

Draft Submittal
(Pink Paper)

SIMULATOR SCENARIOS

FARLEY NOV/DEC 2007-301 EXAM

05000348/2007301 AND 05000364/2007301

**NOVEMBER 5 - 15, 2007
DECEMBER 21, 2007**

FARLEY 2007-301 SIMULATOR SCENARIO COMMENTS
FJE 9/21/07

Generic Comments

A reminder that Forms 301-4, 5, and 6 will require modification for any changes that may result from these comments.

Please delete the examiner names from all Scenarios, as Jay Hopkins will be participating under instruction (i.e. will not be an examiner of record) and may not participate in all scenarios.

Include a copy of any written turnover instructions that will be provided to the applicant.

Please delete the designation "spare" from Scenario #5. I will decide which one will be spare after validating the scenarios during prep week and discussing this with the other examiners.

As the first row of each event, please include how the event is to be cued as well as a summary of plant parameters that would indicate that the event is in progress (i.e. the alarm and instrumentation cues the crew will receive.) See Appendix D, page 3 of 39, paragraph 3, e.g.:

Booth Operator Instructions:	Actuate ET-5 (SG "C" Controlling Steam Pressure Channel Fails HI) on cue from the Lead Evaluator.
Indications Available:	ALB-014-1-2 and 2-2 (LOOP A and LOOP B HI STEAM LINE ΔP)

Booth Operator Instructions:	ET-2 (Boric Acid Tank leak) is initiated during the power reduction.
Indications Available:	ALB-6-6-3, BORIC ACID TANK HIGH/LOW LEVEL

At or near the end of each event, please provide a suggested event terminus (see Appendix D, page 3 of 39, paragraph 3.)

The basis (safety significance and/or supporting reference), and measurable indicators for a number of the critical tasks seem to be implied rather than explicitly stated. Please be explicit (using the language of Appendix D, section D) when describing a critical task in order to prevent inappropriate grading of applicants.

Please provide a binder for each scenario and tabs for the attached procedures for use during exam week.

Modify forms ES-301-4 and ES-301-5 to reflect any changes to Event Types on the outlines (Form ES-D-1).

Scenario No. 1

Event No. 1:

Would the MCR also get a call from the transmission operator / load dispatcher or be required to initiate contact with them?

Provide detailed instructions in body or attachment for changing turbine load (UOP-3.1?)

How does RO decide how much boron/rods to use? Calculated on-shift or via pre-approved reactivity plan?

Event No. 2:

The actions for this event appear to be summarized by position rather than chronologically. The RO (pg. 7) presumably has to recognize that LT-460 has failed before the SRO (page 6) enters AOP-100. Appendix D, page 3 of 39, paragraph 5, states that actions should, to the extent possible, be listed in chronological order. Please reorganize to show actions in chronological order.

What is the intent regarding restoration of letdown? If letdown is restored (e.g. by the BOP), this would count as a Normal evolution.

Page 8 of 9 shows the BOP performing ARP actions concerning pressurizer pressure. Will this be the RO?

Event No. 3

See comments for Event 2 regarding chronological sequencing of actions.

Page 10 of 93 – please highlight (e.g. bold, italics, etc.) which of the BOP actions listed are immediate actions.

Event No. 4

See comments for Event 2 regarding chronological sequencing of actions.

Event No. 5:

See comments for Event 2 regarding chronological sequencing of actions.

Page 14 of 93 appears to be a copy and paste of operating procedures for resetting C-7A. However, there is no reference to these actions on the other pages of Event 5 and no position associated with these actions on page 14.

Event Nos. 6/7:

The last bullet of actions for the BOP during Event 5 (page 13 of 93) shows the BOP tripping the B SGFP. If the BOP trips this pump in response to an associated fault initiated during Event 5, then it does not count as an additional component failure as shown on Form ES-D-1. Event 6 appears to be an ATWS (major transient (M) only) caused by the trip of the A SGFP (prompts the crew to attempt to trip) and failure of both reactor trip switches and the 1A CRDM breaker (results in the ATWS). Although multiple component failures were required to cause the ATWS, the crew is responding to the ATWS, not the individual component failures.

Based on the way the operator actions are organized, the intended plant response is not clear. It could be possible that operators ramp in response to "B" SGFP speed oscillation with the intent of tripping the "B" SGFP when power is low enough to permit this. However, the "B" SGFP trips before the crew can lower power below this level. Will this force them to do something different than they were already doing, e.g. ramp faster or further, in order to count as a separate component malfunction? Note that the BOP actions for Event 5 (page 13) and Event 6 (page 16) are identical and show a target load of 540 MW, but the SRO actions for Event 5 (page 15) show a target load of 515 MW. If timing of cue is important, then we need to agree during prep week on how to pre-insert this or include a Booth Note or Examiner Note in the JPM to prompt proper cueing.

Some actions listed for both the SRO and BOP appear to be actions to be taken during Event 5, e.g. SRO entering AOP-13 when the BOP trips the B SGFP and BOP performing the actions of AOP-13.

Event No. 7 (6)

Critical tasks are based on time from triggers. Please place "Time: ____:____:____" within scenario guide when A SGFW pump is tripped (no MFW) and next to steps for attempting Rx trip, verifying rods driving, tripping turbine, and emergency borating.

What is the basis for the times and power level associated with each critical task (FSAR, PRA, documented ops expectation, etc.)?

It appears that no operator action is required to accomplish the critical task associated with inserting rods if they are in automatic and functioning normally when the ATWS occurs. If no observable performance is required, i.e. does not require operator action to correct, then the action is not a critical task.

Some actions, e.g. SRO transition to EEP-0 on page 20 and RO check for subcriticality to allow transition to EEP-0, do not appear to be in chronological order.

Event 7 (page 21 and 22) RO and BOP actions show SI not required during and following the ATWS. SRO actions on page 22 imply that an SI may have occurred or may be required at this point in the scenario (before Event 8). Why would this be so?

This portion of the scenario guide is confusing as written. The description of Event 8 states that the LBLOCA will not be inserted until the Unit 1 reactor trip is announced, and this is shown as the last item in Event 7 on page 23.

Page 22 shows the crew entering and exiting FRP-P.1. How does this occur after the ATWS but before the LBLOCA (Event 8)?

Event No. 8 (7)

Scenario will most likely be terminated after SRO initiates the first loop in E-1 at step 14 and announces the intention to transition to ESP-1.3 when RWST level requires it. Scenario is unlikely to be run past ESP-1.3 step 6 (in part, due to overlap concerns with JPM "b.")

Without Event 7 counting as a component malfunction for the BOP and without Event 8 counting as a component malfunction for the RO, the scenario appears to contain the following target quantitative attributes:

Total malfunctions: 7

Malfunctions after EOP entry: 0

Abnormal events: 4

Major transients: 2

EOPs entered: 1

EOP contingencies entered: 1

Critical Tasks: 2 (tripping the turbine and emergency boration)

Form ES-301-5 appears to be 'double-counting' event 1 as both a reactivity manipulation and an Instrument/Component malfunction for the BOP (RO-2, 4, and 6) and incorrectly counting this as an I/C malfunction for the SRO (SRO-I1, I2, I3).

Consider adding one or more component malfunctions for the RO and/or BOP after the EOPs have been entered, as described in Appendix D, section C.2.c. See also ES-301, D.5.d, paragraph 2.

Scenario No. 2

Event No. 1:

See comments for Scenario No. 1 events regarding chronological sequencing of actions. Would most of these actions occur in the order in which they are listed in AOP-100?

Page 7 of 64 – please highlight (e.g. bold, italics, etc.) which of the BOP actions listed are immediate actions.

Event No. 2:

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

What is the intent regarding restoration of letdown, if lost. Note that the RO restores letdown in Scenario 1, Event 2 on page 7 of 93. This would be a repeat action if done by the same person.

Event No. 3:

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

The actions required of the BOP to stabilize the plant are identical to the actions required for event 1. The event will provide little new information regarding an applicant's competencies, including 1.a (Recognize/Verify off-normal trends – same parameters), 3.a (Locate and Manipulate controls – same controls), 3.b (Understanding of System Operation – same system), and 3.c (Manual Control – same controls). The scenario should be developed so that various systems are affected by each type of event (Appendix D, B.3, paragraph 3.) Options for other failures for the BOP could include high pressure heater failures or control failures, condensate/booster pump failures, heater drain tank level control failures, etc. Replace either Event No. 1 or Event No. 3.

Event No. 4

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

This event occurs in the same system as Event No. 2 (charging and volume control). The failure may provide little additional information regarding competency 3.b (Understanding of System Operation.) The scenario should be developed so that various systems are affected by each type of event. Replace either Event No. 2 or Event No. 4. Consider rod control malfunctions, including a dropped rod, failures of controlling temperature and pressure, or other failures that require actions to stabilize the plant.

Event No. 5

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

BOP actions mention potential for reactor trip. This would preclude the ramp down in Event 6. Did LJ3 alarm during validation? What action is required by the crew to prevent the high temperature and subsequent trip?

Event No. 6

This Normal event could instead count as a Reactivity event for both the RO and BOP. The Event Type on page 1 shows N(ormal), however the description on page 4 implies R(eactivity.)

Event No. 7

What is the basis for the criteria (prior to verification of immediate actions of EEP-0 and prior to SGs boiling dry) associated with the first two critical tasks?

Pages 16-17 – please highlight (e.g. bold, italics, etc.) which of the RO and BOP actions listed are immediate actions.

Pages 16-17 – please include details regarding operator checks for important parameters, e.g. how does RO check SI status? How does BOP check turbine tripped? See Appendix D, page 3, paragraphs 3 and 4.

ES-D-1, page 2, shows the SRO receiving credit for a Tech Spec on Event 7. The scenario guide for Event 7 does not specify any Tech Specs. Tech Specs after the major casualty are not usually counted because the crew is focused on stabilizing and/or shutting down the plant.

What equipment failure is being inserted to provide the component failure listed for the BOP? It appears that the need to trip the turbine is a byproduct of not meeting P-4, i.e. the malfunction that the RO is expected to diagnose. While the BOP will be required to take critical actions, the diagnosis of the underlying equipment failure will presumably be performed by the RO. In this case, only the RO would receive credit for a component malfunction.

Event No. 8

What are the criteria that, if not met, will result in a crew member failing to meet the critical task of aligning A train ESF equipment? Is this tied to plant parameters or procedure steps? What is the basis?

The outline (page 5) only mentions a critical task for aligning A train ESF, while the header on page 20 only mentions a critical task for isolating the faulted SG. Which are critical, both? This may affect the count of critical tasks on ES-301-4.

Page 20-21 - last row for RO/BOP actions appears to be missing a heading for the four TSLB checks listed. Why are the same actions listed twice (once for the RO and once for the BOP)?

Page 22 specifies criteria for the SRO to go to FRP-Z.1. Does the scenario guide include all of the actions the crew may be directed to perform in EEP-0 before this transition? If not practical to specify sequence of actions and approximate transition point(s), consider listing all EEP-0 actions in sequence, and separately listing Z.1 actions in sequence.

It's not clear why the BOP is being credited with a component malfunction.

If MOV-8820A, what action or response is required vs. no failure? How will scenario progress differently if MOV-8820A is not failed (note that range of EOP contingencies on ES-301-4 is 0-2 and the existing malfunctions and associated EOPs appear to provide ample opportunity to evaluate applicants)?

Although performance of a critical task is required, Event 8 does not appear to be a separate component malfunction for the BOP because the need to perform the action of aligning A train is due to a combination of a component out of service at the beginning of the scenario (A train SSPS) and an earlier component malfunction (1B DG output breaker does not close). If so, then malfunctions after EOP entry (ES-301-4) would appear to equal "2."

Will most likely terminate no later than establishment of normal charging flow.

Scenario No. 3

Event No. 1

Please include that the seismic event requires a ramp in the Event Description for Event No. 1 on Form ES-D-1 page 1.

Write description or for event 1 (or cue for event 2) to terminate prior to verifying IRNI high flux trips clear (13%) in order to preclude any overlap concerns with JPM "g. Reduce Power from 13% to 8% per UOP-2.1."

Event No. 2

No comments.

Event No. 3

ES-D-1 page 1 shows the SRO receiving credit for Tech Specs. The event description on page 9 does not mention any associated Tech Specs.

Event No. 4

SRO action at the bottom of page 11 shows entry into SOP-16.0. Should this be AOP-16.0?

Based on the comment on page 13 regarding not waiting for STP-8.0 to be complete before cueing the next event, is it also intended to not wait to restore letdown, if secured, before moving on?

Event No. 5

Pages 14 – please highlight (e.g. bold, italics, etc.) which of the RO and BOP actions listed are immediate actions.

Write description or for event 5 (or cue for event 6) to terminate prior to verifying IRNI high flux trips clear (13%) in order to preclude any overlap concerns with JPM "g. Reduce Power from 13% to 8% per UOP-2.1."

Unlike reactivity manipulations or normal evolutions, credit for a component/instrument malfunction cannot be given to both the RO and BOP because only one can get credit for the diagnosis portion of the malfunction. The RO may be most likely diagnose the RCP trip and both the RO and BOP could get credit for the subsequent Reactivity manipulation. Add an additional C/I for the BOP. Because Event 2 provides an opportunity to evaluate a limited number of competencies (respond to annunciator/start fan) consider a malfunction that requires the applicant to demonstrate competencies 1.b, 3.b, and 3.c. Additionally, you may want to consider deleting Event 1 since it does not

provide any additional insight regarding applicant competencies and does not provide any further contribution to the minimum events required per Form ES-301-5.

Event No. 6

Could not find any pages with headers labeled for Event No. 6. Event No. 6 appears to start on page 16.

Consider ramping in the SGTR such that the crew is given an opportunity to recognize the impact of the LT-112 failure (no auto swap of charging pump suction to RWST) if not recognized earlier. Ensure event description in header describes timing and magnitude of SGT/SGTR for examiners.

See comments for Scenario No. 1 regarding chronological sequencing of actions.

Please highlight which RO and BOP actions are immediate actions.

What allows early actions for SGTR listed on page 19? Conduct of Ops procedure?

Event No. 7

Why is this component failure broken out as a separate event? It appears to be a component malfunction associated with the SI that occurs in Event 6.

What is the basis for the critical task to isolate break flow before transitioning to ECP-3.1 or commencing RCS cooldown? Does the "or" imply that it must be done before whichever condition comes first?

What is the basis (safety significance) of the critical task to perform an RCS cooldown and maintain temperature such that a transition out of EEP-3 does not occur?

The critical task regarding AFW flow/SG level is a verification, which, if no action is involved, is not a measurable performance indicator per Appendix D, D.1.c (bottom of page 14, top of page 15.) Is it intended that the BOP start an AFW pump and establish AFW flow greater than 395 gpm before entering a red path on heat sink?

The critical task of RCS depressurization is assigned to the BOP on page 29, but the associated actions are listed for the RO on page 30. The critical task criterion is "before water enters the main steam line." How is this objectively determined? When SG NR level reaches maximum indicated on the MCB? See Appendix D, D.1.c.

Scenario No. 4

Event No. 1

Is the limit on # of steps per rod withdrawal a procedural limitation?

Is this event needed to meet minimum requirements for the ROs and BOPs that are likely to participate? If not, consider deleting this event.

Event No. 2

What cue(s) will the BOP have that the event has occurred, besides the report from security?

Any actions required by the RO besides monitoring?

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

Event No. 3

With the exception of the instrument that fails, this event appears identical to Scenario #1, Event No. 2 (LT-460 fails low). If the same applicant should be in the RO position or SRO position for both events, they would not receive credit for both events (event lacks discrimination as an evaluation tool once an applicant has performed it once). If RO will be required to borate or dilute during the first part of the scenario, replace with a reactor makeup system failure, otherwise replace with a PORV failure requiring closure of block valve.

Event No. 4

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

Event No. 5

Event Description: Where is the leak? How long does it take to reach 75 gpm?

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

Event No. 6

See comments for Scenario No. 1 events regarding chronological sequencing of actions.

Please highlight (e.g. bold, italics, etc.) which of the RO and BOP actions listed are immediate actions.

Is the expectation that the RCPs are secured before or after EEP-0 immediate actions are performed?

Form ES-D-1 page 3 states that RCPs should be secured before 2100 psig. The description in the scenario guide does not reflect this. What happens at 2100 psig?

Page 19 lists actions contingent upon a SI. Is a manual or auto SI expected for this event?

Since this event leads to a manual (or automatic) reactor trip, it counts as a major transient per Appendix D, C.2.e (page 9.)

Event No. 7/8

The event description states that 1B DG fails to autostart. Since no operator actions are expected, delete "C" from the type codes for Event 7 on Form ES-D-1 (but retain the bulleted note.)

Page 25 – the note implies that it is desirable to have MOV-8803A & B open before proceeding to event 9. What are MOV-8803A/B, at what step are they operated, and why is this important (please include this information in the note.)

Event 8 (7)

This component malfunction appears to be a subset of Event 7 (which would explain the comment regarding Event 7, page 25.) Rewrite Event 7/8 so that sequence of expected events is clear. Additionally, Event 8 is not listed on Form ES-301-5 but does appear on Form ES-301-6.

What is the basis for the critical task? Why is it important to open them before EPP-0 attachment 2 is completed? Could they be opened after power is restored from Unit 2 in Event 9?

Event 9(8)

The event description states that a dual unit LOSP occurs at step 15 of EEP-0, however, the note associated with Event 7 appears to provide the examiner an option to delay initiation of Event 9 (and this may be necessary to achieve the intent of the associated component malfunction.) Will EPP-0 attachment 2 be completed before step 15 of EEP-0? Please clarify.

Please highlight (e.g. bold, italics, etc.) which of the RO and BOP actions listed are immediate actions.

Critical Task(s)

Is there a time requirement for Farley to restore AC power?

The specific actions necessary to meet the critical task(s) are not clear. Is one critical task to restore AC power to unit 1 using either 1B or 2C EDG (before....) and another to (if 2C EDG is used) to restore 2C EDG cooling and ESF flow to the core? Will ESF equipment have to be manually started if 1B EDG is used?

Both tasks state that AC power must be restored prior to exiting ECP-0.0, however, ECP-0.0 cannot be exited until AC power is restored (circular logic.) What determines whether the crew will restore AC power using 1B or 2C EDGs?

Please highlight each performance indicator (e.g. control manipulation) that is required to complete the critical task(s).

If the crew chooses to start 2C EDG, but fails to restore cooling water, will the simulator provide feedback that EDG temperatures are rising?

Scenario No. 5

All malfunctions for the RO and BOP consist of component malfunctions. Replace some component malfunctions with instrument malfunctions (see Appendix D, B.3)

Event 1

This event appears to be very similar to Scenario No. 4, Event No. 3. If the same applicant should be in the RO position or SRO position for both events, this event would provide little additional information regarding an applicant's competency with respect to diverse systems or the ability to respond to plant events (this uncomplicated event consists of recognizing an alarm and starting a fan.) See Appendix D, section C and C.1.d. Replace with an event that involves an instrument malfunction or automatic actions failing to occur (e.g. valves fail to align on boration, boration fails to auto terminate, containment release fails to secure on high radiation, etc. See RO competency 1 regarding trends, interpretation/diagnosis, instrument readings, and competency 3 regarding setpoints, interlocks, automatic functions, and manual control of automatic functions. Consider embedding one of these malfunctions in Event 2.

Form ES-D-1 shows the RO completing this event. The scenario guide (pg. 5) shows that the RO or BOP may perform the associated actions. Which is most likely?

Event 2

For the expected plant conditions, what should the RO calculate for blended flow and how should he set up the makeup system?

Event 3

What is the operator action required to correct (vs. diagnose) this event, if delegated to a local operator? This component failure provides little opportunity for the applicant to demonstrate competency operating the control boards and, absent required operator action to correct, would not count as a component malfunction (see Appendix D, C.2.b.)

How is C SG level controlled after the event?

Event 4

See comments for Scenario No. 1 events regarding chronological sequencing of actions. SRO actions on page 8 state that both AOP-5 and AOP-4 actions are listed below. Which actions go with which procedure?

Will operators take any actions early (e.g. closing A loop spray valve or A loop AFW FCV) as immediate actions or using 'skill of the craft' before directed? These actions

appear on page 12 (the 5th page of actions concerning Event 4). Please highlight any immediate actions.

Event 5

Critical Task - What is the basis of the performance measure to take these actions before directed by procedure?

Please highlight immediate actions.

Event 5 includes actions for containment pressure greater than 27 psi. These actions would appear to be associated with Event 6 (LB LOCA) rather than Event 5.

Page 20 of event 5 references Event 7, which is not listed on Form ES-D-1 or later in the scenario guide.

Event 6

The component malfunction appears to be necessary to force FRP-Z.1 actions rather than individual operator actions specific to the failure, in which case the event should be coded as a Major Transient.

Critical Task - What is the basis of the performance measure to take these actions before directed by procedure?

Scenario # 2 also results in entry into FRP-Z.1. Consider revising the scenario such that a broader range of EOP Contingency Procedures (FR or ECA) is implemented across all scenarios. If the same applicants were examined using both Scenario #2 and #5, the portions of the second scenario concerning Z.1 actions may provide little additional information regarding an applicant's competencies, especially with respect to event diagnosis, and use of procedures.

Facility: <u>Farley</u>		Scenario No.: <u>1</u>	Op-Test No.: <u>2007301</u>
Examiners: <u>Frank Ehrhardt</u>		Operators: _____	
<u>Jay Hopkins</u>		_____	
<u>Craig Kontz</u>		_____	
Initial Conditions: 100% RTP, Eq Xe, MOL, <u>A</u> Train On-Service – <u>A</u> Train Protected Turnover: 100% RTP, MOL, 880 ppm Cb, 10,000 MWD, Eq Xe, - CTMT batch release – last released 2 days ago, - Current Risk Assessment is GREEN and projected is GREEN, <u>A</u> Train On-Service – <u>A</u> Train Protected, 2C DG T/O for Jacket Water leak repair, - Thunderstorm warnings in effect for Southeast Alabama & Western Georgia			
Event No.	Malf. No.	Event Type*	Event Description
1		R (ALL) TS (SRO)	MVARS start decreasing. Grid is degraded (<3850V)
2	1	I (RO) TS (SRO)	LT-460, pressurizer level, fails low, letdown secures
3	2	I (BOP) TS (SRO)	FT-495, selected steam Flow xmtr for "C" SG fails high
4	3	I (RO)	LT-115 fails low, VCT level, Auto MU starts, must be secured manually
5	4	C (BOP)	"B" SGFP speed oscillation, plant ramp down required to remove the "B" SGFP from service
6	5	M (ALL)	Both SGFPs trip, Man Rx trip required
7	6	C (ALL)	FRP-S.1 entry required for ATWT, neither Rx trip switch works, 1A CRDM MG bkr will not open
8		M (ALL)	LBLOCA when "Unit One Reactor Trip" is announced
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

SCENARIO 1 Summary sheet

Initial Conditions: 100% RTP, Eq Xe, MOL, A Train On-Service – A Train Protected,

- 880 ppm Cb,
- 10,000 MWD,
- Eq Xe,
- CTMT batch release – last released 2 days ago,
- Current Risk Assessment is **GREEN** and projected is **GREEN**,
- A Train On-Service – A Train Protected,
- 2C DG T/O for Jacket Water leak repair

Presets:

Event No.	Malf No.	Event Type*	Event Description
0		Preset	2C DG is tagged out
5		Preset	1B SGFP speed controller output fails: speed oscillations occur in Auto & Manual
6		Preset	1A SGFP trips 120 secs after 1B SGFP trips
7		Preset	The reactor does not trip automatically or by either Rx trip switch, 1A CRDM MG set fails to trip.

Event 1 MVARS start decreasing. Grid is degraded (<3850V). AOP-5.2 entry required. After determining by procedure that rampdown is required after 1 hour with voltage <3850V, Shift manager informs crew to ramp down at 5 MW/min per UOP-3.1.

A degraded grid was part of one Audit exam scenario, but the initiating voltage was > 3850V, NO Lo voltage alarm, and no ramp down was required by procedure (the shift manager cued the entry into AOP-5.2 and the ramp down). This scenario does have voltage <3850V requiring entry into AOP-5.2 without cuing, a different table is filled out for this event in AOP-5.2, and a rampdown with voltage <3850V for > 1 hour is required.

Event 2 LT-460 fails low, letdown secures. AOP-100 &/or AOP-16.0, TS 3.3.1

Event 3 FT-495, selected steam Flow xmtr for "C" SG fails high. The team should select channel III instruments to control 1C SG functions. Team is expected to perform actions of AOP-100, Tech Spec 3.3.2.D

Event 4 LT-115 fails low, Auto MU starts, must be manually secured

Event 5 "B" SGFP develops an oscillation in its speed, its controller can't be shifted to manual. A plant ramp down should be initiated to remove the "B" SGFP from service. AOP-17 should be used if ramp > 5 MW/MIN used

Event 6 Both SGFPs trip. The 'B' pump trips first. The team should use guidance of AOP-13 and attempt to reduce load to 515 MW. During these actions, the 'A' SGFP will trip requiring the crew to manually trip the reactor per AOP-13

- Event 7 The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter FRP-S.1 and insert rods in manual or auto (RO) (CT Within 1 minute >40% power with no MFW), manually trip the turbine (BOP) and emergency borate (CT Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)
- Event 8 LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)
Terminate when EEP-1.0 is entered

SCENARIO OBJECTIVE/OVERVIEW:

Normal plant operation, degraded grid, a loss of all SGFPs, ATWT, followed by an LBLOCA.

The team should be able to:

- Recognize degraded grid & take appropriate actions
- Ramp the unit down in a controlled and conservative manner
- Identify failed instruments
- Implement ARPs to determine the cause and correct failures
- Recognize the entry conditions for AOP-5.2, AOP-13, AOP-16, AOP-100, and AOP-17
- Recognize the symptoms of an ATWT and implement the steps of FRP-S.1, EEP-0.0, EEP-1.0, & ESP-1.3

Facility: Farley Scenario No.: 2 Op-Test No.: 2007301

Examiners: Frank Ehrhardt Operators: _____

Jay Hopkins _____

Craig Kontz _____

Initial Conditions: 74% RTP, MOL, with xenon building in following a xenon-free startup, A Train On-Service – A Train Protected

Turnover:

- 74% power, MOL, Cb = 1177 ppm,
- Xe is building in following a xenon-free startup: 502 pcm,
- ramp up on hold until SSPS problem repaired & RTS,
- CTMT batch release – last released 2 days ago,
- A Train On-Service – B Train Protected,
- "A" train SSPS testing is in progress and was interrupted at step 5.1.8 due to a blown Output Relay Power fuse.
- Testing started 45 minutes ago–The CR is written & work order is being planned,
- Appendix 2 of STP-33.0A is I/P at step 3.0, A MDAFW Pump T/O for bearing oil leak repair,
- The Ops Manager has directed that power be held at the present level for SSPS maintenance,
- Current Risk Assessment is **YELLOW** and projected to remain **YELLOW** With 'A' trn SSPS OOS for fuse replacement,
- (M) LCOs 3.3.1, 3.3.2, 3.3.6, 3.3.7, 3.3.8, & 3.6.3 - For 'A' Train SSPS Surveillance/fuse replacement, 3.7.5 1A MDAFW pump,
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1	1	I (BOP) TS (SRO)	PT-476 A SG PT fails low
2	2	C (RO)	FK-122 fails HI, Charging flow control, man control required
3	3	C (BOP)	SK-509A fails high slowly, SGFP master speed controller, man control required
4	4	I (RO)	PT-145 Fails high, Letdown pressure controller, Man control required
5	5	C (BOP) TS (SRO)	1B SW pump trips. This causes service water to the Turbine Building to isolate. One SW to TB valve will not reopen
6		N (ALL)	Leak in the main generator H2 cooler. Ramp down based on a high leak rate required

7	6	TS (SRO) C (RO & BOP) C (BOP)	A "B" train LOSP, Rx trip signal based on loss of a RCP breaker position, manual Rx trip required using the CRDM MG sets and manual trip of the main turbine 1B DG output bkr does not auto close, Emerg Shutdown of the DG required due to no SW Cooling to DG
8		M (ALL) C (BOP)	1A SG large steam leak inside CTMT, After SI, neither train of ESF equipment will operate normally, FRP-Z.1 entry is required
			Terminate when ESP-1.1, SI TERMINATION, is entered
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (A)bnormal, (M)ajor			

SCENARIO 2 Summary sheet

Initial Conditions: 74% RTP, with xenon building in following a xenon-free startup,
MOL, A Train On-Service – A Train Protected

- The unit had ramped down to 60% to perform SGFP speed controller repair.
- “A” Train SSPS testing is in progress.
- A blown output relay fuse was discovered during testing.
- The CR written / work order is being planned at this time.
- Appendix 2 of STP-33.0A is in progress.
- Plant ramp up and return to full power was in progress prior to a SSPS problem.
- A MDAFW Pump T/O for bearing oil leak repair.
- The OPS Manager has directed holding at 74% power until SSPS is returned to service.

Presets:

Event No.	Event Type*	Event Description
0	preset	Rack out 1A MDAFW
0	Preset	Ann EC4 failed on, SSPS TRN A TRBL
0	Preset	close RT bypass bkr A
5	Preset	MOV-515 & 517 strokes closed & AF5 alarms on trig 1: 1B SW pmp stopped, MOV-515 fails to reopen
7	Preset	The Rx will not trip using either MCB H/S, main turbine does not auto trip, 1B DG output DG08 does not close, 2C DG output DJ06-1 does not close
8	preset	A SSPS has blown relay fuse & won't auto start and align equipment, B train has no power for equip. to start/align
8	preset	A CS Disch MOV-8820A bkr trips as soon as there is flow in A trn CS header>0 gpm.

Event 1 PT-476 A SG PT fails low, AOP-100, TS

Event 2 FK-122 fails HI, man control required, AOP-100 & AOP-16

Event 3 SK-509A fails high slowly, man control required, AOP-100

Event 4 PT-145 Fails high, Man control required

Event 5 1B SW pump trips. This causes service water to the Turbine Building to isolate. AOP-7.0 (Loss of SW TO TB) & AOP-10.0 (Loss of SW), entered to restore 2 SW pmps in A train & unisolate service water to the Turbine Building. One valve will not reopen.

TS should be evaluated for both an inoperable SW pump/train AND the TB SW valve that will not reopen (valve is inop, but in it's required isolation position).

The team should have 1C SW pump aligned to auto start for 1B SW pump to clear LCO on one train of SW

Similar event to an audit exam 1E SW pmp trip, with a difference causing a different outcome. In this scenario, SW to the TB also isolated with one of the valves remaining stuck shut. This requires an additional procedure and associated actions (AOP-7 in addition to AOP-10.0)

Event 6 As a result of the pressure transient in the TB SW system a leak develops in the main generator H2 cooler. Annunciator LJ5 (H2 SYS WTR DETECTOR HI) alarms. The team will be required to determine if leak rate is high or low per ARP-1.11 (LJ5) and will commence a ramp down based on a high leak rate

Event 7 A "B" train LOSP occurs on the loss of 1G 4160V Bus. With RCP breaker position indication on the SOLA, the loss of 'B' train power generates a Rx trip signal based on loss of a RCP breaker position.

The Rx will not trip using either MCB H/S. The team will be required to manually trip the reactor using the CRDM MG sets (RO) (CT opening both CRDM MG set supply breakers prior to completion of verification of immediate operator actions of EEP-0) and manually trip the main turbine (BOP) (CT Manually trip main turbine prior to SG's boiling dry).

The team should evaluate the status of 1B DG and secure the DG since the output breaker will not close and it is running without cooling water.

Similar to an event during audit exam where a loss of B train power occurred due to 1B DG tripping after initially supplying the B train busses. The 2C DG would not start even in Mode 4. In this scenario, the 1B DG starts but the output breaker does not automatically close. The DG has to be shutdown due to no SW Cooling which is a different result than on the audit exam. The SBO 2C DG will start if decision is made to start it, but it's output bkr will not close.

Event 8 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train SI will not actuate (in auto or with manual switch) due to the blown output relay fuse. B train has no ESF buses powered up. Manual alignment of A train ESF equipment required

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

SCENARIO
OBJECTIVE

Instrument and system failures, Loss of B train power, & large steam leak inside containment. The team should be able to:

- identify and respond to control instrumentation per AOP-16 & AOP-100
- identify and recover from a loss of turbine building SW per AOP-7 & 10
- respond to a failure of the reactor protection system to function when required to trip the reactor following the loss of one train of 4160V emergency power per EEP-0.0.
- correctly identify the failure of the 1B DG output breaker to close and their ability to perform step 3.3 RNO in EEP-0 to perform emergency shutdown of the DG
- mitigate the effects of a steam break inside containment with one train of emergency power unavailable and SSPS inoperable in the opposite train-requires manual alignment of ESF equipment per EEP-0, EEP-2, & ESP-1.1.
- recognize FRP-Z.1 entry conditions and take actions to mitigate excessive Containment pressure.

Facility: Farley Scenario No.: 3 Op-Test No.: 2007301

Examiners: Frank Ehrhardt Operators: _____

Jay Hopkins _____

Craig Kontz _____

Initial Conditions: Plant is in Mode 1, MOL, 25% power, Xenon free, A Train On-Service – A Train Protected

Turnover: 25% RTP, MOL, 1292 ppm Cb, 10,000 MWD, Xe building in from Xe free startup at 80 pcm,

- Ramping to 50% power;
- UOP 3.1 has been completed through step 5.1.1,
- The 1B MDAFW pump is tagged out to investigate high vibration and will be out of service for approximately 10 hours.
- Ramp on hold for turnover,
- CTMT batch release – last released 3 days ago,
- Current Risk Assessment is YELLOW due to the 1B MDAFW pump OOS & projected is YELLOW,
- A Train On-Service – A Train Protected,
- Engineering Support is in the process of revising the BEACON strategy since the ramp is on hold,
- LCO: (M) 3.7.5 1B MDAFW
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1		R (ALL)	Seismic event/alarm OBE exceeded,
2	1	I (RO)	LT-112, Fails High, VCT Level
3	2	C (BOP) TS (SRO)	1A Reactor cavity cooling fan trips
4	3	C (RO)	Chg low flow due to Degraded A CHG pmp Head
5	4	C (RO & BOP) TS (SRO)	1A RCP trips
6		M (ALL)	1C SG tube rupture 400 gpm
7	5	C (BOP)	TDAFW does not auto start, must be manually started from MCB. 1A MDAFWP does not auto or manually start (can be started from the HSP if desired)

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

SCENARIO 3 Summary sheet

Initial Conditions: Plant is in Mode 1, MOL, 25% power, Xenon free.

- UOP-3.1 has been completed up to Step 5.1.1.
- The 1B MDAPW pump is tagged out to investigate high vibration and will be out of service for approximately 10 hours.

Presets:

Event No.	Event Type*	Event Description
0	preset	rack out 1B MDAPW
8	Preset	A mdapw fails to auto start
8	Preset	1A mdapw fails to START from MCB switch
8	preset	TDAFW does not auto start

Event 1 Seismic event/alarm OBE exceeded, Shift manager directs normal shutdown as a precaution after initial plant inspections are performed – damage found on 1A 4160V bus

The audit exam had a seismic event on it, but had a different result in that no damage was found in that event. All subsequent events were different in that scenario than in this one. In this event, a RCP bus is found damaged, and later the RCP on that bus trips due to the damage.

Event 2 LT-112, VCT Level, Fails High. Man level control required with LK-112

Event 3 1A Reactor cavity cooling fan trips, ARP requires starting the other one

Event 4 Chg low flow due to Degraded A CHG pmp Head. Attempt to start B or C CHG pmp per SOP-2.1 or AOP-16.0.

Event 5 1A RCP trips (Rx power < P-8 setpoint).

AOP-4 actions required to close 1A loop spray valve (RO), secure feeding the 1A SG (BOP) and perform controlled shutdown (RO & BOP).

apply Tech Spec 3.4.4. With 'A' RCS loop < 541F, the RNO requires to be in Mode 3 in 30 minutes. AOP-17 entry may be required (ramping > 5MW/Min)

Event 6 1C SG tube rupture @ 400 gpm prior to <2% power. The team is expected to determine which SG is ruptured and utilize the correct ERG's to place the plant in a safe condition (CT Identify and isolate flow to/from the ruptured steam generator before a transition to ECP-3.1 occurs or prior to commencing RCS cooldown) (CT Perform a RCS cooldown and maintain RCS temperature so that transition from EEP-3 does not occur because RCS temperature is

- Too high to maintain greater than 36° subcooling or
 - Below the point which would cause transition to FRP-S.1 or FRP-P.1)
- (CT Perform a RCS depressurization to minimize break flow before water enters the main steam line of the ruptured SG.)

Event 7 The team should identify that NO AFW is available. 1A MDAPFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, may direct starting 1A MDAPFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

(significant modification from bank scenario 7C due to no faulted SG)

SCENARIO
OBJECTIVE/OVERVIEW:

Ramping unit up from 25%, a seismic event occurs requiring a ramp and causing instrument & component failures, a 400 gpm SGTR in 1C SG occurs followed by a loss of all AFW.

The team should be able to:

- Respond properly to a seismic event and ramp safely when directed
- Recognize instrument & equipment malfunctions and respond per applicable ARPs, AOP-16, AOP-100, AOP-4
- Respond to SGTR with no auto start of AFW per EEP-0, EEP-3
- Recognize and respond to equipment not automatically starting/repositioning when required.

Facility: Farley Scenario No.: 4 Op-Test No.: 2007301

Examiners: Frank Ehrhardt Operators: _____

Jay Hopkins _____

Craig Kontz _____

Initial Conditions: 4% RTP, EOL, **B** train o/s, **B** train protected, with A SGFP O/S, 528 ppm Cb, 18,000 MWD, Xe building in

Turnover:

- 4% EOL B train o/s with A SGFP O/S, 528 ppm Cb, 18,000 MWD, Xe building in, no LCOs preventing mode 1 entry
- CTMT batch release – last release 2 days ago,
- Current Risk Assessment is **GREEN** and projected to remain **GREEN**,
- Plant start-up is on hold for turnover and will recommence after turnover,
- B Train On-Service – B Train Protected,
- 1A SGFP is on service, transfer to main feed main feed bypass valves is complete,
- UOP-1.2 is complete up to step 5.55,
- 1C DG T/O for slow start investigation,
- Rod K-6 has data B indication problem and DRPI has been placed in Data "A" only.
- MOV-3024B, Emergency SW from 1B Ctmt Cooler is closed and tagged; suspect a bad breaker; work being planned,
- ADMIN LCOs; 3.1.7 (DRPI indication) & 3.6.6 (1B CTMT cooler MOV-3024B), 3.8.1 (1C DG)
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1		N (ALL)	Commence Ramp up from 4%
2	1	I (BOP) TS (SRO)	PT-3371B fails high, B SG Pressure, B SG Atmospheric opens, man control required
3	2	I (RO) TS (SRO)	LT-459 fails low, controlling Pressurizer level channel, charging in man required
4	3	I (BOP)	PT-464 fails high, Steam Header Pressure, Steam dumps open until shut by P-12, SGFP speed increases, Man control required
5		TS (SRO)	An RCS 75GPM leak develops
6	4	C (RO)	The control system for the "A" loop spray valve (PCV-444C) fails. The spray valve sticks open

7	5	M (ALL)	After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0 • 1B DG fails to auto start.
8	6	C (BOP)	HHSI MOVs 8803A & B also fail to open
9		M (ALL)	Dual unit LOSP at step 4 of EEP-0, ECP-0.0, Loss of All AC Power, entry required
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

SCENARIO 4 Summary sheet**Initial Conditions:**

- 4% EOL B train o/s with A SGFP O/S, 528 ppm Cb, 18,000 MWD, Xe building in
- Plant start up is complete up to step 5.55 of UOP-1.2.
- A SGFP is on service, transfer to main feed main feed bypass valves is complete.
- Rod K-6 has data B indication problem and DRPI has been placed in Data "A" only.
- 1B CTMT cooler MOV-3024B is tagged because of a bad breaker. The valve is closed, and work order is being planned.
- The startup is on hold for turnover, and will recommence as soon as turnover is complete.
- 1C DG is T/O for slow start investigation.

Presets:

Event No.	Event Type*	Event Description
0	preset	breaker for MOV-3024B racked out
0	preset	1C DG T/O
4	Preset	DRPI failure on Data B cabinet inside ctmt
7	preset	pressurizer spray valve sticks at 100% after opening
9	preset	HHSI valves 8803a & b will not auto open
10	preset	1B DG fails to Auto Start

- Event 1 Commence Ramp up from 4%
- Event 2 PT-3371B fails high, B Atmospheric opens, man control required, AOP-14
- Event 3 LT-459 fails low, charging in man required, LTDN secures, Htr sec, AOP-100 requires man control of htrs and reestablishing letdown after selecting out LT-459, automatic operation of charging flow can be restored after selecting out LT-459 as controlling channel
- Event 4 PT-464 fails high, Steam dumps open until shut by P-12, SGFP speed increases, Man control required, AOP-100
- Event 5 An RCS 75GPM leak develops. The team should enter AOP-1 as a result of the leak to stabilize pzs level
- Event 6 The control system for the "A" loop spray valve (PCV-444C) fails. The spray valve goes full open and will not close. The team should trip the reactor and secure the 1A and 1B RCPs per ARP-1.8 (HC1) Operator Action 4 or AOP-100 section 1.1 before 2100#

Event 7 After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0

EEP-0 is entered at step 1. 1B DG fails to auto start. This is not needed at this time, but contributes to a total loss of AC in event 9.

Event 8 HHSI MOVs 8803A & B fail to open on the SI. The team must open 8803A or B prior to exiting EEP-0. (CT The team should Open 8803A or 8803B prior to exiting EEP-0)

Event 9 Dual unit LOSP at step 4 of EEP-0, 1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) (CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0.)

(Significant modification from bank scenario 2A due to required ECP-0.0 entry)

SCENARIO OBJECTIVE

Low power instrument and component failures with SBLOCA & LOSP

The team should be able to:

- ramp the plant from low power
- respond to a low power steam leak transient that affects core reactivity per AOP-14
- respond to a low power feedwater transient that has the potential for affecting core reactivity by applying the guidance of AOP-100
- diagnose instrumentation and component failures per applicable ARPs & AOP-100
- diagnose and control the plant with an RCS leak per AOP-1.0
- diagnose a stuck open spray valve per AOP-100, EEP-0, & ESP-0.1
- respond to a SBLOCA with a LOSP during which component failures occur per EEP-1.0 & ECP-0.0

Facility: Farley Scenario No.: Spare Op-Test No.: 2007301

Examiners: Frank Ehrhardt Operators: _____

Jay Hopkins _____

Craig Kontz _____

Initial Conditions: Mode 3, MOL, Xe decreasing from its peak following the reactor trip, The reactor tripped 8 hours ago as a result of two dropped rods, A Train On-Service – A Train Protected,

Turnover:

- 0% RTP, MOL ,940 ppm Cb, 10,000 MWD, Xe concentration is slowly decreasing,
- reactor tripped 8 hours ago as a result of two dropped rods & repairs are in progress,
- Reactor Startup planned in 16 hours, ECC being calculated by Reactor Engineering,
- Currently at step 2.7 of UOP-1.3 initial conditions, IPTE Brief scheduled in 12 hours
- The repairs to the Rod Control system are in progress
- CTMT batch release – last release 2 days ago,
- Current Risk Assessment is **GREEN** and projected is **GREEN**,
- A Train On-Service – A Train Protected,
- Radside SO monitoring 1A charging pump lube oil temperature following maintenance – currently oil temp is stable at 94 deg.,
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1	1	C (RO)	CRDM fan trips, starting other CRDM fan required to provide cooling to CRDMs
2		N (RO) TS (SRO)	RWST lo due to makeup to SFP, Makeup to RWST with reactor makeup system required to maintain T.S. lvl
3	2	C (BOP) TS (SRO)	AFW FCV-3227C fails open, AFW FCV to C SG, alternate means of isolation required to prevent SG overfill

4	3	C (RO & BOP) TS (SRO)	1A S/U transformer trips on fault, 1A RCP loses power, AOP-4 required,
	4	C (BOP) TS (SRO)	1A & 1B Ctmt coolers fail to auto start, man start of at least one required
5	5	M (ALL) C (BOP)	A LBLOCA occurs. Automatic SI fails to actuate, man actuation required
6			'A' CS pump trips on the auto start and 'B' CS discharge MOV-8820B breaker trips soon after the auto open signal, FRP-Z.1 entry required when CSFs are directed to be monitored
			Terminate when FRP-Z.1, complete (significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

SCENARIO Spare Summary sheet**Initial Conditions:**

- Mode 3, MOL, Xe decreasing from its peak following the reactor trip.
- The reactor tripped 8 hours ago as a result of two dropped rods.
- The repairs to the Rod Control system are in progress.
- The Startup is planned for 16 hours from now.

Presets:

Event No.	Event Type*	Event Description
0	preset	Isolate MSDPs, preset to prevent RCS cooldown
3	preset	flash ann jk1 A MDAFWP SUCT PRESS LO when FCV3227C > 0.6, clear when FCV3227C > 0.9
6	Preset	• auto SI train A & B fails • 1A & 1B Ctmt coolers don't auto start on SI • 1A CS Pump trips on overload after auto start • 1B CS Pump Disch vlv 8820B breaker trips after B pump starts and flow is indicated >0 gpm

Event 1 1B CRDM fan trips, BC1 and BC3 comes in, ARP requires Securing 1B fan & starting 1A CRDM fan.

Event 2 EG4, RWST MIN TECH SPEC LVL A TRN annunc comes in while Radside SO filling SFP from RWST. Make up with the Reactor Makeup system required after SFP filling is secured.

(mass in RWST starts out just above the alarm setpoint
@ 38.8 ft.: alarm comes in ~30 secs after SFP filling initiated)

Event 3 AFW FCV-3227C fails open. In this mode, SG level will be maintained using AFW. The crew will have to make a decision on control of AFW flow to the 'C' SG.

LCO 3.7.5 and evaluate the operability of the AFW system with one flowpath potentially inoperable.

Event 4 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop. Closing the A loop spray valve will be required (RO) & secure feeding the SG by closing A loop AFW FCV (BOP)

1A & 1B CTMT CRLS do not auto start

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits.

Another NRC Scenario on this exam had 1A RCP trip from an at power condition. This event is from a mode 3 condition. The result is different in this scenario due to no shutdown required, and AFW FCV must be closed instead of a FRV. TS must still be addressed, but from a different mode of applicability.

Event 5 A LBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of before Step 5 of EEP-0 – Verification of Immediate operator actions)

Event 6 When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-Z.1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

SCENARIO
OBJECTIVE/
OVERVIEW:

Mode 3 with component and instrumentation failures, LBLOCA, failure of CS systems, FRP-Z.1 entry required

The team should be able to:

- recognize and respond to failures of various instruments and components per ARPs, AOP-4.0, AOP-5.0, AOP-100, & Tech Specs
- identify a LBLOCA, initiate a manual SI, recognize that the required Containment Cooling System components are not operating and attempt to establish one train of CS per EEP-0, EEP-1.0, & FRP-Z.1
- identify the loss of containment Spray with high containment pressure >27# while in EEP-0 and transition to FRP-Z.1

HLT-31 NRC exam Scenario potential schedule based on one scenario run on three different teams in a day for a class of 6 ROs, and 5 SROs.

Exam Day (3 exam Scenarios Per day)	Scenario used	Team examined	SRO	RO	BOP
1	1	1	S1	R1	R2
	1	2	S2	R3	R4
	1	3	S3	S4	R6
2	2	4	S5	R2	R1
	2	5	S1	R4	R3
	2	6	S2	S3	R5
3	3	7	S4	S1	R1
	3	8	S5	S2	R2
	3	9	S3	R5	R3
4	4	10	S4	S5	R4
	4	11	*	R6	R5
Extra scenarios					
*SURROGATE SRO REQUIRED (Last day only for 1 of the 2 scenarios)					
R6 gets minimum scenarios (2), all others get one beyond the minimum (3 each)					

HLT-31 AUDIT EXAM SIMULATOR, JPMs & ADMIN tasks

NO DUPLICATION ALLOWED between this audit exam & HLT-31 NRC exam.
Similar tasks may appear on NRC exam, but the results must be different due to some difference such as alternate paths, different power levels, etc.

Simulator exam scenarios – Summaries		
HLT-31 Scen #	From	Description
1	HLT-30 NRC scen 1	100%, EOL, 1A RCP Seal problems results in 400 GPM SBLOCA, ESP-1.2 Terminates
2	HLT-30 Audit 1, HLT 29A NRC scen 1	4% power, SU IP, PORV Sticks open, Block valve won't close, PZR STEAM SPACE SBLOCA, EEP-1 entry terminates
3	HLT-30 NRC scen 2	75% raising power, MOL, Degrade grid followed by LOSP, ECP-0.0, 2C DG started & SW supplying terminates
4	HLT-30 Audit 2, HLT 29A Audit scen 2	100%, MOL, 1G Bus Trips off, 1C Faulted & 1B Ruptured SG, E-2 & E-3 entered. E-3 or ECP-3.1 terminates

Simulator exam events		
HLT-31 Scen #	From	Description
1	HLT-30 NRC scen 1	100%, EOL, 1A RCP Seal problems results in 400 GPM SBLOCA, ESP-1.2 Terminates
1		PT-445 Fails High PORV can be closed, but leaks by. Block valve must be shut. TS 3.4.11 Condition B
1		Seismic event annunciator MK5 requires a reactor shutdown per UOP's to Mode 3 within 6 hours. No damage found on walkdown.
1		RCS leak develops in the letdown heat exchanger which can be isolated. T.S. 3.4.13. Condition A.
1		1E SW pump trips; crew will be directed by AOP-10.0 or ARP-AE4 SW Pump Tripped to start 1C SW pump. T.S. 3.7.8 Condition A T.S. 3.8.1 Condition E

HLT-31 AUDIT EXAM SIMULATOR, JPMs & ADMIN tasks

NO DUPLICATION ALLOWED between this audit exam & HLT-31 NRC exam.
Similar tasks may appear on NRC exam, but the results must be different due to some difference such as alternate paths, different power levels, etc.

1		1C Charging pump high lube oil temperature requires securing the running charging pump. T.S 3.5.2 Condition A
1		Vibrations increase on the RCP requiring a reactor trip and securing of the RCP. 'B' reactor trip breaker fails to open.
1		When the RCP is secured total seal package failure occurs resulting in SBLOCA. SI fails to automatically initiate and must be manually initiated.
1		Service water is lost to the '1B' EDG. BOP must perform Attachment #1.
1		Scenario is terminated when pressurizer level recovery is terminated by beginning pressure reduction per ESP-1.2
2	HLT-30 Audit 1, HLT 29A NRC scen 1	4% power, SU IP, PORV Sticks open, Block valve won't close, PZr STEAM SPACE SBLOCA, EEP-1 entry terminates
2		Increase power currently at Step 5.58
2		Pressurizer channel detector PT-444 fails low.
2		NI-41 has a blown fuse.
2		1A CCW pump trip - failure of 1B CCW pump to auto start.
2		TK 144 controller fails high (temperature) Ltdown Hx outlet temp.
2		PK-444A PZR Master pressure controller ----- fails LOW; MOV 8000B block valve fails to close PORV 444B fails open
2		SBLOCA (PORV fails completely open)
2		1D Load Center Failure feeder breaker trips – 1C CCW pump fails to auto start.
		Terminate per examiner's discretion
3	HLT-30 NRC scen 2	75% raising power, MOL, Degrade grid followed by LOSP, ECP-0.0, 2C DG started & SW supplying terminates
3		Increase reactor power per UOP-3.1
3		PT447, Turbine First Stage Impulse Pressure, fails low. T.S. 3.3.1 Condition T and & 3.3.2 Condition D
3		1C Running charging pump experiences a shaft shear. The standby pump does not auto start. T.S. condition 3.5.2 Condition A
3		Crew gets call from Power Control Center that grid is becoming degraded. No low voltage alarm occurs. Requires AOP-5.2 entry
3		1A Vital Instrument bus supply breaker trips open. T.S. 3.8.7 Condition A and 3.8.9 Condition B

HLT-31 AUDIT EXAM SIMULATOR, JPMs & ADMIN tasks

NO DUPLICATION ALLOWED between this audit exam & HLT-31 NRC exam.
Similar tasks may appear on NRC exam, but the results must be different due to some difference such as alternate paths, different power levels, etc.

3		Loss of off site power occurs and reactor fails to trip. Reactor is tripped by MG set supply breakers having to be opened. 'A' EDG does not auto start and cannot be manually started.
3		When PORV lifts it fails to close fully and block valve fails in mid position when closed. T.S. 3.4.11 Conditions A; B; and C;
3		'B' EDG trips on over speed requiring the crew to enter ECP-0.0. 2C EDG can be used when requested in ECP 0.0. SW pumps must be manually started to supply cooling to the diesel.
3		Scenario is terminated after transition to EEP-1- from ECP-0.0 and after the SRO has determined SI equipment to be started after transition back to EEP-1.
4	HLT-30 Audit 2, HLT 29A Audit scen 2	100%, MOL, 1G Bus Trips off, 1C Faulted & 1B Ruptured SG, E-2 & E-3 entered. E-3 or ECP-3.1 terminates
4		PT-447 fails low
4		Loss of MCC 1G and failure of LK-459 fails low
4		Ramp to 90% power in 15 minutes due to 1A HDT Vibes
4		Trip the 1A HDT pump if not removed from service at the 15 minute mark.
4		1B FRV fails shut
4		Manual Rx Trip expected on SG level approaching low setpoint
4		1B SG has a SGTR 500 gpm when the emergency boration flow starts in ESP-0.1
4		Crew will have to start the 1B CCW pump
4		Loss of power to B train, Attempts to start 2C DG, will not start even in mode 4
4		1A MDAFW pump due to overcurrent trip and 1B MDAFW pump due to loss of power, TDAFW pmp supplies adequate flow to SGs
4		1C SG will have a fault outside CTMT and upstream the MSIVs
4		E-3 to E-2 to E-3, possibly ECP-3.1 terminate scenario when transition to EEP-3 step 22 or ECP-3.1 step 14

FARLEY 2007-301 SIMULATOR OUTLINE COMMENTS
FJE 7/26/07

Generic Comments

Modify forms ES-301-4 and ES-301-5 to reflect any changes to Event Types on the outlines (Form ES-D-1).

Form ES-301-5 should include the event numbers for each applicant in their appropriate positions, not just totals. The form shows that the SRO-Is only have 3 total C/I malfunctions vs. the 4 required. Have you only counted C/I malfunctions in the RO position? See Form ES-301-5 Note 1. Also a reminder that C/I malfunctions can replace R/N events, but not the other way around (see Form ES-301-5 Note 2).

Form ES-301-6: Most scenarios contain more than 6 events, but there are no event numbers higher than 6 listed for the ROs. They would presumably demonstrate some competencies for events 7-9 on the other scenarios (e.g. comply with procedures, operate control boards, and communicate) so please list as appropriate.

Please include Attributes on Form ES-301-4 (provide separate sheet, if desired) for Scenario No. 5 since this Form is used to show the scenario is approved for use (if necessary).

Scenario No. 1

Event No. 1: If you want to credit both board operators for the same reactivity event then please briefly specify the verifiable actions for the RO and the BOP in the summary. What is the basis for crediting the SRO and what are the verifiable actions?

Event No. 2: What is the intent regarding restoration of letdown? If restored (e.g. by the BOP), this would count as a Normal evolution. Ok not to let crew restore (e.g. for time concerns) if this complication has been considered with respect to other malfunctions.

Event No. 5: What is the intent regarding the duration of the ramp, since the crew ramped following Event No. 1?

How did you arrive at the values for attribute 5 (EOPs entered) for this scenario on Form ES-301-4? Note that the reactor trip procedure does not count per Appendix D, C.2.f.

Scenario No. 2

Event 6: If you want to credit both board operators for the same normal event then please briefly specify the verifiable actions for each operator in the summary. What is the basis for crediting the SRO and what are the verifiable actions?

Event 7: LOSP/Rx Trip would appear to be a Major transient also. Please separate component failures for RO (trip switches) and BOP (turbine trip) to show two distinct

component failures. If actions for the manual turbine trip are similar to the actions for JPM "c. Perform required actions for reactor trip without turbine trip," then consider changing one or the other. Concern is overlap per Form ES-201-2, Item 4.d.

Event 8: Is there a Critical Task associated with the manual alignment of any ESF equipment?

How did you arrive at the values for attribute 1 (Total Malfunctions) for this scenario on Form ES-301-4?

Scenario No. 3

Event No. 1: If you want to credit both board operators for the same reactivity event then please briefly specify the verifiable actions for the RO and the BOP in the summary. What is the basis for crediting the SRO and what are the verifiable actions?

Event No. 4: Would this event also result in a TS for the SRO?

How did you arrive at the values for attribute 1 (Total Malfunctions) for this scenario on Form ES-301-4?

Scenario No. 4

Event No. 1: If you want to credit both board operators for the same reactivity event then please briefly specify the verifiable actions for the RO and the BOP in the summary. What is the basis for crediting the SRO and what are the verifiable actions? Why take credit as a Normal vs. Reactivity event?

Event No. 3: If letdown is restored (e.g. by the BOP), this would count as a Normal evolution.

Event No. 5: Where is the leak? What verifiable actions will the RO or BOP perform? Is there an opportunity to count this as a Component failure for the RO?

How did you arrive at the values for attribute 1 (Total Malfunctions) for this scenario on Form ES-301-4?

Scenario No. 5 (Spare?)

Please include Attributes on Form ES-301-4 (provide separate sheet, if desired) since this Form is used to show the scenario is approved for use (if necessary).

Event No. 5: Is the component failure (auto SI) most likely to be diagnosed and performed solely by the BOP, the RO, or both?

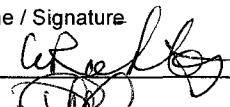
Event No. 6: No Event Types listed – looks like at least one component malfunction.

