

Facility: Diablo Canyon (PWR)Scenario No.: 1Op-Test No.: L111-NRC

Examiners: _____

Operators: _____

Initial Conditions: 75%, MOL, steady-state conditions, 838 ppm boronTurnover: Maintain current power level (for Htr #2 Drip Pp monitoring); place 120 gpm letdown in service (per chemistry) for minor crud burst cleanup. DG 1-3 is OOS.

Event No	Malf No.	Event Type*	Event Description
1	OP B-1A:XII, sec 6.3	N (ATC, BOP)	Places 120 gpm letdown in service (including 2 nd CCP)
2	pmp asw1/2	C (SRO, BOP)	ASW Pp 1-1 trips on OC (1-2 ASW Pp fails to start in auto, and is started manually) (TS)
3	mal gen4	C (ALL) R (ATC)	Full Load Rejection (from 75%); stabilizes @ 20-30% power
4	xmt rms23 vlv sgb13,14	I (SRO, BOP)	S/G Blowdown RM-23 fails high (with blowdown isolation; valves (FCV-498 & FCV-499) fails to isolate, but can be manually closed) (ECG)
5	xmt cvc19	I (SRO, ATC)	VCT level LT-112 fails low (causes continuous makeup; is stopped manually)
6	mal mss3b mal ppl3a	M (ALL) C (BOP)	Steamline 1-2 break OC (with ATWS on SI); the 1-2 S/G must be isolated (CT) ** (see next page) ; terminates SI once the faulted S/G is isolated; Train A SI does not actuate, and must be manually aligned (including Phase A components)
7	mal ppl5a/5b	C (ATC)	Reactor must be manually tripped on safety injection (CT)

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	2
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	2

Rev 2 comments: changed valve that fails on event 4; some timing changes

SCENARIO SUMMARY – NRC #1

1. (Normal Evolution) Crew places 120 gpm letdown in service per OP B-1A:XII, section 6.3 (for RCS cleanup)
2. Auxiliary Salt Water (ASW) Pump 1-1 trips on overcurrent (OC). ASW Pump 1-2 fails to start in automatic, but the BOP can place the pump in manual and start it. Actions will be per AR PK01-03 (for OC trip of 1-1 ASW PP); actions may also be taken per OP AP-10, Loss of Auxiliary Salt Water. **(TS)**
3. A full load rejection occurs on Unit 1 (due to a grid disturbance) (from 75% power). OP AP-2, Full Load Rejection, is implemented to stabilize the plant between 20-30% power on steam dumps.
4. The S/G Blowdown radiation monitor (RM-23) fails high, causing a blowdown isolation. Isolation valves (FCV-498 & 499, blowdown to discharge tunnel) fails to operate in automatic; the BOP recognizes the failure and completes the isolation manually; actions are taken per AR PK11-17, S/G Blowdown Hi Rad. The crew diagnoses that the high reading on the radiation monitor is a failure (due to comparisons with other monitors, the rate of failure, etc), and applies the appropriate Equipment Control Guideline (ECG) ECG 39.3.B). **(ECG)**
5. Volume Control Tank (VCT) level channel LT-112 fails low, causing a continuous (and erroneous) makeup signal. The crew diagnoses the level channel failure by comparing other VCT parameters, and by using OP AP-19, Malfunction of the Reactor Makeup Control System. The makeup system is secured, and makeup is accomplished (if needed) by using the manual mode (or enabling the auto mode for short periods).
6. A steamline break (outside containment) occurs on the 1-2 S/G, almost immediately causing the need for a Safety Injection (SI) and reactor trip**. Train A of SI does not occur automatically, and must be manually actuated. The S/G will be isolated per EOP E-2, Faulted S/G Isolation **(CT)**, and ECCS will be terminated per EOP E-1.1, SI Termination.
7. On the Safety Injection, Reactor Trip does not automatically occur (ATWS), causing the need for a manual reactor trip (which is successful) **(CT)**; transition to EOP FR-S.1 is, therefore, not required, and EOP E-0 is continued.

The scenario is terminated once RHR pumps have been stopped in E-1.1 (approximately step 8 completed), at the discretion of the lead examiner.

** **CT / TCOA note:** Steam break was evaluated against Time Critical Operator Actions (TCOAs) # 18 & 19 (MSLB IC & OC); the break sizes, ramp times, initial power levels, and other conditions differ significantly from the conditions used in this scenario. For these reasons, the S/G isolation will remain critical (a critical task, per WOG), but no TCOA time limits are applied to this scenario.

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 1 Page 01 of 20

Event Description: Crew Places 120 gpm Letdown in Service per OP B-1A:XII (sec 6.3)

Time	Position	Applicant's Actions or Behavior
Note: Procedure step numbers are included at the front of each action/comment in parenthesis, where applicable.		
Note: The Shift Foreman (SFM) may chose to read (direct) the procedure him(her)self, or hand off the procedure to the BOP and ATC to perform		
	SRO	Shift Foreman implements OP B-1A:XII, section 6.3 , to raise letdown from 75 gpm to 120 gpm flow
		(OP B-1A:XII, sec 6.3)
	BOP	<ul style="list-style-type: none"> Reads procedure NOTES prior to step 6.3.1
	BOP	<ul style="list-style-type: none"> (6.3.1) Makes call to field (aux bldg watch, ABW) to monitor letdown filter pressure while raising letdown flow
	BOP	<ul style="list-style-type: none"> (6.3.2) Notes IF/THEN statement on what to do if letdown filter ΔP gets too high
	BOP/ATC	<ul style="list-style-type: none"> (6.3.3) Implements OP B-1A:V to start a second charging pump
		(implements OP B-1A:V, sec 6.2, to start 2nd charging pump)
	ATC	<ul style="list-style-type: none"> (6.2.1) Places FCV-128, charging flow control (CC2, right side) in MANUAL
	BOP	<ul style="list-style-type: none"> (6.2.2, 6.2.3) Starts a 2nd CCP (takes switch momentarily to Start), and verifies normal amps on pump (VB2, lower left of center, skirt area)
Note: HCV-142 is RCP backpressure valve, and FCV-128 is charging flow control valve; after 2 nd pump is placed in service, charging may have to be throttled back slightly (or left as-is due to impending rise to 120 gpm letdown flow).		
	ATC	<ul style="list-style-type: none"> (6.2.4) Verifies (using HCV-142 and FCV-128) that Pzr level is still on program level (it is)
	ATC	<ul style="list-style-type: none"> (6.2.5) Verifies (using HCV-142, and FCV-128 as needed) that RCP seal injection flows are 8-13 gpm (they are)
<i>(continued on next page)</i>		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 1 Page 02 of 20Event Description: Crew Places 120 gpm Letdown in Service per OP B-1A:XII (sec 6.3) (con't)

Time	Position	Applicant's Actions or Behavior
		(OP B-1A:V, sec 6.2, con't)
Note: May not chose to go back to AUTO on FCV-128 in the next step, since they will be raising charging flow to go to 120 gpm letdown in the next few steps.		
	ATC	<ul style="list-style-type: none"> Places Pzr level (FCV-128) back in AUTO if on program level (if desired)
		(returns to OP B-1A:XII, sec 6.3, con't)
	ATC	<ul style="list-style-type: none"> (6.3.4) Monitors TI-127 (CC2 right side), regen HX outlet, while charging and letdown flows are mismatched during the following steps
	ATC	<ul style="list-style-type: none"> (6.3.5) Adjusts charging to keep Regen HX temps (both sides) in normal ranges during the following steps (uses FCV-128)
	BOP	<ul style="list-style-type: none"> (6.3.6) Places letdown HX temp ctrl valve TCV-130, in MANUAL, and then raises the demand 10% higher than current demand (VB2, vertical section, lower center)
	BOP	<ul style="list-style-type: none"> (6.3.7, 6.3.8) Places letdown pressure ctrl valve PCV-135 (right next to TCV-130) in MANUAL, and raises demand (opens valve) until letdown pressure is down to \approx 200 psig.
	ATC	<ul style="list-style-type: none"> (6.3.9) Places FCV-128 in MANUAL (if not already in MAN from previous step)
	ATC	<ul style="list-style-type: none"> (6.3.10) Raises charging flow by opening both FCV-128 (to \approx 132 gpm) and HCV-142 (keeps RCP seal flows 8-13 gpm) to achieve \approx 132 gpm flow.
	BOP	<ul style="list-style-type: none"> Reads CAUTION prior to step 6.3.11
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 1 Page 03 of 20Event Description: Crew Places 120 gpm Letdown in Service per OP B-1A:XII (sec 6.3) (con't)

Time	Position	Applicant's Actions or Behavior
		(OP B-1A:XII, sec 6.3, con't)
	BOP	<ul style="list-style-type: none"> (6.3.11) Reads IF/THEN statement on what to do if letdown pressure is not controlled in next steps
	BOP	<ul style="list-style-type: none"> (6.3.12) OPENS 8149A, 45 gpm letdown orifice stop vlv, to raise letdown flow; raises demand on PCV-135 as needed to control letdown pressure at approx 350 psig.
	BOP	<ul style="list-style-type: none"> (6.3.13, 6.3.14) Verifies that letdown pressure is < 400 psig, and that letdown flow is ≈ 120 gpm (it is)
	BOP	<ul style="list-style-type: none"> (6.3.15) Reads IF/THEN statement on what to do if letdown relief was lifted during evolution (shouldn't have), and lowers letdown pressure to ≈ 200 psig using PCV-135 to reseal letdown relief (only if needed)
	BOP	<ul style="list-style-type: none"> (6.3.16) Adjusts PCV-135 (letdown pressure) to ≈ 350 psig, and places PCV-135 in AUTO
	BOP	<ul style="list-style-type: none"> (6.3.17, 6.3.18) Adjusts TCV-130 to normal letdown temperature (90-100 °F), and returns TCV-130 to AUTO (if desired).
	ATC	<ul style="list-style-type: none"> (6.3.19, 6.3.20) Adjusts FCV-128 (and HCV-142 if needed for seals) to bring Pzr Level back to program, and returns to AUTO (may not occur, due to upcoming events); controls level in manual or auto
Proceed to the next event once 120 gpm letdown is in service, per lead examiner.		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 2 Page 04 of 20**Event Description:** 1-1 ASW Pump trips on OC, and the 1-2 ASW Pump does not auto start (man OK)

Time	Position	Applicant's Actions or Behavior
Note: Procedure step numbers are included at the front of each action/comment in parenthesis, where applicable.		
	ATC	Observes PK01-03 (ASW Pp OC trip) and PK01-01 (three low press / low ΔP inputs) alarming, and informs the Shift Foreman.
	ATC/BOP	Observes that 1-1 ASW Pp has a blue OC light (VB1, far left), and reports condition to the Shift Foreman.
	BOP	Observes that 1-2 ASW Pp did not start, and attempts to start the pump (it will start) by taking the pump Auto/Manual switch to Manual, and attempting to start the pump (all at far left of VB-1 vertical section). Note that these actions may be performed prior to AR PK01-03 or OP AP-10 entry (due to it being an automatic action that did not occur), or may be performed during these procedure.
Note: The Shift Foreman (SFM) may enter OP AP-10 (Loss of ASW), either directly, or after implementing AR PK01-03. AR PK01-01 may be entered briefly, but it is not expected.		
		(ONLY if AR PK01-01 is entered; otherwise, section is N/A)
	SRO	<ul style="list-style-type: none"> (1.0) Goes to section 2.1 due to multiple low pressure inputs
	SRO	<ul style="list-style-type: none"> (2.1.1) Determines that a loss of ASW has occurred, and goes to OP AP-10, Loss of ASW
		(ONLY if AR PK01-03 is entered; otherwise, section is N/A)
	SRO	<ul style="list-style-type: none"> (1.0) Goes to section 2.1, due to OC trip inputs
	SRO/BOP	<ul style="list-style-type: none"> (2.1.1) Determines that the standby ASW pump is NOT running with normal current (did not start); takes 1-2 ASW pp to MAN, and starts it
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 2 Page 05 of 20**Event Description:** 1-1 ASW Pump trips on OC, and the 1-2 ASW Pump does not auto start (con't)

Time	Position	Applicant's Actions or Behavior
		(AR PK01-03, con't) (if used)
	SRO	<ul style="list-style-type: none"> (2.1.2) Determines that ASW flow has been restored, and continues to next step.
	SRO	<ul style="list-style-type: none"> Reads NOTE prior to step 2.1.3
	SRO/BOP	<ul style="list-style-type: none"> (2.1.3) Determines that ASW/CCW HX ΔP is normal @ between 100-140"
	BOP	<ul style="list-style-type: none"> (2.1.4) Directs intake watch to secure continuous chlorination to the 1-1 ASW bay
	SRO	<ul style="list-style-type: none"> (2.1.5a) Dispatches operator to pump breaker (1-1 ASW)
	SRO	<ul style="list-style-type: none"> (2.1.5b, 2.1.5c, 2.1.5d) Determines if breaker reclose is allowed, using Ops Policy B-2 (if desired; will not do this, as the 1-2 ASW pp is running normally); directs maintenance to investigate (including clearance and notification).
Note: "Normalizing" the ASW/CCW trains is not needed for this event (will move on to next event once Tech Specs checked).		
	SRO	<ul style="list-style-type: none"> (2.1.6) Established normal ASW/CCW alignment (will not start/complete)
	SRO	<ul style="list-style-type: none"> (2.1.7) Refers to Tech Spec 3.7.8.A (72 hour action) for ASW Pp 1-1 (note: the failure of the low press auto-start on the 1-2 ASW pp is <u>not</u> a Tech Spec required function)
Note: Actions (significant) in AR PK01-03 and OP AP-10 are very similar; both procedures and actions are detailed here, depending on which procedure(s) are chosen by the crew.		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 2 Page 06 of 20Event Description: 1-1 ASW Pump trips on OC, and the 1-2 ASW Pump does not auto start (con't)

Time	Position	Applicant's Actions or Behavior
		(IF OP AP-10, Loss of Auxiliary Salt Water, is implemented; otherwise, N/A)
	SRO	Implements OP AP-10, Loss of ASW
	BOP	<ul style="list-style-type: none"> (1) Verifies an ASW PP running; takes 1-2 ASW to MANUAL, and starts (if not already done)
	BOP	<ul style="list-style-type: none"> (2) Verifies running pump amps (1-2 ASW) are normal (they are)
	SRO/BOP	<ul style="list-style-type: none"> (3) Verifies AR PK01-01 is OFF (was initially on during failure, but should be off now)
	BOP	<ul style="list-style-type: none"> (4) Verifies CCW HX temperature normal (it is)
	SRO	<ul style="list-style-type: none"> (5) Complies with Tech Specs for failed ASW pump (Tech Spec 3.7.8.A for ASW Pp 1-1, 72 hrs)
<p>Proceed to the next event once the standby ASW pump has been started, and Tech Specs have been addressed, per the lead examiner.</p>		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 3 Page 07 of 20**Event Description:** Full Load Rejection (from 75%)

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnosis made of load rejection by use of various alarms, generator load dropping, and/or generator output breakers open.
	SRO	Implements OP AP-2, Full Load Rejection
Note: Once the generator output breakers open, the rod control system will drive rods in, lowering power (via steam dump demand). Rods are placed in manual, and power stabilized on steam dumps between 20-30% power (ideally, but not required, is to stabilize at a point where group 1 steam dumps are throttled, and group 2 steam dumps are closed).		
		(OP AP-2, Full Load Rejection)
	SRO	Reads CAUTION prior to step 1
	ATC	<ul style="list-style-type: none"> (1) Verifies that control rods are inserting properly in AUTO (VB2, intermittent green IN light)
	ATC/BOP	<ul style="list-style-type: none"> (2) Verifies proper operation of steam dumps, Tave trending to Tref (VB3, red/green indicator lights; Tave/Tref from CC1 recorder/PPC)
	BOP	<ul style="list-style-type: none"> (3) Checks MFP suction adequate <ul style="list-style-type: none"> (3a) Verifies 3rd Condensate/booster Pp set running (VB3, lower, center, will auto-start) (3b) MFP suction is verified adequate (PPC, VB3 meter; will remain > 260 psig)
	BOP	<ul style="list-style-type: none"> (4) Verifies DFWCS in AUTO and controlling S/G levels (CC3 MFW HMI, VB3, PPC) <ul style="list-style-type: none"> Checks MFW control and bypass valves in AUTO Checks both MFPs and their controller in AUTO May check level trends, as well as steam flow/feed flow trends (CC3, PPC, and/or big VB3 DFWCS electronic recorders)

(continued on next page)

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 3 Page 08 of 20Event Description: Full Load Rejection (from 75%) (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-2, Full Load Rejection, con't)
	ATC	<ul style="list-style-type: none"> (5) Rod Control is placed in manual, and power is controlled (via Tave and steam dumps) between 20-30%
	ATC	<ul style="list-style-type: none"> (6) Verifies Pressurizer Pressure is controlling in automatic (2210-2260 psig) (may be outside this for short periods, but is controlling in automatic)
	ATC	<ul style="list-style-type: none"> (7) Verifies Pzr Level is controlling at program, and (optional) charging flow adequate to prevent letdown flashing: may take manual control of Pzr level (now, or any time during ramp) to prevent flashing of letdown (under these conditions, approx 60 gpm charging flow is required to keep letdown properly cooled) <ul style="list-style-type: none"> Places HC-459D (master level controller) or FCV-128 (charging flow controller) in manual (CC2, right side, for both) Keeps charging high enough (approx 60-65 gpm, as minimum) to prevent letdown from flashing (VB2, upper panel, letdown temperature, is monitored) Uses HCV-142 (seal backpressure) to maintain RCP seal flows 8-13 gpm
	SRO/ATC	<ul style="list-style-type: none"> (8) RCS is borated per reactivity handbook for approx 50% load reduction (the following guidance is on the boration checklist in the reactivity handbook) <ul style="list-style-type: none"> Presses STOP on M/U Ctrlr HMI (CC2) Presses BORATE on HMI Sets target gallons for boration (as decided above, and per the Shift Foreman); verifies batch is reset Sets boric acid flowrate Presses START, and monitors boration Once stopped, either returns to AUTO (presses AUTO, then START), or performs additional boration per the Shift Foreman
	SRO	Reads NOTE on stabilizing the plant prior to step 9
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC			Scenario No.: 1			Event No.: 3						Page 09 of 20						
Event Description: Full Load Rejection (from 75%) (con't)																		
Time		Position		Applicant's Actions or Behavior														
				(OP AP-2, Full Load Rejection, con't)														
		BOP		<ul style="list-style-type: none">• (9) Stabilizes secondary:<ul style="list-style-type: none">• Places hotwell reject valve HC-3 controller in manual and closed (VB3, lower, right)• Places FCV-31 (part of cold gas temp control scheme) in manual and full open (VB3, lower right; note that this valve/controller is reverse acting, in that 0% on controller is full open demand)• Adjusts TCV-23 and FCV-31 to attain acceptable steam jet air ejector (SJAЕ) flows and cold gas temps, and then returns controllers to auto, and monitors (all VB3, lower right)• Secures one condensate booster pp set, and places it back in AUTO														
Proceed to the next event once step 9 (above) is completed, and at least the 1 st boration is completed by the ATC, per the lead examiner.																		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 4 Page 10 of 20Event Description: S/G Blowdown Radiation Monitor RM-23 fails high (ECG)

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses RM-23 (Blowdown rad monitor) failing high from the following: <ul style="list-style-type: none"> • PK11-17 alarms (S/G Blowdown high rad alarm) • PPC rad monitor screen • VB2 rad monitor recorder (PPC)
	SRO	Enters PK11-17 annunciator response
		(AR PK11-17, S/G Blowdown Hi Rad)
Note: The below action to complete the blowdown isolation may be done using the AR procedure, or may be done when noted by the ATC or BOP, as it is a failure of an automatic action.		
	BOP	<ul style="list-style-type: none"> • (2.1.1) Verifies that blowdown has isolated; verifies all (8) outside containment and sample isolation valves closed (two lower rows of red valve lights at bottom left of VB3; FCVs 151/154/157/160, and FCVs 250/248/246/244)
	BOP	<ul style="list-style-type: none"> • (2.1.1.a, 2.1.1.b, 2.1.2) Verifies that S/G blowdown has shifted from the outfall to the Equipment Drain Receiver (EDR) (VB3, lower, far left) (FCV-499 opens, FCV-498 closes) Must take FCV-498/499 switch on VB3 to Drn Tk position.
	ALL	<ul style="list-style-type: none"> • (2.1.3, 2.1.6) Evaluates other S/G RMs (RM-19 vs RM-23, and also checks RMs 71-74 (steam line) and RM-15/15R (steam jet air ejector) to determine that RM-23 is probably a failure of the rad monitor
	SRO	<ul style="list-style-type: none"> • (2.1.4, 2.1.5, and later steps) May make directions to prepare to restore blowdown (will not have time prior to next event)
	SRO	<ul style="list-style-type: none"> • (2.1.7) Directs S/Gs to be sampled per CAP AP-1 (quick sample procedure)
<i>(continued on next page)</i>		

** Critical Task

Event Description: S/G Blowdown Radiation Monitor RM-23 fails high (ECG) (con't)

Time	Position	Applicant's Actions or Behavior
		(AR PK11-17, S/G Blowdown Hi Rad, con't)
	ALL	<ul style="list-style-type: none"> (optional) (2.1.8) May check OP O-4 (small S/G Tube leakage check and guidance procedure) and PPC screens to confirm that no S/G tube leakage is occurring (none is, and screens will show this)
	SRO	<ul style="list-style-type: none"> Directs maintenance to investigate failed rad monitor and valve
Cue: (using appropriate time compression) Preliminary troubleshooting shows that none of the auto-closure signals are reaching FCV-498; RM-23 is failed (high) (this cue is critical to Tech Spec call on FCV-498)		
	SRO	Implements ECG for failed Rad Monitor RM-23 (ECG 39.3.B, requires grab samples)
	SRO	May go to OP AP-3 "Steam Generator Tube Failure." After finding no indications of increasing S/G activity, should exit AP-3 in step 4.a RNO.
Proceed to the next event once Tech Specs / ECGs are addressed, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 5 Page 12 of 20**Event Description:** VCT Level Channel LT-112 Fails Low (causes auto makeup)

Time	Position	Applicant's Actions or Behavior
Note/Caution: Ensure that the ATC has placed the makeup system back in AUTO prior to activating this failure.		
	ALL	Diagnosis of makeup control failure is made by one or more of the following: <ul style="list-style-type: none"> Automatic makeup is running, but VCT level shows normal (LT-114) (PPC as L0112A, HSDP) LT-112 shows low level (0%), but VCT pressure shows normal, and CCP operation (suction) is normal (all on VB2) Yokogawa recorder (LT-112A) (VB2 upper left)
	ATC	<ul style="list-style-type: none"> Makeup Control is taken to STOP (on the makeup control HMI, CC2) (may be done before or during OP AP-19 use)
	SRO	Implements OP AP-19, Malfunction of the Reactor Makeup Control System
		(OP AP-19, Malfunction of the Reactor Makeup Control System)
	ATC	<ul style="list-style-type: none"> (1) Ensures M/U set to correct mode (either AUTO and running, or AUTO and stopped if action taken above)
	ATC	<ul style="list-style-type: none"> (1) Ensures system is selected to start (will probably be selected to STOP [now or later] due to unneeded makeup operation); may select STOP before or during OP AP-19 use
	BOP	<ul style="list-style-type: none"> (2) Checks makeup system pumps and valves lineup up, and in AUTO (VB2, lower center; they are all normal)
	ATC/BOP	<ul style="list-style-type: none"> (3) Verifies VCT level channels OPERABLE: <ul style="list-style-type: none"> Observes discrepancy between LT-112 (0%), and LT-114 (normal level); may use VCT pressure and/or normal CCP operation to diagnose that LT-112 has failed (probably diagnosed prior to procedure entry); <u>note</u>: may use operator information manual (OIM) as a diagnostic tool
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC

Scenario No.: 1

Event No.: 5

Page 13 of 20

Event Description: VCT Level Channel LT-112 Fails Low (causes auto makeup) (con't)

[illegible]

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 6 & 7 Page 14 of 20Event Description: Steamline Break OC (1-2 S/G) and ATWS (man trip works) (CT)

Time	Position	Applicant's Actions or Behavior
	ALL	Increased steam flow (VB3/CC3 steam flow meters, recorder, PPC) and noise is noted, as well as dropping S/G pressures (VB3, PPC) and T _{ave} (PPC, CC2, VB2)
	ALL	Crew responds to SI by going to EOP E-0; may initiate manual SI/trip prior to automatic actuation
	ALL/ATC	After noting that reactor trip is needed but not actuated, manual trip switch is used (CC1 or VB2) to trip reactor (successfully); this may be done prior to entry to EOP E-0, or during step 1 of EOP E-0. (Critical Task) (WOG CT E-0-A, reactor is manually tripped prior to completion of step 1 of EOP E-0) **
	SRO	Implements EOP E-0, Reactor Trip or Safety Injection
		(EOP E-0, Reactor Trip or Safety Injection)
	ATC	<ul style="list-style-type: none"> (1) Notes reactor NOT tripped (unless tripped above), and performs manual trip (CC1, or VB2), then verifies trip (trip bkrs open (VB2 upper left), rods on bottom (VB2 upper left DRPI panel), NIs decreasing (CC1 left)) (CT, see above) **
	ATC	<ul style="list-style-type: none"> (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps)
	BOP	<ul style="list-style-type: none"> (3) Checks vital 4kv busses (VB4, vital busses F/G/H have white lights on mimic busses)
	ATC/BOP	<ul style="list-style-type: none"> (4) Checks if SI actuated (PK08-21 ON, also checks VB1 red train lights and/or train equipment to verify both trains actuated)
	SRO	<ul style="list-style-type: none"> (5) Directs App E implemented (usually to BOP)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 6 Page 15 of 20Event Description: Steamline Break OC (1-2 S/G) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-0, Appendix E) (EOP E-0 body steps con't on next page)
	BOP	<p>App E is implemented:</p> <ul style="list-style-type: none"> • (1a) Checks no personnel in Containment (part of turnover; may not voice) • (1b) Announce trip/SI on PA system • (2) Checks main generator – tripped (PK14-01 ON, output bkrs open, and exciter field bkr open, CC3 right side) • (3 & 4) Verify Phase A and containment vent isolation complete (VB1, ESF status lights, red lights ON, white lights OFF) • (5) Verify ESF (SI) actuation complete (ESF/SI red light ON, white lights OFF) • (6) Verifies Feedwater isolation complete (normal FWI portion is complete, with red light ON, and white lights OFF) (S/G portion: red light is ON, white lights OFF) • (7 & 8) Checks containment spray, Phase B, and main steam isolation – NOT required (red lights are OFF for ESF for these on VB1, and white lights are OFF) • (9) Checks AFW status (MDAFPs running, TDAFP may be running, VB3 center area); verifies either min of 435 gpm flow (VB3 center) or S/G level > 15% (VB3 center) • (10) Verifies ECCS flows (charging injection (VB2 upper panel left), SI, RHR (both on VB1 upper panel); expected is that only CCPs will be delivering flow at this RCS pressure • (11) Reports ESF and AFW status to the Shift Foreman • (12 & 13) Checks excess letdown – not in service (8166/8167 closed); turns on aux bldg vent charcoal filter preheater (VB4 lower panel, left side) • (14) Checks secondary systems (MFPs tripped (VB2, green lights ON), only one CB Pp set running, condenser status (not avail)) • (15) Verifies proper operation of Aux Bldg and Control Rm vent systems (VB4 vent status light panel white lights); verifies containment iodine fans secured (VB4, lower panel) • (16 - 21) Verifies DGs running normally (VB4, freq (60), volts (120), speed (900)); verifies vital batteries supplied by chargers (charger and bus volts on VB5, upper panel middle/lower area); verifies MSRs reset (CC3 Triconex HMI); throttles RCP seal injection flows to normal (FCV-128, to 8-13 gpm each, CC2); checks PK11-04 NOT IN (SFP alarm); notifies Shift Foreman of completion
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 6 Page 16 of 20Event Description: Steamline Break OC (1-2 S/G) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-0, Reactor Trip or Safety Injection, con't)
	ATC	<ul style="list-style-type: none"> (6) Checks RCS temperature – stable (temps will initially be dropping due to faulted S/G; AFW will be throttled back (VB2, upper panel lower area)
	ATC	<ul style="list-style-type: none"> (7) Checks Pzr PORVs and Pzr safeties (closed) / PORV block valves (all open), and no elevated tailpipe temps or sonic flows on safeties/PORVs (VB2 – upper panel, far right); checks Pzr sprays closed (CC2)
	SRO/ATC	<ul style="list-style-type: none"> (8) Checks RCP trip criteria (RCS pressure [VB2, PPC] is not < 1300 psig, all SI and ECCS CCPs are running, criteria is <u>not</u> met) (VB1 and VB2)
	ATC/BOP	<ul style="list-style-type: none"> (9) Checks for faulted S/Gs <ul style="list-style-type: none"> Faulted – notes 1-2 S/G pressure is dropping rapidly and/or completely depressurized (all S/G pressures on VB3)
	SRO	Transitions to EOP E-2
		(EOP E-2, Faulted S/G Isolation)
	SRO	Reads (3) CAUTIONS prior to step 1
	BOP	<ul style="list-style-type: none"> (1) Verifies ALL MSIVs and bypasses are closed (VB3, upper panel, left side)
	BOP	<ul style="list-style-type: none"> (2) Checks for any intact S/G (1-1, 1-3, and 1-4 S/Gs have stable pressures, consistent with the RCS cooldown from the 1-2 S/G); continues in E-2
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 1 Event No.: 6 Page 17 of 20Event Description: Steamline Break OC (1-2 S/G) (con't) (CT)

Time	Position	Applicant's Actions or Behavior
		(EOP E-2, Faulted S/G Isolation, con't)
	BOP	<ul style="list-style-type: none"> (3) Identifies 1-2 S/G as faulted (VB3, pressure is still dropping in uncontrolled manner, or completely depressurized at this point)
	BOP	<ul style="list-style-type: none"> (4) Isolates 1-2 faulted S/G (see BOLD substeps below, completed prior to exit from EOP E-2) (Critical Task) (WOG CT E-2-A, isolate faulted S/G prior to exit from EOP E-2): ** <ul style="list-style-type: none"> Verifies MFIV FCV-439 closed (all of these controls on VB3, lower left) (already closed) Verifies SGBD valves FCV-761, 154, and 248 closed (IC, OC, and sample) (already closed) Verifies S/G 1-2 10% steam dump closed (PCV-20) (already closed) Closes TDAFP AFW LCV-107 Closes MDAFP AFW LCV-111 for 1-2 S/G to isolate AFW Closes FCV-37 to isolate steam from 1-2 S/G to TDAFP
	BOP	<ul style="list-style-type: none"> (4f) Verifies AFW flow to at least one intact S/G (VB3, upper panel, center area meters)
	BOP	<ul style="list-style-type: none"> (5) Checks CST level > 10% (VB3, upper panel, center area meter and recorders)
	BOP	<ul style="list-style-type: none"> (6) Removes WR T_{hot} input to SCMM for loop 2 (behind boards, PAMS panel behind VB3) <ul style="list-style-type: none"> Goes to PAM4 panel Presses "Configuration Summary" Presses "Failed S/G" Presses the PB for the T_{hot} to be disabled (2) Presses "Disable Loop 2"
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 1Event No.: 6Page 18 of 20Event Description: Steamline Break OC (1-2 S/G) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-2, Faulted S/G Isolation, con't)
	ATC/BOP	<ul style="list-style-type: none"> (7) Checks for ruptured S/Gs <ul style="list-style-type: none"> No valid alarm on PK11-06, PK11-17, or PK11-18 (RM-23 is failed high) No upward trend on RM-19, 15/15R, or RM-71/72/73/74 (no trends) (recorders on VB2 (and PPC)) Chemistry contacted to sample (per CAP AP-1, quick sample procedure)
	ATC/BOP	<ul style="list-style-type: none"> (8) Checks ECCS Termination Criteria (met) <ul style="list-style-type: none"> RCS Subcooling > 20°F (it is) Secondary Heat Sink (> 435gpm AFW flow or NR S/G level) (satisfied) RCS pressure – stable or rising (it will be) Pzr Level – greater than 12% (it will be)
	SRO	Implements E-1.1, SI Termination, and performs a procedure transition brief
		(EOP E-1.1, SI Termination)
	ATC	<ul style="list-style-type: none"> (1) Resets Safety Injection (SI) (VB-1, vertical panel, right of center)
	ATC/BOP	<ul style="list-style-type: none"> (2) Aligns Charging (stops all but one high head ECCS CCP) <ul style="list-style-type: none"> Verifies ≥ 1 ECCS CP running (both are) (VB2, lower center) (ATC) Resets (pushbuttons) vital 4KV auto-transfers (VB4, near blue lights) (BOP) Stops one ECCS CCP (ATC) Stops 1-3 CCP (stopped during E-0, App E) (ATC)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 1Event No.: 6Page 19 of 20**Event Description:** Steamline Break OC (1-2 S/G) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-1.1, SI Termination, con't)
Note: RCS pressure may need to be watched for a time (Pzr subcooling may cause slight lowering of RCS pressure until heaters catch up, following fill of Pzr during this event); pressure tends to drop a bit after the 1 st ECCS CCP is stopped. Crew should evaluate conditions (subcooled pressurizer) and wait to stabilize vs improper transition to E-1.2.		
	ATC	<ul style="list-style-type: none"> (3) Checks RCS pressure – stable or increasing (it is – or, if dropping slightly, it will stabilize shortly and rise again – see note above)
	ATC	<ul style="list-style-type: none"> (4) Isolates charging injection, by closing 8803A/B and 8801A/B (lower left on VB-2)
	ATC/BOP	<ul style="list-style-type: none"> (5) Establish (normal) charging flow <ul style="list-style-type: none"> Closes HCV-142 (CC2 right side) (ATC) Opens 8107 and 8108, Charging Hdr isolation valves (VB2 lower center area) (BOP) Verifies 8146 (normal charging valve) OPEN (it is) (VB2 lower left area) (BOP) Verifies 8145 and 8148 (aux spray valves) CLOSED (they are) (VB2 lower left area) (BOP) Throttles open FCV-128 to establish flow (already open to maintain seal flows) (CC2, right side) (ATC)
	ATC	<ul style="list-style-type: none"> (6) Adjusts FCV-128 (charging flow control) and HCV-142 (RCP seal backpressure) to maintain Pzr level 17-60% and seals 8-13 gpm (most likely, level will be high, so both valves will be throttle to a minimum charging to support RCP seal flows) (CC2, right side)
(continued on next page)		

** Critical Task

[illegible]

**** Critical Task**

ATTACHMENT 1 – SIMULATOR SETUP

- ☐ Run Init/Initialize /CCs and VBs/Run Drill 81
- ☐ Any tags are placed/removed as necessary
 - CBCs on 1-2 DG start/stop, auto/manual, and output breaker
- ☐ The proper Delta-I curve on CC1 and Reactivity Handbook for the simulator **INIT** in place.
- ☐ The Rod Step Counters indicate correctly.
- ☐ Run “Clear Recorders” icon on lower left desktop to clear YOKOGAWA recorder memories.
- ☐ Clear the PCS HMIs (NSR) by "flushing" the trend buffer; then, restart the "Window Viewer" app.
- ☐ Boric Acid and Primary Water Target Blender set to values identified in Lesson
- ☐ Record PPC MAX on CC2 lamicoid.
- ☐ Record Boron Concentration for desired simulator **INIT** on CC2 lamicoid.
- ☐ Circuit breaker flags are correct on CC1 (Proportional Heaters), CC3, VB4, and VB5
- ☐ Equipment status lamicoids are correct:

RHR Valves (8726A/B and 8734A/B)	- CLOSED (OPEN if RHR in service)
H2 or N2 on VCT	- H2 (unless shut down training)
SUPPLYING IN-SERVICE SCW HX	- CWP 1-1
AUTO RECLOSE FEATURE CUTIN ON THIS CWP	- CWP 1-1
SELECTED TO BUS 2F	- CONT. RM. VENT TRAIN 1 BUS F
SELECTED TO BUS 1H	- CONT. RM. VENT TRAIN 1 BUS H
B.A. XFER PP SUPPLYING BLENDER	- BA PP 1-2
RADWASTE DISCH AND CHLORINATION	- ASW 1-1
OFF NORMAL LAMICOIDS OR PINK MARKERS	- Placed as needed or return to CC3

