detailed instructions for completing Form ES-D-1, the “Scenario Outline,” and Form ES-D-2, the “Required Operator Actions,” that examiners will use to administer the simulator operating tests.

NUREG 1021 ES-301



- When the proposed simulator operating test outlines are complete, forward them to the NRC chief examiner.
- We'll try to have comments back to the licensee within 5 business days.
- After the NRC chief examiner approves the simulator test outline, prepare the final simulator test materials by revising any Form ES-D-1 as requested by the NRC chief examiner and completing a detailed operator action form (ES-D-2) for each event.
- Review the completed simulator operating test for quality using Form ES-301-4, "Simulator Scenario Quality Checklist," and make any changes that might be necessary.
- Submit the entire operating test package to the NRC chief examiner for review and approval. The NRC's chief examiner must receive the test approximately 45 (60) days before the scheduled administration date.

NUREG 1021 ES-301



- The outline and the proposed test shall be independently reviewed by a supervisor/manager before they are submitted to the NRC for approval.
- If the facility licensee developed the operating test, the facility licensee is primarily responsible for technical accuracy and compliance with the restrictions concerning the use of examination banks.
- The NRC chief examiner will review any changes that need to be made with the branch chief before reviewing the examinations with the author or facility contact.
- Upon branch chief approval, and generally at least 14 days before the operating tests are scheduled to be given, the chief examiner will review the test comments with the facility licensee. There are no minimum or maximum limits on the number or scope of changes the chief examiner may direct the author or facility contact to make to the proposed tests.

NUREG 1021 ES-301

Attachments/Forms



Attachment 1, “Open-Reference Question Guidelines”

Form ES-301-1, “Administrative Topics Outline”

Form ES-301-2, “Control Room/In-Plant Systems Outline”

Form ES-301-3, “**Operating Test Quality Checklist**”

Form ES-301-4, “**Simulator Scenario Quality Checklist**”

Form ES-301-5, “**Transient and Event Checklist**”

Form ES-301-6, “**Competencies Checklist**”

Facility: Usta Fish U1/U2 Scenario No.: 1 Op-Test No.: 2014307

Examiners: _____ Operators: _____

Initial Conditions: 100% MOL Steady State conditions. SBO EDG is out of service (tagged out) for Electrical Maintenance trouble shooting of the voltage regulator. A & F APRM's are bypassed. House Heating Boilers in service.

Turnover: Perform Turbine Oil Pump Test in accordance with OP 4160, Section B, Steps B.1.a and B.1.b.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Perform Turbine Oil Pump Test (AW OP-4160)
2	mfRD_09	I	Control rod drive flow controller failure (0%)
3	mfAD_09B	I	RV-71B de-energized
4a	mfRR_07A 50% over 300 sec	C	'A' Recirc Pump #1 Seal Failure
4b	mfRR_08A 15% over 800 sec	C	'A' Recirc #2 Seal Failure
4c	N/A	R/TS	Rapid load reduction - Single Loop Operation (15)
5a	mfRR_05B mfRD_12A 35% Preinsert mfRD_12B 40% Preinsert	M	'B' Recirc Pump trip; Hydraulic ATWS
6	mfRP_09 A&B Preinsert	C	PCIS Group V Isolation Failure
7	mfSL_01A or B	C	Operating SLC Pump Trips 60 seconds after start
8	mfRD_01B Preinsert	C	'B' CRD fails to start

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

Admin items

Initial Conditions

Turnover

Event Description

Event Type

Malf. No.

Event No.