DRAFT

ES-301

Operating Test Quality Checklist

Form ES-301-3

Facility: Farley		Date of Examination: 11/05/07		Operating Exam number: 2007301	
1. General Criteria			Initials		
			a	b*	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).		lf	me	
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.		lf	me	
c.	The operating test shall not duplicate items from the applicants' audit test(s). (see Section D.1.a.)		lf	me	
d.	Overlap with the written examination and between different parts of the operating test is within acceptable limits.		lf	me	
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.		lf	me	
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		lf	me	
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.		lf	me	
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.			lf	me	
		Printed Name / Signature	Date		
a.	Author	Charles V. Richter / 	09/13/07		
b.	Facility Reviewer(*)	Donna M. Christiansen / 	09/13/07		
c.	NRC Chief Examiner (#)	_____	_____		
d.	NRC Supervisor	_____	_____		
NOTE: * The facility signature is not applicable for NRC-developed tests. # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.					

Facility Farley		Date of Exam: 11/05/07 Scenario Numbers: 1/2/3/4 Operating Test No.: 2007301		
QUALITATIVE ATTRIBUTES		Initials		
		a	b*	c#
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.	GR	DL	
2.	The scenarios consist mostly of related events.	GR	DL	
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)	GR	DL	
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.	GR	DL	
5.	The events are valid with regard to physics and thermodynamics.	GR	DL	
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.	GR	DL	
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.	GR	DL	
8.	The simulator modeling is not altered.	GR	DL	
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.	GR	DL	
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.	GR	DL	
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).	GR	DL	
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).	GR	DL	
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.	GR	DL	
Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes	--	--
1.	Total malfunctions (5-8)	6/ 9/ 5/ 6	GR	DL
2.	Malfunctions after EOP entry (1-2)	1/ 3/ 1/ 1	GR	DL
3.	Abnormal events (2-4)	4/ 5/ 2/ 5	GR	DL
4.	Major transients (1-2)	2/ 2/ 1/ 2	GR	DL
5.	EOPs entered/requiring substantive actions (1-2)	1/ 2/ 1/ 1	GR	DL
6.	EOP contingencies requiring substantive actions (0-2)	1/ 1/ 0/ 1	GR	DL
7.	Critical tasks (2-3)	2/ 3/ 4/ 3	GR	DL

Facility Farley		Date of Exam: 11/05/07 Scenario Numbers: 5 / / Operating Test No.: 2007301		
QUALITATIVE ATTRIBUTES		Initials		
		a	b*	c#
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.	GR	DR	
2.	The scenarios consist mostly of related events.	GR	DR	
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)	GR	DR	
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.	GR	DR	
5.	The events are valid with regard to physics and thermodynamics.	GR	DR	
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.	GR	DR	
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.	GR	DR	
8.	The simulator modeling is not altered.	GR	DR	
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.	GR	DR	
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.	GR	DR	
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).	GR	DR	
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).	GR	DR	
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.	GR	DR	
Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes	--	--
1.	Total malfunctions (5-8)	5 / /	GR	DR
2.	Malfunctions after EOP entry (1-2)	1 / /	GR	DR
3.	Abnormal events (2-4)	2 / /	GR	DR
4.	Major transients (1-2)	1 / /	GR	DR
5.	EOPs entered/requiring substantive actions (1-2)	1 / /	GR	DR
6.	EOP contingencies requiring substantive actions (0-2)	1 / /	GR	DR
7.	Critical tasks (2-3)	2 / /	GR	DR

Facility: Farley		Date of Exam: Week of Nov. 5, 2007									Operating Test No.: 2007301						
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		1			2			3			4						
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
															R	I	U
RO - 1 ☒ ☐ ☐	RX		1						1					2	1	1	0
	NOR						6							1	1	1	1
	I/C		2,4				1,3,5			3,5				7	4	4	2
	MAJ		6,8				7,8			1				5	2	2	1
	TS													0	0	2	2
RO - 2 ☒ ☐ ☐	RX			1					1					2	1	1	0
	NOR					6								1	1	1	1
	I/C			1,3,5		2,4				3,5				7	4	4	2
	MAJ			6,8		7,8				1				5	2	2	1
	TS													0	0	2	2
RO - 3 ☒ ☐ ☐	RX		1						1					2	1	1	0
	NOR						6							1	1	1	1
	I/C		2,4				1,3,5			3,5				7	4	4	2
	MAJ		6,8				7,8			6				5	2	2	1
	TS													0	0	2	2
RO - 4 ☒ ☐ ☐	RX			1										1	1	1	0
	NOR					6							1,3	3	1	1	1
	I/C			1,3,5		2,4							2,4	7	4	4	2
	MAJ			6,8		7,8							7,9	6	2	2	1
	TS													0	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must do one scenario, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Farley		Date of Exam: Week of Nov. 5, 2007										Operating Test No.: 2007301					
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		1			2			3			4						
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
															R	I	U
☒ RO - 5 ☐ ☐	RX								1					1	1	1	0
	NOR						6						1,3	3	1	1	1
	I/C						1,3,5		2,4,5				2,4	8	4	4	2
	MAJ						7,8		6				7,9	5	2	2	1
	TS													0	0	2	2
☒ RO - 6 ☐ ☐	RX			1										1	1	1	0
	NOR											1		1	1	1	1
	I/C			1,3,5								3,5,6		6	4	4	2
	MAJ			6,8								7,9		4	2	2	1
	TS													0	0	2	2
☐ SRO-I 1 ☒ ☐	RX								1					1	1	1	0
	NOR													0	1	1	1
	I/C	1,2,3,4,5			1,2,3,4,5				2,4,5					13	4	4	2
	MAJ	6,8			7,8				6					5	2	2	1
	TS	1,2,3			1,5,7									6	0	2	2
☐ SRO-I 2 ☒ ☐	RX								1					1	1	1	0
	NOR													0	1	1	1
	I/C	1,2,3,4,5			1,2,3,4,5				2,4,5					13	4	4	2
	MAJ	6,8			7,8				6					5	2	2	1
	TS	1,2,3			1,5,7									6	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must do one scenario, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Farley		Date of Exam: Week of Nov. 5, 2007		Operating Test No.: 2007301													
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		1			2			3			4						
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
☐ SRO-I 3 ☒ ☐	RX													0	1	1	0
	NOR					6								1	1	1	1
	I/C	1,2,3,4,5				2,4			2,3,4,5					11	4	4	2
	MAJ	6,8				7,8			6					5	2	2	1
	TS	1,2,3							3,4,5					6	0	2	2
☐ SRO-I 4 ☒ ☐	RX		1											1	1	1	0
	NOR													0	1	1	1
	I/C		2,4						2,3,4,5			2,3,4,5,6		11	4	4	2
	MAJ		6,8						6			7,9		5	2	2	1
	TS								3,4,5			2,3,5		6	0	2	2
☐ SRO-I 5 ☒ ☐	RX													0	1	1	0
	NOR											1		1	1	1	1
	I/C				1,2,3,4,5			2,3,4,5				3,5,6		12	4	4	2
	MAJ				7,8			6				7,9		5	2	2	1
	TS				1,5,7			3,4,5						6	0	2	2
☐ ☐ ☐ ☐	RX													NA	1	1	0
	NOR													NA	1	1	1
	I/C													NA	4	4	2
	MAJ													NA	2	2	1
	TS													NA	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must do one scenario, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Farley		Date of Examination: 11/05/07		Operating Test No.: 2007301												
Competencies	APPLICANTS															
	RO - 1 ☒ ☐ abbn ☐				RO - 2 ☒ ☐ babn ☐				RO - 3 ☒ ☐ abbn ☐				RO - 4 ☒ ☐ banb ☐			
	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	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	1,3,5,6,7	N/A	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	N/A	1-4, 7-9
Comply With and Use Procedures (1)	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	1,3,5,6,7	N/A	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	N/A	1-4, 7-9
Operate Control Boards (2)	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	1,3,5,6,7	N/A	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	N/A	1-4, 7-9
Communicate and Interact	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	1,3,5,6,7	N/A	1,2,4,6,7,8	1,3,5,6	1,3,5,6,7	N/A	1,3,5,6,7,8	2,4,6,7,8	N/A	1-4, 7-9
Demonstrate Supervisory Ability (3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comply With and Use Tech. Specs. (3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Notes: (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs.																

Instructions:

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

a=ATC, b=BOP, n=N/A in order of scenario 1, 2, 3, 4

Facility: Farley		Date of Examination: 11/05/07		Operating Test No.: 2007301												
Competencies	APPLICANTS															
	RO - 5 ☒				RO - 6 ☒				☐				SRO-I 1 ☒			
	☐				☐				☐				☐			
	nbab ☐				bnna ☐								ssan ☐			
	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	N/A	1,3,5,6	1,2,4,5,6	1-4,7-9	1,3,5,6,7,8	N/A	N/A	1,3,5,6,7,9					1-8	1-8	1,2,4,5,6	N/A
Comply With and Use Procedures (1)	N/A	1,3,5,6	1,2,4,5,6	1-4,7-9	1,3,5,6,7,8	N/A	N/A	1,3,5,6,7,9					1-8	1-8	1,2,4,5,6	N/A
Operate Control Boards (2)	N/A	1,3,5,6	1,2,4,5,6	1-4,7-9	1,3,5,6,7,8	N/A	N/A	1,3,5,6,7,9					N/A	N/A	1,2,4,5,6	N/A
Communicate and Interact	N/A	1,3,5,6	1,2,4,5,6	1-4,7-9	1,3,5,6,7,8	N/A	N/A	1,3,5,6,7,9					1-8	1-8	1,2,4,5,6	N/A
Demonstrate Supervisory Ability (3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					1-8	1-8	N/A	N/A
Comply With and Use Tech. Specs. (3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					1,2,3	1,5,7	N/A	N/A
Notes: (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs.																

Instructions:

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

a=ATC, b=BOP, s=SR0, n=N/A in order of scenario 1, 2, 3, 4

Facility: Farley		Date of Examination:		11/05/07 Operating Test No.: 2007301															
Competencies	APPLICANTS																		
	☐ SRO-I 2 ☒ ssan ☐				☐ SRO-I 3 ☒ sasn ☐				☐ SRO-I 4 ☒ anss ☐				☐ SRO-I 5 ☒ nssa ☐						
	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	1-8	1-8	1,2,4,5,6	N/A	1-8	2,4,6,7,8	1-7	N/A	1,2,4,6,7,8	N/A	1-7	1-9	N/A	1-8	1-7	13,56,79			
Comply With and Use Procedures (1)	1-8	1-8	1,2,4,5,6	N/A	1-8	2,4,6,7,8	1-7	N/A	1,2,4,6,7,8	N/A	1-7	1-9	N/A	1-8	1-7	13,56,79			
Operate Control Boards (2)	N/A	N/A	1,2,4,5,6	N/A	N/A	2,4,6,7,8	N/A	N/A	1,2,4,6,7,8	N/A	N/A	N/A	N/A	N/A	N/A	13,56,79			
Communicate and Interact	1-8	1-8	1,2,4,5,6	N/A	1-8	2,4,6,7,8	1-7	N/A	1,2,4,6,7,8	N/A	1-7	1-9	N/A	1-8	1-7	13,56,79			
Demonstrate Supervisory Ability (3)	1-8	1-8	N/A	N/A	1-8	N/A	1-7	N/A	N/A	N/A	1-7	1-9	N/A	1-8	1-7	N/A			
Comply With and Use Tech. Specs. (3)	1,2,3	1,5,7	N/A	N/A	1,2,3	N/A	3,4,5	N/A	N/A	N/A	3,4,5	2,3,5	N/A	1,5,7	3,4,5	N/A			
Notes: (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs.																			

Instructions:

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

a=ATC, b=BOP, s=SRO, n=N/A in order of scenario 1, 2, 3, 4

Facility: <u>Farley</u>		Scenario No.: <u>1</u>	Op-Test No.: <u>2007301</u>
Examiners: <u>Frank Ehrhardt</u>		Operators: _____	
<u>Jay Hopkins</u>		_____	
<u>Craig Kontz</u>		_____	
Initial Conditions: 100% RTP, Eq Xe, MOL, <u>A</u> Train On-Service – <u>A</u> Train Protected Turnover: 100% RTP, MOL, 880 ppm Cb, 10,000 MWD, Eq Xe, - CTMT batch release – last released 2 days ago, - Current Risk Assessment is GREEN and projected is GREEN, <u>A</u> Train On-Service – <u>A</u> Train Protected, 2C DG T/O for Jacket Water leak repair, - Thunderstorm warnings in effect for Southeast Alabama & Western Georgia			
Event No.	Malf. No.	Event Type*	Event Description
1		R (RO & BOP) TS (SRO)	MVARS start decreasing. Grid is degraded (<3850V)
2	1	I (RO) TS (SRO)	LT-460, pressurizer level, fails low, letdown secures
3	2	I (BOP) TS (SRO)	FT-495, selected steam Flow xmtr for "C" SG fails high
4	3	I (RO)	LT-115 fails low, VCT level, Auto MU starts, must be secured manually
5	4	C (BOP)	"B" SGFP speed oscillation, plant ramp down required to remove the "B" SGFP from service
6	5	C (BOP) M (ALL)	B SGFP Trips first, then A SGFP trips, Man Rx trip required
7	6	C (RO & BOP)	FRP-S.1 entry required for ATWT, neither Rx trip switch works, 1A CRDM MG bkr will not open
8		M (ALL)	LBLOCA when "Unit One Reactor Trip" is announced
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

SCENARIO 1 Summary sheet

Initial Conditions: 100% RTP, Eq Xe, MOL, A Train On-Service – A Train Protected,

- 880 ppm Cb,
- 10,000 MWD,
- Eq Xe,
- CTMT batch release – last released 2 days ago,
- Current Risk Assessment is **GREEN** and projected is **GREEN**,
- A Train On-Service – A Train Protected,
- 2C DG T/O for Jacket Water leak repair

Presets:

Event No.	Malf No.	Event Type*	Event Description
0		Preset	2C DG is tagged out
6		Preset	1A SGFP trips 120 secs after 1B SGFP trips
7		Preset	The reactor does not trip automatically or by either Rx trip switch, 1A CRDM MG set fails to trip.

Event 1 MVARs start decreasing. Grid is degraded (<3850V). AOP-5.2 entry required. After determining by procedure that rampdown is required after 1 hour with voltage <3850V, Shift manager informs crew to ramp down at 5 MW/min per UOP-3.1.

R actions: RO uses boration and/or rods, BOP operates DEH to set in ramp rate, target, initiate and stop ramp as necessary

A degraded grid was part of one Audit exam scenario, but the initiating voltage was > 3850V, NO Lo voltage alarm, and no ramp down was required by procedure (the shift manager cued the entry into AOP-5.2 and the ramp down). This scenario does have voltage <3850V requiring entry into AOP-5.2 without cuing, a different table is filled out for this event in AOP-5.2, and a rampdown with voltage <3850V for > 1 hour is required.

Event 2 LT-460 fails low, letdown secures. AOP-100 &/or AOP-16.0, TS 3.3.1

I actions: RO Must take manual control of Charging to maintain pressurizer level less than tech spec (63.5%). This is the action given credit for whether or not letdown is restored.

Event 3 FT-495, selected steam Flow xmtr for "C" SG fails high. The team should select channel III instruments to control 1C SG functions. Team is expected to perform actions of AOP-100, Tech Spec 3.3.2.D

Event 4 LT-115 fails low, Auto MU starts, must be manually secured

- Event 5 "B" SGFP develops an oscillation in its speed, its controller can't be shifted to manual. A plant ramp down should be initiated to remove the "B" SGFP from service. AOP-17 should be used if ramp > 5 MW/MIN used
- C actions: BOP will need to place controllers for the A SGFP and/or FRVs in manual as necessary to control SG Levels. Duration of ramp is by examiners discretion.
- Event 6 Both SGFPs trip. The 'B' pump trips first. The team should use guidance of AOP-13 and attempt to reduce load to 515 MW. During these actions, the 'A' SGFP will trip requiring the crew to manually trip the reactor per AOP-13
- Event 7 The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter **EOP ENTRY** FRP-S.1 and insert rods in manual or auto (RO) (**CT** Within 1 minute >40% power with no MFW), manually trip the turbine (BOP) and emergency borate (RO or BOP) (**CT** Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)
- Event 8 LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)
- Terminate when EEP-1.0 is entered **EOP ENTRY**

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 1

Event Description: MVARS start decreasing. Grid is degraded (<3850V). AOP-5.2 entry required. After determining by procedure that rampdown is required after 1 hour with voltage <3850V, Shift manager informs crew to ramp down at 5 MW/min per UOP-3.1.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to take ARP Actions for LB1, DEH TROUBLE ALARM, Hi MVAR Load
	BOP	Takes actions for LB1, DEH TROUBLE ALARM, Hi MVAR Load - Uses DEH GEN CAP screen to view limit of MVAR load vs. actual - OR - Uses SOP-28.1 Graph to view MVAR limit and compares with actual - Lowers reactive load to within MVAR limit
	SRO	- Directs BOP to take ARP-2.2 Actions for WE2 Lo voltage alarm, (YE2, & ZE2 also in, same actions) - Directs AOP-5.2, Degraded Grid, Entry
	BOP	Takes actions for ARP-2.2 WE2 lo voltage alarm: - Determines entry required into FNP-1-AOP-5.2, DEGRADED GRID - Notifies Shift Supervisor to evaluate TS 3.3.5 Condition E
	BOP	- Completes Table 1 to record 1F & 1G 4160V Bus volts every four hours - Calls to expedite return to service on 2C DG - Verifies all DGs aligned for auto start

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 1

Event Description: MVARs start decreasing. Grid is degraded (<3850V). AOP-5.2 entry required. After determining by procedure that rampdown is required after 1 hour with voltage <3850V, Shift manager informs crew to ramp down at 5 MW/min per UOP-3.1.

Time	Position	Applicant's Actions or Behavior
	SRO	• Consults SM to evaluate continued plant operation, informs that rampdown required after 1 hour Voltage <3850V • Informs Shift Manager to consult with ACC for voltage control strategies • Determines TS 3.3.5 Condition E applies, must return voltage to $\geq 3850V$ in one hour
	SRO	Directs ramping per UOP-3.1
	BOP	• May direct rover to flush AFW suction (must be done prior to AFW operation at 3% power) • if desired places IMP PRESS LOOP in service • Commences ramp at up to 5MW/min
	RO	• Controls $T_{avg} \pm 1^{\circ}F$ of T_{ref} with rods or borations (Boration per SOP-2.3 APP B & C, see attached) • Controls $\Delta I \pm 5\%$ of target with rods and borations

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 2

Event Description: LT-460 fails low, letdown secures

Time	Position	Applicant's Actions or Behavior
	SRO	Directs performance of ARPs: • HA3, PZR LVL LO B/U HTRS OFF LTDN SEC ◦ Directs to AOP-100- Actions below • HD4, PRZR HTR CONT TRBL ◦ Actions below Enters AOP-100 (NO immediate actions for this failure) • Directs RO per RO actions below • Addresses Tech Specs 3.3.1 (Mandatory LCO - Condition M Place channel in trip in 6 hours) & 3.3.3 (Admin LCO Only, 2 channels are required) • Notifies the shift manager • Writes a CR & notifies the Work Week Coordinator of the failure • Requests the bistable for LT-460 be tripped in less than 6 hours per Tech Specs

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 2

Event Description: LT-460 fails low, letdown secures

Time	Position	Applicant's Actions or Behavior
	RO	• takes manual control of charging flow to maintain pressurizer level on program value • Checks seal Injection flows 6-13 gpm • Determines LT-460 has failed low • selects unaffected level channel on LS-459Z: chan I/III, 459/461 • manually controls PZR HTRs to control RCS PRESSURE near 2235 (should give a band) places letdown back in service • Verifies all orif iso valves closed: HV8149A, B, & C • Manually adjusts PK 145 to 50% or less • Opens LCV 460 • Adjusts FK 122 in man to at least 18 gpm • Opens LTDN ORIF ISO 60 GPM 8149B or C • Checks letdown flow established • Places PK 145 in auto • Adjusts Chg & letdown to establish a flow balance and establish pressurizer level on program • When pressurizer level is close to program level, Places FK 122 in auto per SOP-2.1 section 4.6.1 (ATTACHED) • WHEN LT-460 is selected out of the control circuit, turns off 1C PRZR HTRS and returns switch to auto, restores all PZR HTRs to auto or man as desired

Op-Test No.: HLT-31 NRC **Scenario No.:** 1 **Event No.:** 2**Event Description:** LT-460 fails low, letdown secures

Time	Position	Applicant's Actions or Behavior
	BOP	ARP HD4 Actions • Places C PZR HTR switch in off • Manually controls pressure by turning heaters on and off until LT-460 is selected out of the control circuit • WHEN LT-460 is selected out of the control circuit, turns off 1C PRZR HTRS and returns switch to auto, restores all PZR HTRs to auto or man as desired

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 3

Event Description: FT-495, selected steam Flow xmtr for "C" SG fails high. The team should select channel III instruments to control 1C SG functions. Team is expected to perform actions of AOP-100

Refer to Tech Spec 3.3.2.D

Time	Position	Applicant's Actions or Behavior
	SRO	Enters AOP-100, Ensures immediate actions are performed, then verifies them in the procedure • Ensures Steam Flow and Feed flows are matched and all SGs at or approaching 65% • Set man trip criteria on SG level (high and low trip setpoints are 82% & 28%) • Directs Turbine be placed on hold • Directs placing the C SG FLOW SEL SW FS/498Z in Channel III • Directs placing controllers in auto when SG levels are near 65% with Feed and Steam flows matched • Addresses Tech spec 3.3.2, FUNCTION 4. e. High Steam Flow (Condition D: place Channel in trip in 6 hours) • Notifies Shift Manager • Submits a CR & Notifies the Work Week Coordinator, request I & C trip bistables in 6 hours or less • Directs BOP to recommence ramp

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 3

Event Description: FT-495, selected steam Flow xmtr for "C" SG fails high. The team should select channel III instruments to control 1C SG functions. Team is expected to perform actions of AOP-100

Refer to Tech Spec 3.3.2.D

Time	Position	Applicant's Actions or Behavior
	BOP	Performs immediate actions of AOP-100 section 1.5 from memory, then continues as directed by SRO • Takes manual control to match steam flow and feed flow as required of ○ SGFP master controller SK-509A or individual controllers SK 509B or C ○ Feed Reg valves FK 478, 488, 498 • Places Ramp on hold • Monitors SG levels and trips if necessary in accordance with the trip criteria established by the SRO • Determines and reports to the SRO than FT 495 is failed high • Places the C SG FLOW SEL SW FS/498Z in Channel III • Places controllers in auto when SG levels are near 65% with Feed and Steam flows matched Performs applicable ARPs when time permits: JB4: MS LINE HI STM FLOW ALERT, JF3: 1C SG LVL DEV, JB3: 1C STM FLOW > FEED FLOW • No additional actions required by the ARPs WHEN directed, recommences ramp
	RO	• Assists with monitoring SG levels, Feed Flows, & Steam Flows • Monitors SG levels and trips if necessary in accordance with the trip criteria established by the SRO

[illegible]

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 5

Event Description: "B" SGFP develops an oscillation in its speed, its controller can't be shifted to manual. A plant ramp down should be initiated to remove the "B" SGFP from service. AOP-17 should be used if ramp > 5 MW/MIN used

Time	Position	Applicant's Actions or Behavior
	SRO	Enters AOP-100, Ensures immediate actions are performed, then verifies them in the procedure • Directs manual control to ensure Steam Flow and Feed flows are matched and all SGs at or approaching 65% • Set man trip criteria on SG level (high and low trip setpoints are 82% & 28%) • Directs ramp down due to B SGFP speed oscillating
	BOP	Performs immediate actions of AOP-100 section 1.5 from memory, then continues as directed by SRO • Takes manual control to match steam flow and feed flow as required of ○ SGFP master controller SK-509A or individual controllers SK 509B or C ○ Feed Reg valves FK 478, 488, 498 • Informs SRO that the B SGFP Speed controller demand is oscillating and can't be placed in manual • Takes manual control of FRVs FK 478, 488, 498 to control SG levels while B SGFP speed is oscillating

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 5

Event Description: "B" SGFP develops an oscillation in its speed, its controller can't be shifted to manual. A plant ramp down should be initiated to remove the "B" SGFP from service. AOP-17 should be used if ramp > 5 MW/MIN used

Time	Position	Applicant's Actions or Behavior
	BOP	Performs immediate actions of AOP-13, LOSS OF MAIN FEEDWATER from memory, then continues as directed by SRO • Presses SGFP SETPOINT button on DEHC keypad • Presses P8 key • Verifies Target of 540 MW & Rate of 1200MW/Min • Depresses GO pushbutton • Monitors SG level for man trip criteria • WHEN SG narrow range level recovers to ~55%, places FRVs in manual and matches steam flow with feed flow (prevents level overshoot and SG overfill) • Places FRVs back in auto when FF matches SF, and SG levels are at or trending to 65% • WHEN <540 MW, and SG Levels at or trending to 65%, TRIPS B SGFP
	RO	• Controls Tavg $\pm$ 5°F of Tref with rods or borations (Boration per SOP-2.3 APP B & C, see attached) • Reduces reactor power with rod insertion or boration until Reactor power matches turbine power (steam dumps are closed and Tavg = Tref $\pm$ 1°F) • Maintains ΔI within COLR by rod insertion or borations • Maintains rods within rod insertion limits (FE2 stays clear: CONT ROD BANK POSITION LO-LO)

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 5

Event Description: "B" SGFP develops an oscillation in its speed, its controller can't be shifted to manual. A plant ramp down should be initiated to remove the "B" SGFP from service. AOP-17 should be used if ramp > 5 MW/MIN used

Time	Position	Applicant's Actions or Behavior
		13.3 <u>IF</u> C-7A is to be reset, <u>THEN</u> perform the following: 13.3.1 Verify that all steam dump valves indicate closed. 13.3.2 Verify 0 demand on STM HDR PRESS controller PK 464 and STM DUMP DEMAND TI408 13.3.3 Place STM DUMP INTLK TRAIN A and TRAIN B to OFF RESET 13.3.4 Place STM DUMP MODE SEL TRAINS A-B to RESET and then release to spring return to TAVG. 13.3.5 Place STM DUMP INTLK TRAIN A and B to ON.

Op-Test No.: HLT-31 NRC **Scenario No.:** 1 **Event No.:** 6

Event Description: Both SGFPs trip. The 'B' pump trips first. The team should use guidance of AOP-13 and attempt to reduce load to 515 MW if not done in event 5. During these actions, the 'A' SGFP will trip 2 Mins after B trips requiring the crew to manually trip the reactor per AOP-13

NRC Discretion on when to trip B SGFP, Crew should trip it after load is <540MW

Time	Position	Applicant's Actions or Behavior
	SRO	WHEN B SGFP trips: enters AOP-13, LOSS OF MAIN FEEDWATER • Set man trip criteria on SG level (high and low trip setpoints are 82% & 28%) • Verifies immediate actions in AOP-13 ○ Rapidly ramping to 515 MW ○ SG levels 28% < level <82% and trending to 65% WHEN A SGFP trips: • Directs tripping of Reactor and perform EEP-0 immediate actions per immediate actions of AOP-13 when A SGFP trips > 35% power Directs entry into FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION - ATWT

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 6

Event Description: Both SGFPs trip. The 'B' pump trips first. The team should use guidance of AOP-13 and attempt to reduce load to 515 MW if not done in event 5. During these actions, the 'A' SGFP will trip 2 Mins after B trips requiring the crew to manually trip the reactor per AOP-13

NRC Discretion on when to trip B SGFP, Crew should trip it after load is <540MW

Time	Position	Applicant's Actions or Behavior
	BOP	WHEN B SGFP trips: Performs immediate actions of AOP-13, LOSS OF MAIN FEEDWATER from memory, then continues as directed by SRO • Presses SGFP SETPOINT button on DEHC keypad • Presses P8 key • Verifies Target of 540 MW & Rate of 1200MW/Min • Depresses GO pushbutton • Monitors SG level for man trip criteria • WHEN SG narrow range level recovers to ~55%, places FRVs in manual and matches steam flow with feed flow (prevents level overshoot and SG overfill) • Places FRVs back in auto when FF matches SF, and SG levels are at or trending to 65% • WHEN <540 MW, and SG Levels at or trending to 65%, TRIPS B SGFP WHEN A SGFP trips: • Attempts to trip reactor & perform step one immediate action of EEP-0 • Reactor does not trip with either trip handswitch or opening MG set breakers • Enters FRP-S.1 and performs Immediate actions

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 6

Event Description: Both SGFPs trip. The 'B' pump trips first. The team should use guidance of AOP-13 and attempt to reduce load to 515 MW if not done in event 5. During these actions, the 'A' SGFP will trip 2 Mins after B trips requiring the crew to manually trip the reactor per AOP-13

NRC Discretion on when to trip B SGFP, Crew should trip it after load is <540MW

Time	Position	Applicant's Actions or Behavior

V

	RO	WHEN B SGFP trips: - Controls $T_{avg} \pm 5^{\circ}\text{F}$ of T_{ref} with rods or borations (Boration per SOP-2.3 APP B & C, see attached) - Reduces reactor power with rod insertion or boration until Reactor power matches turbine power (steam dumps are closed and $T_{avg} = T_{ref} \pm 1^{\circ}\text{F}$) - Maintains ΔI within COLR by rod insertion or borations - Maintains rods within rod insertion limits (FE2 stays clear: CONT ROD BANK POSITION LO-LO)
	RO	WHEN A SGFP trips: - Attempts to trip reactor & performs step one immediate action of EEP-0 - Reactor does not trip with either trip handswitch or opening MG set breakers

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 7

Event Description: The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter FRP-S.1 and insert rods in manual or auto (CT Within 1 minute >40% power with no MFW) and emergency borate (CT Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)

Time	Position	Applicant's Actions or Behavior
	SRO	Directs actions of FRP-S.1 - Verifies immediate actions step 1 & 2 - Rods driving in at ≥ 48 steps/min - Ensure Rover was called to open reactor trip breakers locally - Checks turbine tripped
		Directs RO/BOP to perform remainder of FRP-S.1 as listed in RO/BOP rows below
CRITICAL TASK: insert rods in manual or auto (RO) (Within 1 minute >40% power with no MFW)		
	RO	Performs immediate actions of FRP-S.1 step 1 - Rods driving in at ≥ 48 steps/min - Calls Rover to open Unit One reactor trip breakers locally
CRITICAL TASK: manually trip the turbine (BOP) and emergency borate (RO or BOP) (Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)		
	BOP	Performs immediate actions of FRP-S.1 step 2 Holds turbine trip switch to trip for at least 5 secs

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 7

Event Description: The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter FRP-S.1 and insert rods in manual or auto (CT Within 1 minute >40% power with no MFW) and emergency borate (CT Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)

Time	Position	Applicant's Actions or Behavior
	RO	Performs subsequent actions of FRP-S.1 as directed • Initiates Emerg. Boration of the RCS ○ AT LEAST ONE chg pump RUNNING ○ Start a Bat PMP ○ Open MOV 8104, EMERG BORATE TO CHG PUMP SUCT • Establishes adequate letdown ○ Verifies HV8149A open (45 gpm orif) ○ Verify HV8149B OR C open (60 gpm orif) • Verify charging flow >40 gpm • Verify FI 110 > 30 GPM
	BOP or RO	Performs subsequent actions of FRP-S.1 as directed • Verifies AFW running (Both MDAFW amps >0 & TDAFW SPEED > 3900 RPM)

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 7

Event Description: The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter FRP-S.1 and insert rods in manual or auto (CT Within 1 minute >40% power with no MFW) and emergency borate (CT Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)

Time	Position	Applicant's Actions or Behavior
	BOP or RO	Verify containment ventilation isolation. 5.1 Verify containment purge dampers - CLOSED. ☐ 3197 ☐ 3198D ☐ 3198C ☐ 3196 ☐ 3198A ☐ 3198B 5.2 Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D ☐ 2866C ☐ 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C ☐ 2866D ☐ 2867D 5.3 Stop MINI PURGE SUPP/EXH FAN.
	BOP	IF SI actuated, performs ATT 1, Auto SI Verification (Attached)
	SRO	After directing RO to verify RX NOT Critical at step 8 RNO column, Exits FRP-S.1 to EEP-0, STEP 1

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 7

Event Description: The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter FRP-S.1 and insert rods in manual or auto (CT Within 1 minute >40% power with no MFW) and emergency borate (CT Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)

Time	Position	Applicant's Actions or Behavior
	SRO directs RO	Check if reactor still critical. - Check power range indication - GREATER THAN <u>OR</u> EQUAL TO 5%. PR1(2,3,4) PERCENT FULL POWER ☐ NI 41B ☐ NI 42B ☐ NI 43B ☐ NI 44B <u>OR</u> - Check any intermediate range startup rate - POSITIVE. IR1(2) S/U RATE ☐ NI 35D ☐ NI 36D
	SRO	Enters EEP-0 at step 1 & directs actions per below RO/BOP actions
	RO	- Checks all reactor trip and bypass breakers open - Checks PR & IR Power falling and DRPI rod bottom lights lit - Checks turbine tripped - Checks power to 4160V busses on the EPB - Checks SI Status – No SI Actuated - Checks SI required all parameters and bistable lights – No SI required

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 7

Event Description: The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter FRP-S.1 and insert rods in manual or auto (CT Within 1 minute >40% power with no MFW) and emergency borate (CT Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)

Time	Position	Applicant's Actions or Behavior
	BOP	- Checks power to 4160V busses on the EPB - Checks SI Status – No SI Actuated - Checks SI required all parameters and bistable lights – No SI required (if SI was required, see later steps for SI in event 8)
	SRO	IF SI is required, go to event 8 for those actions. SRO will stay in EEP-0 past step 4 if SI has occurred or is required.
	SRO	IF SI is NOT required, directs transition at step 4 of EEP-0 to ESP-0.1, REACTOR TRIP RESPONSE Directs actions in ESP-0.1 per RO/BOP Actions listed below
	SRO	WHEN CSFs are directed to be monitored, Enters FRP-P.1 & directs actions in RO Row below:
	RO	- Checks RCS Pressure >275 psig {435 psig} NO: - Directs RNO action to return to procedure and step in effect per LHSI flow > 1.5E3 gpm
	SRO	EXITS FRP-P.1 and returns to procedure and step in effect EEP-0
	RO	Checks RCS Tavg stable at or approaching 547°F
	BOP	- Verifies feedwater status 3 FRVs closed 3 FRV Bypass valves closed - MDAFW auto start switches on BOP in Defeat - Both SGFPs tripped

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 7

Event Description: The reactor does not trip using either Rx trip switch. The team should attempt to open MG set bkr. The 1A MG bkr will not open. The team should enter FRP-S.1 and insert rods in manual or auto (CT Within 1 minute >40% power with no MFW) and emergency borate (CT Within 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breaker)

Time	Position	Applicant's Actions or Behavior

	RO	- Checks emerg boration not required - All rod bottom lights lit - RCS Tavg > 525°F - Announces "Unit 1 Reactor Trip"

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	SRO	Directs SI Verified actuated and reentry into EEP-0 per foldout page of ESP-0.1: • < 16°F subcooling & Pzr level < 4%
	SRO	Starts at step 1 of EEP-0, and directs actions per RO/BOP actions listed in rows below:
	SRO, RO, OR BOP	Announces EEP-0 Fold out Page items in effect, directs/takes actions required • Subcooling <16°F [45}, stop all RCPs • RCS Press < 1300 psig, close chg mini-flows • Ctmt pressure > 4 psig, use adverse numbers
	RO	• Checks reactor tripped ○ All 4 RT & BYP Bkrs are open ○ PR & IR power trending down ○ All DRPI rod bottom lights are lit • Checks turbine tripped • Checks power to 4160 V ESF busses both trains energized • Verifies operating DGs are being supplied from at least one SW pump • Checks SI Status ○ MLB-1 1-1 & 1-2 lit ○ BYP & PERMISSIVE SI light lit

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	BOP	- Checks reactor tripped - All 4 RT & BYP Bkrs are open - PR & IR power trending down - All DRPI rod bottom lights are lit - Checks turbine tripped - Checks power to 4160 V ESF busses both trains energized - Verifies operating DGs are being supplied from at least one SW pump - Checks SI Status - MLB-1 1-1 & 1-2 lit - BYP & PERMISSIVE SI light lit - Verifies SI Auto actions using EEP-0 ATT 2 (Attached)
	SRO, RO, or BOP	Announces Fold out page conditions met. Actions directed and performed: - Adverse numbers are in effect (>4psig in ctmt) - Charging miniflow valves must be closed (<1300psig in RCS) - RCPs must be secured IF HHSI flow < 0 gpm)
	RO	Check ctmt pressure has remained <27#: NO, - ctmt pressure has been >27#, - perform RNO column:

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	RO	6.1 Verify PHASE B CTMT ISO - ACTUATED. ☐ MLB-3 1-1 lit ☐ MLB-3 6-1 lit 6.2 Stop all RCPs. RCP ☐ 1A ☐ 1B ☐ 1C 6.3 Verify PHASE B CTMT ISO alignment. 6.3.1 Check All MLB-3 lights lit. 6.3.2 <u>IF</u> any MLB-3 light <u>NOT</u> lit. <u>THEN</u> verify PHASE B CTMT ISO using ATTACHMENT 5. PHASE B CONTAINMENT ISOLATION.

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	RO	6.4 Check containment spray. 6.4.1 Check containment spray flow in both trains greater than 0 gpm. CS FLOW ☐ FI 958A ☐ FI 958B 6.4.2 <u>IF</u> containment spray flow in both trains <u>NOT</u> greater than 0 gpm. <u>THEN</u> verify containment spray pump suction valves open. RWST TO 1A(1B) CS PUMP ☐ Q1E13MOV8817A ☐ Q1E13MOV8817B
	RO	Announces "Unit 1 reactor trip and safety injection"
	RO or BOP	• Checks AFW status ○ Verifies at least 395 gpm flow to SGs ○ OR ○ at least one level > 31% {48} ○ Controls MDAFW & TDAFW flows as necessary ○ Stops TDAFW pump WHEN at least 2 SGs >28% ○ Maintains 31-65% {48-65} SG levels • Checks RCS temps 547 & Stable, NO: performs RNO

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK ☐ A TRN in OFF RESET ☐ B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed. 1A(1B.1C) MS ATMOS REL VLV ☐ PC 3371A ☐ PC 3371B ☐ PC 3371C
	RO or BOP	9.1.3 Control total APW flow to minimize RCS cooldown. APW FLOW TO 1A(1B.1C) SG ☐ FI 3229A ☐ FI 3229B ☐ FI 3229C APW TOTAL FLOW ☐ FI 3229 9.1.4 <u>IF</u> MSIVs are closed <u>THEN</u> proceed to step 9.1.8
	RO or BOP	[MSR isolation & Main Steam Drain Pot isolation are done without SRO direction by the Turbine Building SO after each reactor trip, these may not be performed at this time for this reason]
	RO or BOP	Secures one SJAE if two are in service

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Closes MSIVs if cooldown not stopped
	RO or BOP	Checks PORVs • closed, • iso valves open with power, • no evidence of leak by via downstream temps & PRT parameters
	RO	Checks RCP stopped due to insufficient subcooling
	RO	Checks CHG mini-flows closed due to RCS press<1300 psig
	RO or BOP	Checks SGs not faulted • no press falling uncontrolled • none less than 50 psig
	RO or BOP	Checks SGs not ruptured • no secondary radiation levels high • no SG levels rising uncontrolled
	RO or BOP	Checks RCS intact: NO, RCS not intact due to ctmt rad monitors in alarm, ctmt pressure > 3 psig, ctmt ECCS sump > 0.4 FT
	SRO	Directs team to transition to EEP-1 per RNO of step 15, RCS is NOT intact (Scenario TERMINATION POINT)
NRC DISCRETION AT THIS POINT WHETHER TO CONTINUE OR TERMINATE SCENARIO HERE		
	SRO	Directs actions in EEP-1 per RO/BOP action in rows below:
	RO	Checks RCP stopped due to insufficient subcooling

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Checks SGs not faulted • no press falling uncontrolled • none less than 50 psig
	RO or BOP	• Checks AFW status ○ Verifies at least 395 gpm flow to SGs ○ OR ○ at least one level > 31% {48} ○ Controls MDAFW & TDAFW flows as necessary ○ Stops TDAFW pump WHEN at least 2 SGs >28% ○ Maintains 31-65% {48-65} SG levels
	BOP	Checks secondary radiation normal: YES
	RO	Checks PORVs • closed, • iso valves open with power, • no evidence of leak by via downstream temps & PRT parameters
	SRO	Directs step 6 be performed (1 hour from start of event requirements - not available to perform in simulator- SRO calls for SSS or an extra to perform) • close recirc discs • Establish 1A & 1B post LOCA H2 analyzer on service per ATT 2 • Plot H2 on Fig 1 • Check and control H2 concentration in ctmt

Op-Test No.: HLT-31 NRC Scenario No.: 1 Event No.: 8

Event Description: LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	SRO	Checks for SI termination criteria and continues on without terminating SI due to inadequate RCS pressure & pwr level
	RO or BOP	Checks containment spray system - Both CS pmps started - Resets both trains of CS signals Determines LHSI pumps should NOT be stopped due to RCS Pressure less than 275 psig {435 psig}
	RO or BOP	Establishes CCW to both RHR HXs by verifying open MOV 3185A & B
	BOP	Performs EEP-1 ATT 4, VERIFYING 4160 V BUSSES ENERGIZED (Attached)
	SRO	Directs securing Unloaded DGs (extra, Unit two UO, or BOP)
	SRO	- Begins evaluation of plant status, Determines both trains of recirc equipment available - WHEN 12.5 Feet level in RWST, transitions to ESP-1.3, Cold Leg Recirc (attached) per Fold out page - Directs Unit two UO to assist taking ECCS logs - Directs TSC to evaluate need for RCS sampling
	BOP	checks for no intersystem LOCA outside cmt - Aux building radiation NORMAL - Aux building no hi sump levels & pumps not running - WHT and FDT levels not rising unexplained - Verify at least one train of PRF in operation using SOP-60.0, PRF System (Attached) - Checks LHSI flow in progress by low RCS PRESSURE & LHSI flows $>1.5 \times E3$

Op-Test No.: HLT-31 NRC **Scenario No.:** 1 **Event No.:** 8**Event Description:** LBLOCA when "Unit One Reactor Trip" is announced (Significant modification from bank scenario 1E-C due to addition of LBLOCA)

Terminate when EEP-1.0 is entered

Time	Position	Applicant's Actions or Behavior
	SRO	RETURNS to step 14 & loops in procedure from step 14 to 16 until RWST level <12.5', THEN transitions to ESP-1.3 (Attached)

Attached procedures

01/03/07 15:29:30

UNIT 1

FNP-1-SOP-2.3
Appendix B

APPENDIX B

OPERATOR AID FOR BORATION AND DILUTION

1.0 Boration

NOTE: The Boric Acid Integrator ONLY needs to be verified when changed. This should be documented with an Autolog Entry.

- ☐ ☐ ☐ ☐ 1.1 IF necessary, THEN set the boric acid integrator to the desired quantity.
- ☐ ☐ ☐ ☐ 1.2 IF necessary, THEN adjust LTDN TO VCT FLOW LK 112 setpoint as desired.
- ☐ ☐ ☐ ☐ 1.3 Position the MKUP MODE CONT SWITCH to STOP.
- ☐ ☐ ☐ ☐ 1.4 Position the MKUP MODE SEL SWITCH to BOR.
- ☐ ☐ ☐ ☐ 1.5 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.6 Verify proper boration operation by observing the following:
- On service boric acid pump started.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - BORIC ACID TO BLENDER Q1E21FCV113A opens.
 - Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 1.7 Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows:
- Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.
 - BORIC ACID TO BLENDER Q1E21FCV113A closes.
- ☐ ☐ ☐ ☐ 1.8 If desired to clear the line of acid, perform the applicable steps of Appendix B section 2.0.

NOTE: The following three steps are not required if operation in a mode other than automatic is preferred. Refer to appendix C.

- ☐ ☐ ☐ ☐ 1.9 Position the MKUP MODE SEL SWITCH to AUTO.
- ☐ ☐ ☐ ☐ 1.10 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.11 IF LK 112 setpoint was adjusted per Step 1.2, THEN return setpoint to that required for current conditions.

Attached procedures

01/03/07 15:29:30

UNIT 1

FNP-1-SOP-2.3
Appendix C

APPENDIX C

OPERATOR AID FOR REPETITIVE BORATION AND DILUTION

CAUTION: Without automatic makeup care should be taken to maintain VCT level between 26% and 61% during repetitive operation of the reactor makeup control system.

1.0 Boration

NOTE: During periods of repetitive boration evolutions, to minimize the number of start/stop cycles on the boric acid pump, the handswitch may be placed in START and allowed to return to AUTO to maintain the boric acid pump running. WHEN it is no longer desired to maintain the boric acid pump running continuously, THEN place the handswitch in STOP and return to AUTO.

- ☐ ☐ ☐ ☐ 1.1 The Reactor Makeup Control system has been previously aligned for Boration.
- ☐ ☐ ☐ ☐ 1.2 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.3 Verify proper boration operation by observing the following:
- On service boric acid pump started.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - BORIC ACID TO BLENDER Q1E21FCV113A opens.
 - Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 1.4 Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows:
- Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.
 - BORIC ACID TO BLENDER Q1E21FCV113A closes.

NOTE: WHEN it is no longer desired to maintain the line full of acid, THEN perform the applicable steps of Appendix B section 2.0 to flush the line.

- ☐ ☐ ☐ ☐ 1.5 IF repetitive borations are no longer required THEN verify the system is aligned for Automatic makeup per steps 1.9 through 1.11 of Appendix B.

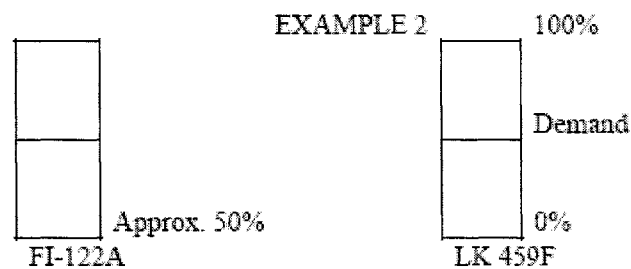
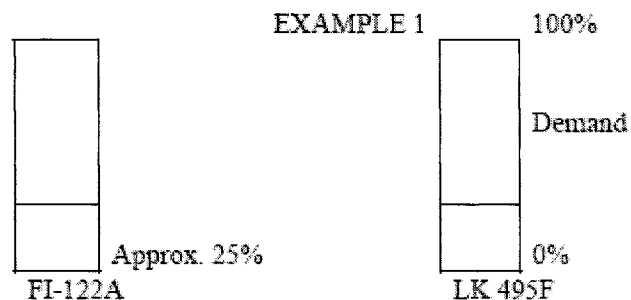
Attached procedures**UNIT 1**

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FNP-1-SOP-2.1

4.6 Charging Flow Control**4.6.1 Automatic Charging Flow Control**

- 4.6.1.1 Verify PRZR LVL LK 459F is in MANUAL.
- 4.6.1.2 Verify PRZR level is at setpoint (within $\pm 3\%$) as indicated on LR 459.
- 4.6.1.3 Manually adjust the output meter on PRZR LVL LK 459F to equal the position of the meter pointer on CHG FLOW indicator FI-122A. See example below:



- 4.6.1.4 Place LK 459F in AUTO.
- 4.6.1.5 Place FK 122 in AUTO.

Attached procedures

SOP-2.3 Section 4.2.1

4.2.1 Makeup to Top of Volume Control Tank

- 4.2.1.1 Verify the VCT capable of receiving makeup.
- 4.2.1.2 Using blended flow nomograph or table, Figure 1, determine the quantity and concentration (boric acid, reactor makeup water, or blend) of makeup to be supplied.

NOTE: The Boric Acid and/or Total Flow Batch Integrators ONLY need to be verified when changed. This should be documented with an Autolog Entry.

- 4.2.1.3 Set the boric acid or reactor makeup water flow controllers and their respective batch integrators to the calculated flow rate and quantity values obtained in step 4.2.1.2.
- 4.2.1.4 IF necessary, THEN adjust LK-112 setpoint down to the pot setting corresponding to the desired VCT level to prevent compressing gas space.
- 4.2.1.5 Position the MKUP MODE CONT SWITCH to STOP.
- 4.2.1.6 Position the MKUP MODE SEL SWITCH to MAN.
- 4.2.1.7 Open MKUP TO VCT Q1E21FCV114A (Q1E21V339).

NOTE: Makeup may be stopped at any time by positioning the MKUP MODE CONT SWITCH to STOP.

- 4.2.1.8 Position the MKUP MODE CONT SWITCH to START.
- 4.2.1.9 IF 1B RMW PUMP is running and not required for current plant conditions, THEN position the 1B RMW PUMP switch to STOP.
- 4.2.1.10 Verify makeup flows indicated on FI-113 and FI-168 are at the pre-selected rates as displayed on MAKEUP FLOW TO CHG/VCT indicator.

Attached procedures

SOP-2.3 Section 4.2.1

- 4.2.1.11 During or following a change of boron concentration of greater than 5 ppm in the RCS, the pressurizer spray must be operated to equalize the concentration throughout the system. Automatic operation of the spray should be initiated by manual operation of the pressurizer heaters when there is a steam bubble in the pressurizer.
- 4.2.1.12 Verify makeup automatically stops when batch integrator setpoints are reached by observing the following:
- (a) Boric acid flow on FI-113 and reactor makeup flow on FI-168 return to zero as displayed on MAKEUP FLOW TO CHG/VCT indicator.
 - (b) RMW TO BLENDER Q1E21FCV114B (Q1E21V345) closed.
 - (c) BORIC ACID TO BLENDER Q1E21FCV113A (Q1E21V354) closed.
- 4.2.1.13 Return MKUP TO VCT Q1E21FCV114A (Q1E21V339) control switch to AUTO.

NOTE:	The following two steps are not required if operation in a mode other than automatic is required.

- 4.2.1.14 Position the MKUP MODE SEL SWITCH to AUTO.
- 4.2.1.15 Position the MKUP MODE CONT SWITCH to START.
- 4.2.1.16 IF the boric acid and/or reactor makeup water flow controllers were adjusted, THEN perform the following:
- (a) Verify the BORIC ACID MKUP FLOW controller FK 113 is in the MAN position. (AI2005205348)
 - (b) Restore FK-113 controller to the setpoint required for automatic makeup per step 4.1.2.
 - (c) Verify FK-168 PRI WTR MKUP FLOW controller in Auto.
- 4.2.1.17 IF LK-112 was adjusted, THEN return LK-112 setpoint to that required for current conditions.

Attached procedures

SOP-2.3 Section 4.2.2

4.2.2 Makeup to Charging Pumps Suction Header

NOTE: IF waste gas system is shutdown, THEN VCT level should be maintained such that VCT pressure is not lowered to the point where the pressure regulator will admit more H₂ or N₂ to the VCT. Repeatedly allowing pressure to drop to this point will eventually result in having to start up the waste gas system to remove excess VCT gas. In addition, VCT level changes should be limited to prevent excessive perturbation of the RCP seals.

- 4.2.2.1 Verify VCT capable of receiving makeup.
- 4.2.2.2 Using blended flow nomograph or table, Figure 1, determine the quantity and concentration (boric acid, reactor makeup water, or blend) of makeup to be supplied to the CVCS.

NOTE: The Boric Acid and/or Total Flow Batch Integrators ONLY need to be verified when changed. This should be documented with an Autolog Entry.

- 4.2.2.3 Set the boric acid and/or reactor makeup water flow controllers and their respective batch integrators to the calculated flow rate and quantity values obtained in step 4.2.2.2.
- 4.2.2.4 IF necessary, THEN adjust LK-112 setpoint down to the pot setting corresponding to the desired VCT level to prevent compressing gas space.
- 4.2.2.5 Position MKUP MODE CONT SWITCH to STOP.
- 4.2.2.6 Position the MKUP MODE SEL SWITCH to MAN
- 4.2.2.7 Open MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B (Q1E21V337).

NOTE: Makeup may be stopped at any time by positioning the MKUP MODE CONT SWITCH to STOP.

- 4.2.2.8 Position MKUP MODE CONT SWITCH to START.
- 4.2.2.9 IF 1B RMW PUMP is running and not required for current plant conditions, THEN position the 1B RMW PUMP switch to STOP.
- 4.2.2.10 Verify boric acid flow on FI-113 and reactor makeup flow on FI-168 are at the pre-selected rates as displayed on MAKEUP FLOW TO CHG/VCT indicator.
- 4.2.2.11 During or following a change of boron concentration of greater than 5 ppm in the RCS, the pressurizer spray must be operated to equalize the concentration throughout the system. Automatic operation of the spray should be initiated by manual operation of the pressurizer heaters when there is a steam bubble in the pressurizer.
- 4.2.2.12 Verify makeup automatically stops when batch integrator setpoints are reached by observing the following:

Attached procedures

SOP-2.3 Section 4.2.2

- (a) Boric acid flow on FI-113 and reactor makeup flow on FI-168 return to zero as displayed on MAKEUP FLOW TO CHG/VCT indicator.
- (b) RMW TO BLENDER Q1E21FCV114B (Q1E21V345) closed.
- (c) BORIC ACID TO BLENDER Q1E21FCV113A (Q1E21V354) closed.

- 4.2.2.13 Return MKUP TO CHG PUMP SUCTION HDR
Q1E21FCV113B (Q1E21V337) control switch to AUTO.

NOTE: The following four steps are not required if operation in a mode other than automatic is preferred.

- 4.2.2.14 Position the MKUP MODE SEL SWITCH to AUTO.

- 4.2.2.15 Position the MKUP MODE CONT SWITCH to START.

- 4.2.2.16 IF the boric acid and/or reactor makeup water flow controllers were adjusted, THEN perform the following:

- (a) Verify the BORIC ACID MKUP FLOW controller FK 113 is in the MAN position. (AI2005205348)
- (b) Restore controller FK-113 to the setpoint required for automatic makeup per step 4.1.2.
- (c) Verify FK-168 PRI WTR MKUP FLOW controller in Auto.

- 4.2.2.17 IF LK-112 was adjusted, THEN return LK-112 setpoint to that required for current conditions.

Attached procedures

FRP-S.1 ATT 1

Step	Action/Expected Response	Response NOT Obtained
ATTACHMENT 1		
AUTOMATIC SAFETY INJECTION VERIFICATION		

<u>CAUTION:</u> Diesel generator damage may occur if all running diesels are not supplied with service water within three minutes.		

1	Check power to 4160 V ESF busses.	
1.1	4160 V ESF busses - AT LEAST ONE ENERGIZED	
	• A Train (F & K) power available lights lit	
	<u>OR</u>	
	• B Train (C & L) power available lights lit	
1.2	4160 V ESF busses - BOTH ENERGIZED	1.2 Try to restore power to deenergized 4160 V ESF bus as time permits while continuing with the remainder of this procedure.
	[] A Train (F & K) power available lights lit [] B Train (C & L) power available lights lit	
1.3	Verify operating diesel generators are being supplied from at least one SW pump.	1.3 <u>IF</u> service water flow cannot be readily restored to a running diesel generator <u>THEN</u> secure the diesel generator using operator aid located on EPB.

Attached procedures

FRP-S.1 ATT 1

ATTACHMENT 1

2 Check SI Status.

- 2.1 Check any SI actuated indication.

BYP & PERMISSIVE
SAFETY
INJECTION

- ☐ ACTUATED status light lit
☐ MLB-1 1-1 lit
☐ MLB-1 11-1 lit

- 2.2 Verify both trains of SI-
ACTUATED.

- 2.2 Manually actuate SI.

- ☐ MLB1 1-1 AND MLB1 11-1 lit

3 Verify main feedwater status.

- 3.1 Verify main feedwater flow control and bypass valves - CLOSED.

- 1A(1B,1C) SG
FW FLOW
☐ FCV 478
☐ FCV 488
☐ FCV 498

- 3.1 Verify main feedwater stop valves closed.

- MAIN FW TO 1A(1B,1C) SG
STOP VLV
☐ Q1N21MOV3232A
☐ Q1N21MOV3232B
☐ Q1N21MOV3232C

- 1A(1B,1C) SG
FW BYP FLOW
☐ FCV 479
☐ FCV 489
☐ FCV 499

- 3.2 Verify both steam generator feed pumps - TRIPPED.

- 3.2 Stop both EH PUMPs.

- 3.3 Verify SG blowdown - ISOLATED.

- 1A(1B,1C) SCBD
ISO
☐ Q1G24HV7614A closed
☐ Q1G24HV7614B closed
☐ Q1G24HV7614C closed

Attached procedures

FRP-S.1 ATT 1

ATTACHMENT 1

- 3.4 Verify SG blowdown sample
ISOLATED MLB lights lit.

1A(1B,1C) SCBD SAMPLE
ISO

- ☐ MLB4 6-4 lit Q1P15HV3328
closed
☐ MLB4 7-4 lit Q1P15HV3329
closed
☐ MLB4 8-4 lit Q1P15HV3330
closed

- 3.4 Locally verify SCBD sample -
isolated (BOP).

STEAM GEN 1A(1B,1C) SAMPLE
ISO

- ☐ Q1P15HV3328 closed
☐ Q1P15HV3329 closed
☐ Q1P15HV3330 closed

OR

Locally verify SCBD sample -
isolated (PRIP).
STEAM GEN 1A(1B,1C) SAMPLE ISO

- ☐ Q1P15HV3179C closed
☐ Q1P15HV3180C closed
☐ Q1P15HV3181C closed

___ 4 Verify PHASE A CTMT ISO.

- 4.1 Verify PHASE A CTMT ISO -
ACTUATED.

- ☐ MLB-2 1-1 lit
☐ MLB-2 11-1 lit

NOTE: The turbine building SW isolation valves Q1P16V515, 517, 514 and 516
will take approximately two minutes to fully stroke closed.

- 4.2 Check all MLB-2 lights - LIT.

- 4.2 Verify proper PHASE A CTMT ISO
alignment.

