Draft Submittal

VOGTLE MAY 2005 EXAM
50-424, 425/2005-301

MAY 17 - 25, 2005
MAY 27, 2005 (WRITTEN)

1. Operating Test Simulator Scenarios

Operating Test Quality Checklist
Draft

Facility: Vogtle Date of Exam: May 2005 Scenario Numbers: 1 / 2 / 3 / 4 (spare) Operating Test Number: 2005-301

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).	N/A	N/A	MAB
b. There is no day-to-day repetition between this and other operating tests to be administered during this examination.	MAB	↓	MAB
c. NRC Exam developed prior to the audit exam. The operating test shall not duplicate items from the applicants' audit test(s). (see Section D.1.a.)	MAB		MAB
d. Overlap with the written examination and between different parts of the operating test is within acceptable limits. Written exam not yet completed.	N/A		TBD
e. It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.	MAB		MAB
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	T	B	D
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.	T	B	D
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.	MAB		MAB

	Printed Name / Signature	Date
a. Author	Mark C. Tates	03.08.05
b. Facility Reviewer(*)	N/A	
c. NRC Chief Examiner (#)	RICHARD S. BALDWIN / Richard S. Baldwin	03/08/05
d. NRC Supervisor	JAMES H. MOORMAN / James H. Moorman	3-9-05

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

Simulator Scenario Quality Checklist
Draft

Facility: Vogtle Date of Exam: May 2005 Scenario Numbers: 1 / 2 / 3 / 4 (spare) Operating Test Number: 2005-301

QUALITATIVE ATTRIBUTES	Initials a	Initials b*	Initials 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.	MB	N/A	KOB
2. The scenarios consist mostly of related events.	MB	N/A	KOB
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)	T	B	D
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.	MB	N/A	KOB
5. The events are valid with regard to physics and thermodynamics.	MB	N/A	KOB
6. Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.	MB	N/A	KOB
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.	T	B	D
8. The simulator modeling is not altered.	MB		KOB
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.	T	B	D
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.	MB	N/A	KOB
11. All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).	MB	N/A	KOB
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).	MB	N/A	KOB
13. The level of difficulty is appropriate to support licensing decisions for each crew position.	MB	N/A	KOB

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

Facility:	Vogtle	Date of Examination:	May 2005	Operating Test No.:	2005-301

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO	1 ATC	1 BOP	2 CREW POSITION SRO	2 ATC	2 BOP	3 CREW POSITION SRO	3 ATC	3 BOP	4 CREW POSITION SRO	4 ATC	4 BOP	TOTAL	MINIMUM(*) R	I	U
SRO-I5	RX													0	1	1	0
	NOR								2					1	1	1	1
	I/C	1 2 3 4 5 6							4 5					8	4	4	2
	MAJ	7							7 9					3	2	2	1
	TS	2 3 6												3	0	2	2
SRO-I6	RX													0	1	1	0
	NOR							2						1	1	1	1
	I/C		2 3 5 6					3 4 5 6 8						9	4	4	2
	MAJ		7					7 9						3	2	2	1
	TS							1 5						2	0	2	2
	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2
	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2

Instructions:

1. Circle 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: 03.08.05

NRC Reviewer:

Facility:	Vogtle	Date of Examination:	May 2005	Operating Test No.:	2005-301

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO	1 ATC	1 BOP	2 CREW POSITION SRO	2 ATC	2 BOP	3 CREW POSITION SRO	3 ATC	3 BOP	4 CREW POSITION SRO	4 ATC	4 BOP	TOTAL	MINIMUM(*) R	I	U
RO-1	RX					1								1	1	1	0
	NOR													0	1	1	1
	I/C			146		367								6	4	4	2
	MAJ			7		8								2	2	2	1
	TS													0	0	2	2
RO-2	RX					1								1	1	1	0
	NOR									2				1	1	1	1
	I/C					367				368				6	4	4	2
	MAJ					8				79				3	2	2	1
	TS													0	0	2	2
RO-3	RX													0	1	1	0
	NOR						4		2					2	1	1	1
	I/C			146			259		45					8	4	4	2
	MAJ			7			8		79					4	2	2	1
	TS													0	0	2	2
SRO-U1	RX													0	1	1	0
	NOR						4							1	1	1	1
	I/C	123 456					259							9	4	4	2
	MAJ	7					8							2	2	2	1
	TS	236												3	0	2	2

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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: Mark C. Tate 03.08.05

NRC Reviewer: [illegible]

Facility:	Vogtle	Date of Examination:	May 2005	Operating Test No.:	2005-301

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO	1 ATC	1 BOP	2 CREW POSITION SRO	2 ATC	2 BOP	3 CREW POSITION SRO	3 ATC	3 BOP	4 CREW POSITION SRO	4 ATC	4 BOP	TOTAL	MINIMUM(*) R	I	U
SRO-I1 SRO-I4	RX				1									1	1	1	0
	NOR				4									1	1	1	1
	I/C		235 6		235 679									10	4	4	2
	MAJ		7		8									2	2	2	1
	TS				26									2	0	2	2
SRO-I2	RX				1									1	1	1	0
	NOR				4				2					2	1	1	1
	I/C				235 679				45					8	4	4	2
	MAJ				8				79					3	2	2	1
	TS				26									2	0	2	2
SRO-I3	RX					1								1	1	1	0
	NOR							2						1	1	1	1
	I/C	123 456				367		345 68						14	4	4	2
	MAJ	7				8		79						4	2	2	1
	TS	236						15						5	0	2	2
SRO-U2	RX													0	1	1	0
	NOR						4	2						2	1	1	1
	I/C						259	345 68						8	4	4	2
	MAJ						8	79						3	2	2	1
	TS							15						2	0	2	2

Instructions:

1. Circle 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: Mark A. Lutz 03-08-05

NRC Reviewer: [illegible]

Facility: Vogtle | Date of Examination: May 2005 | Operating Test No.: 2005-301

Competencies	APPLICANTS															
	RO/SRO-I SRO-U				RO/**SRO-I SRO-U**				RO/SRO-I SRO-U				RO/SRO-I SRO-U			
	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 2 3 4 5 6 7	2 3 5 6 7 8 9	3 4 5 6 7 8 9	1 2 3 5 6 7 8	1 2 3 4 5 7	2 3 5 6 7 8 9	3 4 5 6 7 8 9	1 2 3 5 6 7 8								
Comply With and Use Procedures (1)	1 2 3 4 5 7	1 2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8								
Operate Control Boards (2)	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8												
Communicate and Interact	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8								
Demonstrate Supervisory Ability (3)					1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8								
Comply With and Use Tech. Specs. (3)					2 3 6 7	2 6	1 5	2 3 6								

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

Instructions:

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

Author: Mark A. Bates 03.08.05

NRC Reviewer: Richard S. Baldwin

Initial Conditions: **IC 14** The Unit has been at 100% power for three months following a refueling outage.

Pre-load malfunctions:

- **ES01 - Failure of Automatic Reactor Trip**
- **Override LV-112D and LV-112E –Shut**
- **Insert remote function ES46 for P-14 setpoint**

Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.:

- **Start CCP B, and Tag Out NCP and HV 8109**
- **SI Pump 'A' Tagged Out**
- **Align PT-457 as Controlling Pressurizer pressure channel on Controller & Recorder Selector Switches**
- **Swap DRPI to Train A power (RD 01 remote function)**
- **Secondary aligned per 18009-C, Section B. C. Tag #1 ARV, LIC4415, SJAE's, Steam Seals, TDAFW**
- **IPC Mode & trends**
- **Reactivity Briefing and Shift Manning Sheets**

Turnover: Maintain full power operation.

The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.

Steam Generator #1 has a 30 gallon / day tube leak. 18009-C section B is in effect, Action Level 1 monitoring is in progress, TS 3.4.13 INFO LCO on Identified RCS leakage.

Normal Charging Pump is tagged out and expected to be returned to service at 1200 hours tomorrow. The 'B' CCP is operating. (TR 13.1.3 & 13.1.5)

SI Pump 'A' Tagged Out yesterday at 0800, and should be cleared in 12 hrs. (LCO 3.5.2 Condition A)

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	**FW14**	**100%**	MFP Discharge pressure transmitter (PT-508) fails high
2	**CV18A**	**100%**	'A' Train Centrifugal Charging Pump (CCP) Discharge Header Pipe Break. **ABO – reports water spraying into the room on the discharge side of the pump with about 1 foot of water on the floor** **Override room drain ZLB 15-A3 & A4, ALB61E06 to OFF when leak isolated and directed to initiate room draining by SS.**
3	**PR02C**	**100%**	Pressurizer Pressure Transmitter (PT-457) fails high.
4	**SG02F**	**100%**	'B' Steam Generator Level Transmitter (LT-529) fails high.
5	**CV11**	N/A	Loss of VCT M/U and failure of CCP suction to swap to RWST. **DELETE OVERRIDES on LV-112D & E when RO manually opens valves**
6	**RC05A**	**Ramp to 0.1% in 200 sec**	Small RCS leak requiring Tech Spec Directed Shutdown **Adjust size of leak as necessary to require TS shutdown, but not exceed charging pump capacity**
7	**RC05A** **RC05A** **EL07B**	**Ramp 0.2-1.0% 200 sec** **Ramp to 40% in 200 sec**	Small Break LOCA with automatic RPS trip failed and loss of Electrical Bus BA03 following the Reactor Trip. Leak then worsens to medium break LOCA. **If dispatched, locally close Accumulator isolation valve MOV breakers:** **Remote Functions: SI 01 though SI 04**
END			**After crew establishes RCS cooldown per 19222.**

OPERATING PLAN:

- The Unit has been at 100% power for three months following a refueling outage. Maintain full power operation per 12004-C.

- Normal Charging Pump is tagged out and expected to be returned to service at 1200 hours tomorrow. The 'B' CCP is operating. TR 13.1.3 & TR 13.1.5 (INFO)

- SI Pump 'A' Tagged Out due to bearing failure. It has been out of service since yesterday at 0800, and should be returned to service in 12 hrs. LCO 3.5.2 Condition A is in effect.

- The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.

- Steam Generator #1 has a 30 gallon / day tube leak.

- The required actions of 18009-C, section B, "Operation with a Minor SGTL" have been initiated. Action Level 1 monitoring is in progress.

- TS 3.4.13 INFO LCO on Identified RCS leakage (SGTL)

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 1

Event Description:

Main Feedwater Pump discharge pressure transmitter PT-508 fails high resulting in reduced feedwater flow to all SGs requiring manual control of feedpumps speed

Time	Position	Applicant's Action or Behavior
	BOP	Diagnoses failure of PT-508 high failure with the following indications: Alarms: • SG Hi/Lo Level deviation – all 4 SG's • SG Steam/Feed flow mismatch – all 4 SG's Indications: • Feedwater flow lowering below steam flows • SG levels all decreasing • MFPTs speeds decreasing • MFPs discharge (PT-508) pressure reading 0 psig • MFPs individual discharge pressures reading normal
	SS	Enters AOP 18016-C section A for MFP malfunction
	BOP	Manually controls MFPTs speed using master controller SIC-509A
	BOP	Raises feedwater flows and restores SG levels to 65% NR using manual control MFPTs speed to prevent reactor trip on Lo-Lo SG levels and verifies reactor power < 100%
	BOP	Performs channel check of MFP control instrumentation and identifies failure was due to PT-508
	SS	Contacts SSS for initiation of condition report, generation of work order, contact maintenance, and to notify OPS duty manager of AOP entry.
	BOP	Manually controls MFPs speed through remainder of scenario & dispatches Aux. Building Operator to address SGBD panel local alarm.

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 2

Event Description:

Standby 'A' Train Centrifugal Charging Pump (CCP) discharge header pipe break requiring manual isolation of CCP-1A and entry into LCO 3.5.2

Time	Position	Applicant's Action or Behavior
	TEAM	Identifies pipe break associated with CCP-1A due to the following indications: Alarms: • Level C leak detected • ZLBs 15 A3 & A4 for CCP-1A room hi sump level and flooding Indications: • VCT level starts lowering
	SS	Enters ARP 17061 for window E06 Dispatches Auxiliary Building Operator (ABO) to investigate alarms
	TEAM	Determines that leak can be isolated by shutting CCP suction and discharge valves after receiving report of leak location from ABO
	RO	Isolates leak by: • Placing CCP-1A in pull-to-lock (PTL) to prevent all automatic starts • Shuts CCP-1A discharge and suction MOVs to isolate leak • Verifies leak isolated by report from ABO and VCT level response
	SS	Determines that this is also an impact of LCO 3.5.2 and condition A still applies due to having 100% ECCS flow capacity equal to a single train of ECCS. TR 13.1.3 Condition A and TR 13.1.5 Condition A now apply.

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 2

Event Description:

Standby 'A' Train Centrifugal Charging Pump (CCP) discharge header pipe break requiring manual isolation of CCP-1A and entry into LCO 3.5.2

	SS	Notifies SS to initiate corrective actions including: • CR • Work order • Contact maintenance • Notify OPS duty manager of equipment failure

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 3

Event Description:

Pressurizer Pressure Transmitter (PT-457) fails high requiring the RO to manually control PORV and Sprays to prevent reactor trip and safety injection

Time	Position	Applicant's Action or Behavior
	RO	Diagnoses the failure with the following indications: Alarms: • PRZR HI PRESS • PRZR HI PRESS CHANNEL ALERT • PV-455A OPEN SIGNAL • PRZR PRESS LO PORV BLOCK • PRZR RELIEF DISCHARGE HI TEMP Indications: • PI-457 offscale high • PORV-455 open • PZR sprays open • PZR heaters turn off if on • Actual PZR pressure decreases
	RO	Performs immediate operator actions of AOP 18001-C section C: • Close spray valves. • Close affected PRZR PORV (455) • Operate PRZR heaters as necessary
	SS	Enters AOP 18001-C section C
	RO	Places PRZR master controller in manual @ 25% demand
	RO	Selects unaffected channels for control (P455/456)

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 3

Event Description:

Pressurizer Pressure Transmitter (PT-457) fails high requiring the RO to manually control PORV and Sprays to prevent reactor trip and safety injection

	RO	Returns PORV, sprays, heaters, and master controller to automatic and verifies proper pressure control
	RO	Selects controlling channel on recorder (455)
	RO	Verifies P-11 in proper state for plant conditions within 1 hour: • P-11 BPLB lit
	SS	Initiates corrective actions for failed channel: • CR • Work Order • I&C • OPS duty manager for AOP entry • Bypass failed channel if desired
	SS	Determines applicable Technical Specifications: • LCO 3.3.1 Functional Unit 6 (OTDT) condition E • LCO 3.3.1 Functional Unit 8a (low PZR press) condition M • LCO 3.3.1 Functional Unit 8b (hi PZR press) condition E • LCO 3.3.2 Functional Unit 1d (low PZR press) condition D • LCO 3.3.2 Functional Unit 8b (P-11) condition L

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 4

Event Description:

#2 Steam Generator Level Transmitter (LT-529) fails high requiring manual control of feed regulating valve to prevent reactor trip on lo-lo SG level.