**OPERATOR ACTIONS
EVENT NUMBER 5**

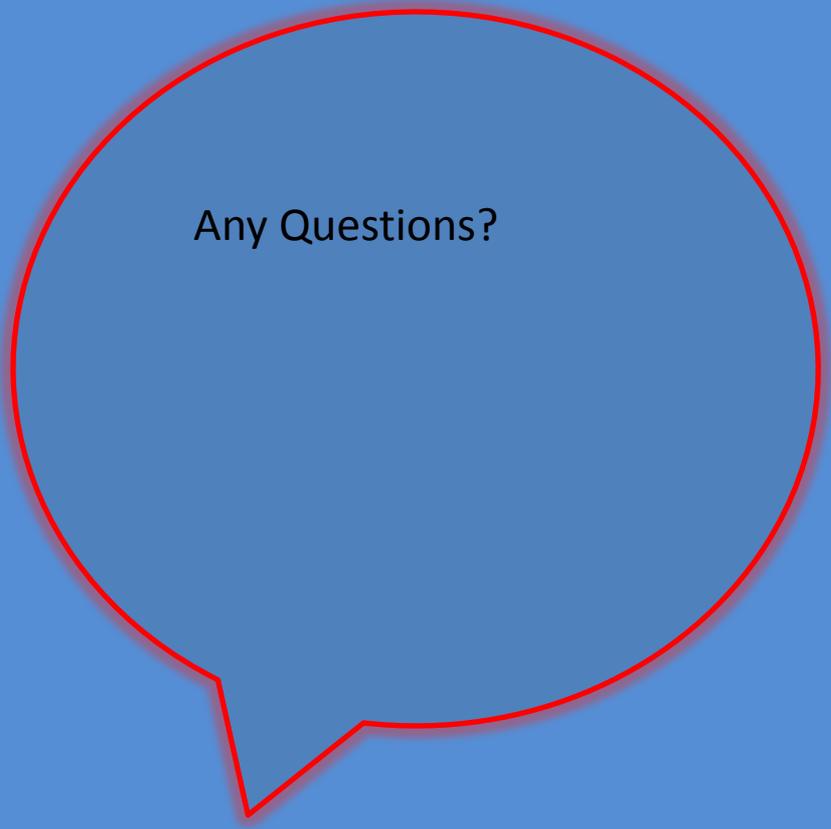
Crew Task Description:

Respond to Trip of the B Recirculation Pump, ATWS

	POS	CANDIDATE ACTIONS/BEHAVIOR	COMMENTS
1.	SRO	When B Recirc Pump trips:	KEY 5 : _____
		Scram the reactor	
2.	RO	When directed, scram the reactor	
		Recognize failure of rods to insert; inform CRS	
3.	RO	Actuate the ARI/RPT logic AND ensure that the recirc drive motor breakers are tripped within 2 minutes of the scram Both Recirc pumps previously tripped	
4.	SRO	When informed of the scram failure enter and direct crew actions IAW EOP-1 and EOP-2	
5.	STA	When directed, verify EOP-1 Table A automatic actions	
6.	CT-1	With a reactor scram required and the reactor not shutdown, INHIBIT ADS to prevent an uncontrolled RPV depressurization and thereby prevent a potentially significant power excursion.	
		Standard: Inhibit ADS prior to automatic initiation.	
7.	SRO	Enter and direct actions per EOP-2:	
		Implement App P to keep the MSIVs Open	
		When steam flow <0.5lbm/hr per steamline, place Mode Switch in SHUTDOWN	
		Verify ARI/RPT initiated	

**OPERATOR ACTIONS
EVENT NUMBER 5**

	POS	CANDIDATE ACTIONS/BEHAVIOR	COMMENTS
		Insert control rods with one or more appropriate appendices	Appendix BB and G are available; Do NOT close CRD-56 until Terminate and Prevent Appendix GG has been completed and vessel level is lowered below 90"
		Stabilize pressure 800-1050 psig with BPVs	
8.	BOP	When directed:	
		Inhibit ADS	
		Implement App P to keep the MSIVs Open	
		Stabilize pressure 800-1050 psig with BPVs.	
9.	CT-2	With a reactor scram required and the reactor not shutdown, TAKE ACTION TO REDUCE POWER by injecting boron and/or inserting control rods, to prevent exceeding the primary containment design limits.	
		Standard: Actions taken within 10 minutes of the scram failure to implement appropriate appendices and/or inject SLC. Only one method needs to be used. The method must result in successful control rod insertion or SLC injection	
10.	RO	When steam flow <0.5lbm/hr per steamline, place Mode Switch in SHUTDOWN	Note: This step is an Immediate Action, and may be performed without direction.



Any Questions?