___ 5 Verify one CHG PUMP in each
train - STARTED.

- ☐ A train (1A or 1B) amps > 0
☐ B train (1C or 1B) amps > 0

Attached procedures

FRP-S.1 ATT 1

ATTACHMENT 1

___ 6 Verify RHR PUMPS - STARTED.

RHR PUMP

☐ 1A amps > 0☐ 1B amps > 0___ 7 Verify each train of CCW -
STARTED.7.1 Verify one CCW PUMP in each
train- STARTED.A train HX 1C or 1B
CCW FLOW☐ FI 3043CA > 0 gpm
OR☐ FI 3043BA > 0 gpmB train HX 1A or 1B
CCW FLOW☐ FI 3043AA > 0 gpm
OR☐ FI 3043BA > 0 gpm7.2 Verify SW flow to associated
CCW HX's.SW FROM 1A(1B, 1C)
CCW HX☐ Q1P16FI3009AA > 0 gpm☐ Q1P16FI3009BA > 0 gpm☐ Q1P16FI3009CA > 0 gpm7.2 Modulate open SW to the
associated CCW HX's.☐ Q1P16FV3009A☐ Q1P16FV3009B☐ Q1P16FV3009C___ 8 Verify each SW train - HAS TWO
SW PUMPS STARTED.☐ A train (1A,1B or 1C)☐ B train (1D,1E or 1C)

Attached procedures

FRP-S.1 ATT 1

ATTACHMENT 1

___ 9 Verify containment fan cooler
 alignment.

- 9.1 Verify at least one
 containment fan cooler per
 train - STARTED IN SLOW SPEED.

CTMT CLR FAN

SLOW SPEED

- A train

☐ 1A

☐ 1B

- B train

☐ 1C

☐ 1D

- 9.2 Verify associated emergency
 service water outlet valves -
 OPEN.

EMERG SW FROM

1A(1B,1C,1D) CTMT CLR

☐ Q1P16MOV3024A

☐ Q1P16MOV3024B

☐ Q1P16MOV3024C

☐ Q1P16MOV3024D

Attached procedures

FRP-S.1 ATT 1

ATTACHMENT 1

10 Check no main steam line isolation actuation signal present.

Signal	Setpoint	Coincidence	TSLB
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2 19-3 19-4
HI STEAM FLOW	> 40%	1/2 ON 2/3	TSLB4 16-3 16-4 17-3 17-4 18-3 18-4
<u>AND</u> LO-LO TAVG	< 543°F	2/3	TSLB2 10-1 10-2 10-3
HI-HI CTMT PRESS	>16.2 psig	2/3	TSLB1 2-2 2-3 2-4

10 Perform the following.

10.1 Verify main steam line isolation and bypass valves closed.

1A(1B,1C) SG
MSIV - TRIP
☐ Q1N11HV3369A
☐ Q1N11HV3369B
☐ Q1N11HV3369C
☐ Q1N11HV3370A
☐ Q1N11HV3370B
☐ Q1N11HV3370C

1A(1B,1C) SG
MSIV - BYP
☐ Q1N11HV3368A
☐ Q1N11HV3368B
☐ Q1N11HV3368C
☐ Q1N11HV3976A
☐ Q1N11HV3976B
☐ Q1N11HV3976C

10.2 IF any main steam isolation valve open,
THEN place the associated test switch in the TEST position.

SG	1A	1B	1C
1A(1B,1C) SG MSIV - TEST Q1N11HV	☐ 3369A/ 70A	☐ 3369B/ 70B	☐ 3369C/ 70C

Attached procedures

FRP-S.1 ATT 1

ATTACHMENT 1

.....

CAUTION: RCPs should NOT be tripped with reactor power GREATER THAN 5%.

.....

NOTE: Step 11 is a continuing action step while in this procedure.

- 11 Check containment pressure -
HAS REMAINED LESS THAN 27 psig.

CTMT PRESS
☐ PR 950

- 11 Perform the following.

- 11.1 Verify PHASE B CTMT ISO -
ACTUATED.

☐ MLB-3 1-1 lit
☐ MLB-3 6-1 lit

- 11.2 Stop all RCPs.

RCP
☐ 1A
☐ 1B
☐ 1C

- 11.3 Verify PHASE B CTMT ISO
alignment.

- 11.3.1 Check All MLB-3 lights lit.

- 11.3.2 IF any MLB-3 light NOT lit,
THEN verify proper PHASE B
CTMT ISO alignment.

Attached procedures

FRP-S.1 ATT 1

ATTACHMENT 1

11.4 Check containment spray.

11.4.1 Check containment spray
flow in both trains greater
than 0 gpm.

CS FLOW

☐ FI 958A☐ FI 958B11.4.2 IF containment spray flow
in both trains NOT greater
than 0 gpm.
THEN verify containment
spray pump suction valves
open.

RWST TO

1A(1B) CS PUMP

☐ Q1E13MOV8817A☐ Q1E13MOV8817B

Attached procedures

ESP-0.1 ATT 3

Step	Action/Expected Response	Response NOT Obtained
☐		

ATTACHMENT 3

VERIFYING 4160 V BUSES ENERGIZED

- 1 Verify 4160 V busses energized.

CAUTION: IF a DG is already operating above its continuous load rating. THEN additional manual loads should not be added. Unanticipated plant emergency conditions may dictate the need to load the emergency diesel generators above the continuous load rating limit (i.e. 2.85 MW for small DGs, 4.075 MW for large DGs). Under these circumstances, diesel generator loading may be raised not to exceed the 2000 hour load rating limit (i.e. 3.1 MW for small DGs, 4.353 MW for large DGs). Diesel loading should be reduced within the diesel generator continuous load rating limit as soon as plant conditions allow.

NOTE: Plant conditions may dictate establishment of contingency electrical lineups. FNP-1-AOP-5.1, CONTINGENCY ELECTRICAL ALIGNMENTS provides guidance for establishing those lineups.

- 1.1 Check offsite power -
AVAILABLE.

- 1.1 Request Shift Manager
coordinate efforts to restore
offsite power.

Attached procedures

ESP-0.1 ATT 3

- 1.2 Check BKR DF01 (1A startup transformer to 1F 4160 V bus)
- CLOSED.

- 1.2 Perform the following.

- 1.2.1 Verify 1F 4160V bus energized by 1-2A or 1C diesel generator.

- 1.2.2 Close the following service water valves.

SW TO RCP
MTR AIR CLRS

[] Q1P16MOV3135

SW TO BLDN HX
& BTRS CHLR

[] Q1P16MOV3149

- 1.2.3 Check SW flow to turbine building throttled.

SW TO TURB BLDG ISO
A TRN

[] Q1P16V515 dual indication

SW TO TURB BLDG ISO
B TRN

[] Q1P16V517 dual indication

Attached procedures

ESP-0.1 ATT 3

- 1.2.4 IF SW flow to turbine building NOT throttled.
THEN close the following service water valves.

SW TO TURB BLDG ISO

A TRN

☐ Q1P16V515

☐ Q1P16V516

SW TO TURB BLDG ISO

B TRN

☐ Q1P16V517

☐ Q1P16V514

SW FROM TURB BLDG

A HDR ISO

☐ Q1P16V540

☐ Q1P16V542

SW FROM TURB BLDG

B HDR ISO

☐ Q1P16V543

☐ Q1P16V541

- 1.2.5 Verify backup cooling to condensate pumps aligned per FNP-1-SOP-21.0.

- 1.2.6 IF A train CCW is the on service train.
THEN isolate SW to the standby CCW heat exchanger.

Standby CCW HX	1C	1B
SW TO 1C(1B) CCW HX Q1P16MOV	☐ 3130C closed	☐ 3130B closed

Attached procedures

ESP-0.1 ATT 3

1.3 Verify BKR DF02 (1F 4160 V bus tie to 1K 4160 V bus) - CLOSED.

1.4 Check BKR DG15 (1B startup transformer to 1G 4160 V bus) - CLOSED.

1.3 IF diesel generator cooling NOT supplied from Unit 2. THEN secure 1-2A and/or 1C diesel generator using ATTACHMENT 4. SECURING A DIESEL GENERATOR WITH AN AUTOMATIC START SIGNAL PRESENT.

1.4 Perform the following.

1.4.1 Verify 1G 4160 V bus energized by 1B diesel generator.

1.4.2 Close the following service water valves.

SW TO RCP
MTR AIR CLRS
[] Q1P16MOV3135

SW TO BLDN HX
& BTRS CHLR
[] Q1P16MOV3149

1.4.3 Check SW flow to turbine building throttled.

SW TO TURB BLDC ISO
A TRN
[] Q1P16V516 dual indication

SW TO TURB BLDC ISO
B TRN
[] Q1P16V514 dual indication

Attached procedures

ESP-0.1 ATT 3

- 1.4.4 IF SW flow to turbine building NOT throttled.
THEN close the following service water valves.

SW TO TURB BLDG ISO
 A TRN

- ☐ Q1P16V515
☐ Q1P16V516

SW TO TURB BLDG ISO
 B TRN

- ☐ Q1P16V517
☐ Q1P16V514

SW FROM TURB BLDG
 A HDR ISO

- ☐ Q1P16V540
☐ Q1P16V542

SW FROM TURB BLDG
 B HDR ISO

- ☐ Q1P16V543
☐ Q1P16V541

- 1.4.5 Verify backup cooling to condensate pumps aligned per FNP-1-SOP-21.0.

- 1.4.6 IF B train CCW is the on service train.
THEN isolate SW to the standby CCW heat exchanger.

Standby CCW HX	1A	1B
SW TO 1A(1B) CCW HX Q1P16MOV	☐ 3130A closed	☐ 3130B closed

Attached procedures

ESP-0.1 ATT 3

- 1.5 Verify BKR DG02 (1C 4160 V bus tie to 1L 4160 V bus) - CLOSED.
- 1.5 IF diesel generator cooling NOT supplied.
THEN secure 1B diesel generator using ATTACHMENT 4. SECURING A DIESEL GENERATOR WITH AN AUTOMATIC START SIGNAL PRESENT.
- 1.6 Verify all RCP busses - ENERGIZED.
- [] 1A 4160 V bus
 [] 1B 4160 V bus
 [] 1C 4160 V bus
- 1.7 Check 1E 4160 V bus - ENERGIZED.
- 1.7 Establish power to 1C 600 V LC emergency section loads.
- 1.7.1 Place handswitch for pressurizer heater group 1B in OFF.
- 1.7.2 Open BKR EC08-1.
- 1.7.3 Close BKRs EE07-1 and EC10-1.
- *****
- CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel generator capacity must be available prior to energizing a group of pressurizer heaters.
- *****
- 1.7.4 Energize pressurizer heater group 1B as required.
- 1.8 Check 1D 4160 V bus - ENERGIZED.
- 1.8 Proceed to step 1.10.
- 1.9 IF 1D 4160 V bus energized.
THEN proceed to step 1.14.

Attached procedures

ESP-0.1 ATT 3

1.10 Establish power to
1A 600 V LC emergency section
loads.

1.10.1 Place handswitch for
pressurizer heater group
1A in OFF.

1.10.2 Verify open BKR EA08-1.

1.10.3 Verify closed BKRs ED08-1
and EA09-1.

CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel
generator capacity must be available prior to energizing a group of
pressurizer heaters.

NOTE: The BYPASS position allows manual energization of pressurizer heater
group 1A from the MCB handswitch, and automatic energization based on
either pressurizer pressure $\leq$ 2210 psig or pressurizer level 5% above
program.

1.10.4 WHEN pressurizer heater
group 1A operation is
desired.

THEN place HTR CRP 1A
BLOCKING BYPASS SW to
BYPASS.

1.10.5 IF required,
THEN manually energize
pressurizer heater group
1A.

Attached procedures

ESP-0.1 ATT 3

CAUTION: To ensure adequate supply voltage to all class 1E loads and to meet short circuit analysis constraints, only one air compressor, 1C (preferred) or 1A, should be powered from the diesel generator. One air compressor will consume 0.16 MW of diesel generator load.

1.11 Verify 1C air compressor in service.

1.11.1 Verify 1C air compressor handswitch in RUN/START.

1.11.2 Verify 1C air compressor started.

1.11 Align 1A air compressor for service.

a) Verify 1C air compressor handswitch in OFF.

b) Place BKR DF13 SYNCH SWITCH in MAN.

c) Close BKR DF13 (1F 4160 V bus tie to 1H 4160 V bus).

d) IF 1H 4160 V bus energized.
THEN energize 1C 600 V LC from normal supply.

[] BKR DH01 closed

[] BKR EGO2-1 closed

e) Start 1A AIR COMPRESSOR.

Attached procedures

ESP-0.1 ATT 3

1.12 Check INST AIR PRESS PI 4004B
- GREATER THAN 85 psig.

1.12 Perform the following.

NOTE: The intent of this step is to regain control of critical air operated components including PORVs and atmospherics. Based on plant conditions and availability of manpower, the applicability, priority and performance of the following actions is at the discretion of the Shift Supervisor.

1.12.1 Restore air pressure.

- Verify proper air compressor operation using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

OR

- IF 2C air compressor available.
THEN align 2C air compressor to Unit 1 using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

1.12.2 IF instrument air NOT restored.
THEN align nitrogen supply to PORVs using FNP-1-SOP-62.1. BACK-UP AIR OR NITROGEN SUPPLY TO THE PRESSURIZER POWER OPERATED RELIEF VALVES.

1.12.3 IF instrument air NOT restored.
THEN align emergency air supply to atmospheric relief valves and/or TDAFWP using FNP-1-SOP-62.0. EMERGENCY AIR SYSTEM.

Attached procedures

ESP-0.1 ATT 3

1.12 Check INST AIR PRESS PI 4004B
- GREATER THAN 85 psig.

1.12 Perform the following.

NOTE: The intent of this step is to regain control of critical air operated components including PORVs and atmospheric. Based on plant conditions and availability of manpower, the applicability, priority and performance of the following actions is at the discretion of the Shift Supervisor.

1.12.1 Restore air pressure.

- Verify proper air compressor operation using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

OR

- IF 2C air compressor available.
THEN align 2C air compressor to Unit 1 using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

1.12.2 IF instrument air NOT restored.
THEN align nitrogen supply to PORVs using FNP-1-SOP-62.1. BACK-UP AIR OR NITROGEN SUPPLY TO THE PRESSURIZER POWER OPERATED RELIEF VALVES.

1.12.3 IF instrument air NOT restored.
THEN align emergency air supply to atmospheric relief valves and/or TDAFWP using FNP-1-SOP-62.0. EMERGENCY AIR SYSTEM.

Attached procedures

ESP-0.1 ATT 3

1.12.4 IF instrument air NOT
restored because 1G 600 V
LC is dennergized.
THEN energize 1G 600 V LC
from 1F 600 V LC using
FNP-1-SOP-36.3, 600,
480 AND 208/120 VOLT AC
ELECTRICAL DISTRIBUTION
SYSTEM.

1.12.5 WHEN instrument air
pressure restored.
THEN perform step 1.13.

1.12.6 Proceed to step 1.14.

1.13 Check instrument air to
containment.

IA TO CTMT
☐ MLB-3 1-2 NOT lit

IA TO PENE RM PRESS LO
☐ Annunciator KDI clear

1.13 Align instrument air to
containment. (BOP)

IA TO PENE RM
☐ N1P19HV3825 open
☐ N1P19HV3885 open

IA TO CTMT
☐ Q1P19HV3611 open

CAUTION: To prevent diesel generator overloading, at least 0.1 MW of diesel
generator capacity must be available prior to aligning a SFP Cooling
Pump to a diesel.

1.14 Verify Spent Fuel Pool
Cooling in service per
FNP-1-SOP-54.0, SPENT FUEL
PIT COOLING AND PURIFICATION
SYSTEM.

-END-

Attached procedures

EEP-0 ATT 2

ATTACHMENT 2

AUTOMATIC ACTIONS VERIFICATION

- 1 **Verify each SW train - HAS TWO
 SW PUMPS STARTED.**
 - ☐ A train (1A, 1B or 1C)
 - ☐ B train (1D, 1E or 1C)

- 2 **Verify each train of CCW -
 STARTED.**
 - 2.1 **Verify one CCW PUMP in each
 train- STARTED.**

A train HX 1C or 1B
 CCW FLOW

☐ FI 3043CA > 0 gpm
 OR

☐ FI 3043BA > 0 gpm

B train HX 1A or 1B
 CCW FLOW

☐ FI 3043AA > 0 gpm
 OR

☐ FI 3043BA > 0 gpm
 - 2.2 **Verify SW flow to associated
 CCW HX's.**

SW FROM 1A(1B, 1C)
 CCW HX

☐ Q1P16FI3009AA > 0 gpm
☐ Q1P16FI3009BA > 0 gpm
☐ Q1P16FI3009CA > 0 gpm
 - 2.2 **Throttle open SW to the
 associated CCW HX's.**

☐ Q1P16FV3009A
☐ Q1P16FV3009B
☐ Q1P16FV3009C

- 3 **Verify one CHG PUMP in each
 train - STARTED.**
 - ☐ A train (1A or 1B) amps > 0
 - ☐ B train (1C or 1B) amps > 0

Attached procedures

EEP-0 ATT 2

4 Verify RHR PUMPS - STARTED.

RHR PUMP

☐ 1A amps > 0☐ 1B amps > 0

5 Verify Safety Injection Flow.

5.1 Check HHSI flow - GREATER THAN
0 gpm.☐ FI 943

5.1 Verify proper SI alignment.

CHG PUMPS TO
REGENERATIVE HX☐ Q1E21MOV8107 closed☐ Q1E21MOV8108 closed

RWST

TO CHG PUMP

☐ Q1E21LCV115B open☐ Q1E21LCV115D open

VCT

OUTLET ISO

☐ Q1E21LCV115C closed☐ Q1E21LCV115E closed

HHSI TO

RCS CL ISO

☐ Q1E21MOV8803A open☐ Q1E21MOV8803B open

CHG PUMP

SUCTION HDR ISO

☐ Q1E21MOV8130A open☐ Q1E21MOV8130B open☐ Q1E21MOV8131A open☐ Q1E21MOV8131B open

CHG PUMP

DISCH HDR ISO

☐ Q1E21MOV8132A open☐ Q1E21MOV8132B open☐ Q1E21MOV8133A open☐ Q1E21MOV8133B open

Attached procedures

EEP-0 ATT 2

5.2 Check RCS pressure - LESS THAN
275 psig[435 psig].

1C(1A) LOOP
RCS WR PRESS

☐ PI 402B
☐ PI 403B

5.3 Check LHSI flow - GREATER THAN
 1.5×10^3 gpm.

1A
RHR HDR
FLOW

☐ FI 605A

1B
RHR HDR
FLOW

☐ FI 605B

5.2 Proceed to Step 6.

5.3 Verify proper RHR alignment.

RWST TO
1A(1B) RHR PUMP

☐ Q1E11MOV8809A open
☐ Q1E11MOV8809B open

CTMT SUMP TO
1A(1B) RHR PUMP

☐ Q1E11MOV8811A closed
☐ Q1E11MOV8812A closed
☐ Q1E11MOV8811B closed
☐ Q1E11MOV8812B closed

1C(1A) RCS LOOP TO
1A(1B) RHR PUMP

☐ Q1E11MOV8701A closed
☐ Q1E11MOV8702A closed
☐ Q1E11MOV8701B closed
☐ Q1E11MOV8702B closed

RHR TO RCS HOT LEG
XCON

☐ Q1E11MOV8887A open
☐ Q1E11MOV8887B open

1A(1B) RHR HX
TO CHG PUMP SUCT

☐ Q1E11MOV8706A closed
☐ Q1E11MOV8706B closed

1A(1B) RHR HX
DISCH VLV

☐ HIK 603A open
☐ HIK 603B open

1A(1B) RHR HX
BYP FLOW VLV

☐ FK 605A closed
☐ FK 605B closed

Attached procedures

EEP-0 ATT 2

ATTACHMENT 2

6 Verify containment ventilation isolation.

6.1 Verify containment purge dampers - CLOSED.

- ☐ 3197
- ☐ 3198D
- ☐ 3198C
- ☐ 3196
- ☐ 3198A
- ☐ 3198E

6.2 Verify containment mini purge dampers - CLOSED.

CTMT PURGE DMPRS
MINI-2866C & 2867C
FULL-3198A & 3198D

- ☐ 2866C
- ☐ 2867C

CTMT PURGE DMPRS
MINI-2866D & 2867D
FULL-3196 & 3197
BOTH-3198B & 3198C

- ☐ 2866D
- ☐ 2867D

6.3 Stop MINI PURGE
SUPP/EXH FAN.

Attached procedures

EEP-0 ATT 2

- 7 Verify containment fan cooler alignment.

- 7.1 Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.

CTMT CLR FAN
SLOW SPEED

- A train

☐ 1A

☐ 1B

- B train

☐ 1C

☐ 1D

- 7.2 Verify associated emergency service water outlet valves - OPEN.

EMERG SW FROM
1A(1B,1C,1D) CTMT CLR

☐ Q1P16MOV3024A

☐ Q1P16MOV3024B

☐ Q1P16MOV3024C

☐ Q1P16MOV3024D

Attached procedures

EEP-0 ATT 2

8 Verify AFW Pumps - STARTED.

8.1 Verify both MDAFW Pumps -
STARTED

- ☐ 1A MDAFW Pump amps > 0
- ☐ 1B MDAFW Pump amps > 0

AND

- ☐ FI-3229A indicates > 0 gpm
- ☐ FI-3229B indicates > 0 gpm
- ☐ FI-3229C indicates > 0 gpm

8.1 Verify MDAFW Pumps deliver
flow to each SG.

8.1.1 Manually start MDAFW Pumps

8.1.2 Verify AFW flow path to
each SG.

MDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3227A in MOD
- ☐ Q1N23HV3227B in MOD
- ☐ Q1N23HV3227C in MOD

MDAFWP TO 1A(1B,1C) SG

FLOW CONT

- ☐ HIC 3227AA open
- ☐ HIC 3227BA open
- ☐ HIC 3227CA open

AFW TO 1A(1B,1C) SG

STOP VLV

- ☐ Q1N23MOV3350A open
- ☐ Q1N23MOV3350B open
- ☐ Q1N23MOV3350C open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764A open
- ☐ Q1N23MOV3764D open
- ☐ Q1N23MOV3764F open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764E open
- ☐ Q1N23MOV3764B open
- ☐ Q1N23MOV3764C open

Attached procedures

EEP-0 ATT 2

8.2 Check TDAFW Pump start required.

8.2 IF TDAFW pump NOT needed.
THEN proceed to Step 9.

Condition	TSLB	Set-point	Coincidence
RCP Bus Under-voltage	TSLB2 1-1 1-2 1-3	2680 V	1/2 Detectors on 2/3 Busses
Low Low SC Water Level In Any 2/3 SGs	TSLB4 4-1.4-2.4-3 5-1.5-2.5-3 6-1.6-2.6-3	28%	2/3 Detectors on 2/3 SGs

8.3 Verify TDAFWP started.

- ☐ MLB-4 1-3 lit
- ☐ MLB-4 2-3 lit
- ☐ MLB-4 3-3 lit

TDAFWP SPEED

- ☐ SI 3411A > 3900 rpm

TDAFWP

SPEED CONT

- ☐ SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.

TDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3228A in MOD
- ☐ Q1N23HV3228B in MOD
- ☐ Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG

FLOW CONT

- ☐ HIC 3228AA open
- ☐ HIC 3228BA open
- ☐ HIC 3228CA open

Attached procedures

EEP-0 ATT 2

9 Verify main feedwater status.

- 9.1 Verify main feedwater flow control and bypass valves - CLOSED.

1A(1B.1C) SG
FW FLOW

- ☐ FCV 478
☐ FCV 488
☐ FCV 498

1A(1B.1C) SG
FW BYP FLOW

- ☐ FCV 479
☐ FCV 489
☐ FCV 499

- 9.2 Verify both steam generator feed pumps - TRIPPED.

- 9.3 Verify SC blowdown - ISOLATED.

1A(1B.1C) SGBD
ISO

- ☐ Q1C24HV7614A closed
☐ Q1C24HV7614B closed
☐ Q1C24HV7614C closed

- 9.4 Verify SC blowdown sample ISOLATED MLB lights lit.

1A(1B.1C) SGBD SAMPLE
ISO

- ☐ MLB1 19-2 lit Q1P15HV3328 closed
☐ MLB1 19-3 lit Q1P15HV3329 closed
☐ MLB1 19-4 lit Q1P15HV3330 closed

- 9.1 Verify main feedwater stop valves closed.

MAIN FW TO 1A(1B.1C) SG
STOP VLV

- ☐ Q1N21MOV3232A
☐ Q1N21MOV3232B
☐ Q1N21MOV3232C

- 9.2 Stop both EH PUMPs.

- 9.4 Locally verify SCBD sample - isolated (BOP).

STEAM GEN 1A(1B.1C) SAMPLE
ISO

- ☐ Q1P15HV3328 closed
☐ Q1P15HV3329 closed
☐ Q1P15HV3330 closed
OR

Locally verify SGBD sample - isolated (PRIP).
STEAM GEN 1A(1B.1C) SAMPLE ISO

- ☐ Q1P15HV3179C closed
☐ Q1P15HV3180C closed
☐ Q1P15HV3181C closed

Attached procedures

EEP-0 ATT 2

10 Check no main steam line isolation actuation signal present.

Signal	Setpoint	Coincidence	TSLB
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2 19-3 19-4
HI STEAM FLOW	> 40%	1/2 ON 2/3	TSLB4 16-3 16-4 17-3 17-4 18-3 18-4
<u>AND</u> LO-LO TAVG	< 543°F	2/3	TSLB2 10-1 10-2 10-3
HI-HI CTMT PRESS	>16.2 psig	2/3	TSLB1 2-2 2-3 2-4

10 Perform the following.

10.1 Verify main steam line isolation and bypass valves closed.

1A(1B,1C) SG
MSIV - TRIP
☐ Q1N11HV3369A
☐ Q1N11HV3369B
☐ Q1N11HV3369C
☐ Q1N11HV3370A
☐ Q1N11HV3370B
☐ Q1N11HV3370C

1A(1B,1C) SG
MSIV - BYP
☐ Q1N11HV3368A
☐ Q1N11HV3368B
☐ Q1N11HV3368C
☐ Q1N11HV3976A
☐ Q1N11HV3976B
☐ Q1N11HV3976C

10.2 IF any main steam isolation valve open.
THEN place the associated test switch in the TEST position.

SG	1A	1B	1C
1A(1B,1C) SG MSIV - TEST Q1N11HV	☐ 3369A/ 70A	☐ 3369B/ 70B	☐ 3369C/ 70C

Attached procedures

EEP-0 ATT 2

11 Verify PHASE A CTMT ISO.

11.1 Verify PHASE A CTMT ISO -
ACTUATED.

- ☐ MLB-2 1-1 lit
- ☐ MLB-2 11-1 lit

NOTE: The turbine building SW isolation valves Q1P16V515, 517, 514 and 516 will take approximately two minutes to fully stroke closed.

11.2 Check all MLB-2 lights - LIT.

11.2 Verify PHASE A CTMT ISO
alignment using ATTACHMENT 3.
PHASE A CONTAINMENT ISOLATION.

12 Check all reactor trip and
reactor trip bypass breakers -
OPEN.

12 Perform the following.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

12.1 Open reactor trip breaker(s)
manually from MCB or locally.

12.2 Record any breaker(s) manually
opened.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

13 Trip CRDM MG set supply
breakers.

1A(1B) MC SET
SUPP BKR

- ☐ N1C11E005A
- ☐ N1C11E005B

Attached procedures

EEP-0 ATT 2

14 Secure secondary components.

14.1 Stop both heater drain pumps.

HDP

☐ 1A☐ 1B

14.2 Check any condensate pump started.

- 14.2.1 IF started.
THEN stop all but one
condensate pump.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

- 14.2.1 IF no condensate pumps are
started.
THEN ensure handswitches
positioned to STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

- 14.3 IF condensate pump operating.
THEN verify backup cooling
aligned to condensate pumps
per FNP-0-SOP-0.0. APPENDIX B.
TB SO ACTIONS FOLLOWING A
REACTOR TRIP OR SAFETY
INJECTION.

- 14.3 Ensure all condensate pump
handswitches positioned to
STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

15 Verify both CRACS mode selector switches in the ON position.

CRACS Mode Selector Switch

☐ A TRAIN☐ B TRAIN

16 Verify two trains of ECCS equipment aligned.

- 16.1 Perform ATTACHMENT 4. TWO
TRAIN ECCS ALIGNMENT
VERIFICATION.

-END-

Attached procedures

EEP-1 ATT 4

ATTACHMENT 4

VERIFYING 4160 V BUSES ENERGIZED

1 Verify 4160 V buses energized.

CAUTION: IF a DG is already operating above its continuous load rating, THEN additional manual loads should not be added. Unanticipated plant emergency conditions may dictate the need to load the emergency diesel generators above the continuous load rating limit (i.e. 2.85 MW for small DGs, 4.075 MW for large DGs). Under these circumstances, diesel generator loading may be raised not to exceed the 2000 hour load rating limit (i.e. 3.1 MW for small DGs, 4.353 MW for large DGs). Diesel loading should be reduced within the diesel generator continuous load rating limit as soon as plant conditions allow.

NOTE: Plant conditions may dictate establishment of contingency electrical lineups. FNP-1-AOP-5.1, CONTINGENCY ELECTRICAL ALIGNMENTS provides guidance for establishing those lineups.

1.1 Check offsite power - AVAILABLE.	1.1 Request Shift Manager coordinate efforts to restore offsite power.
1.2 Check BKR DF01 (1A startup transformer to 1F 4160 V bus) - CLOSED.	1.2 Verify 1F 4160 V bus energized by 1-2A or 1C diesel generator.
1.3 Verify BKR DF02 (1F 4160 V bus tie to 1K 4160 V bus) - CLOSED.	1.3 IF diesel generator cooling NOT supplied from Unit 2, THEN secure 1-2A and/or 1C diesel generator using ATTACHMENT 5, SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT.
1.4 Check BKR DG15 (1B startup transformer to 1G 4160 V bus) - CLOSED.	1.4 Verify 1G 4160 V bus energized by 1B diesel generator.

Attached procedures

EEP-1 ATT 4

1.5 Verify BKR DG02 (1G 4160 V bus tie to 1L 4160 V bus) - CLOSED.

1.6 Verify all RCP busses - ENERGIZED.

- ☐ 1A 4160 V bus
- ☐ 1B 4160 V bus
- ☐ 1C 4160 V bus

1.7 Check 1E 4160 V bus - ENERGIZED.

1.5 IF diesel generator cooling NOT supplied.
THEN secure 1B diesel generator using ATTACHMENT 5. SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT.

1.7 Establish power to 1C 600 V LC emergency section loads.

1.7.1 Place handswitch for pressurizer heater group 1B in OFF.

1.7.2 Open BKR EC08-1.

1.7.3 Close BKRs EE07-1 and EC10-1.

AUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel generator capacity must be available prior to energizing a group of pressurizer heaters.

1.7.4 Energize pressurizer heater group 1B as required.

1.8 Check 1D 4160 V bus - ENERGIZED.

1.8 Proceed to step 1.10.

1.9 IF 1D 4160 V bus energized.
THEN return to PROCEDURE STEPS, step 13.

Attached procedures

EEP-1 ATT 4

1.10 Establish power to
1A 600 V LC emergency section
loads.

1.10.1 Place handswitch for
pressurizer heater group
1A in OFF.

1.10.2 Verify open BKR EA08-1.

1.10.3 Verify closed BKRs ED08-1
and EA09-1.

CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel
generator capacity must be available prior to energizing a group of
pressurizer heaters.

NOTE: The BYPASS position allows manual energization of pressurizer heater
group 1A from the MCB handswitch, and automatic energization based on
either pressurizer pressure $\leq$ 2210 psig or pressurizer level 5% above
program.

1.10.4 WHEN pressurizer heater
group 1A operation is
desired,
THEN place HTR GRP 1A
BLOCKING BYPASS SW to
BYPASS.

1.10.5 IF required,
THEN manually energize
pressurizer heater group
1A.

Attached procedures

EEP-1 ATT 4

CAUTION: To ensure adequate supply voltage to all class 1E loads and to meet short circuit analysis constraints, only one air compressor, 1C (preferred) or 1A, should be powered from the diesel generator. One air compressor will consume 0.16 MW of diesel generator load.

1.11 Verify 1C air compressor in service.

1.11.1 Verify 1C air compressor handswitch in RUN/START.

1.11.2 Verify 1C air compressor started.

1.11 Align 1A air compressor.

a) Verify 1C air compressor handswitch in OFF.

b) Verify SI - RESET.

☐ MLB-1 1-1 not lit

☐ MLB-1 11-1 not lit

CAUTION: IF offsite power is lost after sequencer is reset.
THEN manual actions may be required to restart safeguards equipment.

c) Reset B1F sequencer by depressing the ESS STOP RESET pushbutton on the sequencer panel.
(139' AUX BLDC SWGR rm)

d) Place BKR DF13 SYNCH SWITCH in MAN.

e) Close BKR DF13 (1F 4160V bus tie to 1H 4160V bus).

f) Energize 1C 600 V LC from normal supply.

☐ BKR DH01 closed

☐ BKR EG02-1 closed

g) Start 1A AIR COMPRESSOR.

Attached procedures

EEP-1 ATT 4

1.12 Check INST AIR PRESS PI 4004B
- GREATER THAN 85 psig.

1.12 Perform the following.

NOTE: The intent of this step is to regain control of critical air operated components including PORVs and atmospherics. Based on plant conditions and availability of manpower, the applicability, priority and performance of the following actions is at the discretion of the Shift Supervisor.

1.12.1 Restore air pressure.

- Verify proper air compressor operation using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

OR

- IF 2C air compressor available.
THEN align 2C air compressor to Unit 1 using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

1.12.2 IF instrument air NOT restored.
THEN align nitrogen supply to PORVs using FNP-1-SOP-62.1. BACK-UP AIR OR NITROGEN SUPPLY TO THE PRESSURIZER POWER OPERATED RELIEF VALVES.

1.12.3 IF instrument air NOT restored.
THEN align emergency air supply to atmospheric relief valves and/or TDAFWP using FNP-1-SOP-62.0. EMERGENCY AIR SYSTEM.

Attached procedures

EEP-1 ATT 4

1.12.4 IF instrument air NOT
restored because 1G 600 V
LC is deenergized.
THEN energize 1G 600 V LC
from 1F 600 V LC using
FNP-1-SOP-36.3. 600.
480 AND 208/120 VOLT AC
ELECTRICAL DISTRIBUTION
SYSTEM.

1.12.5 WHEN instrument air
pressure restored.
THEN perform step 1.13.

1.12.6 Return to PROCEDURE STEPS.
step 13.

1.13 Verify instrument air aligned
to containment. (BOP)

IA TO PENE RM

☐ N1P19HV3825 open

☐ N1P19HV3885 open

IA TO CTMT

☐ Q1P19HV3611 open

Attached procedures

SOP-60.0 4.3

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as needed 4.3 or 4.4.

4.3 Verifying Proper PRF System in Operation During a LOCA (A Train Inservice).

- 4.3.1 IF both trains of PRF are started, THEN secure B train of PRF per section 4.6, Securing B Train of PRF Operation During a LOCA.
- 4.3.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.3.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.3.4 Verify Phase B reset as indicated by MLB-3, lights 1.1 and 6.1 not lit.
- 4.3.5 Verify open 1A PRF SUCTION DMPR Q1E15MOV3362A.
- 4.3.6 Verify 1A PRF recirculation fan started.
- 4.3.7 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A.
- 4.3.8 Verify 1A PRF exhaust fan started.
- 4.3.9 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.3.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS Δ P PDI 3367A and PDI 3367B, AND power to B train PRF is available, THEN place the B train of PRF in service as follows:
 - 4.3.10.1 Verify open 1B PRF SUCT DMPR Q1E15MOV3362B.
 - 4.3.10.2 Verify 1B PRF recirculation fan started.
 - 4.3.10.3 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.3.10.4 Verify 1B PRF exhaust fan started.
 - 4.3.10.5 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

Attached procedures

SOP-60.0 4.4

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as desired in sections 4.3 or 4.4.

4.4 Verifying Proper PRF System in Operation During a LOCA (B Train Inservice).

- 4.4.1 IF both trains of PRF are started, THEN secure A train of PRF per section 4.5, Securing A Train of PRF Operation During a LOCA.
- 4.4.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.4.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.4.4 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF remaining in service.

- 4.4.5 Verify open B PRF SUCTION DMPR Q1E15MOV3362B.
- 4.4.6 Verify 1B PRF recirculation fan started.
- 4.4.7 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15HV3356B.
- 4.4.8 Verify 1B PRF exhaust fan started.
- 4.4.9 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A(B) will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.4.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS ΔP PDI 3367A and PDI 3367B, AND power to A train PRF is available, THEN place the A train of PRF in service as follows:
 - 4.4.10.1 Verify open 1A PRF SUCT DMPR Q1E15MOV3362A.
 - 4.4.10.2 Verify 1A PRF recirculation fan started.
 - 4.4.10.3 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.4.10.4 Verify 1A PRF exhaust fan started.
 - 4.4.10.5 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

Attached procedures

SOP-60.0 4.5

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

4.5 Securing A Train of PRF Operation During a LOCA.

4.5.1 Verify the following dampers closed:

- SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A
- SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B

4.5.2 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF being secured.

- 4.5.3 Place 1A PRF exhaust fan in automatic by placing the handswitch to STOP and releasing.
- 4.5.4 Place 1A PRF recirculation fan in automatic by placing the handswitch to STOP and releasing.
- 4.5.5 Place 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A handswitch to AUTO.
- 4.5.6 Close 1A PRF RECIRC FAN RECIRC DMPR Q1E15MOV3361A(B) and return switch to AUTO.
- 4.5.7 Close 1A PRF SUCTION DMPR Q1E15MOV3362A(B) and return switch to AUTO.

Attached procedures

ESP-1.3

Step	Action/Expected Response	Response NOT Obtained

	<u>CAUTION:</u> To ensure that SI recirculation flow is maintained at all times, the following steps should be performed without delay.	

	<u>CAUTION:</u> No Function Restoration Procedure should be implemented until step 7 has been completed.	

	<u>CAUTION:</u> Switchover to recirculation may cause high radiation levels in the auxiliary building.	

1	<u>IF</u> RWST level less than 4.5 ft <u>AND</u> alignment for recirculation <u>NOT</u> imminent. <u>THEN</u> stop any pump taking suction from the RWST.	

Attached procedures

ESP-1.3

NOTE: The intent of Step 2 is to differentiate between a steam line break event (with SI terminated and RWST drain down only from containment spray operation) and a loss of reactor coolant event (RWST drain down from one or more ECCS pumps).

2 Check SI in service.

- Check HHSI flow - GREATER THAN 0 gpm.

A TRN
HHSI FLOW
☐ FI 943

OR

- Check any RHR PUMP - STARTED IN SI MODE.

2 Perform the following.

- 2.1 Reset containment sump to RHR valve switches.

CTMT SUMP TO RHR
PUMP RESET

☐ A TRN
☐ B TRN

- 2.2 Proceed to Step 8.

Started RHR PUMP	1A	1B
RWST TO 1A(1B) RHR PUMP Q1E11MOV	☐ 8809A open	☐ 8809B open
1C(1A) RCS LOOP TO 1A(1B) RHR PUMP Q2E11MOV	☐ 8701A closed ☐ 8701B closed	☐ 8702A closed ☐ 8702B closed

3 Verify SI - RESET.

- ☐ MLB-1 1-1 not lit (A TRN)
☐ MLB-1 11-1 not lit (B TRN)

- 3 IF any train will NOT reset using the MCB SI RESET pushbuttons.
THEN place the affected train S821 RESET switch to RESET.
(SSPS TEST CAB.)

4 Verify at least one train of PRF in operation using FNP-1-SOP-60.0. PENETRATION ROOM FILTRATION SYSTEM in conjunction with the remaining steps of this procedure.

Attached procedures

ESP-1.3

- ___ 5 Verify CCW flow to RHR heat exchangers - ESTABLISHED.

CCW TO

1A(1B) RHR HX

☐ Q1P17MOV3185A open

☐ Q1P17MOV3185B open

- ___ 6 Establish only one CHG PUMP in each train - RUNNING.

☐ A Train (1A or 1B) amps > 0

☐ B Train (1C or 1B) amps > 0

CAUTION: Pump damage will occur if a charging pump or RHR pump is started in a train in which a flow path from the containment sump to the RCS cannot be established or maintained.

- ___ 7 Align ECCS for cold leg recirculation.

- 7.1 Check containment sump level - GREATER THAN 2.4 ft{3.0 ft}.

CTMT SUMP

LVL

☐ LI 3594A

POST ACCIDENT

CTMT WTR LVL

☐ LR 3594B

- 7.2 Verify recirculation valve disconnects - CLOSED USING ATTACHMENT 1.

- 7.3 Stop both RHR PUMPS.

- 7.4 Close RWST TO 1A RHR PUMP Q1E11MOV8809A.

- 7.1 IF both containment sump level indications less than 2.4 ft{3.0 ft}.

THEN go to FNP-1-ECP-1.1. LOSS OF EMERGENCY COOLANT RECIRCULATION.

- 7.4 Perform the following.

- 7.4.1 Stop the running A train CHG PUMP.

- 7.4.2 Proceed to step 7.9.

Attached procedures

ESP-1.3

7.5 Align CTMT sump to 1A RHR PUMP.

CTMT SUMP
TO 1A RHR PUMP

- ☐ Q1E11MOV8811A open
- ☐ Q1E11MOV8812A open

7.6 Close RHR to RCS HOT LEGS XCON
Q1E11MOV8887A.

7.7 Start 1A RHR PUMP.

RHR PUMP

- ☐ 1A amps > 0

7.8 Verify A Train LHSI flow -
STABLE.

1A
RHR HDR
FLOW

- ☐ FI 605A

7.9 Close RWST TO 1B RHR PUMP
Q1E11MOV8809B.

7.10 Align CTMT sump to 1B RHR PUMP.

CTMT SUMP
TO 1B RHR PUMP

- ☐ Q1E11MOV8811B open
- ☐ Q1E11MOV8812B open

7.11 Close RHR to RCS HOT LEGS
XCON Q1E11MOV8887B.

7.5 Perform the following.

7.5.1 Stop the running A train
CHG PUMP.

7.5.2 Proceed to step 7.9.

7.7 Perform the following.

7.7.1 Stop the running A train
CHG PUMP.

7.7.2 Proceed to step 7.9.

7.9 Perform the following.

7.9.1 Stop the running B train
CHG PUMP.

7.9.2 Proceed to step 7.14.

7.10 Perform the following.

7.10.1 Stop the running B train
CHG PUMP.

7.10.2 Proceed to step 7.14.

Attached procedures

ESP-1.3

7.12 Start 1B RHR PUMP.

RHR PUMP

☐ 1B amps > 0

7.12 Perform the following.

7.12.1 Stop the running B train
CHG PUMP.

7.12.2 Proceed to step 7.14.

7.13 Verify B Train LHSI flow -
STABLE.

1B

RHR HDR

FLOW

☐ FI 605B

CAUTION: The charging pumps should be stopped if RCS pressure rises to greater
than their shutoff head.

CAUTION: The charging pump miniflows should NOT be reopened to satisfy
miniflow criteria while the charging pump suction is aligned to the
RHR pumps.

7.14 Verify charging pump miniflow
valves - CLOSED.

1A(1B,1C) CHG PUMP

MINIFLOW ISO

☐ Q1E21MOV8109A☐ Q1E21MOV8109B☐ Q1E21MOV8109C

CHG PUMP

MINIFLOW ISO

☐ Q1E21MOV8106

Attached procedures

ESP-1.3

7.15 IF 1A RHR PUMP started.
THEN align charging pump
 suction header isolation
 valves based on 1B charging
 pump status.

7.15 IF 1A RHR PUMP NOT started.
THEN perform the following.

7.15.1 Verify the A train CHG
 PUMP stopped.

7.15.2 Proceed to step 7.19.

1B Charging Pump Status	Aligned As A Train pump	Aligned As B Train pump	Not Available
CHG PUMP SUCTION HDR ISO Q1E21MOV	☐ 8130A open ☐ 8130B open ☐ 8131A closed ☐ 8131B closed	☐ 8130A closed ☐ 8130B closed ☐ 8131A open ☐ 8131B open	☐ 8130A closed ☐ 8130B closed ☐ 8131A closed ☐ 8131B closed

7.16 Open RHR supply to A train
 charging pump suction.

1A RHR HX
 TO CHG PUMP SUCT
☐ Q1E11MOV8706A

7.17 Verify VCT level - GREATER
 THAN 5%.

7.18 Close A train RWST to
 charging pump header valve.

RWST
 TO CHG PUMP
☐ Q1E21LCV115B

7.16 Perform the following.

7.16.1 Stop the running A train
 CHG PUMP.

7.16.2 Proceed to step 7.19.

7.18 Perform the following.

7.18.1 Stop the running A train
 CHG PUMP.

7.18.2 Close RHR supply to A
 train charging pump
 suction.

1A RHR HX
 TO CHG PUMP SUCT
☐ Q1E11MOV8706A

Attached procedures

ESP-1.3

7.19 IF 1B RHR PUMP started,
THEN align charging pump
suction header isolation
valves based on 1B charging
pump status.

7.19 IF 1B RHR PUMP NOT started,
THEN perform the following.

7.19.1 Verify the B train CHG
PUMP stopped.

7.19.2 Proceed to step 7.23.

1B Charging Pump Status	Aligned As A Train pump	Aligned As B Train pump	Not Available
CHG PUMP SUCTION HDR ISO Q1E21MOV	☐ 8130A open ☐ 8130B open ☐ 8131A closed ☐ 8131B closed	☐ 8130A closed ☐ 8130B closed ☐ 8131A open ☐ 8131B open	☐ 8130A closed ☐ 8130B closed ☐ 8131A closed ☐ 8131B closed

7.20 Open RHR supply to B train
charging pump suction.

1B RHR HX
TO CHG PUMP SUCT
☐ Q1E11MOV8706B

7.21 Verify VCT level - GREATER
THAN 5%.

7.22 Close B train RWST to
charging pump header valve.

RWST
TO CHG PUMP
☐ Q1E21LCV11SD

7.20 Perform the following.

7.20.1 Stop the running B train
CHG PUMP.

7.20.2 Proceed to step 7.23.

7.22 Perform the following.

7.22.1 Stop the running B train
CHG PUMP.

7.22.2 Close RHR supply to B
train charging pump
suction.

1B RHR HX
TO CHG PUMP SUCT
☐ Q1E11MOV8706B

7.22.3 Proceed to step 7.23.

Attached procedures

ESP-1.3

CAUTION: Injecting through 'A' train and 'B' train flowpaths simultaneously with only one charging pump running could result in pump runout conditions. Therefore, in Step 7.23 RNO the HHSI valves should be closed without delay after MOV8885 is opened.

7.23 Verify one CHG PUMP in each
train - STARTED.

- ☐ A train (1A or 1B) amps > 0
- ☐ B train (1C or 1B) amps > 0

7.23 IF an A train CHG PUMP
started,
 THEN proceed to step 7.25
 IF NOT establish B train
 injection per the following.

7.23.1 Open charging pump
recirculation to RCS cold
legs valve.

CHG PUMP RECIRC
TO RCS COLD LEGS
☐ Q1E21MOV8885

7.23.2 Close HHSI isolation
valves.

HHSI TO
RCS CL ISO
☐ Q1E21MOV8803A
☐ Q1E21MOV8803B

7.23.3 Proceed to step 7.25.

7.24 Open charging pump
recirculation to RCS cold
legs valve.

CHG PUMP RECIRC
TO RCS COLD LEGS
☐ Q1E21MOV8885

Attached procedures

ESP-1.3

- 7.25 Align charging pump discharge header isolation valves based on 1B charging pump status.

1B Charging Pump Status	Aligned As A Train pump	Aligned As B Train pump	Not Available
CHG PUMP DISCH HDR ISO Q1E21MOV	☐ 8132A open ☐ 8132B open ☐ 8133A closed ☐ 8133B closed	☐ 8132A closed ☐ 8132B closed ☐ 8133A open ☐ 8133B open	☐ 8132A closed ☐ 8132B closed ☐ 8133A closed ☐ 8133B closed

- 7.26 Verify SI flow - STABLE.

A TRN
HHSI FLOW
☐ FI 943

HHSI
B TRN RECIRC
FLOW
☐ FI 940

1A(1B)
RHR HDR
FLOW
☐ FI 605A
☐ FI 605B

- 7.26 IF at least one train of flow from the containment sump to the RCS can NOT be established or maintained, THEN go to FNP-1-ECF-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.

Attached procedures

ESP-1.3

CAUTION: Any charging pump with suction aligned to an RHR pump should be stopped prior to stopping the RHR pump.

CAUTION: Charging pump or spray pump damage will occur if suction is lost and the pump is not secured.

NOTE:

- Erratic pump parameters (flow, discharge pressure, amps, etc.) are indications of pump cavitation.
- Step 8 is a continuous action step which applies any time ECCS pumps are aligned to the sump.

__ 8 Verify ECCS pumps not affected
 by sump blockage:

8.1 Monitor ECCS pump suction
conditions - NO INDICATION OF
CAVITATION.

CHG PUMP

☐ 1A
☐ 1B
☐ 1C

RHR PUMP

☐ 1A
☐ 1B

CS PUMP

☐ 1A
☐ 1B

8 IF both trains are affected
 such that at least one train of
 SI recirculation flow cannot be
 maintained.
 THEN go to FNP-1-ECP-1.3, LOSS
 OF EMERGENCY COOLANT
 RECIRCULATION CAUSED BY SUMP
 BLOCKAGE.

Attached procedures

ESP-1.3

__ 9 Check containment spray - IN
OPERATION.

9 Perform the following:

9.1 Makeup to the RWST as
necessary.

9.1.1 Makeup to the RWST in
accordance with
FNP-1-SOP-2.3, CHEMICAL AND
VOLUME CONTROL SYSTEM
REACTOR MAKEUP CONTROL
SYSTEM.

OR

9.1.2 Consult TSC staff to
determine alternate method
of makeup to the RWST.

9.2 Go to procedure and step in
effect.

__10 WHEN RWST level less than
4.5 ft.
THEN align containment spray
for cold leg recirculation.

10.1 Reset PHASE B CTMT ISO.

☐ MLB-3 1-1 not lit
☐ MLB-3 6-1 not lit

10.2 Open containment spray pump
containment sump suction
isolation valves.

CTMT SUMP
TO 1A(1B) CS PUMP
☐ Q1E13MOV8826A
☐ Q1E13MOV8827A
☐ Q1E13MOV8826B
☐ Q1E13MOV8827B

10.3 Close containment spray pump
RWST suction isolation valves.

RWST TO
1A(1B) CS PUMP
☐ Q1E13MOV8817A
☐ Q1E13MOV8817B

Attached procedures

ESP-1.3

10.4 WHEN containment spray recirculation flow has been established for at least 8 hours. AND containment pressure is less than 16 psig. THEN stop both CS PUMPs.

10.5 Makeup to the RWST as necessary.

10.5.1 Makeup to the RWST in accordance with FNP-1-SOP-2.3, CHEMICAL AND VOLUME CONTROL SYSTEM REACTOR MAKEUP CONTROL SYSTEM.

OR

10.5.2 Consult TSC staff to determine alternate method of makeup to the RWST.

__11 Go to procedure and step in effect.

Attached procedures

ESP-1.3 ATT 1

Step	Action/Expected Response	Response NOT Obtained
☐		

ATTACHMENT 1

- ___ 1 Close the following disconnects.

'B' Train Disconnects				
Disconnect TPNS No.	Description	Position	Key	Location
Q1R18B033-B	Disconnect FV-T2 MOV 8884-B	ON	Z-91	139' hallway across from chemistry sample room
Q1R18B034-B	Disconnect FV-J2 MOV 8132B-B	ON	Z-89	
Q1R18B035-B	Disconnect FV-S2 MOV 8808B-B	ON	Z-86	
Q1R18B036-B	Disconnect FV-B2 MOV 8889-B	ON	Z-88	
Q1R18B041-B	Disc for MOV 8130B-B	ON	Z-408	
Q1R18B042-B	Disc for MOV 8131B-B	ON	Z-412	
Q1R18B043-B	Disc for MOV 8133B-B	ON	Z-416	

Attached procedures

ESP-1.3 ATT 1

- __ 2 Close the following
disconnects.

'A' Train Disconnects				
Disconnect TPNS No.	Description	Position	Key	Location
Q1R18B030-A	Disconnect FU-J2 MOV 8132A-A	ON	Z-203	139' hallway across from MCC 1A
Q1R18B029-A	Disconnect FU-R2 MOV 8886-A	ON	Z-90	
Q1R18B038-A	Disc for MOV 8130A-A	ON	Z-405	
Q1R18B039-A	Disc for MOV 8131A-A	ON	Z-410	
Q1R18B040-A	Disc for MOV 8133A-A	ON	Z-415	
Q1R18B031-A	Disconnect FU-Z3 MOV 8808C-A	ON	Z-85	
Q1R18B032-A	Disconnect FU-Z2 MOV 8808A-A	ON	Z-84	

- 3 Verify recirculation valves MCB
indication - POWER AVAILABLE.

CHG PUMP
SUCTION HDR ISO

- ☐ Q1E21MOV8130A
☐ Q1E21MOV8130B
☐ Q1E21MOV8131A
☐ Q1E21MOV8131B

CHG PUMP
DISCH HDR ISO

- ☐ Q1E21MOV8132A
☐ Q1E21MOV8132B
☐ Q1E21MOV8133A
☐ Q1E21MOV8133B

1A(1B,1C) ACCUM
DISCH ISO

- ☐ Q1E21MOV8808A
☐ Q1E21MOV8808B
☐ Q1E21MOV8808C

Attached procedures

ESP-1.3 ATT 1

Step	Action/Expected Response	Response NOT Obtained
☐		

ATTACHMENT 1

CHG PUMP RECIRC
TO RCS HOT LEGS
[] Q1E21MOV8884
[] Q1E21MOV8886

RHR TO RCS
HOT LEGS ISO
[] Q1E11MOV8889

- ___ 4 Notify control room of
recirculation valve disconnect
status.

Facility: Farley Scenario No.: 2 Op-Test No.: 2007301

Examiners: Frank Ehrhardt Operators: _____

Jay Hopkins _____

Craig Kontz _____

Initial Conditions: 74% RTP, MOL, with xenon building in following a xenon-free startup, A Train On-Service – A Train Protected

Turnover:

- 74% power, MOL, Cb = 1177 ppm,
- Xe is building in following a xenon-free startup: 502 pcm,
- ramp up on hold until SSPS problem repaired & RTS,
- CTMT batch release – last released 2 days ago,
- A Train On-Service – B Train Protected,
- “A” train SSPS testing is in progress and was interrupted at step 5.1.8 due to a blown Output Relay Power fuse.
- Testing started 45 minutes ago–The CR is written & work order is being planned,
- Appendix 2 of STP-33.0A is I/P at step 3.0, A MDAFW Pump T/O for bearing oil leak repair,
- The Ops Manager has directed that power be held at the present level for SSPS maintenance,
- Current Risk Assessment is **YELLOW** and projected to remain **YELLOW** With ‘A’ trn SSPS OOS for fuse replacement,
- (M) LCOs 3.3.1, 3.3.2, 3.3.6, 3.3.7, 3.3.8, & 3.6.3 - For ‘A’ Train SSPS Surveillance/fuse replacement, 3.7.5 1A MDAFW pump,
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1	1	I (BOP) TS (SRO)	PT-476 A SG PT fails low
2	2	C (RO)	FK-122 fails HI, Charging flow control, man control required
3	3	C (BOP)	SK-509A fails high slowly, SGFP master speed controller, man control required
4	4	I (RO)	PT-145 Fails high, Letdown pressure controller, Man control required
5	5	C (BOP) TS (SRO)	1B SW pump trips. This causes service water to the Turbine Building to isolate. One SW to TB valve will not reopen
6		N (RO & BOP)	Leak in the main generator H2 cooler. Ramp down based on a high leak rate required

7	6	M (ALL)	A "B" train LOSP, Rx trip signal based on loss of a RCP breaker position, manual Rx trip required using the CRDM MG sets and manual trip of the main turbine 1B DG output bkr does not auto close, Emerg Shutdown of the DG required due to no SW Cooling to DG
	7	C (RO & BOP)	
	8	C (BOP)	
8	9	M (ALL) C (BOP)	1A SG large steam leak inside CTMT.EEP-2 to EEP-1 or ESP-1.1. After SI, neither train of ESF equipment will operate normally, FRP-Z.1 entry is required
			Terminate when ESP-1.1, SI TERMINATION, is entered
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (A)bnormal, (M)ajor			

SCENARIO 2 Summary sheet

Initial Conditions: 74% RTP, with xenon building in following a xenon-free startup, MOL, A Train On-Service – A Train Protected

- The unit had ramped down to 60% to perform SGFP speed controller repair.
- “A” Train SSPS testing is in progress.
- A blown output relay fuse was discovered during testing.
- The CR written / work order is being planned at this time.
- Appendix 2 of STP-33.0A is in progress.
- Plant ramp up and return to full power was in progress prior to a SSPS problem.
- A MDAFW Pump T/O for bearing oil leak repair.
- The OPS Manager has directed holding at 74% power until SSPS is returned to service.

Presets:

Event No.	Event Type*	Event Description
0	preset	Rack out 1A MDAFW
0	Preset	Ann EC4 failed on, SSPS TRN A TRBL
0	Preset	close RT bypass bkr A
5	Preset	MOV-515 & 517 strokes closed & AF5 alarms on trig 1: 1B SW pmp stopped, MOV-515 fails to reopen
7	Preset	The Rx will not trip using either MCB H/S, main turbine does not auto trip, 1B DG output DG08 does not close, 2C DG output DJ06-1 does not close
8	preset	A SSPS has blown relay fuse & won't auto start and align equipment, B train has no power for equip. to start/align
8	preset	A CS Disch MOV-8820A bkr trips as soon as there is flow in A trn CS header>0 gpm.

Event 1 PT-476 A SG PT fails low, AOP-100, TS

Event 2 FK-122 fails HI, man control required, AOP-100 & AOP-16

Event 3 SK-509A fails high slowly, man control required, AOP-100

Event 4 PT-145 Fails high, Man control required

Event 5 1B SW pump trips. This causes service water to the Turbine Building to isolate. AOP-7.0 (Loss of SW TO TB) & AOP-10.0 (Loss of SW), entered to restore 2 SW pmps in A train & unisolate service water to the Turbine Building. One valve will not reopen.

TS should be evaluated for both an inoperable SW pump/train AND the TB SW valve that will not reopen (valve is inop, but in it's required isolation position).