- ☐ The Plant Abnormal Status Board is updated for Charging Pump Status, Boron Conc, PRA Risk Status and Work Week Matrix.
- ☐ Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up.
- ☐ PPC Setup:
 - PPC BIG Screen (set to TABULARLG1), select new list, private, “Sim Large”)
 - CC2, SFM PPC Screens select OVERVIEW and SM to Rad Monitors
 - RODCONFIG is updated (click Apply when completed)
- ☐ SPDS (screens and time updating), A screen “RM”, B screen “SPDS”.
- ☐ CC3 Annun. CRT big screen (if enabled then get alarm it needs reset - Tools, keyboard, Tools, password - which is "A", File Exit - Start over)
- ☐ The chart recorders are operating properly. DDR10's and Turbine Vib Recorder are acknowledged and in AUTO. CC1 NR-45 on proper screen. PAMS RVLIS/TMS screens on “Summary” Page.
- ☐ All typewriters are on, with adequate paper/ribbon/etc., and are in the “**ON LINE**” status, as needed.
- ☐ Alarm A&E Viewer window is activated prior to run, and printer is placed ,**ONLINE**”, if needed.
- ☐ Triconex DEH/DFW alarms have been acknowledged/cleared.
- ☐ Seismic drawer put back; check for any alarms on the Rad panels
- ☐ PC setup for SVC tailboard (G-3 ENF Reset, RCPs, U-1 Safety Monitor)
- ☐ Verify paper in HPD2 and print a test page.
- ☐ Verify Annunciator Horn is on (**BELL ON**) and Sound Effects are on (**SOUND ON**).
- ☐ The video, audio, and communication systems are set up and functioning
- ☐ Turn down plant PA on simulator floor (restore to original setting when scenario completed)

TIMELINE AND BOOTH/CONSOLE OPERATOR ACTIONS

Timeline The following table shows the simulator computer operations and other instructions the examiners need to know about the scenario to successfully run the exam. **"X" = Manual entry required!**

	TIME LINE	CONSOLE ENTRY	SYMPTOMS, CUES, AND DESCRIPTION
X	Setup Simulator per Checklist	INIT IC-511	75% power, MOL, C _B = 838 , Integrators: BA – 00, and PW – 25 <ul style="list-style-type: none">Tags: CBCs on DG 1-3 (A/M, Start, output bkr)
X	Setup	Drill 81	Reset normal engineering values
X	Setup	Start TEAM data collection	Collect data for scenario for NRC Exam Team
X	Setup	DRILL 36 in AUTO	Clears DG 1-3 for maintenance
X	Once crew has taken the watch	DRILL 9203 in AUTO	Scenario malfunctions are inputted once the crew takes the watch
X	15 min after 8149A is opened	pmp asw2 1,0,0,0,d,0 pmp asw1 4,0,0,900,c, xv2o212r,0	1-2 ASW pp does not auto-start on low pressure 1-1 ASW pp trips on OC 15 min after 120 letdown is placed in service (8149A opened)
X	When requested	Turbine Bldg: 52-HF-08 bkr for ASW pp 11 has B phase OC flag dropped. Intake: ASW pp 11 motor has charring (<i>bring in door alarm prior to this report</i>)	
	15 min after 1-2 ASW pp is started	mal gen4 act 3,0,900,c, xv1i243c,0	Load Rejection (occurs 5 min after 1-2 ASW pump started)
	15 min after power drops below 28%	xmt rms23 3,1e+06,1,900,c, fnispr.lt.28,0 vlv sgb14 2,1,0,0,d ,.not.xv3ia89c #rbdf498 VLV SGB13 2,0,0,0,d ,.not.xv3ia89c #rbdf499	RM-23 fails high FCV-498 (blowdown to disch tunnel) doesn't auto close & FCV-499 doesn't auto open, can be operated manually on VB3
X	When Maint told to investigate FCV-498 & RM-23	Cue: (using appropriate time compression) Preliminary troubleshooting shows that none of the auto-closure signals are reaching FCV-498; RM-23 is failed (high) (this cue is critical to Tech Spec call on FCV-498)	
X	<u>Note:</u> Make sure that Makeup Controller is in AUTO PRIOR to actuating next event!		
	15 min after closing FCV-498	xmt cvc19 3,0,3,900,c, ,.not.xv3ia89c,0	LT-112 fails low (15 minutes after FCV-498 is closed) (causes continuous auto makeup)
	On SI	mal ppl5a act 1,0,0,d,0 mal ppl5b act 1,0,0,d,0	ATWS (short) on steam break/SI (man trip switch works)
	On SI	mal ppl3a act 3,0,0,d,0 mal ppl1a act 2,0,0,d,0	Train A of SI and Phase A do not actuate in AUTO (must be aligned manually)
	15 min after LT-112 failure	mal mss3b act 5e+06,205,900,c, wcv111(1).gt.10,0	Steam Break (large) OC on the 1-2 S/G (15 minutes after primary water flow detected from LT-112 failure, above)
X	5 min after SI/Trip	DRILL 32 in AUTO	Nuclear Operator actions on a trip
X	If requested	DRILL 17 in AUTO	If requested to open S/G B/D sample valves for S/G samples
X	If requested	DRILL 15 in AUTO	If requested to break vac, secure gland steam, etc

DRILL FILE TEXT

* L111 NRC Exam Scenario 01 (DRILL 9203)
* 9/7/12, glh
*
* (1-2 ASW PP doesn't auto start; man OK)
* PMP ASW2 AUX SALTWATER PP 12 #ocwasp12
pmp asw2 1,0,0,0,d,0 #ocwasp12
*
* (1-1 ASW trips on OC 15 min after 8149A opened)
* PMP ASW1 AUX SALTWATER PP 11 #ocwasp11
pmp asw1 4,0,0,900,c,xv2o212r,0 #ocwasp11
*
* (load rejection 15 minutes after 1-2 ASW pp started)
* mal GEN4 GENERATOR LOSS OF LOAD
mal gen4 act 3,0,900,c,xv1i243c,0
*
* (FCV-498 doesn't auto-close on RM-23 fail high - man OK)
vlv sgb14 2,1,0,0,d,.not.xv3ia89c #rbdf498
VLV SGB13 2,0,0,0,d,.not.xv3ia89c #rbdf499
*
* (RM-23 fails high 15 min after reaching 28% power)
* XMT RMS23 RE-23 S/G BD OVERBOARD LIQUID MONITOR #rrmsr23
xmt rms23 3,1e+06,1,900,c,fnispr.lt.28,0 #rrmsr23
*
* (LT-112 fails low, causing auto m/u, 15 min after closing fcv-498)
* XMT CVC19 VCT 1-1 LEVEL, ALM0341, SPDS, LI-112 #bcvc112
xmt cvc19 3,0,3,900,c,.not.xv3ia89c,0 #bcvc112
*
* (short ATWS, and Train A SI failure on stm break)
* mal PPL5A REACTOR TRIP BREAKER RTA FAILURE TO OPEN (TRAIN A)
mal ppl5a act 1,0,0,d,0
* mal PPL5B REACTOR TRIP BREAKER RTB FAILURE TO OPEN (TRAIN B)
mal ppl5b act 1,0,0,d,0
* mal PPL3A SAFETY INJECTION ACTUATION/PHASE A FAILURES (TRAIN A)
mal ppl3a act 3,0,0,d,0
mal ppl1a act 2,0,0,d,0
*
* (1-2 S/G stm break OC, 15 min after M/U water > 10 lbm/sec)
* mal MSS3B STEAMLINE BREAK OUTSIDE CONTAINMENT (S/G #2)
mal mss3b act 5e+06,205,900,c,wcv111(1).gt.10,0

Diablo Canyon Power Plant Operations Shift Log

Unit 1

Today - Dayshift

Unit 1 Days at Power: 111 Days

Operating Mode: 1

Gross Generation: 891 MWe

Power Level: 75.7 %

Net Generation: 843 MWe

Shift Manager Turnover

PRA RISK STATUS NEXT SHIFT:	GREEN
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
MAIN GEN H ² USAGE (475 SCFD Limit):	307 SCF / 326 SCFD 5 day ave

NEW EMERGENT WORK:

- none

SHUTDOWN TECH SPECS / ECGS:

- TS 3.8.1.B → DG 1-3 OOS for corrective maintenance on fuel racks (discovered during normal surveillance run last night); RTS estimate is 24 hours; last partial STP I-1C completed 30 minutes ago (due in 7.5 hrs); action 3.8.1.B.3.1 has been completed.

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:

- none

TURNOVER ITEMS:

- Unit was ramped to ≈ 75% 8 days ago for high vibrations on the Htr #2 Drain Pump; the motor has been replaced, and following some alignment problems, the pump has been returned to service; due to some minor/intermittent pump vibrations, engineering will be doing data-taking for another shift or two; management will then decide if the plant will ramp back to 100%.
- Chemistry has requested 120 gpm letdown first thing on your shift for minor crud burst (OP B-1A:XII and OP B-1A:V provided for your PJB)

PRIORITY ITEMS FOR NEXT SHIFT:

- Maintain current power level
- Place 120 gpm letdown in service

OPERABILITY ITEMS:

- TS 3.8.1.B → DG 1-3 OOS – 1 day into 14 day action

Shift Foreman Turnover

ANNUNCIATORS IN ALARM:

- Alarms in are consistent with the 1-3 DG OOS (no other alarms)

TURNOVER ITEMS:

- U-1 – maintain 75% - no one in containment; following more data-taking on the Htr #2 Drip Pump, the unit may ramp back to 100% (as early as tomorrow).
- U-2 is at 100%

REACTIVITY MANAGEMENT:

- Time in core life: MOL.
- Power History: Steady State @ 75% for 7+ days, previously at 100% for 73 days.
- Boron concentration is 838 ppm from a sample taken 4 hours ago.
- Control Rod Height: 200 steps on CBD.
- Diluting the RCS approximately 25 gallons every 1.5 hrs.
- The last dilution was completed 15 min ago.
- Rod motion: none planned, as needed to maintain ΔI on target

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- Partial STP I-1C due in 7.5 hrs

OTHER ABNORMAL PLANT STATUS

- None

Facility: Diablo Canyon (PWR)Scenario No.: 2Op-Test No.: L111-NRC

Examiners: _____

Operators: _____

Initial Conditions: 2% with MFW in service, BOL, 1575 ppm boron**Turnover:** OP L-3, @ step 6.29, ready to raise power to 8%

Event No	Malf No.	Event Type*	Event Description
1	N/A	R (ATC)	Raise reactor power from 2% to \approx 8% power
2	ser 0232 vlv pvr2 dsc pvr2	C (SRO, BOP)	At \approx 3% power, Pvr PORV PCV-455C block valve 8000B causes ground, shorts out/goes mid-position, and then breaker trips (can't be closed) (TS)
3	xmt cvc16	I (SRO, BOP)	TE-130 fails low (causes TCV-130 to close in auto), causing high letdown temperature; manual control is used to restore letdown temperature
4	mal sei1 asisrst	C (SRO)	Earthquake (mod) causes construction crane impact on RWST about 35% level (TS only) (later will cause ECA-1.1 entry and CT)
5	cnv rcs2	C (ALL)	PCV-455B (Pvr spray valve) opens slightly on earthquake (mech bound, can't control from C/R); will fail fully open (requiring reactor trip and RCP S/D) (once RWST TS addressed)
6	mal rcs3d	C (ALL)	RCS leak starts and escalates (on aftershock), requiring manual SI
7	vlv sis3/sis4	C (BOP)	8801A/B fail to open on SI, requiring manual opening to establish high head ECCS injection (CT)
8	mal rcs3d asisrst	M (ALL)	SBLOCA and Loss of Emergency Coolant Recirculation (ECR): with low RWST level, causes transfer to cold leg recirc procedure and then loss of ECR procedure; M/U to RWST is directed, and ECCS flow is reduced (CT)

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
8. Total malfunctions (5–8)	6
9. Malfunctions after EOP entry (1–2)	2
10. Abnormal events (2–4)	3
11. Major transients (1–2)	1
12. EOPs entered/requiring substantive actions (1–2)	2
13. EOP contingencies requiring substantive actions (0–2)	1
14. Critical tasks (2–3)	2

Rev 2 comments: deleted one event; adjusted timing; added one more ARP option

SCENARIO SUMMARY – NRC #2

1. Control Rods are pulled one full step at a time to raise power slowly from 2% to 8% power, in preparation for rolling the main turbine.
2. At \approx 3% power, a 480v Bus G ground alarm will signal a malfunction of Pzr PORV block valve 8000B. The valve will (shortly after the alarm) simulate a short/electrical problem, and move to mid-position (and not move thereafter); a few minutes later, the breaker for the valve (8000B) will trip open (and the ground alarm will clear. Tech Spec actions for TS 3.4.11.C will apply (1 hr to place associated PORV in MAN/CLOSED). **(TS)**
3. Letdown heat exchanger temperature element TE-130 will fail low, causing actual letdown temperature to rise and causes alarms, letdown divert from the demineralizers, and rising VCT temperature. OP AP-11, Malf of the CCW System, Sec D, will be used to take manual control of letdown temperature (TCV-130), and control temperature manually.
4. A moderate seismic event causes a large crane in the 115' tank area to tip over and puncture the RWST, about 1/3 of the way up from the bottom of the tank (and it drains slowly to that level). Tech Spec 3.5.4.B will be implemented (1 hr to restore, which is not possible). This failure sets up the final event (loss of emergency coolant recirc capability). **(TS)**
5. Also, one Pzr Spray Valve (PCV-455B) fails partially open (but remains within the ability of the pressure control system at this point). Once the RWST Tech Spec is addressed, the spray valve will fail full open, causing the need for a manual reactor trip, and trip of the 1-1 and 1-2 RCPs. The crew will stabilize in EOP E-0.1, Reactor Trip Response.
6. An RCS leak starts (aftershock) (slow ramp to 900 gpm), requiring actions to try to keep up with the leak, and then initiate a manual Safety Injection (SI) when those efforts fail.
7. On the SI, two of the charging injection isolation valves fail to open, but are opened manually in order to supply high-head ECCS injection. **(CT)**
8. The RCS leak escalates to a SBLOCA, and the crew proceeds (eventually) to ECA-1.1, Loss of Coolant Recirc Capability, where the crew will direct makeup to the RWST, and throttle ECCS flow to conserve RWST inventory. **(CT)**

The scenario is terminated once RWST makeup has been directed, and ECCS flow has been reduced, per EOP ECA-1.1.

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 2 Page 02 of 19**Event Description:** Pzr PORV Block Valve 8000B ground/short (TS)

Time	Position	Applicant's Actions or Behavior
	ATC	Notes and updates to SFM alarm on 480v Bus G (PK17-24, 480v Bus 1G Ground),
Note: The Shift Foreman (SFM) may take one or more of the following actions, using guidance in AR PK17-24, or just basic troubleshooting principles.		
		(AR PK17-24, 480v Bus 1G Ground, IF implemented; otherwise, steps per SFM)
Sequence: The ground alarm will be followed by 8000B going mid-position (simulating a short), and stick there. Several minutes later, the bkr will trip and the gnd alarm will clear.		
	SRO	Implements AR PK17-24, 480v Gus 1G Ground
	SRO	Reads NOTE prior to step 2.1.1
	ALL	<ul style="list-style-type: none"> (2.1.1) Attempts to locate grounded equipment (has board operators check bus 1G equipment for problem indications Notes that 8000B is mid position (and may attempt to restore to open); should note 8000B as the problem, either by the mid-positioned valve and/or by the time the breaker trips and 8000B goes dark, and the alarm clears.
	SRO	<ul style="list-style-type: none"> (2.1.2) May have breaker for 8000B opened (may not happen, if the breaker trips first)
	SRO	<ul style="list-style-type: none"> (2.1.3) Determines that de-energizing the entire 480v Bus is not needed, and moves on
	SRO	<ul style="list-style-type: none"> (2.1.4) Directs maintenance to write notification and repair valve motor/breaker
	SRO/BOP	<ul style="list-style-type: none"> (2.1.5) Implements Tech Spec 3.4.11.C for 8000B (1 hr) <ul style="list-style-type: none"> Places associated PORV (PCV-455C) in MAN/CLOSE (BOP) (VB2, vertical panel, lower right)
	SRO	Should recognize a mode change is not allowed (TS 3.0.4). If Shift Manger is asked about continuing the startup, cue SFM to refer to Tech Specs.
Proceed to the next event once the event is diagnosed, and Tech Specs have been implemented, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 2Event No.: 3Page 03 of 19Event Description: Letdown Heat Exchanger temperature (TE-130) fails low (causes high temp)

Time	Position	Applicant's Actions or Behavior
Note: There are two possible procedure-driven outcomes to this event: the predicted outcome is that the crew will recognize the controller failure in auto due to the temperature indicator failing low, and use manual on the controller to restore normal temperature, using AR PK04-21. The operator may continue to OP AP-11, section D; however, another outcome is written (on following page(s)) to allow for valid entry into the letdown line failure procedure (OP AP-18), which will isolate letdown. Either outcome will provide actions for at least the SRO and BOP (no credit taken for ATC).		
	ALL	Notes/diagnoses letdown high temperature (or TE-130 failure) from one or more of the following: <ul style="list-style-type: none"> TE-130 temperature low (lower than ultimate heat sink) (VB2, center vertical) VCT temperature rising (VB2, center vertical) Letdown diverted (TCV-149) to VCT (away from demineralizers) (VB2, skirt, center) PK04-21 alarm (on letdown high temp and/or high temp divert)
		(AR PK04-21, Letdown Press/Flow/Temp, IF used; otherwise, see AP-11 or AP-18 actions following these)
	SRO	Implements AR PK04-21 section 2.1 for General Actions
	SRO/BOP	2.1.1 Checks letdown not isolated
	SRO/BOP	2.1.2 Checks Letdown break is not suspected
	SRO/BOP	2.1.3 Checks letdown HX outlet pressure is not high.
	SRO/BOP	2.1.4 Checks letdown flow not excessive
	SRO/BOP	2.1.5 Notes that letdown HX outlet temperature is high <ol style="list-style-type: none"> Adjusts HC-130B (VB2) manually as necessary to control ltdn temperature
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 2Event No.: 3Page 04 of 19**Event Description:** Letdown Heat Exchanger temperature (TE-130) fails low (causes high temp) (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-11, Malf of the CCW System, Section D, if used) (if OP AP-18 used, go to next section and mark this section N/A)
	SRO	Implements OP AP-11, Malfunction of the CCW System, Section D (loss of CCW to Ltdn HX)
	BOP	<ul style="list-style-type: none"> (1) Checks TCV-130 controlling letdown temperature (actual temperature is high, but controller output is zero, so it is not controlling in auto) (VB2, vertical center, lower area)
	BOP	<ul style="list-style-type: none"> (1 RNO) Takes manual control of TCV-130 by pressing MAN PB, and then raise PB to reestablish flow to the letdown HX (can use VCT temperature as alternate indication of letdown temperature)
	SRO/BOP	<ul style="list-style-type: none"> (2) Determines that letdown temperature can be maintained in the normal range using the TCV-130 controller in MANUAL
	SRO	<ul style="list-style-type: none"> May contact maintenance to repair TE-130
Note: The crew may discuss contacting chemistry about placing demineralizers back in service (TCV-149 back to normal), but the next event will occur before that evaluation can be completed.		
Note: If for any reason the crew decides that they do not have temperature under control, the procedure directs them to isolate letdown. If that occurs, the steps are listed in the next section (under AP-18 actions), and not repeated in the AP-11 actions, above).		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 3 Page 05 of 19Event Description: Letdown Heat Exchanger temperature (TE-130) fails low (causes high temp) (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-18, Letdown Line Failure, if used; mark N/A if not used)
	SRO	Implements OP AP-18, Letdown Line Failure
	ATC	<ul style="list-style-type: none"> (1a) STOPS load changes (power rise) by stopping rod pulls (CC1, right side)
	SRO	<ul style="list-style-type: none"> (1b, 1c) Notes no RCS heatups/cooldowns, or draindowns in progress
	BOP	<ul style="list-style-type: none"> (2) Isolates letdown by: <ul style="list-style-type: none"> (2a) Closes 8149C (letdown orifice isolation) (VB2 skirt, left side) (2b) Closes LCV-459 and LCV-460 (letdown isolations) (next to above vlv) (2c) Verifies HCV-133 Closed (it is) (RHR letdown controller) (VB2 vertical, center, lower area)
	ATC	<ul style="list-style-type: none"> (3) Checks RCS for leakage (pressure and level) both will now be rising (PPC, CC2 recorders, VB2 meters)
	ATC	<ul style="list-style-type: none"> (4) Reduces charging to minimum (RCP seals only) <ul style="list-style-type: none"> Takes FCV-128 (or HC-459D) to MAN, and lowers demand to get charging header flow to about 32 – 52 gpm (all on PPC or on CC2) Takes HCV-142 dial CCW (basically fully closed, all flow to seals); RCP seal flows at 8-13 gpm (CC2, and PPC)
	SRO	Next steps are to place excess letdown in service and take recover actions (the next event will occur first and preclude this)
Note: Placing excess letdown in service during this scenario is not needed or desired (too much time); the next event should be implemented.		
Proceed to the next event once either 1) TCV-130 is controlling letdown temperature manually using OP AP-11, or 2) Letdown has been isolated per OP AP-18, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 4 Page 06 of 19Event Description: Earthquake & Rupture of the RWST (TS)

Time	Position	Applicant's Actions or Behavior
Note: Procedure step numbers are included at the front of each action/comment in parenthesis, where applicable (per NRC request).		
Note: Although the Shift Foreman may choose to implement CP M-4 (Earthquake) him/her-self, it is not an objective of the scenario, and it would be expected that with equipment problems and a plant status that the procedure be handed over to the Shift Manager or U-2 Shift Foreman.		
	ALL	Earthquake is diagnosed from one or more of the following: <ul style="list-style-type: none"> • PK15-24, Seismic Instrument System (actuated on triggers) • Physical shaking and noise from the earthquake • Various tank alarms going in and out (due to water shifting from earthquake, programmed into simulator modeling)
Note: AR PK15-24 actions are to go to CP M-4 if the reactor does not trip, so those procedure actions are not listed here.		
	SRO	Implements CP M-4, Earthquake (may hand off this procedure at any time to the Shift Manager or U-2 Shift Foreman)
Cue: (from Shift Manager, once CP M-4 identified as procedure to use) The U-2 Shift Foreman (U-2 SFM) and the Work Control Shift Foreman (WCSFM) will implement CP M-4, Earthquake.		
	ATC/BOP	During board walkdown and/or review of tank alarms coming in/out, RWST level is diagnosed as dropping from review of actual levels (VB2, far left, top) and/or PK06-20 (PPC Select alarm, with low RWST level required to be assigned)
Cue: (from security, in 115' tank area) A large industrial crane (with a load attached) became unstable and tipped over during the earthquake, striking and coming to rest on U-1 RWST. A rip about 4' long and several inches wide occurred about 1/3 the way up from the bottom of the tank, which is currently draining to the 115' yard area. RP and maintenance have been called, and an action plan will be created to try to repair the breach. No injuries were reported.		
Note: AR PK06-20 actions are not written here, as they basically just say to identify and correct the cause.		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC

Scenario No.: 2

Event No.: 4

Page 07 of 19

Event Description: Earthquake & Rupture of the RWST (con't) (TS)

Time	Position	Applicant's Actions or Behavior
	SRO	Determines Tech Spec ramifications of RWST break: <ul style="list-style-type: none">• Implements Tech Spec 3.5.4.B (1 hr to restore, which is not possible; otherwise S/D and cooldown is required)
Note: RWST level will settle out (after about 10 minutes or so) to 34-35% level.		
The next event (spray valve failure, in stages) occurs in parallel with this event.		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 2Event No.: 5Page 08 of 19**Event Description:** Pzr Spray Valve (PCV-455B) fails open during earthquake

Time	Position	Applicant's Actions or Behavior
	ALL	Pzr Spray Valve PCV-455B is diagnosed as partially open from one or more of the following: <ul style="list-style-type: none"> • Green "closed" light out above spray valve controller (CC2, above PCV-455B controller) • Pzr Pressure is noted to be dropping slowly (CC2 recorder, PPC, VB-2 meters) • Low pressure alarm (eventually, at approx 2210 psig), PK05-16
Note: PCV-455B is a 2-stage failure. Initially, the valve will be open only enough to cause pressure to fall and rise with extra Pzr heater operation. Once the RWST Tech Spec has been addressed (and with cue from lead examiner), the valve will fail full open, eventually requiring a reactor trip and tripping of RCPs 1-1 and 1-2.		
	ATC	Attempts to close PCV-455B (will not close using controller) (either before or during procedure guidance below)
Note: Crew may go directly to OP AP-13, Malfunction of the Reactor Pressure Control System, or may enter the AR PK05-16 for low pressure first, and then go to AP-13.		
		(AR PK05-16, Pzr Press Hi/Lo, if entered; otherwise, mark section as N/A)
	SRO	Implements PK05-16, Pzr Press Hi/Lo (due to pressure intermittently below 2210 psig)
	ATC	<ul style="list-style-type: none"> • (2.1.1) Determines that reactor has not tripped (pressure is low, but cycling with heaters)
	ATC	<ul style="list-style-type: none"> • (2.1.2) Verifies Pzr PORVs closed (they are)(VB2, far right) • (2.1.2) Attempts to close PCV-455B (won't close) (if not already done above) • (2.1.2) Verifies backup heaters ON (already cycling ON/OFF to maintain pressure); may take all backup heaters to manual ON
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 5 Page 09 of 19Event Description: Pzr Spray Valve (PCV-455B) fails open during earthquake (con't)

Time	Position	Applicant's Actions or Behavior
		(AR PK05-16, Pzr Press Hi/Lo, con't)
	ALL	<ul style="list-style-type: none"> (2.1.3 --> 2.1.7) Checks controller output, channel checks press channels, and checks pressure < 2175 psig (it is not), and eventually goes to section 2.3 for low pressure
	SRO	<ul style="list-style-type: none"> (2.3.1) Determines pressure is still low, and goes to OP AP-13, Malfunction of the Reactor Pressure Control System
		(OP AP-13, Malfunction of the Reactor Pressure Control System)
	SRO	Implements OP AP-13, Malfunction of the Reactor Pressure Control System
	ATC	<ul style="list-style-type: none"> (1) Stops power change in progress (already done) (ie, no more rod pulls)
	BOP	<ul style="list-style-type: none"> (2) Verifies all Pzr PORVs closed (they are) (VB2, vertical, far right)
	BOP	<ul style="list-style-type: none"> (3) Verifies all Pzr Safeties closed (via tailpipe and sonic flows) (VB2, vertical, far right) (they are closed)
	ATC	<ul style="list-style-type: none"> (4) Notes one spray valve open (PCV-455B), and cannot be closed (CC2)
Note: (once the RWST Tech Spec has been addressed, per lead examiner cue, increase the failure of PCV-455B to full open (crew will return to AP-13, step 4a RNO).		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 2Event No.: 5Page 10 of 19Event Description: Pzr Spray Valve (PCV-455B) fails open during earthquake (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-13, Malfunction of the Reactor Pressure Control System, con't)
	ALL	Crew diagnoses that pressure is dropping, and not recovering (trending towards trip setpoint) (VB2 meters, CC2 recorders, PPC, and/or PK05-16 alarms on 2nd low pressure alarm)
	ALL	<ul style="list-style-type: none"> • (4 RNO) Trips Reactor (ATC) • (4 RNO) Stops RCPs 1-1 and 1-2 (BOP) (may delay until after E-0 immediate actions) • (4 RNO) Goes to EOP E-0, Reactor Trip or Safety Injection (SRO)
		(EOP E-0, Reactor Trip or Safety Injection)
	ATC	<ul style="list-style-type: none"> • (1) Verifies reactor trip (trip bkrs open (VB2 upper left), rods on bottom (VB2 upper left DRPI panel), NIs decreasing (CC1 left))
	ATC	<ul style="list-style-type: none"> • (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps)
	BOP	<ul style="list-style-type: none"> • (3) Checks vital 4kv busses (VB4, vital busses F/G/H have white lights on mimic busses)
	ATC/BOP	<ul style="list-style-type: none"> • (4) Checks if SI actuated (PK08-21 OFF, also NO ESF status light coincidence requiring SI) (SI is not required at this time)
<i>(continued on next page)</i>		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 2Event No.: 5Page 11 of 19Event Description: Pzr Spray Valve (PCV-455B) fails open during earthquake (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-0, Reactor Trip or Safety Injection, con't)
	BOP	<ul style="list-style-type: none"> (4 RNO) Determines that S/Gs levels are already in their normal range, but that AFW pps (motor-driven) are not running (not yet required); may start now or later in E-0.1 (VB3, skirt, lower center)
	SRO	<ul style="list-style-type: none"> (4 RNO) Transitions to E-0.1, Reactor Trip Response, and performs a procedure transition brief
Note: With RCPs 1-1 and 1-2 shut down, the trip response will be normal (at this point); the crew may perform a few steps from E-0.1, but the next event may be brought in as soon as E-0.1 performance is started.		
		(E-0.1, Reactor Trip Response)
	ATC	<ul style="list-style-type: none"> (1) Checks RCS temperature stable at 547 F (it is) (CC1 recorder, VB2 meters, PPC)
	ATC/BOP	<ul style="list-style-type: none"> (2a) Checks RCS Tave < 554 F (it is) (ATC) (2b) Verifies FWI (feedwater isolation), Red light ON, white lights OFF (they are) (VB1, vertical, upper left of center) (ATC) (2c) Starts MDAFPs (if not done earlier), and controls S/G levels in auto or manual (VB3, skirt, lower left, for controllers) (BOP)
Proceed to the next event once E-0.1 has been entered, per lead examiner (RCS leak and aftershock will start automatically, conditional on 5 min after shutting down the 1-2 RCP).		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 2Event No.: 6Page 12 of 19**Event Description:** RCS leak initiates, requiring manual SI

Time	Position	Applicant's Actions or Behavior
	ALL	RCS leak is diagnosed from the following (leak ramps up to 900 gpm slowly): <ul style="list-style-type: none"> Pzr level dropping (PPC, CC2 recorder, VB2 meters) Pzr level hi flow demand and/or low level deviation alarms (PK05-21) Containment parameters slowly rising (temp, press) (PPC, VB1 recorder, PAMS panels)
Note: The crew may take actions to try to keep up with the leak (referring to actions in OP AP-1, Excessive RCS Leakage, prior to initiating a manual SI per that procedure or the Foldout Page of E-0.1).		
	ATC	<ul style="list-style-type: none"> May throttle up charging (opening FCV-128 and HCV-142, CC2) in manual to attempt to maintain Pzr Level (per OP AP-1 actions, and leak diagnostics)
	BOP	<ul style="list-style-type: none"> May start 2nd charging pump (CCP) (also AP-1 guidance) as level continues to drop (VB2, lower, center)
	BOP	<ul style="list-style-type: none"> May isolate letdown (closes 8149C and LCVs 459/460, VB2, skirt, left of center) as level continues to drop
	SRO/ATC	<ul style="list-style-type: none"> Per AP-1 (or E-0.1 FOP), initiates a manual SI, and returns to EOP E-0
		(EOP E-0, Reactor Trip or Safety Injection)
	ALL	Repeats first three steps (verifies reactor/turbine trips, and 4KV bus status)
	ATC/BOP	<ul style="list-style-type: none"> (4) Checks if SI actuated (PK08-21 ON, also checks VB1 red train lights and/or train equipment to verify both trains actuated) (they are)
	SRO	<ul style="list-style-type: none"> (5) Directs App E implemented (usually to BOP)
The next events (8801 failures, and increase to SBLOCA) are already proceeding (or have occurred already)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 7 Page 13 of 19Event Description: High-Head ECCS Flow Path Failure (8801A/B); must open manually (CT)

Time	Position	Applicant's Actions or Behavior
		(EOP E-0, Appendix E) (EOP E-0 body steps on next page)
	BOP	<p>App E is implemented:</p> <ul style="list-style-type: none"> • (1a) Checks no personnel in Containment (part of turnover; may not voice) • (1b) Announce trip/SI on PA system • (2) Checks main generator – tripped (PK14-01 OFF, Manual Unit Trip required, output bkrs open, and exciter field bkr open, CC3 right side) • (3 & 4) Verify Phase A and containment vent isolation complete (VB1, ESF status lights, red lights ON, white lights OFF) • (5) Verify ESF (SI) actuation complete (ESF/SI red light ON, white lights OFF, EXCEPT for 8801A&B [VB2 skirt, far left], which must be opened manually to restore high-head ECCS) (Critical Task - WOG CT E-0-D, establish high head ECCS flow prior to exiting EOP E-0) ** • (6) Verifies Feedwater isolation complete (normal FWI portion is complete, with red light ON, and white lights OFF) (S/G portion: red light is ON, white lights OFF) • (7 & 8) Checks containment spray, Phase B, and main steam isolation – NOT required (red lights are OFF for ESF for these on VB1, and white lights are OFF) • (9) Checks AFW status (MDAFPs running, TDAFP may be running, VB3 center area); verifies either min of 435 gpm flow (VB3 center) or S/G level > 15% (VB3 center) • (10) Verifies ECCS flows (charging injection (VB2 upper panel left), SI, RHR (both on VB1 upper panel)) • (11) Reports ESF and AFW status to the Shift Foreman • (12 & 13) Checks excess letdown – not in service (8166/8167 closed); turns on aux bldg vent charcoal filter preheater (VB4 lower panel, left side) • (14) Checks secondary systems (MFPs tripped (VB2, green lights ON), only one CB Pp set running, condenser status (not avail)) • (15) Verifies proper operation of Aux Bldg and Control Rm vent systems (VB4 vent status light panel white lights); verifies containment iodine fans secured (VB4, lower panel) • (16 - 21) Verifies DGs running normally (VB4, freq (60), volts (120), speed (900)); verifies vital batteries supplied by chargers (charger and bus volts on VB5, upper panel middle/lower area); verifies MSRs reset (CC3 Triconex HMI); throttles RCP seal injection flows to normal (FCV-128, to 8-13 gpm each, CC2); checks PK11-04 NOT IN (SFP alarm); notifies Shift Foreman of completion
Next event is already in progress...		