Time	Position	Applicant's Action or Behavior
	BOP	Diagnoses high failure of controlling level transmitter for Steam Generator #2: Alarms: • STM GEN 2 HI/LO LVL DEVIATION • STM GEN 2 HI-HI LEVEL ALERT Indications: • SG #2 level lowering • SG #2 feed flow < steam flow • SG #2 channel 529 offscale high
	BOP	Immediately takes manual control of SG #2 main feed regulating valve to restore narrow range level between 60% and 70%
	SS	Enters AOP 18001-C section E
	BOP	Selects an unaffected control channel Returns feed flow to AUTO Verifies that SG level control maintains level at 65%
	SS	Initiates corrective actions with SSS for failed instrument: • CR • Work Order • Bypass channel if desired • OPS Duty Manager notified of AOP entry

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 4

Event Description:

#2 Steam Generator Level Transmitter (LT-529) fails high requiring manual control of feed regulating valve to prevent reactor trip on lo-lo SG level.

	SS	Determines applicable Technical Specifications: • LCO 3.3.1 Functional Unit 13 (reactor trip) condition E • LCO 3.3.2 Functional Unit 5c (turbine trip & FWI) condition I • LCO 3.3.2 Functional Unit 6b (AFW) condition D • LCO 3.3.3 Functional Unit 5 no condition - Information only

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 5

Event Description:

Loss of Volume Control Tank makeup and failure of charging pump automatic swap to RWST requiring manual action to open RWST suction valves to prevent pump damage

Time	Position	Applicant's Action or Behavior
	RO	Diagnose loss of VCT automatic and Manual makeup capabilities when VCT level drops to 30% due to use of water for RCS leak in event 6 Alarms: • VCT HI / LO LEVEL • AUTO MAKE-UP START SIGNAL BLOCKED Indications: • VCT < 30% without any makeup • VCT < 5.7% and RWST suction valves remain shut • Loss of power to VCT Makeup Control handswitch HS-40001B
	SS	Enter procedure for loss of VCT makeup AOP 18007-C section C
	RO	OPERATE PRZR heaters and sprays as required to stabilize RCS pressure and temperature.
	RO	Starts one Boric Acid Transfer Pump Starts one Reactor Makeup Water Pump Attempts to perform manual makeup to VCT using procedure 13009-1 but will be unsuccessful.
	RO	Manually opens RWST suction valves when VCT level drops below 5.7% • LV-112D • LV-112E • Initiates unit shutdown due to boration from RWST
	SS	Contacts SSS to initiate corrective actions: • CR • Work Order • I&C • OPS duty manager – AOP entry

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 6

Event Description:

Small RCS leak develops which is greater than allowable leakage limits requiring a unit shutdown to comply with technical specification action requirements.

Time	Position	Applicant's Action or Behavior
	All	Diagnoses loss of reactor coolant to CNMT atmosphere: Alarms: • Intermediate radiation alarm • High radiation alarm Indications: • PZR level deviation below program level without Tave reduction • Increased charging flow to maintain PZR level • CNMT radiation increasing on process monitor RE-2562C
	RO	Immediately controls CVCS charging to maintain PZR level. May also reduce CVCS letdown to 45 GPM if necessary: • Manually control letdown pressure • Simultaneously opne 45 gpm orifice and close 75 gpm orifice.
	SS	Enters AOP 18004-C section A for RCS leakage
	RO	Verifies PZR PORVs and spray valves are shut
	BOP	Stops any turbine load changes that may be in progress
	RO	Shift charging suction to the RWST and initiate unit shutdown: Open RWST TO CCP A&B SUCTION VALVES: • LV-0112D & LV-0112E Shut VCT OUTLET ISOLATION valves: • LV-0112B & LV-0112C Align RV TO RWST ISOLATION valves: • HV-8508A CCP-A - ENABLE PTL • HV-8508B CCP-B - ENABLE PTL Shut CCP normal mini flow valves: • HV-8110 CCP-A&B COMMON MINIFLOW • HV-8111A CCP-A MINIFLOW • HV-8111B CCP-B MINIFLOW

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 6

Event Description:

Small RCS leak develops which is greater than allowable leakage limits requiring a unit shutdown to comply with technical specification action requirements.

	SS	Attempts to identify source of leak and may attempt to isolate leak (CVCS LTDN)
	SS	Applies LCO 3.4.13 after verifying UNIDENTIFIED leakage > 1gpm Condition A
	ALL	Initiate a unit shutdown using: • Unit Operating Procedure 12004-C section 4.2 OR • AOP 18013-C (Rapid Power Reduction) due to large boration from RWST
	SS	Notifies Shift Manager to implement Emergency Plan
	BOP	Lowers turbine load as necessary to keep Tave within 3 degrees F of Tref as the RCS borates due to charging pump suctions being shifted to RWST
	RO	May use control rods to supplement RCS boration to lower Tave, most likey will not be necessary once boration takes effect.

Op-Test No.: Vogtle 2005 Scenario No.: 1 Event No.: 7

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

Time	Position	Applicant's Action or Behavior
	RO	Determines that PZR level cannot be maintained with available charging pump flow. May reduce CVCS LTDN flow to 45 GPM.
	SS	Directs manual trip of the reactor and manual SI following reactor trip verification when RO reports unable to maintain PZR level
	SS	Implements Reactor Trip and Safety Injection procedure E-0 / 19000-C
	SS	E-0 Foldout page continuously monitored and applicable actions taken.
	RO ***CRITICAL TASK***	***Manually trips the reactor and verifies reactor is tripped: (IMA)*** • ***All rod bottom lights lit*** • ***Reactor trip & bypass breakers open*** • ***Neutron flux lowering***
	BOP	Verifies turbine is tripped – all stop valves shut (IMA)
	CREW	Verifies electrical power available to only the Train A emergency electrical busses (IMA)
	RO	Manually actuates SI and CHECKS if SI is actuated: (IMA) • Any SI annunciator - LIT. • SI ACTUATED BPLB window LIT
	BOP	Verifies feedwater isolation valves shut: • MFIV's • BFIV's • MFRV's • BFRV's

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	Verifies ECCS equipment aligning on the MLB's
	RO	Verifies CNMT Isolation Phase A Actuated – CIA MLB's indicators correct
	BOP	Verifies proper AFW system operation: • MDAFW pumps – running • SGBD isolation Handswitches – place in hard close • SG sample isolations - shut • TDAFW pump running if lo-lo level on 2 SGs or blackout
	RO	Verifies ECCS pumps running: • CCP's • SI Pumps • RHR Pumps Verifies NCP – NOT running
	BOP	Verifies 2 CCW pumps in each train - running
	BOP	Check for proper NSCW system operation: • 2 pumps in each train – running • NSCW TOWER RTN HDR BYPASS BASIN handswitches - in AUTO: HS-1668A HS-1669A
	RO	Verifies CNMT Cooling Units: • Fans running in low speed – MLB indicators • NSCW cooler isolation valves open – MLB indicators
	RO	Verifies CNMT Ventilation Isolation – dampers & valves shut (MLB indicators)

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO / BOP	Checks if SLI should be actuated: • Any Steamline pressure < 585 psig • CNMT pressure by recording > 14.5 psig • High steam pressure rate if SI/SLI blocked
	RO	Check CNMT spray is actuated if CNMT pressure by recording > 21.5 psig
	BOP	Verify both diesel generators running – notes that 'B" train DG does not have cooling water and possibly high jacket water temperature alarms
	SS	Directs BOP to emergency stop DG -1B
	SS	Caution - Non-essential personnel should be evacuated from containment if conditions warrant.
	RO	Verify BIT flow - notes NO flow and refers to Attachment B to verify valve alignment
	RO	Checks RCS pressure < 1625 psig & notes no SI pump flow – refers to Attachment C for proper valve alignment
	RO	Checks RCS pressure > 300 psig
	BOP	Verifies generator output breakers trip open 30 seconds after turbine trip
	BOP	(continuous action) Verifies total AFW flow > 570 GPM or controls flow to maintain SG NR levels > 10% (32%)

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	Verifies ECCS valve alignment proper on MLB indicators: Notes no power to Train B – may refer to attachments B, C, D
	BOP	(Continuous action) Controls RCS temperature at 557 F by controlling: • steam dump • AFW flows • Tripping MFP's if necessary • Shutting MSIV's & BSIV's if necessary
	SS / RO	CAUTIONS: PRZR PORV block valve which was shut to isolate an excessively leaking or open PRZR PORV should not be opened unless used to prevent challenging the PRZR safeties. When PRZR pressure is greater than 2260 psig, PRZR spray is required. Spray valves should be shut if the associated RCP 4 or RCP 1 is not running to prevent loss of spray effectiveness.
	RO	Verifies: • PZR PORV's –shut in auto • Normal PZR Spray valves – shut • Power available to at least one PORV block valve & it opens > 2185 psig RCS pressure
	RO	(Continuous action) Maintain RCP seal injection flow 8-13 GPM per RCP – will not be able to do this without any charging pumps
	SS / RO	Check RCP trip criteria: NOT met due to lack of SI pumps and CCPs

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	(Continuous Action) Verifies one ACCW pump running
	BOP	Places CNMT hydrogen monitors in service using SOP 13130
	BOP	Checks SG secondary pressure boundaries: • No SG pressure lowering in an uncontrolled manner • No SG completely depressurized

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	SS	CAUTION: Transition to 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE should not be made solely on a high reading on RE-724 or RE-810.
	BOP	Checks SG tubes intact: a. Secondary radiation normal: 1) MAIN STM LINE MONITORS: • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) 2) CNDSR AIR EJCTR/STM RAD MONITORS: • RE-12839C • RE-12839D* • RE-12839E* (* - if onscale) 3) STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) 4) SG sample radiation. 5) SG tube leakage monitors: • RE-724 or RE-810 and SG level rising in an uncontrolled manner b. CHECK SG levels - none rising in an uncontrolled manner. c. OPEN SG sample valves and direct chemistry to take periodic activity samples of all SGs: (open one at a time) SG SAMPLE VALVE 1 HV-9451 2 HV-9452 3 HV-9453 4 HV-9454

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	CHECK if RCS is intact inside containment: • Containment radiation - ABNORMAL. • Containment pressure - ABNORMAL. • Containment emergency recirculation sump levels - ABNORMAL.
	SS	Transitions to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT.
	SS	NOTES: Foldout page should be continuously monitored and applicable actions taken. Critical Safety Function Status Tree monitoring should be initiated at this time. ***(Crew will transition to FRP for degraded core cooling 19222-C when RVLIS dynamic range indication drops to 44%)*** Seal injection flow should be maintained to all RCPs. 91001-C, EMERGENCY CLASSIFICATION AND IMPLEMENTING PROCEDURE should be implemented at this time.
	SS / RO	Check RCP trip criteria: NOT met due to lack of SI pumps and CCPs
	RO	Verifies one ACCW pump running
	BOP	Places CNMT hydrogen monitors in service using SOP 13130
	BOP	Checks SG secondary pressure boundaries: • No SG pressure lowering in an uncontrolled manner • No SG completely depressurized

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	BOP	Check Intact SG's levels: • Control AFW flow > 570 GPM or maintain level > 10% (32%) NR and < 65% • No SG level rising in an uncontrolled manner
	BOP	(Continuous Action) Check Secondary radiation normal: a. OPEN SG sample valves and direct chemistry to take periodic activity samples of all SGs: (open one at a time) SG SAMPLE VALVE 1 HV-9451 2 HV-9452 3 HV-9453 4 HV-9454 b. Check Secondary radiation normal: 1) MAIN STM LINE MONITORS: • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) 2) CNDSR AIR EJCTR/STM RAD MONITOR: • RE-12839C 3) STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) 4) SG sample radiation.
	SS	CAUTION: If any PRZR PORV is open because of high PRZR pressure, Check PORV shut when pressure lowers to less than 2315 psig.

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	(Continuous Action) Checks: • PZR PORV's –shut • Power available to at least one PORV block valve & it opens > 2185 psig RCS pressure • WHEN RCS WR CL temperatures less than 350°F,THEN arm COPS.
	SS	Note: COPS may be disarmed when temperature rises to greater than 350°F and has remained greater than 295°F (green integrity CSFST)
	CREW	(Continuous Action) Check if ECCS flow should be reduced: RCS subcooling - GREATER THAN 24°F [38°F]. ***(This will not be met)***
	SS	NOTE: If Containment Spray is actuated and a primary LOCA is indicated by high containment radiation levels, continuous spray for a minimum duration of 2 hours is required. This should include or be followed by operation in the recirculation mode for a minimum of 1.5 hours per 19013-C, ES-1.3 TRANSFER TO COLD LEG RECIRCULATION, step 8.
	RO	Check if CNMT Spray should be stopped: • Pumps running • CNMT pressure < 15 psig • CNMT radiation normal – or - pumps have operated as indicated in note above If true then: • Reset CS signal • Stop CS pumps • Shut CS discharge valves

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	SS	CAUTION: If offsite power is lost after SI reset, action is required to restart the following ESF equipment if plant conditions require their operation: • RHR pumps • SI pumps • Post-LOCA cavity purge units • Containment Coolers in low speed (Started in high speed on a UV signal) • ESF Chilled Water Pumps (If CRI has been reset) RCS pressure should be monitored. If RCS pressure lowers in an uncontrolled manner to less than 300 psig, the RHR Pumps should be restarted to supply water to the RCS.
	RO	Check if RHR pumps should be stopped: • Any RHR pump running with suction aligned to the RWST • RCS pressure > 300 psig • RCS pressure stable or rising – NO Reset SI
	CREW	Check RCS and SG pressures: • Check pressure in all SGs - STABLE OR RISING. • Check RCS pressure -STABLE OR LOWERING.
	BOP	Check if DGs should be stopped: • AC emergency busses energized by offsite power • Reset SI, if necessary. • Stop any unloaded DG and place in standby by • initiating 13145, DIESEL GENERATORS. • Energize 480V switchgear 1NB01 & 1NB10.