The team should have 1C SW pump aligned to auto start for 1B SW pump to clear LCO on one train of SW

Similar event to an audit exam 1E SW pmp trip, with a difference causing a different outcome. In this scenario, SW to the TB also isolated with one of the valves remaining stuck shut. This requires an additional procedure and associated actions (AOP-7 in addition to AOP-10.0)

Event 6 As a result of the pressure transient in the TB SW system a leak develops in the main generator H2 cooler. Annunciator LJ5 (H2 SYS WTR DETECTOR HI) alarms. The team will be required to determine if leak rate is high or low per ARP-1.11 (LJ5) and will commence a ramp down based on a high leak rate

R actions: RO uses boration and/or rods, BOP operates DEH to set in ramp rate, target, initiate and stop ramp as necessary

Event 7 A "B" train LOSP occurs on the loss of 1G 4160V Bus. With RCP breaker position indication on the SOLA, the loss of 'B' train power generates a Rx trip signal based on loss of a RCP breaker position.

The Rx will not trip using either MCB H/S. The team will be required to manually trip the reactor using the CRDM MG sets (RO) (CT opening both CRDM MG set supply breakers prior to completion of verification of immediate operator actions of EEP-0) and manually trip the main turbine –not a separate malfunction but turbine needs manual trip due to P-4 not met to trip turbine automatically (BOP) (CT Manually trip main turbine prior to SG's boiling dry).

The team should evaluate the status of 1B DG and secure the DG since the output breaker will not close and it is running without cooling water.

Similar to an event during audit exam where a loss of B train power occurred due to 1B DG tripping after initially supplying the B train busses. The 2C DG would not start even in Mode 4. In this scenario, the 1B DG starts but the output breaker does not automatically close. The DG has to be shutdown due to no SW Cooling which is a different result than on the audit exam. The SBO 2C DG will start if decision is made to start it, but it's output bkr will not close.

Event 8

1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train SI will not actuate (in auto or with manual switch) due to the blown output relay fuse. B train has no ESF buses powered up. Manual alignment of A train ESF equipment required (CT align A train to provide ESF actuation and alignment in the injection mode)
FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, M

Terminate when ESP-1.1, SI TERMINATION, is entered

Op-Test No.: HLT-31 NRC **Scenario No.:** 2 **Event No.:** 1**Event Description:** PT-476 A SG PT fails low, AOP-100

Time	Position	Applicant's Actions or Behavior
	SRO	Enters AOP-100, Ensures immediate actions are performed, then verifies them in the procedure: • Ensures Steam Flow and Feed flows are matched and all SGs at or approaching 65% • Set man trip criteria on SG level (high and low trip setpoints are 82% & 28%) • Directs placing the C SG FLOW SEL SW FS/478Z in Channel III • Directs placing controllers in auto when SG levels are near 65% with Feed and Steam flows matched • Addresses Tech spec 3.3.2, FUNCTION 4. e. High Steam Flow (Condition D: place Channel in trip in 6 hours) • Notifies Shift Manager • Submits a CR & Notifies the Work Week Coordinator, request I & C trip bistables in 6 hours or less

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 1

Event Description: PT-476 A SG PT fails low, AOP-100

Time	Position	Applicant's Actions or Behavior
	BOP	Performs immediate actions of AOP-100 section 1.5 from memory, then continues as directed by SRO • Takes manual control to match steam flow and feed flow as required of ○ SGFP master controller SK-509A or individual controllers SK 509B or C ○ Feed Reg valves FK 478, 488, 498 • Monitors SG levels and trips if necessary in accordance with the trip criteria established by the SRO • Determines and reports to the SRO that PT 476 is failed low, which density compensates Channel 4 A SG FT-476 • Places the A SG FLOW SEL SW FS/478Z in Channel III • Places controllers in auto when SG levels are near 65% with Feed and Steam flows matched
	BOP	Performs applicable ARPs when time permits: • JE1: 1A SG STM LINE HI ΔP ALERT, • JG1: 1A SG FEED FLOW > STM FLOW, • JF1: 1A SG LVL DEV No additional actions required by the ARPs
	RO	• Monitors SG levels and trips if necessary in accordance with the trip criteria established by the SRO • Assists BOP monitoring SG levels, Feed Flows, & Steam Flows

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 2

Event Description: FK-122 fails lo, man control required, AOP-100 & AOP-16

Time	Position	Applicant's Actions or Behavior
	SRO	Directs EA2, CHG HDR FLOW HI-LO ARP be addressed • Directs AOP-16.0, CVCS MALFUNCTION entry • Directs RO to control pressurizer level manually if necessary, auto control will not be available • Establishes a band of pressurizer level • Writes CR and informs Work Week Coordinator • Exits AOP-16.0 when Charging & Letdown are in operation and pressurizer level is being controlled at or near program level
	RO	When directed, takes manual control of FK-122 to control Pressurizer level on program per AOP-16.0
	SRO	Directs AOP-16.0 Actions per RO/BOP actions listed in rows below:
	RO	Monitors to ensure proper operation & maintains while controlling pzs level with LK-122 in man: • VCT Level • Chg press & motor amps • On service chg pmp running • Verifies FK-122 is in manual & pzs level is being controlled • Seal inj 6-13 gpm, adj as necessary • Checks DE3 LTDN ORIF ISO VLV REL LINE TEMP HI, Clear • Maintains pressurizer level in band set by SRO

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 2

Event Description: FK-122 fails lo, man control required, AOP-100 & AOP-16

Time	Position	Applicant's Actions or Behavior
	RO or BOP	IF Letdown is secured, THEN: • Closes FK-122 • Minimizes seal injection between 6-13 gpm • Directs Chemistry to shutdown ZAS • Reestablishes letdown if secured per AOP-16.0 Step 8 (attached) • WHEN letdown flow established, THEN go to procedure & step in effect
	RO or BOP	IF Letdown was NOT secured, THEN: • Verify charging flow normal & go to procedure and step in effect

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 3

Event Description: SK-509A fails high slowly, man control required, AOP-100

Time	Position	Applicant's Actions or Behavior
	SRO	Enters AOP-100, Ensures immediate actions are performed, then verifies them in the procedure: • Ensures Steam Flow and Feed flows are matched and all SGs at or approaching 65% • Set man trip criteria on SG level (high and low trip setpoints are 82% & 28%) • Directs Manual control of SGFP speed to maintain SG levels at 65% with Feed and Steam flows matched, & FRVs in a throttled position • Notifies Shift Manager • Submits a CR & Notifies the Work Week Coordinator • Exits AOP-100.0 when SGFP speed in Manual to maintain SG levels are near 65% with Feed and Steam flows matched, proper ΔP for the power level (approx 133 psid for 75%) and FRVs in a throttled position
	BOP	Performs immediate actions of AOP-100 section 1.4 from memory, then continues as directed by SRO • Takes manual control to match steam flow and feed flow as required of ○ SGFP master controller SK-509A or individual controllers SK 509B or C ○ Feed Reg valves FK 478, 488, 498 • Monitors SG levels and trips if necessary in accordance with the trip criteria established by the SRO • Determines and reports to the SRO that SK-509A is failed high, and manual control is required to reduce SGFP speed to normal • Controls SGFP speed in Manual to maintain SG levels are near 65% with Feed and Steam flows matched, proper ΔP for the power level (approx 133 psid for 75%) and FRVs in a throttled position

[illegible]

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 4

Event Description: PT-145 Fails high, AOP-16, & Man control required, AOP-16

Time	Position	Applicant's Actions or Behavior
	SRO	Directs RO or BOP to address DE4, LTDN HX OUTLET PRESS HI ARP.
	SRO	Enters AOP-16.0, CVCS MALFUNCTION, and directs RO/BOP: • Directs AOP-16.0, CVCS MALFUNCTION entry • Directs RO to control letdown pressure manually with PK-145 as necessary, auto control will not be available • Establishes a band of letdown pressure & flow • Writes CR and informs Work Week Coordinator Exits AOP-16.0 when Charging & Letdown are controlled • pressurizer level is controlled at or near program level
	RO	Takes manual control of PK-145 and reduces letdown flow to approx. 130 gpm. Monitors to ensure proper operation and maintains while controlling pZR level with LK-122 in man: • VCT Level • Chg press & motor amps • On service chg pmp running • Seal inj 6-13 gpm, adj as necessary • Checks DE3 LTDN ORIF ISO VLV REL LINE TEMP HI, Clear • Maintains pressurizer level in band set by SRO

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 5

Event Description: 1B SW pump trips. This causes service water to the Turbine Building to isolate. AOP-7.0 & AOP-10.0 to restore service water to the Turbine Building. One valve will not reopen. Technical Specifications should be evaluated for an inoperable SW pump/train and the TB SW valve that will not reopen.

The team should have 1C SW pump aligned to auto start for 1B SW pump

Time	Position	Applicant's Actions or Behavior
	SRO	Enters AOP-7.0. Directs immediate action of AOP-7.0 (attempt to open up either train of SW to Turbine Bldg).
	SRO	• Directs BOP to address ARPs ○ AE4, SW PUMP TRIPPED,, ○ AF5, SW TO TURB BLDG A OR B TRN FLOW HI • Enters AOP-10.0: Meets entry conditions and directed by ARP-AE4. ○ Directs actions per RO & BOP rows below: ○ Exits AOP-10 when 1C SW pump started and SW pressure in both trains > 60 psig • Writes a CR on 1B SW Pump tripped and calls Work Week Coordinator • Writes a CR on V515, SW to TB won't open, & calls Work Week Coordinator • Refers to Technical Specification 3.7.8, Loss of A train SW. LCO in effect until 1C SW pump selected to auto start for 1B • Directs Shift Support Supervisor to use a System Operator to Select 1C SW to auto start for 1B per FNP-1-SOP-24.0

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 5

Event Description: 1B SW pump trips. This causes service water to the Turbine Building to isolate. AOP-7.0 & AOP-10.0 to restore service water to the Turbine Building. One valve will not reopen. Technical Specifications should be evaluated for an inoperable SW pump/train and the TB SW valve that will not reopen.

The team should have 1C SW pump aligned to auto start for 1B SW pump

Time	Position	Applicant's Actions or Behavior
	BOP	Per Immediate action of AOP-7.0: - attempts to open both SW to TB valves that shut, - V517 opens, - V515 does not open - Checks TI-4067, Gen. H2 Temp, less than 46°C (MCB meter) - IF TI-4067, $\geq 46^{\circ}\text{C}$, Trip Reactor & go to EEP-0 - IF SW hdr Pressure < 110 psig directs DB to close SW DIL BYP ISO Per AE4 ARP: Starts 1C SW pump. Per LJ3 ARP: IF LJ3, H2 TEMP HI alarms, THEN trip the reactor and go to EEP-0
	BOP	Per AOP-10.0, - Checks DF02 closed - Verifies 1C SW pump started - Checks SW pressure in both trains > 60 psig

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 6

Event Description: As a result of the pressure transient in the TB SW system a leak develops in the main generator H2 cooler. Annunciator LJ5 (H2 SYS WTR DETECTOR HI) alarms. The team will be required to determine if leak rate is high or low per ARP-1.11 (LJ5) and will commence a ramp down based on a high leak rate

Time	Position	Applicant's Actions or Behavior
	SRO	- Either addresses ARP for LJ5 to direct actions per BOP rows below, or directs BOP to address ARP for LJ5. - WHEN report of water level detectors immediately filling after draining is received, directs Turbine shutdown per UOP-3.1 & SOP-28.1 - Writes CR on H2 cooler leak & calls Work Week Coordinator
	BOP	Takes actions per LJ5: - Directs Turbine building SO (May direct Shift Support Supervisor to assist) to check and drain the 3 water level detectors to determine the source of leakage, & determine rate of leakage - Receives report from Turbine Building that the detectors are refilling immediately after draining - Informs the SRO that Immediate shutdown of the Turbine per SOP-28.1 is required
	BOP	Coordinates with the RO to ramp down per UOP-3.1 - Operates DEH controls to ramp the turbine down at 2 MW/Min - Types in target desired & presses select - Types in rate desired (may start at < 2 & later input 2) & presses select - Presses GO pushbutton to start ramp
	RO	Coordinates with the BOP to ramp down per UOP-3.1 - Uses boration per SOP-2.3 App B & C (Attached) or rod insertion to reduce reactor power - Maintains $T_{avg} \pm 1^\circ$ from T_{ref} - Maintains $\Delta I \pm 5\%$ of target

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 7

Event Description: A "B" train LOSP occurs on the loss of 1G 4160V Bus. With RCP breaker position indication on the SOLA, the loss of 'B' train power generates a Rx trip signal based on loss of a RCP breaker position.

The Rx will not trip using either MCB H/S. The team will be required to manually trip the reactor using the CRDM MG sets (CT opening both CRDM MG set supply breakers prior to completion of verification of immediate operator actions of EEP-0) and manually trip the main turbine (CT Manually trip main turbine prior to SG's boiling dry).

The team should evaluate the status of 1B DG and secure the DG since the output breaker will not close and it is running without cooling water

Time	Position	Applicant's Actions or Behavior
	SRO	Directs a reactor trip per EEP-0 Immediate actions due to meeting coincidence for reactor trip of One RCP bkr position open & power > 30% (P-8 interlock)
CRITICAL TASK: (RO) opening both CRDM MG set supply breakers prior to completion of verification of immediate operator actions of EEP-0		
	RO	Attempts to trip the reactor • with both MCB handswitches • trips reactor by opening both MG set breakers from the MCB • May call Rover to open Unit One reactor trip breakers locally but this is not required in EEP-0 immediate actions • Checks PR & IR Power falling and DRPI rod bottom lights lit
CRITICAL TASK: (BOP) manually trip the main turbine –not a separate malfunction but turbine needs manual trip due to P-4 not met to trip turbine automatically (CT Manually trip main turbine prior to SG's boiling dry).		
	BOP	• Manually Trips turbine

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 7

Event Description: A "B" train LOSP occurs on the loss of 1G 4160V Bus. With RCP breaker position indication on the SOLA, the loss of 'B' train power generates a Rx trip signal based on loss of a RCP breaker position.

The Rx will not trip using either MCB H/S. The team will be required to manually trip the reactor using the CRDM MG sets (CT opening both CRDM MG set supply breakers prior to completion of verification of immediate operator actions of EEP-0) and manually trip the main turbine (CT Manually trip main turbine prior to SG's boiling dry).

The team should evaluate the status of 1B DG and secure the DG since the output breaker will not close and it is running without cooling water

Time	Position	Applicant's Actions or Behavior
	RO	• Checks power to 4160V busses on the EPB • Checks SI Actuated Status – ○ SI WILL actuate if turbine is not quickly tripped after MG bkrs are tripped ○ SI will NOT actuate if turbine is quickly tripped after MG bkrs are tripped • IF NO SI actuated, THEN Checks SI required all parameters and bistable lights – No SI required ○ Transitions to ESP-0.1 at step 4 of EEP-0 after immediate actions verified • IF SI actuated, continues in EEP-0 past step 4 after immediate actions verified
	BOP	• Checks PR & IR Power falling and DRPI rod bottom lights lit • Trips Main Turbine by taking the switch to trip for at least 5 secs. • Checks turbine tripped • Checks power to 4160V busses on the EPB • Checks SI Status – No SI Actuated • Checks SI required all parameters and bistable lights – No SI required

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 7

Event Description: A "B" train LOSP occurs on the loss of 1G 4160V Bus. With RCP breaker position indication on the SOLA, the loss of 'B' train power generates a Rx trip signal based on loss of a RCP breaker position.

The Rx will not trip using either MCB H/S. The team will be required to manually trip the reactor using the CRDM MG sets (**CT** opening both CRDM MG set supply breakers prior to completion of verification of immediate operator actions of EEP-0) and manually trip the main turbine (**CT** Manually trip main turbine prior to SG's boiling dry).

The team should evaluate the status of 1B DG and secure the DG since the output breaker will not close and it is running without cooling water

Time	Position	Applicant's Actions or Behavior
	BOP	Emergency shutdown of the DG required per EEP-0 ATTACHMENT 1, SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT, (attached) due to operating with no cooling water.
	SRO	IF SI HAS OCCURRED, go to event 8 for those actions. SRO will stay in EEP-0 past step 4 if SI has occurred or is required.
	SRO	IF SI is NOT required, directs transition at step 4 of EEP-0 to ESP-0.1, REACTOR TRIP RESPONSE • Directs actions in ESP-0.1 per RO/BOP Actions listed below
	RO	• Checks RCS Tavg stable at or approaching 547°F
	BOP	• Verifies feedwater status ○ 3 FRVs closed ○ 3 FRV Bypass valves closed ○ MDAFW auto start switches on BOP in Defeat ○ Both SGFPs tripped

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 7

Event Description: A "B" train LOSP occurs on the loss of 1G 4160V Bus. With RCP breaker position indication on the SOLA, the loss of 'B' train power generates a Rx trip signal based on loss of a RCP breaker position.

The Rx will not trip using either MCB H/S. The team will be required to manually trip the reactor using the CRDM MG sets (CT opening both CRDM MG set supply breakers prior to completion of verification of immediate operator actions of EEP-0) and manually trip the main turbine (CT Manually trip main turbine prior to SG's boiling dry).

The team should evaluate the status of 1B DG and secure the DG since the output breaker will not close and it is running without cooling water

Time	Position	Applicant's Actions or Behavior

	RO	- Checks emerg boration not required - All rod bottom lights lit - RCS Tavg > 525°F - Announces "Unit 1 Reactor Trip"

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	SRO	IF SI has occurred, continues on in EEP-0 and properly diagnoses a steam break at the transition Step to EEP-2 (FRP-Z.1 will be entered instead of EEP-2 at that time) IF SI has not occurred, THEN directs SI on SI parameters being approached (Low steam Pressure and Hi Steam pressure d/p) OR Auto SI • WHEN CTMT pressure >27 psig, THEN FRP-Z.1 is entered immediately since EEP-0 has been exited once already to ESP-0.1 • Prior to CTMT pressure >27, enters EEP-0, & directs RO & BOP actions per below:
	RO	• Checks reactor tripped ○ All 4 RT & BYP Bkrs are open ○ PR & IR power trending down ○ All DRPI rod bottom lights are lit • Checks turbine tripped
	RO	○ [] TSLB2 14-1 lit [] TSLB2 14-2 lit [] TSLB2 14-3 lit [] TSLB2 14-4 lit

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO	• Checks power to 4160 V ESF busses both trains energized • Verifies operating DGs are being supplied from at least one SW pump • Checks SI Status ○ MLB-1 1-1 & 1-2 lit ○ BYP & PERMISSIVE SI light lit
	BOP	• Checks reactor tripped ○ All 4 RT & BYP Bkrs are open ○ PR & IR power trending down ○ All DRPI rod bottom lights are lit • Checks turbine tripped
	BOP	○ [] TSLB2 14-1 lit [] TSLB2 14-2 lit [] TSLB2 14-3 lit [] TSLB2 14-4 lit

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	BOP	• Checks power to 4160 V ESF busses both trains energized • Verifies operating DGs are being supplied from at least one SW pump • Checks SI Status ○ MLB-1 1-1 & 1-2 lit ○ BYP & PERMISSIVE SI light lit
	SRO	WHEN Ctmt Pressure goes > 27 psig, AND neither Containment Spray train is delivering flow, AND EEP-0 has been exited at least once: • Directs transition to FRP-Z.1. Directs per RO & BOP actions in rows below:
	RO or BOP	Verifies: • Phase A ISO (all MLB-2 lights lit) • Ctmt vent iso: ○ Ctmt purge & mini purge dampers closed ○ Mini purge supp.exh FAN secured

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Checks ctmt spray required by: • CTMT pressure has risen to > 27 psig • Phase B CTMT ISO actuated (MLB-3 1-1 & 6-1 LIT) • CS pumps running (A is running, there is No power to B) • CS flow is > 0 gpm both trains ○ Reports to SRO that B CS has no flow due to loss of B train power & MOV8820A bkr tripped ○ NO Flow in either train
	RO or BOP	Verifies CS Alignment: ○ A Suct. MOV aligned to RWST (8820A open) ○ A Disch hdr aligned (NO due to MOV bkr trip)
	RO or BOP	• Checks all MLB-3 lights lit • STOPs all RCPs • Verifies both A train ctmt coolers running in slow with EMERG SW valves open • Verifies all MSIV & BYPASS valves closed

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Checks if feed flow should be isolated to any SG • Reports that A SG is dropping uncontrolled or < 50 psig • Verifies that MAIN FEED stop valve MOV 3232A is closed • Isolates A train MDAFW flow to A SG by closing MOV3764A at BOP • Isolates TDAFWP FCV3228A on MCB • Sends Rover to unlock & close TDAFW flow to A SG V017A
	SRO	WHEN FRP-Z.1 exit is directed, goes to procedure and step in effect: EEP-0
CRITICAL TASK: (BOP) align A train to provide ESF actuation and alignment in the injection mode		
	BOP	Verifies SI Auto actions using EEP-0 ATT 2 (Attached)
	RO	Check ctmt pressure has remained <27#: IF NOT, ctmt pressure has been >27#, perform RNO column per following actions in rows below (CONTINUING ACTION)

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO	6.1 Verify PHASE B CTMT ISO - ACTUATED. ☐ MLB-3 1-1 lit ☐ MLB-3 6-1 lit 6.2 Stop all RCPs. RCP ☐ 1A ☐ 1B ☐ 1C 6.3 Verify PHASE B CTMT ISO alignment. 6.3.1 Check All MLB-3 lights lit. 6.3.2 <u>IF</u> any MLB-3 light <u>NOT</u> lit. <u>THEN</u> verify PHASE B CTMT ISO using ATTACHMENT 5. PHASE B CONTAINMENT ISOLATION.

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO	6.4 Check containment spray. 6.4.1 Check containment spray flow in both trains greater than 0 gpm. CS FLOW ☐ FI 958A ☐ FI 958B 6.4.2 <u>IF</u> containment spray flow in both trains <u>NOT</u> greater than 0 gpm. <u>THEN</u> verify containment spray pump suction valves open. RWST TO 1A(1B) CS PUMP ☐ Q1E13MOV8817A ☐ Q1E13MOV8817B
	RO	Announces "Unit 1 reactor trip and safety injection"

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	• Checks AFW status ○ Verifies at least 395 gpm flow to SGs ○ OR ○ at least one level > 31% {48} ○ Controls MDAFW & TDAFW flows as necessary ○ Stops TDAFW pump WHEN at least 2 SGs >28% ○ Maintains 31-65% {48-65} SG levels • Checks RCS temps 547 & Stable, NO: performs RNO
	RO or BOP	9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK ☐ A TRN in OFF RESET ☐ B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed. 1A(1B,1C) MS ATMOS REL VLV ☐ PC 3371A ☐ PC 3371B ☐ PC 3371C

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	9.1.3 Control total AFW flow to minimize RCS cooldown. AFW FLOW TO 1A(1B,1C) SG ☐ FI 3229A ☐ FI 3229B ☐ FI 3229C AFW TOTAL FLOW ☐ FI 3229 9.1.4 <u>IF</u> MSIVs are closed <u>THEN</u> proceed to step 9.1.8
	RO or BOP	[MSR isolation & Main Steam Drain Pot isolation are done without SRO direction by the Turbine Building SO after each reactor trip, these may not be directed at this time for this reason]
	RO or BOP	Secures one SJAE if two are in service
	RO or BOP	Closes MSIVs if cooldown not stopped
	RO or BOP	Checks PORVs & spray valves • PORVs closed < 2335 psig, • Spray valves closed or closing < 2260 psig • PORV iso valves open with power, • no evidence of leak by via downstream temps & PRT parameters

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO	Checks RCP criteria: subcooling > 16°F {45}: YES
	RO	Checks CHG mini-flows • Open RCS > 1900 psig • closed RCS press<1300 psig • As is 1300-1900 psig
	RO or BOP	Checks SGs not faulted: NO • A SG IS faulted: press falling uncontrolled OR < 50 psig
	SRO	Directs team to transition to EEP-2 per RNO of step 13, 1A SG is faulted: directs RO & BOP per actions below:
	RO or BOP	• Verify all main steam isolation and bypass valves CLOSED • Checks B & C SGs not faulted • Identifies A SG faulted • Isolates A SG

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior				
	RO or BOP	4.1 Verify all faulted SG atmospheric reliefs - MANUALLY CLOSED. <table border="1"> <tr> <td>Faulted SG</td> <td>1A</td> </tr> <tr> <td>1A(1B,1C) MS ATMOS REL VLV PC</td> <td>[]3371A</td> </tr> </table>	Faulted SG	1A	1A(1B,1C) MS ATMOS REL VLV PC	[]3371A
Faulted SG	1A					
1A(1B,1C) MS ATMOS REL VLV PC	[]3371A					
	RO or BOP	4.2 Verify all faulted SG main feed stop valves - CLOSED. <table border="1"> <tr> <td>Faulted SG</td> <td>1A</td> </tr> <tr> <td>MAIN FW TO 1A(1B,1C) SG STOP VLV Q1N21MOV</td> <td>[]3232A</td> </tr> </table>	Faulted SG	1A	MAIN FW TO 1A(1B,1C) SG STOP VLV Q1N21MOV	[]3232A
Faulted SG	1A					
MAIN FW TO 1A(1B,1C) SG STOP VLV Q1N21MOV	[]3232A					
	RO or BOP	4.3 Verify blowdown from all faulted SGs - ISOLATED. <table border="1"> <tr> <td>Faulted SG</td> <td>1A</td> </tr> <tr> <td>1A(1B,1C) SGBD ISO Q1G24HV</td> <td>[]7614A closed</td> </tr> </table>	Faulted SG	1A	1A(1B,1C) SGBD ISO Q1G24HV	[]7614A closed
Faulted SG	1A					
1A(1B,1C) SGBD ISO Q1G24HV	[]7614A closed					

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior				
	RO or BOP	4.6 Verify SG blowdown sample ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE ISO ☐ MLB1 19-2 lit Q1P15HV3328 closed ☐ MLB1 19-3 lit Q1P15HV3329 closed ☐ MLB1 19-4 lit Q1P15HV3330 closed				
	RO or BOP	5.1 Close MDAFWP isolation valves to all faulted SGs. (BOP) <table border="1"><tr><td>Faulted SG</td><td>1A</td></tr><tr><td>MDAFWP TO 1A(1B,1C) SG ISO Q1N23MOV</td><td>☐ 3764A ☐ 3764E</td></tr></table>	Faulted SG	1A	MDAFWP TO 1A(1B,1C) SG ISO Q1N23MOV	☐ 3764A ☐ 3764E
Faulted SG	1A					
MDAFWP TO 1A(1B,1C) SG ISO Q1N23MOV	☐ 3764A ☐ 3764E					

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior						
	RO or BOP	5.2 Close TDAFWP flow control valves to all faulted SGs. TDAFWP FCV 3228 [] RESET reset <table border="1"><tr><td>Faulted SG</td><td>1A</td></tr><tr><td>TDAFWP TO 1A(1B,1C) SG Q1N23HV</td><td>[] 3228A in MOD</td></tr><tr><td>TDAFWP TO 1A(1B,1C) SG FLOW CONT HIC</td><td>[] 3228AA adjusted</td></tr></table>	Faulted SG	1A	TDAFWP TO 1A(1B,1C) SG Q1N23HV	[] 3228A in MOD	TDAFWP TO 1A(1B,1C) SG FLOW CONT HIC	[] 3228AA adjusted
Faulted SG	1A							
TDAFWP TO 1A(1B,1C) SG Q1N23HV	[] 3228A in MOD							
TDAFWP TO 1A(1B,1C) SG FLOW CONT HIC	[] 3228AA adjusted							
	RO or BOP	5.3 Locally unlock and close flow control valve inlet isolation to all faulted SGs. (100 ft, AUX BLDG above AFW pump rooms) <table border="1"><tr><td>Faulted SG</td><td>1A</td></tr><tr><td>Q1N23V</td><td>[] 017A</td></tr><tr><td>Key</td><td>Z-139</td></tr></table>	Faulted SG	1A	Q1N23V	[] 017A	Key	Z-139
Faulted SG	1A							
Q1N23V	[] 017A							
Key	Z-139							

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Check CST LEVEL > 5.3 ft & direct Makeup to CST as necessary
	BOP	Check secondary radiation • Direct Counting room sample per CCP-31, Leak Rate Determination • Check SG Secondary radiation monitors Normal
	RO or BOP	Check SI termination criteria • Subcooled > 16°F {45°F} • AFW flow > 395 gpm OR intact SG level > 31% {48%} • RCS Pressure stable or rising • Pressurizer level > 13% {48%}
	SRO	IF all criteria met, Transitions to ESP-1.1, SI TERMINATION: See actions after the EEP-1 actions below
	SRO	IF any criteria NOT met, Transitions to EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT
	SRO	IF EEP-1 Entered, Directs RO & BOP actions in rows below:
	RO	Checks RCP stopped due to insufficient subcooling

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Checks SGs not faulted - no press falling uncontrolled - none less than 50 psig
	RO or BOP	- Checks AFW status - Verifies at least 395 gpm flow to SGs - OR - at least one level > 31% {48} - Controls MDAPW & TDAPW flows as necessary - Stops TDAPW pump WHEN at least 2 SGs >28% - Maintains 31-65% {48-65} SG levels
	BOP	Checks secondary radiation normal: YES
	RO	Checks PORVs - closed, - iso valves open with power, - no evidence of leak by via downstream temps & PRT parameters

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	SRO	Check SI termination criteria • Subcooled > 16°F {45°F} • AFW flow > 395 gpm OR intact SG level > 31% {48%} • RCS Pressure stable or rising • Pressurizer level > 13% {48%}
	SRO	IF all criteria met, Transitions to ESP-1.1, SI TERMINATION (ESP-1.1 ACTIONS are listed after the EEP-1.0 actions below)
	SRO	IF ANY criteria not met, continues in EEP-1.0 and directs RO & BOP actions in rows below:
	RO or BOP	Check containment spray system • Any CS pump started - A only running • Reset CS signals
	RO or BOP	Stop LHSL Pmps due to RCS greater than 275 psig {435 psig}, RCS stable or rising, & any RHR pumps running with RWST suction aligned • Verify both trains SI reset, MLB-1 1-1 & 11-1 NOT lit • Stop both RHR pumps

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Check NO SG pressure Falling uncontrolled (i.e. 1A SG has completely blown down) go to step 1 or RCS Pressure rising go to step 1 or NOTE prior to step 10 directs going to step 1 for any steam break
	SRO	Directs to step 1 of EEP-1, and then at step 7, "Check SI termination criteria", transitions out to ESP-1.1 directs actions of ESP-1.1, SI TERMINATION, per RO & BOP rows below:
NRC Discretion: may terminate here or later		
	RO or BOP	- Verifies SI reset (MLB-1 1-1 & 11-1 lights not lit) - Stops all but one chg pump - Verifies RCS pressure stable or rising
	RO or BOP	- Isolates HHSI FLOW: - Checks CHG PUMP RWST SUCT valve LCV115B open (D does not have power) - Verifies charging pump miniflow MOV8106 open (MOV8109A, B, & C do not have power, but should still be open) - Closes HHSI MOV8803A - MOV8803B does not have power, but should still be closed

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Establish normal charging ○ Man close FK-122 ○ Verifies all 4 chg DISCH HDR iso open (8132A & B have power, 8133A & B do not, but should still be open) ○ Verifies MOV8107 & 8108 open (MOV8108, does not have power, but should still be open) ○ Verifies only one chg path aligned: HV8146 OR HV8147 ○ Adjust FK-122 as necessary to maintain pressurizer level 25%-50%{50%-60%}
NRC Discretion: may terminate here or later		
	BOP	• Secure Both A & B RHR pumps • Isolate on service train CCW to RHR hx: MOV3185A • Check Sub Cooled Margin Monitor < 16°F {45°F} • Check pressurizer level >13% {43%}. • Verify phase A CTMT ISO reset: ○ MLB-2 1-1 not lit ○ MLB-2 11-1 not lit • Check phase B CTMT ISO reset: ○ MLB-3 1-1 not lit ○ MLB-3 6-1 not lit

Op-Test No.: HLT-31 NRC Scenario No.: 2 Event No.: 8

Event Description: 1A SG develops a large steam leak inside CTMT that results in a SI set point being exceeded. Neither train of ESF equipment will operate normally. A Train will not operate due to the blown output relay fuse. B train has no ESF buses powered up.

FRP-Z.1 entry is required, >27# ctmt with no CS Flow, no power to B trn CS, MOV-8820A Bkr trips. The team should isolate the faulted SG using the guidance of EEP-2 and then terminate SI in ESP-1.1 (CT isolate faulted SG prior to completing EEP-2 and FRP-Z.1)

Terminate when ESP-1.1, SI TERMINATION, is entered

Time	Position	Applicant's Actions or Behavior

	BOP	• Verify at least one air compressor started (1C) • Verify INST AIR PRESS PI 4004B >85 psig • Check IA to CTMT MLB-3 1-2 not LIT • Check IA to penetration room not LIT • Verify open instrument air to containment valves on BOP: ○ HV3825 ○ HV3885 ○ HV3611
Terminate here when Instrument air is aligned to Containment		

Attached procedures

AOP-16 Step 8

Step	Action/Expected Response	Response NOT Obtained
.....		
	<u>CAUTION:</u> To prevent heat exchanger damage, do not attempt restoration of letdown unless the CCW miscellaneous header is aligned to an operating CCW loop. 	
— 8	Determine if normal letdown should be re-established:	
	8.1 Check normal letdown malfunction(s) - CORRECTED	8.1 Continue actions to restore normal letdown, and proceed to step 9.0.
— 8.2	Verify all letdown orifice isolation valves - CLOSED LTDN ORIF ISO 45 GPM ☐ Q1E21HV8149A LTDN ORIF ISO 60 GPM ☐ Q1E21HV8149B ☐ Q1E21HV8149C	
— 8.3	Place LP LTDN PRESS PK 145 on service: ☐ Place controller in MANUAL ☐ Adjust demand signal to 50% or less	
— 8.4	Place LTDN HX OUTLET TEMP TK 144 on service: ☐ Place controller in AUTO ☐ Set at 3.3 to maintain temperature at approximately 100°F	
— 8.5	Verify VCT HI LVL DIVERT VLV LCV-115A alignment: ☐ Position indicator VCT light - LIT ☐ Handswitch in - AUTO	

Attached procedures

AOP-16 Step 8

- ___ 8.6 Verify LTDN HI TEMP DIVERT VLV
Q1E21TCV143:
- ☐ DEMIN light - LIT
 ☐ Handswitch in - AUTO
- ___ 8.7 Verify LTDN LINE PENE RM ISO's
valves - OPEN
- ☐ Q1E21HV8175A
 ☐ Q1E21HV8175B
- ___ 8.8 Verify LTDN LINE CTMT ISO
Q1E21HV8152 - OPEN
- ___ 8.9 Verify LTDN LINE ISO valves -
OPEN
- ☐ Q1E21LCV459
 ☐ Q1E21LCV460
- 8.10 Initiate minimum charging
flow:
- ___ 8.10.1 Verify CHG FLOW FK 122 in
- MAN
- ___ 8.10.2 Establish minimum charging
flow based on orifices to
be placed on service:
- ___ • 1 Orifice - 18 gpm
- OR
- ___ • 2 Orifices - 40 gpm
- ___ 8.11 Establish approximately
60 gpm letdown flow by
OPENING:
- ___ ☐ Q1E21HV8149B
- OR
- ___ ☐ Q1E21HV8149C
- 8.11 IF no letdown flow can be
established,
THEN proceed to Step 9.

Attached procedures

AOP-16 Step 8

- 8.12 Adjust LP LTDN PRESS PK 145
to maintain desired letdown
pressure -
BETWEEN 260-450 PSIG
- 8.12.1 Set controller between 4.3
and 7.5
- 8.12.2 Check letdown flow -
STABLE
- 8.12.3 Place PK 145 in AUTO
- 8.12.4 Control Letdown pressure
as desired
- 8.13 Control LTDN HX OUTLET TEMP
TK 144 to maintain Letdown
temperature at approximately
100 F:
- ☐ TI-116 VCT TEMP
 - ☐ TI-143 DIVERT LTDN HX TEMP
 - ☐ TI-144 CCW LTDN HX TEMP
- 8.14 Refer to ENP-1-SOP-2.1,
CHEMICAL AND VOLUME CONTROL
SYSTEM PLANT STARTUP AND
OPERATION. for further
guidance on Letdown system
control
- 8.12 IF necessary,
THEN adjust LP LTDN PRESS PK
145 in MANUAL to stabilize
Letdown Pressure at desired
value.

Attached procedures

01/03/07 15:29:30

UNIT 1FNP-1-SOP-2.3
Appendix B

APPENDIX B

OPERATOR AID FOR BORATION AND DILUTION

1.0 Boration

NOTE: The Boric Acid Integrator ONLY needs to be verified when changed. This should be documented with an Autolog Entry.

- ☐ ☐ ☐ ☐ 1.1 IF necessary, THEN set the boric acid integrator to the desired quantity.
- ☐ ☐ ☐ ☐ 1.2 IF necessary, THEN adjust LTDN TO VCT FLOW LK 112 setpoint as desired.
- ☐ ☐ ☐ ☐ 1.3 Position the MKUP MODE CONT SWITCH to STOP.
- ☐ ☐ ☐ ☐ 1.4 Position the MKUP MODE SEL SWITCH to BOR.
- ☐ ☐ ☐ ☐ 1.5 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.6 Verify proper boration operation by observing the following:
- On service boric acid pump started.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - BORIC ACID TO BLENDER Q1E21FCV113A opens.
 - Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 1.7 Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows:
- Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.
 - BORIC ACID TO BLENDER Q1E21FCV113A closes.
- ☐ ☐ ☐ ☐ 1.8 If desired to clear the line of acid, perform the applicable steps of Appendix B section 2.0.

NOTE: The following three steps are not required if operation in a mode other than automatic is preferred. Refer to appendix C.

- ☐ ☐ ☐ ☐ 1.9 Position the MKUP MODE SEL SWITCH to AUTO.
- ☐ ☐ ☐ ☐ 1.10 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.11 IF LK 112 setpoint was adjusted per Step 1.2, THEN return setpoint to that required for current conditions.

Attached procedures

01/03/07 15:29:30

UNIT 1

FNP-1-SOP-2.3
Appendix C

APPENDIX C

OPERATOR AID FOR REPETITIVE BORATION AND DILUTION

CAUTION: Without automatic makeup care should be taken to maintain VCT level between 26% and 61% during repetitive operation of the reactor makeup control system.

1.0 Boration

NOTE: During periods of repetitive boration evolutions, to minimize the number of start/stop cycles on the boric acid pump, the handswitch may be placed in START and allowed to return to AUTO to maintain the boric acid pump running. WHEN it is no longer desired to maintain the boric acid pump running continuously, THEN place the handswitch in STOP and return to AUTO.

- ☐ ☐ ☐ ☐ 1.1 The Reactor Makeup Control system has been previously aligned for Boration.
- ☐ ☐ ☐ ☐ 1.2 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.3 Verify proper boration operation by observing the following:
- On service boric acid pump started.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - BORIC ACID TO BLENDER Q1E21FCV113A opens.
 - Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 1.4 Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows:
- Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.
 - BORIC ACID TO BLENDER Q1E21FCV113A closes.

NOTE: WHEN it is no longer desired to maintain the line full of acid, THEN perform the applicable steps of Appendix B section 2.0 to flush the line.

- ☐ ☐ ☐ ☐ 1.5 IF repetitive borations are no longer required THEN verify the system is aligned for Automatic makeup per steps 1.9 through 1.11 of Appendix B.

Attached procedures

EEP-0 Att. 1

ATTACHMENT 1

SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL
PRESENT

1 Secure affected diesel generator from EPB. 1.1 Verify SI-RESET. ☐ MLB-1 1-1 not lit ☐ MLB-1 11-1 not lit 1.2 Place the affected diesel generator MODE SELECTOR SWITCH to MODE 2. 1.3 Depress affected diesel generator DIESEL EMERG START RESET pushbutton.	1 Secure affected diesel generator from diesel local control panel (155 ft. DIESEL BLDG). a) Place affected diesel generator MODE 4 SELECTOR SWITCH to MODE 4. b) Depress affected diesel generator local STOP pushbutton.

CAUTION: Failure to perform steps 1.5 and 1.6 immediately following step 1.4 may result in restart of the diesel generator when the low speed relay de-energizes.

- 1.4 Depress affected diesel generator STOP pushbutton.
- ☐ DIESEL STOP light lit
- 1.5 Place affected diesel generator MODE SELECTOR SWITCH to MODE 3.
- 1.6 Depress affected diesel generator DIESEL EMERG START RESET pushbutton.

Attached procedures

EEP-0 ATT 2

AUTOMATIC ACTIONS VERIFICATION

- 1 **Verify each SW train - HAS TWO
 SW PUMPS STARTED.**

☐ A train (1A,1B or 1C)
☐ B train (1D,1E or 1C)

- 2 **Verify each train of CCW -
 STARTED.**

- 2.1 Verify one CCW PUMP in each
 train- STARTED.

A train HX 1C or 1B
CCW FLOW

☐ FI 3043CA > 0 gpm
 OR

☐ FI 3043BA > 0 gpm

B train HX 1A or 1B
CCW FLOW

☐ FI 3043AA > 0 gpm
 OR

☐ FI 3043BA > 0 gpm

- 2.2 Verify SW flow to associated
 CCW HX's.

SW FROM 1A(1B, 1C)
CCW HX

☐ Q1P16FI3009AA > 0 gpm
☐ Q1P16FI3009BA > 0 gpm
☐ Q1P16FI3009CA > 0 gpm

- 2.2 Throttle open SW to the
 associated CCW HX's.

☐ Q1P16FV3009A
☐ Q1P16FV3009B
☐ Q1P16FV3009C

- 3 **Verify one CHG PUMP in each
 train - STARTED.**

☐ A train (1A or 1B) amps > 0
☐ B train (1C or 1B) amps > 0

Attached procedures

EEP-0 ATT 2

4 Verify RHR PUMPS - STARTED.

RHR PUMP

☐ 1A amps > 0☐ 1B amps > 0

5 Verify Safety Injection Flow.

5.1 Check HHSI flow - GREATER THAN
0 gpm.☐ FI 943

5.1 Verify proper SI alignment.

CHG PUMPS TO

REGENERATIVE HX

☐ Q1E21MOV8107 closed☐ Q1E21MOV8108 closed

RWST

TO CHG PUMP

☐ Q1E21LCV115B open☐ Q1E21LCV115D open

VCT

OUTLET ISO

☐ Q1E21LCV115C closed☐ Q1E21LCV115E closed

HHSI TO

RCS CL ISO

☐ Q1E21MOV8803A open☐ Q1E21MOV8803B open

CHG PUMP

SUCTION HDR ISO

☐ Q1E21MOV8130A open☐ Q1E21MOV8130B open☐ Q1E21MOV8131A open☐ Q1E21MOV8131B open

CHG PUMP

DISCH HDR ISO

☐ Q1E21MOV8132A open☐ Q1E21MOV8132B open☐ Q1E21MOV8133A open☐ Q1E21MOV8133B open

Attached procedures

EEP-0 ATT 2

5.2 Check RCS pressure - LESS THAN
275 psig(435 psig).

1C(1A) LOOP
RCS WR PRESS

☐ PI 402B
☐ PI 403B

5.3 Check LHSI flow - GREATER THAN
 1.5×10^3 gpm.

1A
RHR HDR
FLOW

☐ FI 605A

1B
RHR HDR
FLOW

☐ FI 605B

5.2 Proceed to Step 6.

5.3 Verify proper RHR alignment.

RWST TO

1A(1B) RHR PUMP

☐ Q1E11MOV8809A open
☐ Q1E11MOV8809B open

CTMT SUMP TO

1A(1B) RHR PUMP

☐ Q1E11MOV8811A closed
☐ Q1E11MOV8812A closed
☐ Q1E11MOV8811B closed
☐ Q1E11MOV8812B closed

1C(1A) RCS LOOP TO

1A(1B) RHR PUMP

☐ Q1E11MOV8701A closed
☐ Q1E11MOV8702A closed
☐ Q1E11MOV8701B closed
☐ Q1E11MOV8702B closed

RHR TO RCS HOT LEG

XCON

☐ Q1E11MOV8887A open
☐ Q1E11MOV8887B open

1A(1B) RHR HX

TO CHG PUMP SUCT

☐ Q1E11MOV8706A closed
☐ Q1E11MOV8706B closed

1A(1B) RHR HX

DISCH VLV

☐ HIK 603A open
☐ HIK 603B open

1A(1B) RHR HX

BYP FLOW VLV

☐ FK 605A closed
☐ FK 605B closed

Attached procedures

EEP-0 ATT 2

ATTACHMENT 2

6 Verify containment ventilation isolation.**6.1 Verify containment purge dampers - CLOSED.**

- ☐ 3197
- ☐ 3198D
- ☐ 3198C
- ☐ 3196
- ☐ 3198A
- ☐ 3198B

6.2 Verify containment mini purge dampers - CLOSED.

CTMT PURGE DMPRS
MINI-2866C & 2867C
FULL-3198A & 3198D

- ☐ 2866C
- ☐ 2867C

CTMT PURGE DMPRS
MINI-2866D & 2867D
FULL-3196 & 3197
BOTH-3198B & 3198C

- ☐ 2866D
- ☐ 2867D

**6.3 Stop MINI PURGE
SUPP/EXH FAN.**

Attached procedures

EEP-0 ATT 2

- 7 Verify containment fan cooler alignment.

- 7.1 Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.

CTMT CLR FAN
SLOW SPEED

- A train

☐ 1A

☐ 1B

- B train

☐ 1C

☐ 1D

- 7.2 Verify associated emergency service water outlet valves - OPEN.

EMERG SW FROM
1A(1B,1C,1D) CTMT CLR

☐ Q1P16MOV3024A

☐ Q1P16MOV3024B

☐ Q1P16MOV3024C

☐ Q1P16MOV3024D

Attached procedures

EEP-0 ATT 2

8 Verify AFW Pumps - STARTED.

8.1 Verify both MDAFW Pumps -
STARTED

- ☐ 1A MDAFW Pump amps > 0
- ☐ 1B MDAFW Pump amps > 0

AND

- ☐ FI-3229A indicates > 0 gpm
- ☐ FI-3229B indicates > 0 gpm
- ☐ FI-3229C indicates > 0 gpm

8.1 Verify MDAFW Pumps deliver
flow to each SG.

8.1.1 Manually start MDAFW Pumps

8.1.2 Verify AFW flow path to
each SG.

MDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3227A in MOD
- ☐ Q1N23HV3227B in MOD
- ☐ Q1N23HV3227C in MOD

MDAFWP TO 1A(1B,1C) SG

FLOW CONT

- ☐ HIC 3227AA open
- ☐ HIC 3227BA open
- ☐ HIC 3227CA open

AFW TO 1A(1B,1C) SG

STOP VLV

- ☐ Q1N23MOV3350A open
- ☐ Q1N23MOV3350B open
- ☐ Q1N23MOV3350C open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764A open
- ☐ Q1N23MOV3764D open
- ☐ Q1N23MOV3764F open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764E open
- ☐ Q1N23MOV3764B open
- ☐ Q1N23MOV3764C open

Attached procedures

EEP-0 ATT 2

8.2 Check TDAFW Pump start required.

8.2 IF TDAFW pump NOT needed.
THEN proceed to Step 9.

Condition	TSLB	Set-point	Coincidence
RCP Bus Under-voltage	TSLB2 1-1 1-2 1-3	2680 V	1/2 Detectors on 2/3 Busses
Low Low SG Water Level In Any 2/3 SGs	TSLB4 4-1.4-2.4-3 5-1.5-2.5-3 6-1.6-2.6-3	28%	2/3 Detectors on 2/3 SGs

8.3 Verify TDAFWP started.

- ☐ MLB-4 1-3 lit
- ☐ MLB-4 2-3 lit
- ☐ MLB-4 3-3 lit

TDAFWP SPEED

- ☐ SI 3411A > 3900 rpm

TDAFWP

SPEED CONT

- ☐ SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.

TDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3228A in MOD
- ☐ Q1N23HV3228B in MOD
- ☐ Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG

FLOW CONT

- ☐ HIC 3228AA open
- ☐ HIC 3228BA open
- ☐ HIC 3228CA open

Attached procedures

EEP-0 ATT 2

9 Verify main feedwater status.

- 9.1 Verify main feedwater flow control and bypass valves - CLOSED.

1A(1B.1C) SC
FW FLOW

- ☐ FCV 478
☐ FCV 488
☐ FCV 498

1A(1B.1C) SC
FW BYP FLOW

- ☐ FCV 479
☐ FCV 489
☐ FCV 499

- 9.2 Verify both steam generator feed pumps - TRIPPED.

- 9.3 Verify SC blowdown - ISOLATED.

1A(1B.1C) SCBD
ISO

- ☐ Q1G24HV7614A closed
☐ Q1G24HV7614B closed
☐ Q1G24HV7614C closed

- 9.4 Verify SC blowdown sample ISOLATED MLB lights lit.

1A(1B.1C) SCBD SAMPLE
ISO

- ☐ MLB1 19-2 lit Q1P15HV3328 closed
☐ MLB1 19-3 lit Q1P15HV3329 closed
☐ MLB1 19-4 lit Q1P15HV3330 closed

- 9.1 Verify main feedwater stop valves closed.

MAIN FW TO 1A(1B.1C) SC
STOP VLV

- ☐ Q1N21MOV3232A
☐ Q1N21MOV3232B
☐ Q1N21MOV3232C

- 9.2 Stop both EH PUMPs.

- 9.4 Locally verify SCBD sample - isolated (BOP).

STEAM GEN 1A(1B.1C) SAMPLE
ISO

- ☐ Q1P15HV3328 closed
☐ Q1P15HV3329 closed
☐ Q1P15HV3330 closed

OR

Locally verify SCBD sample -
isolated (PRIP).
STEAM GEN 1A(1B.1C) SAMPLE ISO

- ☐ Q1P15HV3179C closed
☐ Q1P15HV3180C closed
☐ Q1P15HV3181C closed

Attached procedures

EEP-0 ATT 2

- 10 Check no main steam line isolation actuation signal present.

Signal	Setpoint	Coincidence	TSLB
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2 19-3 19-4
HI STEAM FLOW	> 40%	1/2 ON 2/3	TSLB4 16-3 16-4 17-3 17-4 18-3 18-4
<u>AND</u> LO-LO TAVG	< 543°F	2/3	TSLB2 10-1 10-2 10-3
HI-HI CTMT PRESS	>16.2 psig	2/3	TSLB1 2-2 2-3 2-4

- 10 Perform the following.

- 10.1 Verify main steam line isolation and bypass valves closed.

1A(1B,1C) SG
MSIV - TRIP
☐ Q1N11HV3369A
☐ Q1N11HV3369B
☐ Q1N11HV3369C
☐ Q1N11HV3370A
☐ Q1N11HV3370B
☐ Q1N11HV3370C

1A(1B,1C) SG
MSIV - BYP
☐ Q1N11HV3368A
☐ Q1N11HV3368B
☐ Q1N11HV3368C
☐ Q1N11HV3976A
☐ Q1N11HV3976B
☐ Q1N11HV3976C

- 10.2 IF any main steam isolation valve open.
THEN place the associated test switch in the TEST position.

SG	1A	1B	1C
1A(1B,1C) SG MSIV - TEST Q1N11HV	☐ 3369A/ 70A	☐ 3369B/ 70B	☐ 3369C/ 70C

Attached procedures

EEP-0 ATT 2

11 Verify PHASE A CTMT ISO.

11.1 Verify PHASE A CTMT ISO -
ACTUATED.

- ☐ MLB-2 1-1 lit
- ☐ MLB-2 11-1 lit

NOTE: The turbine building SW isolation valves Q1P16V515, 517, 514 and 516 will take approximately two minutes to fully stroke closed.

11.2 Check all MLB-2 lights - LIT.

11.2 Verify PHASE A CTMT ISO
alignment using ATTACHMENT 3.
PHASE A CONTAINMENT ISOLATION.

12 Check all reactor trip and
reactor trip bypass breakers -
OPEN.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

12 Perform the following.

12.1 Open reactor trip breaker(s)
manually from MCB or locally.

12.2 Record any breaker(s) manually
opened.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

13 Trip CRDM MG set supply
breakers.

- 1A(1B) MC SET
- SUPP BKR
- ☐ N1C11E005A
- ☐ N1C11E005B

Attached procedures

EEP-0 ATT 2

14 Secure secondary components.

14.1 Stop both heater drain pumps.

HDP

☐ 1A☐ 1B

14.2 Check any condensate pump started.

- 14.2.1 IF started.
THEN stop all but one
condensate pump.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

- 14.2.1 IF no condensate pumps are
started,
THEN ensure handswitches
positioned to STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

- 14.3 IF condensate pump operating.
THEN verify backup cooling
aligned to condensate pumps
per FNP-0-SOP-0.0. APPENDIX B.
TR SO ACTIONS FOLLOWING A
REACTOR TRIP OR SAFETY
INJECTION.

- 14.3 Ensure all condensate pump
handswitches positioned to
STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

15 Verify both CRACS mode selector switches in the ON position.

CRACS Mode Selector Switch

☐ A TRAIN☐ B TRAIN

16 Verify two trains of ECCS equipment aligned.

- 16.1 Perform ATTACHMENT 4. TWO
TRAIN ECCS ALIGNMENT
VERIFICATION.

-END-

Attached procedures

EEP-1 ATT 4

ATTACHMENT 4

VERIFYING 4160 V BUSES ENERGIZED

1 Verify 4160 V busses energized.

CAUTION: IF a DG is already operating above its continuous load rating, THEN additional manual loads should not be added. Unanticipated plant emergency conditions may dictate the need to load the emergency diesel generators above the continuous load rating limit (i.e. 2.85 MW for small DGs, 4.075 MW for large DGs). Under these circumstances, diesel generator loading may be raised not to exceed the 2000 hour load rating limit (i.e. 3.1 MW for small DGs, 4.353 MW for large DGs). Diesel loading should be reduced within the diesel generator continuous load rating limit as soon as plant conditions allow.

NOTE: Plant conditions may dictate establishment of contingency electrical lineups. FNP-1-AOP-5.1, CONTINGENCY ELECTRICAL ALIGNMENTS provides guidance for establishing those lineups.

1.1 Check offsite power - AVAILABLE.	1.1 Request Shift Manager coordinate efforts to restore offsite power.
1.2 Check BKR DF01 (1A startup transformer to 1F 4160 V bus) - CLOSED.	1.2 Verify 1F 4160 V bus energized by 1-2A or 1C diesel generator.
1.3 Verify BKR DF02 (1F 4160 V bus tie to 1K 4160 V bus) - CLOSED.	1.3 IF diesel generator cooling <u>NOT</u> supplied from Unit 2. <u>THEN</u> secure 1-2A and/or 1C diesel generator using ATTACHMENT 5, SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT.
1.4 Check BKR DG15 (1B startup transformer to 1G 4160 V bus) - CLOSED.	1.4 Verify 1G 4160 V bus energized by 1B diesel generator.

Attached procedures

EEP-1 ATT 4

1.5 Verify BKR DG02 (1G 4160 V bus tie to 1L 4160 V bus) - CLOSED. 1.6 Verify all RCP busses - ENERGIZED. [] 1A 4160 V bus [] 1B 4160 V bus [] 1C 4160 V bus 1.7 Check 1E 4160 V bus - ENERGIZED.	1.5 <u>IF</u> diesel generator cooling <u>NOT</u> supplied. <u>THEN</u> secure 1B diesel generator using ATTACHMENT 5. SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT. 1.7 Establish power to 1C 600 V LC emergency section loads. 1.7.1 Place handswitch for pressurizer heater group 1B in OFF. 1.7.2 Open BKR EC08-1. 1.7.3 Close BKRs EE07-1 and EC10-1.

AUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel generator capacity must be available prior to energizing a group of pressurizer heaters.

1.8 Check 1D 4160 V bus - ENERGIZED. 1.9 <u>IF</u> 1D 4160 V bus energized. <u>THEN</u> return to PROCEDURE STEPS, step 13.	1.7.4 Energize pressurizer heater group 1B as required. 1.8 Proceed to step 1.10.

Attached procedures

EEP-1 ATT 4

1.10 Establish power to
1A 600 V LC emergency section
loads.

1.10.1 Place handswitch for
pressurizer heater group
1A in OFF.

1.10.2 Verify open BKR EA08-1.

1.10.3 Verify closed BKRs ED08-1
and EA09-1.

CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel
generator capacity must be available prior to energizing a group of
pressurizer heaters.

NOTE: The BYPASS position allows manual energization of pressurizer heater
group 1A from the MCB handswitch, and automatic energization based on
either pressurizer pressure $\leq$ 2210 psig or pressurizer level 5% above
program.

1.10.4 WHEN pressurizer heater
group 1A operation is
desired,
THEN place HTR GRP 1A
BLOCKING BYPASS SW to
BYPASS.

1.10.5 IF required,
THEN manually energize
pressurizer heater group
1A.

Attached procedures

EEP-1 ATT 4

CAUTION: To ensure adequate supply voltage to all class 1E loads and to meet short circuit analysis constraints, only one air compressor, 1C (preferred) or 1A, should be powered from the diesel generator. One air compressor will consume 0.16 MW of diesel generator load.

1.11 Verify 1C air compressor in service.

1.11.1 Verify 1C air compressor handswitch in RUN/START.

1.11.2 Verify 1C air compressor started.

1.11 Align 1A air compressor.

a) Verify 1C air compressor handswitch in OFF.

b) Verify SI - RESET.

☐ MLB-1 1-1 not lit

☐ MLB-1 11-1 not lit

CAUTION: IF offsite power is lost after sequencer is reset.
THEN manual actions may be required to restart safeguards equipment.

c) Reset B1F sequencer by depressing the ESS STOP RESET pushbutton on the sequencer panel.
(139' AUX BLDG SWGR rm)

d) Place BKR DF13 SYNCH SWITCH in MAN.

e) Close BKR DF13 (1F 4160V bus tie to 1H 4160V bus).

f) Energize 1C 600 V LC from normal supply.

☐ BKR DH01 closed

☐ BKR EG02-1 closed

g) Start 1A AIR COMPRESSOR.