** Critical Task

[illegible]

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 8 Page 16 of 19**Event Description:** SBLOCA Response; Loss of Emergency Coolant Recirculation Actions are taken

Time	Position	Applicant's Actions or Behavior
		(EOP E-1.3, Transfer to Cold Leg Recirculation)
Note: With very little RCS leakage reaching the containment sumps, and the RWST prematurely drained (due to leak), E-1.3 will only be performed for the initial alignment, and then the operators will transition to ECA-1.1 when the containment sumps are checked for adequate level for cold leg recirc transfer.		
	BOP	<ul style="list-style-type: none"> (1) App EE assigned/performed: <ul style="list-style-type: none"> (App EE, 1) All (6) series contactor switches are cut in (VB2, upper panel) (App EE, 2, 3) Resets SI and both trains of CI Phase A and Phase B (VB1, upper panel) (probably done earlier) (App EE, 4) Verifies two ASW/CCW HXs in service (already done, VB1, far left) (App EE, 5 & 6) Verifies open CCW cooling valves to RHR HXs (VB1, far left) probably done earlier) (App EE, 7 & 8) Verifies CCP 1-3 stopped (VB2); makes PA announcement concerning CL Recirc (App EE, 9) Dispatches operators to rack in breakers for 8980 and 8976.
	ATC	<ul style="list-style-type: none"> (2, 3) Verifies RHR Pp 1-2 stopped and closes 8700B (VB1, lower right)
	ATC	<ul style="list-style-type: none"> (4, 5) Verifies RHR Pp 1-1 stopped and closes 8700A (VB1, lower right)
	ATC	<ul style="list-style-type: none"> (6) Closes RHR crosstie valves 8716 A/B (VB1, lower center)
	ATC	<ul style="list-style-type: none"> (7) Isolates ECCS Pp recirc paths by closing 8974 A/B, and closing 8105 / 8106 (VB2)
	ATC	<ul style="list-style-type: none"> (8) Verifies recirc sump level > 92 ft (will be low or low off-scale)
	SRO	<ul style="list-style-type: none"> (8 RNO) Transitions to EOP ECA-1.1, Loss of Emergency Coolant Recirculation Capability, and performs procedure transition brief.
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 8 Page 17 of 19**Event Description:** SBLOCA Response; Loss of Emergency Coolant Recirculation Actions are taken, including RWST makeup and ECCS reductions (CT) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP ECA-1.1, Loss of Emergency Coolant Recirculation Capability)
	SRO	<ul style="list-style-type: none"> (1) Determines recirc failure is caused by lack of RWST level (not by sump blockage)
	SRO/ATC	<ul style="list-style-type: none"> (2a) Notes power available to both RHR pps (VB2, lower right) (ATC) (2b) Notes recirc sump level (VB2, vertical, right side) is still low (expected for these conditions); goes to step 3 (ATC/SRO)
	ATC	<ul style="list-style-type: none"> (3) Resets both trains of SI (VB2) (should already be reset)
	ATC	<ul style="list-style-type: none"> (4) Verifies fan coolers (CFCUs, VB1 vertical center area) in low speed (ie, yellow lights; they are)
	ATC	<ul style="list-style-type: none"> (5) Checks RWST level (VB2, far upper left) < 4% (\approx 25-30% at this point)
	ATC	<ul style="list-style-type: none"> (6) Determines Containment Spray Requirements (N/A, not running/activated) (VB1 vertical left of center)
	ATC	<ul style="list-style-type: none"> (7) Adds makeup to the RWST (here) and reduce ECCS (next pages) (WOG CT ECA-1.1-B, must be completed prior to end of procedure) (critical task): ** <ul style="list-style-type: none"> Implements App M of procedure Reads notes prior to steps, and selects section A for makeup (makeup from SFP is preferred method) Directs field operators to perform the section A steps (all in field); may direct entire procedure section to field, as desired (since all performance is in the field, directing the performance satisfies the CT). <u>Note</u>: flow can be confirmed by RWST level rise and/or sim console flow monitoring (although is not required for CT or to end scenario)
<i>(continued on next page)</i>		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 8 Page 18 of 19**Event Description:** SBLOCA Response; Loss of Emergency Coolant Recirculation Actions are taken, including RWST makeup and ECCS reductions (CT) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP ECA-1.1, Loss of Emergency Coolant Recirculation Capability, con't)
	BOP	<ul style="list-style-type: none"> (8) Checks S/G levels, controls 20-65%, and shuts down TDAFP (levels already being controlled, TDAFP not running) (all on VB3)
	ATC/BOP	<ul style="list-style-type: none"> (9) Checks normal (condenser) steam dump available (it may be); if not 10% steam dumps (atmospheric) will be used for cooldown (CC2, VB3)
Note: There will be some cooldown from the SBLOCA (ECCS flow), but it should be well under 100°F of cooldown, so a cooldown should actually be started.		
	ATC/BOP	<ul style="list-style-type: none"> (10) Initiates coodown (< 100°F/hr) via condenser or normal steam dumps Cooldown is performed by: <ul style="list-style-type: none"> HC-507 (CC1) is place in manual and the demand is raised (to start cooldown) When P-12 permissive comes in (on PK08, which closes the steam dumps); the steam dump interlock bypass switches are both taken to "bypass", which enables the steam dumps again (probably have to do this to start C/D). (CC2) (contingency) IF MSIVs are closed, the operators will cooldown by throttling open the 10% steam dumps (PCVs 19, 20, 21, & 22 on VB3 lower middle panel area). @ P-11 permissive (1915 psig, probably done at start), low steamline pressure SI is blocked (no consequence if already on 10% steam dumps) (CC2)
	ATC/BOP	<ul style="list-style-type: none"> (11) Checks ECCS is in service, and determines that CCPs and SI pumps are still delivering flow to the RCS (VB1 and VB2)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 2 Event No.: 8 Page 19 of 19**Event Description:** SBLOCA Response; Loss of Emergency Coolant Recirculation Actions are taken, including RWST makeup and ECCS reductions **(CT)** (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP ECA-1.1, Loss of Emergency Coolant Recirculation Capability, con't)
	ATC/BOP	<ul style="list-style-type: none"> (12) Establishes one train of SI flow (part of Critical Task) **: <ul style="list-style-type: none"> Depresses vital 4KV auto-transfer reset PBs, and verifies blue lights OFF (VB4) (BOP) Stops one ECCS CCP (since two are running) (VB2) (ATC) Stops one SI PP (since both are running) (VB1) (ATC) Determines that RHR PPs are not running; goes to next step (ATC/SRO)
	ATC	<ul style="list-style-type: none"> (13) Verifies recirc sump isolation valves 8982A/B closed (they are) (VB1)
	BOP/SRO	<ul style="list-style-type: none"> (14a) Checks RCPs stopped (should all be by now) (VB2) (14b) Checks RCS subcooling (will not be > 20°F); moves on to step 15 (VB2)
Note: The App G required minimum flow should be between 410-490 gpm, depending on how long the crew took to get here. The remaining CCP or the remaining SI pump will be probably not be capable of this flowrate (alone) at this point, so no pumps will be shut down per step 15 RNO. Only IF the remaining SI pump is up to the minimum flow (and the CCP is shut down), OR if either pump is shut down and minimum flow is not maintained, will this next step be critical (sim console operator should monitor time since trip and App G requirements to assist examiners in determining proper step actions (based on the actual crew sequence of actions, and timing)).		
	ALL	<ul style="list-style-type: none"> (15) Checks RVLIS level (adequate) and subcooled margin (not adequate) to terminate ECCS, so goes to RNO to reduce ECCS (15B RNO) Determines App G minimum flow requirement, based on time since trip (see above; most likely, can't shut down a pump) (15B RNO) Determines that stopping either the last CCP or SI PP will go below that minimum (most likely), and does not stop any pumps
The scenario may be terminated once step 15 has been completed (ie, minimum flow determined, and any actions needed are taken).		

** Critical Task

ATTACHMENT 1 – SIMULATOR SETUP

- ☐ Run Init/Initialize /CCs and VBs/Run Drill 81
- ☐ Any tags are placed/removed as necessary
 - Caution tags on Generator Relay C/Os for backfeed (if needed)
- ☐ The proper Delta-I curve on CC1 and Reactivity Handbook for the simulator **INIT** in place.
- ☐ The Rod Step Counters indicate correctly.
- ☐ Run “Clear Recorders” icon on lower left desktop to clear YOKOGAWA recorder memories.
- ☐ Clear the PCS HMIs (NSR) by "flushing" the trend buffer; then, restart the "Window Viewer" app.
- ☐ Boric Acid and Primary Water Target Blender set to values identified in Lesson
- ☐ Record PPC MAX on CC2 lamicoid.
- ☐ Record Boron Concentration for desired simulator **INIT** on CC2 lamicoid.
- ☐ Circuit breaker flags are correct on CC1 (Proportional Heaters), CC3, VB4, and VB5
- ☐ Equipment status lamicoids are correct:

RHR Valves (8726A/B and 8734A/B)	- CLOSED (OPEN if RHR in service)
H2 or N2 on VCT	- H2 (unless shut down training)
SUPPLYING IN-SERVICE SCW HX	- CWP 1-1
AUTO RECLOSE FEATURE CUTIN ON THIS CWP	- CWP 1-1
SELECTED TO BUS 2F	- CONT. RM. VENT TRAIN 1 BUS F
SELECTED TO BUS 1H	- CONT. RM. VENT TRAIN 1 BUS H
B.A. XFER PP SUPPLYING BLENDER	- BA PP 1-2
RADWASTE DISCH AND CHLORINATION	- ASW 1-1
OFF NORMAL LAMICOIDS OR PINK MARKERS	- Placed as needed or return to CC3

- ☐ The Plant Abnormal Status Board is updated for Charging Pump Status, Boron Conc, PRA Risk Status and Work Week Matrix.
- ☐ Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up:
- ☐ PPC Setup:
 - PPC BIG Screen (set to TABULARLG1), select new list, private, “Sim Large”)
 - CC2, SFM PPC Screens select OVERVIEW and SM to Rad Monitors
 - RODCONFIG is updated (click Apply when completed)
- ☐ SPDS (screens and time updating), A screen “RM”, B screen “SPDS”.
- ☐ CC3 Annun. CRT big screen (if enabled then get alarm it needs reset - Tools, keyboard, Tools, password - which is "A", File Exit - Start over)
- ☐ The chart recorders are operating properly. DDR10's and Turbine Vib Recorder are acknowledged and in AUTO. CC1 NR-45 on proper screen. PAMS RVLIS/TMS screens on “Summary” Page.
- ☐ All typewriters are on, with adequate paper/ribbon/etc., and are in the “**ON LINE**” status, as needed.
- ☐ Alarm A&E Viewer window is activated prior to run, and printer is placed ,**ONLINE**”, if needed.
- ☐ Triconex DEH/DFW alarms have been acknowledged/cleared.
- ☐ Seismic drawer put back; check for any alarms on the Rad panels
- ☐ PC setup for SVC tailboard (G-3 ENF Reset, RCPs, U-1 Safety Monitor)
- ☐ Verify paper in HPD2 and print a test page.
- ☐ Verify Annunciator Horn is on (**BELL ON**) and Sound Effects are on (**SOUND ON**).
- ☐ The video is turned off, audio and communication systems are set up and functioning
- ☐ Turn down plant PA on simulator floor (restore to original setting when scenario completed)

TIMELINE AND BOOTH/CONSOLE OPERATOR ACTIONS

Timeline The following table shows the simulator computer operations and other instructions the examiners need to know about the scenario to successfully run the exam. **“X” = Manual entry required!**

	TIME LINE	CONSOLE ENTRY	SYMPTOMS, CUES, AND DESCRIPTION
X	Setup Simulator per Checklist	Load snap30 and IC_30 from exam flash drive INIT to IC-30	2% power, Mol, C _B = 1575 , Integrators: BA – 00, and PW – 00 • Tags: none
X	Setup	Drill 81	Reset normal engineering values
X	Setup	PPC select	Verify PPC Select alarms setup per PK06-20 & 25
X	Setup	Start TEAM data collection	Collect data for scenario for NRC Exam Team
X	Once crew has taken the watch	DRILL 9204 in AUTO	
	Once NI power is > 3%	ser 0232 act,1,0,0,c,fnispr.gt.3, .not.i521g46 vlv pvr2 2,0.8,10,60,c, fnispr.gt.3,0 dsc pvr2 act,0,0,360,c, fnispr.gt.3,0	Ground alarm (bus G) simulates 80000B ground; short simulated by valve going partially closed (won't move); then, after several minutes, the bkr for 80000B trips (ground alarm clears)
	15 min after 8000B bkr trips	xmt cvc16 3,50,120,900,c, .not.i521g46,0	TE-130 fails low (manual available on TCV-130); causes letdown temp to rise and letdown divert (TCV-149)
	15 min after TCV-130 placed in manual	mal sei1 act 0.21,180,900,c, xv2i158m,0 ramp asisrwst=1.54e6,900, 10,c,jmlsei1 cnv rcs2 2,0.2,10,0,c,jmlsei1,0	1st earthquake; causes hole in RWST, and Pvr spray vlv PCV-455B to fail partially open (hters will control)
X	One minute after crew notes RWST level dropping	Cue: (from security in 115' tank area behind Aux/FHB) A large industrial crane (with a load attached) became unstable and tipped over during the earthquake, striking and coming to rest on U-1 RWST. A rip about 4' long and several inches wide occurred about 1/3 the way up from the bottom of the tank, which is currently draining to the 115' yard area. RP and maintenance have been called, and an action plan will be created to try to repair the breach. No injuries were reported.	
X	When CP M-4 entry discussed or made	Cue: (from Shift Manager) The U-2 SFM and WCSFM will handle CP M-4 actions.	
X	Once RWST Tech Spec is discussed by crew (and per lead examiner	cnv rcs2 2,1,100,0, d,xv2i261o tc xv2i261o, cnv rcs2 2,0,10,0,d,0	Manual Entry: Fails PCV-455B full open (requires reactor trip and tripping of RCPs 1-1 and 1-2 Clears when RCP 12 is stopped
X	After reactor trip announced	DRILL 32 in AUTO	Nuclear Operator actions on a trip are performed

(continued on next page)

TIMELINE AND BOOTH/CONSOLE OPERATOR ACTIONS

Timeline (con't) The following table shows the simulator computer operations and other instructions the examiners need to know about the scenario to successfully run the exam. **"X" = Manual entry required!**

	TIME LINE	CONSOLE ENTRY	SYMPTOMS, CUES, AND DESCRIPTION
	5 min after 1-2 RCP is stopped	bst aux1 1,0,0,300,c, xv2i261o,0 tc jistbst1, mal sei1 act 0.27, 10,30,d,0 mal rcs3d act 0.9,600,360,c, xv2i261o,0	Seismic aftershock causes RCS leak to develop (initially ramped up to 900 gpm to allow diag and action) (will increase after SI)
X	After RWST level ramp has completed ~ 34%	Cue: (from security in 115' tank area behind Aux/FHB) Water has stopped draining from the hole in the U1 RWST.	
X	If requested	DRILL 15 in AUTO	Breaks cond vac, secures gland steam, etc (if requested)
	On SI (RHR PP start)	bst aux2 1,0,0,30,c,xv1o236r,0 tc jistbst2, mal rcs3d act 2.5, 10,15,d,0	Leak size increases to 2.5" SBLOCA (provide proper actions and timing to RWST getting to 33%)
	On SI	vlv sis3 1,0,0,0,d,xv2i227o vlv sis4 1,0,0,0,d,xv2i228o	8801 A&B don't auto-open, but can be manually opened
X	When requested	dsc rhr4 act,1 dsc sis14 act,1	Closes breakers for 8980 (52-1f-31) & 8976 (52-1h-20)
X	When APP M directed	DRILL 112 in AUTO	Makes up to RWST from SFP (1-1 pp) (starts in 2 min)

DRILL FILE TEXT

* L111 NRC Exam Scenario 02 (DRILL 9204)
* 9/9/12 glh
*
* ser ALM345B 0232 480V BUS-1G GRD #0232
ser 0232 act,1,0,0,c,fnispr.gt.3,.not.i521g46 #alm345b
*
* (8000B strokes partially closed, and then won't move)
* VLV PZR2 PRZR PWR REL ISO VALVE #rrc8000b
vlv pZR2 2,0.8,10,5,c,fnispr.gt.3,0 #rrc8000b
*
* (bkr for 8000B trips about 5 minutes later)
* dsc PZR2 52-1G-46 8000B PZR PORV BLOCK VALVE #i521g46
dsc pZR2 act,0,0,300,c,fnispr.gt.3,0 #i521g46
*
* TE-130 fails low 15 minutes after 8000B bkr opens
* XMT CVC16 LTDN HX 1-1 OUT TEMP, T0145A, ALM0394, TI-13 #txmtte130
xmt cvc16 3,50,120,900,c,.not.i521g46,0 #txmtte130
*
* 1st earthquake, 15 min after TCV-130 placed in MAN
* mal SEI1 SEISMIC ACTIVITY
mal sei1 act 0.21,10,900,c,xv2i158m,0
*
* RWST break drains RWST to 35% over 15 min
ramp asisrwst=1.54e6,900,10,c,jmlsei1
*
* PCV-455B fails 20% open on 1st earthquake
* CNV RCS2 PZR SPRAY VALVE #rrcp455b
cnv rcs2 2,0.2,180,0,c,jmlsei1,0 #rrcp455b
* (will be failed full open once RWST Tech Spec addressed)
*
* close spray valve when RCP 12 tripped
tc xv2i261o, cnv rcs2 2,0,10,0,d,0
*
* seismic aftershock 5 min after 1-2 RCP is S/D
* (sets up RCS leak)
* BST AUX10 INSTRUCTOR BISTABLE 10 #jlstbst1
bst aux1 1,0,0,300,c,xv2i261o,0 #jlstbst10
tc jlstbst1, mal sei1 act 0.27,10,30,d,0

* RCS leak (slow to 900 gpm) starts 6 min after RCP 1-2 stopped
* mal RCS3D SMALL LOCA IN BOTTOM OF COLD LEG 4
mal rcs3d act 0.9,600,360,c,xv2i261o,0
*
* (sets up RCS leak increase to 2.5", on SI)
* (conditional on RHR pp start) xv1o236r
bst aux2 1,0,0,30,c,xv1o236r,0 #jlstbst2
tc jlstbst2, mal rcs3d act 2.5,10,0,d,0
*
* 8801 A/B won't open until manually opened
* VLV SIS3 COLD LOOP BORON INJ LINE VLV #rsi8801a
vlv sis3 1,0,0,0,d,xv2i227o #rsi8801a
* VLV SIS4 COLD LOOP BORON INJ LINE VLV #rsi8801b
vlv sis4 1,0,0,0,d,xv2i228o #rsi8801b

Diablo Canyon Power Plant Operations Shift Log

Unit 1

Today - Dayshift

Unit 1 Days at Power: 1 Days

Operating Mode: 2

Gross Generation: 0 MWe

Power Level: 2 %

Net Generation: 0 MWe

Shift Manager Turnover

PRA RISK STATUS NEXT SHIFT:	GREEN
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
MAIN GEN H ² USAGE (475 SCFD Limit):	307 SCF / 326 SCFD 5 day ave

NEW EMERGENT WORK:

- none

SHUTDOWN TECH SPECS / ECGS:

- none

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:

- none

TURNOVER ITEMS:

- A reactor startup was completed early last shift. OP L-2 was closed out, and OP L-3 is now in progress, and steps are complete up to step 6.29 (raise power to 8%), and is attached.
- The main feedwater system is in service (in auto), controlling S/G levels; The AFW system is secured and lined up for automatic operation. Busses were recently transferred to Startup Power.
- Several hours ago, the main turbine rolled off the turning gear (on leakby), rolled up to about 200 rpm, and then slowly slowed down again. When all of the speed pickups (channels) were lost at about 50-75 rpm (expected, and by design), a turbine trip was generated. The turbine was relatched without incident, per OP C-3:II, and has been on the turning gear for the last couple of hours.

PRIORITY ITEMS FOR NEXT SHIFT:

- Raise power to 8%, startup and parallel the main generator, and raise power to 28%.

OPERABILITY ITEMS:

- The mode 2 to 1 checklist (OP L-0) is complete, and signed off

ANNUNCIATORS IN ALARM:

- all current alarms are consistent with current mode and power level (no unexpected alarms)

Shift Foreman Turnover

TURNOVER ITEMS:

- U-1 – 2%, preparing to raise power to 8%, and roll the main turbine
- U-2 is at 100%

REACTIVITY MANAGEMENT:

- Time in core life: BOL.
- Power History: Previously at 100% for 17 days. Currently power level is 2%, following a reactor trip a week ago (MFP trip; repairs have been completed, and other unscheduled outage work has been worked)
- Boron concentration is 1575 ppm from a sample taken 4 hours ago.
- Control Rod Height: ≈130 steps on CBD.
- Rod motion: being used to maintain current power level, and will be used for raising power to 8%

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- None

OTHER ABNORMAL PLANT STATUS

- None

Facility: Diablo Canyon (PWR)Scenario No.: 3Op-Test No.: L111-NRC

Examiners: _____

Operators: _____

Initial Conditions: 100% power, MOL, 774 ppm boronTurnover: DG 1-2 OOS

Event No	Malf No.	Event Type*	Event Description
1	N/A	N (BOP)	Swap to CCP 1-1 from CCP 1-3 per OP B-1A:V, sec 6.1
2	xmt p2r24	I (SRO, BOP)	P2r Press transmitter PT-474 fails low (makes (2) PORVs inoperable) (TS)
3	xmt cvc4	I (SRO, ATC)	FT-128 (charging flow transmitter) fails low (actual charging flow goes high); manual control of FCV-128 is required
4	mal mfw2b ovr xc3i196o	C (ALL) R (ATC)	MFP 1-2 vibrations rise until ramp is required; the pump trips during the ramp (at ≈ 93% power), which causes a faster programmed ramp (≈ 50% power after ramp)
5	mal eps4d	C (SRO, BOP)	Loss of 4KV Vital Bus G (diff trip); alternate equipment is placed in service, and Tech Specs are implemented (TS)
6	Ser 1244 Xmt rcp38	C (ALL)	RCP 1-3 vibration coincident with motor bearing temperature increase (requires reactor trip and trip of RCP 1-3)
7	mal sei1 mal deg1a,c mal syd2	M (ALL)	Earthquake causes loss of Loss of all AC Power; the unit is backfed from 500KV power (CT, TCOA) , and RCS inventory control is established (TCOA) . RCP seal injection is isolated prior to starting a CCP (CT, TCOA)
8	vlv afw7	C (BOP)	TDAFP does not auto start on trip/loss of AC; must be manually started

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
15. Total malfunctions (5–8)	7
16. Malfunctions after EOP entry (1–2)	1
17. Abnormal events (2–4)	5
18. Major transients (1–2)	1
19. EOPs entered/requiring substantive actions (1–2)	1
20. EOP contingencies requiring substantive actions (0–2)	2
21. Critical tasks (2–3)	2

Rev 2 comments: dropped one event (scenario too long), adjusted timing; changed bus that trips; other minor changes following validations

SCENARIO SUMMARY – NRC #3

1. Crew swaps from CCP 1-3 to CCP 1-1 per OP B-1A:V, section 6.1 (normal evolution).
2. Pressurizer pressure channel PT-474 fails low. System control is not affected (control is 2nd highest chan select), but since this channel provides the low press interlock for two Pzr PORVs (PCV-474 and PCV-455C), they must be declared INOPERABLE (block valves must be closed, and power removed). OP AP-5 is used to respond to the failure. **(TS)**
3. FT-128 (charging flow) fails low, causing actual charging flow to rise. FCV-128 (or HC-459D) must be taken to manual, and charging flow controlled by alternate indications for the remainder of the scenario. OP AP-17, section B, may be used to respond to the failure.
4. MFP 1-2 develops vibrations (moderate level) requiring the plant be ramped to \approx 50% power @ 50-200 mw/min (per AR PK09-14). At \approx 93% power, the 1-2 MFP will trip, initiating an even faster automatic programmed ramp down to \approx 50% power. OP AP-25 and OP AP-15 will be used to respond to the ramp/trip.
5. Once the plant is stable at \approx 50% power, 4KV bus G will trip on differential. OP AP-27 will be used to stabilize and respond to the loss of the bus, and restoration of equipment. **(TS)**
6. RCP 1-3 develops vibrations ("Danger" level) coincident with motor bearing temperature increase. The crew will respond by using AR PK05-05 and will trip the reactor and RCP 1-3 (stabilizing the plant in EOP E-0.1).
7. An earthquake will cause sequential electrical failures (loss of 230KV, DGs 1-1 & 1-3) which will result in a loss of all AC to the vital busses. Since backfeed (500KV) is available, the crew will backfeed the unit to restore power (**CT, part of TCOA**), and eventually restore RCS inventory control (**part of TCOA**), using EOP ECA-0.0 and ECA-0.1. The turbine driven AFW pump (TDAFP) does not auto-start from the trip of loss of busses, and must be started to restore AFW flow to the S/Gs. RCP seal cooling is isolated prior to restarting a CCP.
(CT, and part of TCOA). The TCOA is to backfeed the unit, isolate RCP seal cooling, and restore inventory control within 54 minutes (of loss of all AC). ***

The scenario is terminated once the unit is backfed, vital buss(es) are restored, and RCS inventory control is restored.

*** **(TCOA)** The loss of all AC was evaluated against TCOA #37 (station blackout); the conditions of the scenario are close enough to the TCOA conditions that both the TCOA and time limits are applicable: must complete 500KV backfeed, RCP seal isolation (just direction w/l 42 min), and restore RCS inventory control within 54 minutes (of loss of power).

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 1 Page 01 of 28Event Description: CCP swap per OP B-1A:V, sec 6.1 (normal evolution)

Time	Position	Applicant's Actions or Behavior
Note: Procedure step numbers are included at the front of each action/comment in parenthesis, where applicable.		
	SRO	Implements OP B-1A:V, section 6.1, Transferring from a CCP to another CCP
		(OP B-1A:V, CVCS – Transfer Charging Pumps)
Note: The SRO or one of the board operators may be tasked with reading the procedure steps.		
	SRO	Reads NOTE prior to step 6.1.1, which does not apply in this mode.
	BOP	<ul style="list-style-type: none"> (6.1.1) Directs radiation protection to verify survey/posting guidelines implemented (Complete per Turnover instructions)
	ATC	<ul style="list-style-type: none"> (6.1.2) Place FCV-128 in manual.
Note: Starting CCP 1-1 will place Auxiliary Building Ventilation in Buildings and Safeguards mode of operation.		
	BOP	<ul style="list-style-type: none"> (6.1.3, 6.1.4, 6.1.5, 6.1.6) Start CCP 1-1, verify proper amps, secure CCP 1-3, verify acceptable flow on pump CCP 1-1.
	ATC	<ul style="list-style-type: none"> (6.1.7, 6.1.8) Using HCV-142 and FCV-128 adjust PZR level to program band, adjust seal flow to 8-13 gpm.
	ATC	<ul style="list-style-type: none"> (6.1.9) When PZR level is at reference, place FCV-128 in auto.
	BOP	<ul style="list-style-type: none"> (6.1.10) Place Auxiliary Building Ventilation to "BLDG ONLY" mode. (N/A since CCP 1-3 is NOT the on-coming pump)
	BOP	<ul style="list-style-type: none"> (6.1.11) Update the Abnormal Status Board for shutdown charging pump, CCP 1-3, boron concentration, date, and time
Proceed to the next event once CCP 1-1 in service, CCP 1-3 shutdown, and PZR level control in AUTO, and per the lead examiner.		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 2 Page 02 of 28**Event Description:** Pzr Pressure Channel PT-474 Fails Low (TS)

Time	Position	Applicant's Actions or Behavior
		Note: When this press channel fails low, no controls will be affected (2 nd highest signal select will kick out the channel from control input). This channel (PT-474) is the interlock (blocking) channel for Pzr PORVs PCV-474 and PCV-455C (will no longer lift in AUTO).
	ATC/BOP	Observes one or more of the following indications: <ul style="list-style-type: none"> • PT-474 (VB2 upper right side, PPC picture Pzr) failing low • PK05-16 (input on low press) Pressurizer Pressure Low • PK04-06 (two inputs on low press) Protection Channel Activated • PK02-04 Safeguard Channel Activated • PK04-04 OTΔT C-3 Channel Activated • PK06-21 PCS Trouble
Note: The PK05-16 response may be used, in addition to OP AP-5. Both are detailed in the case both are used.		
	SRO	(ONLY IF USED) Implements AR PK05-16, Pressurizer Pressure Low
		(only if used) (AR PK05-16, Press Hi/Lo) (otherwise, this section is N/A)
	ATC	<ul style="list-style-type: none"> • (2.1.1) Verifies reactor did not trip (it didn't)
	BOP	<ul style="list-style-type: none"> • (2.1.2) Verifies Pzr PORVs closed (they are) (VB2, upper panel, right)
	ATC	<ul style="list-style-type: none"> • (2.1.2) Verifies Pzr Sprays closed (they are) (CC2, controllers and green lights ON, above them)
	ATC	<ul style="list-style-type: none"> • (2.1.2) Verifies Pzr Htrs – ON, if needed (they are not affected by this failure) (CC1, left)
	ATC	<ul style="list-style-type: none"> • (2.1.3) Checks RCS pressure above 2175 psig (it is) (Tech Spec concern) (VB2 upper right side, PPC picture Pzr)

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 2 Page 03 of 28**Event Description:** Pzr Pressure Channel PT-474 Fails Low (TS) (con't)

Time	Position	Applicant's Actions or Behavior
		(AR PK05-16, Press Hi/Lo, con't)
	ATC	<ul style="list-style-type: none"> (2.1.4) Verifies HC-455K Pzr Press controller @ 78.8% (it is; not affected) (CC2)
	BOP	<ul style="list-style-type: none"> (2.1.5) Performs channel check of Pzr Pressure channels; notes PT-474 does NOT channel check (failed low), if not already noted/diagnosed (VB2 upper right)
	SRO	Reads NOTE prior to step 2.1.6
	SRO/ATC	<ul style="list-style-type: none"> (2.1.6.a) Notes HC-455K is in AUTO and controlling normally (CC2) (ATC) (2.1.6.b) N/A (SRO) (2.1.6.c) Directed to go to OP AP-5
	SRO	Implements OP AP-5, Malf of Eagle-21 Protection or Control Channel
		(OP AP-5, Malfuction of Eagle-21 Protection or Control Channel)
	SRO/ATC	<ul style="list-style-type: none"> (1) Notes that Pzr pressure is controlling properly in Auto (chan failure does not affect normal control) (CC2, VB2 meters)
	BOP	<ul style="list-style-type: none"> (2) Determines that the failure is not Eagle-21 related (PK06-01 and PK06-03 are OFF)
	SRO/ATC	<ul style="list-style-type: none"> (3) Determines that ΔT channel has not failed (Pzr press chan); ensures ΔT channel not selected to Loop 14
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 2Page 04 of 28Event Description: Pzr Pressure Channel PT-474 Fails Low (TS) (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-5, Malfunction of Eagle-21 Protection or Control Channel, con't)
	BOP	<ul style="list-style-type: none"> (4) Verifies steam dumps are not actuated (no armed or open, unless not reset from ramp just completed – VB3, center)
	SRO	<ul style="list-style-type: none"> (5) Notifies I&C of the PT-474 failure, as time permits
	SRO	Reads CAUTION prior to step 6
	SRO/BOP	<ul style="list-style-type: none"> (6, 7) Notes step 6 requirements to take channel OOS prior to working; Places OOS stickers on failed channel indications (VB2 PT-474 meter, uses Att 4.1 and 4.2)
	SRO	<ul style="list-style-type: none"> (8) Determines Tech Spec actions using Att 4.1: <ul style="list-style-type: none"> 3.3.2.D Low press SI (72 hrs) 3.3.1.E High press trip (72 hrs) 3.3.1.E OTΔT trip (72 hrs) 3.3.1.M Low press trip (72 hrs) 3.4.11.B PCV-474 & 455C low press intlk (1 hr to close block valve 8000A and 8000B, and remove pwr from both, 72 hrs to repair for PCV-455C only)
	SRO/BOP	<ul style="list-style-type: none"> (8) Closes Pzr block valves 8000A and 8000B w/l 1 hr (for PCV-474 and PCV-455C) (VB2, vertical lower right) (BOP) (8) Directs that power be removed from block valves 8000A and 8000B (SRO/BOP)
Proceed to the next event once the Tech Specs have been determined, and the 1 hr actions above have been done, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 3 Page 05 of 28**Event Description:** Charging Flow Transmitter FT-128 fails low (charging goes high)

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses charging flow problem from one or more of the following: <ul style="list-style-type: none"> • Indicated charging flow (FE-128) indicates low or 0 (CC2 meter, PPC) • RCP seal flows indicate high and rising (due to controller perceived need for more flow) (VB2 meters, PPC) • Pzr level rising slowly (due to rising charging flow) (VB2 meters, PPC, CC2 recorder) • VCT level dropping slowly (due to rising charging flow) (VB2 recorder, PPC) • Diagnostic brief may be held (gather above data and conclude that indicated flow has failed low)
Note: The corrective action for this failure may be taken without procedure use, or OP AP-17, section B, may also be referenced (only has general, obvious guidance).		
	ATC	Takes manual control of charging (using charging controller FCV-128), and lowers charging flow to normal (uses alternate indications to control flow (ie, RCP seal flows, VCT level, Pzr level, etc) (CC2, PPC)
		(if used, OP AP-17, Loss of Charging, Sec B; otherwise, mark N/A)
	SRO	(if used) Implements OP AP-17, Loss of Charging, Section B
	SRO	<ul style="list-style-type: none"> • (1) Stops unit load changes (N/A)
	BOP/ATC	<ul style="list-style-type: none"> • (2) Checks letdown flow normal (it is) (VB2 meter, PPC)
	ALL	<ul style="list-style-type: none"> • (3a) Determines that charging amps are rising, charging flow (indicated) is at zero, and charging pressure has also risen (determines that RNO actions are N/A, since charging pump is stable) (VB2 meters, CC2 meters, PPC) • (3b) Determines that VCT level is lowering slowly (due to rising charging flow) (CC2, PPC)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC		Scenario No.: 3	Event No.: 3	Page 06 of 28
Event Description: Charging Flow Transmitter FT-128 fails low (charging goes high) (con't)				
Time	Position	Applicant's Actions or Behavior		
		(OP AP-17, Loss of Charging, Sec B, con't)		
	ATC/BOP	<ul style="list-style-type: none"> (4a) Determines that Pzr level is stable/rising (rising slowly) (VB2 meters, CC2 recorder, PPC) (4b) Determines that RCP seal flows are high (contradicts indicated charging flow); ATC may or may not adjust FCV-128 or HCV-142 at this time to return charging flow and seal flows to normal. (CC2) 		
	ATC/ALL	<ul style="list-style-type: none"> (5a) Determines that charging flow is NOT responding properly to Pzr level changes (unless manual control already taken) (ie, flow high with level high, with indicated flow low) (CC2, VB2, PPC); goes to step 5d. 		
	ATC	<ul style="list-style-type: none"> (5d) Determines charging control not responding normally due to flow indicator failure; takes manual control of charging (HC-459D or FCV-128), and returns charging flow to normal (or below normal, to return level to setpoint) (CC2) 		
	SRO	<ul style="list-style-type: none"> (6, 7) Notifies maintenance of failed transmitter, and operates with Pzr level in manual 		
Proceed to the next event once charging is in manual with flow restored to normal, per the lead examiner.				