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	SS	CAUTION: Level in the containment emergency sump and RWST should be monitored to ensure inventory for RHR pump(s) suction.
	CREW	Initiate evaluation of plant status: a. Verify cold leg recirculation capability from at least one flow path: Power available to: • HV-8811A - CNMT SUMP TO RHR PMP-A • RHR Pump A -OPERABLE. • HV-8809A – RHR PMP-A TO COLD LEG 1&2 ISO VLV. • RHR heat exchanger A - OPERABLE. b. Check Auxiliary Leak Detection Systems: 1. Plant vent radiation monitors - Normal: • RE-12442A EFFL PART • RE-12442B EFFL IODINE • RE-12442C EFFL RAD • RE-12444C RADIOGAS RAD 2. Check Auxiliary Building break detection system on QPCP - NO LEAK DETECTION STATUS LIGHT LIT. c. Obtain samples: For boron, pH, and radioactivity: • RCS • Both containment emergency sumps (if cold leg recirculation has been established.) For radioactivity, hydrogen and oxygen concentrations: • Containment atmosphere d. Evaluate plant equipment: 1) Secure unnecessary plant equipment. 2) Review inoperable equipment which may be required. Repair or make available, as possible. e. Consult TSC for additional equipment to be started to assist in recovery including: • H2 analyzers • CRDM fans

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO / SS	Check if RCS cooldown and depressurization is required: a. Check RCS pressure GREATER THAN 300 PSIG. b. Go to 19012-C, ES-1.2 POST-LOCA COOLDOWN AND DEPRESSURIZATION.

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	CREW	Validates ORANGE path on CORE Cooling CSFST with the following parameters: Core exit Thermal Couples < 1200 F RCS Subcooling < 24 F (38 F) RCP's Running and RVLIS Dynamic Range < 44%
	CREW	Transitions to 19222-C, FR-C.2 RESPONSE TO DEGRADED CORE COOLING
	SS	CAUTION: If RWST level lowers to less than 39%, the ECCS should be aligned for cold leg recirculation by initiating 19013-C, ES-1.3 TRANSFER TO COLD LEG RECIRCULATION. NOTE: 91001-C EMERGENCY CLASSIFICATION AND IMPLEMENTING INSTRUCTIONS should be implemented at this time. Normal conditions for running RCPs are desired, but RCPs should not be tripped if normal conditions cannot be established or maintained.
	RO	(Continuous Action) Verify ECCS valve alignment - proper injection lineup indicated by MLB's

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	Check for BIT flow, use attachment A as necessary to start pumps & align valves. If CCP flow not verified, then: • Reset SI, if necessary, • Start the NCP Check SI pumps for flow. Start pumps and align valves as necessary using Attachment B. Check RCS pressure < 300 psig – (It will be above this value)
	RO	(Continuous Action) Check RCS vent paths: - PZR PORV block have power, PZR PORV's shut, PZR PORV block valves open > 2185 psig RCS pressure
	SS	Note: COPS may be disarmed when temperature rises to greater than 350°F and has remained greater than 295°F (green integrity CSFST)
	RO	Check other RCS Vent paths - SHUT: RX Head vent to letdown isolation valves: • HV-8095-A • HV-8095-B • HV-8096-A • HV-8096-B CVCS letdown isolation valves: • Orifice isolation valves: HV-8149A/B/C • LV-459 & LV-460 Excess Letdown Line Isolation Valves: • HV-8153 & HV-8154

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	BOP	Check RCS sample isolation valves SHUT: • HV-3548 RC HOT LEG-1&3 SAMPLE-IRC • HV-3502 RC HOT LEG-1&3 SAMPLE-ORC • HV-3513 PRZR STM SAMPLE-IRC • HV-3514 PRZR STM SAMPLE-ORC • HV-3507 PRZR LIQUID SAMPLE-IRC • HV-3508 PRZR LIQUID SAMPLE-ORC
	RO/BOP	Check at least One RCP running and try to establish support conditions using Attachment D if not met
	RO	Check RVLIS dynamic head indication: It will be less than the following: 44% -4 RCPs 30% -3 RCPs 20%-2 RCPs 13%-1 RCP
	RO	Check All RCPs running and then stop RCP 4
	RO	Check SI accumulator Isolation vales OPEN: • HV-8808A • HV-8808B • HV-8808C • HV-8808D
	BOP	Control intact SG levels between 10% (32%) and 65%. Maintain at least 570 GPM total feed flow if all SG levels < 10% (32%)

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	SS	CAUTION: The following step will cause accumulator injection which may cause red path condition in F-0.4, INTEGRITY CSFST. This procedure should be completed before transition to 19241-C, FR-P.1 RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION. NOTE: After the low steamline pressure SI is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded. COPS should be armed when RCS WR cold leg temperature is less than 350°F.
	BOP ***CRITICAL TASK***	***Depressurize all intact SGs to 200 psig. Maintain cooldown rate in RCS cold legs < 100 F/Hr. Use either steam dumps or ARVs*** Block low steamline pressure SI/SLI when RCS pressure < 2000 psig and high steam pressure rate alarms are clear using: • HS-40068 • HS-40069
	BOP	Stop SG depressurization when at least 2 RCS hot leg temperatures are < 380 F.
	SS	CAUTION: RHR pumps should be NOT be run longer than 30 minutes without CCW to the RHR heat exchangers
	RO	Check RHR Pumps running

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	Isolate SI accumulators if at least 2 RCS WR temperatures < 380 F: Reset SI, if necessary Dispatch an operator to close accumulator isolation valve MOV breakers: Valve — Breaker HV-8808A — 1ABE-19 HV-8808B — 1BBC-19 HV-8808C — 1ABC-19 HV-8808D — 1BBE-19 Shut SI Accumulator isolation valves: HV-8808A HV-8808B HV-8808C HV-8808D Open accumulator isolation valve MOV breakers
	SS	CAUTION: F-0.2 Core Cooling CSFST should be closely monitored during the subsequent steps.
	RO	Stop all RCPs
	BOP ***CRITICAL TASK***	***Depressurize all intact SGs to atmospheric pressure. Maintain cooldown rate in RCS cold legs < 100 F/Hr.*** ***Dump steam to condenser or use SG ARVs***

Event Description:

Small break LOCA develops requiring a reactor trip. RO must manually trip reactor due to failure of automatic reactor trip. Loss of power to B train ESF electrical busses will result in no high head or intermediate head SI. This will lead to an orange path on core cooling, requiring the crew to cooldown and depressurize the RCS below ECCS accumulator and low head SI pumps injection pressures to restore core cooling.

	RO	Verify ECCS flow: • BIT flow • SI pump flow • RHR pump flow
	SS	Note: COPS should be armed when RCS WR cold leg temperature is less than 350 F.
	RO	Check core cooling: • RVLIS full range > 62% • At least 2 RCS WR hot leg temperatures < 350 F
	SS	Go to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT, Step 13.

Initial Conditions: IC ___; The Unit is at 0% power in Mode 2 with a MOL reactor startup in progress.

Pre-load malfunctions:

- **ES08 - SI 'A' Train Auto Actuation Failure**
- **ES16 - SI 'B' Train Auto Actuation Failure**
- **SI06B - SI Pump 'B' Failure to Auto Start**
- **NS07E - NSCW pump #5 Failure to Auto Start**
- **RF: ES46 - P14 Setpoint Adjustment to 83%**

Ensure all required procedures and data sheets are provided:

- **12003-C markup. Ensure Audio CR channel in service.**
- **14940-1 (ECC)**
- **1/M data sheet. Ensure Shutdown Monitor set up for 1/M Mode of Operation. (RX ENG FEEDBACK)**
- **RCS temperature monitoring**
- **IPC Mode & trends**
- **Reactivity Briefing Sheet**

Turnover: The previous crew has initiated the reactor startup per UOP 12003-C. Source range counts are stable and Control bank 'C' is presently at 70 steps. 1/M data now projects criticality at 120 steps on Control bank 'D'. Continue with the reactor startup beginning with **step 4.2.21 of 12003-C**, and stabilize reactor power between 1-3%.

The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.

Steam Generator #1 has a 30 gallon / day tube leak. **18009-C section B is in effect, Action Level 1 monitoring is in progress , TS 3.4.13 INFO LCO on Identified RCS leakage.**

Time	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Pull control rods to establish critical reactor
2	NS02A	N/A	Train 'A' NSCW Pump #1 trips and standby pump fails to automatically start. *** If dispatched, report Overcurrent trip on NSCW pump #1.**
3	PR03A	0%	Controlling channel Pressurizer Level Transmitter (LT-459) fails low. *** Allow BOP to reestablish letdown.**
5	MS03D	100%	Steam Generator #4 ARV Pressure Transmitter fails high.
6	CV02	25%	Letdown line break inside Containment
7	O/R ALB 08 ANNUN	E4,E3 F4, F3	RCP #2 Increasing Vibration. **Insert E4 - Wait 120 sec. - insert E3 (Crew should dispatch CBO to RCP VMP)** **Wait 5 min. - insert F4 - Wait 120 sec. -- insert F3** **If dispatched, report RCP #2 indicates <u>5.5 mils on frame</u> & <u>23 mils on shaft</u>.**
8	MS04C	100%	Steam Generator #3 double-ended guillotine break of main steam line in Containment.
END			**When crew transitions to 19011-C**

OPERATING PLAN:

- The previous crew has initiated the reactor startup per UOP 12003-C.
- Source range counts are stable at _____
- Control bank 'C' is presently at 70 steps.
- 1/M data now projects criticality at 100 steps on Control bank 'D'.
  - +750 pcm is All Rods Out
  - -750 pcm control rod position is 80 steps on Control bank 'C'
- After reviewing and briefing on completed steps in **12003-C**, continue with the reactor startup beginning with step **4.2.21**, and stabilize reactor power between 1-3%.
- The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.
- Steam Generator #1 has a 30 gallon / day tube leak.
- The required actions of 18009-C, section B, "Operation with a Minor SGTL" have been initiated. Action Level 1 monitoring is in progress.
- TS 3.4.13 INFO LCO on Identified RCS leakage.

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Event No.: 1

Event Description: Crew will perform actions necessary to continue the in-progress reactor startup until criticality is achieved and identified. The RO will need to withdraw control rods, and both the RO and SRO will need to identify when the reactor is critical.

Time	Position	Applicant's Action or Behavior
	RO SRO	When Control Bank C reaches 115 steps, VERIFY Control Bank D begins withdrawing. (TS SR 3.1.6.3)
	RO	VERIFY IR indication comes on scale as source range count rate rises. • Ensure proper overlap between SR and IR channels.
	RO	At an IR indication of approximately 2 X 10^{-5}%, PERFORM the following: • VERIFY proper indications for P-6 permissive (status lights lit), • BLOCK the source range hi flux reactor trip by placing both SR BLOCK/ RESET A/B switches HS-40030/HS-40031 to the BLOCK position, • VERIFY SR Hi flux trip blocked (BPLB lights lit)
	RO SRO	Recognize indications of criticality by identifying steadily increasing counts and a constant positive SUR on SR and IR NI's.
	RO	Raises power to 2 X 10^{-3}% in the Intermediate Range by adjusting control rods as necessary to establish a SUR of approximately 0.5 dpm to take Critical Data.

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Event No.: 2

Event Description: Trip of 'A' train NSCW pump #1 with pump #5 failing to automatically start.

Time	Position	Applicant's Action or Behavior
	RO SRO	Diagnose degraded NSCW conditions by noting trip of NSCW pump #1 and abnormal system conditions: • NSCW TRAIN A LO HDR PRESS alarm • NSCW TRAIN A LO FLOW alarms • Degraded flow and pressure indications on QMCB
	RO	Informs SS of auto-start failure of NSCW pump #5, and manually starts standby 'A' train NSCW pump.
	SRO	Initiates AOP 18021: Directs RO to verify proper operation of AFFECTED NSCW train by checking for normal system pressure, flows, and basin level.
	SRO	Initiates repair activities: • CR & WO generated • Duty Manager of AOP entry • Maintenance notified for support
	RO	Initiates review of Tech Specs. • T.S. LCO 3.7.8

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Event No.: 3

Event Description: Controlling Pressurizer level channel fails low.

Time	Position	Applicant's Action or Behavior
	RO SRO	Diagnose controlling Pressurizer level channel failure: • Letdown flow isolates • LI-459 indication • Pressurizer heaters trip off • Various Pressurizer level annunciators
	SRO	Initiates AOP 18001-C, Section D to direct crew actions.
	RO	Takes manual control of charging to: • limit Pressurizer level rise, • minimize thermal cycle on charging nozzle, and • maintain RCP seal injection between 8-13 gpm
	RO	Selects an unaffected channel for Pressurizer level control.
	SRO	Directs BOP to reestablish letdown flow per SOP 13006. Note: Letdown restoration listed as next event.
	RO	Restores Pressurizer heaters to service.
	RO	Returns Pressurizer level control to Auto, and monitors parameters to verify proper system response: • Charging and letdown flows • Pressurizer level trending to program • Proper heater operation
	SRO	Initiates repair activities: • CR & WO generated • Duty Manager of AOP entry • Maintenance notified for support
	SRO	Initiates review of Tech Specs. • T.S. LCO 3.3.4 • T.S. Info LCO's 3.3.1 and 3.3.3

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Event No.: 4

Event Description: BOP reestablishes letdown flow per 13006-1.