Attached procedures

EEP-1 ATT 4

1.12 Check INST AIR PRESS PI 4004B
- GREATER THAN 85 psig.

1.12 Perform the following.

NOTE: The intent of this step is to regain control of critical air operated components including PORVs and atmospherics. Based on plant conditions and availability of manpower, the applicability, priority and performance of the following actions is at the discretion of the Shift Supervisor.

1.12.1 Restore air pressure.

- Verify proper air compressor operation using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

OR

- IF 2C air compressor available.
THEN align 2C air compressor to Unit 1 using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

1.12.2 IF instrument air NOT restored.
THEN align nitrogen supply to PORVs using FNP-1-SOP-62.1. BACK-UP AIR OR NITROGEN SUPPLY TO THE PRESSURIZER POWER OPERATED RELIEF VALVES.

1.12.3 IF instrument air NOT restored.
THEN align emergency air supply to atmospheric relief valves and/or TDAFWP using FNP-1-SOP-62.0. EMERGENCY AIR SYSTEM.

Attached procedures

EEP-1 ATT 4

1.12.4 IF instrument air NOT
restored because 1G 600 V
LC is deenergized.
THEN energize 1G 600 V LC
from 1F 600 V LC using
ENP-1-SOP-36.3, 600.
480 AND 208/120 VOLT AC
ELECTRICAL DISTRIBUTION
SYSTEM.

1.12.5 WHEN instrument air
pressure restored.
THEN perform step 1.13.

1.12.6 Return to PROCEDURE STEPS,
step 13.

1.13 Verify instrument air aligned
to containment. (BOP)

IA TO PENE RM

☐ N1P19HV3825 open

☐ N1P19HV3885 open

IA TO CTMT

☐ Q1P19HV3611 open

Attached procedures

SOP-60.0 4.3

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as needed 4.3 or 4.4.

4.3 Verifying Proper PRF System in Operation During a LOCA (A Train Inservice).

- 4.3.1 IF both trains of PRF are started, THEN secure B train of PRF per section 4.6, Securing B Train of PRF Operation During a LOCA.
- 4.3.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.3.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.3.4 Verify Phase B reset as indicated by MLB-3, lights 1.1 and 6.1 not lit.
- 4.3.5 Verify open 1A PRF SUCTION DMPR Q1E15MOV3362A.
- 4.3.6 Verify 1A PRF recirculation fan started.
- 4.3.7 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A.
- 4.3.8 Verify 1A PRF exhaust fan started.
- 4.3.9 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.3.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS Δ P PDI 3367A and PDI 3367B, AND power to B train PRF is available, THEN place the B train of PRF in service as follows:
 - 4.3.10.1 Verify open 1B PRF SUCT DMPR Q1E15MOV3362B.
 - 4.3.10.2 Verify 1B PRF recirculation fan started.
 - 4.3.10.3 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.3.10.4 Verify 1B PRF exhaust fan started.
 - 4.3.10.5 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

Attached procedures

SOP-60.0 4.4

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as desired in sections 4.3 or 4.4.

4.4 Verifying Proper PRF System in Operation During a LOCA (B Train Inservice).

- 4.4.1 IF both trains of PRF are started, THEN secure A train of PRF per section 4.5, Securing A Train of PRF Operation During a LOCA.
- 4.4.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.4.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.4.4 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF remaining in service.

- 4.4.5 Verify open B PRF SUCTION DMPR Q1E15MOV3362B.
- 4.4.6 Verify 1B PRF recirculation fan started.
- 4.4.7 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15HV3356B.
- 4.4.8 Verify 1B PRF exhaust fan started.
- 4.4.9 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A(B) will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.4.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS Δ P PDI 3367A and PDI 3367B, AND power to A train PRF is available, THEN place the A train of PRF in service as follows:
 - 4.4.10.1 Verify open 1A PRF SUCT DMPR Q1E15MOV3362A.
 - 4.4.10.2 Verify 1A PRF recirculation fan started.
 - 4.4.10.3 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.4.10.4 Verify 1A PRF exhaust fan started.
 - 4.4.10.5 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

Attached procedures

SOP-60.0 4.5

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

4.5 Securing A Train of PRF Operation During a LOCA.

4.5.1 Verify the following dampers closed:

- SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A
- SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B

4.5.2 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF being secured.

4.5.3 Place 1A PRF exhaust fan in automatic by placing the handswitch to STOP and releasing.

4.5.4 Place 1A PRF recirculation fan in automatic by placing the handswitch to STOP and releasing.

4.5.5 Place 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A handswitch to AUTO.

4.5.6 Close 1A PRF RECIRC FAN RECIRC DMPR Q1E15MOV3361A(B) and return switch to AUTO.

4.5.7 Close 1A PRF SUCTION DMPR Q1E15MOV3362A(B) and return switch to AUTO.

Facility: Farley Scenario No.: 3 Op-Test No.: 2007301

Examiners: Frank Ehrhardt Operators: _____

Jay Hopkins _____

Craig Kontz _____

Initial Conditions: Plant is in Mode 1, MOL, 25% power, Xenon free, A Train On-Service – A Train Protected

Turnover: 25% RTP, MOL, 1292 ppm Cb, 10,000 MWD, Xe building in from Xe free startup at 80 pcm,

- Ramping to 50% power;
- UOP 3.1 has been completed through step 5.1.1,
- The 1B MDAFW pump is tagged out to investigate high vibration and will be out of service for approximately 10 hours.
- Ramp on hold for turnover,
- CTMT batch release – last released 3 days ago,
- Current Risk Assessment is YELLOW due to the 1B MDAFW pump OOS & projected is YELLOW,
- A Train On-Service – A Train Protected,
- Engineering Support is in the process of revising the BEACON strategy since the ramp is on hold,
- LCO: (M) 3.7.5 1B MDAFW
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1		R (RO & BOP)	Seismic event/alarm OBE exceeded,
2	1	I (RO)	LT-112, Fails High, VCT Level
3	2	C (BOP) TS (SRO)	1A Reactor cavity cooling fan trips
4	3	C (RO) TS (SRO)	Chg low flow due to Degraded A CHG pmp Head
5	4	C (RO & BOP) TS (SRO)	1A RCP trips

6		M (ALL)	1C SG tube rupture 400 gpm
7	5	C (BOP)	TDAFW does not auto start, must be manually started from MCB. 1A MDAFWP does not auto or manually start (can be started from the HSP if desired)
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

SCENARIO 3 Summary sheet

- Initial Conditions:** Plant is in Mode 1, MOL, 25% power, Xenon free.
- UOP-3.1 has been completed up to Step 5.1.1.
 - The 1B MDAFW pump is tagged out to investigate high vibration and will be out of service for approximately 10 hours.

Presets:

Event No.	Event Type*	Event Description
0	preset	rack out 1B MDAFW
8	Preset	A mdafw fails to auto start
8	Preset	1A mdafw fails to START from MCB switch
8	preset	TDAFW does not auto start

Event 1 Seismic event/alarm OBE exceeded, Shift manager directs normal shutdown as a precaution after initial plant inspections are performed – damage found on 1A 4160V bus

R actions: RO uses boration and/or rods, BOP operates DEH to set in ramp rate, target, initiate and stop ramp as necessary

The audit exam had a seismic event on it, but had a different result in that no damage was found in that event. All subsequent events were different in that scenario than in this one. In this event, a RCP bus is found damaged, and later the RCP on that bus trips due to the damage.

Event 2 LT-112, VCT Level, Fails High. Man level control required with LK-112

Event 3 1A Reactor cavity cooling fan trips, ARP requires starting the other one

Event 4 Chg low flow due to Degraded A CHG pmp Head. Attempt to start B or C CHG pmp per SOP-2.1 or AOP-16.0. TS is admin only, since still have two trains of chg, but Reduced redundancy in A train.

Event 5 1A RCP trips (Rx power < P-8 setpoint).

AOP-4 actions required to close 1A loop spray valve (RO), secure feeding the 1A SG (BOP) and perform controlled shutdown (RO & BOP).

apply Tech Spec 3.4.4. With 'A' RCS loop < 541F, the RNO requires to be in Mode 3 in 30 minutes. AOP-17 entry may be required (ramping > 5MW/Min)

Event 6 1C SG tube rupture @ 400 gpm prior to <2% power. The team is expected to determine which SG is ruptured and utilize the correct ERG's to place the plant in a safe condition (CT Identify and isolate flow to/from the ruptured steam generator before a transition to ECP-3.1 occurs or prior to commencing RCS cooldown) (CT Perform a RCS cooldown and maintain RCS temperature so that transition from EEP-3 does not occur because RCS temperature is

- Too high to maintain greater than 36° subcooling or
- Below the point which would cause transition to FRP-S.1 or FRP-P.1)

(CT Perform a RCS depressurization to minimize break flow before water enters the main steam line of the ruptured SG.)

Event 7 The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

(significant modification from bank scenario 7C due to no faulted SG)

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 1

Event Description: Seismic event/alarm OBE exceeded, Shift manager directs normal shutdown as a precaution after initial plant inspections are performed – damage found on 1A 4160V bus

Time	Position	Applicant's Actions or Behavior
	SRO	Directs actions per MK5 ARP. Checks that a seismic event has occurred • Phone calls from the Diesel Building SO & Outside SO confirms the Seismic alarm is valid • Directs walkdown of plant per att. 2 (delegates this task to personnel outside of the Control Room such as the SSS) Compares the seismic panel printout channel 1, 2 and 3 Spectral Acceleration measured values to the Spectral Acceleration design values on Table 1, "Safe Shutdown Earthquake (SSE) Limit for Determination of Site Area Emergency Classification". • Several measured "g" values exceed Safe Shutdown Earthquake (SSE) Limit for Site Area Emergency Classification. • Informs Shift Manager of need to classify and notify for the event per EIP-9.0 & of need to shutdown in 6 hours: 3.2 Declare a Site Area Emergency per EIP-9.0, Guideline 2. a) Assess shutdown equipment availability. b) Monitor nuclear instrumentation for changes in indication. c) Commence shutdown to be in Mode 3 within 6 hrs after assessing shutdown equipment availability.

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 1

Event Description: Seismic event/alarm OBE exceeded, Shift manager directs normal shutdown as a precaution after initial plant inspections are performed – damage found on 1A 4160V bus

Time	Position	Applicant's Actions or Behavior
	SRO	Compares the seismic panel printout on Table 2, & 3. • Determines that the CAV Design limit HAS BEEN exceeded due to Spectral Acceleration design value exceeded. • Directs RO & BOP to commence ramp down per UOP-3.1 to be off line within 6 hours • Directs additional walkdowns & CRs to calibrate instruments per ARP MK5 steps 5-8 • Writes CR & calls Work Week Coordinator or directs SSS to write CR on "A 4160V Bus" that was damaged as determined by report from walkdown team
	BOP	Coordinates with the RO to ramp down per UOP-3.1 • Operates DEH controls to ramp the turbine down at 2 MW/Min ○ Types in target desired & presses select ○ Types in rate desired (may start at < 2 & later input 2) & presses select ○ Presses GO pushbutton to start ramp
	RO	Coordinates with the BOP to ramp down per UOP-3.1 • Uses boration per SOP-2.3 App B & C (Attached) or rod insertion to reduce reactor power ○ Maintains $T_{avg} \pm 1^\circ$ from T_{ref} ○ Maintains $\Delta I \pm 5\%$ of target
	BOP	IF Ramp down continues: performs actions in UOP-2.1 (< 20% POWER) • Notifies ACC that Generator is ready for unloading • Ramps turbine to approximately 40 MW per SOP-28.1 steps 4.12.1-4.12.7 (attached) • Verifies IR NI Hi flux trips cleared prior to going below 13% power (TSLB 3-2.1 & 2.2 OFF)

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 1

Event Description: Seismic event/alarm OBE exceeded, Shift manager directs normal shutdown as a precaution after initial plant inspections are performed – damage found on 1A 4160V bus

Time	Position	Applicant's Actions or Behavior
	RO	Maintains power at 8% until turbine is off line with control rods & steam dump operation
	BOP	• Places Steam dumps in pressure mode per SOP-18.0 (ATTACHED) • Sets Steam dump controller pot for setpoint of present S/G pressure, or until steam dumps start to open • WHEN Turbine Generator is at approx. 40 MW load, and steam dumps are open in the steam pressure mode, ○ Stations personnel at the turbine ○ Removes the turbine generator from the grid per sop-28.1 steps 4.12-4.12.14(attached) ○ Directs completion of STP-42 (Unit 2 UO)

Op-Test No.: <u>HLT-31 NRC</u> Scenario No.: <u>3</u> Event No.: <u>2</u>		
Event Description: LT-112, VCT Level, Fails High. Man level control required with LK-112		
Time	Position	Applicant's Actions or Behavior
	RO	Announces: • DF3, VCT LVL HI-LO alarm in • LI-112B offscale hi & LI-115 reading 48% (same as it was prior to the alarm) • LT-112B appears failed, • LK-112 demand is 100% • LCV-115A is in full divert • May use skill of the craft to take manual control of LK-112 and reduce demand to 0% prior to being directed by the ARP
	SRO	Directs RO or BOP to perform actions of ARP for DF3. • May delegate the performance of the ARP to the RO or BOP.
	BOP	• Addresses actions of ARP for DF3 and directs RO per row below:
	RO	• Adjusts LK-112, VCT level controller in manual as necessary to maintain VCT level as indicated by LI-115-adjusts demand to 0% • Realizes manual opening of RWST CHG pump suctions and subsequent closing of VCT outlet valves will be required if necessary, auto operation on 5% VCT level will not be available
	SRO	Writes CR and informs Work Week Coordinator of the LT-112 failure

[illegible]

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 4

Event Description: Chg low flow due to Degraded A CHG pmp Head. Attempt to start B or C CHG pmp per SOP-2.1 or AOP-16.0

Time	Position	Applicant's Actions or Behavior
	RO	Announces: • DE1, REGEN HX STDN FLOW DISCH TEMP HI, & DD1, RCP SEAL INJ FLOW LO alarms in • Chg flow has dropped to only 50 gpm • Chg amps have dropped to only 55 (normal approx 75 amps) • Shaft Seal Flow has dropped to less than 4 gpm each for A, B, & C RCP seal flow
	RO	May take manual control of FK-122, charging FCV, by skill of the craft to increase charging flow to reduce thermal stress across tubes in regen hx • Charging flow & pump amps rise slightly, but not enough to match charging flow with letdown (2 orifices on service) May take manual control of HIK-185, SEAL WTR INJECTION FCV, by skill of the craft to increase charging flow to reduce thermal stress across tubes in regen hx • SEAL INJ flow rises slightly, but is still only 4 gpm each and in the "red" band below min of 6 gpm each May take off service the 45 or 60 gpm letdown orif, by operator aid on MCB: "REMOVING SECOND LTDN ORIFICE FROM SERVICE" to decrease letdown flow to reduce thermal stress across tubes in regen hx • Letdown flow is reduced to 80 or 60, but is still too hi for the reduced charging and seal injection flow.
	SRO	Directs RO to address ARP actions for DD1 and DE1. Actions in RO rows below • May delegate the reader function of the ARPs to the BOP

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 4

Event Description: Chg low flow due to Degraded A CHG pmp Head. Attempt to start B or C CHG pmp per SOP-2.1 or AOP-16.0

Time	Position	Applicant's Actions or Behavior
	RO	Per DE1, REGEN HX LTDN FLOW DISCH TEMP HI, • Determines actual temp on TI-140, REGEN HX Outlet Temp (alarm setpoint 365°F) • Monitors chg & ltdn flows & temps • Directs entry into AOP-16.0 • Refers to SOP-2.1, CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION, as necessary • May raise Charging flow with FK-122 in man & 100% demand • May reduce or completely secure letdown with operator aid from MCB (See attached)
	RO	Per DD1, RCP SEAL INJ FLOW LO, • Determines cause of alarm: not enough seal flow or charging flow with HIK-186 & FK-122 full open • Directs BOP to Monitor RCP lower bearing temperatures and #1 Seal Leakoff Flows • Fully opens SEAL WTR INJECTION HIK-186 • Determines a complete loss of seal injection has NOT occurred, and that CCW to thermal barrier is still aligned
	SRO	Directs entry into SOP-16.0, CVCS MALFUNCTION. Directs actions per RO & BOP rows below:

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 4

Event Description: Chg low flow due to Degraded A CHG pmp Head. Attempt to start B or C CHG pmp per SOP-2.1 or AOP-16.0

Time	Position	Applicant's Actions or Behavior
	RO	• Monitors VCT level: ○ IF letdown has NOT been secured reports VCT level is rising due to the reduced charging flow ○ IF letdown HAS been secured, reports VCT level is dropping due to charging and seal injection • Places ramp on hold by depressing white "Hold" pushbutton on DEHC panel • Reports CHG Press, Motor amps, & flow are all low with A chg pump running • Places FK-122 in manual & raises demand to 100% • Adjusts HIK-186, SEAL WTR INJECTION to 10 (full open) • Reports CHG Press, Motor amps, charging flow & seal injection flow are all low with A chg pump running • Checks clear: DE3, LTDN ORIF ISO VLV REL LINE TEMP HI • Checks normal letdown on service: not affected by malfunction • Checks charging flow ABNORMAL & AFFECTED by malfunction • Verifies VCT outlet iso valves open LCV115C & E • Verifies charging pump suction header aligned: MOV8130A & B MOV8131A & B OPEN • Verifies charging pump discharge header aligned: MOV8132A & B MOV8133A & B OPEN • Verifies CHG PUMPS TO REGENERATIVE HX aligned: MOV8107 & 8108 OPEN • Checks Pressurizer level NOT stable 20% - 60%

Op-Test No.: <u>HLT-31 NRC</u> Scenario No.: <u>3</u> Event No.: <u>4</u>		
Event Description: Chg low flow due to Degraded A CHG pmp Head. Attempt to start B or C CHG pmp per SOP-2.1 or AOP-16.0		
Time	Position	Applicant's Actions or Behavior
	SRO	Directs RO to start B CHG Pump & secure A CHG pump (May direct starting C instead of B) per SOP-2.1.
	RO	Per SOP-2.1 sec. 4.7, • Checks aux oil pump light lit on MCB • Checks open all 4 miniflow valves on MCB • Verifies CCW pump running in train of CHG to be started • Starts B(C) CHG pump & observes amps, pressure, & flow for proper response • Checks aux oil pump light goes out for B(C) CHG pump • Adjusts FK-122 & HIK-186 as desired to control CHG & SEAL INJ flows • Secures A CHG pump • Performs, or reports the need to perform to the SRO, STP-8.0, RCP SEAL INJECTION LEAKAGE TEST (NOT intended to wait until this is performed prior to the next event)
	SRO	• Writes CR on A CHG pump for degraded head and informs Work Week Coordinator • Directs Rover and or SSS to rack out the A CHG pump • Addresses tech spec Mandatory LCO 3.5.2 Cond A (SR 3.5.2.1 is required with A CHG inop) ◦ LCO will be cleared when A CHG pump is racked out • IF Letdown was secured, directs RO to place letdown in service Per RO actions below:
	RO or BOP	IF Letdown was secured, places in service per AOP-16 (Attached)

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 5

Event Description: 1A RCP trips (Rx power < P-8 setpoint). AOP-4 actions required and perform controlled shutdown. Tech Spec 3.4.4. With 'A' RCS loop < 541F, the RNO requires to be in Mode 3 in 30 minutes. AOP-17 entry may be required (if ramping > 5MW/Min)

Time	Position	Applicant's Actions or Behavior
	SRO	Directs AOP-4, LOSS OF REACTOR COOLANT FLOW, per RO & BOP rows below: • Immediate operator actions • Subsequent actions
	SRO	Directs BOP to address ARPs as time permits (NO additional actions required by ARPs beyond AOP-4.0): • EF1, 1A RCS LOOP FLOW LO OR 1A RCP BKR OPEN • HF1, RX COOLANT LOOPS TAVG DEV HI-LO • HF2, RX COOLANT LOOPS ΔT DEV HI-LO • HF3, TAVG/TREF DEV • MF4, 4160V BKR TRIPPED
	BOP	• Reduces demand of FK-479, Feed Reg Bypass Valve to 0% in man • Reduces demand of FK-478, Feed Reg Valve to 0% in man
	RO	• Reduces demand of PK-444C, 1A RCS loop spray valve to 0% in man • Reports Tavg for A RCS loop is < 541°F, (TS 3.4.2 applies: Min temp for criticality)
	SRO	Directs RO & BOP to place the unit in mode 3 in 30 minutes per RO & BOP actions below. • Directs entry into AOP-17 IF ramp is greater than 5MW/Min • WHEN in mode 3, transitions to UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY
	SRO	Writes CR on A RCP trip and informs work week coordinator.

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 5

Event Description: 1A RCP trips (Rx power < P-8 setpoint). AOP-4 actions required and perform controlled shutdown. Tech Spec 3.4.4. With 'A' RCS loop < 541F, the RNO requires to be in Mode 3 in 30 minutes. AOP-17 entry may be required (if ramping > 5MW/Min)

Time	Position	Applicant's Actions or Behavior
	BOP	Coordinates with the RO to ramp down per UOP-3.1 - Operates DEH controls to ramp the turbine down at 2 MW/Min - Types in target desired & presses select - Types in rate desired (may start at < 2 & later input 2) & presses select - Presses GO pushbutton to start ramp
	RO	Coordinates with the BOP to ramp down per UOP-3.1 & UOP-2.1 (<20% power) - Uses boration per SOP-2.3 App B & C (Attached) or rod insertion to reduce reactor power - Maintains $T_{avg} \pm 1^\circ$ from T_{ref} - Maintains $\Delta I \pm 5\%$ of target - Maintains RCS Pressure 2200-2300 psig - Maintains Pressurizer level ~22%
	BOP	WHEN Ramping down per UOP-2.1 (<20% power) - Places Steam dumps in pressure mode per SOP-18.0 (ATTACHED) - Sets Steam dump controller pot for setpoint of present S/G pressure, or until steam dumps start to open - WHEN Turbine Generator is at approx. 40 MW load, and steam dumps are open in the steam pressure mode, - Stations personnel at the turbine - Removes the turbine generator from the grid per sop-28.1 steps 4.12-4.12.14 (attached) Directs completion of STP-42 (Unit 2 UO)

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
.	SRO	Directs AOP-2 entry and FH1 ARP • Informs Shift Manager that EIP-9 is required, a SGTR is indicated by secondary rad alarms, p2r level drop, and C SG level rise • Recognizes that A SG level is higher than the other two due only to the A RCP trip • Decides to continue shutdown due to Tave, loss of RCP, & Seismic event rather than stabilize to quantify SGTR leakrate • actions per RO & BOP rows below:
	SRO	• Sets trip criteria: IF leak rate is > 120 gpm (capacity of reactor make up system), THEN requires reactor trip, then SI • Reports to SM EIP-9 is required due to R-15 in alarm
	BOP	Addresses MCB alarm: FH1 for R-15, SJAExhaust & R-19, SGBD SAMPLE & R-23A, SGBD SRG TK INLET alarms • Reports to SS (who informs SM) EIP-9 is required due to R-15 in alarm • Notifies Counting Room to Immediately sample the SGs per CCP-31, LEAK RATE DETERMINATION • Verifies sample line isolation valves HV3328, 3329, 3330 are closed • Directs Radside SO to verify FCV-1152, SGBD flow control is closed

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO	Maintains pressurizer level stable at normal programmed value & maintains VCT level > 20 % • Adjusts FCV-122 • reduces letdown by closing orif isolation valves HV8149A, B, or C as necessary • Verifies RMU System in auto OR manually makes up to VCT
	BOP	Checks Radiation monitoring system is operable: R-15 & R-70 • Recognizes that R-70 is not accurate below 20% power
	BOP or RO	Reports: • leakrate is getting worse and is greater than reactor makeup system capability • C SG level is raising even though feed flow has been reduced
	SRO	Directs RO and BOP to trip Reactor, verify the Reactor is tripped, Actuate Safety injection, and perform immediate actions of EEP-0, REACTOR TRIP OR SAFETY INJECTION. • Enters EEP-0, & directs RO & BOP actions per below:

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO	- Checks reactor tripped - All 4 RT & BYP Bkrs are open - PR & IR power trending down - All DRPI rod bottom lights are lit - Checks turbine tripped: [] TSLB2 14-1 lit [] TSLB2 14-2 lit [] TSLB2 14-3 lit [] TSLB2 14-4 lit
	RO	- Checks power to 4160 V ESF busses both trains energized - Verifies operating DGs are being supplied from at least one SW pump - Checks SI Status - MLB-1 1-1 & 1-2 lit - BYP & PERMISSIVE SI light lit
	BOP	- Checks reactor tripped - All 4 RT & BYP Bkrs are open - PR & IR power trending down - All DRPI rod bottom lights are lit - Checks turbine tripped:

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	BOP	○ [] TSLB2 14-1 lit [] TSLB2 14-2 lit [] TSLB2 14-3 lit [] TSLB2 14-4 lit
	BOP	• Checks power to 4160 V ESF busses both trains energized • Verifies operating DGs are being supplied from at least one SW pump • Checks SI Status ○ MLB-1 1-1 & 1-2 lit ○ BYP & PERMISSIVE SI light lit
	SRO	After EEP-0 Immediate actions have been verified, MAY direct BOP to perform annunciator management and early actions: • Control AFW flow to > 395 gpm until any intact SG > 31% NR level • Feed C SG until > 31% (above tubes), THEN Isolate AFW to C SG Directs attempt to start 1A MDAFWP & TDAFWP if RO or BOP does not attempt after noticing no AFW flow
	RO or BOP	WHEN RO or BOP notices no AFW flow, THEN they should attempt to start the 1A MDAFWP & TDAFWP, further actions covered in next event - 7
	BOP	Verifies SI Auto actions using EEP-0 ATT 2 (Attached)

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO	Check ctmt pressure has remained <27#: YES
	RO	Announces "Unit 1 reactor trip and safety injection"
	BOP	• Checks AFW status ○ Verifies at least 395 gpm flow to SGs ○ OR ○ at least one level > 31% {48} ○ Reports to SRO: no AFW pumps were running, and SG levels are > 31%, ▪ "The TDAFW pump auto start is not required. Should be able to start the TDAFW pump manually with the MCB switches when we need it". ▪ "The 1A MDAFW pump did not automatically start but should have, and did not start with the MCB Handswitch".
	RO or BOP	Checks RCS temps 547 & Stable, IF NOT performs RNO of step 9 below: • [MSR isolation & Main Steam Drain Pot isolation are done without SRO direction by the Turbine Building SO after each reactor trip, these may not be directed at this time for this reason] • Secures one SJAE if two are in service • Closes MSIVs if cooldown not stopped

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO	Checks PORVs & spray valves • PORVs closed < 2335 psig, • Spray valves closed or closing < 2260 psig • PORV iso valves open with power, • no evidence of leak by via downstream temps & PRT parameters
	RO	Checks RCP criteria: subcooling > 16°F {45}: YES
	RO	Checks CHG mini-flows • Open RCS > 1900 psig • closed RCS press<1300 psig • As is 1300-1900 psig
	RO or BOP	Checks SGs not faulted: YES • A SG press falling uncontrolled OR < 50 psig
	RO or BOP	Checks SGs not Ruptured: NO • C SG level rising uncontrolled
	SRO	Directs team to transition to EEP-3 per RNO of step 14, 1C SG is Ruptured: directs RO & BOP per actions below:

Op-Test No.: HLT-31 NRC **Scenario No.:** 3 **Event No.:** 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO or BOP	- Checks Sub Cooling > 16°F{45°F} SUBCOOLED IN CETC Mode: YES - Checks C SG level Rising Uncontrolled & Ruptured - Verifies C SG Atmospheric relief HV3371C - controller in auto and - pot set at 8.25, AND - closed
CRITICAL TASK: (BOP) Identify and isolate flow to/from the ruptured steam generator before a transition to ECP-3.1 occurs or prior to commencing RCS cooldown		
	BOP	- Isolates steam supply to TDAFW PUMP from C SG - Directs Counting room to perform CCP-645, MAIN STEAM ABNORMAL ENVIRONMENTAL RELEASE - Check A MDAFW pump running: NO - Check 1C SG ruptured: YES - Directs Steam to TDAFW pump from C SG HV3235B Switches on HSP taken to LOCAL & STOP - Checks B SG ruptured: NO

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO or BOP	- Verify SGBD from C SG isolated: HV7614C closed - Verify at least one MSIV & BYPASS valve for C SG closed: - HV3369C or HV 3370C - AND - HV3368C or HV 3376C
	RO or BOP	WHEN C SG > 31% NR LEVEL, THEN: - Close HV3227C Pot & Verify switch in MOD - Close HV3228C Pot & Verify switch in MOD
	RO or BOP	Check C SG Pressure > 250 psig: YES
CRITICAL TASK: (BOP) Perform a RCS cooldown and maintain RCS temperature so that transition from EEP-3 does not occur because RCS temperature is - Too high to maintain greater than 36° subcooling or - Below the point which would cause transition to FRP-S.1 or FRP-P.1)		
	BOP	Perform RCS cooldown Determine required CETC temp for CD based on C SG PRESSURE

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior	
		RUPTURED SG PRESSURE (psig)	REQUIRED CORE EXIT TEMPERATURE
		1151 - 1200	536°F {522°F}
		1101 - 1150	531°F {516°F}
		1051 - 1100	525°F {510°F}
		1001 - 1050	519°F {504°F}
		951 - 1000	513°F {498°F}
		901 - 950	507°F {491°F}
		851 - 900	500°F {484°F}
		801 - 850	494°F {477°F}
		751 - 800	487°F {469°F}
		701 - 750	479°F {461°F}
		651 - 700	471°F {453°F}
	SRO or BOP	Display hottest CETC by Plant Computer page ITC1, TC summary, highest TC'S	
	RO or BOP	WHEN P-12 LIGHT LIT (543°F Tavg) Block low steam line pressure SI & Bypass the steam dump interlock	

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
		6.3.1 Block low steam line pressure SI. STM LINE PRESS SI BLOCK - RESET [] A TRN to BLOCK [] B TRN to BLOCK 6.3.2 Verify blocked indication. BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ. [] TRAIN A BLOCKED light lit [] TRAIN B BLOCKED light lit
	BOP	6.3.3 Bypass the steam dump interlock. STM DUMP INTERLOCK [] A TRN to BYP INTLK [] B TRN to BYP INTLK
	BOP	Adjust steam dumps max open: PK-464 adjusted > 25%

Op-Test No.: HLT-31 NRC **Scenario No.:** 3 **Event No.:** 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	BOP	Dump steam to condenser at max obtainable rate (this is achieved when A & E STEAM DUMP valves are full open as indicated by red light lit and green light out for A & E steam dump valves on secondary valve status panel on MCB)

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	BOP	Check steam dumps avail to dump steam: BYP & PERMISSIVE COND AVAIL ☐ C-9 light lit STM DUMP ☐ MODE SEL A-B TRN in STM PRESS STM DUMP INTERLOCK ☐ A TRN in ON ☐ B TRN in ON STM HDR PRESS ☐ PK 464 adjusted
CRITICAL TASK: (BOP) Verify AFW flow greater than 395 gpm or SG level > 31% [48%]		

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	BOP	IF not started previously, starts the TDAFW pump from B SG Steam supply & feeds B SG: • opens HV3235A/26, TDAFWP STM SUPP FROM 1B SG • Throttles open HV3228BA, TDAFWP TO 1B SG FLOW CONT
	BOP	WHEN hottest CETCs less than required, THEN STOP RCS cooldown AND Maintain CETCs less than required temperature
	BOP	WHEN A AND B SG level > 31%, maintain both 33%-65% NR level
	RO	Check PORVs • Isolation valves have power avail & are open • Closed <2335 psig • No evidence of leakage by downstream temps or PRT parameters TI-463, PI -472, LI470, TI-471
	BOP	• Verify SI reset, MLB-1 1-1 & 11-1 not LIT • Verify Phase A reset, MLB-2 1-1 & 11-1 not LIT • Check Phase B reset, MLB-3 1-1 & 6-1 not LIT

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	BOP	Establish Instrument air to containment • Verify at least one air compressor started: 1A, 1B, OR 1C • Air pressure on PI 4004B > 85 psig • IA to ctmt avail: MLB-3 1-2 NOT lit • KD1, IA TO PENE RM PRESS LO clear ○ OR ○ HV3825, 3885, & 3611 open on BOP
	RO or BOP	• Check RHR RWST suctions opened • Checks RCS > 275 psig • Stops both RHR pumps
	BOP	WHEN hottest CETCs less than required, THEN STOP RCS cooldown AND Maintain CETCs less than required temperature
	BOP	Checks ruptured SG pressure stable or rising: YES
	RO	Check Sub Cooled Margin Monitor > 36°F in CETC mode
CRITICAL TASK: (BOP) Perform a RCS depressurization to minimize break flow before water enters the main steam line of the ruptured SG.		

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO	Reduces RCS pressure to minimize break flow and refill pressurizer • Opens B RCP spray 100% demand • Announces spray is ineffective when pressure drop rate slows • Opens one PORV • Closes B Spray and PORV WHEN: ○ RCS Pressure < ruptured SG pressure AND pressurizer lvl > 13 % ○ OR Pressurizer level > 73% ○ OR Subcooled Margin Monitor < 16°F
	RO or BOP	Checks RCS pressure rising on PI-402A & 403A
		NRC Discretion: can terminate here or continue
	RO or BOP	Checks SI termination criteria • Checks Subcooled Margin Monitor > 16°F • Verify AFW > 395 gpm ○ OR intact SG NR level > 31% • Check RCS pressure Stable or rising • Check pressurizer level >13%
	RO	• Stops all but one charging pump

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	RO	Isolate HHSI flow • Check open RWST chg pump suctions LCV115B & D • Verify open all 4 CHG miniflows: MOVs 8109A, B, & C, & 8106 • Close HHSI iso valves MOV8803A & B
	RO	Establish normal charging • Manually close FK-122 • Verify Charging discharge path aligned MOVs open: 8132A, 8132B, 8133A, 8133B, 8107, 8108 • Verify CHG line - one only open (norm or alt): HV8146 OR HV8147 • Adjust FK-122 as necessary in man or auto to maintain pressurizer level 15%-50% • IF required to maintain pressurizer level, THEN start another charging pump
	RO	Verify SI flow not required • Checks Subcooled Margin Monitor > 16°F • Check pressurizer level >13%
	RO	• Adjust BORIC ACID MKUP FLOW FK-113 pot setting > cold shutdown boron concentration. • Verify reactor makeup system in Auto: ○ MKUP MODE SEL SWITCH IN AUTO ○ MKUP MODE CONT SWITCH in Start & back to auto

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior

	RO	WHEN pressurizer level >25% [50%], THEN establish letdown per EEP-3.0, step 27 (attached)
	RO	28 Align charging pump suction to VCT. CHG PMP SUCTION HDR ISO ☐ Q1E21MOV8130A open ☐ Q1E21MOV8130B open ☐ Q1E21MOV8131A open ☐ Q1E21MOV8131B open VCT OUTLET ISO ☐ Q1E21LCV115C open ☐ Q1E21LCV115E open RWST TO CHG PUMP ☐ Q1E21LCV115B closed ☐ Q1E21LCV115D closed 1A(1B) RHR HX TO CHG PUMP SUCT ☐ Q1E11MOV8706A closed ☐ Q1E11MOV8706B closed

Op-Test No.: HLT-31 NRC Scenario No.: 3 Event No.: 7

Event Description: The team should identify that NO AFW is available. 1A MDAFWP won't start from the MCB, TDAFW will not auto start, must be started in order to supply AFW. SG levels will be adequate for a heat sink and initially, NO AFW Pump will be required to be started. If the TDAFW pump is NOT started initially, it will be started later when the cooldown commences. AFW flow will be established after starting the TDAFW pump from the MCB. If desired, the SS may direct starting 1A MDAFWP from the HSP. (CT Verify AFW flow greater than 395 gpm or SG level > 31% [48%])

Terminate when 1C SG cooldown and depressurization to stop break flow complete

Time	Position	Applicant's Actions or Behavior
	BOP	___29 [CA] <u>WHEN</u> RCS pressure LESS THAN 700 psig. <u>THEN</u> Isolate accumulators. 29.1 Check the following indications. • Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F(45°F) SUBCOOLED IN CETC MODE. • Check pressurizer level - GREATER THAN 13%(43%). 29.2 Check power to discharge valves - AVAILABLE. 1A(1B,1C) ACCUM DISCH ISO ☐ Q1E21MOV8808A ☐ Q1E21MOV8808B ☐ Q1E21MOV8808C 29.3 Close all SI accumulator discharge valves. 1A(1B,1C) ACCUM DISCH ISO ☐ Q1E21MOV8808A ☐ Q1E21MOV8808B ☐ Q1E21MOV8808C
	RO & BOP	Control RCS parameters to minimize RCS to secondary leakage per EEP-3, step 30 (attached)
terminate scenario when parameter control strategy is determined		

Attached Procedures

ARP MK5 steps 5-8

ACTION EXPECTED

5. Additional walk-downs
 - Contact Corporate Farley Plant Support and request that a plant walk-down be conducted per step 5.3.2 of EPRI Guideline NP-6695.
 - Contact Plant Farley Maintenance to initiate actions for the Dry Fuel Storage (DFS) per the appropriate section of FNP-0-MP-112.1, DFS EQUIPMENT MALFUNCTION GUIDANCE.
6. Generate a Condition Report to have the following instrumentation calibrated:
 - 6.1 RHR miniflow indicating switches
 - Q1E11FIS602A 1A RHR
 - Q1E11FIS602B 1B RHR
 - Q2E11FIS602A 2A RHR
 - Q2E11FIS602B 2B RHR
 - 6.2 SW to TB Flow Hi Diff Switches
 - Q1P16PDS565
 - Q1P16PDS566
 - Q1P16PDS568
 - Q1P16PDS569
 - Q2P16PDS565
 - Q2P16PDS566
 - Q2P16PDS568
 - Q2P16PDS569
 - 6.3 AFW Flow Transmitters:
 - Q1N23FT3229A
 - Q1N23FT3229B
 - Q1N23FT3229C
 - Q2N23FT3229A
 - Q2N23FT3229B
 - Q2N23FT3229C

Attached Procedures

ARP MK5 steps 5-8

ACTION EXPECTED**6.4 RCS WR Press Transmitters**

- Q1B21PT402
- Q1B21PT403
- Q2B21PT402
- Q2B21PT403

6.5 FDWTR Flow Transmitters

- N1C22FT476
- N1C22FT477
- N1C22FT486
- N1C22FT487
- N1C22FT496
- N1C22FT497
- N2C22FT476
- N2C22FT477
- N2C22FT486
- N2C22FT487
- N2C22FT496
- N2C22FT497

6.6 PZR Press to OTDT Gain Pots

- N1B13TY412FP1
- N1B13TY422FP1
- N1B13TY432FP1
- N2B13TY412FP1
- N2B13TY422FP1
- N2B13TY432FP1

6.7 NCH Cards

- N1B13NY412C
- N1B13NY422C
- N1B13NY432C
- N2B13NY412C
- N2B13NY422C
- N2B13NY432C

Attached Procedures

ARP MK5 steps 5-8

ACTION EXPECTED

6.8 NIS to OTDT Gain Pots

- N1B13NY412AP1
- N1B13NY412AP2
- N1B13NY422AP1
- N1B13NY422AP2
- N1B13NY432AP1
- N1B13NY432AP2
- N2B13NY412AP1
- N2B13NY412AP2
- N2B13NY422AP1
- N2B13NY422AP2
- N2B13NY432AP1
- N2B13NY432AP2

6.9 NCH Cards

- N1B13NY412C
- N1B13NY422C
- N1B13NY432C
- N2B13NY412C
- N2B13NY422C
- N2B13NY432C

6.10 PRESSURIZER Pressure Xmitters:

- Q1B31PT0455
- Q1B31PT0456
- Q1B31PT0457
- Q2B31PT0456

6.11 STEAM Flow Transmitters:

- Q1C22FT0474
- Q1C22FT0475
- Q1C22FT0484
- Q1C22FT0485
- Q1C22FT0494
- Q1C22FT0495

Attached Procedures

ARP MK5 steps 5-8

ACTION EXPECTED

7. Generate a Condition Report for the following transmitters to be evaluated at steady state operation for pre-seismic and post-seismic to determine if post-event calibration is necessary.

7.1 RCS Flow Transmitters:

- Q1B21FT0414
- Q1B21FT0415
- Q1B21FT0416
- Q1B21FT0424
- Q1B21FT0425
- Q1B21FT0426
- Q1B21FT0434
- Q1B21FT0435
- Q1B21FT0436
- Q2B21FT0414
- Q2B21FT0415
- Q2B21FT0416
- Q2C22FT0424
- Q2B21FT0425
- Q2B21FT0426
- Q2B21FT0434
- Q2B21FT0435
- Q2B21FT0436

7.2 STEAM Pressure Transmitters:

- Q1N11PT0474
- Q1N11PT0475
- Q1N11PT0476
- Q1N11PT0484
- Q1N11PT0485
- Q1N11PT0486

Attached Procedures

ARP MK5 steps 5-8

ACTION EXPECTED

- Q1N11PT0494
- Q1N11PT0495
- Q1N11PT0496
- Q2N11PT0474
- Q2N11PT0475
- Q2N11PT0476
- Q2N11PT0484
- Q2N11PT0485
- Q2N11PT0486
- Q2N11PT0494
- Q2N11PT0495
- Q2N11PT0496

7.3 TURBINE IMPULSE Pressure

Transmitters:

- Q1N11PT0446
- Q1N11PT0447
- Q2N11PT0446
- Q2N11PT0447

8. Ensure that surveillance requirements are performed on seismic instrumentation as required by FSAR Chapter 16.

Attached Procedures

SOP-2.3 app. B & C

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UNIT 1

FNP-1-SOP-2.3
Appendix B

APPENDIX B

OPERATOR AID FOR BORATION AND DILUTION

1.0 Boration

NOTE: The Boric Acid Integrator ONLY needs to be verified when changed. This should be documented with an Autolog Entry.

- ☐ ☐ ☐ ☐ 1.1 IF necessary, THEN set the boric acid integrator to the desired quantity.
- ☐ ☐ ☐ ☐ 1.2 IF necessary, THEN adjust LTDN TO VCT FLOW LK 112 setpoint as desired.
- ☐ ☐ ☐ ☐ 1.3 Position the MKUP MODE CONT SWITCH to STOP.
- ☐ ☐ ☐ ☐ 1.4 Position the MKUP MODE SEL SWITCH to BOR.
- ☐ ☐ ☐ ☐ 1.5 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.6 Verify proper boration operation by observing the following:
- On service boric acid pump started.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - BORIC ACID TO BLENDER Q1E21FCV113A opens.
 - Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 1.7 Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows:
- Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.
 - BORIC ACID TO BLENDER Q1E21FCV113A closes.
- ☐ ☐ ☐ ☐ 1.8 If desired to clear the line of acid, perform the applicable steps of Appendix B section 2.0.

NOTE: The following three steps are not required if operation in a mode other than automatic is preferred. Refer to appendix C.

- ☐ ☐ ☐ ☐ 1.9 Position the MKUP MODE SEL SWITCH to AUTO.
- ☐ ☐ ☐ ☐ 1.10 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.11 IF LK 112 setpoint was adjusted per Step 1.2, THEN return setpoint to that required for current conditions.

Attached Procedures

SOP-2.3 app. B & C

01/03/07 15:29:30

UNIT 1

FNP-1-SOP-2.3
Appendix C

APPENDIX C

OPERATOR AID FOR REPETITIVE BORATION AND DILUTION

CAUTION: Without automatic makeup care should be taken to maintain VCT level between 26% and 61% during repetitive operation of the reactor makeup control system.

1.0 Boration

NOTE: During periods of repetitive boration evolutions, to minimize the number of start/stop cycles on the boric acid pump, the handswitch may be placed in START and allowed to return to AUTO to maintain the boric acid pump running. WHEN it is no longer desired to maintain the boric acid pump running continuously, THEN place the handswitch in STOP and return to AUTO.

- ☐ ☐ ☐ ☐ 1.1 The Reactor Makeup Control system has been previously aligned for Boration.
- ☐ ☐ ☐ ☐ 1.2 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 1.3 Verify proper boration operation by observing the following:
- On service boric acid pump started.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - BORIC ACID TO BLENDER Q1E21FCV113A opens.
 - Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 1.4 Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows:
- Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.
 - BORIC ACID TO BLENDER Q1E21FCV113A closes.

NOTE: WHEN it is no longer desired to maintain the line full of acid, THEN perform the applicable steps of Appendix B section 2.0 to flush the line.

- ☐ ☐ ☐ ☐ 1.5 IF repetitive borations are no longer required THEN verify the system is aligned for Automatic makeup per steps 1.9 through 1.11 of Appendix B.

Attached Procedures

SOP-28.1 Steps 4.12.1 - 4.12.7

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FNP-1-SOP-28.1

4.12 Main Turbine Shutdown from Minimum Load

NOTE:

- This section assumes that Turbine load has been reduced to approximately 170 MW per FNP-1-UOP-3.1, POWER OPERATION.
- When the feedback loop is placed in/out of service, Target and Demand are reset to equal Pimp. Thus any RAMP or HOLD in progress will be stopped. As a result the operator will have to reenter Target and Rate desired.

- 4.12.1 IF IMP PRESS LOOP is in service, THEN remove the feedback loop as follows.
- 4.12.1.1 Place Turbine on HOLD.
- 4.12.1.2 On the FEEDBACK STATUS DISPLAY, move the cursor to IMP PRESS LOOP IN.
- 4.12.1.3 Depress the SELECT key and verify IMP PRESS LOOP is highlighted in reverse video.
- 4.12.1.4 Depress the STOP key and verify the FEEDBACK STATUS indicates IMP PRESS OUT.
- 4.12.2 Verify that 4160V AC buses 1A, 1B, 1C, 1D, and 1E are aligned to their respective startup transformers per FNP-1-SOP-36.2, 4160V AC ELECTRICAL DISTRIBUTION SYSTEM, before performing the rest of step 4.12.
- 4.12.3 On the CONTROL SETPOINT (SETPOINT) page, set the load target at 40 MW and the desired load rate as follows:
- 4.12.3.1 Move the cursor to the TARGET field near the bottom of the main screen area.
- 4.12.3.2 Enter 40 using the numeric keypad.
- 4.12.3.3 Depress the SELECT key and verify that 40 appears under TARGET near the center of the screen and that the HOLD pushbutton on the manual panel is illuminated.
- 4.12.3.4 IF it is desired to change the load rate, THEN move the cursor to the RATE field near the bottom of the main screen area.
- 4.12.3.5 Enter the desired rate using the numeric keypad.
- 4.12.3.6 WHEN the desired rate has been entered, THEN depress the SELECT key and verify that the correct value appears next to RATE in the upper right portion of the screen.

Attached Procedures

SOP-28.1 Steps 4.12.1 - 4.12.7

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UNIT 1

FNP-1-SOP-28.1

4.12.4 Depress the GO pushbutton.

NOTE: The drain valves can be opened by placing the Turbine Drain Selector Switch in the MAN. position, and then placing the Turbine Drain Valve Switch in the OPEN position.

4.12.5 Verify automatic Turbine Drain valve opening below approximately 170 MW.

NOTE:

- The intent of the following step is to remove MSR's from operation after turbine load has been reduced below approximately 86 MW. IF plant conditions required removal of MSR's previous to this step, THEN the following actions should be verified completed.
- When the MSR's are reset in step 4.12.6.1, valves may not close if the red temperature limit light is lit on the Reheat Control Panel. Power may have to be cycled to the Reheat Control Panel N1H11NGRC2509 to reset this condition. CR 2004001032

4.12.6 WHEN Turbine load has decreased below approximately 86 MW, THEN remove MSR's from service as follows:

4.12.6.1 Depress the RESET pushbutton on the Reheater Control System Panel.

4.12.6.2 Close the second stage steam supply isolation valves.

- N1N11V503A
- N1N11V503B
- N1N11V503C
- N1N11V503D
- N1N11V619A
- N1N11V619B
- N1N11V619C
- N1N11V619D

4.12.6.3 Open second stage steam supply line drain valves.

- N1N11V573
- N1N11V574
- N1N11V575
- N1N11V576

4.12.6.4 Open the second stage steam supply ramp valve drains.

- N1N11V620
- N1N11V621
- N1N11V622
- N1N11V623

Attached Procedures

SOP-28.1 Steps 4.12.1 - 4.12.7

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UNIT 1

FNP-1-SOP-28.1

- 4.12.7 Verify that the Steam Dump is aligned for Steam Pressure Mode Operation per FNP-1-SOP-18.0, STEAM DUMP SYSTEM.

Attached Procedures

SOP-28.1 Steps 4.12.8 through 4.12.14

NOTE: IF the Auxiliary Steam System is being supplied by Unit 2, THEN consideration should be given to shifting Gland Seals and Air Ejectors to the Auxiliary Steam Header.

- 4.12.8 Start the Bearing Oil Pump by placing the Bearing Oil Pump - LC 1Q switch in the START position, and THEN allow it to spring return to the AUTO position.
- 4.12.9 Verify that the Main Turbine Shaft Lift Pump switch and the Turning Gear Starter switch are both in the AUTO position.
- 4.12.10 IF it is desired to perform FNP-1-STP-151.5 MAIN TURBINE OVERSPEED TEST OR is otherwise desired by the Operations Manager to trip the Generator before the Main Turbine, THEN go to step 4.12.12.

NOTE:

- To ensure reclosure of the generator output breakers in a timely manner (≤ 30 minutes), steps 4.12.11 through 4.12.15 should not be delayed while awaiting the execution of a tagout that carries out similar steps.
- VARS should be at zero prior to tripping the Main Turbine.

CAUTION: Ensure 4160V Buses A, B, C, D and E are energized from the startup transformers prior to tripping main turbine.

- 4.12.11 WHEN Turbine load has decreased below approximately 40 MW as indicated on WM 4087, THEN perform the following:
- 4.12.11.1 Trip the Main Turbine by placing the Main Turbine Emergency Trip switch to TRIP and hold for 5 seconds. {CMT 0007249}
- 4.12.11.2 Verify that all Throttle, Governor, Intercept, and Reheat Stop Valves close.
- 4.12.11.3 After approximately 30 seconds, verify 230 KV breakers 810 and 914 are tripped. IF the Reverse Power Light is not lit, THEN place the Reverse Power Handswitch in the BYPASS position before tripping breakers 810 and 914.
- 4.12.11.4 Verify that turbine speed is decreasing.

Attached Procedures

SOP-28.1 Steps 4.12.8 through 4.12.14

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UNIT 1

FNP-1-SOP-28.1

- 4.12.11.5 Verify all three phases of main generator breakers 810 and 914 are open by observation of generator MW, VARS and phase amps.
- 4.12.11.6 Open the Regulator Supply Breaker 41. Verify that generator voltage decreases.
- 4.12.11.7 Place the Regulator Transfer Switch in the OFF position.
- 4.12.11.8 Place the PWR SYS STABILIZER CONT SWITCH to the OFF position. (Located in the upper left-hand compartment of the Exciter Switchgear - T.B. 155')
- 4.12.11.9 Check that the green OFF light on the front of the switchgear is illuminated.

NOTE:	Unit 1 MCB annunciator LK2 illuminating in step 4.12.11.10 is different than Unit 2 MCB annunciator LK2 which would not be illuminated. MCB annunciators LK2 illuminate differently on the units for PSS inputs because the units have different PSS's.

- 4.12.11.10 Check that MCB annunciator LK2, VOLT REG TRIP/PSS OFF, alarms.
- 4.12.11.11 Remove the Isophase Bus Duct Cooling System from service per Section 4.15 of this procedure.
- 4.12.11.12 Go to step 4.12.13

Attached Procedures

SOP-28.1 Steps 4.12.8 through 4.12.14

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UNIT 1

FNP-1-SOP-28.1

CAUTION: Monitor turbine speed when taking main generator off line to ensure turbine speed is controlled ~ 1800 RPM after the generator output breakers are opened.

CAUTION: Ensure 4160V Buses A, B, C, D, and E are energized from the startup transformers prior to tripping generator output breakers.

NOTE:

- To ensure reclosure of the generator output breakers in a timely manner (≤ 30 minutes), steps 4.12.12 through 4.12.15 should not be delayed while awaiting the execution of a tagout that carries out similar steps.
- VARS should be at zero prior to opening the generator output breakers.

4.12.12 WHEN Turbine load has decreased below approximately 40 MW as indicated on WM 4087, THEN open 230 KV breakers 810 and 914 as follows:

4.12.12.1 Place the PWR SYS STABILIZER CONT SWITCH to the OFF position. (Located in the upper left-hand compartment of the Exciter Switchgear - T.B. 155')

4.12.12.2 Check that the green OFF light on the front of the switchgear is illuminated.

NOTE: Unit 1 MCB annunciator LK2 illuminating in step 4.12.12.3 is different than Unit 2 MCB annunciator LK2 which would not be illuminated. MCB annunciators LK2 illuminate differently on the units for PSS inputs because the units have different PSS's.

4.12.12.3 Check that MCB annunciator LK2, VOLT REG TRIP/PSS OFF, alarms.

4.12.12.4 Verify the REVERSE POWER handswitch in the BYPASS position.

4.12.12.5 Trip 230 KV breakers 810 and 914.

4.12.12.6 Verify turbine speed is controlled ~ 1800 RPM. IF turbine speed approaches the overspeed trip setpoint (≤ 1998 RPM), THEN place the turbine emergency trip switch to the trip position and hold for at least 5 seconds. {CMT 0007249}

4.12.12.7 Verify all three phases of main generator breakers 810 and 914 are open by observation of generator MW, VARS, phase amps and synch scope action.

Attached Procedures

SOP-28.1 Steps 4.12.8 through 4.12.14

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UNIT 1

FNP-1-SOP-28.1

- 4.12.12.8 Remove the Isophase Bus Duct Cooling System from service by opening EP-17 on the Main Control Board.

CAUTION: To prevent possible turbine trip that could occur if the regulator does not null out properly, perform step 4.12.12.10 without delay after completion of step 4.12.12.9.

NOTE: To raise voltage on Reg Balance Meter VM4098, the Man Voltage Adjust switch should be taken to lower.

- 4.12.12.9 Using the Manual Voltage Adjust Switch, null (zero) the regulator balance voltmeter, THEN place the Regulator Transfer Switch in the OFF position.
- 4.12.12.10 Using the Manual Voltage Adjust Switch, adjust generator output voltage to approximately 22KV as indicated on analog voltmeter 4099 or digital voltmeter 5122.
- 4.12.12.11 IF it is desired to perform FNP-1-STP-151.5, MAIN TURBINE OVERSPEED TEST, THEN perform the following:
- 4.12.12.11.1 Open the Regulator Supply Breaker 41. Verify that generator voltage decreases.
- 4.12.12.11.2 WHEN approximately 5 minutes has elapsed since opening the 41 breaker, THEN trip the 600V feeder breaker to the Main Transformer Cooling Supply A and B (EP-16 and EQ-06).
- 4.12.12.11.3 Perform FNP-1-STP-151.5, MAIN TURBINE OVERSPEED TEST.
- 4.12.12.11.4 Proceed to step 4.12.12.13.
- 4.12.12.12 Trip the Main Turbine by placing the Main Turbine Emergency Trip switch to TRIP and hold for 5 seconds. {CMT 0007249}
- 4.12.12.13 Verify that all Throttle, Governor, Intercept, and Reheat Stop Valves close.
- 4.12.12.14 Verify that turbine speed is decreasing.
- 4.12.12.15 Open or verify open the Regulator Supply Breaker 41. Verify that generator voltage decreases.

Attached Procedures

SOP-28.1 Steps 4.12.8 through 4.12.14

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UNIT 1

FNP-1-SOP-28.1

NOTE: The performance of this procedure may continue while waiting to perform step 4.12.13.

4.12.13 IF FNP-1-STP-151.5, MAIN TURBINE OVERSPEED TEST not performed per step 4.12.12.11, THEN perform the following:

4.12.13.1 WHEN approximately 5 minutes has elapsed since opening the 41 breaker, THEN trip the 600V feeder breaker to the Main Transformer Cooling Supply A and B (EP-16 and EQ-06).

NOTE:

- The tagout for the Generator Motor Operated Disconnect has to be implemented only if the generator is to remain off-line for a significant amount of time (on the order of > 8 hours).
- The remainder of this section can be performed in parallel while returning to the applicable procedure and step in effect. (Example would be a UOP).

4.12.14 Dispatch personnel to open disconnect switch 915 in accordance with FNP-0-SOP-36.8, HIGH VOLTAGE SWITCHYARD ACTIVITIES.

Attached Procedures

AOP-16, Restoration of letdown:

.....

CAUTION: To prevent heat exchanger damage, do not attempt restoration of letdown unless the CCW miscellaneous header is aligned to an operating CCW loop.

.....

— 8 Determine if normal letdown should be re-established:

8.1 Check normal letdown malfunction(s) - CORRECTED

8.1 Continue actions to restore normal letdown, and proceed to step 9.0.

— 8.2 Verify all letdown orifice isolation valves - CLOSED

LTDN ORIF ISO
45 GPM

☐ Q1E21HV8149A

LTDN ORIF ISO
60 GPM

☐ Q1E21HV8149B

☐ Q1E21HV8149C

— 8.3 Place LP LTDN PRESS PK 145 on service:

☐ Place controller in MANUAL

☐ Adjust demand signal to 50% or less

— 8.4 Place LTDN HX OUTLET TEMP TK 144 on service:

☐ Place controller in AUTO

☐ Set at 3.3 to maintain temperature at approximately 100°F

— 8.5 Verify VCT HI LVL DIVERT VLV LCV-115A alignment:

☐ Position indicator VCT light - LIT

☐ Handswitch in - AUTO

Step 8 continued on next page.