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 4Page 07 of 28Event Description: MFP 1-2 High Vibrations, requiring plant ramp

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	The alarm PK09-14, MFP 1-2, is noted as unexpected and reported to the Shift Foreman; the high vibration input is reported
	SRO	Implements AR PK09-14, MFP 1-2 (high vibrations)
		(AR PK09-14, MFP 1-2) (high vibrations)
	SRO	<ul style="list-style-type: none"> (1) Input table refers crew to section 2.2
	BOP	<ul style="list-style-type: none"> (2.2.1.a) Evaluates vibration readings from 1-2 MFP (turbine/MFP HMI on VB4, lower left); notes multiple probes with rising vibration readings
	SRO	<ul style="list-style-type: none"> (2.2.2) Notes that the 1-2 MFP is not the only MFP in operation, and is directed to go to OP AP-25, Rapid Load Reduction, and ramp the unit to 550 MWe at 50-200 mw/min, and then trip that MFP
	SRO	Implements OP AP-25, Rapid Load Reduction
		(OP AP-25, Rapid Load Reduction)
	SRO	Enters OP AP-25, Rapid Load Reduction <ul style="list-style-type: none"> (1a) Determines runback/programmed ramp is not in progress (may not vocalize, since this ramp is initiated by the crew)
	BOP	<ul style="list-style-type: none"> Ramp is started (guidance is also on lamicoid pegboard on CC3): <ul style="list-style-type: none"> (1b) MW and IMP feedbacks are placed in service (all on Triconex turbine HMI, CC3) (1c) \approx 550 MWe load target is entered into Triconex HMI (1d) Sets ramp rate to \approx 50-200 mw/min (1e) Pushes GO
<i>(continued on next page)</i>		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 4Page 08 of 28Event Description: MFP 1-2 High Vibrations, requiring plant ramp (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-25, Rapid Load Reduction, con't)
	SRO/BOP	(OP O-3) May make calls to chemistry if/when 15%/hr shut down rate is exceeded
	ATC	<ul style="list-style-type: none"> (2) Verifies that control rods are inserting properly in AUTO (VB2, intermittent green IN light)
	ATC	<ul style="list-style-type: none"> (3, 4) Verifies ON all pressurizer backup heaters (CC1, left), and verifies CCP (1-3) running (VB2),
	ATC	<ul style="list-style-type: none"> (5) Verifies charging flow adequate to prevent letdown flashing: may take manual control of Pzr level (already in manual from prior event) to prevent flashing of letdown (under these conditions, approx 60 gpm charging flow is required to keep letdown properly cooled) <ul style="list-style-type: none"> Places HC-459D (master level controller) or FCV-128 (charging flow controller) in manual (CC2, right side, for both) Keeps charging high enough (approx 60-65 gpm, as minimum) to prevent letdown from flashing (VB2, upper panel, letdown temperature, is monitored)
	BOP	<ul style="list-style-type: none"> (6) Verifies DFWCS in AUTO and controlling S/G levels (CC3 MFW HMI, VB3, PPC) <ul style="list-style-type: none"> Checks MFW control and bypass valves in AUTO Checks both MFPs and their controller in AUTO May check level trends, as well as steam flow/feed flow trends (CC3, PPC, and/or big VB3 DFWCS electronic recorders)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 4Page 09 of 28Event Description: MFP 1-2 High Vibrations, requiring plant ramp (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-25, Rapid Load Reduction, con't)
	ATC	<ul style="list-style-type: none"> (7) RCS is borated per reactivity handbook for approx 50% load reduction (the following guidance is on the boration checklist in the reactivity handbook) <ul style="list-style-type: none"> Presses STOP on M/U Ctrlr HMI (CC2) Presses BORATE on HMI Sets target gallons for boration (as decided above, and per the Shift Foreman); verifies batch is reset Sets boric acid flowrate Presses START, and monitors boration Once stopped, either returns to AUTO (presses AUTO, then START), or performs additional boration per the Shift Foreman
	SRO	<ul style="list-style-type: none"> The Shift Foreman provides reactivity oversight for the ramp
	BOP	<ul style="list-style-type: none"> (8) Checks secondary system status: <ul style="list-style-type: none"> (8a) MFP suction is verified adequate (PPC, VB3 meter; will remain > 260 psig) (8b) Verifies 3rd Condensate/booster Pp set running (VB3, lower, center; all pumps will be running)
	ATC	<ul style="list-style-type: none"> (9) Verifies proper operation of steam dumps, Tave trending to Tref (VB3, red/green indicator lights; Tave/Tref from CC1 recorder/PPC)
Note: Once the MFP 1-2 trips, the crew will go to OP AP-15; note that the actions in AP-15 and AP-25 are very similar, and often repeat each other; some of those overlapping actions are also repeated here, so that the examiner can follow along in one procedure until the actual transition occurs to the other.		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 4 Page 10 of 28

Event Description: MFP 1-2 High Vibrations, requiring plant ramp (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-25, Rapid Load Reduction) (con't)
	ATC	<ul style="list-style-type: none"> (10) Checks pressurizer pressure and level trending to program (actual will be close to program, but may be in manual control) (CC2, PPC)
Note: At approx 93% power, the 1-2 MFP will trip (causing a faster programmed ramp to occur), and OP AP-15, Loss of Feedwater Flow, will be implemented; OP AP-15 action duplicate most AP-25 actions, and the crew will probably stabilize the plant from that point using OP AP-15.		
	SRO	Implements OP AP-15, Loss of Feedwater Flow, Section A
		(OP AP-15, Loss of Feedwater Flow, Section A)
	ATC/BOP	<ul style="list-style-type: none"> (1) Determines if power is still > 80% (ATC) (1 RNO) Starts both MDAFPs (VB3 lower center) (if still > 80%) (BOP)
	BOP	<ul style="list-style-type: none"> (2, 5) Verifies programmed ramp is in progress (Triconex HMI on CC3; 225 mw/min down to 650 MWe, then 25 mw/min to 550 MWe)
	BOP	<ul style="list-style-type: none"> (3) Verifies that MFP suction pressure is > 260 psig (it is) (VB3 meter, PPC)
	ATC	<ul style="list-style-type: none"> (4) Verifies that control rods are inserting properly in AUTO (VB2, intermittent green IN light)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 4 Page 11 of 28Event Description: MFP 1-2 High Vibrations, requiring plant ramp (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-15, Loss of Feedwater Flow, Section A, con't)
	ATC	<ul style="list-style-type: none"> (6) Verifies charging flow adequate to prevent letdown flashing: may take manual control of Pzr level (already in manual from prior event) to prevent flashing of letdown (under these conditions, approx 60 gpm charging flow is required to keep letdown properly cooled) Places HC-459D (master level controller) or FCV-128 (charging flow controller) in manual (CC2, right side, for both) Keeps charging high enough (approx 60-65 gpm, as minimum) to prevent letdown from flashing (VB2, upper panel, letdown temperature, is monitored)
	BOP	<ul style="list-style-type: none"> (7, 11) Verifies DFWCS in AUTO and controlling S/G levels (CC3 MFW HMI, VB3, PPC) Checks MFW control and bypass valves in AUTO Checks both MFPs and their controller in AUTO May check level trends, as well as steam flow/feed flow trends (CC3, PPC, and/or big VB3 DFWCS electronic recorders)
	ATC	<ul style="list-style-type: none"> (8) RCS is borated per reactivity handbook for approx 50% load reduction (the following guidance is on the boration checklist in the reactivity handbook) <ul style="list-style-type: none"> Presses STOP on M/U Ctrlr HMI (CC2) Presses BORATE on HMI Sets target gallons for boration (as decided above, and per the Shift Foreman); verifies batch is reset Sets boric acid flowrate Presses START, and monitors boration Once stopped, either returns to AUTO (presses AUTO, then START), or performs additional boration per the Shift Foreman
	ATC	<ul style="list-style-type: none"> (9) Verifies proper operation of steam dumps, Tave trending to Tref (VB3, center)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 4 Page 12 of 28Event Description: MFP 1-2 High Vibrations, requiring plant ramp (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-15, Loss of Feedwater Flow, Section A, con't)
	ATC	<ul style="list-style-type: none"> (10) Checks pressurizer pressure and level trending to program (actual will be close to program, but may be in manual control) (CC2, PPC)
Note: It is not expected that all of the OP AP-15 actions be performed, but additional actions are included (below), depending on how much of the event is evaluated, per the lead examiner.		
	ALL	<ul style="list-style-type: none"> (12) Stabilizes the plant once ramp completed (as time permits, these are later AP-25 actions) <ul style="list-style-type: none"> T_{ave} within 1.5 F of T_{ref} Axial flux difference (AFD) in target band (or borating to get it there); rods > RIL S/Gs are trending towards program level (CC3, VB3, PPC) (they will be stable and close to program level of 65%) MFP D/Ps are on program (DFWCS HMI on CC3) (D/P will be very close to program, and stable) Pzr pressure and level stable, in normal bands (CC2, PPC) Returns turbine to standby status <ul style="list-style-type: none"> Takes MW and IMP pressure feedbacks OUT on Triconex turbine control HMI (CC3) Sets valve position limit (VPL) to 1-2% above current value (same controller) May perform reactivity brief
	SRO/BOP	<ul style="list-style-type: none"> (13a, 13b) Resets steam dumps (to normal control) <ul style="list-style-type: none"> Checks steam dumps closed (they are, CC3 middle status light panel), and UI-500 (demand signal; next to status lights) @ 0%) Resets C-7A/7B (C-7A <u>may</u> be in) (CC2, right)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC

Scenario No.: 3

Event No.: 4Page 13 of 28

Event Description: MFP 1-2 High Vibrations, requiring plant ramp (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-15, Loss of Feedwater Flow, Section A, con't; optional)
	SRO/BOP	<ul style="list-style-type: none"> • (14) Stabilizes secondary: • Secures MDAFPs • Places hotwell reject valve HC-3 controller in manual and closed (VB3, lower, right) • Places FCV-31 (part of cold gas temp control scheme) in manual and full open (VB3, lower right; note that this valve/controller is reverse acting, in that 0% on controller is full open demand) • Adjusts TCV-23 and FCV-31 to attain acceptable steam jet air ejector (SJAE) flows and cold gas temps, and then returns controllers to auto, and monitors (all VB3, lower right)
The next event may be implemented once the plant is stable @ ≈ 50% power, at least one boration has been completed, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 5 Page 14 of 28Event Description: Loss of 4KV Vital Bus G (differential trip) (TS)

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses loss of 4KV Bus G from one or more of the following: <ul style="list-style-type: none"> Numerous equipment alarms associated with the loss of 4KV Bus G equipment PK17-02/04/09 DG-1-2 (bus G) alarms PK17-16 and PK17-17 4KV Bus G alarms (both related to loss of bus) Blue light on 4KV Bus G (diff) (VB4) White lights out on 4KV and 480 vac Bus G (VB4)
	BOP	Diagnoses differential trip on Bus G due to alarms (above), blue light on Bus G, and loss of power available white light on Bus G.
	SRO	(ONLY IF USED) Implements AR PK17-17, 4KV Bus G Fdr UV (note that OP AP-27 may be entered directly, or from one of the following ARPs)
		(only if used) (AR PK17-17, 4KV Bus G Fdr UV) (otherwise, this section is N/A)
	SRO/ATC	<ul style="list-style-type: none"> (1) Determines section 2.1 applicable from input of alarm
	SRO/BOP	<ul style="list-style-type: none"> (2.1) Determines Bus G is not energized, and transitions to OP AP-27, Loss of Vital 4KV and/or 480 vac Bus
	SRO	(ONLY IF USED) Implements AR PK17-16, 4KV Bus G Diff Lockout
		(only if used) (AR PK17-16, 4KV Bus G Diff Lockout) (otherwise, this section is N/A)
	SRO	<ul style="list-style-type: none"> (1) Determines that section 2.1 is applicable, from alarm input(s)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 5Page 15 of 28Event Description: Loss of 4KV Vital Bus G (differential trip) (TS) (con't)

Time	Position	Applicant's Actions or Behavior
		(AR PK17-16, 4KV Bus G Diff Lockout, con't)
	SRO/BOP	<ul style="list-style-type: none"> (2.1.1) Verifies the Aux, DG, and S/U feeder breakers open to Bus G (2.1.1) Opens 480 vac Bus G breaker 52-HH-5 (VB4, below 4KV Bus G mimic)
	SRO	<ul style="list-style-type: none"> (2.1.2) Determines Bus G is not energized, and transitions to OP AP-27, Loss of Vital 4KV and/or 480 vac Bus
		(OP AP-27, Loss of Vital 4KV and/or 480vac Bus)
	BOP	<ul style="list-style-type: none"> (1) Checks vital 4KV busses energized (only Bus G OFF; other white bus lights checked ON) (VB4, lower)
	ATC	<ul style="list-style-type: none"> (2) Checks DRPI energized (on) (VB2, upper left)
	BOP	<ul style="list-style-type: none"> (3) Confirms 4KV Bus G is tripped on diff OC (VB4, blue light on bus)
	SRO	<ul style="list-style-type: none"> (4) Notifies maintenance of bus fault
	ATC/BOP	<ul style="list-style-type: none"> (5) Checks alternate pumps running on 4KV busses (ASW, CCW, CCP); CCW PP 1-3 may need to be started
	BOP	<ul style="list-style-type: none"> (6) Checks 480 vac vital busses – only bus 1G de-energized (VB4 – white pwr light for each 480 vac bus)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC

Scenario No.: 3

Event No.: 5

Page 16 of 28

Event Description: Loss of 4KV Vital Bus G (differential trip) (TS) (con't)

[illegible]

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 5Page 17 of 28Event Description: Loss of 4KV Vital Bus G (differential trip) (TS) (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-27, Loss of Vital 4KV and/or 480vac Bus, con't)
	SRO	<ul style="list-style-type: none"> (7) Evaluates Tech Specs and ECGs (longer specs as time permits, per lead examiner): <ul style="list-style-type: none"> TS 3.4.11.C – PORV block valve (1 hr) TS 3.8.1.B – AC Sources – operating (STP I-1C w/l 1 hr, continues to be in effect) TS 3.8.4.A – DC Sources – operating (restore batt charger) (2 hrs) NOTE: may not have time to look up all (longer time limit) Tech Specs prior to next event TS 3.6.3.A & C – Cont isolation valves (4 hrs, 72 hrs) TS 3.8.9.A – Distribution system (vital bus) – operating (8 hrs to restore) TS 3.7.3.A – MFIVs, MFRVs & bypasses, etc (72 hrs) TS 3.8.7 – Inverters (only a trouble alarm at this point, so none INOPERABLE) ECG 23.6.A – Vital 480 vac swgr class 1 ventilation (30 days)
	SRO/BOP	<ul style="list-style-type: none"> (8) Check unloaded DGs (N/A)
	SRO	<ul style="list-style-type: none"> (9) Checks OPERABILITY of ESF equipment (pumps, valves lost due to Bus G loss) <ul style="list-style-type: none"> CS Pp 1-1 OOS RHR Pp 1-1 OOS CCPs (CCP 1-2 and 1-3 OOS)
Proceed to the next event once the Tech Spec actions above have been addressed, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 6 Page 18 of 28**Event Description:** RCP 1-3 Vibration with motor bearing temperature increase

Time	Position	Applicant's Actions or Behavior
Note: RCP 1-3 vibration coincident with motor bearing temperature increase per AR PK05-05 step 2.1.2 requires reactor trip and RCP 1-3 trip.		
	ALL	<p>Diagnosis is made of RCP 1-3 vibration and motor bearing temperature increase using one or more of the following:</p> <ul style="list-style-type: none"> RCP parameters rising (meters on VB2, upper center, above RCP controls) (PPC picture and various group displays) PK05-05 RCP Vibration Vibration Monitoring Operations Console (simulated: Desktop PC behind Sim control console)
		(AR PK05-05, RCP Vibration)
	SRO	Implements AR PK05-05, RCP Vibration
	SRO	<ul style="list-style-type: none"> (1) Will select section 2.1 based on input
	BOP	<ul style="list-style-type: none"> (2.1.1) Determines RCP 1-3 is in alarm using the Vibration Monitoring Operations Console (Desktop PC behind Sim control console)
Cue: When Desktop PC is checked for RCP vibration, (from Shift Manager) report "Danger" level vibration on RCP 1-3 "Motor Shaft X axis" on Vibration Monitoring Operations Console.		
	ATC/BOP	<ul style="list-style-type: none"> (2.1.2) Monitors RCP parameters Seal Flows (no change), Seal Temperatures (no change), Motor Bearing temperatures (rising) (PPC picture RCP, other PPC displays, and VB2 meters). After a short time, operator should report rising motor bearing temperatures as significant change coincident with vibration.
	ATC/BOP	<ul style="list-style-type: none"> (2.1.3) Once step 2.1.2 parameter changes (motor bearing temperature increase) are reported, SRO directs reactor trip and RCP 1-3 trip after immediate actions, and E-0 entered.
Note: The rest of AR PK05-05 is not listed here. It is expected that the operators report motor bearing temperatures significantly changing, prompting a reactor trip and RCP 1-3 trip.		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 6 Page 19 of 28Event Description: RCP 1-3 Vibration with motor bearing temperature increase (con't)

Time	Position	Applicant's Actions or Behavior
	ATC	<ul style="list-style-type: none"> (2.1.3) Initiates reactor trip (CC1, or VB2)
	BOP/ATC	<ul style="list-style-type: none"> (2.1.3) Trips RCP 1-3 (may do this following EOP E-0 immediate actions)
	SRO	Implements EOP E-0, Reactor Trip or Safety Injection
		(EOP E-0, Reactor Trip or Safety Injection)
	ATC	<ul style="list-style-type: none"> (1) Verifies reactor trip (trip bkrs open(VB2 upper left), rods on bottom (VB2 upper left DRPI panel), Nis decreasing (CC1 left))
	ATC	<ul style="list-style-type: none"> (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps)
	BOP	<ul style="list-style-type: none"> (3) Checks vital 4kv busses (VB4, vital busses F/H have white lights on mimic busses)
(continued on next page)		

** Critical Task

[illegible]

**** Critical Task**

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 6 Page 21 of 28Event Description: RCP 1-3 Vibration with motor bearing temperature increase (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-0.1, Reactor Trip Response, con't)
	ATC/BOP	<ul style="list-style-type: none"> (2) Checks Feedwater Isolation (FWI) complete Checks Tave < 554°F (expected, or soon will be) Checks FWI MLB (monitor light box) (VB1, upper center), RED light ON, WHITE lights OFF (they are, if actuated; this actuation will occur when < 554°F) (<u>note</u>: temperature will fluctuate a bit due to stopping the RCPs earlier) Checks AFW flow > 435 gpm (the flow will be adequate, and/or S/G levels will still be on-scale) (VB3)
	ATC	<ul style="list-style-type: none"> (3) Checks all control rods – fully inserted (they are) (VB2 upper left, for DRPI panel)
	ATC/BOP	<ul style="list-style-type: none"> (4) Checks Pzr and level control Checks Pzr level > 17% (it is) (VB2 meter, CC2 recorder, PPC) Checks charging and letdown in service (they both are) (CC2 and VB2 CVCS mimic) Checks Pzr level trending to 22%; operates FCV-128 and HCV-142 (CC2) to control Pzr level 22% - 60% (RNO) Operates Pzr heaters as needed (auto/manual) to maintain normal pressure (normal auto operation expected at this point, with pressure returning to normal or normal already)
The next event may be implemented once EOP E-0.1 is in progress and the RCPs have been secured, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 7 Page 22 of 28Event Description: Earthquake and Loss of ALL AC

Time	Position	Applicant's Actions or Behavior
Note: The Loss of ALL AC develops when a loss of Startup Power (230KV) occurs; Bus G is de-energized due to the differential trip, the 1-2 DG is cleared, and the 1-1 and 1-3 DGs trip during their start. 500KV is available, so backfeed will be accomplished using App DD early in the procedure.		
	ALL	Diagnosis of the Loss of AC is made using one or more of the following: <ul style="list-style-type: none"> • “Many” alarms occur, mostly associated with the earthquake or equipment power problems • All of the vital and non-vital bus white power available lights are out (VB4 and VB5, lower panel, near each mimic bus) • The S/U Pwr available light (right end of VB5) is out • DG 1-3 shutdown relay tripped alarm (PK18-15) is noted (and/or the DG is noted not to be running) • DG 1-1 shutdown relay tripped alarm (PK16-15) is noted (and/or the DG is noted not to be running)
	SRO	Implements ECA-0.0, Loss of All Vital AC Power
Cue: (from Shift Manager) The U-2 Shift Foreman will take CP M-4 actions.		
		(ECA-0.0, Loss of All Vital AC Power)
	ATC	<ul style="list-style-type: none"> • (1) Verifies reactor trip (trip bkrs open (VB2 upper left), NIs decreasing (CC1 left))
	ATC	<ul style="list-style-type: none"> • (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps)
	ATC	<ul style="list-style-type: none"> • (3) Performs RCS isolation steps <ul style="list-style-type: none"> • (3a) Verifies letdown isolated 8149 A/B/C close OR LCV-459/460 closed (all 8149s will be closed due to the loss of AC (to CCPs) (VB2 lower left) (ATC) • (3b) Checks Pzr PORVs closed (they are) (ATC) • (3c) Verifies excess letdown isolated (8166/8167, VB2 lower far right) (they are both closed) (ATC) • (3d) Verifies NSSS sample valves closed (VB1 lower left) (some are still open, and must be taken to close position) (ATC)
<i>(continued on next page)</i>		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 7 & 8 Page 23 of 28**Event Description:** Loss of ALL AC, con't; TDAFP auto-start failure

Time	Position	Applicant's Actions or Behavior
		(ECA-0.0, Loss of All Vital AC Power, con't)
	BOP	<ul style="list-style-type: none"> (4) Verifies AFW status AFW flow > 435 gpm (VB3 upper center meters, SPDS) (the TDAFP does not start in auto, but will start from VB3); starts TDAFP
Note: The TDAFP is available, but the valves no longer have power (usually open); once the TDAFP is started, then local operators may be stationed to control the TDAFP LCVs (and AFW flow) until 4KV bus G is restored.		
	SRO/BOP	<ul style="list-style-type: none"> (5a, and RNO) Starts any DG from the Control Room (VB4, upper panel); there is no action to do here, since Bus G has an diff trip, and busses F & H, DG 1-3 & 1-1 have a S/D relay trip; the Shift Foreman (SFM) may authorize an attempted reset of the relay and DG starts (won't be successful)
	SRO	May request maintenance and/or operators to investigate/make available any or all of the DGs at this point
	SRO/BOP	<ul style="list-style-type: none"> (5b) Checks any vital bus energized (they're not, VB4 white lights light on busses); there is currently no power to manually close in to these busses
	SRO/ATC	<ul style="list-style-type: none"> (5c) Observes that no vital busses are energized (VB4 white bus lights out); may use the sync key in one of the generator output bkrs (CC3 far right) to check for voltage, or by asking the Shift Manager or switchyard, it is determined that 500KV will be available in 5-10 minutes.
	SRO	<ul style="list-style-type: none"> (5c RNO) Directs App DD implementation to backfeed, while the rest of crew continues with ECA-0.0 body
Cue (when status checked): 500KV power will be available in about 5-10 minutes.		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 7Page 24 of 28Event Description: Loss of ALL AC, con't; energize vital bus (CT)

Time	Position	Applicant's Actions or Behavior
		(ECA-0.0, Loss of All Vital AC Power, con't)
	BOP	<ul style="list-style-type: none"> (App DD) Implements App DD (steps vital to critical task of energizing bus are bolded) <ul style="list-style-type: none"> (App DD, 1) Checks 500KV power available by putting sync key in PCB-532 and/or PCB-632 (CC3 far right) (may have already been done above and given report that 500KV would be available shortly; not needed if crew already received report of backfeed power available from switchyard) (App DD, 2) Verifies generator exciter field bkr open (it is) (may take it to pull-to-lock position) (App DD, 3) Opens the MOD (CC3 right); takes switch to open (takes a few moments to open fully) (App DD, 4) Cuts out generator protective relays for backfeed clearance (all toggles on VB4 upper panel with "blue" lamicoids) (App DD, 5) Verifies generator output breakers trip reset blue light off (VB4 upper left near gen trip lockout relays) (blue light is off) (App DD, 6) Resets unit trip lockout relays (VB4 upper left) (reset is vertical position on handles, not slanted) (App DD, 7) Closes generator output breakers, PCB-532 and PCB-632 (CC3) (inserts sync key, turns to ON, closes bkr, turns off sync key, and removes for each breaker) (only one breaker required for CT) (App DD, 8) Cuts out vital bus auto transfer relays (toggle switch adjacent to each bus on VB4, each taken to cutout position) (only one of bus F or G required for CT) (App DD, 9) Resets auto transfer relays for vital busses (PBs next to cutout switches on VB4); makes blue lights go out (any actions on Bus G are not relevant at this point, since the bus cannot be energized) (only one of bus F or H required for CT) (App DD, 10) Verifies personnel clear of vital bus swgr (phone); may also check status of installation of interlocks on vital 4KV loads prior to energizing busses
		(continued on next page)

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 7 Page 25 of 28Event Description: Loss of ALL AC, con't; energize vital bus, and isolate RCP seals/cooling
(CTs & TCOA)

Time	Position	Applicant's Actions or Behavior
		(ECA-0.0, Loss of All Vital AC Power) (con't)
	BOP	<ul style="list-style-type: none"> (App DD) Implements App DD (con't) (App DD, 11) Verifies S/U and DG feeder breakers for each vital bus are open (VB4, lower, above each bus mimic); opens any startup breakers that are still closed (App DD, 12) Closes Aux Feeder breakers for busses F and H (inserts sync key, turns to ON, closes bkr, turns off sync key, and removes for each breaker) (VB4, lower; left side feeder breaker on each bus) (only one of bus F or H required for CT) (App DD) (WOG CT E-0-C, energize at least one vital bus prior to exiting ECA-0.0) (steps in bold above required for CT) (Critical Task) (also, part of non-timed TCOA) ** (App DD, 13) (as time permits, not expected) Reviews backfeed procedure OP J-2:V for additional actions and clearance actions
Note: The actions below (body of procedure) will continue as the BOP is aligning backfeed to the vital busses (above).		
	ATC	<ul style="list-style-type: none"> (6) Checks any vital bus energized (will not be at this point, before the appendix is completed)
	SRO/ATC	<ul style="list-style-type: none"> (7) Directs actions to isolate RCP seal cooling (all field actions); directing local actions in step 7 is a Critical Task (WOG CT ECA-0.0-H, isolate RCP seals prior to starting a CCP, in ECA-0.1 or ECA-0.2) (Critical Task) (also, part of non-timed TCOA) **
	SRO/ATC	<ul style="list-style-type: none"> (8) Controls S/G levels by local/manual control, as needed (assigns operators in field and has them throttle TDAFP LCVs as needed to maintain 20-65% level) (VB3 meters, PPC)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 7Page 26 of 28**Event Description:** Loss of ALL AC, con't; energize vital bus, and isolate RCP seals/cooling

Time	Position	Applicant's Actions or Behavior
		(ECA-0.0, Loss of All Vital AC Power) (con't)
	SRO/ATC	<ul style="list-style-type: none"> (9) Installs interlocks (to prevent Pp starts) for all ESF pumps (ASW, CCW, CCP, SI, RHR, AFW) (may not do Bus G at this time, since it cannot be energized) (VB1, VB2, VB3, lower sections) (interlock physically fits over start switches and locks them in "stop" position)
	ATC	<ul style="list-style-type: none"> (9) Places all ASW and CCW stby selector switches in MANUAL (VB1, upper left)
	SRO/ATC	<ul style="list-style-type: none"> (9) Directs field operators to rack out breaker on CFCUs (may not do Bus G at this time) (9) Places CFCU speed selector switches in slow speed (VB1, upper center)
Note: A few more ECA-0.0 body actions may be completed before a vital bus is energized, but only the RCP seal isolation and interlock installations above are required before leaving the procedure.		
	SRO	<ul style="list-style-type: none"> (6) Per step 6, when at least one vital bus is energized, goes to step 27 of the procedure
	BOP	<ul style="list-style-type: none"> (27) Checks S/Gs pressures stable (they are) (VB3)
	SRO/BOP	<ul style="list-style-type: none"> (28) Aligns battery chargers from available 480 vac busses (Bus G is OOS, so the crew may direct aligning battery charger 1-21 to the 1-2 battery) (all field actions) (only IF not done earlier during OP AP-27 actions)
Note: It is expected that the crew will find conditions that allow exit to EOP ECA-0.1 (no SI), however, exit to either ECA-0.1 or ECA-0.2 is allowable and will complete the scenario objectives.		
	ALL	<ul style="list-style-type: none"> (29) Checks SI initiation criteria, and determines recovery procedure (most likely ECA-0.1)
<i>(continued on next page)</i>		

** Critical Task

Op-Test No.: L111-NRCScenario No.: 3Event No.: 7Page 27 of 28Event Description: Loss of ALL AC; energize vital bus; restore inventory control (con't)

Time	Position	Applicant's Actions or Behavior
	SRO	(29) Implements ECA-0.1, Loss of All AC without SI Required
		(ECA-0.1, Loss of All Vital AC Power without SI Required)
Note: If ECA-0.2 is used, essentially the same actions are performed, but in addition ECCS pumps and CFCUs are considered for starts as well. That procedure is not detailed here.		
	SRO	<ul style="list-style-type: none"> Reads CAUTIONs and NOTE prior to step 1
	SRO/BOP	<ul style="list-style-type: none"> (1) Verifies RCP seal isolation step (from ECA-0.0) completed (all field actions; should already have received phone call from field) (done) (note: this is part of the critical task of isolating RCP cooling PRIOR to starting a CCP)
	BOP	<ul style="list-style-type: none"> (2) Check Containment Isolation Phase A NOT Actuated (probably won't be – resets if it is actuated)
Note: All of the following substeps establish minimum loading of equipment on to the available vital busses (F & H), the goal being to re-establish RCS inventory control.		
	ATC/BOP	<ul style="list-style-type: none"> (3a, 3b) Checks instrument air available (FCV-584 is on VB4, lower left); if isolated, the valve is opened, and header pressure checked (above it) Note: FCV-584 won't open if instrument air pressure is too low
Cue: If AP-9 implemented, (from Shift Manager) U-2 SFM will implement AP-9.		
	ATC	<ul style="list-style-type: none"> (3c, 3d, 3e) Prepares ASW/CCW pumps for starts <ul style="list-style-type: none"> Resets vital bus auto-transfers (bus F & H) (pushbuttons, making the blue lights go out, VB4, adjacent to each bus mimic) (may have been done earlier in App DD) Verifies ASW and CCW pps all in MANUAL (may already have been done) (VB1, far left, vertical panel)
	ATC	<ul style="list-style-type: none"> (3f) Removes interlock(s), and starts at least one ASW pump (VB1, far left, vertical)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: 3 Event No.: 7 Page 28 of 28

Event Description: Loss of ALL AC; energize vital bus; restore inventory control (CT) (con't)

Time	Position	Applicant's Actions or Behavior
		(ECA-0.1, Loss of All Vital AC Power without SI Required, con't)
	ATC	<ul style="list-style-type: none"> (3g) Verifies RCS isolation (from ECA-0.0 step; already complete), removes interlock(s), and starts one CCW pump (VB1 just to right of ASW pumps)
	ATC	<ul style="list-style-type: none"> (3h1, 3h2) Notes no CCP is currently running, and that only CCP 1-1 is available (3h3) Verifies suction from the VCT or RWST (may be either) (VB2, lower, center) (3h4) Verifies charging injection valves closed (either closed, or can be closed) (VB2, far left, lower) (3h5) Sets HCV-142 (seal backpressure) to 20% open (CC2) (3h6) Opens 8105/8105 (CCP recircs) (probably already open) (VB2, lower, center) (3h7, 3h8, 3h9, 3h10) (all VB2 left, lower) Verifies normal charging valve 8146 open (it is), aux spray vlvs 8145/8148 closed (they are), and charging hdr isolations 8107 and 8108 open (open, or can be opened) (3h11) Removes interlock(s), and starts CCP 1-1 (Critical Task: RCP seal isolation [direction] must have been completed prior to this point); also, establishes RCS inventory control (part of TCOA to establish within 54 min)) ** (3h12) Throttles open FCV-128 to establish charging flow
The scenario may be terminated once power is establish to a vital bus, RCP seal isolation has been directed, and a CCP has been started (RCS inventory control), per the lead examiner.		

**** Critical Task**

ATTACHMENT 1 – SIMULATOR SETUP

- ☐ Run Init/Initialize /CCs and VBs/Run Drill 81
- ☐ Any tags are placed/removed as necessary
 - CBCs on 1-2 DG start/stop, auto/manual, and output breaker
- ☐ The proper Delta-I curve on CC1 and Reactivity Handbook for the simulator **INIT** in place.
- ☐ The Rod Step Counters indicate correctly.
- ☐ Run “Clear Recorders” icon on lower left desktop to clear YOKOGAWA recorder memories.
- ☐ Clear the PCS HMIs (NSR) by "flushing" the trend buffer; then, restart the "Window Viewer" app.
- ☐ Boric Acid and Primary Water Target Blender set to values identified in Lesson
- ☐ Record PPC MAX on CC2 lamicoid.
- ☐ Record Boron Concentration for desired simulator **INIT** on CC2 lamicoid.
- ☐ Circuit breaker flags are correct on CC1 (Proportional Heaters), CC3, VB4, and VB5
- ☐ Equipment status lamicoids are correct:

RHR Valves (8726A/B and 8734A/B)	- CLOSED (OPEN if RHR in service)
H2 or N2 on VCT	- H2 (unless shut down training)
SUPPLYING IN-SERVICE SCW HX	- CWP 1-1
AUTO RECLOSE FEATURE CUTIN ON THIS CWP	- CWP 1-1
SELECTED TO BUS 2F	- CONT. RM. VENT TRAIN 1 BUS F
SELECTED TO BUS 1H	- CONT. RM. VENT TRAIN 1 BUS H
B.A. XFER PP SUPPLYING BLENDER	- BA PP 1-2
RADWASTE DISCH AND CHLORINATION	- ASW 1-1
OFF NORMAL LAMICOIDS OR PINK MARKERS	- Placed as needed or return to CC3

- ☐ The Plant Abnormal Status Board is updated for Charging Pump Status, Boron Conc, PRA Risk Status and Work Week Matrix.
- ☐ Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up:
- ☐ PPC Setup:
 - PPC BIG Screen (set to TABULARLG1), select new list, private, “Sim Large”)
 - CC2, SFM PPC Screens select OVERVIEW and SM to Rad Monitors
 - RODCONFIG is updated (click Apply when completed)
- ☐ SPDS (screens and time updating), A screen “RM”, B screen “SPDS”.
- ☐ CC3 Annun. CRT big screen (if enabled then get alarm it needs reset - Tools, keyboard, Tools, password - which is "A", File Exit - Start over)
- ☐ The chart recorders are operating properly. DDR10's and Turbine Vib Recorder are acknowledged and in AUTO. CC1 NR-45 on proper screen. PAMS RVLIS/TMS screens on “Summary” Page.
- ☐ All typewriters are on, with adequate paper/ribbon/etc., and are in the “**ON LINE**” status, as needed.
- ☐ Alarm A&E Viewer window is activated prior to run, and printer is placed ,**ONLINE**”, if needed.
- ☐ Triconex DEH/DFW alarms have been acknowledged/cleared.
- ☐ Seismic drawer put back; check for any alarms on the Rad panels
- ☐ PC setup for SVC tailboard (G-3 ENF Reset, RCPs, U-1 Safety Monitor)
- ☐ Verify paper in HPD2 and print a test page.
- ☐ Verify Annunciator Horn is on (**BELL ON**) and Sound Effects are on (**SOUND ON**).
- ☐ The video, audio, and communication systems are turned off
- ☐ Turn down plant PA on simulator floor (restore to original setting when scenario completed)

TIMELINE AND BOOTH/CONSOLE OPERATOR ACTIONS

Timeline The following table shows the simulator computer operations and other instructions the examiners need to know about the scenario to successfully run the exam. **"X" = Manual entry required!**

	TIME LINE	CONSOLE ENTRY	SYMPTOMS, CUES, AND DESCRIPTION
X	Setup Simulator per Checklist	INIT 510	100% power, MOL, $C_B = 774$, Integrators: BA – 00, and PW – 20 • Tags: DG 1-2 CBCs
X	Setup	Drill 81	Reset normal engineering values
X	Setup	Start TEAM data collection	Collect data for scenario for NRC Exam Team
X	Setup	DRILL 35 in AUTO	Clears DG 1-2 for maintenance
X	Once crew has taken the watch	DRILL 9205 in AUTO	Scenario malfunctions are inputted once the crew takes the watch
X	Note: The first event is the crew swapping CCP's per OP B-1A:V section 6.1		
X	When Aux Board called	Cue: There are no releases in progress on either unit.	
	15 min after CCP 1-1 started	xmt p2r24 2,0,0,900,c, XV2O264R,0	PT-474 fails low (no control effect, but makes two PORVs inoperable, due to loss of interlock channel; PCVs, PCV-474 and PCV-455C)
X	When requested	dsc p2r1 act,0 dsc p2r2 act,0	Opens breakers for 8000A & 8000B
	15 min after 8000A closed	xmt cvc4 3,0,5,900,c, xv2i195c,0	FT-128 fails low (charging flow goes high); manual control is available, and taken to control flow
	45 min after FCV-128 taken to MAN	mal mfw2b act 8,600,2700,c, xc2i016m,0 ovr xv3i196o act,1,0,0,c, fnispr.lt.93,0	MFP 1-2 vibs increase to ≈ 8 mils, requiring fast ramp to 50%. MFP 1-2 will trip @ 93%, causing even faster programmed ramp.
	15 min after < 575 MW on turbine	mal eps4d act 2,0,900,c, smss.lt.575,0	Loss of 4KV Vital Bus G (diff trip)
X	Once bus trip investigated	Cue: There is an acrid smell in the 4KV bus G room, but no smoke or fire.	
X	When Requested to open breaker for 8000B	DRILL 12 in AUTO	Opens breaker for 8000B
X	When Requested, to transfer 1-2 bat to 121 charger	DRILL 47 in AUTO	Transfers 1-2 battery to 121 charger.

(continued on next page)

TIMELINE AND BOOTH/CONSOLE OPERATOR ACTIONS

Timeline (con't) The following table shows the simulator computer operations and other instructions the examiners need to know about the scenario to successfully run the exam. **"X" = Manual entry required!**

	TIME LINE	CONSOLE ENTRY	SYMPTOMS, CUES, AND DESCRIPTION
X	When Requested to transfer PY-16 to backup	DRILL 97 in AUTO	Transfers PY-16 to back power
	30 min after loss of bus G	ser 1244 act,1,0,1800, c,.not.jeps1g,0 xmt rcp38 3,322,200,1800, c,.not.jeps1g,0 #txmtrlr(3)	RCP 13 high vibration and increasing motor bearing temperature
	10 min after 1-3 RCP is shut down	mal sei1 act 0.35,10,600,c, xv2i262o,0 mal deg1a act 2,0,0,c,jmlsei1,0 mal deg1c act 2,0,0,c,jmlsei1,0 MAL SYD1 act 2,5,0, c,jmlsei1,0	Seismic event triggers loss of ALL AC (loss of S/U, DG 1-1 & 1-3 fails, bus G is already dead, and DG 1-2 is cleared) (backfeed is available)
	When TDAFP start needed	vlv afw7 1,0,0,0,d,xv3i219o	TDAFP won't start in AUTO; will start from VB3
X	After reactor trip	DRILL 32 in AUTO	Nuclear Operator actions on a reactor trip
X	One minute after earthquake	<u>Cue:</u> (from Shift Manager) The U-2 Shift Foreman and I will handle CP M-4 actions.	
X	Once backfeed status checked	<u>Cue:</u> 500 KV power will be available from Gates in 5 -10 minutes. 230 KV power has relayed out, and there are no estimates for its return.	
X	When Requested	DRILL 24 in AUTO (or MAN) as needed)	Isolates RCP seal cooling, FCV-357, etc (don't forget return phone call, as this is part of TCOA)
X	Once Drill 24 actions complete	<u>Cue:</u> Notify C/R that RCP seals have been isolated per ECA-0.0 (use whatever wording they gave you on the direction to perform the step)	
X	When Requested	DRILL 23 in MAN - ONLY	Racks out breakers for CFCUs (if requested) (only do CFCU breakers in the file)
X	When requested to throttle AFW locally	DRILLS 161-170 in AUTO	Use these drills to throttle AFW as directed
X	Once Bus G is restored	DRILL 171 in AUTO	<u>IMPORTANT:</u> Releases GCFs on TDAFP LCVs so valves will work again from the control room.
X	To restore 500KV power	Mal syd1 clr Loa syd11 act,1,0,0,d,0	Clears malfunction and restores power from Gates substation.