Time	Position	Applicant's Action or Behavior
	BOP	Initiates section 4.4.2 of 13006. Note: With letdown isolated and charging still in service, an Auto-makeup will occur to ensure VCT level is maintained. The RO and/or BOP should verify proper makeup flowrates per the Reactivity Briefing Sheet.
	BOP	Manually adjusts PIC-131 to 50-75%.
	BOP	Manually adjusts TIC-130 to approximately 50%.
	BOP	Ensures charging flow approximately 90 gpm and RCP seal injection flow between 8-13 gpm.
	BOP	Opens Letdown isolation valves LV-459 & 460.
	BOP	Opens selected orifice isolation valve HV-8149 B or C.
	SRO	Logs/notes which orifice isolation valve utilized in control log.
	BOP	Adjusts PIC-131 to between 360-380 psig, and returns controller to automatic.
	BOP	Ensures TIC-130 is less than 115 F, and returns controller to automatic.
	BOP	Monitors plant parameters to ensure proper controller response: • Pressurizer level • Charging and letdown flows • Letdown temperature
	RO	Returns charging flow control to automatic, if desired.

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Event No.: 5

Event Description: SG #2 ARV Pressure Transmitter Fails High

Time	Position	Applicant's Action or Behavior
	BOP SRO	Diagnose opening of SG ARV by any of the following indications: • ALB 15 F01 MS Safety Valve Leaking alarm • ARV tailpipe temperature monitoring panel alarm on QPCP • Lowering RCS temperature • Rising reactor power • SG #2 ARV controller indication
	BOP	Manually shuts SG ARV #2.
	SRO	Implements available ARP and/or AOP guidance for ARV failure. Note: Crew actions to close the ARV will probably occur before ARP/AOP reference is made per the guidance of Ops Admin procedure 10020. ARP will direct use of AOP 18008 for secondary coolant leakage if ARV opening not planned. This AOP however primarily addresses secondary leaks that can not be located and/or isolated.
	RO	Insert control rods as necessary to limit unplanned power transient.
	BOP	Reduce steam demand and raise RCS temperature to match Tavg and Tref by: • Closing SG #2 ARV • Reducing steam dump demand
	RO	Control charging and letdown flow to maintain Pressurizer level in program band.
	RO	Operate heaters and sprays as required to maintain Pressurizer pressure in program band.

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Event No.: 5

Event Description: SG #2 ARV Pressure Transmitter Fails High

	BOP	Adjust AFW flow, if necessary, to restore SG #2 level to program.
	SRO	Reviews Tech Specs for applicability. May initiate Info LCO's 3.3.4 and 3.7.4 for tracking purposes.

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Event No.: 6

Event Description: Letdown line break inside Containment.

Time	Position	Applicant's Action or Behavior
	RO SRO	Diagnose loss of RCS/CVCS inventory by any of the following indications: • CNMT moisture alarm or activity rising. • CNMT sump level rising. • CNMT radiation monitors alarming.
	SRO	Implements ARP and AOP guidance for leakage inside Containment: • 17102 guidance for RE-2562, 002, and 003 in alarm condition • 18004 for response to RCS leakage indications
	RO	Controls charging and letdown flows to maintain Pressurizer level in program band by performing the following, as necessary: • Raising charging flow • Starting an additional charging pump • Reducing letdown flow
	RO	Verifies Pressurizer PORV's and spray valves shut.
	RO	Verifies that Pressurizer level is trending to program. Note: Crew should not be required to perform a Reactor trip and SI based on the leak size.

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Event No.: 6

Event Description: Letdown line break inside Containment.

	RO	Ensure VCT level is maintained. Swap charging pump suctions to the RWST, if required. • LV-112B & C are the VCT supply isolation valves • LV-112D & E are the RWST supply isolation valves
	SRO	Notify Shift Manager/Ops Duty Manager for support for the following: • Evacuation of Containment, when/if necessary • Implementation of 91001-C (EPIP's) • Notification to plant management of AOP entry
	ALL	Locate source of leakage per Table 1 of 18004-C. Note: Leak is on the high energy portion of the letdown line. Containment temperature and pressure will begin to steadily increase, so a Containment entry for leakage identification would not be advisable due to personnel safety concerns. The leak can be isolated if letdown is removed from service. No discernible changes in charging and letdown parameters will be present however due to the leak size and location. Control room indications and AOP 18004-C will point crew toward responding to RCS leakage inside Containment. SYMPTOMS LISTED IN TABLE 1 OF 18004-C **Chemical and volume control system**: • Abnormal temperatures in letdown or charging flow. • Abnormal pressure in letdown or charging flow. • Abnormal flows in letdown or charging flow. • CVCS TRAIN A (B) PMP RM HI TEMP alarm (ALB-51). • Pressurizer relief tank level, temperature or pressure rising from CVCS Letdown Line Relief Valve PSV-8117. • Seal Return Line Relief Valve PSV-8121 lifting. • CVCS PIPE BREAK RM PROT ACTUATION alarm (ALB-63).

Op-Test No.: 2005-301 | Scenario No.: 2 | Page 3 of 3

Event No.: 6

Event Description: Letdown line break inside Containment.

		SYMPTOMS LISTED IN TABLE 1 OF 18004-C **Containment atmosphere:** • Rising temperature or moisture indication. • CNMT HI TEMP alarm. • CNMT HI MSTR alarm. • RX CVTY DRN SUMP HI-HI LVL alarm (ALB-61). • CNMT DRN SUMP HI-HI LEVEL alarm (ALB-61). • CNMT HI-1 PRESS ALERT ADVERSE CNMT alarm. • RE-0002, -0003 CONTAINMENT LOW RANGE AREA MONITOR alarm or rising. • RE-0005, RE-0006 CONTAINMENT HIGH RANGE AREA MONITOR alarm or rising. • RE-2562A CONTAINMENT ATMOSPHERE PROCESS AIR PARTICULATE MONITOR alarm or rising. • RE-2562C CONTAINMENT ATMOSPHERE PROCESS RADIOGAS MONITOR alarm or rising. • CNMT CLR COND LEAK alarm (ALB-62).
	ALL	Isolate the leak Since no indications are present that would identify CVCS letdown as the source of the leakage, the crew may not decide to isolate letdown.
	SRO	If not isolated, the crew will be required to initiate a shutdown to comply with the Tech Spec leakage required actions of LCO 3.4.13.

Op-Test No.: 2005-301 Scenario No.: 2 Page 1 of 1

Event No.: 7

Event Description: High vibration on RCP #2.

Time	Position	Applicant's Action or Behavior
	RO SRO	Per RCP High Vibration Alert alarms ARP 17008 E3 & E4, DISPATCH an operator to the Vibration Monitoring Panel 1-1201-P5-VMP to: • IDENTIFY the Reactor Coolant Pump (RCP) causing the alarm. • CHECK both vibration channels and alarm setpoints for shaft and frame of each RCP (32 points in all) to verify no obvious vibration monitoring equipment problems exist. • ATTEMPT to reset alarm using COMMON RESET toggle switch.
	RO SRO	REFER to 13003-1, "Reactor Coolant Pump Operation" and note Limitations section for RCP Trip Criteria: <u>An RCP shall be stopped if any of the following conditions exist.</u> • Motor bearing temperature exceeds 195°F. • Motor stator winding temperature exceeds 311°F. • Seal water inlet temperature exceeds 230°F • Total loss of ACCW for a duration of 10 minutes. • **RCP shaft vibration of 20 mils or greater.** • **RCP frame vibration of 5 mils or greater.** • Differential pressure across the no.1 seal of < 200 psid
Critical Task	ALL	When RCP High Vibration alarms ALB 08 F03 & F04 are received and the Control Building operator reports high vibration readings on the RCP Vibration Monitoring Panel, the crew should trip RCP #2 per 13003-1 guidance. **The RCP must be tripped within 10 minutes of the tripping the reactor during the next event.**

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Event No.: 8 and 9

Event Description:

A large steamline break inside Containment occurs. The accident condition will cause an automatic Reactor Trip and Safety Injection signal within seconds. The Reactor will trip, but the SI will not automatically actuate. The crew will have to manually actuate SI, and will have to manually start the 'B' train SI pump. The crew will respond per 19000, and then implement 19020 to isolate the faulted SG.

Time	Position	Applicant's Action or Behavior
	SRO	Implements Reactor Trip and Safety Injection procedure 19000-C in response to SLB IRC.
	SRO	E-0 Foldout page continuously monitored and applicable actions taken.
	RO **IOA**	Verifies Reactor is tripped: • All rod bottom lights lit • Reactor trip & bypass breakers open • Neutron flux lowering
	BOP IOA	Verifies turbine is tripped • All stop valves shut
	CREW IOA	Verifies electrical power available to all of the emergency electrical busses
	RO **Critical Task**	**CHECKS if SI is actuated:** • **SI annunciators - LIT** • **SI ACTUATED BPLB window will NOT be LIT due to the SI actuation failure** **Note: SI will initially appear to be actuated. Several SI alarms will be lit. The RO should recognize that Bypass Permissive Light Board (BPLB) indication is NOT proper for SI actuation, and should check if SI is required. All SI parameters should indicate that SI is required. With equipment alignment not occurring, SI should be manually actuated.**

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Event No.: 8 and 9

Event Description:

A large steamline break inside Containment occurs. The accident condition will cause an automatic Reactor Trip and Safety Injection signal within seconds. The Reactor will trip, but the SI will not automatically actuate. The crew will have to manually actuate SI, and will have to manually start the 'B' train SI pump. The crew will respond per 19000, and then implement 19020 to isolate the faulted SG.

	BOP	Verifies feedwater isolation valves shut: • MFIV's • BFIV's • MFRV's • BFRV's
	RO	Verifies ECCS equipment aligning on the MLB's. If the SI actuation failure was not detected in step 4, then this step will direct a manual actuation of SI if ECCS equipment is not properly aligning per Control Board MLB indication.
	RO	Verifies CNMT Isolation Phase A Actuated • CIA MLB's indicators correct
	BOP	Verifies proper AFW system operation: • MDAFW pumps – running • SGBD isolation Handswitches – place in hard close • SG sample isolations - shut • TDAFW pump running if lo-lo level on 2 SGs or blackout
	RO	Verifies ECCS pumps running: • CCP's • SI Pumps **(SI Pump 'B' will have to be manually started)** • RHR Pumps Verifies NCP – NOT running
	BOP	Verifies 2 CCW pumps in each train – running

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Event No.: 8 and 9

Event Description:

A large steamline break inside Containment occurs. The accident condition will cause an automatic Reactor Trip and Safety Injection signal within seconds. The Reactor will trip, but the SI will not automatically actuate. The crew will have to manually actuate SI, and will have to manually start the 'B' train SI pump. The crew will respond per 19000, and then implement 19020 to isolate the faulted SG.

	RO	Check for proper NSCW system operation: • 2 pumps in each train – running • NSCW TOWER RTN HDR BYPASS BASIN handswitches - in AUTO: HS-1668A HS-1669A
	RO	Verifies CNMT Cooling Units: • Fans running in low speed – MLB indicators • NSCW cooler isolation valves open – MLB indicators
	RO	Verifies CNMT Ventilation Isolation – dampers & valves shut (MLB indicators)
	RO / BOP	Checks if SLI should be actuated: • Any Steamline pressure < 585 psig • CNMT pressure by recording > 14.5 psig • High steam pressure rate if SI/SLI blocked
	RO	Check CNMT spray is actuated if CNMT pressure by recording > 21.5 psig
	BOP	Verify both diesel generators running
	RO	Verify BIT flow on FI-917A
	RO	Checks RCS pressure < 1625 psig
	RO	Checks RCS pressure > 300 psig

Op-Test No.: 2005-301 Scenario No.: 1 Page 4 of 7

Event No.: 8 and 9

Event Description:

A large steamline break inside Containment occurs. The accident condition will cause an automatic Reactor Trip and Safety Injection signal within seconds. The Reactor will trip, but the SI will not automatically actuate. The crew will have to manually actuate SI, and will have to manually start the 'B' train SI pump. The crew will respond per 19000, and then implement 19020 to isolate the faulted SG.

	BOP	Verifies generator output breakers trip open 30 seconds after turbine trip
	BOP Continuous action	Verifies total AFW flow > 570 GPM or controls flow to maintain SG NR levels > 10% (32%)
	RO	Verifies ECCS valve alignment proper on MLB indicators
	RO BOP Continuous action	Checks RCS temperature stable at or trending to 557. Note: The main steamlines will have automatically isolated due to the SLB. If the faulted SG has been isolated and is completely depressurized, then RCS temperature will begin to increase. The crew will be expected to limit the rate of temperature increase by dumping steam from the intact SG's via the ARV's.
	RO	Verifies: • PZR PORV's –shut in auto • Normal PZR Spray valves – shut • Power available to at least one PORV block valve & it opens > 2185 psig RCS pressure
	RO Continuous action	Maintain RCP seal injection flow 8-13 GPM per RCP by adjusting FV-121, as necessary.
	SS / RO	Check RCP trip criteria

Event No.: 8 and 9

Event Description:

A large steamline break inside Containment occurs. The accident condition will cause an automatic Reactor Trip and Safety Injection signal within seconds. The Reactor will trip, but the SI will not automatically actuate. The crew will have to manually actuate SI, and will have to manually start the 'B' train SI pump. The crew will respond per 19000, and then implement 19020 to isolate the faulted SG.

	RO Continuous Action	Verifies one ACCW pump running
	BOP	Places CNMT hydrogen monitors in service on QPCP using SOP 13130
	BOP	Checks SG secondary pressure boundaries: • No SG pressure lowering in an uncontrolled manner • No SG completely depressurized NOTE: The crew should identify the E-2 transition criteria and implement 19020-C to verify proper isolation of the faulted SG. The BOP may have initiated isolation of the faulted SG prior to this transition based on the guidance of 10020-C for equipment and personnel protection. It is expected that the SS will be notified of this action, if taken.

Event No.: 8 and 9

Event Description:

A large steamline break inside Containment occurs. The accident condition will cause an automatic Reactor Trip and Safety Injection signal within seconds. The Reactor will trip, but the SI will not automatically actuate. The crew will have to manually actuate SI, and will have to manually start the 'B' train SI pump. The crew will respond per 19000, and then implement 19020 to isolate the faulted SG.