Attached Procedures

AOP-16, Restoration of letdown:

Step	Action/Expected Response	Response NOT Obtained
☐		
8.6	Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: ☐ DEMIN light - LIT ☐ Handswitch in - AUTO	
8.7	Verify LTDN LINE PENE RM ISO's valves - OPEN ☐ Q1E21HV8175A ☐ Q1E21HV8175B	
8.8	Verify LTDN LINE CTMT ISO Q1E21HV8152 - OPEN	
8.9	Verify LTDN LINE ISO valves - OPEN ☐ Q1E21LCV459 ☐ Q1E21LCV460	
8.10	Initiate minimum charging flow:	
8.10.1	Verify CHG FLOW FK 122 in - MAN	
8.10.2	Establish minimum charging flow based on orifices to be placed on service: • 1 Orifice - 18 gpm <u>OR</u> • 2 Orifices - 40 gpm	
8.11	Establish approximately 60 gpm letdown flow by OPENING: ☐ Q1E21HV8149B <u>OR</u> ☐ Q1E21HV8149C	8.11 <u>IF</u> no letdown flow can be established. <u>THEN</u> proceed to Step 9.

Attached Procedures

AOP-16, Restoration of letdown:

Step	Action/Expected Response	Response NOT Obtained
8.12	Adjust LP LTDN PRESS PK 145 to maintain desired letdown pressure - BETWEEN 260-450 PSIG	8.12 <u>IF</u> necessary, <u>THEN</u> adjust LP LTDN PRESS PK 145 in MANUAL to stabilize Letdown Pressure at desired value.
8.12.1	Set controller between 4.3 and 7.5	
8.12.2	Check letdown flow - STABLE	
8.12.3	Place PK 145 in AUTO	
8.12.4	Control Letdown pressure as desired	
8.13	Control LTDN HX OUTLET TEMP TK 144 to maintain Letdown temperature at approximately 100 F: [] TI-116 VCT TEMP [] TI-143 DIVERT LTDN HX TEMP [] TI-144 CCW LTDN HX TEMP	
8.14	Refer to FNP-1-SOP-2.1, <u>CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION</u> , for further guidance on Letdown system control	

Attached Procedures

Operator aid from MCB for letdown (from SOP-2.1 figure 2)

Figure 2

PLACING SECOND LTDN ORIFICE ON SERVICE DURING
TRANSIENT CONDITIONS

1. Place FK-122 in MANUAL and adjust to > 80 gpm.
2. Place PK-145 in MANUAL and adjust to $\leq 50\%$.
3. Open LTDN ORIF ISO 45 GPM, Q1E21HV8149A
4. Establish desired LTDN pressure and return PK_145 to AUTO.(260-450 psig)
5. Restore FK-122 to AUTO when desired.
6. Refer to SOP-2.1 when time permits.

REMOVING SECOND LTDN ORIFICE FROM SERVICE

1. Place FK-122 in MANUAL and adjust < 80 gpm.
2. Close LTDN ORIF ISO 45 GPM, Q1E21HV8149A.
3. Place FK-122 in AUTO when desired
4. Refer to SOP-2.1 when time permits.

Ref: FNP-1-SOP-2.1

Attached Procedures

EEP-0 ATT 2

AUTOMATIC ACTIONS VERIFICATION

- 1 **Verify each SW train - HAS TWO
 SW PUMPS STARTED.**

☐ A train (1A, 1B or 1C)
☐ B train (1D, 1E or 1C)

- 2 **Verify each train of CCW -
 STARTED.**

- 2.1 **Verify one CCW PUMP in each
 train- STARTED.**

A train HX 1C or 1B
CCW FLOW

☐ FI 3043CA > 0 gpm
 OR

☐ FI 3043EA > 0 gpm

B train HX 1A or 1B
CCW FLOW

☐ FI 3043AA > 0 gpm
 OR

☐ FI 3043BA > 0 gpm

- 2.2 **Verify SW flow to associated
 CCW HX's.**

SW FROM 1A(1B, 1C)
CCW HX

☐ Q1P16FI3009AA > 0 gpm
☐ Q1P16FI3009BA > 0 gpm
☐ Q1P16FI3009CA > 0 gpm

- 2.2 **Throttle open SW to the
 associated CCW HX's.**

☐ Q1P16FV3009A
☐ Q1P16FV3009B
☐ Q1P16FV3009C

- 3 **Verify one CHG PUMP in each
 train - STARTED.**

☐ A train (1A or 1B) amps > 0
☐ B train (1C or 1B) amps > 0

Attached Procedures

EEP-0 ATT 2

4 Verify RHR PUMPS - STARTED.

RHR PUMP

☐ 1A amps > 0☐ 1B amps > 0

5 Verify Safety Injection Flow.

5.1 Check HHSI flow - GREATER THAN
0 gpm.☐ FI 943

5.1 Verify proper SI alignment.

CHG PUMPS TO

REGENERATIVE HX

☐ Q1E21MOV8107 closed☐ Q1E21MOV8108 closed

RWST

TO CHG PUMP

☐ Q1E21LCV115B open☐ Q1E21LCV115D open

VCT

OUTLET ISO

☐ Q1E21LCV115C closed☐ Q1E21LCV115E closed

HHSI TO

RCS CL ISO

☐ Q1E21MOV8803A open☐ Q1E21MOV8803B open

CHG PUMP

SUCTION HDR ISO

☐ Q1E21MOV8130A open☐ Q1E21MOV8130B open☐ Q1E21MOV8131A open☐ Q1E21MOV8131B open

CHG PUMP

DISCH HDR ISO

☐ Q1E21MOV8132A open☐ Q1E21MOV8132B open☐ Q1E21MOV8133A open☐ Q1E21MOV8133B open

Attached Procedures

EEP-0 ATT 2

5.2 Check RCS pressure - LESS THAN
275 psig(435 psig).

1C(1A) LOOP
RCS WR PRESS
☐ PI 402B
☐ PI 403B

5.3 Check LHSI flow - GREATER THAN
 1.5×10^3 gpm.

1A
RHR HDR
FLOW

☐ FI 605A

1B
RHR HDR
FLOW

☐ FI 605B

5.2 Proceed to Step 6.

5.3 Verify proper RHR alignment.

RWST TO
1A(1B) RHR PUMP
☐ Q1E11MOV8809A open
☐ Q1E11MOV8809B open

CTMT SUMP TO
1A(1B) RHR PUMP
☐ Q1E11MOV8811A closed
☐ Q1E11MOV8812A closed
☐ Q1E11MOV8811B closed
☐ Q1E11MOV8812B closed

1C(1A) RCS LOOP TO
1A(1B) RHR PUMP
☐ Q1E11MOV8701A closed
☐ Q1E11MOV8702A closed
☐ Q1E11MOV8701B closed
☐ Q1E11MOV8702B closed

RHR TO RCS HOT LEG
XCON
☐ Q1E11MOV8887A open
☐ Q1E11MOV8887B open

1A(1B) RHR HX
TO CHG PUMP SUCT
☐ Q1E11MOV8706A closed
☐ Q1E11MOV8706B closed

1A(1B) RHR HX
DISCH VLV
☐ HIK 603A open
☐ HIK 603B open

1A(1B) RHR HX
BYP FLOW VLV
☐ FK 605A closed
☐ FK 605B closed

Attached Procedures

EEP-0 ATT 2

ATTACHMENT 2

6 Verify containment ventilation
 isolation.6.1 Verify containment purge
 dampers - CLOSED.

- ☐ 3197
- ☐ 3198D
- ☐ 3198C
- ☐ 3196
- ☐ 3198A
- ☐ 3198B

6.2 Verify containment mini purge
 dampers - CLOSED.

CTMT PURGE DMPRS
MINI-2866C & 2867C
FULL-3198A & 3198D

- ☐ 2866C
- ☐ 2867C

CTMT PURGE DMPRS
MINI-2866D & 2867D
FULL-3196 & 3197
BOTH-3198B & 3198C

- ☐ 2866D
- ☐ 2867D

6.3 Stop MINI PURGE
 SUPP/EXH FAN.

Attached Procedures

EEP-0 ATT 2

- 7 Verify containment fan cooler alignment.

- 7.1 Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.

CTMT CLR FAN
SLOW SPEED

- A train

☐ 1A

☐ 1B

- B train

☐ 1C

☐ 1D

- 7.2 Verify associated emergency service water outlet valves - OPEN.

EMERG SW FROM
1A(1B,1C,1D) CTMT CLR

☐ Q1P16MOV3024A

☐ Q1P16MOV3024B

☐ Q1P16MOV3024C

☐ Q1P16MOV3024D

Attached Procedures

EEP-0 ATT 2

8 Verify AFW Pumps - STARTED.

8.1 Verify both MDAFW Pumps -
STARTED

- ☐ 1A MDAFW Pump amps > 0
- ☐ 1B MDAFW Pump amps > 0

AND

- ☐ FI-3229A indicates > 0 gpm
- ☐ FI-3229B indicates > 0 gpm
- ☐ FI-3229C indicates > 0 gpm

8.1 Verify MDAFW Pumps deliver
flow to each SG.

8.1.1 Manually start MDAFW Pumps

8.1.2 Verify AFW flow path to
each SG.

MDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3227A in MOD
- ☐ Q1N23HV3227B in MOD
- ☐ Q1N23HV3227C in MOD

MDAFWP TO 1A(1B,1C) SG
FLOW CONT

- ☐ HIC 3227AA open
- ☐ HIC 3227BA open
- ☐ HIC 3227CA open

AFW TO 1A(1B,1C) SG
STOP VLV

- ☐ Q1N23MOV3350A open
- ☐ Q1N23MOV3350B open
- ☐ Q1N23MOV3350C open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764A open
- ☐ Q1N23MOV3764D open
- ☐ Q1N23MOV3764F open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764E open
- ☐ Q1N23MOV3764B open
- ☐ Q1N23MOV3764C open

Attached Procedures

EEP-0 ATT 2

8.2 Check TDAFW Pump start required.

8.2 IF TDAFW pump NOT needed, THEN proceed to Step 9.

Condition	TSLB	Set-point	Coincidence
RCP Bus Under-voltage	TSLB2 1-1 1-2 1-3	2680 V	1/2 Detectors on 2/3 Busses
Low Low SG Water Level In Any 2/3 SGs	TSLB4 4-1.4-2.4-3 5-1.5-2.5-3 6-1.6-2.6-3	28%	2/3 Detectors on 2/3 SGs

8.3 Verify TDAFWP started.

- ☐ MLB-4 1-3 lit
- ☐ MLB-4 2-3 lit
- ☐ MLB-4 3-3 lit

TDAFWP SPEED

- ☐ SI 3411A > 3900 rpm

TDAFWP

SPEED CONT

- ☐ SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.

TDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3228A in MOD
- ☐ Q1N23HV3228B in MOD
- ☐ Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG

FLOW CONT

- ☐ HIC 3228AA open
- ☐ HIC 3228BA open
- ☐ HIC 3228CA open

Attached Procedures

EEP-0 ATT 2

9 Verify main feedwater status.

- 9.1 Verify main feedwater flow control and bypass valves - CLOSED.

1A(1B.1C) SG

FW FLOW

☐ PCV 478

☐ PCV 488

☐ PCV 498

1A(1B.1C) SG

FW BYP FLOW

☐ PCV 479

☐ PCV 489

☐ PCV 499

- 9.2 Verify both steam generator feed pumps - TRIPPED.

- 9.3 Verify SG blowdown - ISOLATED.

1A(1B.1C) SCBD

ISO

☐ Q1G24HV7614A closed

☐ Q1G24HV7614B closed

☐ Q1G24HV7614C closed

- 9.4 Verify SG blowdown sample ISOLATED MLB lights lit.

1A(1B.1C) SCBD SAMPLE

ISO

☐ MLB1 19-2 lit Q1P15HV3328 closed

☐ MLB1 19-3 lit Q1P15HV3329 closed

☐ MLB1 19-4 lit Q1P15HV3330 closed

- 9.1 Verify main feedwater stop valves closed.

MAIN FW TO 1A(1B.1C) SG

STOP VLV

☐ Q1N21MOV3232A

☐ Q1N21MOV3232B

☐ Q1N21MOV3232C

- 9.2 Stop both EH PUMPs.

- 9.4 Locally verify SCBD sample - isolated (BOP).

STEAM GEN 1A(1B.1C) SAMPLE

ISO

☐ Q1P15HV3328 closed

☐ Q1P15HV3329 closed

☐ Q1P15HV3330 closed

OR

Locally verify SCBD sample - isolated (PRIP).

STEAM GEN 1A(1B.1C) SAMPLE ISO

☐ Q1P15HV3179C closed

☐ Q1P15HV3180C closed

☐ Q1P15HV3181C closed

Attached Procedures

EEP-0 ATT 2

- 10 Check no main steam line isolation actuation signal present.

Signal	Setpoint	Coincidence	TSLB
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2 19-3 19-4
HI STEAM FLOW	> 40%	1/2 ON 2/3	TSLB4 16-3 16-4 17-3 17-4 18-3 18-4
<u>AND</u> LO-LO TAVG	< 543°F	2/3	TSLB2 10-1 10-2 10-3
HI-HI CTMT PRESS	>16.2 psig	2/3	TSLB1 2-2 2-3 2-4

- 10 Perform the following.

- 10.1 Verify main steam line isolation and bypass valves closed.

1A(1B,1C) SG
MSIV - TRIP
☐ Q1N11HV3369A
☐ Q1N11HV3369B
☐ Q1N11HV3369C
☐ Q1N11HV3370A
☐ Q1N11HV3370B
☐ Q1N11HV3370C

1A(1B,1C) SG
MSIV - BYP
☐ Q1N11HV3368A
☐ Q1N11HV3368B
☐ Q1N11HV3368C
☐ Q1N11HV3976A
☐ Q1N11HV3976B
☐ Q1N11HV3976C

- 10.2 IF any main steam isolation valve open.
THEN place the associated test switch in the TEST position.

SG	1A	1B	1C
1A(1B,1C) SG MSIV - TEST Q1N11HV	☐ 3369A/ 70A	☐ 3369B/ 70B	☐ 3369C/ 70C

Attached Procedures

EEP-0 ATT 2

11 Verify PHASE A CTMT ISO.

11.1 Verify PHASE A CTMT ISO -
 ACTUATED.

- ☐ MLB-2 1-1 lit
- ☐ MLB-2 11-1 lit

NOTE: The turbine building SW isolation valves Q1P16V515, 517, 514 and 516
 will take approximately two minutes to fully stroke closed.

11.2 Check all MLB-2 lights - LIT.

11.2 Verify PHASE A CTMT ISO
 alignment using ATTACHMENT 3,
 PHASE A CONTAINMENT ISOLATION.

12 Check all reactor trip and
 reactor trip bypass breakers -
 OPEN.

12 Perform the following.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

12.1 Open reactor trip breaker(s)
 manually from MCB or locally.

12.2 Record any breaker(s) manually
 opened.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

13 Trip CRDM MG set supply
 breakers.

- 1A(1B) MC SET
SUPP BKR
- ☐ N1C11E005A
 - ☐ N1C11E005B

Attached Procedures

EEP-0 ATT 2

14 Secure secondary components.

14.1 Stop both heater drain pumps.

HDP

☐ 1A☐ 1B

14.2 Check any condensate pump started.

14.2.1 IF started.

THEN stop all but one condensate pump.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

14.2.1 IF no condensate pumps are started.

THEN ensure handswitches positioned to STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C14.3 IF condensate pump operating.
THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO ACTIONS FOLLOWING A REACTOR TRIP OR SAFETY INJECTION.

14.3 Ensure all condensate pump handswitches positioned to STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

15 Verify both CRACS mode selector switches in the ON position.

CRACS Mode Selector Switch

☐ A TRAIN☐ B TRAIN

16 Verify two trains of ECCS equipment aligned.

16.1 Perform ATTACHMENT 4, TWO TRAIN ECCS ALIGNMENT VERIFICATION.

-END-

Attached Procedures

EEP-3, STEP 27

27 [CA] WHEN pressurizer level
greater than 25%(50%).
THEN establish letdown.

CAUTION: To prevent heat exchanger damage, do not attempt restoration of
letdown or excess letdown unless the CCW miscellaneous header is
aligned to an operating CCW loop.

27.1 IF charging flow path aligned.
THEN establish normal letdown.

27.1 Establish excess letdown.

a) Align CCW to excess
letdown heat exchangers.

CCW TO EXC
LTDN/RCDT HXS

☐ Q1P17HV3095 open

CCW FROM EXC
LTDN/RCDT HXS

☐ Q1P17HV3067 open

☐ Q1P17HV3443 open

b) Adjust EXC LTDN HX DISCH
HIK 137 closed.

Step 27 continued on next page.

Page Completed

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Attached Procedures

EEP-3, STEP 27

NOTE: It is permissible to assume that the LTDN LINE PENE RM ISO valves are open if there has been no automatic closure signal or loss of instrument air. Position will be verified by indication of letdown flow.

27.1.1 Open letdown isolation valves.

LTDN LINE
PENE RM ISO

- ☐ Q1E21HV8175A (PRIP)
- ☐ Q1E21HV8175B (PRIP)

LTDN LINE
CTMT ISO

- ☐ Q1E21HV8152

LTDN LINE
ISO

- ☐ Q1E21LCV459
- ☐ Q1E21LCV460

27.1.2 Open charging flow control valve FK-122 as necessary to obtain minimum charging flow for letdown cooling.

CHG FLOW

- ☐ FK 122 manually adjusted

27.1.3 Manually adjust LP LTDN PRESS PK 145 to 50% open.

Step 27 continued on next page.

____Page Completed

Attached Procedures

EEP-3, STEP 30

CAUTION: To prevent release of radioactivity to the environment, RCS and ruptured SG(s) pressures must be maintained less than the ruptured SG(s) atmospheric relief valve setpoint (1035 psig).

30 [CA] Control RCS parameters to minimize RCS to secondary leakage.

30.1 Perform appropriate action(s) from table.

		RUPTURED SG(s) LEVEL		
		Rising	Falling	Offscale high
P R Z R L E V E L	Less than 25%(50%)	• Raise charging flow. • Reduce RCS pressure.	• Raise charging flow.	• Raise charging flow. • Maintain RCS and ruptured SG(s) pressures equal.
	Between 25%(50%) and 60%(60%)	• Reduce RCS pressure.	• Turn on PRZR heaters.	• Maintain RCS and ruptured SG(s) pressures equal.
	Between 60%(60%) and 73%(66%)	• Reduce RCS pressure. • Reduce charging flow.	• Turn on PRZR heaters.	• Maintain RCS and ruptured SG(s) pressures equal.
	Greater than 73%(66%)	• Reduce charging flow.	• Turn on PRZR heaters.	• Maintain RCS and ruptured SG(s) pressures equal.

Step 30 continued on next page.

Page Completed

DRAFT

Facility: Farley Scenario No.: 4 Op-Test No.: 2007301Examiners: Frank Ehrhardt Operators: _____Jay Hopkins _____Craig Kontz _____Initial Conditions: 4% RTP, EOL, **B** train o/s, **B** train protected, with A SGFP O/S, 528 ppm Cb, 18,000 MWD, Xe building inTurnover:

- 4% EOL B train o/s with A SGFP O/S, 528 ppm Cb, 18,000 MWD, Xe building in, no LCOs preventing mode 1 entry
- CTMT batch release – last release 2 days ago,
- Current Risk Assessment is **GREEN** and projected to remain **GREEN**,
- Plant start-up is on hold for turnover and will recommence after turnover,
- B Train On-Service – B Train Protected,
- 1A SGFP is on service, transfer to main feed main feed bypass valves is complete,
- UOP-1.2 is complete up to step 5.55,
- 1C DG T/O for slow start investigation,
- Rod K-6 has data B indication problem and DRPI has been placed in Data "A" only.
- MOV-3024B, Emergency SW from 1B Ctmt Cooler is closed and tagged; suspect a bad breaker; work being planned,
- ADMIN LCOs; 3.1.7 (DRPI indication) & 3.6.6 (1B CTMT cooler MOV-3024B), 3.8.1 (1C DG)
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1		N (RO & BOP)	Commence Ramp up from 4%
2	1	I (BOP) TS (SRO)	PT-3371B fails high, B SG Pressure, B SG Atmospheric opens, man control required
3	2	I (RO) TS (SRO) N (BOP)	LT-459 fails low, controlling Pressurizer level channel, charging in man required Letdown is restored
4	3	I (BOP)	PT-464 fails high, Steam Header Pressure, Steam dumps open until shut by P-12, SGFP speed increases, Man control required
5	4	TS (SRO) C (RO)	An RCS 75 GPM leak develops

6	5	C (RO)	The control system for the "A" loop spray valve (PCV-444C) fails. The spray valve sticks open
7		M (ALL) C (No actions)	After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0 1B DG fails to auto start.
8	6	C (BOP)	HHSI MOVs 8803A & B also fail to open
9		M (ALL)	Dual unit LOSP at step 15 of EEP-0, ECP-0.0, Loss of All AC Power, entry required
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

SCENARIO 4 Summary sheet

Initial Conditions:

- 4% EOL B train o/s with A SGFP O/S, 528 ppm Cb, 18,000 MWD, Xe building in
- Plant start up is complete up to step 5.55 of UOP-1.2.
- A SGFP is on service, transfer to main feed main feed bypass valves is complete.
- Rod K-6 has data B indication problem and DRPI has been placed in Data "A" only.
- 1B CTMT cooler MOV-3024B is tagged because of a bad breaker. The valve is closed, and work order is being planned.
- The startup is on hold for turnover, and will recommence as soon as turnover is complete.
- 1C DG is T/O for slow start investigation.

Presets:

Event No.	Event Type*	Event Description
0	preset	breaker for MOV-3024B racked out
0	preset	1C DG T/O
4	Preset	DRPI failure on Data B cabinet inside ctmt
7	preset	pressurizer spray valve sticks at 100% after opening
9	preset	HHSI valves 8803a & b will not auto open
10	preset	1B DG fails to Auto Start

Event 1 Commence Ramp up from 4%

N actions: RO uses rods to increase power, BOP increases AFW flow & Steam dump setpoint as necessary to maintain SG levels and Tavg <554°F

- Event 2 PT-3371B fails high, B Atmospheric opens, man control required, AOP-14
- Event 3 LT-459 fails low, charging in man required, LTDN secures, Htr sec, AOP-100 requires man control of htrs and reestablishing letdown after selecting out LT-459, automatic operation of charging flow can be restored after selecting out LT-459 as controlling channel
- Event 4 PT-464 fails high, Steam dumps open until shut by P-12, SGFP speed increases, Man control required, AOP-100
- Event 5 An RCS 75GPM leak develops. The team should enter AOP-1 as a result of the leak to stabilize pwr level
- C action: RO must raise chg & reduce letdown to balance flow to perform AOP-1.0 Leakrate determination
- Event 6 The control system for the "A" loop spray valve (PCV-444C) fails. The spray valve goes full open and will not close. The team should trip the reactor and secure the 1A and 1B RCPs per ARP-1.8 (HC1) Operator Action 4 or AOP-100 section 1.1 before 2100#
- Event 7 After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0
- EEP-0 is entered at step 1. 1B DG fails to auto start. This is not needed at this time, no actions taken, but contributes to a total loss of AC in event 9.
- Event 8 HHSI MOVs 8803A & B fail to open on the SI. The team must open 8803A or B prior to exiting EEP-0. (CT The team should Open 8803A or 8803B prior to exiting EEP-0)
- Event 9 Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.
- 1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSL must be started prior to exiting EEP-0 & entry into EEP-1.0.)

(Significant modification from bank scenario 2A due to required ECP-0.0 entry)

Op-Test No.: <u>HLT-31 NRC</u> Scenario No.: <u>4</u> Event No.: <u>1</u>		
Event Description: Commence Ramp up from 4%, (Mode 1 entry allowed by T.S. with only one of 3 DGs inoperable per T.S. 3.8.1, CONDITION B., REQUIRED ACTION B.1 NOTE)		
Time	Position	Applicant's Actions or Behavior

[illegible]

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 2

Event Description: PT-3371B fails high, B Atmospheric opens, man control required, AOP-14. Security calls in 2 minutes after event initiated and reports lots of steam coming out above the roof of Unit one MSVR.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs entry into AOP-14, SECONDARY SYSTEM LEAKAGE. Directs actions per RO & BOP rows below:
	RO or BOP	Evaluates plant status for continued safe operation: • Pzr level > 15% • Pzr pressure > 2000 psig • SG pressure > 650 psig • Ctmt pressure < 2 psig • Reactor power < 15%
	BOP	Checks secondary leakage: • Checks SG atmospheric relief valves closed: ○ Places PC-1171B in man and closes B Atmospheric relief valve • Directs Diesel building SO, Turbine building SO or Rover to check roof of MSVR to identify any leakage from safeties • Directs Diesel building SO, Turbine building SO or Rover to check roof of MSVR to identify any leakage from safeties • Checks Steam dumps closed to expected position for plant conditions (not failed open) • Directs Turbine building SO to check turbine building components: ○ FW Htr vints & drains ○ Main steam drain pots ○ Turbine drains ○ MSRs

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 2

Event Description: PT-3371B fails high, B Atmospheric opens, man control required, AOP-14. Security calls in 2 minutes after event initiated and reports lots of steam coming out above the roof of Unit one MSVR.

Time	Position	Applicant's Actions or Behavior
	BOP	• Directs Radside SO to check SGBD area for secondary leakage • Checks containment radiation normal ○ R-2, R-7, R-11 • Checks containment sump level not rising using STP-70 (SRO may determine procedure is NOT required due to leak already isolated & ctmt sump is not rising) • Checks ctmt conditions normal ○ Temp recorder on BOP ○ CTMT CLR SUPP AIR MOISTURE on MCB ○ CTMT pressure MCB ○ CTMT CLR DRN LVL • Directs Rover to check TDAFWP room for leakage
	SRO	Determines the leak has been isolated • Consults operations manager to evaluate continued plant operation • Directs Rover to check HSP for PI3371B indication ○ Determines PT3371B is failed hi ○ Writes CR for PT3371B & informs Work Week Coordinator ○ Writes LCO 3.3.4 Condition A (Restore required Function to OPERABLE status in 30 days), Remote Shutdown System Instrumentation and Controls for B SG Pressure PT3371B

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 3 Page x of x

Event Description: LT-459 fails low, charging in man required, LTDN secures, Htr sec, AOP-100 requires man control of htrs and reestablishing letdown after selecting out LT-459

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to address ARPs: • HA3, PRZR LVL LO HTRS OFF LTDN SEC this is a yellow window annunc • HB2, PRZR LVL DEV LO • HD4 PRZR HTR CONT TRBL • EA2, CHG HDR FLOW HI-LO this a yellow window annunc
	SRO	Enters AOP-100, Section 1.2. Directs RO & BOP actions per rows below:
	RO	Checks pressurizer level trending to or on program: NO • Takes manual control of FK-122 OR LK-459 and reduces demand to 0 • Adjusts Seal injection flows HIK-186: 6-13 gpm • Reports that LT459 is failed low • Selects CHAN III/II on LS-459Z to defeat input of LT-459 to pressurizer level control • Selects unaffected channel, either CHAN II or CHAN III on LS/459Y
	RO	Determines Letdown is NOT in service, and places it in service per AOP-100, Section 1.2, step 4 & 5 (Attached)
	RO	Places FK-122 & LK-459 back in auto per SOP-2.1 section 4.6 (attached), CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION
	RO	6.2 Restore control of pressurizer heaters. ☐ 1A PRZR HTR GROUP BACKUP ☐ 1B PRZR HTR GROUP BACKUP ☐ 1C PRZR HTR GROUP VARIABLE ☐ 1D PRZR HTR GROUP BACKUP ☐ 1E PRZR HTR GROUP BACKUP

Op-Test No.: HLT-31 NRC **Scenario No.:** 4 **Event No.:** 3 **Page x of x****Event Description:** LT-459 fails low, charging in man required, LTDN secures, Htr sec, AOP-100 requires man control of htrs and reestablishing letdown after selecting out LT-459

Time	Position	Applicant's Actions or Behavior

Op-Test No.: <u>HLT-31 NRC</u> Scenario No.: <u>4</u> Event No.: <u>4</u>		
Event Description: PT-464 fails high, Steam dumps open until shut by P-12, SGFP speed increases, Man control required, AOP-100		
Time	Position	Applicant's Actions or Behavior
	SRO	Directs entry into AOP-100, section 1.4, and performance of immediate actions, then directs subsequent actions per RO & BOP rows below: • Set man trip criteria on SG level (high and low trip setpoints are 82% & 28%) • Notifies Shift Manager • Submits a CR & Notifies the Work Week Coordinator
	SRO	Directs RO or BOP to address ARPs as time permits • JG1, 2, & 3: 1A, 1B & 1C SG STM FLOW > FEED FLOW • JF1, 2, & 3: 1A, 1B, & 1C SG LVL DEV
	SRO	Enters LCO 3.4.2, RCS Minimum Temperature for Criticality: Be in Mode 3 in 30 minutes: IF Tavg < 541°F,

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 4

Event Description: PT-464 fails high, Steam dumps open until shut by P-12, SGFP speed increases, Man control required, AOP-100

Time	Position	Applicant's Actions or Behavior
	BOP	Performs immediate actions of AOP-100, section 1.4 & subsequent actions as directed by SRO • Takes manual control of A SGFP speed to match steam flow and feed flow as required of ○ SGFP master controller SK-509A or individual controller SK 509B ○ Bypass Feed Reg valves FK 479, 489, 499 • IF steam dumps are in AUTO, THEN Takes manual control of Steam dumps in steam pressure mode to control RCS Temp ~ 547°F & stable • Monitors SG levels and trips if necessary in accordance with the trip criteria established by the SRO • Determines and reports to the SRO that PT 464 is failed high, which affects SGFP speed and Steam Dump operation in the steam pressure mode • Places Bypass feed reg valve controllers in auto when SG levels are near 65% with Feed and Steam flows matched, ○ Maintains A SGFP speed controller in manual and maintains program d/p for current power (~50 psig) ○ Maintains Steam Dump controllers in manual to control RCS temperature ~ 547°F & stable

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 5

Event Description: An RCS 75GPM leak develops. The team should enter AOP-1 as a result of the leak to stabilize PZR level

Time	Position	Applicant's Actions or Behavior
	SRO	Directs performance of ARPs - EA2 CHG HDR FLOW HI-LO - FH1 RMS HI RAD (R-2, 7, 12: CTMT rad alarms in)
	RO	Reports pressurizer level is dropping with charging maximum - May take manual control of charging FK-122 and raise demand to 100% - May request to take one or both letdown orifices off service - May diagnose and announce RCS leak
	BOP	Performs actions of ARP EA2, Charging HDR FLOW HI-LO: - Determines RCS leak indicated, directs to AOP-1.0, RCS LEAKAGE Performs actions of ARP FH1 RMS HI RAD for alarms R-2, R-7, & R-12 - Determines RCS leak indicated, directs to AOP-1.0, RCS LEAKAGE

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 5

Event Description: An RCS 75GPM leak develops. The team should enter AOP-1 as a result of the leak to stabilize PZR level

Time	Position	Applicant's Actions or Behavior
	SRO	Directs entry into AOP-1 and directs actions per RO & BOP rows below: • Enters LCO 3.4.13 for unidentified RCS Operational LEAKAGE Condition A (don't know if it is pressure boundry leakage or not until ctmt entry made to inspect): ○ fix leak in 4 hours or shutdown in 6 hours • Informs Shift Manager of ○ leakrate for classification and notification per EIP-8 & EIP-9.0 ○ need for ctmt entry to look for leak source ○ T.S. requires fix leak in 4 hours or shutdown in 6 hours • Directs Unit 2 UO or extra plant operator to align 1A & 1B post LOCA containment hydrogen analyzers for service using Attachment 1 •
	RO	• Adjusts FK-122 to raise charging flow • Reduces letdown flow by opening one or both orifice isolation valves HV8149 A & C • Establishes charging and letdown flowrates to stabilize pressurizer level • Ensures Reactor makup is in auto to maintain VCT level > 20% • Determines leak rate from flow balance

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 5

Event Description: An RCS 75GPM leak develops. The team should enter AOP-1 as a result of the leak to stabilize PZR level

Time	Position	Applicant's Actions or Behavior
	RO or BOP	3.1 Determine RCS leak rate from CVCS flow balance. _____ (charging flow) + _____ (seal injection flow) - _____ (letdown flow) - _____ (#1 seal leakoff flow) = _____ (RCS leak rate)
	BOP	• Reports R-2, R-7, & R-12 are in alarm. R-11 is upscale or in alarm • Pulls ctmt sumps to lock • Times level increase in ctmt sump to estimate a leakrate • Reports Aux building radiation NORMAL, R-4, R-6, & R-10 • Reports secondary radiation normal:
	BOP	7.4.1 Check secondary radiation - NORMAL. ☐ R-15 SJAE EXH ☐ R-19 SGBD SAMPLE ☐ R-23A SGBD HX OUTLET ☐ R-23B SGBD TO DILUTION ☐ R-15B TURB BLDG VNTL (BOP) ☐ R-15C TURB BLDG VNTL (BOP) ☐ R-60A MS ATMOS REL (BOP) ☐ R-60B MS ATMOS REL (BOP) ☐ R-60C MS ATMOS REL (BOP) ☐ R-60D TDAFWP EXH (BOP) ☐ R-70A 1A SG TUBE LEAK DET (BOP) ☐ R-70B 1B SG TUBE LEAK DET (BOP) ☐ R-70C 1C SG TUBE LEAK DET (BOP)

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 5

Event Description: An RCS 75GPM leak develops. The team should enter AOP-1 as a result of the leak to stabilize PZR level

Time	Position	Applicant's Actions or Behavior
	BOP	• Directs Counting Room to sample SGs for radioactivity per CCP-31, LEAK RATE DETERMINATION • Reports CCW system radiation normal R-17A & B • Reports CCW surge tank level has no unexplained level rise
	RO	Reports PRT conditions normal: • Pressure < 5 psig • Level < 78% • Temp < 120°F
	RO or BOP	• Places VCT HI LVL DIVERT VLV LCV115A in VCT position
	BOP	• Places aux building sump pmps in Pull to Lock on BOP panel • Evaluates ctmt sump level rise per STP-70
	SRO	Assigns personnel outside the control room (radside SO or Shift Support Supervisor) to inspect accessible portions of charging, letdown, BTRS and seal injection systems using ATT. 3, & ATT. 4, LEAK INSPECTION
	BOP	Closes RCS Sample valves on BOP panel L & notifies chemistry:
		• PRZR Stm Sample Iso Q1P15HV3104 • PRZR Liq Sample ISO Q1P15HV3103 • RCS Loops 2&3 Sample Iso Q1P15HV3765 • ACCUM Sample ISO Q1P15HV3766

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 5

Event Description: An RCS 75GPM leak develops. The team should enter AOP-1 as a result of the leak to stabilize PZR level

Time	Position	Applicant's Actions or Behavior
	BOP	7.11.2 Notify Chemistry of the following: • RCS samples have been isolated in the Control Room • Check RCS sampling using ATTACHMENT 5, LEAK INSPECTION - CHEMISTRY SAMPLE ROOM AREA.
	RO	Maintains Pressurizer level • Secures Letdown orifice isolation valves • Raises charging flow with FK-122 or LK-459 as necessary to
	RO & BOP	May begin unit shutdown per UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 6

Event Description: The control system for the "A" loop spray valve (PCV-444C) fails. The spray valve goes full open and will not close. The team should trip the reactor and secure the 1A and 1B RCPs per ARP-1.8 (HC1) Operator Action 4 or AOP-100 section 1.1 before 2100#

Time	Position	Applicant's Actions or Behavior
	SRO	Directs AOP-100 section 1.1 immediate actions and subsequent actions per RO & BOP rows below:
	RO	Takes manual control to raise RCS pressure: • PORVs PCV445 & 444B • Sprays PK-444C & D • Heaters 1A, 1B, 1C, 1D, 1E • Reports that the spray valve is stuck open and a reactor trip is required prior to 2100 psig • Trips reactor and completes immediate actions of EEP-0.0
	BOP	Verifies Reactor is tripped and • THEN secures A & B RCP • Completes immediate actions of EEP-0
	SRO	Verifies EEP-0 immediate actions and directs subsequent actions per RO & BOP rows below:
	RO	• Checks reactor tripped ○ All 4 RT & BYP Bkrs are open ○ PR & IR power trending down ○ All DRPI rod bottom lights are lit • Checks turbine tripped
	RO	○ [] TSLB2 14-1 lit [] TSLB2 14-2 lit [] TSLB2 14-3 lit [] TSLB2 14-4 lit

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 6

Event Description: The control system for the "A" loop spray valve (PCV-444C) fails. The spray valve goes full open and will not close. The team should trip the reactor and secure the 1A and 1B RCPs per ARP-1.8 (HC1) Operator Action 4 or AOP-100 section 1.1 before 2100#

Time	Position	Applicant's Actions or Behavior
	RO	• Checks power to 4160 V ESF busses both trains energized • Verifies operating DGs are being supplied from at least one SW pump (IF SI in progress only) • Checks SI Status (lights lit if SI in progress) ○ MLB-1 1-1 & 1-2 NOT lit ○ BYP & PERMISSIVE SI light NOT lit
	BOP	• Checks reactor tripped ○ All 4 RT & BYP Bkrs are open ○ PR & IR power trending down ○ All DRPI rod bottom lights are lit • Checks turbine tripped
	BOP	○ [] TSLB2 14-1 lit [] TSLB2 14-2 lit [] TSLB2 14-3 lit [] TSLB2 14-4 lit
	BOP	• Checks power to 4160 V ESF busses both trains energized • Verifies operating DGs are being supplied from at least one SW pump (IF SI in progress only) • Checks SI Status (lights lit if SI in progress) ○ MLB-1 1-1 & 1-2 NOT lit ○ BYP & PERMISSIVE SI light NOT lit

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 6

Event Description: The control system for the "A" loop spray valve (PCV-444C) fails. The spray valve goes full open and will not close. The team should trip the reactor and secure the 1A and 1B RCPs per ARP-1.8 (HC1) Operator Action 4 or AOP-100 section 1.1 before 2100#

Time	Position	Applicant's Actions or Behavior
	SRO	After EEP-0 Immediate actions have been verified, MAY direct BOP to perform annunciator management and early actions: Control AFW flow to > 395 gpm until any intact SG > 31% NR level
	SRO	IF SI has occurred, EEP-0 SI actions, IF SI has NOT occurred, Transitions to ESP-0.1, REACTOR TRIP RESPONSE. Directs actions per RO & BOP rows below:
	RO	Checks RCS Tav_g stable at or approaching 547°F
	BOP	- Verifies feedwater status 3 FRVs closed 3 FRV Bypass valves closed - MDAFW auto start switches on BOP in Defeat - Both SGFPs tripped
	RO	- Checks emerg boration not required - All rod bottom lights lit - RCS Tav_g > 525°F - Announces "Unit 1 Reactor Trip"

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 7

Event Description: After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0
EEP-0 is entered at step 1. 1B DG fails to auto start

Time	Position	Applicant's Actions or Behavior
	SRO	Directs SI Verified actuated and reentry into EEP-0 per foldout page of ESP-0.1: < 16°F subcooling & Pzr level < 4%
	SRO	Starts at step 1 of EEP-0, and directs actions per RO/BOP actions listed in rows below:
	SRO, RO, OR BOP	Announces EEP-0 Fold out Page items in effect, directs/takes actions required - Subcooling <16°F [45], stop all RCPs - RCS Press < 1300 psig, close chg mini-flows - Ctmt pressure > 4 psig, use adverse numbers
	RO	- Checks reactor tripped - All 4 RT & BYP Bkrs are open - PR & IR power trending down - All DRPI rod bottom lights are NOT lit due to loss of B train power - Checks turbine tripped - Checks power to 4160 V ESF busses both trains energized - Verifies operating DGs are being supplied from at least one SW pump - Checks SI Status - MLB-1 1-1 & 1-2 lit - BYP & PERMISSIVE SI light lit

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 7

Event Description: After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0
EEP-0 is entered at step 1. 1B DG fails to auto start

Time	Position	Applicant's Actions or Behavior
	BOP	- Checks reactor tripped - All 4 RT & BYP Bkrs are open - PR & IR power trending down - All DRPI rod bottom lights are NOT lit due to loss of B train power - Checks turbine tripped - Checks power to 4160 V ESF busses both trains energized - Verifies operating DGs are being supplied from at least one SW pump - Checks SI Status - MLB-1 1-1 & 1-2 lit - BYP & PERMISSIVE SI light lit - Verifies SI Auto actions using EEP-0 ATT 2 (Attached)
	RO	Check ctmt pressure has remained <27#: YES
	RO	Announces "Unit 1 reactor trip and safety injection"
	RO or BOP IF RCS NOT 547 & Stable	- Checks AFW status - Verifies at least 395 gpm flow to SGs - OR - at least one level > 31% {48} - Controls MDAFW & TDAFW flows as necessary - Stops TDAFW pump WHEN at least 2 SGs >28% - Maintains 31-65% {48-65} SG levels - Checks RCS temps 547 & Stable, IF NO: performs RNO per rows below

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 7

Event Description: After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0
EEP-0 is entered at step 1. 1B DG fails to auto start

Time	Position	Applicant's Actions or Behavior
	RO or BOP IF RCS NOT 547 & Stable	9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK ☐ A TRN in OFF RESET ☐ B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed. 1A(1B.1C) MS ATMOS REL VLV ☐ PC 3371A ☐ PC 3371B ☐ PC 3371C
	RO or BOP IF RCS NOT 547 & Stable	9.1.3 Control total APW flow to minimize RCS cooldown. APW FLOW TO 1A(1B.1C) SG ☐ FI 3229A ☐ FI 3229B ☐ FI 3229C AFW TOTAL FLOW ☐ FI 3229 9.1.4 <u>IF</u> MSIVs are closed <u>THEN</u> proceed to step 9.1.8
	RO or BOP IF RCS NOT 547 & Stable	[MSR isolation & Main Steam Drain Pot isolation are done without SRO direction by the Turbine Building SO after each reactor trip, these may not be performed at this time for this reason]

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 7

Event Description: After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0
EEP-0 is entered at step 1. 1B DG fails to auto start

Time	Position	Applicant's Actions or Behavior
	RO or BOP IF RCS NOT 547 & Stable	Secures one SJAE if two are in service
	RO or BOP IF RCS NOT 547 & Stable	Closes MSIVs if cooldown not stopped
	RO or BOP	Checks PORVs • closed, • iso valves open with power, • no evidence of leak by via downstream temps & PRT parameters
	RO	Checks RCS subcooling > 16°F: YES
	RO	Checks CHG mini-flows EITHER closed or open if • 1300 psig < RCS press < 1900 psig
	RO or BOP	Checks SGs not faulted • no press falling uncontrolled • none less than 50 psig
	RO or BOP	Checks SGs not ruptured • no secondary radiation levels high • no SG levels rising uncontrolled
	RO or BOP	Checks RCS intact: NO, RCS not intact due to ctmt rad monitors in alarm
	SRO	Directs team to transition to EEP-1 per RNO of step 15, RCS is NOT intact

Op-Test No.: HLT-31 NRC **Scenario No.:** 4 **Event No.:** 7**Event Description:** After ESP-0.1 entry, SBLOCA occurs. FOP requires SI/EEP-0.0
EEP-0 is entered at step 1. 1B DG fails to auto start

Time	Position	Applicant's Actions or Behavior

NRC DISCRETION IF EEP-0 ATT 2 has been complete and MOV-8803A & B
have been opened, go to event 9. If desired, continue in EEP-1.

Actions for EEP-1.0 under Event No.: 9

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 8

Event Description: HHSI MOVs 8803A & B fail to open on the SI. The team must open 8803A or B prior to exiting EEP-0. (CT The team should Open 8803A or 8803B prior to exiting EEP-0)

Time	Position	Applicant's Actions or Behavior

CRITICAL TASK: (BOP) Open 8803A or 8803B prior to exiting EEP-0, Attachment 2

[illegible]

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior

	SRO	Directs transition to ECP-0.0 & immediate operator actions based on no power to either vital 4160V train. Directs actions per RO & BOP rows below:
	RO & BOP	Performs Immediate actions steps and verifies by direction of SRO: • Check all reactor trip and bypass breakers A & B open • Check NI Power falling on PR & IR Nis • Check Turbine tripped:
	RO & BOP	Check turbine tripped. ☐ TSLB2 14-1 lit ☐ TSLB2 14-2 lit ☐ TSLB2 14-3 lit ☐ TSLB2 14-4 lit
	RO	Verifies RCS Isolated:
	RO	3.1 <u>WHEN</u> RCS pressure less than 2335 psig, <u>THEN</u> verify both PRZR PORVs closed.

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior
	RO	3.2.1 Verify all letdown line orifice isolation valves - CLOSED. LTDN ORIF ISO 45 GPM [] Q1E21HV8149A LTDN ORIF ISO 60 GPM [] Q1E21HV8149B [] Q1E21HV8149C <u>OR</u>
	RO	3.2.2 Verify letdown line isolation valves - CLOSED. LTD LINE ISO [] Q1E21LCV459 [] Q1E21LCV460

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior
	RO	3.3 Verify excess letdown line - ISOLATED. EXC LTDN ISO VLV ☐ Q1E21HV8153 closed ☐ Q1E21HV8154 closed
	RO	3.4 Verify all reactor vessel head vent valves - CLOSED. RX VESSEL HEAD VENT OUTER ISO ☐ Q1B13SV2213A ☐ Q1B13SV2213B RX VESSEL HEAD VENT INNER ISO ☐ Q1B13SV2214A ☐ Q1B13SV2214B
	RO	Verifies AFW flow > 395 gpm

Op-Test No.: HLT-31 NRC **Scenario No.:** 4 **Event No.:** 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior

	BOP	Performs load shed (step 5.1) OF ECP-0.0 (Attached) NOTE: MAY have performed it early while SRO & RO performed steps 1-4.
CRITICAL TASK: (BOP) Either 2C or 1B DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.		
	BOP	Checks 1-2A, 1C or 1B DG running for Unit 1: NO • Perform 2C SBO start: • Verifies 2C DG in mode 1 • Places 2C DG UNIT SELECTOR switch in Unit 1 • WHEN load shed verified, pushes 2C DG DIESEL START pushbutton • Verify 2C DG starts • Verify 2C DG output breaker closes DJ06 • Verify 1G to 1J bus DG13 closed tie • Verify 1G to 1L bus DG02 closed tie • Verify two SW pumps in B train (1D, 1E or 1C)

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSl must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior
	BOP	5.7 Verify adequate SW flow. 5.7.1 Verify two SW PUMPS in energized train - RUNNING. ☐ A Train (1A, 1B or 1C) ☐ B Train (1D, 1E or 1C) 5.7.2 <u>IF</u> A train energized, <u>THEN</u> verify SW TO/FROM DG BLDG - A HDR Q1P16V519/537 open. 5.7.3 <u>IF</u> B train energized, <u>THEN</u> verify SW TO/FROM DG BLDG - B HDR Q1P16V518/536 open.
	BOP	5.7.4 Check no running diesel generator lube oil temperature annunciator in alarm. (155 ft, DG BLDG local control panel)

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior

CRITICAL TASK: if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

	SRO	Directs starting of Minimum ESF equipment (SBO DG does not automatically sequence loads on with SI in progress): • 1D & 1E SW PUMPS • 1B or 1A CCW PUMP • 1C or 1D CTMT cooler • 1C Charging pump
NRC DISCRETION: termination point here, could go on in EEP-1.0		
	SRO	Transitions to procedure and step in effect of EEP-1.0
	SRO	Directs actions in EEP-1 per RO/BOP action in RO & BOP rows below:
	RO	Checks RCS subcooling > 16°F: YES
	RO or BOP	Checks SGs not faulted • no press falling uncontrolled • none less than 50 psig

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior

	RO or BOP	Checks AFW status • Verifies at least 395 gpm flow to SGs • OR • at least one level > 31% {48} • Controls MDAFW & TDAFW flows as necessary • Stops TDAFW pump WHEN at least 2 SGs >28% • Maintains 31-65% {48-65} SG levels
	BOP	Checks secondary radiation normal: YES
	RO	Checks PORVs • closed, • iso valves open with power, • no evidence of leak by via downstream temps & PRT parameters

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior

	SRO	Directs step 6 be performed (1 hour from start of event requirements - not available to perform in simulator-SRO calls for SSS or an extra to perform) - close recirc discs - Establish 1A & 1B post LOCA H2 analyzer on service per ATT 2 - Plot H2 on Fig 1 - Check and control H2 concentration in cmt
	SRO	Checks for SI termination criteria and continues on without terminating SI due to inadequate RCS pressure & pwr level
	RO or BOP	Checks containment spray system Both CS pmps NOT RUNNING
	RO or BOP	Checks RCS pressure > than 275 psig {435 psig} & stable or rising - If NO: Establishes CCW to both RHR HXs by verifying open MOV 3185A & B - DOES NOT secure RHR PUMPS - IF YES: VERIFIES SI reset & Stops LHSI pumps
	BOP	Verifies 4160V busses energized per EEP-1 ATT 4 (Attached)

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSI must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior

NRC DISCRETION: termination after ATT 4 done, could go on in EEP-1.0

	SRO	Directs securing Unloaded DGs (extra, Unit two UO, or BOP)
	SRO	• Begins evaluation of plant status, Determines both trains of recirc equipment available • WHEN 12.5 Feet level in RWST, transitions to ESP-1.3, Cold Leg Recirc (attached) per Fold out page • Directs Unit two UO to assist taking ECCS logs • Directs TSC to evaluate need for RCS sampling
	BOP	Checks for no intersystem LOCA outside ctmt • Aux building radiation NORMAL • Aux building SUMPS: ○ no hi sump levels & pumps not running • WHT and FDT levels not rising unexplained • Verify at least one train of PRF in operation using SOP-60.0, PRF System (Attached) • Checks LHSI flow in progress by low RCS PRESSURE & LHSI flows $>1.5 \times E3$

Op-Test No.: HLT-31 NRC Scenario No.: 4 Event No.: 9

Event Description: Dual unit LOSP at step 15 of EEP-0, Check RCS intact. Initiate after transition to EEP-1.0 has been determined.

1/2A goes to Unit two and 1C DG is T/O. 1B DG did not start in auto, will start manually from the EPB per ECP-0.0. Either 1B or 2C will manually start and supply Unit one B train per ECP-0.0. B train SW pumps must be started manually if 2C supplies. (CT Either 1B or 2C DG supplying B train power to the ESF busses with Service water cooling, prior to exiting ECP-0.0. NOTE: U2 is supplying SW to 2C prior to U1 SW pumps starting.)

Terminate after two train verification complete (EEP-0 ATT. 4) & Entry into EEP-1.0

(CT if 2C DG started, verify at least one ESF train supplying cooling water to the core, the B1G sequencer will not run for an SI with 2C DG supplying. SW, CCW, & HHSl must be started prior to exiting EEP-0 & entry into EEP-1.0.)

Time	Position	Applicant's Actions or Behavior

	SRO	RETURNS to step 14 & loops in procedure from step 14 to 16 until RWST level <12.5', THEN transitions to ESP-1.3 (Attached)
Termination after loop to step 1 accomplished		

Attached Procedures

SOP-2.3 Appendix B 2.0

OPERATOR AID FOR BORATION AND DILUTION

2.0 Dilution

NOTE: The Total Batch Integrator ONLY needs to be verified when changed. This should be documented with an Autolog Entry.

- ☐ ☐ ☐ ☐ 2.1 IF necessary, THEN set the total batch integrator to the desired quantity.
- ☐ ☐ ☐ ☐ 2.2 IF necessary, THEN adjust LTDN TO VCT FLOW LK 112 setpoint as desired.
- ☐ ☐ ☐ ☐ 2.3 Position the MKUP MODE CONT SWITCH to STOP.
- ☐ ☐ ☐ ☐ 2.4 Align the makeup system for dilution as follows:
- Position the MKUP MODE SEL SWITCH to DIL or ALT DIL.
 - IF using ALT DIL AND it is desired to bypass the VCT, THEN place the MKUP TO VCT valve Q1E21FCV114A in close.
- ☐ ☐ ☐ ☐ 2.5 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 2.6 Verify proper dilution operation by observing the following:
- IF using ALT DIL, MAKEUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - MKUP TO VCT Q1E21FCV114A opens, unless bypassing VCT.
 - RMW TO BLENDER Q1E21FCV114B opens.
 - Reactor makeup flow is displayed on FI-168 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 2.7 Verify the dilution automatically stops when the total flow batch integrator reaches its setpoint by observing the following:
- Reactor makeup flow returns to zero as displayed on FI-168 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO VCT Q1E21FCV114A closes.
 - RMW TO BLENDER Q1E21FCV114B closes.
 - IF ALT DIL was used, THEN MAKEUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.

NOTE: The following four steps are not required if operation in a mode other than automatic is preferred. Refer to appendix C.

- ☐ ☐ ☐ ☐ 2.8 IF VCT was bypassed, THEN verify MKUP TO VCT valve Q1E21FCV114A (Q1E21V339) in AUTO.
- ☐ ☐ ☐ ☐ 2.9 Position the MKUP MODE SEL SWITCH to AUTO.
- ☐ ☐ ☐ ☐ 2.10 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 2.11 IF LK 112 setpoint was adjusted per Step 2.2, THEN return setpoint to that required for current conditions.

Attached Procedures

SOP-2.3 Appendix C 2.0

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UNIT 1

FNP-1-SOP-2.3

Appendix C

CAUTION: Without automatic makeup care should be taken to maintain VCT level between 26% and 61% during repetitive operation of the reactor makeup control system.

2.0 Dilution

- ☐ ☐ ☐ ☐ 2.1 The Reactor Makeup Control system has been previously aligned for Dilution or Alternate Dilution.
- ☐ ☐ ☐ ☐ 2.2 Position the MKUP MODE CONT SWITCH to START.
- ☐ ☐ ☐ ☐ 2.3 Verify proper dilution operation by observing the following:
- IF using ALT DIL, MAKEUP TO CHG PUMP SUCTION HDR Q1E21FCV113B opens.
 - MKUP TO VCT Q1E21FCV114A opens, unless bypassing VCT.
 - RMW TO BLENDER Q1E21FCV114B opens.
 - Reactor makeup flow is displayed on FI-168 MAKEUP FLOW TO CHG/VCT.
- ☐ ☐ ☐ ☐ 2.4 Verify the dilution automatically stops when the total flow batch integrator reaches its setpoint by observing the following:
- Reactor makeup flow returns to zero as displayed on FI-168 MAKEUP FLOW TO CHG/VCT.
 - MKUP TO VCT Q1E21FCV114A closes or is closed if bypassing the VCT.
 - RMW TO BLENDER Q1E21FCV114B closes.
 - IF ALT DIL was used, THEN MAKEUP TO CHG PUMP SUCTION HDR Q1E21FCV113B closes.
- ☐ ☐ ☐ ☐ 2.5 IF repetitive dilutions are no longer required THEN verify the system is aligned for Automatic makeup per steps 2.8 through 2.11 of Appendix B.

Attached Procedures

UOP-1.2 Step 5.57

*5.57 WHEN Nuclear at Power Permissive P-10 permissive status light is illuminated (2/4 power ranges greater than 10%), THEN perform the following: {CMT-0003695}

- _____ 5.57.1 Block the intermediate range reactor trip and overpower rod stop.
_____ / ☐ Place INTERMEDIATE RANGE BLOCK TRN A to BLOCK.
_____ ☐ Place INTERMEDIATE RANGE BLOCK TRN B to BLOCK.
- _____ 5.57.2 On the Bypass and Permissive Panel verify the following:
_____ ☐ The INTERM RANGE TRAIN A TRIP BLOCKED light illuminated.
_____ ☐ The INTERM RANGE TRAIN B TRIP BLOCKED light illuminated.
- _____ 5.57.3 Block the power range low setting reactor trip.
_____ / ☐ Place POWER RANGE BLOCK TRN A to BLOCK.
_____ ☐ Place POWER RANGE BLOCK TRN B to BLOCK.
- _____ 5.57.4 On the Bypass and Permissive Panel verify the following:
_____ ☐ The POWER RANGE LOW SETTING TRAIN A TRIP BLOCKED light illuminated.
_____ ☐ The POWER RANGE LOW SETTING TRAIN B TRIP BLOCKED light illuminated.
- _____ 5.57.5 Verify that Low Power Trip Block P-7 status light is not illuminated to ensure the unblocking of the following reactor trips.
_____ ☐ Pressurizer Low Pressure
_____ ☐ Pressurizer High Water Level
_____ ☐ Loss of Flow-Two Loops

NOTE: Default speed for the paperless recorder is 10 min/div due to storage capability of the ATA Flash Card. IF 2 min/div is selected during startup, THEN storage capability should be monitored.

- _____ 5.57.6 Verify NR-45B is in the desired speed, i.e., 2nd speed (2 min/div) OR normal speed. (10 min/div)

Attached Procedures

AOP-100, Section 1.2, Step 4 & 5

___ 4 Check letdown inservice. ___ 4.1 Check indication of one or more letdown orifice isolation valves open ☐ Q1E21HV8149A LTDN ORIF ISO 45 GPM ☐ Q1E21HV8149B LTDN ORIF ISO 60 GPM ☐ Q1E21HV8149C LTDN ORIF ISO 60 GPM ___ 4.2 Check Letdown flow indicated. ☐ PI-150 LTDN HX OUTLET FLOW. ___ 4.3 Proceed to step 6.0.	4 Establish normal letdown as follows. a) Verify closed all letdown orifice isolation valves. LTDN ORIF ISO 45 GPM ☐ Q1E21HV8149A LTDN ORIF ISO 60 GPM ☐ Q1E21HV8149B ☐ Q1E21HV8149C b) Verify LP LTDN PRESS PK 145 in MANUAL and adjust the demand signal to 50% or less. c) <u>IF</u> necessary. THEN OPEN both LTDN LINE PENE RM ISO's Q1E21HV8175A and B from the Penetration Room Isolation Panel. d) Verify open LTDN LINE CTMT ISO Q1E21HV8152 e) Verify open both LTDN LINE ISO Q1E21LCV459 and Q1E21LCV460.

Step 4 continued on next page.