DRILL FILE TEXT

* L111 NRC Exam Scenario 03 (DRILL 9205)
* 10/4/12 glh
*
* PT-474 fails low (PCV-455c & pcv-474 INOP)
* (15 min after CCP 1-1 started)
* XMT PZR24 PZR PRESS #pxmtpzr(4)
xmt pzr24 2,0,0,900,c,XV2O264R,0 #pxmtpzr(4)
*
* FT-128 fails low (chrg fails high; manual works) 15 min after 8000A closed
* XMT CVC4 CHARGING FLOW, P0128A, FI-128B, SPDS, FI-128 #wxmtf128
xmt cvc4 3,0,5,900,c,xv2i195c,0 #wxmtf128
*
* MFP 1-2 vibrations (need AP-25 ramp to 50%) (45 min after FCV-128 to MAN)
* mal MFW2B MAIN FEEDWATER PUMP 1-2 VIBR ALARM AND TRIP
mal mfw2b act 8,600,2700,c,xc2i016m,0
*
* MFP 1-2 trips @ 93% power
* ovr VB3143D FEED PP 12 TRIP XV3I196O #xv3i196
ovr xv3i196o act,1,0,0,c,fnispr.lt.93,0 #vb3143d
*
* 4kv bus G diff trip 15 min after 50% reached (smss.lt.575)
* mal EPS4d 4KV BUS D FEEDER BREAKER TRIP
mal eps4d act 2,0,900,c,smss.lt.575,0
*
* RCP 13 high vibration & motor brg temp increase
* VLV CCW6 2,0,10,1800,c,.not.jeps1g,0 #rccf749 not used
ser 1244 act,1,0,1800,c,.not.jeps1g,0
xmt rcp38 3,322,200,1800,c,.not.jeps1g,0 #txmtrlrb(3)
*
* seismic event (triggers rest) 10 min after 1-3 rcp is S/D
* mal SEI1 SEISMIC ACTIVITY
mal sei1 act 0.35,10,600,c,xv2i262o,0
*
* loss of S/U and DGs 1-1 and 1-3 for loss of AC
* (backfeed is available)
* mal DEG1a DIESEL GENERATOR 11 FAILURE
mal deg1a act 2,0,0,c,jmlsei1,0
* mal DEG1C DIESEL GENERATOR 13 FAILURE
mal deg1c act 2,0,0,c,jmlsei1,0
* mal SYD1 LOSS OF offsite POWER
MAL SYD1 act 2,5,0,c,jmlsei1,0
*
* TDAFP doesn't start is AUTO (starts when 95 taken to OPEN)
* VLV AFW7 AFW TURB 11 STM SUPPLY HDR #rmsf095
vlv afw7 1,0,0,0,d,xv3i219o #rmsf095

Diablo Canyon Power Plant Operations Shift Log

Unit 1

Today - Dayshift

Unit 1 Days at Power: 203 Days

Operating Mode: 1

Gross Generation: 1190 MWe

Power Level: 100 %

Net Generation: 1147 MWe

Shift Manager Turnover

PRA RISK STATUS NEXT SHIFT:	GREEN
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
MAIN GEN H ² USAGE (475 SCFD Limit):	309 SCF / 327 SCFD 5 day ave

NEW EMERGENT WORK:

- none

SHUTDOWN TECH SPECS / ECGS:

- TS 3.8.1.B → DG 1-2 OOS for corrective maintenance on fuel racks (discovered during normal surveillance run two nights ago); RTS estimate is 12 hours; last partial STP I-1C completed 30 minutes ago (due in 7.5 hrs); action 3.8.1.B.3.1 has been completed.

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:

- none

TURNOVER ITEMS:

- Maintain 100% power
- Swap from CCP 1-3 to CCP 1-1 first thing your shift per OP B-1A:V, section 6.1 (procedure attached) to support a routine surveillance next shift.

PRIORITY ITEMS FOR NEXT SHIFT:

- See turnover items

OPERABILITY ITEMS:

- TS 3.8.1.B → DG 1-2 OOS – 2 days into 14 day action

ANNUNCIATORS IN ALARM:

- Alarms in are consistent with the 1-2 DG OOS (no other alarms)

Shift Foreman Turnover

TURNOVER ITEMS:

- U-1 – maintain 100% - no one in containment
- U-2 is at 100%

REACTIVITY MANAGEMENT:

- Time in core life: MOL.
- Power History: Steady State, previously at 100% for 73 days. Currently power at 100%
- Boron concentration is 774 ppm from a sample taken 4 hours ago.
- Control Rod Height: 231 steps on CBD.
- Diluting the RCS approximately 20 gallons every 1.5 hrs.
- The last dilution/boration was completed 15 min ago.
- Rod motion: none planned, as needed to maintain ΔI on target

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- DG 1-2; next partial STP I-1C due in about 7.5 hrs.

OTHER ABNORMAL PLANT STATUS

- None

Facility: Diablo Canyon (PWR)Scenario No.: SOp-Test No.: L111-NRC

Examiners: _____

Operators: _____

Initial Conditions: 100%, MOL, 774 ppm boronTurnover: CCP 1-3 OOS, DG 1-2 OOS

Event No	Malf No.	Event Type*	Event Description
1	dsc rod1	C (SRO, ATC)	The normal DRPI power supply fails; rods are placed in manual until the power supply is transferred to backup (TS)
2	N/A	C (ALL) R (ATC)	The GCC orders a load shed of 350 MWe in the next 10 minutes; the crew uses OP AP-25 to ramp the unit down to comply (≈ 35 mw/min)
3	xmt rcs93	C (SRO, ATC)	Loop 3 Tc fails high (slowly), causing rods to move in; rods should be taken to manual; the rods may be placed back in auto once the failed channel has been "kicked out" by the PCS. (TS)
4	cnv mfw4	C (SRO, BOP)	FCV-520 fails closed (slowly) in auto; manual control is taken and S/G 1-2 level is controlled manually
5	mal rsc3a pmp cvc1/2 pmp sis1/2 mal syd2	M (ALL)	A SBLOCA (with failure of all CCPs and SI Pps, and TDAFP won't start) leads to Inadequate Core Cooling (ICC); S/Gs are eventually depressurized to inject low head ECCS (RHR) (CT)
6	mal ppl3a/b	C (ATC)	Auto SI fails on the SBLOCA; a manual SI is performed. (CT)
7	mal ppl1b	C (BOP)	Train B Phase A fails to actuate on the SI; manual alignment is performed.
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
22. Total malfunctions (5–8)	7
23. Malfunctions after EOP entry (1–2)	2
24. Abnormal events (2–4)	4
25. Major transients (1–2)	1
26. EOPs entered/requiring substantive actions (1–2)	1
27. EOP contingencies requiring substantive actions (0–2)	1
28. Critical tasks (2–3)	2

Rev 2 comments: updates based on validations (including remove one event due to length of scenario), updated summary; adjusted timing

SCENARIO SUMMARY – NRC #Spare

1. The normal power supply to DRPI trips open. The crew will take actions to place DRPI on backup, and place control rods in manual during this period. **(TS)**
2. The Grid Coordination Center (GCC) orders the unit to drop 350 mw of load in the next 10 minutes (due to grid imbalance from a line trip); the crew will ramp the unit down using OP AP-25, Rapid Load Reduction, at about 35 mw/min, and then stabilize the unit.
3. One of the loop 3 Tc transmitters will fail high (slowly); this slow failure will cause rods to initially move in (based on the failure, uses auct high Tave) before the PCS system kicks out that channel (based on excessive deviation). Control rods should be placed in manual. If the rods are not in manual before the failing channel is automatically removed from control, then the control rods will drive out to compensate for the previous movement. Actions will be taken per OP AP-5, Malfunction of an Eagle-21 Protection or Control Channel. **(TS)**
4. Main Feedwater Reg Valve (MFWRV) FCV-520 fails closed (slowly); manual control is available, and is taken to return feedflow and S/G 1-2 level back to program.
5. A SBLOCA (5") occurs, rapidly causing the need for a safety injection. All ECCS CCPs and SI Pps will fail on OC (common mode relay failures), leaving no high or medium head ECCS; eventually, core conditions will degrade to an Inadequate Core Cooling (ICC) condition, where the S/Gs will be depressurized in order to inject ECCS flow from the RHR system **(CT)**.
6. Automatic Safety Injection fails; manual SI must be initiated when the SBLOCA occurs. **(CT)**
7. Phase A containment isolation, train B, also fails, and equipment must be repositioned manually.

The scenario is terminated once the RCS is successfully depressurized and low-head (RHR) ECCS is injecting into the RCS.

Op-Test No.: L111-NRCScenario No.: SEvent No.: 1Page 01 of 21Event Description: Normal Power to DRPI Fails (transferred to backup)

Time	Position	Applicant's Actions or Behavior
Note: Procedure step numbers are included at the front of each action/comment in parenthesis, where applicable.		
	ALL	DRPI power loss is diagnosed from one or more of the following: <ul style="list-style-type: none"> • DRPI Panel is "dark", with no rod position lights (VB2, left, black DRPI panel) • PK03-21 alarms on two inputs
	SRO	Implements AR PK03-21, "DRPI Failure / Rod Bottom"
		(AR PK03-21, DRPI Failure / Rod Bottom)
	SRO	<ul style="list-style-type: none"> • (1) Selects section 2.1 from "DRPI urgent failure" input
	ATC	<ul style="list-style-type: none"> • (2.1.1) Takes manual control of rods by placing bank selector switch in MAN, and verifying normal manual speed on meter (45-51 spm) (CC1 right)
	SRO	<ul style="list-style-type: none"> • (2.1.4) Implements Tech Spec 3.1.7.B (immediate action to place rod control in manual)
Cue: (for next step) There are currently no loads on their backup source (from the OP O-13 attachment 1 table)		
	SRO/BOP	<ul style="list-style-type: none"> • (2.1.5.a) Directs that DRPI be transferred to backup power (may send Nuclear Operator to normal breaker first to investigate) per OP A-3:I (all field actions, except below)
	SRO	<ul style="list-style-type: none"> • (2.1.5.a) May perform OP O-13 load assessment prior to (or after) transferring DRPI power) (use cue above; margin is available)
	ATC	<ul style="list-style-type: none"> • (2.1.5.b) Once DRPI is restored, Rod Control is returned to auto by placing the back selector in AUTO, and verifying 8 spm on the speed indicator (CC1, right)
Proceed to the next event once control rods are back in AUTO, and Tech Specs have been discussed, per the lead examiner.		

** Critical Task

Op-Test No.: L111-NRCScenario No.: SEvent No.: 2Page 02 of 21**Event Description:** Unit Receives Backdown Order - Ramps Unit down 350 MW

Time	Position	Applicant's Actions or Behavior
Cue: (from Shift Manager) I have just received a valid backdown order from the Grid Coordination Center (GCC). Per Ops Policy B-1, ramp unit 1 down 350 MW in the next 10 minutes.		
	SRO	Implements OP AP-25, Rapid Load Reduction
		(OP AP-25, Rapid Load Reduction)
	SRO	Enters OP AP-25, Rapid Load Reduction <ul style="list-style-type: none"> (1a) Determines runback/programmed ramp is not in progress (may not vocalize, since this ramp is initiated by the crew)
	BOP	<ul style="list-style-type: none"> Ramp is started (guidance is also on lamicoid pegboard on CC3): <ul style="list-style-type: none"> (1b) MW and IMP feedbacks are placed in service (all on Triconex turbine HMI, CC3) (1c) \approx 840 MWe (1190-350, approximate) load target is entered into Triconex HMI (1d) Sets ramp rate to \approx 35 mw/min (approximate rate) (1e) Pushes GO
	SRO/BOP	(OP O-3) May make calls to chemistry if/when 15%/hr shut down rate is exceeded
	ATC	<ul style="list-style-type: none"> (2) Verifies that control rods are inserting properly in AUTO (VB2, intermittent green IN light)
	ATC	<ul style="list-style-type: none"> (3, 4) Verifies ON all pressurizer backup heaters (CC1, left), and verifies CCP (1-2) running (VB2),
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 2 Page 03 of 21Event Description: Unit Receives Backdown Order - Ramps Unit down 350 MW (con't)

Time	Position	Applicant's Actions or Behavior
		(OP AP-25, Rapid Load Reduction, con't)
	ATC	<ul style="list-style-type: none"> (5) Verifies charging flow adequate to prevent letdown flashing: may take manual control of Pzr level (now, or any time during ramp) to prevent flashing of letdown (under these conditions, approx 60 gpm charging flow is required to keep letdown properly cooled) Places HC-459D (master level controller) or FCV-128 (charging flow controller) in manual (CC2, right side, for both) Keeps charging high enough (approx 60-65 gpm, as minimum) to prevent letdown from flashing (VB2, upper panel, letdown temperature, is monitored)
	BOP	<ul style="list-style-type: none"> (6) Verifies DFWCS in AUTO and controlling S/G levels (CC3 MFW HMI, VB3, PPC) Checks MFW control and bypass valves in AUTO Checks both MFPs and their controller in AUTO May check level trends, as well as steam flow/feed flow trends (CC3, PPC, and/or big VB3 DFWCS electronic recorders)
	ATC	<ul style="list-style-type: none"> (7) RCS is borated per reactivity handbook for approx 30% (roughly) load reduction (the following guidance is on the boration checklist in the reactivity handbook) Presses STOP on M/U Ctrlr HMI (CC2) Presses BORATE on HMI Sets target gallons for boration (as decided above, and per the Shift Foreman); verifies batch is reset Sets boric acid flowrate Presses START, and monitors boration Once stopped, either returns to AUTO (presses AUTO, then START), or performs additional boration per the Shift Foreman
		(continued on next page)

** Critical Task

[illegible]

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 2 Page 05 of 21

Event Description: Unit Receives Backdown Order - Ramps Unit down 350 MW (con't)

[illegible]

**** Critical Task**

[illegible]

** Critical Task

Op-Test No.: L111-NRCScenario No.: SEvent No.: 3Page 07 of 21**Event Description:** Loop 3 Tcold Fails High (slowly)

Time	Position	Applicant's Actions or Behavior
Note: One of the loop 3 Tc transmitters will fail high (slowly); this slow failure will cause rods to initially move in (based on the failure) before the PCS system kicks out that channel on excessive deviation. Control rods should be placed in manual. If the rods are not in manual before the failing channel is automatically removed from control (by PCS), then the control rods will drive out to compensate for the previous movement.		
	ALL	Diagnosis of the failed Tc channel (and/or unwarranted rod movement) is made using one or more of the following: <ul style="list-style-type: none"> • Reactor and generator power are approx equal and not moving • Tave and Tref were initially matched • Loop 3 Tave, ΔT, and other indications (CC1, VB2 meters) are diverging from the other loops • PK06-03 (RTD failure), PK06-04 (PPS Trouble), and other alarms related to failed channel
Note: Pzr level control will also be momentarily affected by the Tc failure; level control will probably be in manual from the previous ramp, but if in AUTO, level control may be placed in manual during the transient.		
	ATC	Control rods are placed in manual (may be done prior to OP AP-5 entry, or during its use) (CC1 bank selector switch)
	SRO	Implements OP AP-5, Malf of Eagle-21 Protection or Control Channel
		(OP AP-5, Malfuction of Eagle-21 Protection or Control Channel)
	SRO/ATC	<ul style="list-style-type: none"> • (1a, 1b) Notes that rod control (Tave) is NOT controlling properly in Auto (see above) and goes to step 1a, 1b RNO and takes MANUAL control of rods (CC1); "may" take control of Pzr level (FCV-128 to MAN) if it is in auto at the time of the failure (CC2). SRO refers to Att. 4.2 now or later.
	BOP/SRO	<ul style="list-style-type: none"> • (2a) Determines that the failure is Eagle-21 related (PK06-03 – ON), and goes to step 2a RNO)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 3 Page 08 of 21Event Description: Loop 3 Tcold Fails High (slowly)

Time	Position	Applicant's Actions or Behavior
		(OP AP-5, Malfunction of Eagle-21 Protection or Control Channel, con't)
	ATC	<ul style="list-style-type: none"> (2a RNO) Determines which Protection Set is affected (from Ronan or Viewer/board indications); set III
	SRO	<ul style="list-style-type: none"> (2a RNO) Directs WCL (Work Control Lead)/watchstander to open all Prot Set III doors (racks 11,13) and monitor per Att 4.2
	SRO	<ul style="list-style-type: none"> (2a RNO) Determines which instruments are in the affected racks (11 & 13) using Att 4.1 (would include loop 3 T_{ave}, ΔT, $OP\Delta T$ and $OT\Delta T$ setpoint on VB2/PPC)
	SRO	<ul style="list-style-type: none"> (2a RNO) Determines affected bistables and fills out Bistable Trip Authorization Sheet (Att 4.4) (may do now or in later step) <ul style="list-style-type: none"> TC-431C Loop 3 $OT\Delta T$ Trip TC-431G Loop 3 $OP\Delta T$ Trip S/G TTD bistables (4) are an option, but not required (ie, either TTDs set to zero, or lo-lo bistables tripped)
	SRO/ATC	<ul style="list-style-type: none"> (3) Verifies that Loop 3 ΔT is NOT selected as a recorder input (on CC1)
	BOP	<ul style="list-style-type: none"> (4) Verifies steam dumps are not actuated (no armed or open, unless not reset from ramp just completed – VB3, center)
	SRO	<ul style="list-style-type: none"> (5) Notifies I&C of the Loop 3 Tcold failure, as time permits
	SRO	Reads CAUTION prior to step 6
	SRO/BOP	<ul style="list-style-type: none"> (6, 7) Notes step 6 requirements to take channel OOS prior to working; Places OOS stickers on failed channel indications (VB2 meters, uses Att 4.1 and 4.2)
(continued on next page)		

** Critical Task

[illegible]

** Critical Task

Op-Test No.: L111-NRC

Scenario No.: SEvent No.: 4Page 10 of 21

Event Description: MFW Reg Valve FCV-520 (1-2 S/G) Fails low

[illegible]

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 5 & 6 Page 11 of 21Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC); Auto SI fails (CT)

Time	Position	Applicant's Actions or Behavior
	ALL	RCS leak (SBLOCA) is diagnosed from the following (5" break): <ul style="list-style-type: none"> Pzr level dropping rapidly (PPC, CC2 recorder, VB2 meters) Pzr level hi flow demand and/or low level deviation alarms (PK05-21) Containment parameters rising rapidly (temp, press) (PPC, VB1 recorder, PAMS panels) PK02-02, Safety Injection Initiate, alarms (as well as other ESF related alarms)
	ATC/ALL	<ul style="list-style-type: none"> Manually initiates Safety Injection when it is noted that SI did not actuate (may be done before or during E-0) (Critical Task) (WOG CT E-0-XX, actuate SI prior to exit from E-0) **
	SRO	Implements EOP E-0, Reactor Trip or Safety Injection
		(EOP E-0, Reactor Trip or Safety Injection)
	ATC	<ul style="list-style-type: none"> (1) Verifies reactor trip (trip bkrs open (VB2 upper left), rods on bottom (VB2 upper left DRPI panel), NIs decreasing (CC1 left))
	ATC	<ul style="list-style-type: none"> (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps)
	BOP	<ul style="list-style-type: none"> (3) Checks vital 4kv busses (VB4, vital busses F/G/H have white lights on mimic busses)
	ATC/BOP	<ul style="list-style-type: none"> (4) Checks if SI actuated (PK08-21 OFF, but ESF lights and PK02-02 require an SI) SI is actuated manually, if not already done above (CT) **
	SRO	<ul style="list-style-type: none"> (5) Directs App E implemented (usually to BOP)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 5 & 7 Page 12 of 21

Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

[illegible]

**** Critical Task**

Op-Test No.: L111-NRCScenario No.: SEvent No.: 5Page 13 of 21**Event Description:** SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-0, Reactor Trip or Safety Injection, con't)
	BOP	<p>App E is con't:</p> <ul style="list-style-type: none"> (15) Verifies proper operation of Aux Bldg and Control Rm vent systems (VB4 vent status light panel white lights); verifies containment iodine fans secured (VB4, lower panel) (16 - 21) Verifies DGs running normally (VB4, freq (60), volts (120), speed (900)); verifies vital batteries supplied by chargers (charger and bus volts on VB5, upper panel middle/lower area; notes DG 1-2 OOS); verifies MSRs reset (CC3 Triconex HMI); throttles RCP seal injection flows to normal (FCV-128, to 8-13 gpm each, CC2); checks PK11-04 NOT IN (SFP alarm); notifies Shift Foreman of completion
	ATC	<ul style="list-style-type: none"> (6) Checks RCS temperature – stable; AFW may be throttled back (VB2 meters, upper panel lower area)
	ATC	<ul style="list-style-type: none"> (7) Checks Pzr PORVs and Pzr safeties (closed) / PORV block valves (all open), and no elevated tailpipe temps or sonic flows on safeties/PORVs (VB2 – upper panel, far right); checks Pzr sprays closed (CC2) (tailpipe temps will be elevated, but consistent with containment temperatures from the SBLOCA)
	SRO/ATC	<ul style="list-style-type: none"> (8) Checks RCP trip criteria – observes RCS pressure (< 1300 psig, but NO SI/CCPs running); does NOT stop RCPs) (VB1 and VB2)
Note: 230KV power (startup power) will be lost shortly after this decision is made (helps with ICC conditions timing), so RCPs will eventually be lost		
	ATC/BOP	<ul style="list-style-type: none"> (9) Checks for faulted S/Gs <ul style="list-style-type: none"> Faulted – checks all S/G pressures on VB3 (not uncontrolled drop or depressurized)
	ATC/BOP	<ul style="list-style-type: none"> Notes that 230KV (startup) power has been lost
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC

Scenario No.: S

Event No.: 5

Page 14 of 21

Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

[illegible]

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 5 Page 15 of 21Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-1, Loss of Reactor or Secondary Coolant, con't)
Note: The ICC conditions should cause enough degradation to core conditions that transition to FR-C.2 or FR-C.1 should occur within about 15-20 minutes following the initiation of the SBLOCA.		
	ATC	<ul style="list-style-type: none"> (1) Checks RCPs tripped (already done, VB2) (1) Continues to maintain RCP seal flows 8-13 gpm (FCV-128) (CC2)
	ATC/BOP	<ul style="list-style-type: none"> (2 & 3) Checks for faulted/ruptured S/Gs <ul style="list-style-type: none"> Faulted – checks all S/G pressures on VB3 (not uncontrolled drop/depressurized; all are dropping slowly, as the primary is now the heat sink for the secondary) Ruptured – checks RE-71/72/73/74 and RE-15/19 recorders on VB2 (and PPC; no upward trends or spikes, unless containment “shine” is noted), and PK11-06/17/18 (alarms not in); requests chemistry to sample S/Gs for activity (as follows, if done): <ul style="list-style-type: none"> Verifies phase A containment isolation reset (VB1) Opens FCV-584 (air to containment) (VB4, lower left) Opens blowdown isolation valves inside containment (FCV-760, 761, 762, 763) May require blocking low steamline pressure MSI/SI (due to low steamline pressures); two block switches on CC2 taken to block position
	BOP	<ul style="list-style-type: none"> (4) Maintains S/G levels 20 [25] - 65% (VB3, AFW controls)
	ATC	<ul style="list-style-type: none"> (5) Check Pzr PORVs (closed) / blocks (open/powered) (VB2 – upper panel, far right)
	ATC	<ul style="list-style-type: none"> (6) Verifies containment spray in service (PK01-18 OFF, containment spray is not in service, and not required) (VB1)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: SEvent No.: 5Page 16 of 21Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP E-1, Loss of Reactor or Secondary Coolant, con't)
	ATC/BOP	<ul style="list-style-type: none"> (7) Checks ECCS termination criteria (not met, SCM is < 20°F, Pzr level is also below 12% [40%])
Note: If RCS pressure is still stabilized at this point, RHR pumps will be shut down [until needed later] (if pressure going down, they will be left in service); either condition is satisfactory for now.		
	ATC	<ul style="list-style-type: none"> (8) Maintains RHR pumps running, and aligns cooling (may open FCV-364 and 365 now [will open in later step], VB1 far left lower)
	ALL	<ul style="list-style-type: none"> (9) Checks S/G pressures (VB3) and RCS pressure - consistent with LOCA (they are, although RCS pressure may be almost stable at saturation)
	ATC/BOP	<ul style="list-style-type: none"> (10) Check if DGs should be stopped (busses are powered from DGs, so they cannot be secured) (VB4)
	ATC	<ul style="list-style-type: none"> (11a, b) Verifies recirc capability (RHR Pps have power (VB1), checks aux bldg rad levels (RM-04, 06, 10, 13 show no elevated readings) (PPC, back RMS panels), and checks RHR systems alarms (PK02-16 and PK02-17 off) for intersystem LOCA (ISLOCA - no indications other than for SBLOCA)
	ATC	<ul style="list-style-type: none"> (11c) Checks RHR Pps running, and establishes cooling to the heat exchangers (by opening FCV-364/365, as noted above), if not already open (and pumps running) (all on VB1)
	ATC/BOP	<ul style="list-style-type: none"> (11d) Implements App P (2nd/manual check of ESF status lights; may be a lower priority)
(continued on next page)		

** Critical Task

Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

[illegible]

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 5 Page 18 of 21Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

Time	Position	Applicant's Actions or Behavior
Note: Depending on timing, the crew will note degrading RCS conditions and transition to either FR-C.2, Degraded Core Cooling, OR EOP FR-C.1, Inadequate Core Cooling. If EOP FR-C.2 is entered first, eventual transition to EOP FR-C.1 will occur within a short period.		
	SRO	(if degraded core conditions of high temperature, > 700°F or low RVLIS level < 32%, are noted) Transitions to EOP FR-C.2, Degraded Core Cooling, and may perform a procedure transition brief
		(if used) (EOP FR-C.2, Degraded Core Cooling; otherwise this section N/A)
	ATC	<ul style="list-style-type: none"> (1) Resets Safety Injection (SI) (PBs on VB1)
	SRO/ATC	<ul style="list-style-type: none"> (2) Checks ECCS alignment (notes alignment correct; problem is still with lack of CCPs and SI PPs) (VB1, VB2)
	ATC	<ul style="list-style-type: none"> (3) Tries to verify ECCS flow (none) (VB1 & VB2 meters) <ul style="list-style-type: none"> Notes CCP 1-3 is not available (VB2) May send operators to the field to reverify lineups (won't help)
	ATC/BOP	<ul style="list-style-type: none"> (4) Checks Pzr PORVs and RCS head vents - closed (they are) VB2 far right, PAM1 for head vents)
	ATC	<ul style="list-style-type: none"> (5) Checks RCP status (none running, no power available); goes to step 8
Cue: (when offsite power checked, per Shift Manager) 230KV has relayed out and RTS is not known; 500KV power also relayed out due to line problems, and RTS is about an hour (500KV is energized, but NOT stable).		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRCScenario No.: SEvent No.: 5Page 19 of 21Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

Time	Position	Applicant's Actions or Behavior
		(FR-C.2, Degraded Core Cooling, con't)
	ATC/BOP	<ul style="list-style-type: none"> (8) Checks core cooling (T/Cs and RVLIS) - determines that conditions are still degrading
	SRO/ATC	<ul style="list-style-type: none"> (9) Directs that accumulator breakers be racked in (SRO) (9) Verifies accumulators are available (ATC)
	BOP	<ul style="list-style-type: none"> (10) Maintains S/G levels 15 [25] - 65% (VB3, AFW controls)
	ATC	<ul style="list-style-type: none"> (11) Blocks both trains of low steamline pressure SI (both switches to BLOCK) (CC2)
	SRO/BOP	<ul style="list-style-type: none"> (12) Performs RCS cooldown at < 100°F/hr rate <p>Cooldown is performed by:</p> <ul style="list-style-type: none"> (condenser is NOT available) Places each 10% steam dump controller in Manual, and throttles open (PCVs 19, 20, 21, and 22 on VB3 lower middle panel area). (target is 250 psig RCS pressure, and lower once accumulators are injected and isolated)
	ATC	<ul style="list-style-type: none"> (13) Verifies RHR Pps are running
	SRO	<ul style="list-style-type: none"> (14) Directs accumulators isolated one injected
Note: If EOP FR-C.2 is entered (prior to EOP FR-C.1), most likely only a few steps will be performed prior to transition to EOP FR-C.1; many of the two procedures have similar steps for the initial stages of the procedure. No further EOP FR-C.2 steps will be listed here.		
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 5 Page 20 of 21Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

Time	Position	Applicant's Actions or Behavior
	SRO	Notes conditions for Inadequate Core Cooling, and implements EOP FR-C.1 for ICC conditions
		(EOP FR-C.1, Inadequate Core Cooling)
	ATC	<ul style="list-style-type: none"> (1) Verifies ECCS flow path - correct (it is) (VB1, VB2, local walkdowns)
	ATC	<ul style="list-style-type: none"> (2) Tries to verify ECCS flow (none) (VB1 & VB2 meters) Notes CCP 1-3 is not available (VB2) May send operators to the field to reverify lineups (won't help)
	ATC	<ul style="list-style-type: none"> (3) Checks RCP status (none running, no power available); goes to step 8
Cue: (when offsite power checked, per Shift Manager) 230KV has relayed out and RTS is not known; 500KV power also relayed out due to line problems, and RTS is expected in about an hour (500KV is energized, but NOT stable).		
	SRO/ATC	<ul style="list-style-type: none"> (4) Directs that accumulator breakers be racked in (SRO) (4) Verifies accumulators are available (ATC)
	ATC	<ul style="list-style-type: none"> (5, 6, 7) Checks temperatures > 700/1200°F and/or RVLIS < 32% (one or both are unsat at this point); stays in this procedure (ie, this step looks for procedure success) (PPC, PAMS, SPDS)
	SRO	<ul style="list-style-type: none"> (8) Directs that post-accident containment H₂ monitor be placed in service
	BOP	<ul style="list-style-type: none"> (9) Maintains S/G levels 15 [25] - 50% (VB3, AFW controls)
(continued on next page)		

** Critical Task

Op-Test No.: L111-NRC Scenario No.: S Event No.: 5 Page 21 of 21Event Description: SBLOCA, leading to Inadequate Core Cooling (ICC) (con't)

Time	Position	Applicant's Actions or Behavior
		(EOP FR-C.1, Inadequate Core Cooling)
	ATC/BOP	<ul style="list-style-type: none"> (10) Checks Pzr PORVs and RCS head vents - closed (they are) VB2 far right, PAMS1 for head vents)
	ATC	<ul style="list-style-type: none"> (11a) Blocks both trains of low steamline pressure SI (both switches to BLOCK) (CC2)
	SRO/BOP	<ul style="list-style-type: none"> (11b/c) Performs RCS cooldown at maximum rate possible <p>Cooldown is performed by:</p> <ul style="list-style-type: none"> (condenser is NOT available) Places each 10% steam dump controller in Manual, and throttles open (PCVs 19, 20, 21, and 22 full open on VB3 lower middle panel area). (target is 250 psig RCS pressure, and lower once accumulators are injected and isolated)
	ATC	<ul style="list-style-type: none"> (12) Isolates accumulators once 250 psig reached in RCS, by taking each outlet valve switch to CLOSE (Resets SI if not already done) (VB1)
	BOP	<ul style="list-style-type: none"> (14) Continues S/G depressurization until ECCS flow from RHR system is achieved (Critical Task) (WOG CT FR-C-1-B, to depressurize S/Gs until low head ECCS injects into the RCS, prior to need to restart RCPs) **
Terminate the scenario once low head RHR flow is injecting into the RCS, per the lead examiner.		