	SRO	Implements 19020-C to complete faulted SG isolation: • At least one SG should be maintained available for RCS cooldown. • Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown. • CSFST monitoring assigned/initiated • Shift Manager notified to implement 91001-C (EPIP's)
	BOP	Verifies main steamlines isolated.
	BOP	Verifies an intact SG is available.
	BOP	Identifies faulted SG #3 by uncontrolled depressurization and/or complete depressurization.
	BOP **Critical Task**	**Isolates faulted SG #3:** • **MFIV: HV-5229** • **BFIV: · HV-15198** • • **MDAFW PMP-B supply: HV-5134** • **TDAFW supply: HV-5127** • • **ARV:· PV-3020** • • **SGBD:· HV-7603C** • **SG sample:· HV-9453**

Event No.: 8 and 9

Event Description:

A large steamline break inside Containment occurs. The accident condition will cause an automatic Reactor Trip and Safety Injection signal within seconds. The Reactor will trip, but the SI will not automatically actuate. The crew will have to manually actuate SI, and will have to manually start the 'B' train SI pump. The crew will respond per 19000, and then implement 19020 to isolate the faulted SG.

	BOP	Verifies CST levels are > 15%.
	SRO BOP	Initiate sampling of SG's one at a time for indications of primary-to-secondary activity: • Sampling results • Main steamline rad monitors • Condenser Air Ejector/Exhaust rad monitors • SGBD rad monitors • Uncontrolled level rise
	ALL	Verifies ECCS termination criteria met: • RCS subcooling - GREATER THAN 24°F (38°F ADVERSE) • Secondary heat sink: · Total feed flow to intact SGs-GREATER THAN 570 GPM OR Narrow range level in at least one intact SG GREATER THAN 10% [32% ADVERSE.] • RCS pressure - STABLE or RISING. • PRZR level - GREATER THAN 9% [37% ADVERSE.]
	SRO	Transitions to 19011-C to terminate ECCS injection.

Initial Conditions: **IC 14** The Unit has been at 100% power for three months following a refueling outage.

Pre-load malfunctions:

- **AF03B - Failure of MDAFW Pump B Coupling**
- **AF04 - TDAFW Governor Failure**
- **TU18 - Auto turbine trip failure**
- **Remote Function ES46 – P14 setpoint**

Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.:

- **MDAFW Pump 'A' Tagged**
- **SI Pump 'A' Tagged Out**
- **Override standby EHC pump to OFF**
- **Override SGBD isolation lights (HS7603A-D) – RED ON and Green OFF**
- **Secondary aligned per 18009-C, Section B, Tag #1 ARV, LIC4415, SJAE's, Steam Seals, TDAFW**
- **IPC Mode & trends**
- **Reactivity Briefing and Shift Manning Sheets**

Turnover: Maintain full power operation.

The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.

Steam Generator #1 has a 30 gallon / day tube leak. 18009-C section B is in effect, Action Level 1 monitoring is in progress, TS 3.4.13 INFO LCO on Identified RCS leakage.

MDAFW Pump 'A' Tagged Out today at 0400 hours. Scheduled to be returned in 24 hours (TS 3.7.5 Condition B)

SI Pump 'A' Tagged Out yesterday at 0800, and should be cleared in 12 hrs. (LCO 3.5.2 Condition A)

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	**RD10I** **Delete after repair**	N/A	Stuck control rod (H-8) while rods are inserted on subsequent turbine runback **Reactor engineering requests power reduction to 75% be made without moving rods to minimize flux peaking** **I&C reports they have found a blown fuse on the lift coil for rod H8. They recommend replacing the fuse. No other apparent damage. Will have current recorders hooked up to coil stack to verify proper operation.**
2	**TU07**	N/A	Turbine runback due to control system failure
3	N/A	N/A	**Report from engineering that SI Pump 'B' is inoperable due wrong oil added to bearing reservoirs. Pump was run with incorrect oil, need to tag and inspect and evaluate pump bearings for damage, will take at least 24 hours.**
4	N/A	N/A	Plant shutdown due to entering Tech Spec. 3.0.3
5	**CV04**	N/A	Loss of Cooling to Letdown Heat Exchanger (TE-130 Fails Low)
6	**TU11**	N/A	Main Turbine EHC Pump trips and the standby pump fails to automatically start. ***Delete Override on EHC pump B when operator attempts manual start***
7	**ES15** **Delete after SI**	N/A	Spurious 'B' Train Safety Injection and failure of turbine to automatically trip. ***Insert when BOP is away from the main turbine controls***
8	SGBI Failure	N/A	***Delete overrides when BOP manually closes valves.***
END			**When crew establishes bleed and feed or Condensate flow per 19231.**

OPERATING PLAN:

- The Unit has been at 100% power for three months following a refueling outage. Maintain full power operation per 12004-C.

- MDAFW Pump 'A' Tagged Out today at 0400 hours and is scheduled to be returned to service in 24 hours. LCO 3.7.5 Condition B is in effect.

- SI Pump 'A' Tagged Out due to bearing failure. It has been out of service since yesterday at 0800, and should be returned to service in 12 hrs. LCO 3.5.2 Condition A is in effect.

- The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.

- Steam Generator #1 has a 30 gallon / day tube leak.

- The required actions of 18009-C, section B, "Operation with a Minor SGTL" have been initiated. Action Level 1 monitoring is in progress.

- TS 3.4.13 INFO LCO on Identified RCS leakage (SGTL)

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 1

Event Description:

Inadvertent turbine runback , BOP must take manual control of turbine load to stop the transient.

Time	Position	Applicant's Action or Behavior
	RO / BOP	Diagnoses loss of turbine load with the following indications: • Unexplained loss of generator MW. • Unexplained insertion of control rods while in auto. • RCS Tave increasing
	RO / BOP	Determines if a turbine runback is required: (IMA) • No OTΔT or OPΔT bistable status lights lit
	BOP	Stabilizes turbine load using standby load control: (IMA) • Matches CV signal and IV signals using standby load set potentiometer • Depresses ON and BYPASS pushbuttons on STANDBY SIGNAL MATCH
	SS	Enters AOP 18012-C for turbine runback
	BOP	Checks turbine load stabilized
	SS	Turbine loading rates in standby mode are not restricted by the EHC system and are totally under control of the operator
	BOP	(Continuous Action) Controls load using the standby load set potentiometer
	RO	Ensures Rod Control System in AUTO and maintaining Tavg / Tref
	BOP	Verifies steam dump system armed and responding to Tave / Tref deviation
	RO	Verifies PRZR pressure control restoring pressure to 2235 psig

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 1

Event Description:

Inadvertent turbine runback , BOP must take manual control of turbine load to stop the transient.

	BOP	Verifies SGWLC restoring SG levels to program band
	SS	NOTE: Chemistry should be notified every time reactor power is changed by 15% or more in a one hour period so iodine activity can be determined per Tech Spec SR 3.4.16.2
	BOP	Check steam dumps valves shut and reset C-7 if present
	BOP	Perform 14286 Turbine Trip Device Operability Test, sections 5.1 and 5.2
	BOP	When cause of turbine runback is corrected then initiate 13800, Turbine Operation to restore EHC to normal
	SS	Continue operation in accordance with the UOP currently in effect Calls SSS to initiate a CR and notify OPS duty manager of AOP entry

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 2

Event Description:

Control rod H-8 in control bank D sticks while crew responds to plant transient due to inadvertent turbine runback.

Time	Position	Applicant's Action or Behavior
	RO / SS	Diagnoses stuck rod with DRPI indications
	SS	Enters AOP 18003-C section C if deviation > 12 steps Enters SOP 13502-1 section 4.2.1 if deviation is < or + 12 steps
	BOP	Stops turbine loading changes (SOP)
	RO	Checks DRPI available
	SS	Initiates LCO 3.1.4 actions concurrent with AOP 18003-C: Condition B applies: B.1.1 Verify SDM is ≥ the limit specified in the COLR – 1 hour - OR - B.1.2 Initiate boration to restore SDM to within limit – 1 hour AND B.2 Reduce THERMAL POWER to ≤ 75% RTP – 2 hours AND B.3 Verify SDM is ≥ the limit specified in the COLR –once per 12 hours AND B.4 Perform SR 3.2.1.1. – 72 hours AND B.5 Perform SR 3.2.2.1 - 72 hours AND B.6 Reevaluate safety analyses and confirm results remain valid for duration of operation under these conditions. – 5 days
	RO	Checks that ONLY ONE rod is misaligned > 12 steps by comparing DRPI to group step counters (demand position)
	RO	Places rod control in manual and hold (SOP)
	RO / BOP	Restores Tave to program by either adjusting turbine load or boron concentration (SOP)

Event Description:

Control rod H-8 in control bank D sticks while crew responds to plant transient due to inadvertent turbine runback.

	RO	Maintains power distribution limits when > 50% power for: (SOP) • AFD (PTDB Tab 6.0) • QPTR (< 1.02)
	SS	NOTE: If exact time of rod misalignment not known then uses time of previous rod alignment verification in surveillance procedure 14000.
	SS	Records: (SOP) • Time of rod misalignment • Misaligned rod number • Misaligned rod position (DRPI) • Affected group position (demand and DRPI) • Initial power level
	SS	NOTE: Rod motion is permissible when performing the following step if DRPI is available
	RO / BOP	Reduce thermal power to < 75% within 2 hours from time of rod misalignment
	SS	Initiate corrective action to determine cause of and repair malfunction (SOP)
	SS	Determines if criteria met to realign rod: • Time of misalignment known • Direct cause known and corrective actions taken • Misaligned rod withdrawal begins within: 6 hours (< 10,000 MWD/MTU) 4 hours (> 10,000 MWD/MTU)
	SS	Check reactor power < 75% and stable

Event Description:

Control rod H-8 in control bank D sticks while crew responds to plant transient due to inadvertent turbine runback.

	RO	(Continuous Action) Maintains AFD within +/- 5% of target when > 50% power If AFD cannot be maintained within +/- 5% of target then reduce power to < 50%
	RO	(Continuous Action) Maintain power < 75% (50%) and stable during rod recovery Keep Tave / Tref matched during recovery (SOP)
	CREW	Determines best method is to align affected rod to the group (SOP)
	RO	Selects Control Bank D on bank selector switch (SOP)
	BOP	Disconnects lift coils for all rods in control bank D except rod H-8 (SOP)
	SS	Determines fuel has been preconditioned to > 99% power
	RO	Inserts rod H-8 to control bank D position (SOP)
	SS	Records rod realignment time and position
	BOP	Reconnects all lift coils (SOP)
	RO	Resets Rod Control Urgent Failure alarm using the alarm reset switch HS-40039 if necessary (SOP)
	CREW	Directs control building operator to reset master cycler per procedure 13502, rod control drive and position indication system (SOP)
	RO	Exercises affected bank (SOP) per procedure 14410

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 2

Event Description:

Control rod H-8 in control bank D sticks while crew responds to plant transient due to inadvertent turbine runback.

	RO	Resets affected group step counters to the position recorded by SS (SOP)
	CREW	Directs Control Building Operator to reset P/A converter to match the bank position display recorded by the SS (SOP)
	RO	Places rod bank selector in Manual or Auto as directed by SS (SOP)
	SS	Notified duty engineer that rod realignment has occurred and that a plant computer rod position adjustment may be necessary

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 3 & 4 Page 1 of 4

Event Description:

SI Pump 1A reported INOP due to wrong oil being added to the bearings. SS begins a unit shutdown after entry into LCO 3.0.3.

Time	Position	Applicant's Action or Behavior
	SS	Determines that LCO 3.0.3 is applicable and takes action within 1 hour to place the unit in mode 3 within 7 hours.
	CREW	Implements procedure 12004-C section 4.2 for T.S required shutdown
	SS	DIRECT Chemistry to sample the RCS hydrogen and gas activity concentration
	RO/BOP	ENSURE that Pressurizer Steam Space Sample Line is in service
	SS	NOTIFY Chemistry to adjust the pressurizer steam space sample flow rate to maximum
	RO	ENERGIZE the Pressurizer Backup Heaters to ENHANCE RCS degassing
	RO	MAXIMIZE CVCS letdown purification flow rate (**13006-1**)
	RO	ENSURE CCP B or the NCP is running and supplied with cooling water.
	RO	MAINTAIN RCP 1, 2, 3, & 4 SEAL WATER 1-FI-0145A, 1-FI-0144A, 1-FI-0143A, and 1-FI-0142A flows between 8 and 13 gpm per RCP.
	RO	NOTE CHARGING LINE 1-FI-0121A flow
	RO	SELECT CHARGING LINE 1-FIC-0121 to MANUAL and perform the following simultaneously: RAISE Charging Line 1-FIC-0121 flow to approximately 120 to 130 gpm, ADJUST SEAL FLOW CONTROL 1-HC-0182 as necessary to MAINTAIN Seal Injection flows between 8 & 13 gpm

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Event Description:

SI Pump 1A reported INOP due to wrong oil being added to the bearings. SS begins a unit shutdown after entry into LCO 3.0.3.

	RO	If the NCP is in service, a. ADJUST SEAL FLOW CONTROL 1-HC-0182 as necessary to MAINTAIN Seal Injection flows approximately 8 gpm. b. CLOSE the NCP miniflow valve 1-HV-8109.
	RO	ADJUST SEAL FLOW CONTROL 1-HC-0182 to MAINTAIN Seal Injection flows between 8 & 13 gpm
	RO	ENSURE Regenerative Heat Exchanger Outlet 1-TI-0127 temperature remains less than 290°F
	RO	PLACE LOW PRESS LETDOWN 1-PIC-0131 pressure controller to MAN and ADJUST LO PRESS LETDWN 1-PI-0131A pressure to between 100 and 120 psig
	RO	OPEN the selected letdown orifice by holding its respective handswitch in OPEN until fully open
	RO	ADJUST 1-PIC-0131 to maintain letdown pressure between 360 and 380 psig and SELECT 1-PIC-0131 to AUTO
	RO	MONITOR 1-LR-0459 pressurizer actual level and level setpoint
	RO	ADJUST 1-FIC-0121 to maintain pressurizer level within 1% of setpoint
	RO	If desired, PLACE pressurizer level control in automatic: a. ENSURE PRZR LEVEL CONT 1-LIC-0459 in AUTO, b. PLACE 1-FIC-0121 in AUTO

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Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 3 & 4

Event Description:

SI Pump 1A reported INOP due to wrong oil being added to the bearings. SS begins a unit shutdown after entry into LCO 3.0.3.