Attached Procedures

AOP-100, Section 1.2, Step 4 & 5

5 Check Letdown flow established. 5.1 Check Letdown flow indicated. [] PI-150 LTDN HX OUTLET FLOW. 5.2 IF Letdown flow established, <u>THEN</u> place LP LTDN PRESS PK-145 in AUTO as follows: 5.2.1 Verify that LP LTDN PRESS PK 145 is set between 4.3-7.5 to maintain the desired Letdown Pressure between 260-450 psig. 5.2.2 Place LP LTDN PRESS PK 145 in AUTO and verify that Letdown pressure is maintained at the desired value. 5.2.3 Verify that LTDN HX OUTLET TEMP TK 144 is maintaining Letdown temperature at approximately 100 F. [] TI-116 VCT TEMP [] TI-143 DIVERT LTDN HX TEMP [] TI-144 CCW LTDN HX TEMP 5.2.4 See FNP-1-SOP-2.1. CHEMICAL <u>AND</u> VOLUME CONTROL SYSTEM PLANT STARTUP <u>AND</u> OPERATION, for further guidance on Letdown or Charging control.	f) Verify CHG FLOW PK 122 is in MAN <u>AND</u> establish the required minimum charging flow for one orifice to be placed on service. (18 gpm) g) OPEN LTDN ORIF ISO 60 GPM Q1E21HVS149B or C to establish approximately 60 gpm Letdown flow. 5 Go to FNP-1-AOP-16.0. CVCS MALFUNCTION

Attached Procedures

SOP-2.1 Section 4.6

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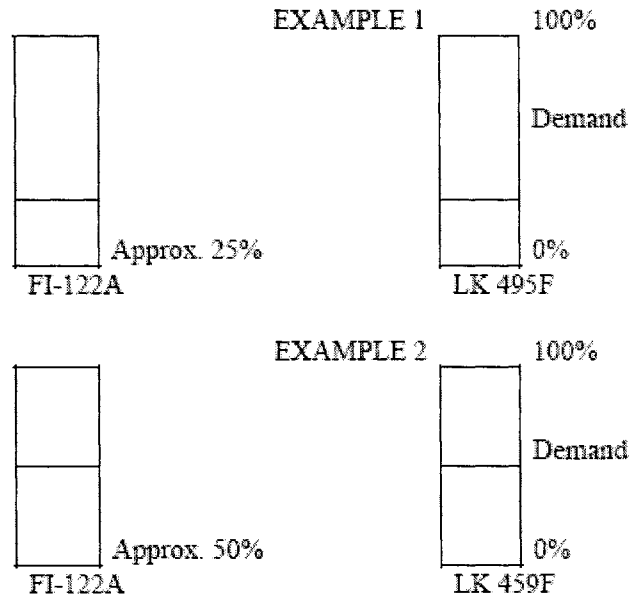
UNIT 1

FNP-1-SOP-2.1

4.6 Charging Flow Control

4.6.1 Automatic Charging Flow Control

- 4.6.1.1 Verify PRZR LVL LK 459F is in MANUAL.
- 4.6.1.2 Verify PRZR level is at setpoint (within $\pm 3\%$) as indicated on LR 459.
- 4.6.1.3 Manually adjust the output meter on PRZR LVL LK 459F to equal the position of the meter pointer on CHG FLOW indicator FI-122A. See example below:



- 4.6.1.4 Place LK 459F in AUTO.
- 4.6.1.5 Place FK 122 in AUTO.

Attached Procedures

EEP-0 ATT 2

ATTACHMENT 2

AUTOMATIC ACTIONS VERIFICATION

- 1 Verify each SW train - HAS TWO
 SW PUMPS STARTED.

 ☐ A train (1A, 1B or 1C)
 ☐ B train (1D, 1E or 1C)
- 2 Verify each train of CCW -
 STARTED.

 2.1 Verify one CCW PUMP in each
 train- STARTED.

 A train HX 1C or 1B
 CCW FLOW

 ☐ FI 3043CA > 0 gpm
 OR

 ☐ FI 3043BA > 0 gpm

 B train HX 1A or 1B
 CCW FLOW

 ☐ FI 3043AA > 0 gpm
 OR

 ☐ FI 3043BA > 0 gpm

 2.2 Verify SW flow to associated
 CCW HX's.

 SW FROM 1A(1B, 1C)
 CCW HX

 ☐ Q1P16FI3009AA > 0 gpm
 ☐ Q1P16FI3009BA > 0 gpm
 ☐ Q1P16FI3009CA > 0 gpm

 2.2 Throttle open SW to the
 associated CCW HX's.

 ☐ Q1P16FV3009A
 ☐ Q1P16FV3009B
 ☐ Q1P16FV3009C
- 3 Verify one CHG PUMP in each
 train - STARTED.

 ☐ A train (1A or 1B) amps > 0
 ☐ B train (1C or 1B) amps > 0

Attached Procedures

EEP-0 ATT 2

4 Verify RHR PUMPS - STARTED.

RHR PUMP

☐ 1A amps > 0☐ 1B amps > 0

5 Verify Safety Injection Flow.

5.1 Check HHSI flow - GREATER THAN
0 gpm.☐ FI 943

5.1 Verify proper SI alignment.

CHG PUMPS TO

REGENERATIVE HX

☐ Q1E21MOV8107 closed☐ Q1E21MOV8108 closed

RWST

TO CHG PUMP

☐ Q1E21LCV115B open☐ Q1E21LCV115D open

VCT

OUTLET ISO

☐ Q1E21LCV115C closed☐ Q1E21LCV115E closed

HHSI TO

RCS CL ISO

☐ Q1E21MOV8803A open☐ Q1E21MOV8803B open

CHG PUMP

SUCTION HDR ISO

☐ Q1E21MOV8130A open☐ Q1E21MOV8130B open☐ Q1E21MOV8131A open☐ Q1E21MOV8131B open

CHG PUMP

DISCH HDR ISO

☐ Q1E21MOV8132A open☐ Q1E21MOV8132B open☐ Q1E21MOV8133A open☐ Q1E21MOV8133B open

Attached Procedures

EEP-0 ATT 2

5.2 Check RCS pressure - LESS THAN
275 psig(435 psig).

1C(1A) LOOP
RCS WR PRESS

☐ PI 402B
☐ PI 403B

5.3 Check LHST flow - GREATER THAN
 1.5×10^3 gpm.

1A
RHR HDR
FLOW

☐ FI 605A

1B
RHR HDR
FLOW

☐ FI 605B

5.2 Proceed to Step 6.

5.3 Verify proper RHR alignment.

RWST TO

1A(1B) RHR PUMP

☐ Q1E11MOV8809A open
☐ Q1E11MOV8809B open

CTMT SUMP TO

1A(1B) RHR PUMP

☐ Q1E11MOV8811A closed
☐ Q1E11MOV8812A closed
☐ Q1E11MOV8811B closed
☐ Q1E11MOV8812B closed

1C(1A) RCS LOOP TO

1A(1B) RHR PUMP

☐ Q1E11MOV8701A closed
☐ Q1E11MOV8702A closed
☐ Q1E11MOV8701B closed
☐ Q1E11MOV8702B closed

RHR TO RCS HOT LEG

XCON

☐ Q1E11MOV8887A open
☐ Q1E11MOV8887B open

1A(1B) RHR HX

TO CHC PUMP SUCT

☐ Q1E11MOV8706A closed
☐ Q1E11MOV8706B closed

1A(1B) RHR HX

DISCH VLV

☐ HIK 603A open
☐ HIK 603B open

1A(1B) RHR HX

BYP FLOW VLV

☐ FK 605A closed
☐ FK 605B closed

Attached Procedures

EEP-0 ATT 2

ATTACHMENT 2

6 Verify containment ventilation
isolation.6.1 Verify containment purge
dampers - CLOSED.

- ☐ 3197
- ☐ 3198D
- ☐ 3198C
- ☐ 3196
- ☐ 3198A
- ☐ 3198B

6.2 Verify containment mini purge
dampers - CLOSED.

CTMT PURGE DMPRS
MINI-2866C & 2867C
FULL-3198A & 3198D

- ☐ 2866C
- ☐ 2867C

CTMT PURGE DMPRS
MINI-2866D & 2867D
FULL-3196 & 3197
BOTH-3198B & 3198C

- ☐ 2866D
- ☐ 2867D

6.3 Stop MINI PURGE
SUPP/EXH FAN.

Attached Procedures

EEP-0 ATT 2

- 7 Verify containment fan cooler alignment.

- 7.1 Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.

CTMT CLR FAN
SLOW SPEED

- A train

☐ 1A

☐ 1B

- B train

☐ 1C

☐ 1D

- 7.2 Verify associated emergency service water outlet valves - OPEN.

EMERG SW FROM
1A(1B,1C,1D) CTMT CLR

☐ Q1P16MOV3024A

☐ Q1P16MOV3024B

☐ Q1P16MOV3024C

☐ Q1P16MOV3024D

Attached Procedures

EEP-0 ATT 2

8 Verify AFW Pumps - STARTED.

8.1 Verify both MDAFW Pumps -
STARTED

- ☐ 1A MDAFW Pump amps > 0
- ☐ 1B MDAFW Pump amps > 0

AND

- ☐ FI-3229A indicates > 0 gpm
- ☐ FI-3229B indicates > 0 gpm
- ☐ FI-3229C indicates > 0 gpm

8.1 Verify MDAFW Pumps deliver
flow to each SG.

8.1.1 Manually start MDAFW Pumps

8.1.2 Verify AFW flow path to
each SG.

MDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3227A in MOD
- ☐ Q1N23HV3227B in MOD
- ☐ Q1N23HV3227C in MOD

MDAFWP TO 1A(1B,1C) SG
FLOW CONT

- ☐ HIC 3227AA open
- ☐ HIC 3227BA open
- ☐ HIC 3227CA open

AFW TO 1A(1B,1C) SG
STOP VLV

- ☐ Q1N23MOV3350A open
- ☐ Q1N23MOV3350B open
- ☐ Q1N23MOV3350C open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764A open
- ☐ Q1N23MOV3764D open
- ☐ Q1N23MOV3764F open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764E open
- ☐ Q1N23MOV3764B open
- ☐ Q1N23MOV3764C open

Attached Procedures

EEP-0 ATT 2

8.2 Check TDAFW Pump start required.

8.2 IF TDAFW pump NOT needed.
THEN proceed to Step 9.

Condition	TSLB	Set-point	Coincidence
RCP Bus Under-voltage	TSLB2 1-1 1-2 1-3	2680 V	1/2 Detectors on 2/3 Busses
Low Low SG Water Level In Any 2/3 SGs	TSLB4 4-1.4-2.4-3 5-1.5-2.5-3 6-1.6-2.6-3	28%	2/3 Detectors on 2/3 SGs

8.3 Verify TDAFWP started.

- ☐ MLB-4 1-3 lit
- ☐ MLB-4 2-3 lit
- ☐ MLB-4 3-3 lit

TDAFWP SPEED

- ☐ SI 3411A > 3900 rpm

TDAFWP
SPEED CONT

- ☐ SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.

TDAFWP
TO 1A(1B,1C) SG

- ☐ Q1N23HV3228A in MOD
- ☐ Q1N23HV3228B in MOD
- ☐ Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG
FLOW CONT

- ☐ HIC 3228AA open
- ☐ HIC 3228BA open
- ☐ HIC 3228CA open

Attached Procedures

EEP-0 ATT 2

9 Verify main feedwater status.

- 9.1 Verify main feedwater flow control and bypass valves - CLOSED.

1A(1B.1C) SG
FW FLOW

- ☐ FCV 478
☐ FCV 488
☐ FCV 498

1A(1B.1C) SG
FW BYP FLOW

- ☐ FCV 479
☐ FCV 489
☐ FCV 499

- 9.2 Verify both steam generator feed pumps - TRIPPED.

- 9.3 Verify SG blowdown - ISOLATED.

1A(1B.1C) SCBD
ISO

- ☐ Q1G24HV7614A closed
☐ Q1G24HV7614B closed
☐ Q1G24HV7614C closed

- 9.4 Verify SG blowdown sample ISOLATED MLB lights lit.

1A(1B.1C) SCBD SAMPLE
ISO

- ☐ MLB1 19-2 lit Q1P15HV3328 closed
☐ MLB1 19-3 lit Q1P15HV3329 closed
☐ MLB1 19-4 lit Q1P15HV3330 closed

- 9.1 Verify main feedwater stop valves closed.

MAIN FW TO 1A(1B.1C) SG
STOP VLV

- ☐ Q1N21MOV3232A
☐ Q1N21MOV3232B
☐ Q1N21MOV3232C

- 9.2 Stop both EH PUMPs.

- 9.4 Locally verify SCBD sample - isolated (BOP).

STEAM GEN 1A(1B.1C) SAMPLE
ISO

- ☐ Q1P15HV3328 closed
☐ Q1P15HV3329 closed
☐ Q1P15HV3330 closed

OR

Locally verify SCBD sample - isolated (PRIP).
STEAM GEN 1A(1B.1C) SAMPLE ISO

- ☐ Q1P15HV3179C closed
☐ Q1P15HV3180C closed
☐ Q1P15HV3181C closed

Attached Procedures

EEP-0 ATT 2

- 10 Check no main steam line isolation actuation signal present.

Signal	Setpoint	Coincidence	TSLB
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2 19-3 19-4
HI STEAM FLOW	> 40%	1/2 ON 2/3	TSLB4 16-3 16-4 17-3 17-4 18-3 18-4
AND LO-LO TAVG	< 543°F	2/3	TSLB2 10-1 10-2 10-3
HI-HI CTMT PRESS	>16.2 psig	2/3	TSLB1 2-2 2-3 2-4

- 10 Perform the following.

- 10.1 Verify main steam line isolation and bypass valves closed.

1A(1B,1C) SC
MSIV - TRIP
☐ Q1N11HV3369A
☐ Q1N11HV3369B
☐ Q1N11HV3369C
☐ Q1N11HV3370A
☐ Q1N11HV3370B
☐ Q1N11HV3370C

1A(1B,1C) SC
MSIV - BYP
☐ Q1N11HV3368A
☐ Q1N11HV3368B
☐ Q1N11HV3368C
☐ Q1N11HV3976A
☐ Q1N11HV3976B
☐ Q1N11HV3976C

- 10.2 IF any main steam isolation valve open.
THEN place the associated test switch in the TEST position.

SG	1A	1B	1C
1A(1B,1C) SC MSIV - TEST Q1N11HV	☐ 3369A/ 70A	☐ 3369B/ 70B	☐ 3369C/ 70C

Attached Procedures

EEP-0 ATT 2

11 Verify PHASE A CTMT ISO.

11.1 Verify PHASE A CTMT ISO -
ACTUATED.

- ☐ MLB-2 1-1 lit
- ☐ MLB-2 11-1 lit

NOTE: The turbine building SW isolation valves Q1P16V515, 517, 514 and 516 will take approximately two minutes to fully stroke closed.

11.2 Check all MLB-2 lights - LIT.

11.2 Verify PHASE A CTMT ISO
alignment using ATTACHMENT 3,
PHASE A CONTAINMENT ISOLATION.12 Check all reactor trip and
reactor trip bypass breakers -
OPEN.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

12 Perform the following.

- 12.1 Open reactor trip breaker(s)
manually from MCB or locally.
- 12.2 Record any breaker(s) manually
opened.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

13 Trip CRDM MG set supply
breakers.

- 1A(1B) MG SET
SUPP BKR
- ☐ N1C11E005A
- ☐ N1C11E005B

Attached Procedures

EEP-0 ATT 2

14 Secure secondary components.

14.1 Stop both heater drain pumps.

HDP

☐ 1A☐ 1B

14.2 Check any condensate pump started.

14.2.1 IF started.
THEN stop all but one
condensate pump.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

14.2.1 IF no condensate pumps are
started.
THEN ensure handswitches
positioned to STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

14.3 IF condensate pump operating.
THEN verify backup cooling
aligned to condensate pumps
per FNP-0-SOP-0.0. APPENDIX B.
TB SO ACTIONS FOLLOWING A
REACTOR TRIP OR SAFETY
INJECTION.

14.3 Ensure all condensate pump
handswitches positioned to
STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

15 Verify both CRACS mode selector switches in the ON position.

CRACS Mode Selector Switch

☐ A TRAIN☐ B TRAIN

16 Verify two trains of ECCS equipment aligned.

16.1 Perform ATTACHMENT 4. TWO
TRAIN ECCS ALIGNMENT
VERIFICATION.

-END-

Attached Procedures

SOP-60.0 4.3

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as needed 4.3 or 4.4.

4.3 Verifying Proper PRF System in Operation During a LOCA (A Train Inservice).

- 4.3.1 IF both trains of PRF are started, THEN secure B train of PRF per section 4.6, Securing B Train of PRF Operation During a LOCA.
- 4.3.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.3.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.3.4 Verify Phase B reset as indicated by MLB-3, lights 1.1 and 6.1 not lit.
- 4.3.5 Verify open 1A PRF SUCTION DMPR Q1E15MOV3362A.
- 4.3.6 Verify 1A PRF recirculation fan started.
- 4.3.7 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A.
- 4.3.8 Verify 1A PRF exhaust fan started.
- 4.3.9 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.3.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS Δ P PDI 3367A and PDI 3367B, AND power to B train PRF is available, THEN place the B train of PRF in service as follows:
 - 4.3.10.1 Verify open 1B PRF SUCT DMPR Q1E15MOV3362B.
 - 4.3.10.2 Verify 1B PRF recirculation fan started.
 - 4.3.10.3 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.3.10.4 Verify 1B PRF exhaust fan started.
 - 4.3.10.5 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

Attached Procedures

SOP-60.0 4.4

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as desired in sections 4.3 or 4.4.

4.4 Verifying Proper PRF System in Operation During a LOCA (B Train Inservice).

- 4.4.1 IF both trains of PRF are started, THEN secure A train of PRF per section 4.5, Securing A Train of PRF Operation During a LOCA.
- 4.4.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.4.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.4.4 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF remaining in service.

- 4.4.5 Verify open B PRF SUCTION DMPR Q1E15MOV3362B.
- 4.4.6 Verify 1B PRF recirculation fan started.
- 4.4.7 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15HV3356B.
- 4.4.8 Verify 1B PRF exhaust fan started.
- 4.4.9 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A(B) will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.4.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS Δ P PDI 3367A and PDI 3367B, AND power to A train PRF is available, THEN place the A train of PRF in service as follows:
 - 4.4.10.1 Verify open 1A PRF SUCT DMPR Q1E15MOV3362A.
 - 4.4.10.2 Verify 1A PRF recirculation fan started.
 - 4.4.10.3 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.4.10.4 Verify 1A PRF exhaust fan started.
 - 4.4.10.5 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

Attached Procedures

SOP-60.0 4.5

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

4.5 Securing A Train of PRF Operation During a LOCA.

4.5.1 Verify the following dampers closed:

- SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A
- SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B

4.5.2 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF being secured.

4.5.3 Place 1A PRF exhaust fan in automatic by placing the handswitch to STOP and releasing.

4.5.4 Place 1A PRF recirculation fan in automatic by placing the handswitch to STOP and releasing.

4.5.5 Place 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A handswitch to AUTO.

4.5.6 Close 1A PRF RECIRC FAN RECIRC DMPR Q1E15MOV3361A(B) and return switch to AUTO.

4.5.7 Close 1A PRF SUCTION DMPR Q1E15MOV3362A(B) and return switch to AUTO.

Attached Procedures

EEP-0 Step 5.1 load shed

- 5 [CA] Restore power to any emergency bus.

- 5.1 Verify supply breakers for major loads on emergency 4160 V busses - OPEN.

- ☐ BKR DF01 (1A S/U XFMR TO 1F 4160 V BUS)
- ☐ BKR DF15 (1B S/U XFMR TO 1F 4160 V BUS)
- ☐ BKR DF-13-1 (1F 4160 V BUS TIE TO 1H 4160 V BUS)
- ☐ BKR DG01 (1A S/U XFMR TO 1G 4160 V BUS)
- ☐ BKR DG15 (1B S/U XFMR TO 1G 4160 V BUS)

- ☐ 1A BATT CHARGER BKR ED-04-1
- ☐ 1C BATT CHARGER A TRN BKR ED-09-1
- ☐ 1C BATT CHARGER B TRN BKR EE-06-1
- ☐ 1B BATT CHARGER BKR EE-05-1

- ☐ 1C CCW PUMP BKR DF-04-1
- ☐ 1B CCW PUMP BKR DF-05-1
- ☐ 1B CCW PUMP BKR DG-05-1
- ☐ 1A CCW PUMP BKR DG-04-1

- ☐ 1A SW PUMP BKR DK-03-1
- ☐ 1B SW PUMP BKR DK-04-1
- ☐ 1C SW PUMP BKR DK-05-1
- ☐ 1C SW PUMP BKR DL-05-1
- ☐ 1D SW PUMP BKR DL-03-1
- ☐ 1E SW PUMP BKR DL-04-1

- ☐ #4 RW PUMP BKR DJ-03-1
- ☐ #5 RW PUMP BKR DJ-04-1
- ☐ #8 RW PUMP BKR DH-03-1
- ☐ #9 RW PUMP BKR DH-04-1
- ☐ #10 RW PUMP BKR DH-05-1

Attached Procedures

EEP-0 Step 5.1 load shed

- ☐ 1B CRDM CLG FAN BKR ED-11-1
- ☐ 1A CRDM CLG FAN BKR EE-13-1

- ☐ 1A CS PUMP BKR DF-11-1
- ☐ 1B CS PUMP BKR DG-11-1

- ☐ 1A RHR PUMP BKR DF-09-1
- ☐ 1B RHR PUMP BKR DG-09-1

- ☐ 1A CHG PUMP BKR DF-06-1
- ☐ 1B CHG PUMP A TRN BKR DF-07-1
- ☐ 1B CHG PUMP B TRN BKR DG-07-1
- ☐ 1C CHG PUMP BKR DG-06-1

- ☐ 1A MDAFWP BKR DF-10-1
- ☐ 1B MDAFWP BKR DG-10-1

Attached Procedures

EEP-1 ATT 4

ATTACHMENT 4

VERIFYING 4160 V BUSES ENERGIZED

1 Verify 4160 V busses energized.

CAUTION: IF a DG is already operating above its continuous load rating. THEN additional manual loads should not be added. Unanticipated plant emergency conditions may dictate the need to load the emergency diesel generators above the continuous load rating limit (i.e. 2.85 MW for small DGs, 4.075 MW for large DGs). Under these circumstances, diesel generator loading may be raised not to exceed the 2000 hour load rating limit (i.e. 3.1 MW for small DGs, 4.353 MW for large DGs). Diesel loading should be reduced within the diesel generator continuous load rating limit as soon as plant conditions allow.

NOTE: Plant conditions may dictate establishment of contingency electrical lineups. ENP-1-AOP-5.1, CONTINGENCY ELECTRICAL ALIGNMENTS provides guidance for establishing those lineups.

1.1 Check offsite power - AVAILABLE.	1.1 Request Shift Manager coordinate efforts to restore offsite power.
1.2 Check BKR DF01 (1A startup transformer to 1F 4160 V bus) - CLOSED.	1.2 Verify 1F 4160 V bus energized by 1-2A or 1C diesel generator.
1.3 Verify BKR DF02 (1F 4160 V bus tie to 1K 4160 V bus) - CLOSED.	1.3 IF diesel generator cooling NOT supplied from Unit 2. THEN secure 1-2A and/or 1C diesel generator using ATTACHMENT 5, SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT.
1.4 Check BKR DG15 (1B startup transformer to 1G 4160 V bus) - CLOSED.	1.4 Verify 1G 4160 V bus energized by 1B diesel generator.

Attached Procedures

EEP-1 ATT 4

1.5 Verify BKR DG02 (1C 4160 V bus tie to 1L 4160 V bus) - CLOSED.

1.6 Verify all RCP busses - ENERGIZED.

- [] 1A 4160 V bus
- [] 1B 4160 V bus
- [] 1C 4160 V bus

1.7 Check 1E 4160 V bus - ENERGIZED.

1.5 IF diesel generator cooling NOT supplied, THEN secure 1B diesel generator using ATTACHMENT 5. SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT.

1.7 Establish power to 1C 600 V LC emergency section loads.

1.7.1 Place handswitch for pressurizer heater group 1B in OFF.

1.7.2 Open BKR EC08-1.

1.7.3 Close BKRs EE07-1 and EC10-1.

CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel generator capacity must be available prior to energizing a group of pressurizer heaters.

1.7.4 Energize pressurizer heater group 1B as required.

1.8 Check 1D 4160 V bus - ENERGIZED.

1.8 Proceed to step 1.10.

1.9 IF 1D 4160 V bus energized, THEN return to PROCEDURE STEPS, step 13.

Attached Procedures

EEP-1 ATT 4

1.10 Establish power to
1A 600 V LC emergency section
loads.

1.10.1 Place handswitch for
pressurizer heater group
1A in OFF.

1.10.2 Verify open BKR EA08-1.

1.10.3 Verify closed BKRs ED08-1
and EA09-1.

CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel
generator capacity must be available prior to energizing a group of
pressurizer heaters.

NOTE: The BYPASS position allows manual energization of pressurizer heater
group 1A from the MCB handswitch, and automatic energization based on
either pressurizer pressure $\leq$ 2210 psig or pressurizer level 5% above
program.

1.10.4 WHEN pressurizer heater
group 1A operation is
desired,
THEN place HTR GRP 1A
BLOCKING BYPASS SW to
BYPASS.

1.10.5 IF required,
THEN manually energize
pressurizer heater group
1A.

Attached Procedures

EEP-1 ATT 4

CAUTION: To ensure adequate supply voltage to all class 1E loads and to meet short circuit analysis constraints, only one air compressor, 1C (preferred) or 1A, should be powered from the diesel generator. One air compressor will consume 0.16 MW of diesel generator load.

1.11 Verify 1C air compressor in service.

1.11.1 Verify 1C air compressor handswitch in AUTO after START/RUN.

1.11.2 Verify 1C air compressor started.

1.11 Align 1A air compressor.

a) Verify 1C air compressor handswitch in OFF.

b) Verify SI - RESET.

☐ MLB-1 1-1 not lit

☐ MLB-1 11-1 not lit

CAUTION: IF offsite power is lost after sequencer is reset.
THEN manual actions may be required to restart safeguards equipment.

c) Reset B1F sequencer by depressing the ESS STOP RESET pushbutton on the sequencer panel.
(139' AUX BLDG SWGR rm)

d) Place BKR DF13 SYNCH SWITCH in MAN.

e) Close BKR DF13 (1F 4160V bus tie to 1H 4160V bus).

f) Energize 1C 600 V LC from normal supply.

☐ BKR DH01 closed

☐ BKR EG02-1 closed

g) Start 1A AIR COMPRESSOR.

Attached Procedures

EEP-1 ATT 4

1.12 Check INST AIR PRESS PI 4004B
- GREATER THAN 85 psig.

1.12 Perform the following.

NOTE: The intent of this step is to regain control of critical air operated components including PORVs and atmospherics. Based on plant conditions and availability of manpower, the applicability, priority and performance of the following actions is at the discretion of the Shift Supervisor.

1.12.1 Restore air pressure.

- Verify proper air compressor operation using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

OR

- IF 2C air compressor available.
THEN align 2C air compressor to Unit 1 using FNP-1-SOP-31.0. COMPRESSED AIR SYSTEM.

1.12.2 IF instrument air NOT restored.
THEN align nitrogen supply to PORVs using FNP-1-SOP-62.1. BACK-UP AIR OR NITROGEN SUPPLY TO THE PRESSURIZER POWER OPERATED RELIEF VALVES.

1.12.3 IF instrument air NOT restored.
THEN align emergency air supply to atmospheric relief valves and/or TDAPWP using FNP-1-SOP-62.0. EMERGENCY AIR SYSTEM.

Attached Procedures

EEP-1 ATT 4

- 1.12.4 IF instrument air NOT
restored because 1G 600 V
LC is deenergized.
THEN energize 1G 600 V LC
from 1F 600 V LC using
FNP-1-SOP-36.3, 600.
480 AND 208/120 VOLT AC
ELECTRICAL DISTRIBUTION
SYSTEM.
- 1.12.5 WHEN instrument air
pressure restored.
THEN perform step 1.13.
- 1.12.6 Return to PROCEDURE STEPS.
step 13.

1.13 Verify instrument air aligned
to containment. (BOP)

IA TO PENE RM

☐ N1P19HV3825 open

☐ N1P19HV3885 open

IA TO CTMT

☐ Q1P19HV3611 open

Facility: Farley Scenario No.: 5-Spare Op-Test No.: 2007301

Examiners: Frank Ehrhardt Operators: _____

Jay Hopkins _____

Craig Kontz _____

Initial Conditions: Mode 3, MOL, Xe decreasing from its peak following the reactor trip, The reactor tripped 8 hours ago as a result of two dropped rods, A Train On-Service – A Train Protected,

Turnover:

- 0% RTP, MOL, 940 ppm Cb, 10,000 MWD, Xe concentration is slowly decreasing,
- reactor tripped 8 hours ago as a result of two dropped rods & repairs are in progress,
- Reactor Startup planned in 16 hours, ECC being calculated by Reactor Engineering,
- Currently at step 2.7 of UOP-1.3 initial conditions, IPTE Brief scheduled in 12 hours
- The repairs to the Rod Control system are in progress
- CTMT batch release – last release 2 days ago,
- Current Risk Assessment is **GREEN** and projected is **GREEN**,
- A Train On-Service – A Train Protected,
- Radside SO monitoring 1A charging pump lube oil temperature following maintenance – currently oil temp is stable at 94 deg.,
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1	1	C (RO)	CRDM fan fault, securing the CRCM fan on service & starting other CRDM fan required to provide cooling to CRDMs
2		N (RO) TS (SRO)	RWST lo due to makeup to SFP, Makeup to RWST with reactor makeup system required to maintain T.S. lv
3	2	C (BOP) TS (SRO)	AFW FCV-3227C fails open, AFW FCV to C SG, alternate means of isolation required to prevent SG overfill

4	3	C (RO & BOP) TS (SRO)	1A S/U transformer trips on fault, 1A RCP loses power, AOP-4 required,
	4	C (BOP) TS (SRO)	1A & 1B Ctmt coolers fail to auto start, man start of at least one required
5	5	M (ALL) C (BOP)	A SBLOCA occurs. Automatic SI fails to actuate, man actuation required
6		C (no actions)	A LBLOCA occurs. 'A' CS pump trips on the auto start and 'B' CS discharge MOV-8820B breaker trips soon after the auto open signal, FRP-Z.1 entry required when CSFs are directed to be monitored
			Terminate when FRP-Z.1, complete (significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

SCENARIO Spare Summary sheet**Initial Conditions:**

- Mode 3, MOL, Xe decreasing from its peak following the reactor trip.
- The reactor tripped 8 hours ago as a result of two dropped rods.
- The repairs to the Rod Control system are in progress.
- The Startup is planned for 16 hours from now.

Presets:

Event No.	Event Type*	Event Description
0	preset	Isolate MSDPs, preset to prevent RCS cooldown
3	preset	flash ann jk1 A MDAFWP SUCT PRESS LO when FCV3227C > 0.6, clear when FCV3227C > 0.9
6	Preset	• auto SI train A & B fails • 1A & 1B Cmt coolers don't auto start on SI • 1A CS Pump trips on overload after auto start • 1B CS Pump Disch vlv 8820B breaker trips after B pump starts and flow is indicated >0 gpm

Event 1 1B CRDM fan fault, BC1 in, ARP requires Securing 1B fan & starting 1A CRDM fan.

Event 2 EG4, RWST MIN TECH SPEC LVL A TRN annunc comes in while Radside SO filling SFP from RWST. Make up with the Reactor Makeup system required after SFP filling is secured.
(mass in RWST starts out just above the alarm setpoint
@ 38.8 ft.: alarm comes in ~30 secs after SFP filling initiated)

Event 3 AFW FCV-3227C fails open. In this mode, SG level will be maintained using AFW. The crew will have to make a decision on control of AFW flow to the 'C' SG.

LCO 3.7.5 and evaluate the operability of the AFW system with one flowpath potentially inoperable.

Event 4 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop. Closing the A loop spray valve will be required (RO) & secure feeding the SG by closing A loop AFW FCV (BOP)

1A & 1B CTMT CRLS do not auto start

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits.

Another NRC Scenario on this exam had 1A RCP trip from an at power condition. This event is from a mode 3 condition. The result is different in this scenario due to no shutdown required, and AFW FCV must be closed instead of a FRV. TS must still be addressed, but from a different mode of applicability.

Event 5 A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of SI before Step 5 of EEP-0 – Verification of Immediate operator actions)

Event 6 A LBLOCA occurs. When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-EEP-1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

[illegible]

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 2

Event Description: EG4, RWST MIN TECH SPEC LVL A TRN annunc comes in while Radside SO filling SFP from RWST. Make up with the Reactor Makeup system required after SFP filling is secured.

(mass in RWST starts out just above the alarm setpoint
@ 38.8 ft.: alarm comes in ~30 secs after SFP filling initiated)

Time	Position	Applicant's Actions or Behavior
	SRO	Directs Performance of ARP EG4: RO & BOP actions Below:
	BOP	Determines actual level in RWST • May look at trend on computer (slow trend down in RWST level started when Radside SO Commenced makeup to SFP) • Actual RWST level IS at alarm setpoint • May call Radside SO and ask to secure RWST silica removal if it is in service (it is not in service) • Calls Radside SO to secure makeup to the SFP • Calls Diesel building SO to check around the RWST for leaks OR checks computer trend to verify RWST level drop has stopped
	RO	Aligns the boric acid blender to the RWST, per SOP-2.3, CHEMICAL AND VOLUME CONTROL SYSTEM REACTOR MAKEUP CONTROL SYSTEM, section 4.2.3 Makeup to Refueling Water Storage Tank (Attached) • fill the RWST until the alarm clears. • NOTE: computer reactivity spreadsheet MAY BE USED to calculate a blended flow to makeup to the RWST instead of SOP-2.3 NOMOGRAPHS or formula.
	SRO	Refers to Technical Specifications LCO 3.5.4 (RWST) & tank curves: • Determines that actual RWST level of ~38.7' is greater than tech spec level required of 38.4'. • No LCO required

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 3

Event Description: AFW FCV-3227C fails open. In this mode, SG level will be maintained using AFW. The crew will have to make a decision on control of AFW flow to the 'C' SG.

LCO 3.7.5 and evaluate the operability of the AFW system with one flowpath potentially inoperable

Time	Position	Applicant's Actions or Behavior
	SRO	Directs ARP Performance IF alarm comes in: • JK1, 1A MDAFWP SUCT PRESS LO
	BOP	• Determines actual suction pressure by PI-3211A is LOW & CST level is adequate • Determines FCV3227C is full open & won't go closed when demanded by potentiometer • Recommends isolating MDAFW flow to C SG by ○ closing BOP MOV3764C (B train) OR MOV3764F (A train) ○ OR Jacking closed locally HV3227C ○ OR Isolating HV3227C locally with manual isolation valve ○ Logs out of position valve not covered by a procedure for configuration control
	SRO	• Writes CR & informs Work Week Coordinator • Writes LCO 3.7.5, Condition C for inoperable MDAFW Flowpath to C SG (2 MD trains inop. to C SG)

Op-Test No.: HLT-31 NRC **Scenario No.:** Spare **Event No.:** 4

Event Description: 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop.

1A & 1B CTMT CRLS do not auto start [AOP-5 does not address ctmt coolers, but EEP-0 will]

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs AOP-5.0, LOSS OF A OR B TRAIN ELECTRICAL POWER, entry and directs actions per BOP rows below: • Directs AOP-4.0, LOSS OF REACTOR COOLANT FLOW, entry and directs actions per RO rows below:
	BOP	• Verifies both train of 4160V BUSSES energized: YES – A train from 1/2A DG, B train from off-site through B SU XFMR • Checks 1/2A DG Started & output bkr closed ○ Started ○ 59-61 Hz ○ 3740-4580 V ○ 1F 4160V bus power light lit

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 4

Event Description: 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop.

1A & 1B CTMT CRLS do not auto start [AOP-5 does not address ctmt coolers, but EEP-0 will]

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits

Time	Position	Applicant's Actions or Behavior
	BOP	• Verifies SW supply flow in A train adequate ○ 2 A train SW pumps running ○ SW TO/FROM DG BLDG in A train OPEN: V519/536 ○ Dual indication (throttled) on SW TO TURB BLDG ISO valves V514 & V517 ○ Opens SW TO TURB BLDG ISO B TRAIN V517 ○ Closes A train SW TO/FROM TURB BLDG ISO valves V515, V516, V540, & V542 ○ Closes MOV3135, MOV3149 ○ Directs Radside SO to secure SGBD ○ Checks no 1/2A DG lube oil temp annunciater in alarm (calls Diesel building SO to check local annunc. Panel)
	BOP	If desired, Stops A or B MDAFW pump

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 4

Event Description: 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop.

1A & 1B CTMT CRLS do not auto start [AOP-5 does not address ctmt coolers, but EEP-0 will]

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits

Time	Position	Applicant's Actions or Behavior
	BOP	5 <u>IF</u> not required, <u>THEN</u> stop any running MDAFW pump. 5.1 Momentarily place MDAFW FCV 3227 RESET A TRN <u>OR</u> B TRN switches to the reset position. 5.2 Stop 1A or 1B MDAFW Pump 5.3 Verify 1A or 1B MDAFW Pump amps at 0 on II3305A or B. 5.4 <u>WHEN</u> MDAFW Pump is stopped, <u>THEN</u> perform the following: ☐ Verify MDAFWP TO 1A,1B <u>AND</u> 1C SG Q1N11HV3227A,B <u>AND</u> C in MOD. ☐ Verify MDAFWP TO 1A/1B/1C SG B TRN FCV 3227 in MOD. ☐ Fully open MDAFWP to 1A,1B and 1C SG FLOW CONT HIC-3227AA, BA and CA (100% demand)
	BOP	Checks SW available in B train • 1D & 1E SW pumps running • B train SW pressure > 60 psig
	RO	• Starts A CCW pump (B train) • Starts C charging pump

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 4

Event Description: 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop.

1A & 1B CTMT CRLS do not auto start [AOP-5 does not address ctmt coolers, but EEP-0 will]

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits

Time	Position	Applicant's Actions or Behavior
	BOP	Checks A train CCW operating • C HX FI 3043CA > 0 gpm
	RO or BOP	• Maintains SG NR levels 61-69% with a MDAFW pump, & controlling FCV-3227A, B, & C • Checks RHR NOT required • Maintains Mode 3 stable per UOP • Verifies 4160V NON-Vital busses energized ○ 1B, 1C, 1E 4160V busses enrg. ○ Reports 1A & 1D 4160V busses are NOT energized ○ Performs steps for 1D bus deenergized: 15.3 RNO, 15.4, 15.5, & 15.6 AOP-5 (Attached)
	SRO	• Check Tech Spec met for 3.4.5, RCS Loops—MODE 3 ○ (only 2 loops in operation are required in mode 3, so this is met) • Write LCO on 3.8.1 AC Sources—Operating, Condition A ○ One of the two offsite required circuits is inoperable
	BOP	Verify unaffected train Energized • LCs E, C, L, J, S • MCCs B, G, T, V

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 4

Event Description: 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop.

1A & 1B CTMT CRLS do not auto start [AOP-5 does not address ctmt coolers, but EEP-0 will]

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits

Time	Position	Applicant's Actions or Behavior
	BOP	• Calls Radside SO to check SFP in service & place on service on B train if necessary • Check A train 125V DC battery loads < 250 a • Secures A Cond pmp switch to the off position • Secures Make up to RWST if not done already due to loss of both RMW pmps (due to loss of power to LoLo lvl switches) • Secures 1B CRDM Fan which auto starts and brings in fault alarm from previously identified fault
	RO	Performs AOP-4 immediate operator actions: • Secures feeding A SG by closing MDAFW FCV 3227A • Manually closes 1A RCS loop spray valve PK-444C
	RO	• Monitors Tavg for RCS loops $\geq 541^{\circ}\text{F}$ Minimum Temp for Criticality ○ (A loop may be < 541°F, but this TS is not applicable in mode 3) • Maintains PRZR pressure 2200-2300 psig with heaters and B loop spray valve as required • Checks normal letdown established ○ IF Letdown not established, restore using AOP-4.0 attachment 1 (attached) • Maintains PRZR level at ~22% level
	SRO	Directs to open Reactor Trip breakers within 6 hours

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 4

Event Description: 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-5 for the loss of the train of power and AOP-4 for the loss of flow in the 'A' loop.

1A & 1B CTMT CRLS do not auto start [AOP-5 does not address ctmt coolers, but EEP-0 will]

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits

Time	Position	Applicant's Actions or Behavior

	SRO	Procedure step is: Direct to UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY After evaluation of this step may decide to go to UOP-1.3: Procedure and step in effect

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 5

Event Description: A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of ESF equipment before Step 5 of EEP-0 – Verification of Immediate operator actions)

Time	Position	Applicant's Actions or Behavior
	SRO	Directs entry into AOP-1.0, and directs actions per RO/BOP actions listed in rows below:
	BOP or RO	Takes actions of AOP-1.0 (attached) UNTIL Manual Reactor Trip & SI Due to RCS Leakage greater than Reactor Makeup capability (<120 gpm).
	SRO	Starts at step 1 of EEP-0, and directs actions per RO/BOP actions listed in rows below:
CRITICAL TASK: (RO or BOP) <u>WHEN</u> SI Setpoint is exceeded, <u>THEN</u> Manually actuate at least one train of SI before Step 5 of EEP-0 – Verification of Immediate operator actions		
	BOP or RO	Manually actuates SI when called for and no auto SI occurs
	SRO, RO, OR BOP	Announces EEP-0 Fold out Page items in effect, directs/takes actions required - Subcooling <16°F [45], stop all RCPs - RCS Press < 1300 psig, close chg mini-flows - Ctmt pressure > 4 psig, use adverse numbers
	RO	- Checks reactor tripped - All 4 RT & BYP Bkrs are open - PR & IR power trending down - All DRPI rod bottom lights are lit - Checks turbine tripped - Checks power to 4160 V ESF busses both trains energized - Verifies operating DGs are being supplied from at least one SW pump - Checks SI Status - MLB-1 1-1 & 1-2 lit - BYP & PERMISSIVE SI light lit

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 5

Event Description: A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of ESF equipment before Step 5 of EEP-0 – Verification of Immediate operator actions)

Time	Position	Applicant's Actions or Behavior
	BOP	- Checks reactor tripped - All 4 RT & BYP Bkrs are open - PR & IR power trending down - All DRPI rod bottom lights are lit - Checks turbine tripped - Checks power to 4160 V ESF busses both trains energized - Verifies operating DGs are being supplied from at least one SW pump - Checks SI Status - MLB-1 1-1 & 1-2 lit - BYP & PERMISSIVE SI light lit - Verifies SI Auto actions using EEP-0 ATT 2 (Attached)
	SRO, RO, or BOP	Announces Fold out page conditions met. Actions directed and performed: - Adverse numbers are in effect (>4psig in ctmt) - Charging miniflow valves must be closed (<1300psig in RCS) - RCPs must be secured IF HHSI flow < 0 gpm)
	RO	Check ctmt pressure has remained <27#: NO, - ctmt pressure has been >27#, - perform RNO column:

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 5

Event Description: A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of ESF equipment before Step 5 of EEP-0 – Verification of Immediate operator actions)

Time	Position	Applicant's Actions or Behavior
	RO	6.1 Verify PHASE B CTMT ISO - ACTUATED. ☐ MLB-3 1-1 lit ☐ MLB-3 6-1 lit 6.2 Stop all RCPs. RCP ☐ 1A ☐ 1B ☐ 1C 6.3 Verify PHASE B CTMT ISO alignment. 6.3.1 Check All MLB-3 lights lit. 6.3.2 <u>IF</u> any MLB-3 light <u>NOT</u> lit. <u>THEN</u> verify PHASE B CTMT ISO using ATTACHMENT 5. PHASE B CONTAINMENT ISOLATION.

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 5

Event Description: A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of ESF equipment before Step 5 of EEP-0 – Verification of Immediate operator actions)

Time	Position	Applicant's Actions or Behavior
	RO	6.4 Check containment spray. 6.4.1 Check containment spray flow in both trains greater than 0 gpm. CS FLOW ☐ FI 958A ☐ FI 958B 6.4.2 <u>IF</u> containment spray flow in both trains <u>NOT</u> greater than 0 gpm. <u>THEN</u> verify containment spray pump suction valves open. RWST TO 1A(1B) CS PUMP ☐ Q1E13MOV8817A ☐ Q1E13MOV8817B
	RO	Announces "Unit 1 reactor trip and safety injection"
	RO or BOP	- Checks AFW status - Verifies at least 395 gpm flow to SGs - OR - at least one level > 31% {48} - Controls MDAFW & TDAFW flows as necessary - Stops TDAFW pump WHEN at least 2 SGs >28% - Maintains 31-65% {48-65} SG levels - Checks RCS temps 547 & Stable, NO: performs RNO

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 5

Event Description: A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of ESF equipment before Step 5 of EEP-0 – Verification of Immediate operator actions)

Time	Position	Applicant's Actions or Behavior
	RO or BOP	9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK ☐ A TRN in OFF RESET ☐ B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed. 1A(1B.1C) MS ATMOS REL VLV ☐ PC 3371A ☐ PC 3371B ☐ PC 3371C
	RO or BOP	9.1.3 Control total AFW flow to minimize RCS cooldown. AFW FLOW TO 1A(1B.1C) SG ☐ FI 3229A ☐ FI 3229B ☐ FI 3229C AFW TOTAL FLOW ☐ FI 3229 9.1.4 IF MSIVs are closed THEN proceed to step 9.1.8
	RO or BOP	[MSR isolation & Main Steam Drain Pot isolation are done without SRO direction by the Turbine Building SO after each reactor trip, these may not be performed at this time for this reason]
	RO or BOP	Secures one SJAE if two are in service

Op-Test No.: HLT-31 NRC **Scenario No.:** Spare **Event No.:** 5

Event Description: A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of ESF equipment before Step 5 of EEP-0 – Verification of Immediate operator actions)

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Closes MSIVs if cooldown not stopped
	RO or BOP	Checks PORVs • closed, • iso valves open with power, • no evidence of leak by via downstream temps & PRT parameters
	RO	Checks RCP stopped due to insufficient subcooling
	RO	Checks CHG mini-flows closed due to RCS press<1300 psig
	RO or BOP	Checks SGs not faulted • no press falling uncontrolled • none less than 50 psig
	RO or BOP	Checks SGs not ruptured • no secondary radiation levels high • no SG levels rising uncontrolled
	RO or BOP	Checks RCS intact: NO, RCS not intact due to ctmt rad monitors in alarm, ctmt pressure > 3 psig, ctmt ECCS sump > 0.4 FT
	SRO	Directs team to transition to EEP-1 per RNO of step 15, RCS is NOT intact (EEP-1 ACTIONS as listed later in this event)

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 5

Event Description: A SBLOCA occurs. Automatic SI fails to actuate. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of ESF equipment before Step 5 of EEP-0 – Verification of Immediate operator actions)

Time	Position	Applicant's Actions or Behavior

[illegible]

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 6

Event Description: A LBLOCA occurs. When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-EEP-1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

Time	Position	Applicant's Actions or Behavior

	SRO	Directs entry into FRP-Z.1 WHEN orange path exists AND WHEN CSFs are directed to be monitored which is AFTER EEP-0 is exited
	RO or BOP	Verifies: • Phase A ISO (all MLB-2 lights lit) • Ctmt vent iso: ○ Ctmt purge & mini purge dampers closed ○ Mini purge supp.exh FAN secured
	RO or BOP	Checks ctmt spray required by: • CTMT pressure has risen to > 27 psig • Phase B CTMT ISO actuated (MLB-3 1-1 & 6-1 LIT) • CS pumps running (A is tripped, there is No flow on B train due to disch MOV8820B Bkr tripping prior to valve opening) • CS flow is > 0 gpm both trains ○ Reports to SRO that neither train has flow ▪ A train has no flow due to A CS pump tripped ▪ B CS has no flow due to MOV8820B bkr tripped
	RO or BOP	Verifies CS Alignment: • Both Suct. MOV8817A & B open (aligned to RWST) • A Disch hdr aligned (B disch hdr NOT aligned due to MOV8820B bkr trip)

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 6

Event Description: A LBLOCA occurs. When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-EEP-1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

Time	Position	Applicant's Actions or Behavior

CRITICAL TASKS: (BOP) Manually start at least one A train Containment cooler before exiting FRP-Z.1.

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 6

Event Description: A LBLOCA occurs. When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-EEP-1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

Time	Position	Applicant's Actions or Behavior
	RO or BOP	- Checks all MLB-3 lights lit - STOPs all RCPs - Verifies All avail ctmt coolers running in slow (at least one A train ctmt cooler-DG load may support both) - Verifies EMERG SW valves open - Verifies all MSIV & BYPASS valves closed
	RO or BOP	Checks if feed flow should be isolated to any SG Reports that NO SG is dropping uncontrolled or < 50 psig
	SRO	WHEN FRP-Z.1 exit is directed, goes to procedure and step in effect: EEP-1 STEP 1
	SRO	Directs actions in EEP-1 per RO/BOP action in rows below:
	RO	Checks RCP stopped due to insufficient subcooling
	RO or BOP	Checks SGs not faulted - no press falling uncontrolled - none less than 50 psig

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 6

Event Description: A LBLOCA occurs. When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-EEP-1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

Time	Position	Applicant's Actions or Behavior
	RO or BOP	- Checks AFW status - Verifies at least 395 gpm flow to SGs - OR - at least one level > 31% {48} - Controls MDAFW & TDAFW flows as necessary - Stops TDAFW pump WHEN at least 2 SGs >28% - Maintains 31-65% {48-65} SG levels
	BOP	Checks secondary radiation normal: YES
	RO	Checks PORVs - closed, - iso valves open with power, - no evidence of leak by via downstream temps & PRT parameters
	SRO	Directs step 6 be performed (1 hour from start of event requirements - not available to perform in simulator- SRO calls for SSS or an extra to perform) - close recirc discs per ATT 1 - Establish 1A & 1B post LOCA H2 analyzer on service per ATT 2 - Plot H2 on Fig 1 - Check and control H2 concentration in ctmt
	SRO	Checks for SI termination criteria and continues on without terminating SI due to LOCA in progress

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 6

Event Description: A LBLOCA occurs. When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-EEP-1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

Time	Position	Applicant's Actions or Behavior
	RO or BOP	Checks containment spray system Resets both trains of CS signals
	RO or BOP	- Determines LHSI pumps should NOT be stopped due to RCS Pressure less than 275 psig {435 psig} - Establishes CCW to both RHR HXs by verifying open MOV 3185A & B
	BOP	Verifies 4160V busses energized per EEP-1 ATT 4, VERIFYING 4160 V BUSSES ENERGIZED (Attached)
	BOP	Directs securing Unloaded DGs (extra, Unit two UO, or BOP)
	SRO	- Begins evaluation of plant status, - Determines both trains of recirc equipment available - WHEN 12.5 Feet level in RWST, transitions to ESP-1.3, Cold Leg Recirc (attached) per Fold out page - Directs Unit two UO to assist taking ECCS logs - Directs TSC to evaluate need for RCS sampling

Op-Test No.: HLT-31 NRC Scenario No.: Spare Event No.: 6

Event Description: A LBLOCA occurs. When containment pressure reaches 27#, 'A' CS pump trips on the auto start, 'B' CS discharge MOV-8820B breaker trips on the auto open, and 1C & 1D CTMT cooler fail to auto start, FRP-Z.1 entered. (CT Manually start at least one A train Containment cooler before exiting FRP-Z.1.)

Terminate when FRP-EEP-1, complete

(significant modification from bank scenario 8A-C due to Not requiring ECP-1.1 entry)

Time	Position	Applicant's Actions or Behavior
	BOP	checks for no intersystem LOCA outside ctmt • Aux building radiation NORMAL • Aux building no hi sump levels & pumps not running • WHT and FDT levels not rising unexplained • Verify at least one train of PRF in operation using SOP-60.0, PRF System (Attached) • Verifies VCT level >5% • Checks LHSI flow in progress by low RCS PRESSURE & LHSI flows >1.5xE3
	SRO	RETURNS to step 14 & loops in procedure from step 14 to 16 until RWST level <12.5', THEN transitions to ESP-1.3 (Attached)
<u>NRC discretion:</u> Terminate at • EEP-1, step 14 • When transition is made form EEP-1 to ESP-1.3 • OR ESP-1.3 is complete after CL recirc is established		

Attached Procedures

SOP-2.3 section 4.2.3

4.2.3 Makeup to refueling water storage tank (RWST)

NOTE:

- Due to system interconnections, the RWST should not be on recirculation using the Refueling Water Purification Pump while making up to the RWST. However, it is permissible to makeup while BARS is in operation.
- IF makeup to the RWST is due to BARS operation, THEN to minimize dilution of the RWST, boron concentration the blended flow should be greater than or equal to the BARS reject flow concentration.
- IF desired to flush the line of acid following makeup, THEN remember to perform step 4.2.3.15 at an appropriate time prior to reaching the batch integrator setpoint.

CAUTION: Avoid operations that could result in RCS volume changes. Makeup to the VCT from the blender will not be available while making up to the RWST.

- 4.2.3.1 Verify the RWST capable of receiving makeup.
- 4.2.3.2 Using the blended flow nomograph or table, Figure 1, determine the quantity and concentration (boric acid and reactor makeup water, or blend) of makeup to be supplied (assuming the boron concentration in the RWST will not change).

Attached Procedures

SOP-2.3 section 4.2.3

- 4.2.3.3 IF the final boron concentration in the RWST is going to differ from the initial, THEN use the following formulas to determine the amount of water or acid to be added.

To dilute the RWST: $VA = \frac{CI - CF}{CF} (VI)$

To borate the RWST: $VA = \frac{CI - CF}{CF - CA} (VI)$

To determine final boron concentration:

$$CF = \frac{[CI \times VI] + [CA \times VA]}{VF}$$

Where:

VA = Volume of water or acid added to the RWST

VI = Initial water volume in RWST

VF = Final water volume in RWST

CI = Initial boron concentration in RWST

CF = Final boron concentration in RWST

CA = Boron concentration added to RWST

- 4.2.3.4 IF the RWST is on recirc, THEN secure the Refueling Water Purification Pump.

NOTE: When blended flow concentration of 2000 PPM is required, the makeup system may not be able to deliver boric acid flow for 120 gpm total flow. IF necessary, THEN the total flow may be set for < 120 gpm and the individual flows proportioned accordingly.

NOTE: The Boric Acid and/or Total Flow Batch Integrators **ONLY** need to be verified when changed. This should be documented with an Autolog Entry.

- 4.2.3.5 Set the boric acid and/or reactor makeup water flow controllers and their respective batch integrators to the required flowrate and quantity values obtained from step 4.2.3.2 or 4.2.3.3.
- 4.2.3.6 Position the MKUP MODE CONT SWITCH to STOP.
- 4.2.3.7 Position the MKUP MODE SEL SWITCH to MAN.

Attached Procedures

SOP-2.3 section 4.2.3

- 4.2.3.8 Open blender discharge to RWST valve 1-CVC-V-8434 (N1E21V238).
- 4.2.3.9 Open blender miscellaneous discharge isolation valve 1-CVC-V-8432 (Q1E21V237).
- 4.2.3.10 Place MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B (Q1E21V337) in the CLOSED position.
- 4.2.3.11 Place MKUP TO VCT Q1E21FCV114A (Q1E21V339) in the CLOSED position.
- 4.2.3.12 IF making up to the RWST is due to the depletion of boron by the BARS system and it is desired to make-up with boric acid only, THEN close RMW TO BLENDER valve Q1E21FCV114B (Q1E21V345).

NOTE: Makeup may be stopped at any time by positioning the MKUP MODE CONT SWITCH to STOP.

- 4.2.3.13 Position the MKUP MODE CONT SWITCH to START.
- 4.2.3.14 IF 1B RMW PUMP is running and not required for current plant operations, THEN position the 1B RMW PUMP switch in STOP.
- 4.2.3.15 Verify boric acid flow on FI-113 and reactor makeup flow on FI-168 are at the pre-selected rates as displayed on MAKEUP FLOW TO CHG/VCT indicator.
- 4.2.3.16 IF desired to flush the acid out of the line, THEN at the appropriate time to conclude the makeup with RMW only:
 - (a) Verify RMW TO BLENDER valve Q1E21FCV114B (Q1E21V345) open.
 - (b) Close BORIC ACID TO BLENDER valve Q1E21FCV113A (Q1E21V354)

Attached Procedures

SOP-2.3 section 4.2.3

- 4.2.3.17 Verify makeup automatically stops when batch integrator setpoints are reached by observing the following:
- (a) Boric acid flow on FI-113 and reactor makeup flow on FI-168 return to zero as displayed on MAKEUP FLOW TO CHG/VCT indicator.
 - (b) RMW TO BLENDER valve Q1E21FCV114B (Q1E21V345) closed IF in AUTO.
 - (c) BORIC ACID TO BLENDER valve Q1E21FCV113A (Q1E21V354) closed.
- 4.2.3.18 Close blender miscellaneous discharge isolation valve 1-CVC-V-8432 (Q1E21V237).
- 4.2.3.19 Close blender discharge to RWST valve 1-CVC-V-8434 (N1E21V238).
- 4.2.3.20 Place MKUP TO VCT Q1E21FCV114A (Q1E21V339) in AUTO.
- 4.2.3.21 Place MKUP TO CHG PUMP SUCTION HDR Q1E21FCV113B (Q1E21V337) in AUTO.
- 4.2.3.22 Verify RMW TO BLENDER valve Q1E21FCV114B (Q1E21V345) in AUTO.
- 4.2.3.23 Verify BORIC ACID TO BLENDER valve Q1E21FCV113A (Q1E21V354) in AUTO.

NOTE: The following two steps are not required if operation in a mode other than automatic is required.

- 4.2.3.24 Position the MKUP MODE SEL SWITCH to AUTO.
- 4.2.3.25 Position the MKUP MODE CONT SWITCH to START.
- 4.2.3.26 Set the boric acid and/or total flow batch integrators to the required quantities as needed for normal system operation.

Attached Procedures

SOP-2.3 section 4.2.3

- 4.2.3.27 IF the boric acid and/or reactor makeup water flow controllers were adjusted, THEN perform the following:
- (a) Verify the BORIC ACID MKUP FLOW controller FK 113 is in the MAN position. (AI2005205348)
 - (b) Restore controller FK-113 to the setpoint required for automatic makeup per step 4.1.2.
 - (c) Verify FK-168 PRI WTR MKUP FLOW controller in Auto.
- 4.2.3.28 IF the Refueling Water Purification Pump was secured in Step 4.2.3.4, THEN perform the following:
- (a) Start the RWP pump.
 - (b) Throttle SFP purification outlet to RWST 1-SFP-V-8793B (N1G31V021B) to establish 100 gpm on the SFP demineralizer FI-654.