** Critical Task

ATTACHMENT 1 – SIMULATOR SETUP

- ☐ Run Init/Initialize /CCs and VBs/Run Drill 81
- ☐ Any tags are placed/removed as necessary
 - Caution tags on CCP 1-3 and DG 1-2 (bkr, man/auto, and start/stop)
- ☐ The proper Delta-I curve on CC1 and Reactivity Handbook for the simulator **INIT** in place.
- ☐ The Rod Step Counters indicate correctly.
- ☐ Run “Clear Recorders” icon on lower left desktop to clear YOKOGAWA recorder memories.
- ☐ Clear the PCS HMIs (NSR) by "flushing" the trend buffer; then, restart the "Window Viewer" app.
- ☐ Boric Acid and Primary Water Target Blender set to values identified in Lesson
- ☐ Record PPC MAX on CC2 lamicoid.
- ☐ Record Boron Concentration for desired simulator **INIT** on CC2 lamicoid.
- ☐ Circuit breaker flags are correct on CC1 (Proportional Heaters), CC3, VB4, and VB5
- ☐ Equipment status lamicoids are correct:

RHR Valves (8726A/B and 8734A/B)	- CLOSED (OPEN if RHR in service)
H2 or N2 on VCT	- H2 (unless shut down training)
SUPPLYING IN-SERVICE SCW HX	- CWP 1-1
AUTO RECLOSE FEATURE CUTIN ON THIS CWP	- CWP 1-1
SELECTED TO BUS 2F	- CONT. RM. VENT TRAIN 1 BUS F
SELECTED TO BUS 1H	- CONT. RM. VENT TRAIN 1 BUS H
B.A. XFER PP SUPPLYING BLENDER	- BA PP 1-2
RADWASTE DISCH AND CHLORINATION	- ASW 1-1
OFF NORMAL LAMICOIDS OR PINK MARKERS	- Placed as needed or return to CC3

- ☐ The Plant Abnormal Status Board is updated for Charging Pump Status, Boron Conc, PRA Risk Status and Work Week Matrix.
- ☐ Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up:
- ☐ PPC Setup:
 - PPC BIG Screen (set to TABULARLG1), select new list, private, “Sim Large”)
 - CC2, SFM PPC Screens select OVERVIEW and SM to Rad Monitors
 - RODCONFIG is updated (click Apply when completed)
- ☐ SPDS (screens and time updating), A screen “RM”, B screen “SPDS”.
- ☐ CC3 Annun. CRT big screen (if enabled then get alarm it needs reset - Tools, keyboard, Tools, password - which is "A", File Exit - Start over)
- ☐ The chart recorders are operating properly. DDR10's and Turbine Vib Recorder are acknowledged and in AUTO. CC1 NR-45 on proper screen. PAMS RVLIS/TMS screens on “Summary” Page.
- ☐ All typewriters are on, with adequate paper/ribbon/etc., and are in the “**ON LINE**” status, as needed.
- ☐ Alarm A&E Viewer window is activated prior to run, and printer is placed ,**ONLINE**”, if needed.
- ☐ Triconex DEH/DFW alarms have been acknowledged/cleared.
- ☐ Seismic drawer put back; check for any alarms on the Rad panels
- ☐ PC setup for SVC tailboard (G-3 ENF Reset, RCPs, U-1 Safety Monitor)
- ☐ Verify paper in HPD2 and print a test page.
- ☐ Verify Annunciator Horn is on (**BELL ON**) and Sound Effects are on (**SOUND ON**).
- ☐ The video, audio, and communication systems are set up and functioning
- ☐ Turn down plant PA on simulator floor (restore to original setting when scenario completed)

TIMELINE AND BOOTH/CONSOLE OPERATOR ACTIONS

Timeline The following table shows the simulator computer operations and other instructions the examiners need to know about the scenario to successfully run the exam. ***“X” = Manual entry required!***

	TIME LINE	CONSOLE ENTRY	SYMPTOMS, CUES, AND DESCRIPTION
X	Setup Simulator per Checklist	INIT 510	100% power, MOL, $C_B = 774$, Integrators: BA – 00, and PW – 25 • Tags: CCP 1-3, DG 1-2
X	Setup	Drill 81	Reset normal engineering values
X	Setup	Start TEAM data collection	Collect data for scenario for NRC Exam Team
X	Setup	Board Operations	Place the 1-2 CCP in service, and stop/clear the 1-3 CCP.
X	Setup	DRILL 35 in AUTO	Clears the 1-2 DG
X	Setup	ser 0219 act,0,0,0,d,0 dsc cvc29 act,0,0,0,d,0	Clears the 1-3 CCP
X	Once crew has taken the watch	DRILL 9206 in AUTO	Scenario malfunctions are inputted once the crew takes the watch
	2 min after crew takes the watch	dsc rod1 act,0,0,120,d,0	Normal power supply to DRPI trips (backup is available)
X	When requested to place DRPI on backup	loa eps act,1,0,0,d,0	Places DRPI on backup
X	When DRPI problem investigated	<u>Cue:</u> The normal DRPI breaker (52-1F-45) is tripped open, with no apparent damage, no unusual smells.	
X	Once rods placed back in AUTO, per lead examiner	<u>Cue:</u> (from Shift Manager) I have just received a valid backdown order from the Grid Coordination Center (GCC). Per Ops Policy B-1, ramp unit 1 down 350 MW in the next 10 minutes.	
	3 min after generator load is less than 900 MWe	xmt rcs93 3,679,180,600,c, smss.lt.900,0	Loop 3 Tc fails slowly high (first causes rods to drive in, and if left long enough in auto, will eventually cause rods to drive back out in AUTO (once PCS kicks out that loop)
	25 min after gen load < 900 MWe (per lead examiner)	cnv mfw4 2,20,120,1500,c, smss.lt.900,ftd520_man	FCV-520 fails slowly closed; manual control will work (vlv failure clears on hitting manual on controller); level is controllable

(continued on next page)

TIMELINE AND BOOTH/CONSOLE OPERATOR ACTIONS

Timeline (con't) The following table shows the simulator computer operations and other instructions the examiners need to know about the scenario to successfully run the exam. ***"X" = Manual entry required!***

TIME LINE	CONSOLE ENTRY	SYMPTOMS, CUES, AND DESCRIPTION
Failures on Safety Injection	mal ppl3a act 1,0,0,d,0 mal ppl3b act 1,0,0,d,0 mal ppl1b act 2,0,0,d,0	<ul style="list-style-type: none"> • AUTO SI fails • One train of Phase A fails
Failures to enable inadequate core cooling scenario (and reasonable timing)	pmp cvc1 4,0,0,15,c, fnispr.lt.5,0 pmp cvc2 4,0,0,15,c, fnispr.lt.5,0 pmp sis1 4,0,0,15,c,fnispr.lt.5,0 pmp sis2 4,0,0,15,c,fnispr.lt.5,0 mal syd2 act 0,1,180,c, prcmstar(1).lt.1300,0 vlv afw7 1,0,0,0,d,0	<ul style="list-style-type: none"> • All ECCS SI Pps and CCPs trip on OC (no high or med head ECCS) • Loss of 230KV startup power (3 min after pressure is < 1300 psig); ensures RCPs not available (less time to ICC) • TDAFP won't start (do not make available)
5 min after FCV-520 is taken to MAN	mal rcs3a act 5,10,300,c, ftd520_man,0	SBLOCA (5") eventually leads to ICC conditions

DRILL FILE TEXT

* L111 NRC Exam Scenario - Spare (DRILL 9206)
* 09/04/12 jfb
*
* Loss of normal DRPI power
* dsc ROD1 52-1F-45 DRPI NORMAL PWR TRANSFMR #i521f45
dsc rod1 act,0,0,120,d,0 #i521f45
*
* Loop 3 Tc fails high (slowly) 10 min after gen < 900 MW
* XMT RCS93 RCS LP3 NR T-COLD: TQM-430B, TQM-430B1 #txmt410b(3)
xmt rcs93 3,679,180,600,c,smss.lt.900,0 #txmt410b(3)
*
* Auto SI fails on SBLOCA, also, train B Phase A fails
* mal PPL3A SAFETY INJECTION ACTUATION FAILURE (TRAIN A)
mal ppl3a act 1,0,0,d,0
* mal PPL3B SAFETY INJECTION ACTUATION FAILURE (TRAIN B)
mal ppl3b act 1,0,0,d,0
* mal PPL1B CONTAINMENT ISOLATION PHASE A FAILURE (TRAIN B)
mal ppl1b act 2,0,0,d,0
*
* FCV-520 fails low in AUTO (MAN OK) 25 min after turb load is less than 900 MW,
* CNV MFW4 MAIN FEEDWATER REG. VALVE #rfwf520
cnv mfw4 2,0.20,120,1500,c,smss.lt.900,0 #rfwf520
tc ftd520_man, cnv mfw4 clr
*
* CCPs and SI PPs trip on OC (common mode relay failure) on SI
* PMP CVC1 CHARGING PP 11 (CENT.) #ocvp11
pmp cvc1 4,0,0,15,c,fnispr.lt.5,0 #ocvp11
* PMP CVC2 CHARGING PP 12 (CENT.) #ocvp12
pmp cvc2 4,0,0,15,c,fnispr.lt.5,0 #ocvp12
* PMP SIS1 SAFETY INJECTION PP 11 #osip11
pmp sis1 4,0,0,15,c,fnispr.lt.5,0 #osip11
* PMP SIS2 SAFETY INJECTION PP 12 #osip12
pmp sis2 4,0,0,15,c,fnispr.lt.5,0 #osip12
*
* SBLOCA to cause ICC 5 min after FCV-520 placed in manual
* mal RCS3A SMALL LOCA IN BOTTOM OF COLD LEG 1
mal rcs3a act 5,10,300,c,ftd520_man,0
*
* Loss of S/U power once decision made to leave RCPs on
MAL SYD2 act 0,1,180,c,prcmstar(1).lt.1300,0
*
* TDAFP won't start following SI
* VLV AFW7 AFW TURB 11 STM SUPPLY HDR #rmsf095
vlv afw7 1,0,0,0,d,0 #rmsf095

Diablo Canyon Power Plant Operations Shift Log

Unit 1

Today - Dayshift

Unit 1 Days at Power: 207 Days

Operating Mode: 1

Gross Generation: 1190 MWe

Power Level: 100 %

Net Generation: 1147 MWe

Shift Manager Turnover

PRA RISK STATUS NEXT SHIFT:	GREEN
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
MAIN GEN H ² USAGE (475 SCFD Limit):	311 SCF / 322 SCFD 5 day ave

NEW EMERGENT WORK:

- CCP 1-3 (see below)

SHUTDOWN TECH SPECS / ECGS:

- TS 3.8.1.B → DG 1-2 OOS for corrective maintenance on air starter motor (discovered during normal surveillance run two nights ago); RTS estimate is 12 hours; last partial STP I-1C completed 1 hour ago (due in 7 hrs); action 3.8.1.B.3.1 has been completed.

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:

- ECG 8.1.A – CCP 1-3 OOS, due to rising vibrations; alignment is almost complete, expect to run sometime this shift. Declared inoperable 5 hrs ago, doing hourly fire watches and complying with actions in the A.1.2 section; pump is required back in 6.5 days (RTS is later this shift).

TURNOVER ITEMS:

- Maintain 100% power
- Run the 1-3 CCP if it becomes available

PRIORITY ITEMS FOR NEXT SHIFT:

- See above

OPERABILITY ITEMS:

- TS 3.8.1.B → DG 1-2 OOS – 2 days into 14 day action

ANNUNCIATORS IN ALARM:

- Alarms in are consistent with the 1-2 DG OOS (no other alarms)

Shift Foreman Turnover

TURNOVER ITEMS:

- U-1 – maintain 100% - no one in containment
- U-2 is at 100%

REACTIVITY MANAGEMENT:

- Time in core life: MOL.
- Power History: Steady State, previously at 100% for 177 days. Currently power at 100%
- Boron concentration is 774 ppm from a sample taken 4 hours ago.
- Control Rod Height: 231 steps on CBD.
- Diluting the RCS approximately 25 gallons every 1.5 hrs.
- The last dilution/boration was completed 15 min ago.
- Rod motion: none planned, as needed to maintain ΔI on target

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- DG 1-2; next partial STP I-1C due in about 7 hrs.

OTHER ABNORMAL PLANT STATUS

- None

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-A1

Title: DETERMINE IF ROD INSERTION LIMIT (RIL) HAS BEEN EXCEEDED

Examinee: _____

Evaluator: _____

Date

Testing Method: Perform X Simulate

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from L061Audit ADMRO1)

Note: This is an admin JPM (RO), intended for the classroom setting.

References: U-2 STP I-1A, Routine Shift Checks Required by Licenses, Rev 121
U-2 COLR, Core Operating Limits Report, Rev 6

Alternate Path: Yes _____ No X

Time Critical: Yes No X

Time Allotment: 10 minutes (average validation time ____ min)

Critical Steps: 2, 3

Job Designation: RO

Rev Comments/TIPs: Rev 1: minor corrections following Ops Rep review

DCPP Task # / Rating: 796200 N/A

Gen KA # / Rating: GEN 2.1.25, Conduct of Operations 3.9

AUTHOR: JOHN F. BUCKLEY DATE:

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Required Materials:

- U-2 STP I-1A, Routine Shift Checks Required by Licenses, Rev 121 (partial, with step 11, is adequate)
- U-2 COLR, Core Operating Limits Report, Rev 6 (partial, with RIL page, is adequate); Figure 1

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue: The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Control Bank positions are compared with the RIL, and it is determined that CBC and CBD are NOT meeting RIL requirements (see answer key for details).

Start Time: _____

Step	Standards
1. Operator obtains correct procedures.	<u>Note:</u> Provide the U-2 STP I-1A (partial OK) and U-2 COLR (partial OK), if not already provided.
	1.1 Operator obtains STP I-1A, Attachment 12.1.
	1.2 Operator obtains COLR for Diablo Canyon Unit 2, Figure 1.
	Step was: Sat: _____ Unsat _____

** Denotes a Critical Step.

Step	Standards
** 2. Records data (thermal power level, Rod Insertion Limit (RIL), and bank positions) on STP Data Sheet . (step 11a)	<p>2.1 Determines present power level to be U4300A05/A15 reading (25%).</p> <p>2.2 Records present thermal power level on STP I-1A Data Sheet (25%).</p> <p>2.3 Determines Insertion limit for current power level for CBD is 25 (± 3) steps.**</p> <p>2.4 Determines Insertion limit for current power level for CBC is 152 (± 3) steps.**</p>
	<p><u>Note:</u> Both bank RILs and bank positions will be placed on the answer sheet, but only one (either bank) need be entered on the STP (both OK).</p>
	<p>2.5 Records Insertion limit on STP I-1A data sheet (either bank, or both; see answer key). **</p> <p>2.6 Records current bank position on STP I-1A data sheet (either bank, or both; see answer key). **</p>
	<p>2.8 Initials “PERF” field.</p>
	<p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step.

Step	Standards
** 3. Determines if RIL limits are met. (step 11b)	<p><u>Note:</u> The next substeps may be done in any order. The Answer Sheet will be the official grading document for this JPM.</p> <p>3.1 Compares CBD RIL with current bank position, and determines RIL limit NOT met. ** (will be documented on answer sheet)</p> <p>3.2 Compares CBC RIL with current bank position, and determines RIL limit NOT met. ** (will be documented on answer sheet)</p> <p><u>Note:</u> This above may be done in any order.</p> <p>3.3 Initials “PERF” field.</p> <p>3.4 (optional) may add asterisk/note that step is UNSAT (RIL limits NOT met (and/or add to comment page).</p> <p>*****</p> <p>Cue: (if examinee attempts to notify the SFM (proctor), just tell them to document their results on the answer sheet and STP data sheet.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step.

INSTRUCTOR WORKSHEET

Step	Standards
4. Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core. (step 11c)	<p>4.1 Notes that CBA and CBB are fully withdrawn.</p> <hr/> <p><u>Note:</u> Proper sequencing can be determined by the fact that the first two control banks are fully withdrawn, and that CBC is 128 steps higher than CBD, and CBC is > 103 steps (ie, CBA/CBB are all rods out).</p> <hr/> <p>4.2 Determines that CBC and CBD have proper overlap and sequence.</p> <p>4.3 Initials "PERF" field.</p> <p>Step was: Sat: _____ Unsat _____</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step.

ANSWER KEY

Note to Examiner: The STP I-1A (step 11) should be filled out, however, the ANSWER SHEET is the official grading document for this task (since it documents intermediate steps not shown on the STP data sheets)

Step 11 of STP I-1A:

APPL MODE	TECH SPEC REFERENCE	A. CHECK / VERIFICATION FROM CONTROL ROOM	PERF
1	SR 3.1.6.2 SR 3.1.6.3	11. COLR Insertion Limit	
		a. Record Insertion Limit for present thermal power level from current COLR:	<i>978</i>
		Present thermal power level 25 %	
		Insertion limit Bank (see below) steps.	
		Demand Bank posit: CBC/CBD 147 / 19 steps.	
		b. Verify each control bank is above the insertion limit specified in the COLR.	<i>(1)</i>
		c. Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core. If all control banks are fully withdrawn, check N/A.	<i>978</i>
			N/A []

(note: step 1b may include * / note / comment with some or all of the below information on the STP data sheet (or comment page))

ANSWER KEY		
Bank	RIL (from COLR)	Is Control Bank Above the Rod Insertion Limit (RIL)?
A	N/A (ARO)	[X] YES [] NO
B	N/A (ARO)	[X] YES [] NO
C	152 ± 3 steps	[] YES [X] NO
D	25 ± 3 steps	[] YES [X] NO

EXAMINEE CUE SHEET / ANSWER SHEET**Initial Conditions:** Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

<u>ANSWER SHEET</u>			
Control Bank	RIL (from COLR)	Is Control Bank Above the Rod Insertion Limit (RIL)?	
CBA	N/A (ARO)	<input type="checkbox"/> YES	<input type="checkbox"/> NO
CBB	N/A (ARO)	<input type="checkbox"/> YES	<input type="checkbox"/> NO
CBC		<input type="checkbox"/> YES	<input type="checkbox"/> NO
CBD		<input type="checkbox"/> YES	<input type="checkbox"/> NO

EXAMINEE CUE SHEET / ANSWER SHEET

PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT

NUMBER COLR 2
REVISION 6
PAGE 12 OF 13
UNIT 2

TITLE: COLR for Diablo Canyon Unit 2

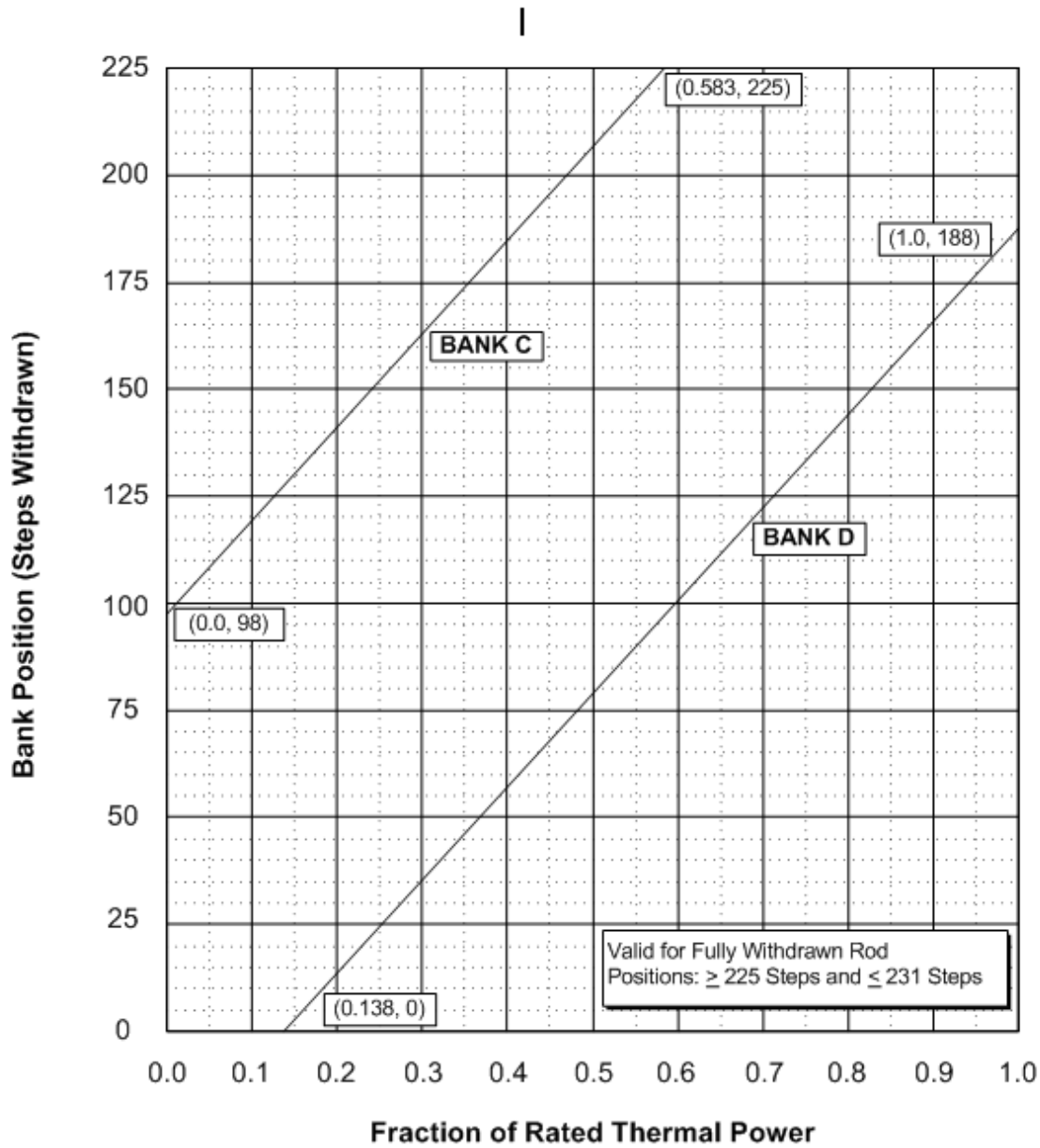


Figure 1: Control Bank Insertion Limits Versus Rated Thermal Power

Number:	NRCL111-A2		
Title:	DETERMINE RAMP RATE RESTRICTIONS		
Examinee:	_____		
Evaluator:	_____		
	Print	Signature	Date
Testing Method:	Perform <u> X </u>	Simulate <u> </u>	
Results:	Sat <u> </u>	Unsat <u> </u>	Total Time: <u> </u> minutes
Comments:	(modified from L061Audit ADMRO2, and LJACO-12R)		

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Required Materials: OP L-4, Normal Operation at Power, Unit 2, Step 6.3.3.j, Rev. 67. (partial procedure recommended)
Load Changing Recommendations, Volume 9B, Page VA-2, Rev. 0 (attached to answer sheet)

Initial Conditions: Given:

- Both Units are at 100% power.
- A High Swell Warning is in effect (9.5 overall rating), and an Operational Decision-Making (ODM) meeting has resulted in plans for both units to ramp down to < 25% power, in anticipation of a "kelp attack".
- OP L-4 has been implemented on both units for the ramp.

Initiating Cue: U-2 Shift Foreman (SFM) directs you to calculate the minimum time allowable to ramp Unit 2 from 100% to 20% turbine power, per OP L-4, step 6.3.3.j; the SFM directs that you use the "recommended normal operating line" on the referenced figure for your calculations.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: It is determined that the minimum ramp time for the U-2 ramp from 100% to 20% power is 1.5 hrs / 90 min (1.25 to 1.75 hrs is the acceptable range, or 75 – 105 minutes).

Start Time: _____

Step	Standards
1. Refers to appropriate procedure.	Note: Provide the partial OP L-4 (step 6.3.3.j, as a minimum), and drawing VA-2 from Vol 9B, if not done previously. These pages are attached to the answer sheet.
	1.1 References Volume 9B, Page VA-2.
	1.2 References OP L-4, step 6.3.3.j.
	Step was: Sat: _____ Unsat _____
** 2. Determines Initial Turbine Load and 1 st stage temperature based on current power level.	2.1 Determines initial turbine load to be 100%.
	2.2 Determines 1 st stage temperature to be 275 °F (± 5 °F). **
	2.3 Records both above values in step 6.3.3.j.2.
	Step was: Sat: _____ Unsat _____
** 3. Determines Final Turbine Load and 1 st stage temperature based on final (target) power level.	3.1 Determines final turbine load to be 20%.
	3.2 Determines 1 st stage temperature to be 135 °F (± 5 °F). **
	3.3 Records both above values in step 6.3.3.j.3.
	Step was: Sat: _____ Unsat _____

** Denotes a Critical Step.

Step	Standards
** 4. Determines Temperature Change for ramp.	<p>4.1 Determines temperature change for 1st stage temperature to be 140 °F (275-135) (acceptable range, based on two previous curve readings is 130 – 150 °F). **</p> <p>4.2 Records value in step 6.3.3.j.4.</p> <p>Step was: Sat: _____ Unsat _____</p>
** 5. Determines minimum permissible time for ramp.	<p><u>Cue:</u> The U-2 SFM has directed use of the "recommended normal operating line" while doing this calculation.</p> <p>5.1 Uses graph on Vol 9B VA-2 to determine that minimum ramp time, based on above ΔT (from step 4.1, above), is 1.5 hrs (acceptable range is 1.25 – 1.75 hrs, based on above curve readings). **</p> <p>5.2 Records value in step 6.3.3.j.5.</p> <p>Step was: Sat: _____ Unsat _____</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step.

ANSWER KEY

<u>ANSWER KEY</u>	
Minimum Ramp Time:	1.5 hrs / 90 min (1.25 – 1.75 hrs is acceptable, as is 75-105 minutes)

Partial OP L-4 (step 6.3.3.j) copied here:

j. Determine turbine ramp rate restrictions:

1. REFER TO Volume 9B, Section VA, Figure IC-2, page VA-2.
2. Initial turb load: 100 % 1st stg temp: 275 °F (270-280 acceptable)
3. Final turb load: 20 % 1st stg temp: 135 °F (130-140 acceptable)
4. Temperature change (2 - 3): _____ °F (130-150 acceptable)
5. Minimum permissible time to perform the power reduction: 90 minutes (see above range) ____/____/____

EXAMINEE CUE SHEET / ANSWER SHEET**Initial Conditions:** Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

ANSWER SHEET**Minimum Ramp Time:****Partial OP L-4 (step 6.3.3.j) copied here:**

j. Determine turbine ramp rate restrictions:

- REFER TO Volume 9B, Section VA, Figure IC-2, page VA-2.
- Initial turb load: ____% 1st stg temp: ____°F
- Final turb load: ____% 1st stg temp: ____°F
- Temperature change (2 - 3): ____°F
- Minimum permissible time to perform the power reduction: ____ minutes

____/____/____

OPERATION DATA
FIGURE IC-2
SOURCE: DC 663280-36

DATE 11/70

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-A3

Title: DETERMINE IF AXIAL FLUX DIFFERENCE (AFD) IS WITHIN TECH SPEC LIMITS

Examinee: _____

Evaluator: _____

Date

Testing Method: Perform X Simulate

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified for RO from LJAEC-11S and L081CAdmin ADM03)

Note: This is an admin JPM (RO), intended for the classroom setting.

References: Vol 9B, Figure R23-2F-1, U-2 Cycle 17 RAOC Limits, Rev 260
U-2 COLR, (last page, AFD limits), Rev 6
U-2 STP I-1C (partial), Att 12.1, step 1, Rev 81

Alternate Path: Yes _____ No X

Time Critical: Yes No X

Time Allotment: 10 minutes (average validation time min)

Critical Steps: 2, 3, 4, 6

Job Designation: RO

Rev Comments/TIPs: Rev 1: minor corrections following Ops Rep review; added refs to cue sheets

DCPP Task # / Rating: 816200 4.2

Gen KA # / Rating: GEN 2.2.42, Equipment Control 3.9

AUTHOR: JOHN F. BUCKLEY DATE:

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Required Materials:

- Vol 9B, Figure R23-2F-1, U-2 Cycle 17 RAOC Limits, Rev 260
- U-2 COLR, (last page, AFD limits), Rev 6
- U-2 STP I-1C (partial), Att 12.1, step 1, Rev 81
- calculator

Initial Conditions: Given:

- Unit 2 has just completed a partial stator cooling water runback that was terminated when the Turbine Building Watch started the standby pump.
- The crew is in OP AP-25, and are taking actions to stabilize following the ramp. Power is about 65%.
- The Work Control Lead (WCL) just finished reviewing alarms, and noted that PK03-25, input 1252, Reactor Axial Offset PPC Alarm, is IN, and has implemented PK03-25, section 2.1.
- Plant status is as follows:
 - U4300A05/A15 is not available.
 - U1169A05 is @ 66.0%.
 - PPC MAX (NI POWER) is 100.3%
 - ΔI readings are as follows:
 - NI-41C \rightarrow -27.2%
 - NI-42C \rightarrow -23.9%
 - NI-43C \rightarrow -26.5%
 - NI-44C \rightarrow -26.8%

Initiating Cue: The U-2 Shift Foreman (SFM) directs you to determine if AFD is within Tech Spec limits, using STP I-1C, Attachment 12.1, step 1, and note your results on the STP data sheet, and below on the Answer Sheet.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: The examinee determines that 3 of 4 AFD channels are NOT within Tech Spec Limits (see Answer Key).

Start Time: _____

Step	Standards
1. This is a left column step. Note that it is the same as the old format.	<p><u>Note:</u> Provide copies of partial STP I-1C (Att 12.1, step 1), and Figure R23-2F-1, if not already done. Provide U-2 COLR (last page) if requested. Note that R23-2F-1 and the drawing in the COLR are the same, except that R23-2F-1 includes admin limits.</p> <hr/> <p><u>Note:</u> The surveillance only checks AFD within Tech Spec limits. This task checks both Tech Spec and admin limits (by using the answer sheet).</p> <hr/> <p>1.1 References U-2 STP I-1C, Attachment 12.1, step 1.</p> <p>1.2 References U-2 Vol 9B Figure R23-2F-1.</p> <p>1.3 (May) reference U-2 COLR (last page, AFD Tech Spec Limits).</p> <p>Step was: Sat: _____ Unsat _____</p>
** 2. Determines Rated Thermal Power (RTP) for AFD Check.	<p><u>Note:</u> With thermal power (U4300A05) not available, the alternate (NI power, using calc) will be used.</p> <hr/> <p>2.1 Determines that 1st choice (thermal power) for power reading (U4300A05) is not available.</p> <p>2.2 Determines RTP by dividing current NI power (66.0%) by PPC MAX (100.3) to get 65.8% (65.8 – 65.803 acceptable), and enters on data sheet. **</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step.

** Denotes a Critical Step.

Step	Standards
** 3. Determines Upper AFD Limit.	<p>Note: Using either curve will yield the same results.</p> <p>3.1 Compares 65.8% RTP with right side of R23-2F-1 (and/or U-2 COLR AFD curve).</p> <p>3.2 Determines upper limit to be +20.5% (20.0% – 21.0% is acceptable), and enters on data sheet. **</p> <p>Step was: Sat: _____ Unsat _____</p>
** 4. Determines Lower AFD Limit.	<p>Note: Using either curve will yield the same results.</p> <p>4.1 Compares 65.8% RTP with left side of R23-2F-1 (and/or U-2 COLR AFD curve).</p> <p>4.2 Determines lower limit to be -25.0% (-24.5% → -25.5% is acceptable), and enters on data sheet. **</p> <p>Step was: Sat: _____ Unsat _____</p>
5. Enters AFD readings on data sheet for comparison.	<p>5.1 Enters AFD readings on data sheet (from initial conditions).</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step.

Step	Standards
** 6. Compares RTP to AFD readings, and determines if AFD is within Tech Spec limits.	<p>6.1 Checks NI-41C against the lower limits, determines it is NOT in the "Acceptable Operation" area, and marks the "AFD Within Limits" NO box. **</p> <p>6.2 Checks NI-42C against the lower limits, determines it is in the "Acceptable Operation" area, and marks the "AFD Within Limits" YES box. **</p> <p>6.3 Checks NI-43C against the lower limits, determines it is NOT in the "Acceptable Operation" area, and marks the "AFD Within Limits" NO box. **</p> <p>6.4 Checks NI-44C against the lower limits, determines it is NOT in the "Acceptable Operation" area, and marks the "AFD Within Limits" NO box. **</p> <p><u>Note:</u> Examinee may use asterisk/note/comment to note that AFD is outside limits on step 1b. Any of these is acceptable; the Answer Sheet makes this part of the step very clear.</p> <p>6.5 Determines that more than one AFD channel is outside the limits (also, marks YES on answer sheet). **</p> <p>Step was: Sat: _____ Unsat _____</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step.

ANSWER KEY

ANSWER KEY

RTP %	Upper AFD Limit	Lower AFD Limit	Indicated AFD		AFD Within Limits	
					Yes	No
			NI-41C	-27.2	[]	[x]
<u>65.8</u>	<u>+20.5</u>	<u>-25.0</u>	NI-42C	-23.9	[x]	[]
(65.8 – 65.803)	(20.0 – 21.0)	(-24.5 → -25.5)	NI-43C	-26.5	[]	[x]
			NI-44C	-26.8	[]	[x]

Do more than one excore channel exceed AFD Limits?

[x] YES [] NO

EXAMINEE CUE SHEET / ANSWER SHEET**Initial Conditions:** Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

<u>RTP</u> %	Upper AFD Limit	Lower AFD Limit	Indicated AFD		AFD Within Limits	
					Yes	No
			NI-41C		[]	[]
_____	_____	_____	NI-42C		[]	[]
			NI-43C		[]	[]
			NI-44C		[]	[]

Do more than one excore channel exceed AFD Limits?

☐ YES ☐ NO

EXAMINEE CUE SHEET / ANSWER SHEET

PACIFIC GAS AND ELECTRIC COMPANY
 DIABLO CANYON POWER PLANT

NUMBER	COLR 2
REVISION	6
PAGE	13 OF 13
UNIT	2

TITLE: COLR for Diablo Canyon Unit 2

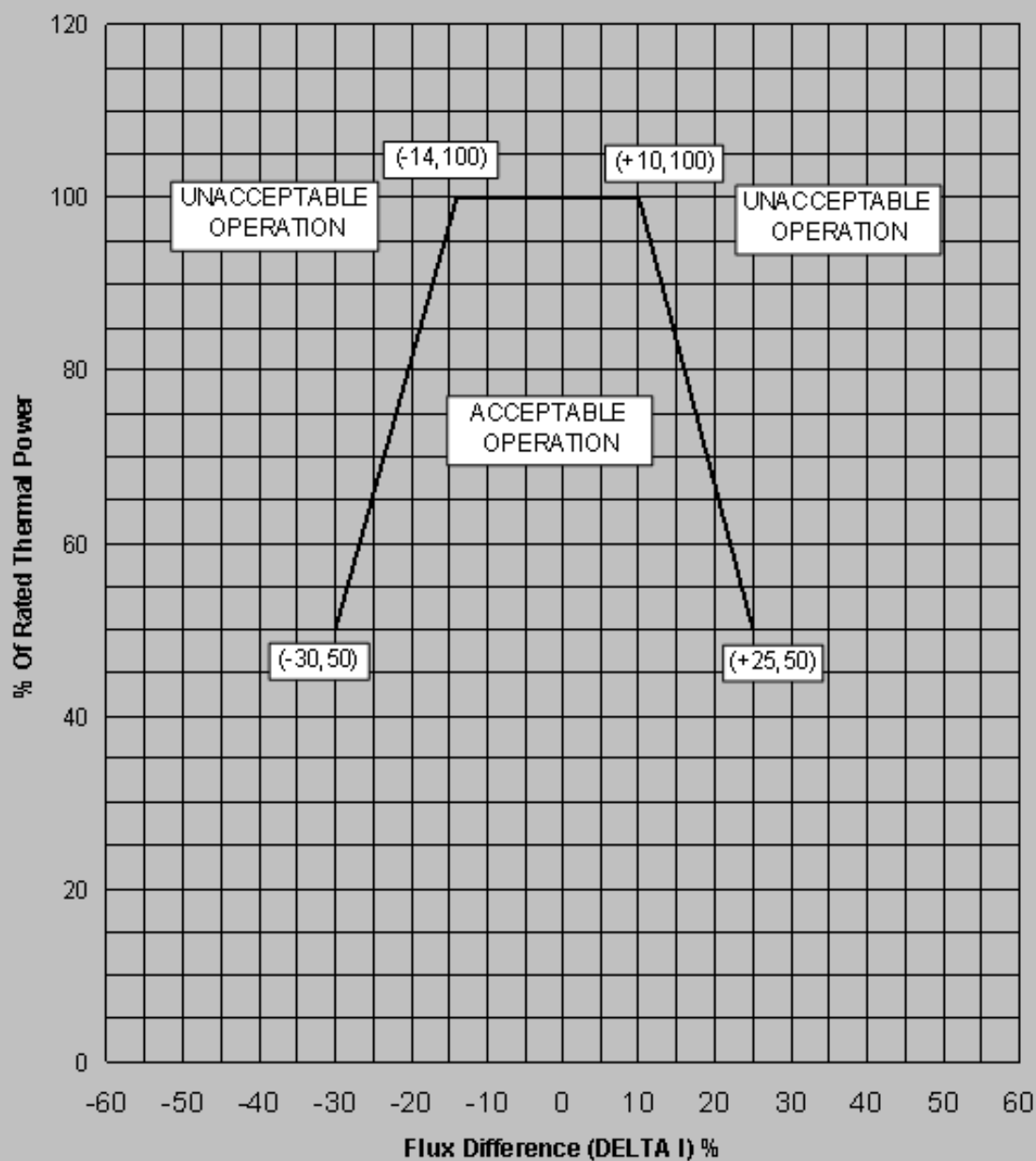
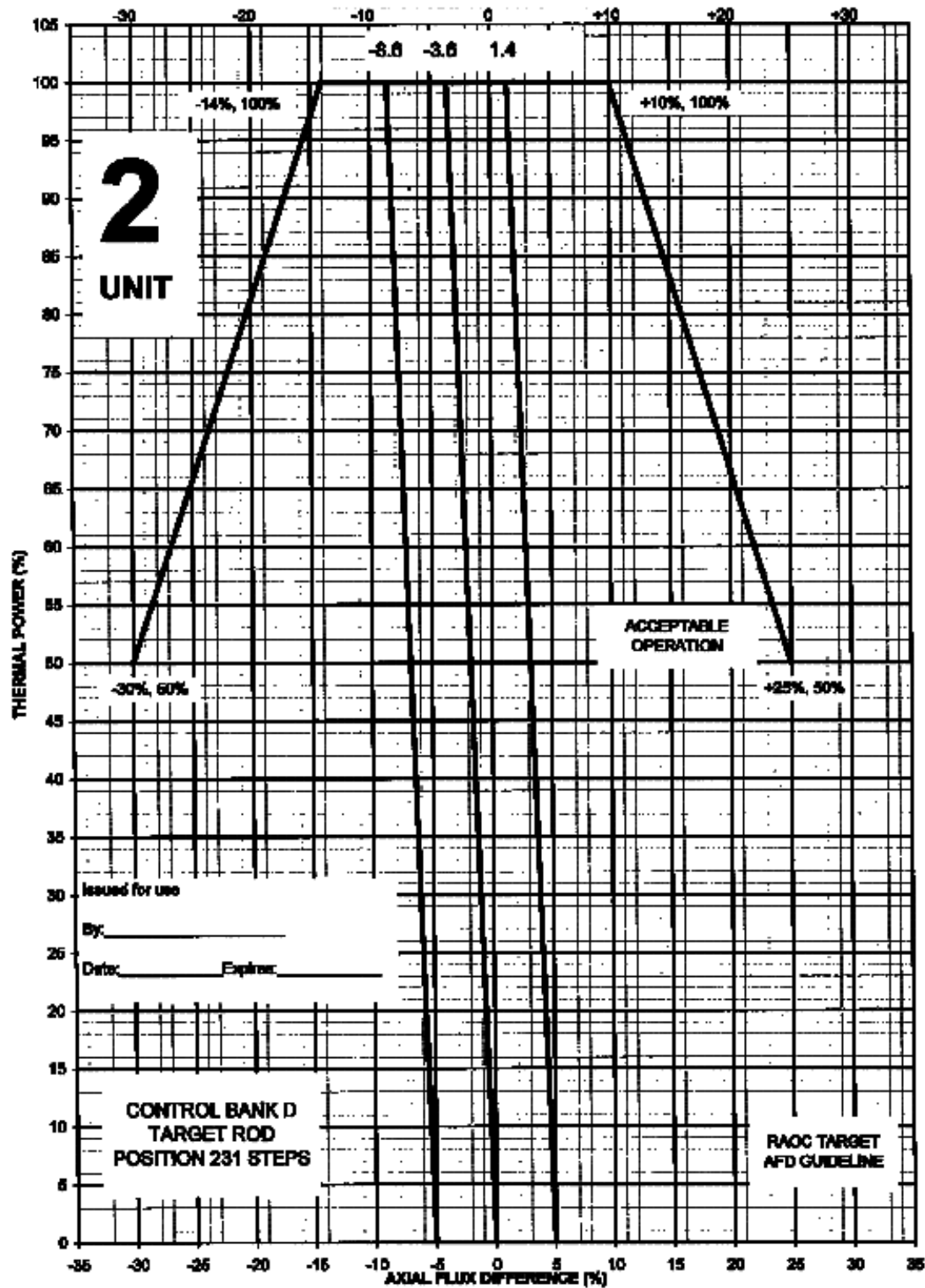


Figure 2: AFD Limits as a Function of Rated Thermal Power

EXAMINEE CUE SHEET / ANSWER SHEET

DIABLO CANYON POWER PLANT
FIGURE R23-2F-1
DATA FOR STP I-1CR-23
UNIT 2 CYCLE 17 RAOC LIMITS

392 EFPD



PAGE ID-13a

REVISION 280

DATE 7/12/12

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-A4

Title: CALCULATE MAXIMUM STAY TIME

Examinee: _____

Evaluator: _____

Date _____

Testing Method: Perform X Simulate

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from L081NRCADM04 & L061NRCADM04.)