	RO	ADJUST 1-TIC-0130 LETDOWN HEAT EXCH OUTLET to maintain LETDOWN HEAT EXCH OUTLET 1-TI-0130 below 115°F, and SELECT to AUTO
	RO	In the Unit Control Log, RECORD the letdown orifice that was placed-in-service
	RO	PLACE the Rod Control System in MANUAL and CONTROL Tavg within 2°F of Tref during the power reduction.
	RO	Selects SOP 13009-1 section 4.8 for frequent RCS borations
	RO	Determine the amount of boric acid necessary to accomplish the desired change in boron concentration using PTDB Tab 2.3 and correct the obtained value using PTDB Tab 2.1 or use instructions provided by Rx Engineering
	RO	Verify the Reactor Makeup System aligned for automatic operation.
	RO	Boric acid flow may be adjusted to desired flow using 1-FIC-0110 with SS concurrence. Changes to pot setting should be logged in the control room log and restored at completion of activity
	RO	Place VCT MAKEUP CONTROL 1-HS-40001B in STOP
	RO	Place VCT MAKEUP MODE SELECT 1-HS-40001A in BOR
	RO	Set BORIC ACID TO BLENDER integrator 1-FQI-0110 for the desired amount of boric acid
	RO	Place VCT MAKEUP CONTROL 1-HS-40001B in START and verify flow indicated on 1-FI-0110A

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Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 3 & 4 Page 4 of 4

Event Description:

SI Pump 1A reported INOP due to wrong oil being added to the bearings. SS begins a unit shutdown after entry into LCO 3.0.3.

	RO	When BORIC ACID TO BLENDER integrator 1-FQI-0110 reaches its setpoint, ensure boration stops and the following valves close: • 1-FV-0110A BORIC ACID TO BLENDER, • 1-FV-0110B BLENDER OUTLET TO CHARGING PUMPS SUCT
	RO	Repeat Steps to borate as necessary to continue power change and/or compensate for Xenon
	SS	Request Unit 2 to supply auxiliary steam
	SS/BOP	NOTIFY System Operator of upcoming power decrease.
	BOP	REDUCE turbine load as desired per 13800, "Main Turbine Operation"
	SS	Each time reactor power change exceeds 15% in a one hour period, NOTIFY Chemistry to perform the following samples: (1) RCS iodine sample per TS SR 3.4.16.2. (Required between 2 and 6 hours after reactor power changes greater than or equal to 15% in a one hour period) (2) Gaseous release path samples per ODCM Table
	RO/BOP	Maintain Tavg within 2°F of Tref
	BOP	Directs ABO to reduce SGBD temperatures per 13605-1 during power descent

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 5

Event Description:

Loss of cooling to CVCS letdown heat exchanger (TE-130 fails low) resulting in hi temperature divert of letdown to protect CVCS demins. RO will have to manually control ACCW flow through the CVCS letdown heat exchanger to restore normal temperatures.

Time	Position	Applicant's Action or Behavior
	RO	Diagnoses loss of cooling to CVCS letdown Heat exchanger: Alarms: • LTDN HX HI TEMP DEMIN DIVERT (ALB7F04) Indications: • CVCS LTDN HX outlet temperature indication (TE-130) offscale low • CVCS valve TV-129 diverts flow around the demins
	RO / SS	Refers to aunnciator response procedure 17007-1 for window F04 *(Note: if flashing in the CVCS letdown line occurs, operator will isolate letdown and SS may elect to enter AOP 18007-C section A for loss of letdown.*
	RO	Takes manual control of TV-130 and restores normal letdown temperature (<132 F)
	RO	Returns TV-129 to the Demin position
	RO	If letdown was manually isolated, refers to SOP 13006-1 section 4.4.2 to restore letdown

Event Description:

Loss of cooling to CVCS letdown heat exchanger (TE-130 fails low) resulting in hi temperature divert of letdown to protect CVCS demins. RO will have to manually control ACCW flow through the CVCS letdown heat exchanger to restore normal temperatures.

	RO	Establishes proper CVCS alignment: • Charging pump - Running • Letdown orifice isolations (HV-8149A/B/C) – Closed • Letdown isolations (LV-459/460) – Closed • PZR auxiliary spray valve (HV-8145) –Closed • Letdown pipe break isolation (HV-15214) – Open • Letdown CNMT isolations (HV-8152/8160) – Open • LETDOWN PRESS 1-PIC-0131 in MANUAL output 50% to 75%, • LETDOWN HX OUTLET TEMP 1-TIC-0130 in MANUAL output 50% • PRESSURIZER LEVEL 1-LR-0459 greater than 17% • Normal or Alternate Charging line valve (HV-8146/8147) –Open • Charging isolation valves (HV-8105/8106) –Open
	RO	Establishes 80-90 GPM charging flow and 8-13 GPM RCP seal injection flow
	RO	Opens letdown isolation valves LV-459 and LV-460
	RO	Establishes letdown flow by opening one 75 GPM orifice isolation valve (HV-8149B or HV-8149C)
	RO	Places letdown pressure control (PIC-131) in automatic after stabilizing pressure between 360-380 psig
	RO	Manually adjusts letdown temperature controller TIC-130 as necessary to maintain letdown temperature < 115 F
	RO	ENSURE REGEN HEAT EXCH LETDWN 1-TI-0127 indicates less than 380°F

Event Description:

Loss of cooling to CVCS letdown heat exchanger (TE-130 fails low) resulting in hi temperature divert of letdown to protect CVCS demins. RO will have to manually control ACCW flow through the CVCS letdown heat exchanger to restore normal temperatures.

	RO	MONITOR 1-LR-0459 pressurizer level and pressurizer level setpoint. Maintain pressurizer level within 1% of setpoint using 1-FIC-0121 output as applicable. If desired, PLACE pressurizer level control in automatic: a. ENSURE PRZR LEVEL CONT 1-LIC-0459 in AUTO, b. PLACE 1-FIC-0121 in AUTO.
	SS	Contacts SSS to initiate corrective actions: • CR • Work order • Contact I&C

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 6

Event Description:

Main Turbine hydraulic pump trips and the standby pump fails to automatically start. BOP must manually start standby pump to prevent turbine trip signal (auto trip defeated).

Time	Position	Applicant's Action or Behavior
	BOP	Diagnoses trip of EHC pump: • 1NB02 TROUBLE alarm • HYD FLUID LO PRESS alarm (1500 psig) • Amber light lit for running EHC pump • EHC pressure lowering
	BOP / SS	Refers to procedure 17020-1 for window D05
	BOP	Starts standby EHC pump and verifies EHC pressure recovers to 1600 psig. Note: Standby EHC pump automatic start at 1400 psig is disabled and turbine will trip if EHC pressure drops to 1100 psig.
	SS	Initiates corrective actions: • Turbine Building Operator to investigate problem • CR • Maintenance contacted

Op-Test No.: Vogtle Scenario No.: 3 Event No.: 7 & 8

Event Description:

Spurious Train B Safety Injection and failure of turbine to automatically trip. Automatic SLI will be overridden to ensure SG inventories are reduced for event 9 (LOHS). BOP will have to manually trip turbine to stop loss of SG inventory.

Time	Position	Applicant's Action or Behavior
	CREW	Diagnose safety injection: SI actuated for train B equipment
	SS	Implements Reactor Trip and Safety Injection procedure E-0 / 19000-C
	SS	E-0 Foldout page continuously monitored and applicable actions taken.
	RO	Verifies reactor is tripped: (IMA) • All rod bottom lights lit • Reactor trip & bypass breakers open • Neutron flux lowering
	BOP ***CRITICAL TASK***	***Verifies turbine is tripped – all stop valves shut – NO*** ***Manually trips turbine***
	CREW	Verifies electrical power available to emergency electrical busses (IMA)
	RO	CHECKS if SI is actuated: (IMA) • Any SI annunciator - LIT. • SI ACTUATED BPLB window LIT
	BOP	Verifies feedwater isolation valves shut: • MFIV's • BFIV's • MFRV's • BFRV's
	RO	Verifies ECCS equipment aligning on the MLB's for Train B only – Manually actuates SI

Op-Test No.: Vogtle Scenario No.: 3 Event No.: 7 & 8

Event Description:

Spurious Train B Safety Injection and failure of turbine to automatically trip. Automatic SLI will be overridden to ensure SG inventories are reduced for event 9 (LOHS). BOP will have to manually trip turbine to stop loss of SG inventory.

	RO	Verifies CNMT Isolation Phase A Actuated – CIA MLB's indicators correct
	BOP ***CRITICAL TASK***	Verifies proper AFW system operation: • MDAFW pumps – running (Will not be running) • ***SGBD Isolation Handswitches – place in hard close (SGBD Isolation valves will be overridden open)*** • SG sample isolations - shut • TDAFW pump running if lo-lo level on 2 SGs or blackout (will be tripped on overspeed)
	BOP / SS	Dispatches operator / maintenance personnel to investigate and fix AFW system problems.
	RO	Verifies ECCS pumps running: • CCP's • SI Pumps • RHR Pumps Verifies NCP – NOT running
	BOP	Verifies 2 CCW pumps in each train - running
	BOP	Check for proper NSCW system operation: • 2 pumps in each train – running • NSCW TOWER RTN HDR BYPASS BASIN handswitches - in AUTO: HS-1668A HS-1669A
	RO	Verifies CNMT Cooling Units: • Fans running in low speed – MLB indicators • NSCW cooler isolation valves open – MLB indicators
	RO	Verifies CNMT Ventilation Isolation – dampers & valves shut (MLB indicators)

Op-Test No.: Vogtle Scenario No.: 3 Event No.: 7 & 8

Event Description:

Spurious Train B Safety Injection and failure of turbine to automatically trip. Automatic SLI will be overridden to ensure SG inventories are reduced for event 9 (LOHS). BOP will have to manually trip turbine to stop loss of SG inventory.

	RO / BOP	Checks if SLI should be actuated: • Any Steamline pressure < 585 psig • CNMT pressure by recording > 14.5 psig • High steam pressure rate if SI/SLI blocked
	RO	Check CNMT spray is actuated if CNMT pressure by recording > 21.5 psig
	BOP	Verify both diesel generators running
	SS	Caution - Non-essential personnel should be evacuated from containment if conditions warrant.
	RO	Verify BIT flow
	RO	Checks RCS pressure > 1625 psig
	BOP	Verifies generator output breakers trip open 30 seconds after turbine trip
	BOP	(continuous action) Verifies total AFW flow > 570 GPM or controls flow to maintain SG NR levels > 10% (32%) Notes that there is no AFW flow and all SG NR levels are < 10% (32%)
	SS	GOES TO 19231-C, FR-H.1 RESPONSE TO LOSS OF SECONDARY HEAT SINK. (Event 9)

Op-Test No.: Vogtle 2005 Scenario No.: 3 Event No.: 9

Event Description:

Loss of all feedwater occurs resulting in a loss of secondary heat sink. Crew will need to initiate RCS bleed and feed or take actions to establish condensate flow to the SG's.

Time	Position	Applicant's Action or Behavior
	SS	Implements loss of heat sink EOP 19231-C / FR-H.1
	SS	CAUTION: If total feed flow is less than 570 gpm due to operator action, and if total feed flow capability of 570 gpm is available, this FRP should not be performed. Feed flow should not be re-established to any faulted SG if a non-faulted SG is available.
	SS	NOTE: 91001-C EMERGENCY CLASSIFICATION AND IMPLEMENTING INSTRUCTIONS should be implemented at this time.
	CREW	Check if secondary heat sink is required: a. RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE. b. RCS WR temperature - GREATER THAN 350°F.
	RO	Check at least one CCP available
	CREW	(Continuous Action) Checks RCS Bleed & Feed Criteria: • WR level in any 3 SG's < 29% (44%) - OR - • RCS pressure due to loss of heat sink > 2335 psig When criteria met then trip all RCP's and initiate bleed & feed

Event Description:

Loss of all feedwater occurs resulting in a loss of secondary heat sink. Crew will need to initiate RCS bleed and feed or take actions to establish condensate flow to the SG's.

	BOP	Place CNMT Hydrogen Monitors in service using 13130-1:
		• Open CNMT isolation valves for monitors:
		  o 1HV2792A, 1HV2792B, 1HV2791B, 1HV2793B (Trn A)
		  o 1HV2790A, 1HV2790B, 1HV2791A, 1HV2793A (Trn B)
		• MODE switch in ANALYZE
		• FUNCTION SELECTOR in SAMPLE
		• Depress remote control button & verify sample light is on

	SS / BOP	Try to establish AFW flow to at least one steam generator: • SGBD valves – shut • SG sample valves – shut • Condensate storage tank level > 15% • Motor driven AFW pumps – power/ alignment • AFW throttle valves –open • Turbine driven pump valve alignment
	RO	Stop all RCP's
	CREW	Note the crew will take the following actions to clear the FWI signal: • MFRV's – shut in manual • Check SI actuated • Block SI signals from CNMT pressure if > 3.8 psig • Depressurize < 1950 psig (P-11) and block low steamline pressure SI and low PRZR pressure SI • Reset SI • Cycle reactor trip breakers to break seal-in on FWI signal • Reset FWI
	BOP	Will try to establish flow from a main feed pump but will not be able to start the steam driven feedwater pump due to the steamlines being isolated.

Event Description:

Loss of all feedwater occurs resulting in a loss of secondary heat sink. Crew will need to initiate RCS bleed and feed or take actions to establish condensate flow to the SG's.