Attached Procedures

AOP-5 Section 15.3, 15.4, 15.5

15.3 Check 1D 4160 V bus ENERGIZED.

15.3.1 IF 1D 4160V bus energized
THEN go to step 16.0.15.3 Establish power to 1A 600 V LC
emergency section loads.a) Verify pressurizer heater
group 1A - OFF.

b) Verify open BKR EA08-1.

c) Verify closed BKRs ED08-1
and EA09-1.

CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel
generator capacity must be available prior to energizing a group of
pressurizer heaters.

NOTE: The BYPASS position allows manual energization of pressurizer heater
group 1A from the MCB handswitch, and automatic energization based on
either pressurizer pressure ≤ 2210 psig or pressurizer level 5% above
program.

d) WHEN pressurizer heater
group 1A operation is
desired.
THEN place HTR CRP 1A
BLOCKING BYPASS SW to
BYPASS.

e) IF required.
THEN manually energize
pressurizer heater group
1A.

Attached Procedures

AOP-5 Section 15.3, 15.4, 15.5

CAUTION: To ensure adequate supply voltage to all class 1E loads and to meet short circuit analysis constraints, only one air compressor, 1C (preferred) or 1A, should be powered from the diesel generator. One air compressor will consume 0.16 MW of diesel generator load.

NOTE: Guidance for operation of the air compressors when either selected or de-selected from the sequencer is provided in FNP-1-SOP-31.0, COMPRESSED AIR SYSTEM.

15.4 Align 1C air compressor for service.

15.4.1 Place the 1C air compressor handswitch in RUN/START.

15.4.2 Verify 1C air compressor started.

15.4 Align 1A air compressor for service.

a) Verify 1C air compressor handswitch in OFF.

b) Verify SI - RESET.

☐ MLB-1 1-1 not lit

☐ MLB-1 11-1 not lit

c) Reset BlF sequencer.
(139 ft. AUX BLDC A train SWGR room)

d) Close BKR DF13 (1F 4160 V bus tie to 1H 4160 V bus).

e) IF 1H 4160 V bus energized.
THEN energize 1C 600 V LC from normal supply.

☐ BKR DH01 closed

☐ BKR EC02-1 closed

f) Start 1A AIR COMPRESSOR.

15.5 Check INST AIR PRESS PI 4004B
- GREATER THAN 85 psig.

15.5 Perform the following.

Attached Procedures

15.6 Verify instrument air aligned
to containment.

15.6.1 Check the following.

IA TO CTMT

☐ MLB-3 1-2 NOT lit

IA to PENE RM PRESS LO

☐ Annunciator KDI clear

15.6 Align instrument air to
containment.(BOP)

IA TO PENE RM

☐ N1P19HV3825 open

☐ N1P19HV3825 open

IA TO CTMT

☐ Q1P19HV3611 open

Attached Procedures

AOP-4.0 attachment 1

RESTORING LETDOWN

NOTE: This attachment assumes that letdown was lost due to a plant transient and that no system malfunction has occurred.

- 1 WHEN plant conditions permit.
THEN restore normal letdown flow as follows:
 - 1.1 Verify closed all letdown orifice isolation valves.

LTDN ORIF ISO
45 GPM
☐ Q1E21HV8149A

LTDN ORIF ISO
60 GPM
☐ Q1E21HV8149B
☐ Q1E21HV8149C
 - 1.2 Verify LP LTDN PRESS PK 145 in MANUAL and adjust the demand signal to 50% or less.
 - 1.3 Verify that LTDN HX OUTLET TEMP TK 144 is in AUTO, and set at 3.3 to maintain temperature at approximately 100°F
 - 1.4 Verify that the VCT HI LVL DIVERT VLV LCV-115A position indicator VCT light is lit and the handswitch is in the AUTO position.
 - 1.5 Verify that LTDN HI TEMP DIVERT VLV Q1E21TCV143, DEMIN light is lit and the handswitch is in the AUTO position.
 - 1.6 IF necessary.
THEN OPEN both LTDN LINE PENE RM ISO's Q1E21HV8175A and B from the Penetration Room Isolation Panel.
 - 1.7 Verify open LTDN LINE CTMT ISO Q1E21HV8152
 - 1.8 Verify open both LTDN LINE ISO Q1E21LCV459 and Q1E21LCV460.
 - 1.9 Verify CHG FLOW PK 122 is in MAN AND establish the required minimum charging flow for the number of orifices to be placed on service. (18 gpm for 1 orifice or 40 gpm for two orifices)
 - 1.10 OPEN LTDN ORIF ISO 60 GPM Q1E21HV8149B or C to establish approximately 60 gpm Letdown flow.

Attached Procedures

AOP-4.0 attachment 1

ATTACHMENT 1

RESTORING LETDOWN

- 1.11 Verify that LP LTDN PRESS PK 145 is set between 4.3-7.5 to maintain the desired Letdown Pressure between 260-450 psig.
- 1.12 IF necessary.
THEN adjust LP LTDN PRESS PK 145 in MANUAL to stabilize Letdown Pressure at the desired value.
- 1.13 Place LP LTDN PRESS PK 145 in AUTO and verify that Letdown pressure is maintained at the desired value.
- 1.14 Verify that LTDN HX OUTLET TEMP TK 144 is maintaining Letdown temperature at approximately 100 F.
 - [] TI-116 VCT TEMP
 - [] TI-143 DIVERT LTDN HX TEMP
 - [] TI-144 CCW LTDN HX TEMP
- 1.15 IF normal letdown flow established.
THEN return to procedure step 7.0.
- 1.16 IF normal letdown flow NOT established.
THEN attempt to restore any letdown flow using FNP-1-AOP-16.0. CVCS MALFUNCTION.

Attached Procedures

AOP-1

NOTE:

- Charging flow is limited to approximately 130 gpm when FK 122 is operated in automatic.
- The intent of step 1 is to ensure that SI is actuated if PRZR level cannot be maintained stable above the low level heater interlock setpoint. If possible, pressurizer level should be restored to the normal program value. A stable pressurizer level permits a controlled orderly shutdown and cooldown to cold shutdown.

1 Maintain pressurizer level
stable at or near programmed
level.

[] Control charging flow

OR

[] Reduce letdown flow.

OR

[] IF required to maintain PRZR
level,
THEN isolate letdown.

1 Perform the following.

1.1 Verify reactor tripped.

1.2 IF reactor tripped,
THEN actuate SI.

1.3 Go to FNP-1-EEP-0, REACTOR
TRIP OR SAFETY INJECTION.

Attached Procedures

AOP-1

.....

CAUTION: IF VCT level indication is lost due to a low level, OR IF it is suspected that the lower level tap has been uncovered, THEN the VCT level transmitters will need to be vented for reliable level indication. {2006203596}

.....

2 Maintain VCT level greater than 20%. 2.1 Verify reactor makeup system - IN AUTOMATIC. <u>OR</u> 2.2 Control reactor makeup system in manual using FNP-1-SOP-2.3, CHEMICAL AND VOLUME CONTROL SYSTEM REACTOR MAKEUP CONTROL SYSTEM.	2 Perform the following. a) Verify charging pump suction aligned to RWST. RWST TO CHG PUMP ☐ Q1E21LCV115B open ☐ Q1E21LCV115D open VCT OUTLET ISO ☐ Q1E21LCV115C closed ☐ Q1E21LCV115E closed b) Begin unit shutdown using FNP-1-UOP-3.1, POWER OPERATION and FNP-1-UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY.

Attached Procedures

AOP-1

Step	Action/Expected Response	Response NOT Obtained
3	Determine RCS leak rate.	
3.1	Determine RCS leak rate from CVCS flow balance. _____ (charging flow) + _____ (seal injection flow) - _____ (shutdown flow) - _____ (#1 seal leakoff flow) - _____ (RCS leak rate)	
3.2	IF plant conditions are stable. THEN determine RCS leak rate using FNP-1-STP-9.0, RCS LEAKAGE TEST.	
4	WHEN RCS leak rate determined, THEN evaluate required actions using Technical Specifications.	
5	WHEN RCS leak rate determined, THEN evaluate event classification and notification requirements using FNP-0-EIP-8, NON-EMERGENCY NOTIFICATIONS and FNP-0-EIP-9, EMERGENCY CLASSIFICATION AND ACTIONS.	
6	WHEN RCS leak rate greater than 50 gpm. THEN align 1A and 1B post LOCA containment hydrogen analyzers for service using Attachment 1.	

Attached Procedures

AOP-1

.....

CAUTION: Since abnormal conditions may exist, nonessential personnel should not be permitted in containment until RCS leakage has been located.

.....

NOTE:

- The intent of step 7 is to provide a systematic leakage search plan. Steps 7.2 through 7.12 may be done in any order.
- IF at anytime the location of an RCS leak is discovered or reported, THEN actions to isolate the leak should be taken immediately.

7 Identify RCS leakage source.

7.1 Frequently monitor CVCS flow balance as the actions of steps 7.2 through 7.12 are taken.

_____ (charging flow)

+_____ (seal injection flow)

-_____ (letdown flow)

-_____ (#1 seal leakoff flow)

-_____ (RCS leak rate)

Attached Procedures

AOP-1

Step	Action/Expected Response	Response NOT Obtained
☐		
7.2	Check containment radiation - NORMAL.	7.2 Perform the following.
☐	R-2 CTMT 155 ft	7.2.1 Consult Shift Manager to evaluate requirement for containment entry.
☐	R-7 SEAL TABLE	7.2.2 Evaluate placing CTMT sump pump handswitches in PULL-TO-LOCK to prevent overflowing the WHT.
☐	R-11 CTMT PARTICULATE	7.2.3 Verify containment ventilation isolation.
☐	R-12 CTMT GAS	7.2.3.1 Stop MINI PURGE SUPP/EXH FAN.
		7.2.3.2 Verify containment mini purge dampers - CLOSED.
		CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D
		☐ 2866C
		☐ 2867C
		CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C
		☐ 2866D
		☐ 2867D

Attached Procedures

AOP-1

Step	Action/Expected Response	Response NOT Obtained
	7.3 Check auxiliary building radiation - NORMAL. ☐ R-4 1C CHG PUMP RM ☐ R-6 SAMPLE RM AREA ☐ R-10 PRF	7.3 Perform the following. 7.3.1 Announce the hazard area using the Gaitronics System. 7.3.2 Evacuate the hazard area of non-essential personnel. 7.3.3 Dispatch Health Physics and Operations personnel to visually inspect accessible portions of charging, letdown, BTRS and seal injection systems using ATTACHMENT 3, LEAK INSPECTION - 121' Elevation and Above and ATTACHMENT 4, LEAK INSPECTION - 100' Elevation and Below.
	7.4 Check no SG tube leakage. 7.4.1 Check secondary radiation - NORMAL. ☐ R-15 SJAE EXH ☐ R-19 SGBD SAMPLE ☐ R-23A SGBD HX OUTLET ☐ R-23B SGBD TO DILUTION ☐ R-15B TUBE BLDG VNTL (BOP) ☐ R-15C TUBE BLDG VNTL (BOP) ☐ R-60A MS ATMOS REL (BOP) ☐ R-60B MS ATMOS REL (BOP) ☐ R-60C MS ATMOS REL (BOP) ☐ R-60D TDAFWP EXH (BOP) ☐ R-70A 1A SG TUBE LEAK DET (BOP) ☐ R-70B 1B SG TUBE LEAK DET (BOP) ☐ R-70C 1C SG TUBE LEAK DET (BOP) 7.4.2 Direct Counting Room to sample SGs for radioactivity using FNP-0-CCP-31, LEAK RATE DETERMINATION.	7.4 Go to FNP-1-AOP-2.0, STEAM GENERATOR TUBE LEAKAGE.

Step 7 continued on next page.

Page Completed

Attached Procedures

AOP-1

Step	Action/Expected Response	Response NOT Obtained
7.5	Check CCW system.	7.5 Perform the following.
7.5.1	Check CCW surge tank radiation - NORMAL. ☐ R-17A CCW ☐ R-17B CCW	a) Establish excess letdown using ENP-1-SOP-2.7, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN.
7.5.2	Check CCW surge tank level -NO UNEXPLAINED LEVEL RISE.	b) Secure normal letdown.
		c) <u>IF</u> CCW parameters return to normal, <u>THEN</u> return to step 3.
		d) Establish normal letdown using ENP-1-SOP-2.1, CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION.
		e) Secure excess letdown.
		f) <u>IF</u> seal injection supplied to all RCPs, <u>THEN</u> isolate CCW from RCP thermal barrier heat exchangers. CCW FROM RCP THERM BARR ☐ Q1P17HV3045 closed ☐ Q1P17HV3184 closed
		g) <u>IF</u> CCW parameters do <u>NOT</u> return to normal, <u>THEN</u> restore CCW from RCP thermal barrier heat exchangers. CCW FROM RCP THERM BARR ☐ Q1P17HV3045 open ☐ Q1P17HV3184 open

Attached Procedures

AOP-1

Step	Action/Expected Response	Response NOT Obtained
7.6	Check PRT conditions normal.	
7.6.1	Check PRT pressure - LESS THAN 5 psig.	7.6.1 Perform annunciator HE5, PRT PRESS HI, annunciator response procedure in conjunction with this procedure.
7.6.2	Check PRT level - LESS THAN 78%.	7.6.2 Perform annunciator HE4, PRT LVL HI-LO, annunciator response procedure in conjunction with this procedure.
7.6.3	Check PRT temperature - LESS THAN 120°F.	7.6.3 Perform annunciator HE3, PRT TEMP HI, annunciator response procedure in conjunction with this procedure.
7.7	Check VCT HI LVL DIVERT VLV Q1E21LCV115A - IN VCT POSITION.	7.7 Place VCT HI LVL DIVERT VLV Q1E21LCV115A in VCT position.
7.8	Check auxiliary building room sumps - HI LVL ALARMS CLEAR AND NO SUMP PUMPS RUNNING IN AUTO.	
7.9	Check containment sump level - NOT RISING EXCESSIVELY USING FNP-1-STP-70.0, CONTAINMENT SUMP SURVEILLANCE.	7.9 Consult the Shift Manager to evaluate requirement for containment entry.
7.10	Dispatch personnel to visually inspect accessible portions of charging, laydown, BTRS and seal injection systems using ATTACHMENT 3, LEAK INSPECTION - 121' Elevation and Above and ATTACHMENT 4, LEAK INSPECTION - 100' Elevation and Below.	

Attached Procedures

AOP-1

Step	Action/Expected Response	Response NOT Obtained
7.11	Isolate RCS sampling as follows:	
7.11.1	Close the following valves located on U1 BOP PNL L: • PRZR Stm Sample Iso Q1P15HV3104 • PRZR Liq Sample ISO Q1P15HV3103 • RCS Loops 2&3 Sample Iso Q1P15HV3765 • ACCUM Sample ISO Q1P15HV3766	7.11.1 Close the following valves located on U1 BOP PNL N: • PRZR Stm Sample Iso Q1P15HV3331 • PRZR Liq Sample ISO Q1P15HV3332 • RCS Loops 2&3 Sample Iso Q1P15HV3333 • ACCUM Sample ISO Q1P15HV3334
NOTE: Isolating sample valves from the control room should isolate PASS RCS leakage from pressure relief valves. If RCS leakage is terminated and no signs of leakage can be identified, then a relief valve may have been leaking to the WHT.		
7.11.2	Notify Chemistry of the following: • RCS samples have been isolated in the Control Room • Check RCS sampling using ATTACHMENT 5, LEAK INSPECTION - CHEMISTRY SAMPLE ROOM AREA.	
7.12	Evaluate MCB indications and alarms against ATTACHMENT 2, LEAK IDENTIFICATION SYMPTOMS to determine the RCS leakage source.	
8	<u>WHEN</u> the RCS leakage source identified. <u>THEN</u> take appropriate actions to isolate the leak.	

Attached Procedures

AOP-1

Step	Action/Expected Response	Response NOT Obtained
9	<u>WHEN</u> RCS leakage source isolated. <u>THEN</u> determine the post isolation leak rate per FNP-1-STP-9.0, RCS LEAKAGE TEST.	
9.1	<u>IF</u> RCS leak rate is satisfactory, <u>THEN</u> go to procedure in effect.	9.1 Have Operations personnel continue leak investigation per step 7 and proceed to step 10.
10	Consult the Shift Manager to evaluate continued plant operation.	
11	<u>IF</u> continued plant operation desired, <u>THEN</u> return to step 1.	11 Go to step 12.
NOTE: • The intent of the following step is to place the unit in Mode 3 using the UOPs, and in cold shutdown using the remainder of this procedure. • This procedure assumes at least one RCP is running. With no RCP in operation, the cooldown should be performed in accordance with FNP-1-ESP-0.2, NATURAL CIRCULATION COOLDOWN TO PREVENT REACTOR VESSEL HEAD STEAM VOIDING, as directed by FNP-1-ESP-0.1, REACTOR TRIP RESPONSE or FNP-1-AOP-4.0, LOSS OF REACTOR COOLANT FLOW. • Shutdown control rods should remain fully withdrawn if a cooldown to cold shutdown is commenced prior to reaching the required cold shutdown boron concentration. • Pressurizer level may be raised, not to exceed 50%, in anticipation of the cooldown.		
12	Begin unit shutdown using FNP-1-UOP-3.1, POWER OPERATION and FNP-1-UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY.	
13	<u>WHEN</u> Unit is placed in MODE 3. <u>THEN</u> continue in this procedure	

Attached Procedures

EEP-0 ATT 2

AUTOMATIC ACTIONS VERIFICATION

- 1 **Verify each SW train - HAS TWO
 SW PUMPS STARTED.**

☐ A train (1A,1B or 1C)
☐ B train (1D,1E or 1C)

- 2 **Verify each train of CCW -
 STARTED.**

- 2.1 **Verify one CCW PUMP in each
 train- STARTED.**

A train HX 1C or 1B
CCW FLOW

☐ FI 3043CA > 0 gpm
 OR

☐ FI 3043BA > 0 gpm

B train HX 1A or 1B
CCW FLOW

☐ FI 3043AA > 0 gpm
 OR

☐ FI 3043BA > 0 gpm

- 2.2 **Verify SW flow to associated
 CCW HX's.**

SW FROM 1A(1B, 1C)
CCW HX

☐ Q1P16FI3009AA > 0 gpm
☐ Q1P16FI3009BA > 0 gpm
☐ Q1P16FI3009CA > 0 gpm

- 2.2 **Throttle open SW to the
 associated CCW HX's.**

☐ Q1P16FV3009A
☐ Q1P16FV3009B
☐ Q1P16FV3009C

- 3 **Verify one CHG PUMP in each
 train - STARTED.**

☐ A train (1A or 1B) amps > 0
☐ B train (1C or 1B) amps > 0

Attached Procedures

EEP-0 ATT 2

4 Verify RHR PUMPS - STARTED.

RHR PUMP

☐ 1A amps > 0☐ 1B amps > 0

5 Verify Safety Injection Flow.

5.1 Check HHSI flow - GREATER THAN
0 gpm.☐ FI 943

5.1 Verify proper SI alignment.

CHG PUMPS TO

REGENERATIVE HX

☐ Q1E21MOV8107 closed☐ Q1E21MOV8108 closed

RWST

TO CHG PUMP

☐ Q1E21LCV115B open☐ Q1E21LCV115D open

VCT

OUTLET ISO

☐ Q1E21LCV115C closed☐ Q1E21LCV115E closed

HHSI TO

RCS CL ISO

☐ Q1E21MOV8803A open☐ Q1E21MOV8803B open

CHG PUMP

SUCTION HDR ISO

☐ Q1E21MOV8130A open☐ Q1E21MOV8130B open☐ Q1E21MOV8131A open☐ Q1E21MOV8131B open

CHG PUMP

DISCH HDR ISO

☐ Q1E21MOV8132A open☐ Q1E21MOV8132B open☐ Q1E21MOV8133A open☐ Q1E21MOV8133B open

Attached Procedures

EEP-0 ATT 2

5.2 Check RCS pressure - LESS THAN
275 psig(435 psig).

1C(1A) LOOP
RCS WR PRESS

☐ PI 402B
☐ PI 403B

5.3 Check LHSI flow - GREATER THAN
 1.5×10^3 gpm.

1A
RHR HDR
FLOW

☐ FI 605A

1B
RHR HDR
FLOW

☐ FI 605B

5.2 Proceed to Step 6.

5.3 Verify proper RHR alignment.

RWST TO

1A(1B) RHR PUMP

☐ Q1E11MOV8809A open
☐ Q1E11MOV8809B open

CTMT SUMP TO

1A(1B) RHR PUMP

☐ Q1E11MOV8811A closed
☐ Q1E11MOV8812A closed
☐ Q1E11MOV8811B closed
☐ Q1E11MOV8812B closed

1C(1A) RCS LOOP TO

1A(1B) RHR PUMP

☐ Q1E11MOV8701A closed
☐ Q1E11MOV8702A closed
☐ Q1E11MOV8701B closed
☐ Q1E11MOV8702B closed

RHR TO RCS HOT LEG

XCON

☐ Q1E11MOV8887A open
☐ Q1E11MOV8887B open

1A(1B) RHR HX

TO CHG PUMP SUCT

☐ Q1E11MOV8706A closed
☐ Q1E11MOV8706B closed

1A(1B) RHR HX

DISCH VLV

☐ HIK 603A open
☐ HIK 603B open

1A(1B) RHR HX

BYP FLOW VLV

☐ FK 605A closed
☐ FK 605B closed

Attached Procedures

EEP-0 ATT 2

ATTACHMENT 2

**6 Verify containment ventilation
isolation.****6.1 Verify containment purge
dampers - CLOSED.**

- ☐ 3197
- ☐ 3198D
- ☐ 3198C
- ☐ 3196
- ☐ 3198A
- ☐ 3198B

**6.2 Verify containment mini purge
dampers - CLOSED.**

CTMT PURGE DMPRS
MINI-2866C & 2867C
FULL-3198A & 3198D

- ☐ 2866C
- ☐ 2867C

CTMT PURGE DMPRS
MINI-2866D & 2867D
FULL-3196 & 3197
BOTH-3198B & 3198C

- ☐ 2866D
- ☐ 2867D

**6.3 Stop MINI PURGE
SUPP/EXH FAN.**

Attached Procedures

EEP-0 ATT 2

- 7 Verify containment fan cooler alignment.
- 7.1 Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.
- CTMT CLR FAN
 SLOW SPEED
- A train
- ☐ 1A
☐ 1B
- B train
- ☐ 1C
☐ 1D
- 7.2 Verify associated emergency service water outlet valves - OPEN.
- EMERG SW FROM
 1A(1B,1C,1D) CTMT CLR
- ☐ Q1P16MOV3024A
☐ Q1P16MOV3024B
☐ Q1P16MOV3024C
☐ Q1P16MOV3024D

Attached Procedures

EEP-0 ATT 2

8 Verify AFW Pumps - STARTED.

8.1 Verify both MDAFW Pumps -
STARTED

- ☐ 1A MDAFW Pump amps > 0
- ☐ 1B MDAFW Pump amps > 0

AND

- ☐ FI-3229A indicates > 0 gpm
- ☐ FI-3229B indicates > 0 gpm
- ☐ FI-3229C indicates > 0 gpm

8.1 Verify MDAFW Pumps deliver
flow to each SG.

8.1.1 Manually start MDAFW Pumps

8.1.2 Verify AFW flow path to
each SG.

MDAFWP

TO 1A(1B,1C) SG

- ☐ Q1N23HV3227A in MOD
- ☐ Q1N23HV3227B in MOD
- ☐ Q1N23HV3227C in MOD

MDAFWP TO 1A(1B,1C) SG

FLOW CONT

- ☐ HIC 3227AA open
- ☐ HIC 3227BA open
- ☐ HIC 3227CA open

AFW TO 1A(1B,1C) SG

STOP VLV

- ☐ Q1N23MOV3350A open
- ☐ Q1N23MOV3350B open
- ☐ Q1N23MOV3350C open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764A open
- ☐ Q1N23MOV3764D open
- ☐ Q1N23MOV3764F open

MDAFWP TO

1A(1B,1C) SG ISO (BOP)

- ☐ Q1N23MOV3764E open
- ☐ Q1N23MOV3764B open
- ☐ Q1N23MOV3764C open

Attached Procedures

EEP-0 ATT 2

8.2 Check TDAFW Pump start required.

8.2 IF TDAFW pump NOT needed.
THEN proceed to Step 9.

Condition	TSLB	Set-point	Coincidence
RCP Bus Under-voltage	TSLB2 1-1 1-2 1-3	2680 V	1/2 Detectors on 2/3 Busses
Low Low SG Water Level In Any 2/3 SGs	TSLB4 4-1.4-2.4-3 5-1.5-2.5-3 6-1.6-2.6-3	28%	2/3 Detectors on 2/3 SGs

8.3 Verify TDAFWP started.

- ☐ MLB-4 1-3 lit
- ☐ MLB-4 2-3 lit
- ☐ MLB-4 3-3 lit

TDAFWP SPEED

- ☐ SI 3411A > 3900 rpm

TDAFWP

SPEED CONT

- ☐ SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.

TDAFWP

TO 1A(1B.1C) SG

- ☐ Q1N23HV3228A in MOD
- ☐ Q1N23HV3228B in MOD
- ☐ Q1N23HV3228C in MOD

TDAFWP TO 1A(1B.1C) SG

FLOW CONT

- ☐ HIC 3228AA open
- ☐ HIC 3228BA open
- ☐ HIC 3228CA open

Attached Procedures

EEP-0 ATT 2

9 Verify main feedwater status.

- 9.1 Verify main feedwater flow control and bypass valves - CLOSED.

1A(1B.1C) SG
FW FLOW

- ☐ FCV 478
☐ FCV 488
☐ FCV 498

1A(1B.1C) SG
FW BYP FLOW

- ☐ FCV 479
☐ FCV 489
☐ FCV 499

- 9.2 Verify both steam generator feed pumps - TRIPPED.

- 9.3 Verify SG blowdown - ISOLATED.

1A(1B.1C) SCBD
ISO

- ☐ Q1G24HV7614A closed
☐ Q1G24HV7614B closed
☐ Q1G24HV7614C closed

- 9.4 Verify SG blowdown sample ISOLATED MLB lights lit.

1A(1B.1C) SCBD SAMPLE
ISO

- ☐ MLB1 19-2 lit Q1P15HV3328 closed
☐ MLB1 19-3 lit Q1P15HV3329 closed
☐ MLB1 19-4 lit Q1P15HV3330 closed

- 9.1 Verify main feedwater stop valves closed.

MAIN FW TO 1A(1B.1C) SG
STOP VLV

- ☐ Q1N21MOV3232A
☐ Q1N21MOV3232B
☐ Q1N21MOV3232C

- 9.2 Stop both EH PUMPS.

- 9.4 Locally verify SCBD sample - isolated (BOP).

STEAM GEN 1A(1B.1C) SAMPLE
ISO

- ☐ Q1P15HV3328 closed
☐ Q1P15HV3329 closed
☐ Q1P15HV3330 closed

OR

Locally verify SCBD sample - isolated (PRIP).
STEAM GEN 1A(1B.1C) SAMPLE ISO

- ☐ Q1P15HV3179C closed
☐ Q1P15HV3180C closed
☐ Q1P15HV3181C closed

Attached Procedures

EEP-0 ATT 2

- 10 Check no main steam line isolation actuation signal present.

Signal	Setpoint	Coincidence	TSLB
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2 19-3 19-4
HI STEAM FLOW	> 40%	1/2 ON 2/3	TSLB4 16-3 16-4 17-3 17-4 18-3 18-4
<u>AND</u> LO-LO TAVC	< 543°F	2/3	TSLB2 10-1 10-2 10-3
HI-HI CTMT PRESS	>16.2 psig	2/3	TSLB1 2-2 2-3 2-4

- 10 Perform the following.

- 10.1 Verify main steam line isolation and bypass valves closed.

1A(1B,1C) SG
MSIV - TRIP
☐ Q1N11HV3369A
☐ Q1N11HV3369B
☐ Q1N11HV3369C
☐ Q1N11HV3370A
☐ Q1N11HV3370B
☐ Q1N11HV3370C

1A(1B,1C) SG
MSIV - RYP
☐ Q1N11HV3368A
☐ Q1N11HV3368B
☐ Q1N11HV3368C
☐ Q1N11HV3976A
☐ Q1N11HV3976B
☐ Q1N11HV3976C

- 10.2 IF any main steam isolation valve open.
THEN place the associated test switch in the TEST position.

SG	1A	1B	1C
1A(1B,1C) SG MSIV - TEST Q1N11HV	☐ 3369A/ 70A	☐ 3369B/ 70B	☐ 3369C/ 70C

Attached Procedures

EEP-0 ATT 2

11 Verify PHASE A CTMT ISO.

11.1 Verify PHASE A CTMT ISO -
ACTUATED.

- ☐ MLB-2 1-1 lit
- ☐ MLB-2 11-1 lit

NOTE: The turbine building SW isolation valves Q1P16V515, 517, 514 and 516 will take approximately two minutes to fully stroke closed.

11.2 Check all MLB-2 lights - LIT.

11.2 Verify PHASE A CTMT ISO
alignment using ATTACHMENT 3.
PHASE A CONTAINMENT ISOLATION.

12 Check all reactor trip and
reactor trip bypass breakers -
OPEN.

12 Perform the following.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

12.1 Open reactor trip breaker(s)
manually from MCB or locally.

12.2 Record any breaker(s) manually
opened.

- ☐ Reactor trip breaker A
- ☐ Reactor trip breaker B
- ☐ Reactor trip bypass breaker A
- ☐ Reactor trip bypass breaker B

13 Trip CRDM MG set supply
breakers.

- 1A(1B) MG SET
SUPP BKR
- ☐ N1C11E005A
- ☐ N1C11E005B

Attached Procedures

EEP-0 ATT 2

14 Secure secondary components.

14.1 Stop both heater drain pumps.

HDP

☐ 1A☐ 1B

14.2 Check any condensate pump started.

14.2.1 IF started,
THEN stop all but one
condensate pump.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

14.2.1 IF no condensate pumps are
started,
THEN ensure handswitches
positioned to STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

14.3 IF condensate pump operating,
THEN verify backup cooling
aligned to condensate pumps
per FNP-0-SOP-0.0, APPENDIX B,
TB SO ACTIONS FOLLOWING A
REACTOR TRIP OR SAFETY
INJECTION.

14.3 Ensure all condensate pump
handswitches positioned to
STOP.

CNDS PUMP

☐ 1A☐ 1B☐ 1C

15 Verify both CRACS mode selector switches in the ON position.

CRACS Mode Selector Switch

☐ A TRAIN☐ B TRAIN

16 Verify two trains of ECCS equipment aligned.

16.1 Perform ATTACHMENT 4. TWO
TRAIN ECCS ALIGNMENT
VERIFICATION.

-END-

Attached Procedures

EEP-1 ATT 4

ATTACHMENT 4

VERIFYING 4160 V BUSES ENERGIZED

1 Verify 4160 V busses energized.

CAUTION: IF a DG is already operating above its continuous load rating, THEN additional manual loads should not be added. Unanticipated plant emergency conditions may dictate the need to load the emergency diesel generators above the continuous load rating limit (i.e. 2.85 MW for small DGs, 4.075 MW for large DGs). Under these circumstances, diesel generator loading may be raised not to exceed the 2000 hour load rating limit (i.e. 3.1 MW for small DGs, 4.353 MW for large DGs). Diesel loading should be reduced within the diesel generator continuous load rating limit as soon as plant conditions allow.

NOTE: Plant conditions may dictate establishment of contingency electrical lineups. PNP-1-AOP-5.1, CONTINGENCY ELECTRICAL ALIGNMENTS provides guidance for establishing those lineups.

1.1 Check offsite power - AVAILABLE.	1.1 Request Shift Manager coordinate efforts to restore offsite power.
1.2 Check BKR DF01 (1A startup transformer to 1F 4160 V bus) - CLOSED.	1.2 Verify 1F 4160 V bus energized by 1-2A or 1C diesel generator.
1.3 Verify BKR DF02 (1F 4160 V bus tie to 1K 4160 V bus) - CLOSED.	1.3 IF diesel generator cooling <u>NOT</u> supplied from Unit 2, <u>THEN</u> secure 1-2A and/or 1C diesel generator using ATTACHMENT 5, SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT.
1.4 Check BKR DG15 (1B startup transformer to 1G 4160 V bus) - CLOSED.	1.4 Verify 1G 4160 V bus energized by 1B diesel generator.

Attached Procedures

EEP-1 ATT 4

- 1.5 Verify BKR DG02 (1G 4160 V bus tie to 1L 4160 V bus) - CLOSED.
- 1.5 IF diesel generator cooling NOT supplied.
THEN secure 1B diesel generator using ATTACHMENT 5. SECURING A DIESEL GENERATOR WITH A SAFETY INJECTION SIGNAL PRESENT.
- 1.6 Verify all RCP busses - ENERGIZED.
- ☐ 1A 4160 V bus
☐ 1B 4160 V bus
☐ 1C 4160 V bus
- 1.7 Check 1E 4160 V bus - ENERGIZED.
- 1.7 Establish power to 1C 600 V LC emergency section loads.
- 1.7.1 Place handswitch for pressurizer heater group 1B in OFF.
- 1.7.2 Open BKR EC08-1.
- 1.7.3 Close BKRs EE07-1 and EC10-1.
- *****
- AUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel generator capacity must be available prior to energizing a group of pressurizer heaters.
- *****
- 1.7.4 Energize pressurizer heater group 1B as required.
- 1.8 Check 1D 4160 V bus - ENERGIZED.
- 1.8 Proceed to step 1.10.
- 1.9 IF 1D 4160 V bus energized.
THEN return to PROCEDURE STEPS. step 13.

Attached Procedures

EEP-1 ATT 4

1.10 Establish power to
1A 600 V LC emergency section
loads.

1.10.1 Place handswitch for
pressurizer heater group
1A in OFF.

1.10.2 Verify open BKR EA08-1.

1.10.3 Verify closed BKRs ED08-1
and EA09-1.

CAUTION: To prevent diesel generator overloading, at least 0.3 MW of diesel
generator capacity must be available prior to energizing a group of
pressurizer heaters.

NOTE: The BYPASS position allows manual energization of pressurizer heater
group 1A from the MCB handswitch, and automatic energization based on
either pressurizer pressure ≤ 2210 psig or pressurizer level 5% above
program.

1.10.4 WHEN pressurizer heater
group 1A operation is
desired.

THEN place HTR GRP 1A
BLOCKING BYPASS SW to
BYPASS.

1.10.5 IF required.
THEN manually energize
pressurizer heater group
1A.

Attached Procedures

EEP-1 ATT 4

CAUTION: To ensure adequate supply voltage to all class 1E loads and to meet short circuit analysis constraints, only one air compressor, 1C (preferred) or 1A, should be powered from the diesel generator. One air compressor will consume 0.16 MW of diesel generator load.

1.11 Verify 1C air compressor in service.

1.11.1 Verify 1C air compressor handswitch in RUN/START.

1.11.2 Verify 1C air compressor started.

1.11 Align 1A air compressor.

a) Verify 1C air compressor handswitch in OFF.

b) Verify SI - RESET.

☐ MLB-1 1-1 not lit

☐ MLB-1 11-1 not lit

CAUTION: IF offsite power is lost after sequencer is reset.
THEN manual actions may be required to restart safeguards equipment.

c) Reset B1F sequencer by depressing the ESS STOP RESET pushbutton on the sequencer panel.
(139' AUX BLDG SWGR rm)

d) Place BKR DF13 SYNCH SWITCH in MAN.

e) Close BKR DF13 (1F 4160V bus tie to 1H 4160V bus).

f) Energize 1G 600 V LC from normal supply.

☐ BKR DH01 closed

☐ BKR EGO2-1 closed

g) Start 1A AIR COMPRESSOR.

Attached Procedures

EEP-1 ATT 4

1.12 Check INST AIR PRESS PI 4004B
- GREATER THAN 85 psig.

1.12 Perform the following.

NOTE: The intent of this step is to regain control of critical air operated components including PORVs and atmospherics. Based on plant conditions and availability of manpower, the applicability, priority and performance of the following actions is at the discretion of the Shift Supervisor.

1.12.1 Restore air pressure.

- Verify proper air compressor operation using FNP-1-SOP-31.0, COMPRESSED AIR SYSTEM.

OR

- IF 2C air compressor available.
THEN align 2C air compressor to Unit 1 using FNP-1-SOP-31.0, COMPRESSED AIR SYSTEM.

1.12.2 IF instrument air NOT restored,
THEN align nitrogen supply to PORVs using FNP-1-SOP-62.1, BACK-UP AIR OR NITROGEN SUPPLY TO THE PRESSURIZER POWER OPERATED RELIEF VALVES.

1.12.3 IF instrument air NOT restored,
THEN align emergency air supply to atmospheric relief valves and/or TDAPWP using FNP-1-SOP-62.0, EMERGENCY AIR SYSTEM.

Attached Procedures

EEP-1 ATT 4

- 1.12.4 IF instrument air NOT restored because 1G 600 V LC is deenergized.
THEN energize 1G 600 V LC from 1F 600 V LC using FNP-1-SOP-36.3. 600. 480 AND 208/120 VOLT AC ELECTRICAL DISTRIBUTION SYSTEM.
- 1.12.5 WHEN instrument air pressure restored.
THEN perform step 1.13.
- 1.12.6 Return to PROCEDURE STEPS, step 13.

1.13 Verify instrument air aligned to containment. (BOP)

IA TO PENE RM

☐ N1P19HV3825 open

☐ N1P19HV3885 open

IA TO CTMT

☐ Q1P19HV3611 open

Attached Procedures

SOP-60.0 4.3

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as needed 4.3 or 4.4.

4.3 Verifying Proper PRF System in Operation During a LOCA (A Train Inservice).

- 4.3.1 IF both trains of PRF are started, THEN secure B train of PRF per section 4.6, Securing B Train of PRF Operation During a LOCA.
- 4.3.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.3.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.3.4 Verify Phase B reset as indicated by MLB-3, lights 1.1 and 6.1 not lit.
- 4.3.5 Verify open 1A PRF SUCTION DMPR Q1E15MOV3362A.
- 4.3.6 Verify 1A PRF recirculation fan started.
- 4.3.7 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A.
- 4.3.8 Verify 1A PRF exhaust fan started.
- 4.3.9 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.3.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS Δ P PDI 3367A and PDI 3367B, AND power to B train PRF is available, THEN place the B train of PRF in service as follows:
 - 4.3.10.1 Verify open 1B PRF SUCT DMPR Q1E15MOV3362B.
 - 4.3.10.2 Verify 1B PRF recirculation fan started.
 - 4.3.10.3 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.3.10.4 Verify 1B PRF exhaust fan started.
 - 4.3.10.5 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

Attached Procedures

SOP-60.0 4.4

NOTE: The intent of securing one train of PRF if both are running, is to limit total PRF effluent to the vent stack to the minimum possible. Either train may be shutdown as desired in sections 4.3 or 4.4.

4.4 Verifying Proper PRF System in Operation During a LOCA (B Train Inservice).

- 4.4.1 IF both trains of PRF are started, THEN secure A train of PRF per section 4.5, Securing A Train of PRF Operation During a LOCA.
- 4.4.2 Verify closed SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A (BOP).
- 4.4.3 Verify closed SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B (BOP).
- 4.4.4 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF remaining in service.

- 4.4.5 Verify open B PRF SUCTION DMPR Q1E15MOV3362B.
- 4.4.6 Verify 1B PRF recirculation fan started.
- 4.4.7 Verify open 1B PRF RECIRC FAN EXH DMPR Q1E15HV3356B.
- 4.4.8 Verify 1B PRF exhaust fan started.
- 4.4.9 Verify open 1B PRF EXH FAN DISCH DMPR Q1E15HV3357B.

NOTE: The FSAR assumes that following PRF system actuation, MOV 3361A(B) will modulate open (it modulates only in the open direction) to limit penetration room pressure to greater than -2 IN WC (less vacuum).

- 4.4.10 IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS ΔP PDI 3367A and PDI 3367B, AND power to A train PRF is available, THEN place the A train of PRF in service as follows:
 - 4.4.10.1 Verify open 1A PRF SUCT DMPR Q1E15MOV3362A.
 - 4.4.10.2 Verify 1A PRF recirculation fan started.
 - 4.4.10.3 Verify open 1A PRF RECIRC FAN EXH DMPR Q1E15MOV3356A.
 - 4.4.10.4 Verify 1A PRF exhaust fan started.
 - 4.4.10.5 Verify open 1A PRF EXH FAN DISCH DMPR Q1E15HV3357A.

Attached Procedures

SOP-60.0 4.5

04/03/07 14:15:08

UNIT 1

FNP-1-SOP-60.0

4.5 Securing A Train of PRF Operation During a LOCA.

4.5.1 Verify the following dampers closed:

- SFP to 1A PRF SUPPLY DMPR Q1V48HV3538A
- SFP to 1B PRF SUPPLY DMPR Q1V48HV3538B

4.5.2 Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.

NOTE: The following steps apply only to the train of PRF being secured.

4.5.3 Place 1A PRF exhaust fan in automatic by placing the handswitch to STOP and releasing.

4.5.4 Place 1A PRF recirculation fan in automatic by placing the handswitch to STOP and releasing.

4.5.5 Place 1A PRF RECIRC FAN EXH DMPR Q1E15HV3356A handswitch to AUTO.

4.5.6 Close 1A PRF RECIRC FAN RECIRC DMPR Q1E15MOV3361A(B) and return switch to AUTO.

4.5.7 Close 1A PRF SUCTION DMPR Q1E15MOV3362A(B) and return switch to AUTO.

ESP-1.3

Step	Action/Expected Response	Response NOT Obtained

<u>CAUTION:</u> To ensure that SI recirculation flow is maintained at all times, the following steps should be performed without delay.		

<u>CAUTION:</u> No Function Restoration Procedure should be implemented until step 7 has been completed.		

<u>CAUTION:</u> Switchover to recirculation may cause high radiation levels in the auxiliary building.		

___ 1	<u>IF</u> RWST level less than 4.5 ft <u>AND</u> alignment for recirculation <u>NOT</u> imminent, <u>THEN</u> stop any pump taking suction from the RWST.	

Attached Procedures

ESP-1.3

NOTE: The intent of Step 2 is to differentiate between a steam line break event (with SI terminated and RWST drain down only from containment spray operation) and a loss of reactor coolant event (RWST drain down from one or more ECCS pumps).

2 Check SI in service.

- Check HHSI flow - GREATER THAN 0 gpm.

A TRN
HHSI FLOW
☐ FI 943

OR

- Check any RHR PUMP - STARTED IN SI MODE.

2 Perform the following.

- 2.1 Reset containment sump to RHR valve switches.

CTMT SUMP TO RHR
PUMP RESET

☐ A TRN
☐ B TRN

- 2.2 Proceed to Step 3.

Started RHR PUMP	1A	1B
RWST TO 1A(1B) RHR PUMP Q1E11MOV	☐ 8809A open	☐ 8809B open
1C(1A) RCS LOOP TO 1A(1B) RHR PUMP Q2E11MOV	☐ 8701A closed ☐ 8701B closed	☐ 8702A closed ☐ 8702B closed

3 Verify SI - RESET.

- ☐ MLB-1 1-1 not lit (A TRN)
☐ MLB-1 11-1 not lit (B TRN)

- 3 IF any train will NOT reset using the MCB SI RESET pushbuttons.
THEN place the affected train S821 RESET switch to RESET.
(SSPS TEST CAB.)

- 4 Verify at least one train of PRF in operation using ENP-1-SOP-60.0. PENETRATION ROOM FILTRATION SYSTEM in conjunction with the remaining steps of this procedure.

Attached Procedures

ESP-1.3

- ___ 5 Verify CCW flow to RHR heat exchangers - ESTABLISHED.

CCW TO
1A(1B) RHR HX
[] Q1P17MOV3185A open
[] Q1P17MOV3185B open

- ___ 6 Establish only one CHG PUMP in each train - RUNNING.

[] A Train (1A or 1B) amps > 0
[] B Train (1C or 1B) amps > 0

CAUTION: Pump damage will occur if a charging pump or RHR pump is started in a train in which a flow path from the containment sump to the RCS cannot be established or maintained.

- ___ 7 Align ECCS for cold leg recirculation.

- 7.1 Check containment sump level - GREATER THAN 2.4 ft(3.0 ft).

CTMT SUMP
LVL
[] LI 3594A

POST ACCIDENT
CTMT WTR LVL
[] LR 3594B

- 7.2 Verify recirculation valve disconnects - CLOSED USING ATTACHMENT 1.

- 7.3 Stop both RHR PUMPS.

- 7.4 Close RWST TO 1A RHR PUMP Q1E11MOV8809A.

- 7.1 IF both containment sump level indications less than 2.4 ft(3.0 ft).
THEN go to FNP-1-ECP-1.1. LOSS OF EMERGENCY COOLANT RECIRCULATION.

- 7.4 Perform the following.

- 7.4.1 Stop the running A train CHG PUMP.

- 7.4.2 Proceed to step 7.9.

Attached Procedures

ESP-1.3

7.5 Align CTMT sump to 1A RHR PUMP.

CTMT SUMP
TO 1A RHR PUMP

- ☐ Q1E11MOV8811A open
- ☐ Q1E11MOV8812A open

7.6 Close RHR to RCS HOT LEGS XCON
Q1E11MOV8887A.

7.7 Start 1A RHR PUMP.

- RHR PUMP
- ☐ 1A amps > 0

7.8 Verify A Train LHSI flow -
STABLE.

- 1A
RHR HDR
FLOW
- ☐ FI 605A

7.9 Close RWST TO 1B RHR PUMP
Q1E11MOV8809B.

7.10 Align CTMT sump to 1B RHR PUMP.

- CTMT SUMP
TO 1B RHR PUMP
- ☐ Q1E11MOV8811B open
 - ☐ Q1E11MOV8812B open

7.11 Close RHR to RCS HOT LEGS
XCON Q1E11MOV8887B.

7.5 Perform the following.

7.5.1 Stop the running A train
CHG PUMP.

7.5.2 Proceed to step 7.9.

7.7 Perform the following.

7.7.1 Stop the running A train
CHG PUMP.

7.7.2 Proceed to step 7.9.

7.9 Perform the following.

7.9.1 Stop the running B train
CHG PUMP.

7.9.2 Proceed to step 7.14.

7.10 Perform the following.

7.10.1 Stop the running B train
CHG PUMP.

7.10.2 Proceed to step 7.14.

Attached Procedures

ESP-1.3

7.12 Start 1B RHR PUMP.

RHR PUMP

☐ 1B amps > 0

7.12 Perform the following.

7.12.1 Stop the running B train
CHG PUMP.

7.12.2 Proceed to step 7.14.

7.13 Verify B Train LHSI flow -
STABLE.

1B

RHR HDR

FLOW

☐ FI 605B

CAUTION: The charging pumps should be stopped if RCS pressure rises to greater
than their shutoff head.

CAUTION: The charging pump miniflows should NOT be reopened to satisfy
miniflow criteria while the charging pump suctions are aligned to the
RHR pumps.

7.14 Verify charging pump miniflow
valves - CLOSED.

1A(1B,1C) CHG PUMP

MINIFLOW ISO

☐ Q1E21MOV8109A☐ Q1E21MOV8109B☐ Q1E21MOV8109C

CHG PUMP

MINIFLOW ISO

☐ Q1E21MOV8106

Attached Procedures

ESP-1.3

7.15 IF 1A RHR PUMP started.
THEN align charging pump
 suction header isolation
 valves based on 1B charging
 pump status.

7.15 IF 1A RHR PUMP NOT started.
THEN perform the following.

7.15.1 Verify the A train CHG
 PUMP stopped.

7.15.2 Proceed to step 7.19.

1B Charging Pump Status	Aligned As A Train pump	Aligned As B Train pump	Not Available
CHG PUMP SUCTION HDR ISO Q1E21MOV	☐ 8130A open ☐ 8130B open ☐ 8131A closed ☐ 8131B closed	☐ 8130A closed ☐ 8130B closed ☐ 8131A open ☐ 8131B open	☐ 8130A closed ☐ 8130B closed ☐ 8131A closed ☐ 8131B closed

7.16 Open RHR supply to A train
 charging pump suction.

1A RHR HX
 TO CHG PUMP SUCT
☐ Q1E11MOV8706A

7.17 Verify VCT level - GREATER
 THAN 5%.

7.18 Close A train RWST to
 charging pump header valve.

RWST
 TO CHG PUMP
☐ Q1E21LCV115B

7.16 Perform the following.

7.16.1 Stop the running A train
 CHG PUMP.

7.16.2 Proceed to step 7.19.

7.18 Perform the following.

7.18.1 Stop the running A train
 CHG PUMP.

7.18.2 Close RHR supply to A
 train charging pump
 suction.

1A RHR HX
 TO CHG PUMP SUCT
☐ Q1E11MOV8706A

Attached Procedures

ESP-1.3

7.19 IF 1B RHR PUMP started,
THEN align charging pump
suction header isolation
valves based on 1B charging
pump status.

1B Charging Pump Status	Aligned As A Train pump	Aligned As B Train pump	Not Available
CHG PUMP SUCTION HDR ISO Q1E21MOV	☐ 8130A open ☐ 8130B open ☐ 8131A closed ☐ 8131B closed	☐ 8130A closed ☐ 8130B closed ☐ 8131A open ☐ 8131B open	☐ 8130A closed ☐ 8130B closed ☐ 8131A closed ☐ 8131B closed

7.20 Open RHR supply to B train
charging pump suction.

1B RHR HX
TO CHG PUMP SUCT
☐ Q1E11MOV8706B

7.21 Verify VCT level - GREATER
THAN 5%.

7.22 Close B train RWST to
charging pump header valve.

RWST
TO CHG PUMP
☐ Q1E21LCV115D

7.19 IF 1B RHR PUMP NOT started,
THEN perform the following.

7.19.1 Verify the B train CHG
PUMP stopped.

7.19.2 Proceed to step 7.23.

7.20 Perform the following.

7.20.1 Stop the running B train
CHG PUMP.

7.20.2 Proceed to step 7.23.

7.22 Perform the following.

7.22.1 Stop the running B train
CHG PUMP.

7.22.2 Close RHR supply to B
train charging pump
suction.

1B RHR HX
TO CHG PUMP SUCT
☐ Q1E11MOV8706B

7.22.3 Proceed to step 7.23.

Attached Procedures

ESP-1.3

CAUTION: Injecting through 'A' train and 'B' train flowpaths simultaneously with only one charging pump running could result in pump runout conditions. Therefore, in Step 7.23 RNO the HHSI valves should be closed without delay after MOV8885 is opened.

7.23 Verify one CHG PUMP in each
train - STARTED.

- ☐ A train (1A or 1B) amps > 0
- ☐ B train (1C or 1B) amps > 0

7.23 IF an A train CHG PUMP
started,
THEN proceed to step 7.25
IF NOT establish B train
injection per the following.

7.23.1 Open charging pump
recirculation to RCS cold
legs valve.

CHG PUMP RECIRC
TO RCS COLD LEGS
☐ Q1E21MOV8885

7.23.2 Close HHSI isolation
valves.

HHSI TO
RCS CL ISO
☐ Q1E21MOV8803A
☐ Q1E21MOV8803B

7.23.3 Proceed to step 7.25.

7.24 Open charging pump
recirculation to RCS cold
legs valve.

CHG PUMP RECIRC
TO RCS COLD LEGS
☐ Q1E21MOV8885

Attached Procedures

ESP-1.3

- 7.25 Align charging pump discharge header isolation valves based on 1B charging pump status.

1B Charging Pump Status	Aligned As A Train pump	Aligned As B Train pump	Not Available
CHG PUMP DISCH HDR ISO Q1E21MOV	☐ 8132A open ☐ 8132B open ☐ 8133A closed ☐ 8133B closed	☐ 8132A closed ☐ 8132B closed ☐ 8133A open ☐ 8133B open	☐ 8132A closed ☐ 8132B closed ☐ 8133A closed ☐ 8133B closed

- 7.26 Verify SI flow - STABLE.

A TRN
HHSI FLOW
☐ FI 943

HHSI
B TRN RECIRC
FLOW
☐ FI 940

1A(1B)
RHR HDR
FLOW
☐ FI 605A
☐ FI 605B

- 7.26 IF at least one train of flow from the containment sump to the RCS can NOT be established or maintained. THEN go to FNP-1-ECP-1.1. LOSS OF EMERGENCY COOLANT RECIRCULATION.

Attached Procedures

ESP-1.3

CAUTION: Any charging pump with suction aligned to an RHR pump should be stopped prior to stopping the RHR pump.

CAUTION: Charging pump or spray pump damage will occur if suction is lost and the pump is not secured.

NOTE:

- Erratic pump parameters (flow, discharge pressure, amps, etc.) are indications of pump cavitation.
- Step 8 is a continuous action step which applies any time ECCS pumps are aligned to the sump.

— 8 Verify ECCS pumps not affected by sump blockage:	8 IF both trains are affected such that at least one train of SI recirculation flow cannot be maintained,
8.1 Monitor ECCS pump suction conditions - NO INDICATION OF CAVITATION.	THEN go to FNP-1-ECP-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE.
CHG PUMP ☐ 1A ☐ 1B ☐ 1C	
RHR PUMP ☐ 1A ☐ 1B	
CS PUMP ☐ 1A ☐ 1B	

Attached Procedures

ESP-1.3

__ 9 Check containment spray - IN
OPERATION.

9 Perform the following:

9.1 Makeup to the RWST as
necessary.

9.1.1 Makeup to the RWST in
accordance with
FNP-1-SOP-2.3, CHEMICAL AND
VOLUME CONTROL SYSTEM
REACTOR MAKEUP CONTROL
SYSTEM.

OR

9.1.2 Consult TSC staff to
determine alternate method
of makeup to the RWST.

9.2 Go to procedure and step in
effect.

__10 WHEN RWST level less than
4.5 ft.
THEN align containment spray
for cold leg recirculation.

10.1 Reset PHASE B CTMT ISO.

- ☐ MLB-3 1-1 not lit
- ☐ MLB-3 6-1 not lit

10.2 Open containment spray pump
containment sump suction
isolation valves.

CTMT SUMP
TO 1A(1B) CS PUMP

- ☐ Q1E13MOV8826A
- ☐ Q1E13MOV8827A
- ☐ Q1E13MOV8826B
- ☐ Q1E13MOV8827B

10.3 Close containment spray pump
RWST suction isolation valves.

RWST TO
1A(1B) CS PUMP

- ☐ Q1E13MOV8817A
- ☐ Q1E13MOV8817B

Attached Procedures

ESP-1.3

10.4 WHEN containment spray recirculation flow has been established for at least 8 hours, AND containment pressure is less than 16 psig, THEN stop both CS PUMPs.

10.5 Makeup to the RWST as necessary.

10.5.1 Makeup to the RWST in accordance with
FNP-1-SOP-2.3. CHEMICAL AND
VOLUME CONTROL SYSTEM
REACTOR MAKEUP CONTROL
SYSTEM.

OR

10.5.2 Consult TSC staff to determine alternate method of makeup to the RWST.

___11 Go to procedure and step in effect.

Attached Procedures

ESP-1.3 ATT 1

Step	Action/Expected Response	Response NOT Obtained
☐		

ATTACHMENT 1

- ___ 1 Close the following disconnects.

'B' Train Disconnects				
Disconnect TPNS No.	Description	Position	Key	Location
Q1R18B033-B	Disconnect FV-T2 MOV 8884-B	ON	Z-91	139' hallway across from chemistry sample room
Q1R18B034-B	Disconnect FV-J2 MOV 8132B-B	ON	Z-89	
Q1R18B035-B	Disconnect FV-S2 MOV 8808B-B	ON	Z-86	
Q1R18B036-B	Disconnect FV-B2 MOV 8889-B	ON	Z-88	
Q1R18B041-B	Disc for MOV 8130B-B	ON	Z-408	
Q1R18B042-B	Disc for MOV 8131B-B	ON	Z-412	
Q1R18B043-B	Disc for MOV 8133B-B	ON	Z-416	

Attached Procedures

ESP-1.3 ATT 1

- __ 2 Close the following
disconnects.

'A' Train Disconnects				
Disconnect TPNS No.	Description	Position	Key	Location
Q1R18B030-A	Disconnect FU-J2 MOV 8132A-A	ON	Z-203	139' hallway across from MCC 1A
Q1R18B029-A	Disconnect FU-R2 MOV 8886-A	ON	Z-90	
Q1R18B038-A	Disc for MOV 8130A-A	ON	Z-405	
Q1R18B039-A	Disc for MOV 8131A-A	ON	Z-410	
Q1R18B040-A	Disc for MOV 8133A-A	ON	Z-415	
Q1R18B031-A	Disconnect FU-Z3 MOV 8808C-A	ON	Z-85	
Q1R18B032-A	Disconnect FU-Z2 MOV 8808A-A	ON	Z-84	

- 3 Verify recirculation valves MCB
indication - POWER AVAILABLE.

CHG PUMP
SUCTION HDR ISO

- ☐ Q1E21MOV8130A
☐ Q1E21MOV8130B
☐ Q1E21MOV8131A
☐ Q1E21MOV8131B

- CHG PUMP
DISCH HDR ISO
☐ Q1E21MOV8132A
☐ Q1E21MOV8132B
☐ Q1E21MOV8133A
☐ Q1E21MOV8133B

- 1A(1B,1C) ACCUM
DISCH ISO
☐ Q1E21MOV8808A
☐ Q1E21MOV8808B
☐ Q1E21MOV8808C

Attached Procedures

ESP-1.3 ATT 1

Step	Action/Expected Response	Response NOT Obtained
☐		

ATTACHMENT 1

CHG PUMP RECIRC
TO RCS HOT LEGS
[] Q1E21MOV8884
[] Q1E21MOV8886

RHR TO RCS
HOT LEGS ISO
[] Q1E11MOV8889

- 4 Notify control room of
recirculation valve disconnect
status.