Note: This is an admin JPM (RO), intended for the classroom setting.

References: RP1.ID6, Personnel Dose Limits and Monitoring Requirements, Rev 10B

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: 15 minutes (average validation time ____ min)

Critical Steps: 3, 4

Job Designation: RO

Rev Comments/TIPs: Minor changes following validation

DCPP Task # / Rating: GET RWTLIMIT06 N/A

Gen KA # / Rating: GEN 2.3.4, Radiation Control 3.2

AUTHOR: JOHN F. BUCKLEY DATE:

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Required Materials:

- RP1.ID6, Personnel Dose Limits and Monitoring Requirements, Rev 10B
- calculator

Initial Conditions: Given:

- The Work Control Shift Foreman (WCSFM) and Work Control Lead (WCL) have assigned you to hang an outage clearance in two locations, which are both in a High Radiation Area.
 - The first portion of the clearance is in an area where the dose rate is 150 mr/hr, and the work there will take 30 minutes.
 - The second portion of the clearance is in an area where the dose rate is 325 mr/hr; it is not known how long this work will take.
- Your current year exposure history (per NRC Form 4) is as follows:
 - Deep Dose Equivalent (DDE) = 873 mrem
 - Committed Dose Equivalent (CDE) = 25 mrem
 - Committed Effective Dose Equivalent (CEDE) = 187 mrem
 - Lens Dose Equivalent (LDE) = 18 mrem
 - Shallow Dose Equivalent (SDE) = 555 mrem
 - Effective Dose Equivalent (EDE) = 1111 mrem

Initiating Cue: The WCSFM has directed you to determine the maximum time you can stay in High Radiation Area above, to complete the 2nd portion of the clearance (once you have completed the first portion of the clearance), and still remain within DCPD administrative dose guidelines for Total Effective Dose Equivalent (TEDE, whole body) dose.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Determines maximum stay time to be 1.93 hrs (1.9 – 1.93 hrs, or 114 – 116 minutes)

Start Time: _____

Step	Standards
1. Determines current TEDE.	Note: TEDE = EDE + CEDE. Steps preceding step 3.2 may be performed in any order.
	1.1 Determines current TEDE by adding the EDE (1111 mrem) to the CEDE (187 mrem) = 1298 mrem .
	Step was: Sat: _____ Unsat _____
2. Determines dose required to complete 1 st portion of clearance.	Note: Dose Rate x Stay Time = Dose used for 1 st portion of clearance.
	2.1 Multiplies dose rate (150 mrem/hr) time stay time (1/2 hour) = 75 mrem used for 1 st portion of clearance.
	Step was: Sat: _____ Unsat _____
** 3. Determines dose margin allowed for 2 nd portion of clearance.	Note: All guidelines and limits can be found in RP1.ID6.
	3.1 Determines administrative guideline is 2000 mrem for the year.
	3.2 Determines dose margin for 2 nd portion of clearance by subtracting current annual dose (1298 mrem) and dose for 1 st portion of clearance (75 mrem) from dose limit (2000 mrem); $2000 - (1298 + 75) =$ 627 mrem margin (for job). **
	Step was: Sat: _____ Unsat _____

** Denotes a Critical Step.

Step	Standards
** 4. Determines maximum stay time (for 2 nd portion of clearance).	4.1 Stay Time = Margin / Dose Rate 4.2 Stay Time = 627 mrem / 325 mrem/hr.. 4.3 Stay Time = 1.93 hrs (allowable range is 1.9 – 1.93 hrs, or 114-116 minutes) ** Step was: Sat: _____ Unsat _____

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step.

EXAMINEE CUE SHEET**Initial Conditions:** Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
 - Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

ANSWER (Stay Time) =

Work Area (use back of sheet as needed)

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-A5

Title: DETERMINE IF ROD INSERTION LIMIT (RIL) HAS BEEN EXCEEDED

Examinee: _____

Evaluator: _____

Date _____

Testing Method: Perform X Simulate

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from L061Audit ADMRO1)

Note: This is an admin JPM (SRO), intended for the classroom setting.

References: U-1 & U-2 Technical Specifications
U-2 COLR, Core Operating Limits Report, Rev 6
U-2 STP I-1A, Routine Shift Checks Required by Licenses, Rev 121

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: 10 minutes (average validation time min)

Critical Steps: 2, 3, 4

Job Designation: SRO

Rev Comments/TIPs: Rev 1: minor corrections following Ops Rep review

DCPP Task # / Rating: 796200 / 910400 NA / 4.7

Gen KA # / Rating: GEN 2.1.25, Conduct of Operations 4.2

AUTHOR: JOHN F. BUCKLEY DATE:

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Required Materials:

- U-2 STP I-1A, Routine Shift Checks Required by Licenses, Rev 121 (partial, with step 11, is adequate)
- U-2 COLR, Core Operating Limits Report, Rev 6 (partial, with RIL page, is adequate); Figure 1

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue: The U-2 Shift Foreman (SFM) has directed you as the Work Control Shift Foreman (WCSFM) to use the COLR to independently determine if control banks are above the Rod Insertion Limit (RIL); also, note any Tech Specs action statements that are applicable (if any). Write your results on this Cue / Answer Sheet.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Control Bank positions are compared with the RIL, and it is determined that CBC and CBD are NOT meeting RIL requirements (see answer key for details), and that TS Action 3.1.6.A is applicable (see answer key).

Start Time: _____

Step	Standards
1. Operator obtains correct procedures.	<u>Note:</u> Provide access to Technical Specifications, and the U-2 COLR (partial OK), if not already provided.
	1.1 Operator obtains Technical Specifications (may do this later).
	1.2 Operator obtains COLR for Diablo Canyon Unit 2, Figure 1.
	Step was: Sat: _____ Unsat _____

** Denotes a Critical Step.

Step	Standards
** 2. Determines Rod Insertion Limits (RILs) for the current power level.	2.1 Determines present power level to be U4300A05/A15 reading (25%). 2.2 Determines Insertion limit for current power level for CBD is 25 (± 3) steps.** 2.3 Determines Insertion limit for current power level for CBC is 152 (± 3) steps.** Step was: Sat: _____ Unsat _____
** 3. Determines if RIL limits are met.	3.1 Compares CBD RIL with current bank position, and determines RIL limit NOT met. ** 3.2 Compares CBC RIL with current bank position, and determines RIL limit NOT met. ** ***** Cue: (if examinee attempts to notify the SFM (proctor), just tell them to document their results on the answer sheet. ***** Step was: Sat: _____ Unsat _____

** Denotes a Critical Step.

INSTRUCTOR WORKSHEET

Step		Standards	
**	4. Determines Tech Spec Applicability.	4.1	Notes that not meeting the RIL constitutes a failure to meet Tech Spec LCO 3.1.6.
		4.2	Determines that Tech Spec Action Statement 3.1.6.A is applicable to this condition (and notes on answer sheet). **
		Step was: Sat: _____ Unsat _____	

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step.

ANSWER KEY

<u>ANSWER KEY</u>		
Control Bank	RIL (from COLR)	Is Control Bank Above the Rod Insertion Limit (RIL)?
CBA	N/A (ARO)	[X] YES [] NO
CBB	N/A (ARO)	[X] YES [] NO
CBC	152 ± 3 steps	[] YES [X] NO
CBD	25 ± 3 steps	[] YES [X] NO
Tech Spec Actions applicable (if any)	TS Action 3.1.6.A (may also spell out actions, as shown below, but this is not required)	

3.1.6 Control Bank Insertion Limits

LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank insertion limits not met.	A.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Restore control bank(s) to within limits.	2 hours

EXAMINEE CUE SHEET / ANSWER SHEET**Initial Conditions:** Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

<u>ANSWER SHEET</u>		
Control Bank	RIL (from COLR)	Is Control Bank Above the Rod Insertion Limit (RIL)?
CBA	N/A (ARO)	[] YES [] NO
CBB	N/A (ARO)	[] YES [] NO
CBC		[] YES [] NO
CBD		[] YES [] NO
Tech Spec Actions applicable (if any)		

EXAMINEE CUE SHEET / ANSWER SHEET

PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT

NUMBER COLR 2
REVISION 6
PAGE 12 OF 13
UNIT 2

TITLE: COLR for Diablo Canyon Unit 2

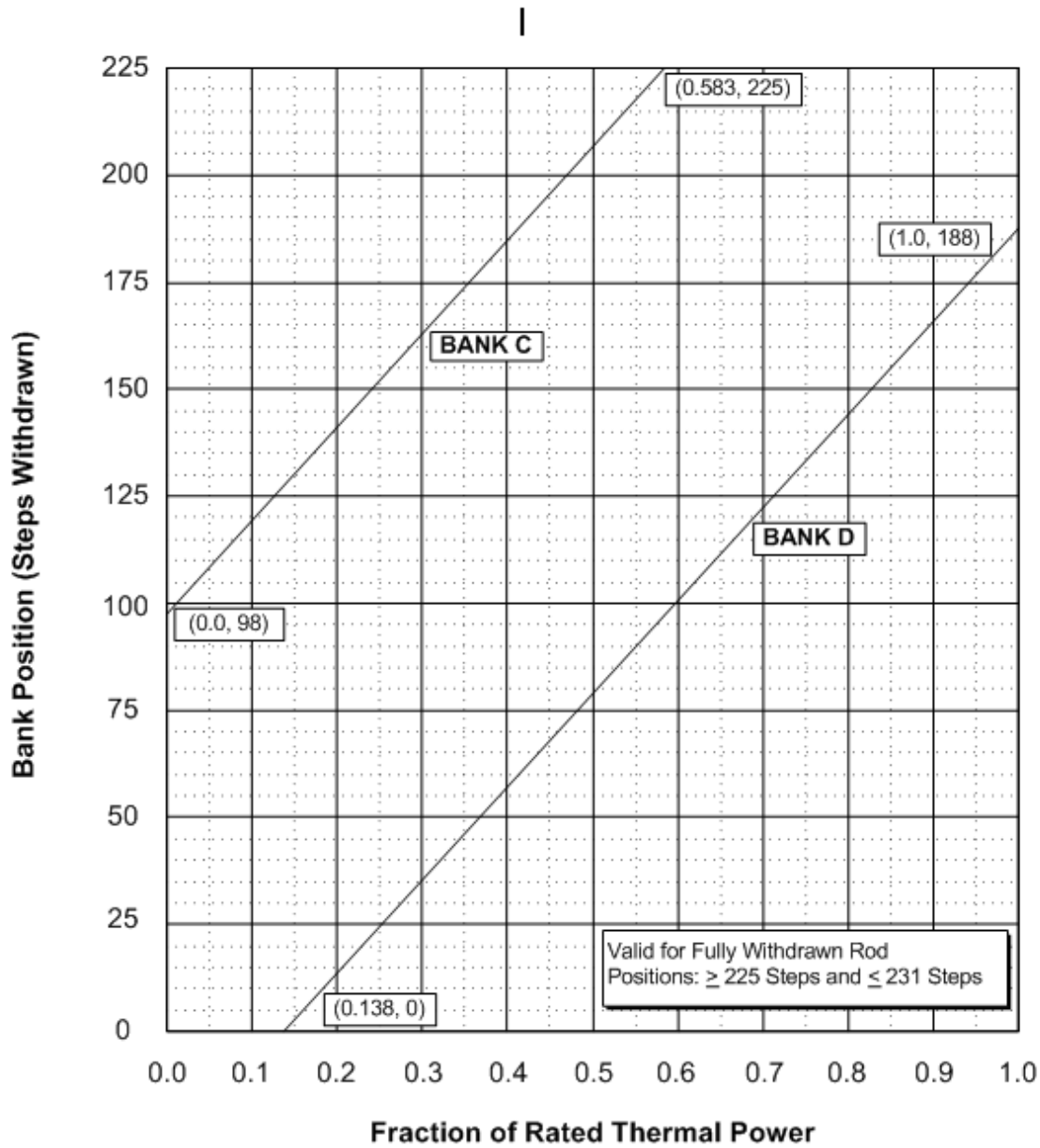


Figure 1: Control Bank Insertion Limits Versus Rated Thermal Power

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-A6

Title: APPROVE MOVEMENT OF SPENT FUEL ASSEMBLIES

Examinee: _____

Evaluator: _____

Date _____

Testing Method: Perform X Simulate

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from L061NRC/L061CAudit ADM06 and LJACO-14S)

Note: This is an admin JPM (SRO), intended for the classroom setting.

References: OP B-8DS3, Insert Shuffle Within the Spent Fuel Pool, Rev. 26 (not needed as handout for JPM)

Tech Spec 3.7.17, Spent Fuel Assembly Storage

Alternate Path: Yes _____ No X

Time Critical:

Time Allotment: 15 minutes (average validation time ____ min)

Critical Steps: 2, 3, 4, 5

Job Designation: SRO

Rev Comments/TIPs: Rev 1: minor corrections following Ops Rep review

DCPP Task # / Rating: 816600 / 356800 4.1 / 2.6

Gen KA # / Rating:	GEN 2.1.37, Conduct of Operations	4.6
---------------------------	-----------------------------------	-----

AUTHOR: JOHN F. BUCKLEY DATE:

Directions: No plant controls or equipment are to be operated during the performance of this Job Performance Measure. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Required Materials: U1/U2 Technical Specifications (may give just TS 3.7.17 if not enough full volumes to go around)

Initial Conditions: Given:

- Unit One is at 100% power.
- Reactor Engineering is planning to move spent fuel assemblies from "All Cell Configuration" areas to the "B" locations in "2 x 2 Array Configuration" areas.

Initiating Cue: You are the SRO assigned to review the proposed changes (shown below). Review each change and determine if the proposed move should be allowed or dis-allowed, based on the conditions given for each assembly. Document your evaluations below, on this cue/answer sheet.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Determines if each move should be allowed (see Answer Key).

Start Time: _____

Step	Standards
1. References correct Technical Specification and figures.	<p><u>Note:</u> for a move to the "B" location in a 2 x 2 Array, Figures 3.7.17-1 and 3.7.17-3 should be used.</p> <p>1.1 References Tech Spec 3.7.17, Spent Fuel Assembly Storage.</p> <p>1.2 References Figure 3.7.17-1 to determine what limits apply to the "B" location in a 2 x 2 Array (ie, comply with figure 3.7.17-3 for 2 x 2 Array).</p> <p>Step was: Sat: _____ Unsat _____</p>
** 2. Determine if Element AE-22 can be placed in a "B" location for a 2 x 2 Array Storage Location.	<p>2.1 Compares burnup on fuel cell AE-22 with Figure 3.7.17-3.</p> <p>2.2 Determines that fuel move is ALLOWABLE. **</p> <p>Step was: Sat: _____ Unsat _____</p>
** 3. Determine if Element AA-01 can be placed in a "B" location for a 2 x 2 Array Storage Location.	<p>3.1 Compares burnup on fuel cell AA-01 with Figure 3.7.17-3.</p> <p>3.2 Determines that fuel move is ALLOWABLE. **</p> <p>Step was: Sat: _____ Unsat _____</p>
** 4. Determine if Element AG-11 can be placed in a "B" location for a 2 x 2 Array Storage Location.	<p>4.1 Compares burnup on fuel cell AG-11 with Figure 3.7.17-3.</p> <p>4.2 Determines that fuel move is NOT ALLOWABLE. **</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step.

Step		Standards	
**	5. Determine if Element AD-33 can be placed in a "B" location for a 2 x 2 Array Storage Location.	5.1	Compares burnup on fuel cell AD-33 with Figure 3.7.17-3.
		5.2	Determines that fuel move is NOT ALLOWABLE. **
		Step was: Sat: _____ Unsat _____	

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

**** Denotes a Critical Step.**

ANSWER KEY

ANSWER KEY

Element	Initial Enrichment (wt% U-235)	Discharge Burnup (MWD/MTU)	Allow or Dis-allow
AE-22	3.25	34,106	Allow [X] Dis-allow []
AA-01	3.5	36,503	Allow [X] Dis-allow []
AG-11	3.75	36,117	Allow [] Dis-allow [X]
AD-33	4.00	39,433	Allow [] Dis-allow [X]

Note: Figure with plotted (approximate) locations is on next page (for examiner information only).

ANSWER KEY

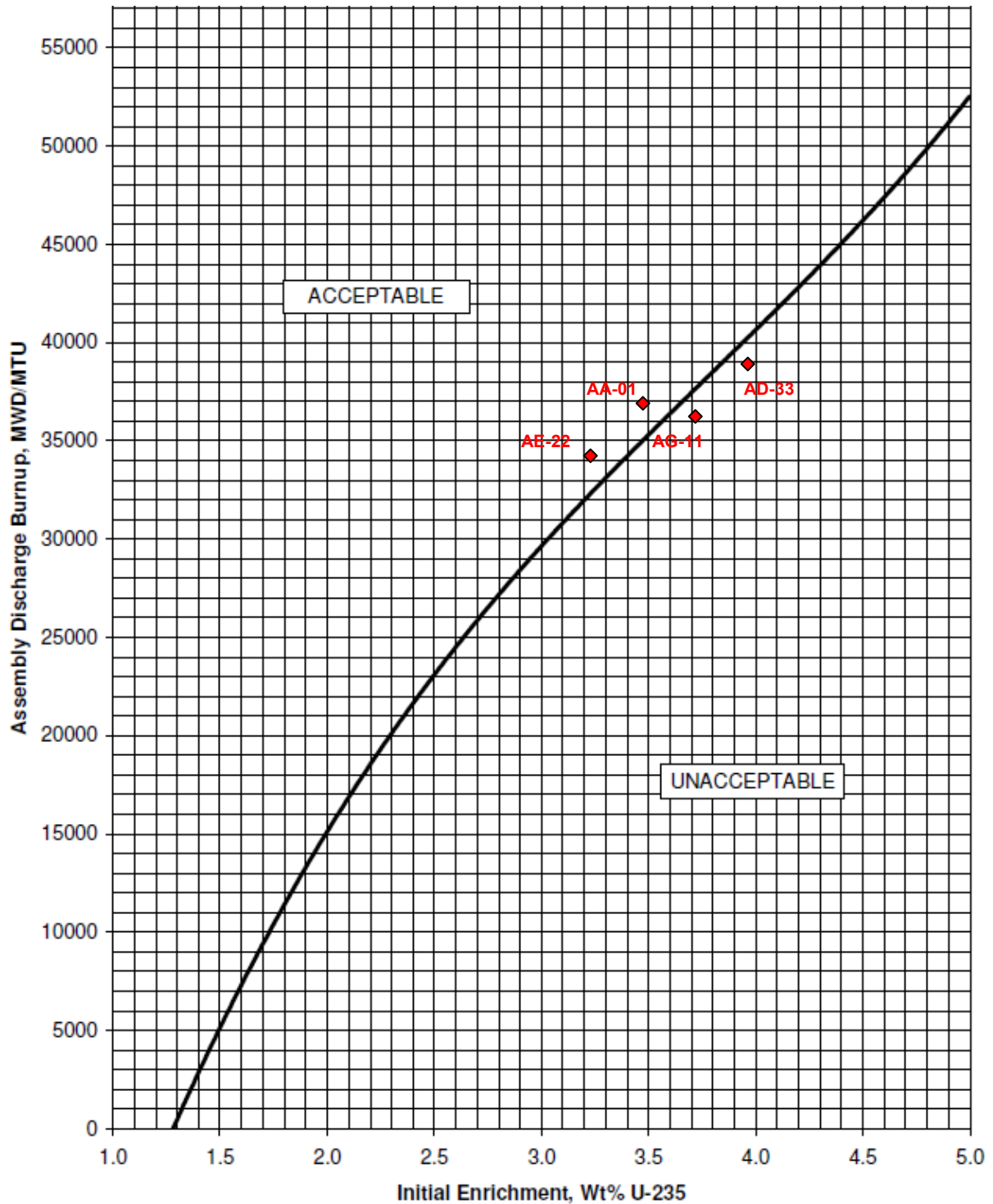


FIGURE 3.7.17-3

EXAMINEE CUE SHEET / ANSWER SHEET**Initial Conditions:** Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Fuel Assembly	Initial Enrichment (wt% U-235)	Discharge Burnup (MWD/MTU)	Allow or Dis-allow
AE-22	3.25	34,106	Allow [] Dis-allow []
AA-01	3.5	36,503	Allow [] Dis-allow []
AG-11	3.75	36,117	Allow [] Dis-allow []
AD-33	4.00	39,433	Allow [] Dis-allow []

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-S1

Title: RESPOND TO HIGH ACCUMULATOR PRESSURE

Examinee: _____

Evaluator: _____

Date

Testing Method: Perform X Simulate

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (from LJC-009)

Note: This JPM is designed to be performed in // with the S2 JPM.

References: U-1 AR PK02-05, ACCUM PRESSURE HI-LO, Rev. 18A
U-1 OP B-3B:I, Accumulator Fill and Pressurize, Rev. 27B

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: 25 minutes (average validation time min) (OCT ave time 13.7 min)

Critical Steps: 5, 6, 7, 8, 9

Job Designation: RO/SRO

Rev Comments/TIPs: Rev 1: corrected typos, minor updates

DCPP Task # / Rating: 327600 3.1

AUTHOR: GARY HUTCHISON DATE:

Gen KA # / Rating: 006.A1.13

3.5 / 3.7

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The student will be given the initial conditions and initiating cue. The task standard will NOT be read to the student. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the step with which to begin.

Required Materials: None

Initial Conditions: Given:

- Unit 1 is at 100% power.
- PK02-05 is in alarm .

Initiating Cue: The Shift Foreman directs you to respond to the alarm, and take necessary action to return accumulator parameters to normal in accordance with AR PK02-05 and other applicable procedure(s), as required.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Alarm is cleared and the lineup returned to normal in accordance with AR PK02-05 and OP B-3B:I.

Start Time: _____

Step	Standards
1. Obtain the correct procedure.	1.1 References AR PK02-05. Step was: Sat: _____ Unsat _____
2. Verify abnormal condition exists.	2.1 Reads NOTE prior to step 2.1.1. 2.2 Checks PI-960 and PI-961 to verify alarm is not due to instrument failure. (can be checked on VB-1, or on the PPC) 2.3 Reads step 2.1.2 that refers to Tech Specs. (give cue below) ***** Cue: The SFM is addressing all Technical Specification requirements at this time. ***** 2.4 Checks Annunciator PK02-10 “ACCUM LEVEL HI-LO” CLEAR 2.5 Determines the alarm condition is accumulator 11 high pressure and transitions to Section 2.2 “High Pressure” Step was: Sat: _____ Unsat _____
3. Determine High Accumulator 11 Pressure is NOT due to Level increase (step 2.2.1, first line)	3.1 Determines level is normal and pressure is high from previous step, and goes on to next step (2.2.2). Step was: Sat: _____ Unsat _____
4. Transition to OP B-3B:I “Accumulators – Fill and Pressurize” (per step 2.2.2 of PK02-05)	4.1 Implements OP B-3B:I, step 6.4 (may review applicable P&Ls prior to continuing with section 6.4).

** Denotes Critical Step and Sub Steps.

Step was: Sat: _____ Unsat: _____

** Denotes Critical Step and Sub Steps.

Step	Standards
** 5. Close valve SI-1-8880, accumulator nitrogen fill header isolation.	5.1 Positions valve control switch for SI-1-8880 to CLOSE. ** Step was: Sat: _____ Unsat _____
** 6. Open valve SI-1-8875A, accumulator 11 fill and vent isolation.	6.1 Reviews CAUTION prior to opening valve. 6.2 Positions valve control switch for SI-1-8875A to OPEN. ** Step was: Sat: _____ Unsat _____
** 7. Slowly OPEN HCV-943, nitrogen header vent valve, to vent accumulator.	7.1 Reviews CAUTION prior to opening valve. 7.2 Manipulates (rotates partially CW) potentiometer to OPEN valve HCV-943 until accumulator 1-1 pressure decreases to approximately 625 psig and PK02-05 CLEARS (critical substep met if high pressure alarm cleared). ** <u>NOTE:</u> Examinee may close HCV-943 first (prior to closing 8875A); closing either valve in time to prevent a low pressure alarm is the intent. Step was: Sat: _____ Unsat _____
** 8. Close valve SI-1-8875A, accumulator 11 fill and vent isolation.	8.1 Positions valve control switch for SI-1-8875A to CLOSE. ** Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

Step	Standards
** 9. CLOSE HCV-943, nitrogen header vent valve.	<u>NOTE:</u> This action may have been completed on earlier step. 9.1 Manipulates (rotates fully CCW) the potentiometer to CLOSE valve HCV-943. ** Step was: Sat: _____ Unsat _____
10. Open valve SI-1-8880, accumulator nitrogen fill header isolation.	10.1 Positions valve control switch for SI-1-8880 to OPEN. Step was: Sat: _____ Unsat _____
11. Monitor accumulator pressure.	11.1 Determines no other accumulators need to be vented. 11.2 Verifies that PK02-05 is no longer in alarm (may have done this when venting). 11.3 Reads NOTE prior to step 2.2.3. 11.4 Continue to monitor accumulator pressure. ***** <u>Cue:</u> Pressure has remained constant for 20 minutes. ***** <u>Cue:</u> The SFM will have other operators continue monitoring accumulator pressure and any required troubleshooting. ***** Step was: Sat: _____ Unsat _____

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

** Denotes Critical Step and Sub Steps.

- ☐ Initialize the simulator to IC-510 (100%, MOL).
- ☐ Enter drill file 1009 or manually insert the following:

Command	Description
1. delm psisacc (1)	Removes point from monitor screen
2. monv psisacc (1)	Monitors accumulator 11 pressure
3. set psisacc (1) = 665	Increases accumulator 11 pressure to 650 psig
4. run 10	

- ☐ Inform the examiner that the simulator setup is complete.
- ☐ Go to RUN when the examinee is given the cue sheet.

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-S2

Title: PARALLEL DG 1-2 TO STARTUP POWER

Examinee: _____

Evaluator: _____
Print Signature Date

Testing Method: Perform X Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from LJC-087)

Note: This JPM is designed to be performed in // with the S1 JPM.

References: OP J-6B:V, Diesel Generator 12, Manual Operations, Rev. 31

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: 20 minutes (average validation time ____ min)

Critical Steps: 3, 5, 7, 8, 9

Job Designation: RO/SRO

Rev Comments/TIPs: Minor updates following validation

DCPP Task # / Rating: 941200 4.0

Gen KA # / Rating: 064.A4.06 3.9 / 3.9

AUTHOR: _____ **JOHN F. BUCKLEY** _____ **DATE:** _____

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. If the task is being done in the plant or lab, and after identifying the appropriate procedure for the task, the examinee may be given the procedure and told what step to begin the task at.

Required Materials: None – a partial OP J-6B:V may be provided if available (otherwise, provide the entire procedure)

Initial Conditions: Given:

- Unit 1 is at 100%.
- Diesel Generator 1-2 is supplying 4kV bus G in the Auto Mode.
- Both Auxiliary and Startup power are available, and stable.

Initiating Cue: You are directed by the Shift Foreman to parallel Diesel Generator 1-2 with Startup power, per OP J-6B:V, section 6.4.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: DG 1-2 is paralleled to Startup power, in accordance with OP J-6B:V, section 6.4.

Start Time: _____

Step	Standards
1. Obtain the correct procedure.	1.1 References OP J-6B:V, Step 6.4. Step was: Sat: _____ Unsat _____
2. Check auxiliary power available.	2.1 Reads NOTE 2.2 Checks breaker 52-HG-14 available. 2.3 Checks white potential light ON. Step was: Sat: _____ Unsat _____
** 3. Prepare the diesel generator for parallel to aux power.	3.1 Reads CAUTION. 3.2 Places Mode Selector Switch to MANUAL. ** 3.3 Adjusts Man Speed Control switch to obtain frequency of 60 Hz, as necessary. 3.4 Places Bus G Xfer to S/U PWR C/O switch to CUT-OUT. ** 3.5 Verifies that Bus G Auto Xfer indicating light (blue light) is off. 3.6 Verifies generator protective relays CUT-IN. Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

Step	Standards
4. Verify 4kV bus G at 60 Hz.	4.1 Verifies 60 Hz indicated on Bus G frequency indication. 4.2 Adjusts Man Speed Control switch to obtain 60 Hz, as necessary. Step was: Sat: _____ Unsat _____
** 5. Cuts in the Startup Feeder Sync Switch (52-HG-14).	5.1 Inserts Sync key into Startup Feeder Breaker switch. ** 5.2 Turns key to ON position. ** Step was: Sat: _____ Unsat _____
6. Verify proper operation of the Synchroscope.	<u>NOTE:</u> If the sync scope is not moving, the examinee may "bump" the speed control to check the following. 6.1 Observes light out at the 12 o'clock position. 6.2 Observes lights full bright at 6 o'clock position. Step was: Sat: _____ Unsat _____
** 7. Adjust diesel generator 12 speed.	7.1 Adjusts Man Speed Control switch to obtain synchroscope turning slowly in the counterclockwise (SLOW) direction. ** <u>NOTE:</u> This is identified as NORMAL in the procedure. Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

Step	Standards
** 8. Adjust diesel generator voltage.	8.1 Adjusts Man/Auto Volt Control switch to match diesel voltage, w/in 2 volts, to the incoming auxiliary power voltage, as necessary.** Step was: Sat: _____ Unsat _____
** 9. Close Startup Feeder Bkr. (52-HG-14) to parallel the DG to startup power.	9.1 When Synchroscope is slightly before 12 o'clock (counter clockwise direction), CLOSES 52-HG-14. ** 9.2 Verifies breaker 52-HG-14 is closed. 9.3 Observes VARS-OUT. 9.4 Turns S/U FDR SYNC SW OFF. ***** Cue: Another operator will monitor DG 1-2 operation, and separate/secure the diesel once parallel operations are completed. ***** Step was: Sat: _____ Unsat _____

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

- ☐ Initialize the simulator to IC-510 (100%, MOL).
- ☐ There is no drill for this JPM
- ☐ Go to RUN on the simulator.
- ☐ Perform the following:
 1. Place diesel generator 12 Mode Select switch in MANUAL.
 2. Start diesel generator 12.
 3. Parallel to bus G and pick up 0.5 MW Load.
 4. Open Aux Transformer Breaker for bus G.
 5. Place diesel generator 12 Mode Select switch in AUTO.
 6. CUT-IN protective relays.
- ☐ Go to FREEZE on the simulator.
- ☐ Inform the examiner that the simulator setup is complete.
- ☐ Go to RUN when the examinee is given the cue sheet.

EXAMINEE CUE SHEET

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-S3

Title: ESTABLISH EMERGENCY BORATION

Examinee: _____

Evaluator: _____

Print Signature Date

Testing Method: Perform X Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from LJC-063)

**Note: This JPM is designed to be performed in series with the S4 JPM.
(both JPMs relatively short, and similar setups; do S3 first, then S4)**

References: OP AP-6, Emergency Boration, Rev. 19

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: 15 minutes (average validation time ____ min)

Critical Steps: 3, 4, 6, 7

Job Designation: RO/SRO

Rev Comments/TIPs: Rev 1: corrected typos and one repeated substep on step 4

DCPP Task # / Rating: 64200 4.1

Gen KA # / Rating: 024.AA1.03 3.5 / 3.3

AUTHOR: _____ JOHN F. BUCKLEY _____ DATE: _____

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. If the task is being done in the plant or lab, and after identifying the appropriate procedure for the task, the examinee may be given the procedure and told what step to begin the task at.

Required Materials: None.

Initial Conditions: Given:

- Unit 1 tripped from low power about 10 minutes ago.
- The plant is now stable in MODE 3, and is proceeding through EOP E-0.1, Reactor Trip Response.
- (3) control rods did not fully insert during the reactor trip response.
- The crew is currently at step 3 of EOP E-0.1, and implementation of OP AP-6, Emergency Boration, is required due to the stuck rods.

Initiating Cue: The Shift Foreman directs you to commence emergency borate in accordance with OP AP-6, Emergency Boration, while the crew continues with EOP E-0.1.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Emergency boration has been established from the CVCS makeup controller, per OP AP-6 (≥ 30 gpm flow rate, and target of ≥ 2700 gallons of boric acid). Completion of the boration is NOT required.

Start Time: _____

Step	Standards
1. Obtain the correct procedure.	1.1 References OP AP-6. 1.2 Reads NOTES prior to Step 1. Step was: Sat: _____ Unsat _____
2. Verifies charging in service.	2.1 Verifies charging in service (using one or more of the following): <ul style="list-style-type: none"> • Traces charging lineup on VB-2 • Notes normal charging flow on CC2 (charging flow meter) Step was: Sat: _____ Unsat _____
** 3. Places VCT makeup control in BORATE mode.	3.1 PRESSES STOP on makeup controller. ** 3.2 Notes "AUTO-STOPPED" and change in screen color, confirming that auto makeup has stopped. 3.3 PRESSES BORATE on makeup controller. ** 3.4 Notes "BORATE" mode lights up, and/or "BORATE STOPPED" at top of screen (screen options also change). Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

Step	Standards
** 4. Sets TARGET BATCH for emergency boration.	<p>4.1 Determines amount of boric acid required per Appendix A, item #2: (3 stuck rods) x (900 galllons boric acid per rod) = 2700 gallons boric acid. **</p> <p>4.2 Determines amount of boric acid required per Appendix A.</p> <p>4.3 PRESSES TARGET BATCH window (pop-up window appears). **</p> <p>4.4 ENTERS "2700" in pop-up window, and PRESSES ENTER. **</p> <p>4.5 Verifies "2700" in "TARGET BATCH" window.</p> <p>Step was: Sat: _____ Unsat _____</p>
5. Resets BATCHED GALLONS.	<p><u>NOTE:</u> The BATCHED GALLONS is normally at zero (as in this case), and verifying (or resetting) are both adequate for this step.</p> <p>5.1 May PRESS BATCHED gallons window, and notes pop-up window.</p> <p>5.2 May PRESS RESET on pop-up window (window disappears).</p> <p>5.3 Verifies "0.0" in BATCHED GALLONS window.</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
** 6. Sets BORIC ACID FLOW SP.	6.1 PRESSES BORIC ACID FLOW SP window . ** (and notes pop-up window).
	<u>NOTE:</u> Normally, a number between 30 and 35 or so will be entered (higher numbers aren't achievable).
	6.2 ENTERS a number ≥ 30 , and presses ENTER. ** (pop-up disappears)
	6.3 Verifies \geq "30.0" in BORIC ACID FLOW SP window.
	Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

Step	Standards
** 7. Commences Emergency Boration.	<p>7.1 Presses START to start emergency boration. **</p> <p>7.2 Notes one or more of the following, indicating that boration has started:</p> <ul style="list-style-type: none"> • Screen color change • BORATE BATCHING at top of screen • BATCHED GALLONS and BORIC ACID FLOW windows both counting / coming up to flow rate <p>7.3 Verifies boric acid flow rate is ≥ 30 gpm (M/U controller/CC2 flow recorder/VB2 meter).</p>
	<p><u>NOTE:</u> Completion of the entire emergency boration is not required for this task. Once the examiner has completed his/her observations of the proper start of the emergency boration, the JPM may be ended with the following cue.</p>
	<p>*****</p> <p>Cue: Another operator will monitor and complete this emergency boration.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____ *</p> <p>[] Comment # (required for Unsat)</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

- ☐ Initialize the simulator to IC-514 (HSB, 550°F, MOL).
- ☐ This JPM is meant to be performed in concert with JPM NRCL111-S4 (emergency control room evacuation). The two JPMs shall NOT be performed at the same time (too close in proximity, and need slightly different setups). They are short enough that they can (and should) be performed one after the other. This JPM should always be performed FIRST, and the S4 JPM done right after this JPM (after it's setup is complete).
- ☐ Enter drill file 9201, or manually insert the following:

Command	Description
ovr xv3i224c act,1,0,0,d,10	Starts CB Pp set 1-2 (for S4 JPM)
mal rod4a act 2,j11,0,d,0 mal rod4b act 2,g5,0,d,0 mal rod4c act 2,l7,0,d,0	Sticks 3 rods (j11,G5,L7) for emergency boration task
ovr xc1i072t act,1,0,5,d,2	Trips reactor to set up HSB and E-0.1 conditions needed for task
run 15	Runs for 15 sec.
anack	Acknowledges alarms

- ☐ Inform the examiner that the simulator setup is complete.
- ☐ Go to RUN when the examinee is given the cue sheet.