	BOP Critical Task	***Will establish condensate flow to one steam generator by:*** • ***Checking MSIV's & BSIVs shut*** • ***Depressurizing selected SG to < 550 psig using ARV*** • ***Opening MFP discharge valves*** • ***Verifying a condensate pump is running*** • ***Opening Bypass Feed Isolation Valve*** • ***Opening Bypass feed regulating valve***
	CREW	If flow established to one SG and RCS bleed and Feed has ***NOT*** been established then crew will transition out of loss of heat sink procedure and return to procedure and step in effect. If RCS bleed and feed ***has*** been established then crew will remain in the loss of heat sink procedure until one SG has NR level > 10% (32%).

Event Description:

Loss of all feedwater occurs resulting in a loss of secondary heat sink. Crew will need to initiate RCS bleed and feed or take actions to establish condensate flow to the SG's.

		The following are for RCS bleed & feed
	SS	CAUTION: Steps 12 thru 15 should be performed quickly in order to establish RCS heat removal by RCS bleed and feed.
	RO ***CRITICAL TASK***	***Actuate SI, if not previously actuated.***
	RO ***CRITICAL TASK***	***Verify at least one CCP or SI pump running***
	RO ***CRITICAL TASK***	***Verify proper ECCS injection alignment indicated on MLB's***
	SS	CAUTION: During bleed and feed operation the PRT may rupture. Containment pressure should be monitored and CS actuation should be verified if containment pressure reaches 21.5 psig.
	RO ***CRITICAL TASK***	***Establish RCS bleed path:*** ***a. Place all PRZR heaters in OFF/PTL.*** ***b. Verify power to PRZR PORV block valves - AVAILABLE*** ***c. Arm COPS and verify PRZR PORV block valves - BOTH OPEN.*** ***d. Open both PRZR PORVs.***
	RO	Verify adequate bleed path: Both PORV's open Both PORV block valves open with COPS armed

Event Description:

Loss of all feedwater occurs resulting in a loss of secondary heat sink. Crew will need to initiate RCS bleed and feed or take actions to establish condensate flow to the SG's.

	BOP	Perform Steps 1 thru 17 of 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION while continuing with this procedure.
	CREW	(Continuous Action) Maintain RCS heat removal: • Maintain ECCS flow. • Maintain PRZR PORVs – BOTH OPEN.
	SS	CAUTION: If offsite power is lost after SI reset, action is required to restart the following ESF equipment if plant conditions require their operation: • RHR pumps • SI pumps • Post-LOCA cavity purge units. • Containment Coolers in low speed (Started in high speed on a UV signal) • ESF Chilled Water Pumps (if CRI has been reset)
	RO	Reset SI
	SS	CAUTION: Repositioning Phase A isolation valves may cause radiation problems throughout the plant.
	BOP	Reset containment isolation Phase A.
	SS	NOTE: Establishing instrument air to containment may result in opening of pressurizer spray valves and unexpected lowering of RCS pressure.

Event Description:

Loss of all feedwater occurs resulting in a loss of secondary heat sink. Crew will need to initiate RCS bleed and feed or take actions to establish condensate flow to the SG's.

	BOP	Establish instrument air to containment: a. Verify instrument air a. Start additional air pressure - GREATER THAN 100 PSIG b. Open INSTR AIR CNMT ISO VLV HV-9378 using handswitches HS-9378A and HS-9378B.
	BOP	Place Containment Hydrogen Monitors in service by initiating 13130, POST ACCIDENT HYDROGEN CONTROL.
	SS	CAUTION: If Containment Spray is actuated and a primary LOCA is indicated by high containment radiation levels, continuous spray for a minimum duration of 2 hours is required. This should include or be followed by operation in the recirculation mode for a minimum of 1.5 hours per 19013-C, ES-1.3 TRANSFER TO COLD LEG RECIRCULATION, Step 8.
	RO	(Continuous Action) Check if conditions met to stop CNMT Spray pumps: • CNMT Pressure < 15 psig • Spray pumps running 2 hours and at least 1.5 hours in recirculation mode If met, then reset CS signal, Stop CS Pumps, Shut CS isolation valves HV-9001A & HV-9001B

Event Description:

Loss of all feedwater occurs resulting in a loss of secondary heat sink. Crew will need to initiate RCS bleed and feed or take actions to establish condensate flow to the SG's.

	SS	CAUTION: If RWST level lowers to less than 39%, ECCS should be aligned for cold leg recirculation using 19013-C, ES-1.3 TRANSFER TO COLD LEG RECIRCULATION. RHR pumps should not be run longer than 30 minutes without CCW to the RHR heat exchangers. NOTES: Continued attempts to establish a secondary heat sink should use Steps 5, 7 and 9 as guidance. If bleed and feed has been initiated and RCS Core Exit temperatures are stable or lowering, feed flow to one steam generator at a time should be established at a rate of 30-100 gpm until level exceeds 9% WR [31% ADVERSE]. Feed flow rates should be controlled to prevent excessive RCS cooldown.
	CREW	(Continuous Action) Continue attempts to establish secondary heat sink in at least one SG: • AFW flow. • Main FW flow. • Condensate flow.

Initial Conditions: IC 14 The Unit has been at 100% power for three months following a refueling outage.

Pre-load malfunctions:

- **ES01 - Auto Reactor Trip Failure**
- **ES02 - Manual Reactor Trip Failure**
- **ES03 - RTB 'B' Fails to Open**
- **AC03B - ACCW pump #2 Failure to Auto Start**
- **O/R HV-8811A & B CLOSE**
- **RF: ES46 - P14 Setpoint Adjustment to 83%**

Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.:

- **NCP & miniflow Tagged Out (CCP 'B' running) – expected back tomorrow by 1200.**
- **SI Pump 'A' Tagged Out –OOS yesterday at 0800, and should be cleared in 12 hrs. LCO 3.5.2 (Cond. A)**
- **Secondary aligned per 18009-C, Section B**
- **IPC Mode & trends**
- **Reactivity Briefing and Shift Manning Sheets**

Turnover: Maintain full power operation.

The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.

Steam Generator #1 has a 30 gallon / day tube leak. **18009-C section B is in effect, Action Level 1 monitoring is in progress , TS 3.4.13 INFO LCO on Identified RCS leakage.**

Time	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	SG 05B	O%	SG #2 controlling feed flow transmitter (FT-522) fails low.
2	**NI10D**	N/A	Power Range NI channel 44 fails high.
3	**MS06A**	**50%**	SG #1 MS safety valve fails partially open. TS required power reduction. **If requested, use RF MS __ to simulate Maintenance gagging safety closed.**
5	**AC02A**	**N/A**	Trip of running ACCW pump #1 with pump #2 failing to auto start.
6	**CV05**	**100**	Letdown heat exchanger tube leak. **If dispatched, perform local isolations of Letdown Hx using RF AC 06**
7	**RD07**	**N/A**	Rods will fail to insert automatically during the next event. Manual insertion required during ATWT response.
8	**RC05A**	**5-50% in 200 sec**	RCS leak that leads to ATWT. **After crew performs step 17 of 19000, <u>remove RC05A</u> and replace with <u>RC03A</u> (DBA)**
9	**RF TK02 1500 sec**	**95-39%**	**This ramp rate ensures adequate Cnmt sump level will be available for the transitions to 19013-C, Cold Leg Recirculation.**
END			**After crew initiates actions of 19111-C to keep core covered and initiates emergency work to get sump isolation valves open.**

OPERATING PLAN:

- The Unit has been at 100% power for three months following a refueling outage. Maintain full power operation per 12004-C.

- NCP Tagged Out due to high vibration. It is expected back tomorrow by 1200.

- SI Pump 'A' Tagged Out due to bearing failure. It has been out of service since yesterday at 0800, and should be returned to service in 12 hrs. LCO 3.5.2 (Cond. A) is in effect.

- The Severe Weather checklist is in progress due to thunderstorms approaching from the West. High winds are possible within the hour.

- Steam Generator #1 has a 30 gallon / day tube leak.

- The required actions of 18009-C, section B, "Operation with a Minor SGTL" have been initiated. Action Level 1 monitoring is in progress.

- TS 3.4.13 INFO LCO on Identified RCS leakage.

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Event No.: 1

Event Description: Controlling feed flow channel on SG #2 fails low.

Time	Position	Applicant's Action or Behavior
	BOP SRO	Diagnose controlling SG #2 feed flow channel failure: • STM GEN 2 FLOW MISMATCH alarm • steam/feed flow mismatch on indicators
	BOP **IOA**	Take manual control of affected SG feed flow and MFP(s) speed to restore NR level between 60% and 70%.
	SRO	Initiates AOP 18001-C, Section G to direct crew actions.
	BOP	Selects an unaffected channel for SG level control.
	BOP	Returns SG level and MFP control speed to Auto, and monitors parameters to verify proper system response: • steam and feed flows • SG levels • MFP speed
	SRO	Initiates repair activities: • CR & WO generated • Duty Manager of AOP entry • Maintenance notified for support

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Event No.: 2

Event Description: Power Range NI channel 44 fails high.

Time	Position	Applicant's Action or Behavior
	RO SRO	Diagnose PR NI channel failure: • PWR RANGE CHANNEL DEVIATION alarm. • PWR RANGE UP/LWR DET HI FLX DEV alarm (5 min delay) • PWR RANGE HI NEUTRON FLX HI SETPOINT ALERT alarm • OVERPOWER ROD STOP alarm. • POWER RANGE HI NEUTRON FLX RATE ALERT. • Power Range Trip status lights illuminated. • Rapid inward motion of control rods in automatic rod control.
	RO **IOA**	Takes manual control of control rods to stop rapid insertion.
	SRO	Initiates AOP 18002-C, Section B to direct crew actions.
	BOP	Ensures no load changes in progress.
	BOP	Bypasses PR NI channel 44 on: • ROD STOP BYPASS switch • COMPARATOR CHANNELDEFEAT switch • POWER MISMATCH BYPASS switch • UPPER SECTION switch • LOWER SECTION switch
	BOP	Resets rate trip
	RO	Restores RCS Tavg to program by initiating rod withdrawal.

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Event No.: 2

Event Description: Power Range NI channel 44 fails high.

	RO	Returns rod control to auto, if desired.
	SRO	Initiates repair activities: • CR & WO generated • Duty Manager of AOP entry • Maintenance notified for support
	SRO	Verifies Tech Spec 1-hour Actions: Within one hour, verify interlock is in required state for existing unit conditions, as required by Technical Specifications 3.3.1-1 function 16c, d, e.
	RO	Verifies BPLB status lights correct for existing plant conditions: • P8 • P9 • P10 & input to P7
	SRO	Initiates review of Tech Specs: Evaluates need to pull fuses and/or trip affected bistables within 72 hours. • TS LCO 3.3.1 Functions 2A, 3, and 6
	SRO	Notifies Reactor Engineering to initiate 88015-C, QPTR CONFIRMATION per Tech Spec SR 3.2.4.2.
	SRO	Identifies need to initiate 14915, SPECIALCONDITIONS SURVEILLANCE LOGS, DATA SHEET 7

Op-Test No.: 2005-301 **Scenario No.:** 4 **Page 1 of 2**

Event No.: 3 and 4

Event Description: SG #1 Main Steam Safety Valve Fails Open

Time	Position	Applicant's Action or Behavior
	BOP SRO	Diagnose opening of SG Safety Valve by any of the following indications: • ALB 15 F01 MS Safety Valve Leaking alarm • Tailpipe temperature monitoring panel alarm on QPCP • Lowering RCS temperature • Rising reactor power • SG #1 steam flow indication
	SRO	Directs crew to lower power to keep all power indications below 100%.
	BOP	Lowers turbine power to limit reactor power rise and restore RCS Tavg.
	SRO	Implements available ARP and/or AOP guidance for Main Steam safety valve failure.
	RO	If necessary, control charging and letdown flow to maintain Pressurizer level in program band.
	RO	If necessary, operate heaters and sprays as required to maintain Pressurizer pressure in program band.
	BOP	Ensures hotwell level being adequately maintained.
	RO	Verifies CNMT pressure indications are normal.

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Event No.: 3 and 4

Event Description: SG #1 Main Steam Safety Valve Fails Open

	SRO	Reviews Tech Specs for applicability. • Reduce power and adjust the High Flux Trip Setpoints to **less than or equal to 71%** per TS LCO 3.7.1, Table 3.7.1-1.
	SRO	Initiates repair activities and informs plant management of required power reduction: • CR & WO generated • Duty Manager of AOP and Tech Spec entries • Maintenance notified for support
	RO	Initiates power reduction by initiating boration and/or inserting control rods.
	BOP	Reduces turbine load to reduce power.

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Event No.: 5

Event Description: Trip of ACCW pump #1 with pump #2 failing to automatically start.

Time	Position	Applicant's Action or Behavior
	SRO BOP RO	Diagnose degraded ACCW conditions by noting trip of ACCW pump #1 and abnormal system conditions: • ACCW LO HDR PRESS annunciator. • ACCW RCP 1 (2) (3) (4) CLR LOW FLOW annunciator. • ACCW RCP 1 (2) (3) (4) CLR OUTLET HI TEMP annunciator. • ACCW RX COOLANT DRN TK HX LO FLOW annunciator. • ACCW EXCESS LTDN HX LO FLOW annunciator. • ACCW RTN HDR FROM RCP LO FLOW annunciator. • Low ACCW header pressure indication May also get alarms listed below depending on timing of standby ACCW pump start: • Letdown Hx Outlet Hi Temp • Letdown Hx Hi Temp Demin Divert
	SRO	Initiates AOP 18022: • Directs RO to start at least one ACCW pump
	BOP	Informs SS of auto-start failure of ACCW pump #2, and manually starts standby ACCW pump. Note: This action may occur before AOP is initiated
	BOP	Verifies proper operation of ACCW by checking for: • At least 135 psig on PI-1977 • Adequate ACCW surge tank level on IPC • Thermal barrier isolation valves open • Return temperature less than 1200F

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Event No.: 5

Event Description: Trip of ACCW pump #1 with pump #2 failing to automatically start.

	BOP	Verifies ACCW Containment isolation valves open: • ACCW SPLY HDR ORC ISO VLV - HV-1979 • ACCW SPLY HDR IRC ISO VLV- HV-1978 • ACCW RTN HDR IRC ISO VLV -HV-1974 • ACCW RTN HDR ORC ISO VLV -HV-1975
	RO Continuous	Recognizes RCP Trip Criteria NOT present
	SRO	Initiates repair activities: • CR & WO generated • Duty Manager of AOP entry • Maintenance notified for support

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Event No.: 6

Event Description: Letdown heat exchanger tube rupture.

Time	Position	Applicant's Action or Behavior
	RO SRO	Diagnose loss of RCS/CVCS inventory by any of the following indications: • Radiation alarms on RE-1950 • Lowering letdown flow
	SRO	Implements ARP guidance for high radiation on RE-1950: • REQUEST Chemistry to sample and analyze the ACCW. • NOTIFY Health Physics of the alarm. • LOCATE the source of inleakage. • ISOLATE the source if possible.
	RO	PLACE LETDOWN TO DEMIN/VCT 1-TV-0129 to the VCT position using 1-HS-0129, and VERIFY 1-TV-0129 aligns to the VCT.
	RO	PLACE VCT HUT LETDOWN DIVERT 1-LV-0112A to the HUT position using 1-HS-0112A, VERIFY 1-LV-0112A aligns to the RHUT.
	RO	ISOLATE letdown. ENSURE closed: • 1-HV-8149A, B, C • 1-LV-0459 • 1-LV-0460 • 1-HV-8152 • 1-HV-8160 • 1-PV-0131 • 1-TV-0130

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Event No.: 6

Event Description: Letdown heat exchanger tube rupture.

	SRO RO	Dispatch System Operator to SHUT Letdown Heat Exchanger manual valves: • (AB-A08) 1-1208-U6-041, • (AB-A17) 1-1217-U4-126, • (AB-108) 1-1217-U4-129.
	SRO	NOTIFY Chemistry of letdown isolation.
	SRO	Initiate AOP 18007, Section A, to address the loss of letdown flow.
	RO	Reduce charging flow to 10 gpm > total Seal Injection flow
	RO BOP	Place Excess Letdown in service per 13008-1 • Opens HV-8153 & 8154 • Establishes flow with HC-123 Establishing Excess Letdown may cause an alarm on the QPCP: • Backflushable Filter Panel alarm Operator would be dispatched to acknowledge and investigate.
	RO	Verify the ability to control Pressurizer level. If Pressurizer level can not be controlled, then the normal charging flow path will be isolated. All of charging would be routed through the RCP seals.
	SRO	Evaluate long term operation without normal charging and letdown in service
	SRO	Notify Shift Manager/Ops Duty Manager for support for the following: • Notification to plant management of AOP entry • Maintenance on the letdown system

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Event No.: 7

Event Description:

A medium LOCA develops inside Containment. The accident condition will force the crew to attempt a manual Reactor Trip. The Reactor will not manually or automatically trip. The crew will implement 19211 for an ATWT condition. The control rods will not automatically insert. This will force manual insertion of control rods by the RO. The Reactor will be tripped locally. After transitioning back to 19000, RCP trip criteria will become applicable. After the RCP's are tripped, a DBA LOCA will develop.

Time	Position	Applicant's Action or Behavior
	ALL	Recognizes degrading plant conditions: • High radiation alarms in Containment • Lowering Pressurizer level and pressure indications and alarms • High Containment moisture and temperature alarms
	SRO	Directs RO to manually trip the Reactor. Note: As pressure rapidly lowers, an Automatic Rx Trip signal will be generated by the calculated OTDT Rx Trip prior to receiving the Low Pressure Rx Trip.
	RO IOA **Critical Task**	**Attempts to trip the Reactor with manual handswitches.** **When Reactor can not be tripped, begins manually inserting control rods in manual.**
	BOP IOA	Manually trips turbine and verifies turbine is tripped • All stop valves shut
	SRO	Dispatches an operator to locally trip the Reactor.
	SRO	Implements 19211 for the ATWT condition.
	BOP	Ensures that Generator output breakers have opened.

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Event No.: 7

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	BOP	Verifies AFW pumps are running
	RO	Checks Reactor for subcritical indications: • Power < 5% • No positive SUR • Reactor trip and bypass breakers open Note: These indications won't be met. The crew will have to complete 19211.
	SRO	Emergency Borate the RCS and verify RCS pressure less than 2335 psig. Note: SI will have automatically actuated and RCS pressure will be rapidly lowering due to the large LOCA.
	RO	Verifies CVI has occurred by checking MLB indications
	ALL	Verify Rx and Turbine trips have occurred. Note: The crew will initiate a verification of the first 16 steps of 19000 while continuing on with 19211.
	BOP	Control SG levels between 32-65% by maintaining 1260 gpm AFW flow
	RO SRO	Verifies dilution paths isolated: • FV-111A shut • Operator dispatched to 1-1208-U4-183 to verify shut

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Event No.: 7

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	ALL	Verify RCS cooldown stopped. Note: Depending on the timing and completion of prior actions, a cooldown will probably be present at this time. This would require the crew to lower AFW flow to 570 gpm, and isolate the Main Steamlines.
	RO	Verifies Reactor is subcritical: • PR channels < 5% • IR channels – Negative SUR
	SRO	Transitions to 19000. • Short crew transition briefing would be expected at this point.
	RO	Verifies Reactor tripped.
	BOP	Verifies Turbine tripped.
	BOP	Verifies power to all emergency busses.
	RO	Verifies SI is actuated: • SI annunciator - LIT • SI ACTUATED BPLB window LIT
	BOP	Verifies feedwater isolation valves shut: • MFIV's • BFIV's • MFRV's • BFRV's

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Event No.: 7

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	RO	Verifies ECCS equipment aligning on the MLB's.
	RO	Verifies CNMT Isolation Phase A Actuated • CIA MLB's indicators correct
	BOP	Verifies proper AFW system operation: • MDAFW pumps – running • SGBD isolation Handswitches – place in hard close • SG sample isolations - shut • TDAFW pump running if lo-lo level on 2 SGs or blackout
	RO	Verifies ECCS pumps running: • CCP's • SI Pumps • RHR Pumps Verifies NCP – NOT running
	BOP	Verifies 2 CCW pumps in each train – running
	RO	Check for proper NSCW system operation: • 2 pumps in each train – running • NSCW TOWER RTN HDR BYPASS BASIN handswitches - in AUTO: HS-1668A HS-1669A

Event No.: 7

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	RO	Verifies CNMT Cooling Units: • Fans running in low speed – MLB indicators • NSCW cooler isolation valves open – MLB indicators
	RO	Verifies CNMT Ventilation Isolation – dampers & valves shut (MLB indicators)
	RO / BOP	Checks if SLI should be actuated: • Any Steamline pressure < 585 psig • CNMT pressure by recording > 14.5 psig • High steam pressure rate if SI/SLI blocked
	RO	Check CNMT spray is actuated if CNMT pressure by recording > 21.5 psig
	BOP	Verify both diesel generators running
	RO	Verify BIT flow on FI-917A
	RO	Checks RCS pressure < 1625 psig
	RO	Checks RCS pressure > 300 psig
	BOP	Verifies generator output breakers trip open 30 seconds after turbine trip

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	BOP Continuous action	Verifies total AFW flow > 570 GPM or controls flow to maintain SG NR levels > 10% (32%)
	RO	Verifies ECCS valve alignment proper on MLB indicators
	RO BOP	Checks RCS temperature stable at or trending to 557.
	RO	Verifies: • PZR PORV's –shut in auto • Normal PZR Spray valves – shut • Power available to at least one PORV block valve & it opens > 2185 psig RCS pressure
	RO Continuous action	Maintain RCP seal injection flow 8-13 GPM per RCP by adjusting FV-121, as necessary.
Critical Task	**SS / RO**	**Check RCP trip criteria** **Note: This is Foldout Page item and would be applicable when 19000 is re-entered from 19211.** **Note: At this point, or after the RCP's are stopped, the LOCA will become a DBA. This will cause a momentary Orange path to come in and out on the Core Cooling CSFST as the RCS depressurizes. If the crew validates this indication, a transition to 19222 should not be required. The RCS Integrity CSFST will turn RED due to the large cooldown. The crew should transition to 19241-C, to determine that the Integrity FRP does not need to be completed due to RCS pressure and RHR flow, and should transition back out at step 1.**

Event No.: 7

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	RO Continuous Action	Verifies one ACCW pump running
	BOP	Places CNMT hydrogen monitors in service on QPCP using SOP 13130
	BOP	Verifies SG secondary pressure boundaries intact: • No SG pressure lowering in an uncontrolled manner • No SG completely depressurized
	BOP	Verifies SG tubes intact: • No change in secondary radiation indications • No abnormal/changing sample results from Chemistry • No uncontrolled level rise in any SG • Initiates post-accident sampling of SG's for activity
	SRO RO	Verifies RCS NOT intact inside Containment: • Containment radiation -ABNORMAL. • Containment pressure -ABNORMAL. • Containment emergency recirculation sump levels - ABNORMAL.

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	SRO	Implements 19010-C to respond to RCS LOCA inside Containment: • CSFST and Foldout Page monitoring assigned/initiated • Shift Manager notified to implement 91001-C (EPIP's) • Seal injection flow maintained to RCP's.
	RO Continuous	Check RCP Trip Criteria • RCS pressure < 1375 psig • CCP or SIP available
	RO	Verify at least one ACCW pump in service
	BOP	Place Containment Hydrogen Monitors in service
	BOP	Verify no faulted SG exists: • No uncontrolled depressurizaton • No complete depressurization
	BOP Continuous	Throttle AFW flows to maintain intact SG levels in program band • 32-65% for adverse CNMT
	BOP Continuous	Verify no SGTR indications exist: • No abnormal secondary radiation • No uncontrolled level rise
	RO Continuous	Verify proper operation of PORV's and PORV block valves

Event No.: 7

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	ALL	Verifies ECCS termination criteria met: • RCS subcooling - GREATER THAN 24°F (38°F ADVERSE) • Secondary heat sink: · Total feed flow to intact SGs-GREATER THAN 570 GPM OR Narrow range level in at least one intact SG GREATER THAN 10% [32% ADVERSE.] • RCS pressure - STABLE or RISING. • PRZR level - GREATER THAN 9% [37% ADVERSE.]
	SRO	Transitions to 19013-C when RWST level lowers to 39%.

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Event No.: 8

Event Description:
While performing 19013-C, ECCS for Cold Leg Recirculation, the crew will discover that the Emergency Sump supplies to ECCS (HV-8811A & B) can not be opened. This will force the crew to transfer to 19111-C, Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Action or Behavior
	SRO	Initiates 19013-C, to initiate Cold Leg Recirculation alignment:
	SRO	Plant personnel notified of Cold Leg Recirc alignment: • Health Physics • Page announcement performed
	SRO	Reviews initial notes and cautions of 19013 with crew: • Actions required if offsite power lost after SI reset • FRP's not to be performed until after alignment completed • Need for haste. Minimum of 14 minutes until potential loss of suction
	RO	Resets SI
	RO	Verifies cooling water systems available to support CL Recirc: • CCW system operation normal • NSCW system operation normal
	RO Continuous	Monitors level in the containment emergency sumps and RWST to ensure inventory for RHR pump(s) suction.

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Event No.: 8

Event Description:
While performing 19013-C, ECCS for Cold Leg Recirculation, the crew will discover that the Emergency Sump supplies to ECCS (HV-8811A & B) can not be opened. This will force the crew to transfer to 19111-C, Loss of Emergency Coolant Recirculation.

	RO	Verifies flow path NOT available for RHR pumps: • HV-8811A and HV-8811B can not be opened Note: Crew will be directed to stop RHR pumps to attempt manual realignment, but this will be unsuccessful. Since neither sump suction can be opened, the crew will be directed to 19111-C.
	SRO	Initiates 19111-C, Loss of Emergency Coolant Recirculation
	SRO	Reviews initial notes and cautions of 19111 with crew: • If recirculation capability is restored at any time, return to procedure and step in effect • Stop any ECCS or CS pump that loses suction
	SRO ROP Continuous	Check if Emergency Coolant Recirculation capability is available: • Flowpath • Sump level • Power available
	RO	Verifies SI reset
	BOP	Verifies CCU's running in Lo speed

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	SRO RO	Determine minimum CS requirements based on: • RWST level • Containment pressure • Containment Cooling Units running NOTE: Table is utilized to determine the number of CS pumps required.
	RO Continuous	Align CS pumps for recirculation, if necessary
Critical Task	**SRO**	**Initiate Makeup to the RWST:** • **Initiate 13701, BORIC ACID SYSTEM** **OR** • **Initiate ATTACHMENT A, Makeup From Spent Fuel Pool.** **Note: Both of these choices will involve dispatching operators to perform local actions. Initiating either will be considered SAT.**
	BOP	Maintain intact SG's in program band.
	ALL	Initiate RCS cooldown. Won't be required due to RCS conditions
	RO	Establish one train of ECCS Note: If RHR pumps are not running (due to previous guidance), then the crew should re-open HV-8812A or B and start a RHR pump at this point.
	RO	Check if a RCP can be started.

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Event No.: 8

Event Description:
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Critical Task	SRO RO	Check if ECCS can be terminated: • Full range RVLIS > 62% • RCS subcooling > 880F Note: Due to crew actions taken for the failure of both RHR sump suction valves and the timing of crew response, any of the conditions listed below may be present. The conditions are listed from most likely to be present to least likely to be present. Sat performance of this task will depend upon the crew taking the appropriate action for the plant condition present at the time this step is reached: ○ If Full range RVLIS is below 62%, then the crew will go to step 20 and must start available ECCS pumps as necessary to raise RVLIS indication above 62%. ○ If RVLIS is >62%, but subcooling is < 88 F, then the crew will be required to reduce ECCS injection flow per Figure 1 of 19111. ○ If both conditions are satisfied, then 19111 will provide guidance to terminate ECCS and establish normal charging flow.
	SRO	If applicable, determine minimum required ECCS flow per Figure 1: • Time since Reactor Trip • Core Exit TC indications
	Freeze	Terminate scenario when: • RWST makeup has been initiated, • Maintenance dispatched for HV-8811A&B • Lead Examiner request