EXAMINEE CUE SHEET

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number:	NRCL111-S4		
Title:	PERFORM CONTROL ROOM ACTIONS PRIOR TO EVACUATION		
Examinee:	<hr/>		
Evaluator:	<hr/>		
	Print	Signature	Date
Testing Method:	Perform <u> X </u>	Simulate <u> </u>	
Results:	Sat <u> </u>	Unsat <u> </u>	Total Time: <u> </u> minutes
Comments:	(from LJC-021)		

Note: This JPM is designed to be performed in series with the S3 JPM.
(both JPMs relatively short, and similar setups; do S3 first, then S4)

References:	U-1 OP AP-8A, Control Room Inaccessibility - Establishing Hot Stby, Rev. 30 OP1.ID2, TCOAs, Rev 4 (& TCOA database); TCOA item 63	
Alternate Path:	Yes _____	No <u> X </u>
Time Critical:	Yes _____	No <u> X </u>
Time Allotment:	15 minutes (average validated time ____ min) (OCT ave time 8.1 min)	
Critical Steps:	6, 7, 8, 9, 10, 11	
Job Designation:	RO/SRO	
Rev Comments/TIPS:	Rev 1: corrected typos, minor updates	
DCPP Task # / Rating:	805200	4.2
Gen KA # / Rating:	068.AA1.11/21	3.9 / 4.1 (for both)

AUTHOR: GARY HUTCHISON DATE:

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. If the task is being done in the plant or lab, and after identifying the appropriate procedure for the task, the examinee may be given the procedure and told what step to begin the task at.

Required Materials: None.

Initial Conditions: Given:

- Unit 1 was at low power, when a fire was reported in the Cable Spreading Room
- Unit 1 tripped, and is now stable in hot standby (HSB), with the crew working their way through EOP E-0.1.
- The Fire Brigade has responded to the fire.
- Smoke is now present in the Control Room, and the Shift Manager has directed that the Control Room be evacuated.
- Conditions in the control room are not yet extreme. "Immediate" evacuation is NOT required.

Initiating Cue: The Shift Foreman directs you to perform the actions required in OP AP-8A prior to evacuation of the control room.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: The Control Room actions for OP AP-8A have been performed.

Time Critical Operator Action (TCOA): This JPM was evaluated against TCOA # 63, "Trip RCPs W/I 10 minutes".
This TCOA:

- is not applicable to this JPM, because the RCPs are successfully tripped from the Control Room, and the TCOA is based on local tripping of the RCPs.

Start Time: _____

Step	Standards
1. Obtain the correct procedure.	1.1 References OP AP-8A. Step was: Sat: _____ Unsat _____
2. Verifies reactor trip.	2.1 Reads Note. 2.2 May trip reactor using the reactor trip switch (already done). 2.3 Checks reactor trip and bypass breakers open. 2.4 Checks rod bottom lights ON. 2.5 Checks reactor power decreasing. Step was: Sat: _____ Unsat _____
3. Determine immediate evacuation is not required.	3.1 Reads CAUTION. 3.2 Determines immediate evacuation is not required. ***** Cue: Immediate evacuation is not required. ***** Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

INSTRUCTOR WORKSHEET

Step	Standards
4. Verify turbine tripped.	4.1 Checks all 4 stop valves closed. Step was: Sat: _____ Unsat _____
** 5. Manually initiate a unit trip and verify bus transfers.	5.1 Trips the Unit using the unit trip switch.** 5.2 Verifies all 4kV and 12kV buses transfer to startup power. 5.3 Verifies all vital 4kV buses are energized. Step was: Sat: _____ Unsat _____
** 6. Manually close MSIVs and bypass valves.	6.1 Closes ALL MSIVs. ** 6.2 Verifies MSIVs are closed. 6.3 Checks all bypass valves closed. Step was: Sat: _____ Unsat _____
** 7. Transfer charging suction to the RWST.	7.1 Reads Note. 7.2 Opens 8805A OR 8805B (OK to open both). ** 7.3 Verifies valve(s) are open. <u>NOTE:</u> Step 7.4 is NOT critical if VCT pressure is less than 28 psig. 7.4 Closes LCV-112B or 112C. (OK to close both) ** 7.5 Verifies valve(s) closed. Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

INSTRUCTOR WORKSHEET

Step	Standards
** 8. Trip all reactor coolant pumps.	8.1 Trips ALL reactor coolant pumps. ** 8.2 Verifies pumps tripped. Step was: Sat: _____ Unsat _____
** 9. Isolates letdown	9.1 Verify CLOSED 8149A, 8149B. 9.2 CLOSES 8149C ** Step was: Sat: _____ Unsat _____
** 10. Resets 4kV Vital auto transfer relays.	10.1 Resets 4kV vital bus auto transfer relays. ** 10.2 Verifies relays reset. Step was: Sat: _____ Unsat _____
** 11. Shutdown all but one running condensate/booster pump sets.	11.1 Verifies MAN/AUTO selector switch in MAN for pump set(s) to be secured. 11.2 Stops all but one condensate/booster pump set. ** 11.3 Verifies pump(s) shutdown. Step was: Sat: _____ Unsat _____
12. Open or check open RCS hot leg and pressurizer liquid space sample valves.	12.1 Verifies open NSS-9356A and 9356B. 12.2 Verifies open NSS-9355A and 9355B. Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

Step	Standards
13. Collect equipment needed from the control room.	13.1 Collects the fire brigade, security key rings, and radios. ***** Cue: The Shift Foreman will transport the Fire Brigade, security key rings, and radios to the hot shutdown panel. ***** Step was: Sat: _____ Unsat _____

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

- ☐ This JPM is meant to be performed in concert with JPM NRCL111-S3 (emergency borate – normal means). The two JPMs shall NOT be performed at the same time (too close in proximity, and need slightly different setups). They are short enough that they can (and should) be performed one after the other. This JPM should always be performed AFTER the S3 JPM (and assumes the S3 setup has already been done).
- ☐ Verify NRC L111 S3 JPM setup complete, or S3 JPM completed (IC-514, and Drill 9201, if not doing the S3 JPM)
- ☐ Go to STOP on the makeup control system, and place it back in AUTO.
- ☐ Clear the (3) stuck rod malfunctions (from S3 JPM) (mal rod4a, 4b 4c clr)
- ☐ Activate cardox alarm for CSR: loa fir1 act,1,0,0,d,0
- ☐ Acknowledge alarms.
- ☐ **NOTE: an IC can be created at this point, to shorten setups for multiple JPMs, if desired**
- ☐ Go to FRZ, and inform the examiner that the setup is complete.
- ☐ Go to RUN when the examinee is given the cue sheet.

EXAMINEE CUE SHEET

Initial Conditions:

Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-S5

Title: TERMINATE HIGH-HEAD ECCS AFTER A SAFETY INJECTION

Examinee: _____

Evaluator: _____

Date _____

Testing Method: Perform X Simulate

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References: U-1 EOP E-1.1, SI Termination, Rev 27

Alternate Path: Yes X No

Time Critical: Yes _____ No X

Time Allotment: _____ min (average validation time _____ min)

Critical Steps: 1, 2, 3, 4, 5, 6

Job Designation: RO/SRO

Rev Comments/TIPs: Rev 1: corrected typos, minor change to cue

DCPP Task # / Rating: 888400 4.0

Gen KA # / Rating: 013.A4.02 4.3 / 4.4

AUTHOR: GARY HUTCHISON DATE:

Directions: No plant controls or equipment are to be operated during the performance of this Job Performance Measure. All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The student will be given the initial conditions and initiating cue. The task standard will NOT be read to the student. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the step with which to begin.

Required Materials: None

Initial Conditions: Given:

- Unit 1 was operating at low power, when an RCS leak developed.
- OP AP-1 for RCS Leakage was entered, and the leakrate required the initiation of a Safety Injection.
- The crew has completed EOP E-0; EOP E-1 progressed to step 7, where SI Termination Criteria was checked, and met.
- Transition was made to EOP E-1.1, SI Termination. The procedure transition brief has just been completed.

Initiating Cue: The SFM directs you to perform actions in EOP E-1.1, starting at step 1 of E-1.1.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: High-head ECCS is secured, normal charging established, and then high head ECCS reestablished (after evaluating Pzr Level), per steps 1-6 of EOP E-1.1.

Start Time: _____

Step	Standards
** 1. RESET Safety Injection (SI).	<p><u>Note:</u> This task is mostly carried out on VB-1 and VB-2.</p> <p>1.1 RESETS both trains of Safety Injection (presses both PBs). **</p> <p>Step was: Sat: _____ Unsat _____</p>
** 2. Align Charging.	<p>2.1 CHECKS any ECCS CCP running (both are running).</p> <p><u>Note:</u> There are 3 of these, just to right of 4KV bus breakers for each vital bus (VB-4). Pressing the PB makes the blue light next to it go OFF, and the alarm (above) to clear.</p> <p>2.2 Depress Vital 4kV Auto Transfer Relay Resets: Blue Light – OFF (presses PB for each vital bus: F, G, and H; any order). **</p> <p><u>Note:</u> There will be two ECCS CCPs running (the 1-3 CCP will already be stopped). One running pump will be stopped. (VB-2)</p> <p>2.3 STOPS one ECCS CCP (stops either running ECCS CCP). **</p> <p><u>Note:</u> This pump was already stopped per EOP E-0, App E.</p> <p>2.4 VERIFIES 1-3 CCP stopped (already stopped).</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step.

INSTRUCTOR WORKSHEET

Step	Standards
** 3. CHECK RCS Pressure – Stable or Increasing.	<p><u>Note:</u> RCS pressure may be checked on the recorders or meters near the middle of VB-2 (vertical section), and/or from numerous PPC screens.</p> <hr/>
	<p>3.1 CHECKS RCS Pressure – Stable or increasing (it is). **</p> <hr/>
	<p><u>Note:</u> Makes decision to continue to step 4.</p> <hr/>
	<p>Step was: Sat: _____ Unsat _____</p> <hr/>
** 4. Isolates Charging Injection.	<p><u>Note:</u> (far left end of VB-2) May be done in any order. Closing "either" set of valves satisfies the "critical" portion of the step.</p> <hr/>
	<p>4.1 CLOSES 8803A & B (takes each valve to CLOSE). **</p> <hr/>
	<p>4.2 CLOSES 8801A & B (takes each valve to CLOSE). **</p> <hr/>
	<p>Step was: Sat: _____ Unsat _____</p> <hr/>

** Denotes a Critical Step.

Step	Standards
** 5. Established Normal Charging.	<p><u>Note:</u> HCV-142 (charging backpressure) and FCV-128 (charging flow control) are on CC-2. The other header valves are on VB-2.</p> <p>5.1 CLOSES HCV-142 (dials fully CCW on pot).</p> <p>5.2 OPENS 8107 and 8108, Norm Chg to Regen Hx Stop VlvS (takes each valve ctrl to OPEN). **</p> <p>5.3 VERIFIES 8146 OR 8147 (chrg hdr iso) – OPEN (8146 is already OPEN).</p> <p>5.4 VERIFIES 8145 AND 8148 (aux spray vlvs) – CLOSED(both already CLOSED).</p> <p><u>Note:</u> The following substep is not critical, as the valve will already be partially open, and in Manual. The examinee may throttle the valve to control flow.</p> <p>5.5 Throttle open FCV-128 to establish Charging flow (may throttle further by pressing press up or down PBs).</p> <p>*****</p> <p>Cue: (use ONLY IF examinee evaluates FOP #3 during step 5 for SI re-initiation criteria prior to going to step 6) Another operator is evaluating the FOP. Continue in E-1.1.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step.

Step	Standards
** 6. CONTROLS Charging Flow To Maintain PZR Level.	<p><u>Note:</u> With the size of the leak, along with the reduced charging flow, PZR level will be dropping, requiring restarting ECCS equipment, and transition to EOP E-1.2.</p>
	<p>6.1 CHECKS PZR Level, 17% to 60% and stable (within range, but level is dropping – NOT stable).</p>
	<p><u>Note:</u> The examinee may perform this next substep, or jump right to the RNO instructions for step 6a (ie, skip charging adjustments, based on current indications).</p>
	<p>6.2 May raise charging flow (to try to stabilize level), using FCV-128 to raise flow, and HCV-142 to set seal flows (can achieve 8-13 gpm on seal flows, but PZR Level will continue to drop).</p>
	<p><u>Note:</u> Step 6A RNO instructions will now be implemented. First IF/THEN statement will evaluate if any faulted S/Gs are present (they are NOT)</p>
	<p>6.3 Determines that there are NO faulted S/Gs (checks pressure on VB-3 or any PPC terminal).</p>

(continued on next page)

** Denotes a Critical Step.

INSTRUCTOR WORKSHEET

Step	Standards
** 6. (con't)	<p><u>Note:</u> 2nd IF/THEN statement is applicable (no faulted S/Gs), so following actions are taken.</p> <hr/> <p><u>Note:</u> One of each of the following two sets of valves must be opened to satisfy the critical step (// paths).</p> <hr/> <p>6.5 OPENS 8803A and B (each switch taken to OPEN). **</p> <p>6.6 OPENS 8801A and B (each switch taken to OPEN). **</p> <hr/> <p><u>Note:</u> Only one of the following valves must be closed to satisfy the critical substep.</p> <hr/> <p>6.7 CLOSES 8107 and 8108 (each switch taken to CLOSE). **</p> <hr/> <p><u>Note:</u> The following step is optional, but may be performed due to foldout page instructions (FOP #3).</p> <hr/> <p>6.8 May restart ECCS CCP previously secured.</p> <p>6.9 Transitions to EOP E-1.2.</p> <p>*****</p> <p>Cue: Other operators will continue with performance of EOP E-1.2.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step.

ATTACHMENT 1, SIMULATOR SETUP

- ☐ Initialize the simulator to IC-514 (100%, MOL, HSB for S/U).
- ☐ Enter drill file 9202 or manually insert the following:

Command	Description
ovr xc2i016m act,1,0,0,d,2	FCV-128 to manual, for seals/etc
mal rcs3b act 0.2,1,0,d,0	RCS leak (to cause need for SI)
ovr xc2i030c act,1,0,0,d,3	Manual SI
ovr xv1i158o act,1,0,40,d,0 ovr xv1i160o act,1,0,40,d,0	Opens FCV-603 and FCV-431 (per E-0)
ovr xv2i266o act,1,0,40,d,10	Stops CCP 1-3 (per App E)
ovr xv4i388c act,1,0,40,d,0	Aux Bldg charcoal filter preheater ON (per App E)
mal rcs3c act,0.15,10,0,c,xv2i248o,0	Adjust RCS leakage so that all examinees will get consistent indications of Pzr level dropping at step 6 of E-1.1 (conditional on 8108 opening)
run 120	Runs sim for 2 min, then FRZ

- ☐ Perform the following:
 1. Place FCV-603 and FCV-431 in OPEN position.
 2. Place LCV-12 in CTRL Only
- ☐ (optional) Create IC at this point, to minimize multiple setups (if desired)
- ☐ Inform the examiner that the simulator setup is complete.
- ☐ Go to RUN when the examinee is given the cue sheet.

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-S6

Title: INITIATE BLEED AND FEED FOR A LOSS OF HEAT SINK

Examinee: _____

Evaluator: _____
Print Signature Date

Testing Method: Perform X Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (from LJC-122)

References: U-1 EOP FR-H.1, Response to Loss of Secondary Heat Sink, Rev 27
OP1.ID2, TCOAs, Rev 4 (& TCOA database); TCOA item 33

Alternate Path: Yes X No _____

Time Critical: Yes _____ No X

Time Allotment: 15 minutes (average validation time ____ min) (OCT ave time 10.1 min)

Critical Steps: 2, 9

Job Designation: RO/SRO

Rev Comments/TIPs: Rev 1: corrected typos, minor updates

DCPP Task # / Rating: 196800, 889200, 317800, 875800, 169600 3.3 / 3.5 / 3.3 / 3.7 / 3.0

Gen KA # / Rating: E05.EA1.1 4.1 / 4.0

AUTHOR: _____ **JOHN F. BUCKLEY** _____ **DATE:** _____

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. If the task is being done in the plant or lab, and after identifying the appropriate procedure for the task, the examinee may be given the procedure and told what step to begin the task at.

Required Materials: None.

Initial Conditions: Given:

- Unit 1 experienced a loss of secondary heat sink.
- EOP FR-H.1 was implemented and all efforts to establish AFW, MFW, and condensate flow failed.

Initiating Cue: At least 3 steam generator wide range levels are less than 18% and the SFM directs you to establish and verify RCS bleed and feed per EOP FR-H.1, FOP Item #5.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: RCS bleed and feed has been established and verified as required by EOP FR-H.1, steps 12-18.

Time Critical Operator Action (TCOA): This JPM was evaluated against TCOA # 33, "Initiate Feed and Bleed Cooling within 2500 seconds".

This TCOA:

- is not applicable to this JPM because (per the TCOA database), it does not meet the definition of a TCOA, and is not part of the licensing bases.

Start Time:

Step	Standards
1. Obtain the correct procedure.	1.1 References EOP FR-H.1. 1.2 Reads CAUTION prior to Step 12. Step was: Sat: _____ Unsat _____
** 2. Actuate Safety Injection.	2.1 Positions the SAFETY INJECTION ACTUATE switch on CC-2 <u>or</u> VB-1 to ACTUATE. ** 2.2 Verifies that SI is actuated by observing PK08-21 ON and/or SI Monitor Light Box red status light ON. Step was: Sat: _____ Unsat _____
3. Verify RCS feed paths.	3.1 Observes that at least one CCP <u>or</u> one SI pump is running. 3.2 Observes that ECCS valves are in their proper emergency alignment on the VB1 and VB2 mimic (may also use Monitor Light Box status lights). Step was: Sat: _____ Unsat _____
4. Reset SI.	<u>NOTE:</u> The 60 second SI timer will have to time out before SI can be reset. 4.1 Depresses the SAFETY INJECTION RESET TRAIN A and TRAIN B pushbuttons. 4.2 Verifies that SI is reset by observing PK08-22 ON and/or SI Monitor Box red status light OFF. Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

INSTRUCTOR WORKSHEET

Step	Standards
5. Reset Containment Isolation Phase A and Phase B.	<p>5.1 Depresses the CONTMT ISOL PHASE A RESET pushbuttons.</p> <p>5.2 Verifies Phase A red lights are OFF or PK02-01 is OFF.</p> <p>5.3 Observes that Phase B is NOT actuated, <u>or</u> depresses the Phase B RESET pushbuttons.</p> <p>Step was: Sat: _____ Unsat _____</p>
6. Establish instrument air to containment.	<p>6.1 Opens FCV-584.</p> <p>6.2 Verifies that FCV-584 has opened.</p> <p>6.3 Observes that instrument air header pressure is > 90 psig on PI-380.</p> <p>Step was: Sat: _____ Unsat _____</p>
7. Establish RCS bleed path.	<p>7.1 Observes that PORV block valves are open:</p> <ul style="list-style-type: none"> o 8000A o 8000B o 8000C <p>7.2 Attempts to opens all PORVs by taking switches to the OPEN position.</p> <ul style="list-style-type: none"> o PCV-474 o PCV-455C o PCV-456 <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

INSTRUCTOR WORKSHEET

Step	Standards
8. Verify PZR PORVs and associated block valves – at least two open.	8.1 Diagnoses that at least two PORVs have NOT opened.
	Step was: Sat: _____ Unsat _____
** 9. Open reactor vessel head vents. o 8078A & D (PAM 1) o 8078B & C (PAM 1)	9.1 Opens reactor vessel head vents: o 8078A & 8078D. ** o 8078B & 8078C. ** 9.2 Verifies 8078A, B, C, & D have opened. ***** Cue: Other operators will continue with the FR-H.1 procedure steps. ***** Step was: Sat: _____ Unsat _____
Stop Time: _____	
Total Time: _____	(Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

- ☐ INIT to IC 716. (ONLY IF no IC available, you can create conditions as follows; DON'T use if IC 716 works):
 - IC-510, then run drill 1053
 - When drill complete, use 10%ers to B/D 3 S/Gs to < 18% (use max chrg during depress)
 - 10%ers to normal and FRZ once stable (takes about 20 min)
- ☐ This SNAP allows entry into EOP FR-H.1 at Step 12. Three (3) steam generator wide range levels are < 18% and steam generator 10% steam dumps are in AUTO at 8.38 turns.
- ☐ Enter drill file 1122 or manually insert the following:

Command	Description
vlv pzc4 1,0,0,0,d,0 #rrcp455c	PCV-455c fails as is.
vlv pzc5 1,0,0,0,d,0 #rrcp456	PCV-456 fails as is
vlv pzc6 1,0,0,0,d,0 #rrcp474	PCV-474 fails as is

- ☐ Perform the following:
 1. Display the E-0 screen on SPDS panel A.
 2. Display the CSF-3 screen on SPDS panel B.
- ☐ Inform the examiner that the simulator setup is complete.
- ☐ Go to RUN when the examinee is given the cue sheet.

EXAMINEE CUE SHEET

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue:

The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-C1

Title: RESPOND TO RHR LEAKAGE INTO THE PRT

Examinee: _____

Evaluator: _____

Print

Signature

Date

Testing Method: Perform _____ Simulate X

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

NOTE: THIS JPM MAY BE PERFORMED ON EITHER UNIT.

NOTE: THIS JPM IS INTENDED TO BE SIMULATED IN THE C/R.

References: U-1 & U-2, OP AP-16, Malfunction of the RHR System, Rev 13A

Alternate Path: Yes X No _____

Time Critical: Yes _____ No X

Time Allotment: 15 min (average validation time ____ min)

Critical Steps: 4

Job Designation: RO/SRO

Rev Comments/TIPs: Minor updates following validation

DCPP Task # / Rating: 39800 4.0

Gen KA # / Rating: 025.AA1.03 3.4 / 3.3

AUTHOR: _____ **GARY HUTCHISON** **DATE:** _____

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Equipment operation "Cues" are contingent on proper operation by the examinee, and should be "adjusted" should equipment operation differ from expected.

Note: **Clearly state the Unit for performance during the initial conditions and cue, below. A procedure is attached for each unit (use the correct procedure for the unit selected).**

Required Materials: OP AP-16, Unit 1 & 2

Initial Conditions: Given:

- **Unit 1 / Unit 2 (specify)** is in Mode 4, cooling down to Mode 5 for a normal refueling outage.
- RHR cooling is in service (both pumps and both HXs), with RHR letdown in service. RHR flows are 1600-1700 gpm on each HX.
- RCS temperature is $\approx 302^{\circ}\text{F}$, and slowly lowering (slow cooldown in progress)
- RCS Pressure is 325 psig and stable (pressure band is 300-350 psig).
- The BOPCO has just reported to the SFM that both PRT level and pressure are slowly rising. The Aux Bldg Watch has been dispatched to walk down the RHR system, and report back to the Control Room.
- The SFM has just implemented OP AP-16, Malfunction of the RHR System, due to rising PRT level.

Initiating Cue: The SFM directs you to perform OP AP-16 to respond to the leakage into the PRT, starting at step 1.

NOTE: **Do NOT provide the student with the Task Standard.**

Task Standard: Both RHR pumps have been stopped, and the RHR system isolated from the RCS, per steps 1-4 of OP AP-16.

Start Time: _____

Step	Standards
1. Check RHR pump status (step 1).	<p><u>Note:</u> Most of the indications and controls for this JPM are located on VB-1 and VB-2. The examinee may also reference plant parameters from the PPC for some indications</p>
	<p><u>Note:</u> Pump indications on the lower "skirt" area on the right hand side of VB-1. The ammeters are on the vertical section just above the pumps.</p>
1.1	<p>Verifies an RHR pump is running (they both are).</p> <p>*****</p> <p>Cue: (for both pumps) The Red light is ON, Green light OFF, pumps amps are 40-42 and stable.</p> <p>*****</p>
	<p><u>Note:</u> These indications are just above the pumps on the vertical section on the right side of VB-2). The examinee may also refer to several PPC plots or displays (with the same cue below).</p>

(continued on next page)

** Denotes a Critical Step or substep.

Step	Standards
1. (con't)	<p>1.2 Verifies RHR flow indicated on FI-970/971.</p> <p>*****</p> <p>Cue: Both meters read 1600-1700 gpm each on FI-970B and FI-971B (FI-970A and FI-971A both pegged high).</p> <p>*****</p> <p>Note: The two supply valves are on the "skirt" at the left end of VB-1; the CCW flow meters are on the left vertical section of VB-1 (just to right of the ASW system). CCW header A & B flows are 4000-5000 gpm higher than normal with RHR HXs in service.</p> <hr/> <p>1.3 VERIFIES CCW to the RHR Heat Exchangers.</p> <p>*****</p> <p>Cue: (if checked) FCV-364 and FCV-365 are Red Light ON, Green Light OFF.</p> <p>*****</p> <p>*****</p> <p>Cue: (if checked) CCW header flows are 8200 gpm (FI-68 for hdr A), 11,000 gpm (FI-48, hdr B), and 3400 (FI-46, hdr C).</p> <p>*****</p> <p>Note: The examinee should proceed to step 2.</p> <hr/> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step or substep.

INSTRUCTOR WORKSHEET

Step	Standards
2. Starts an alternate means of heat removal, if required (it is NOT) (step 2).	<p><u>Note:</u> The examinee should find the RHR still in service and move to the next step after the first substep.</p>
	<p>2.1 (observes CAUTION prior to step) Checks RHR <u>not</u> in operation (IT IS), goes to RNO instructions, and goes to step 3)</p>
	<p><u>Note:</u> The examinee should conclude that RHR <u>IS</u> in operation, and go to step 3 (per the RNO instructions for step 2A). If the examinee rechecks pumps or flows again, the cues from step 1 may be repeated here.</p>
	<p><u>Note:</u> The following cues are <u>ONLY</u> if the examinee attempts to complete step 2 (vs going on to step 3, above). This will move the examinee on to step 3.</p>
	<p>*****</p> <p>Cue: (for step 2b) (VB-2 vertical section) RCPs #2 and #4 (#1 and #3 for U-2) are Red Light ON, Green Light OFF. The other two RCPs are OOS on an admin Tagout.</p> <p>*****</p>
	<p>*****</p> <p>Cue: (for step 2c) Another operator has been assigned to control RCS temperature, using steam dumps.</p> <p>*****</p>
	<p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step or substep.

Step	Standards
3. CHECKS For Indication of Leakage From the RHR System (step 3) (there IS leakage).	<p><u>Note:</u> The following indications will show leakage from the RHR system (to the PRT); the examinee should go to step 4 from the step 3A RNO instructions.</p> <hr/> <p>3.1 Checks NO indications of leakage from the RHR system (see symptoms) (there ARE indications); determines that leak exists, and goes to step 4 per step 3A RNO instructions.</p> <p>*****</p> <p>Cue: (once checked) (all of these may be checked on the PPC as well)</p> <ul style="list-style-type: none"> • PRT (VB2, vertical, right): level is 90%, and still rising • PRT: pressure is 3.7 psig and rising slowly • Pzr level (VB-2, same area, or CC2 right side): 33.2%, and dropping slowly • Pzr Pressure (VB2, same area): 325 psig and stable, being maintained with additional heater operation <p>*****</p> <hr/> <p>Step was: Sat: _____ Unsat _____</p> <hr/>

** Denotes a Critical Step or substep.

Step	Standards
** 4. CHECKS PRT Level - STABLE OR DECREASING (step 4). (it is NOT)	<p>Note: With PRT level still rising, the RHR system will have to be shut down and isolated.</p> <hr/> <p>4.1 (reads NOTE prior to step) Confirms that PRT level is still rising; goes to step 4A RNO instructions.</p> <hr/> <p>Note: The examinee may go to the RNO instructions based on previous data, or may confirm PRT level rising again prior taking those actions.</p> <hr/> <p>*****</p> <p>Cue: (if PRT level checked again)</p> <ul style="list-style-type: none"> • PRT (VB2, vertical, right): level is 90.7%, and still rising • PRT: pressure is 3.9 psig and rising slowly • Pzr level (VB-2, same area, or CC2 right side): 33.0%, and dropping slowly • Pzr Pressure (VB2, same area): 325 psig and stable <p>*****</p> <p>4.2 STOPS both RHR pumps. **</p> <p>*****</p> <p>Cue: (for each pump) amps are zero, the Red light is OFF, Green light ON, and FI-970/971 flows are all bottom of scale.</p> <p>*****</p> <hr/> <p>Note: If operator mentions that step 2 was a continuous action step, Cue him/her that another operator will perform step 2</p> <hr/>

** Denotes a Critical Step or substep.

** Denotes a Critical Step or substep.

Step	Standards
** 4. (con't)	<p><u>Note:</u> This is the RHR letdown valve, controlled by a "pot" on the vertical section of VB-2 (in the middle); CCW to close.</p> <hr/> <p>4.3 CLOSES RHR Letdown to CVCS, HCV-133. **</p> <p>*****</p> <p>Cue: The pot rotated several turns CCW, and now reads zero (won't turn any more).</p> <p>*****</p> <hr/> <p><u>Note:</u> These are both located at the far left end of the VB-2 "skirt". The switches are normal, two-position valve controls</p> <hr/> <p>4.4 CLOSES RHR Loop 4 Suction Isolation Valves, 8701 and 8702. **</p> <p>*****</p> <p>Cue: (prior to operation) Lamicoids on both valves indicate breakers are racked in for both valves.</p> <p>*****</p> <p>*****</p> <p>Cue: (for each valve, once switch taken to CLOSE) The Green light is ON; after (stroke) time, the Red light is OFF .</p> <p>*****</p> <p style="text-align: right;"><i>(continued on next page)</i></p>

** Denotes a Critical Step or substep.

INSTRUCTOR WORKSHEET

Step	Standards
4. (con't)	<p><u>Note:</u> The next substep directs the operator to additional diagnostic and action steps, not part of this task.</p> <hr/> <p>4.5 The operator is directed to step 13.</p> <p>*****</p> <p>Cue: Other operators will continue with OP AP-16 actions.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step or substep.

CAUTION: **No plant controls or equipment are to be operated during the performance of this JPM. Controls may be pointed at, but are not to be touched.**

Initial Conditions: Given:

- **Units 1 and 2 were ramped down** to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue: The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-C2

Title: CHECK IF CONTAINMENT SPRAY SHOULD BE STOPPED

Examinee: _____

Evaluator: _____

Print

Signature

Date

Testing Method: Perform _____ Simulate X

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

NOTE: THIS JPM MAY BE PERFORMED ON EITHER UNIT.

NOTE: THIS JPM IS INTENDED TO BE SIMULATED IN THE C/R.

References: U-1 EOP E-1, Loss of Reactor or Secondary Coolant, Rev 32

U-2 EOP E-1, Loss of Reactor or Secondary Coolant, Rev 23

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: _____ min (average validated time _____ min)

Critical Steps: 4, 5

Job Designation: RO/SRO

Rev Comments/TIPs: Rev 1: corrected typos, minor updates

DCPP Task # / Rating: 849200 3.7

Gen KA # / Rating: 026.A4.01 4.5 / 4.3

AUTHOR: _____ **GARY HUTCHISON** _____ **DATE:** _____

Directions: No plant controls or equipment are to be operated during the performance of this Job Performance Measure. All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Equipment operation "Cues" are contingent on proper operation by the examinee, and should be "adjusted" should equipment operation differ from expected.

Note: Clearly state the Unit for performance during the initial conditions and cue, below. A procedure is attached for each unit (use the correct procedure for the unit selected).

Required Materials: U-1 or U-2 EOP E-1, Loss of Reactor or Secondary Coolant (pg 6 / step 6 is adequate)

Initial Conditions: Given:

- A steam break occurred inside containment on **Unit 1 / Unit 2 (specify)**
- The steam break caused the following actuations:
 - Safety Injection/Reactor Trip
 - Main Steamline Isolation
 - Containment Spray Actuation
- Both trains of Containment Spray are currently in service, with Containment pressure \approx 7 psig and dropping slowly.
- The crew has progressed in the EOPs through EOP E-0, and are now up to step 6 of EOP E-1

Initiating Cue: The SFM directs you to check if containment spray should be stopped, by performing step 6 of EOP E-1.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: The Containment Spray system is secured, per EOP E-1, step 6.

INSTRUCTOR WORKSHEET

Start Time: _____

Step	Standards
1. Check PK01-18 CONTAINMENT SPRAY ACTUATION - ON.	<p><u>Note:</u> This is a note.</p> <hr/> <p>1.1 CHECKS PK01-18, Containment Spray Actuation ON (it is).</p> <p>*****</p> <p>Cue: PK01-18 is LIT. (if checked; not required) the RED lights for the Containment Isolation Phase B and Main Steam Isolation (Monitor Light Box D) are LIT.</p> <p>*****</p> <p><u>Note:</u> Continues on to step 6b.</p> <hr/> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step or substep.

Step	Standards
2. Check Containment Radiation Levels (normal).	<p><u>Note:</u> The alarms are located above the right side of VB-3, and the RM-2 & 7 are behind the control boards (Westinghouse RMs near the NIs); RM-30/31 are on PAM2 (also behind the boards). Rad monitors can also be accessed on the PPC.</p>
	<p>2.1 CHECKS PK11-21, HIGH RADIATION – OFF (it is OFF).</p> <p>*****</p> <p>Cue: PK11-21 is <u>not</u> LIT.</p> <p>*****</p> <p>2.2 CHECKS RE-2/RE-7-NORMAL (they are).</p> <p>*****</p> <p>Cue: (at monitor or PPC) (for each monitor) The radiation monitor is reading lower than the at-power reading, and stable.</p> <p>*****</p> <p>2.3 CHECKS PK11-19, CONTMT RADIATION - OFF.</p> <p>*****</p> <p>Cue: PK11-19 is <u>not</u> LIT.</p> <p>*****</p> <p style="text-align: right;"><i>(continued on next page)</i></p>

** Denotes a Critical Step or substep.

Step	Standards
2. (con't)	<p>2.4 CHECKS R-30/R-31-NORMAL (PAM 2) (they are).</p> <p>*****</p> <p>Cue: (at monitor or PPC) (for each monitor) The radiation monitor is reading lower than the at-power reading, and stable.</p> <p>*****</p> <p><u>Note:</u> Continues on to step 6c.</p> <p>Step was: Sat: _____ Unsat _____</p>
3. Check Containment Pressure - LESS THAN 20 PSIG.	<p><u>Note:</u> Containment pressures are located on the vertical potion of VB-1, left side (also available on the PPC). One or more channels may be checked.</p> <p>3.1 CHECKS containment pressure(s), < 20 psig (it is).</p> <p>*****</p> <p>Cue: (for each channel checked) Pressure is reading 5.5 psig, and dropping slowly.</p> <p>*****</p> <p><u>Note:</u> Continues on to step 6d.</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step or substep.

INSTRUCTOR WORKSHEET

Step	Standards
** 4. Resets Containment Spray Trains A and B.	<p><u>Note:</u> These are in the same area on VB-1, vertical panel, left of center. They are pushbutton controls. These two substeps may be done in any order (or at the same time).</p>
	<p>4.1 RESETS Containment Spray, Train A (PB depressed). **</p>
	<p><u>Note:</u> There are no ESF red status lights for each train of containment spray, so a cue is only appropriate once "both" pushbuttons have been depressed.</p>
	<p>4.2 RESETS Containment Spray, Train B (PB depressed). **</p>
	<p>*****</p> <p>Cue: PK01-18 is <u>not</u> LIT (RED alarm window cleared)</p> <p>*****</p>
	<p><u>Note:</u> Continues on to step 6e-6h.</p>
	<p>Step was: Sat: _____ Unsat _____</p>

** Denotes a Critical Step or substep.

Step	Standards
** 5. Secures Containment Spray System.	<p><u>Note:</u> These controls are all below the containment pressure meters on VB-1 (on the skirt area, to the right of the ASW/CCW systems).</p> <hr/> <p>5.1 STOPS both Containment Spray Pps (control switch taken to STOP of each pump). **</p> <p>*****</p> <p>Cue: (for each pump, if checked):</p> <ul style="list-style-type: none"> • The pump Red Light is OFF, and the Green Light is ON • Pump amps are zero (only if checked) • Spray Additive Tank Flow is zero (only if checked) • Spray flow (on PAMS panel) is zero (only if checked) <p>*****</p> <hr/> <p><u>Note:</u> These are the spray header isolation valves, about a foot above the spray pump controls.</p> <hr/> <p>5.2 CLOSES 9001A & B (each switch taken to close). **</p> <p>*****</p> <p>Cue: (for each valve) The Green Light is ON; after a few seconds (stroke time), the Red Light is OFF.</p> <p>*****</p>

** Denotes a Critical Step or substep.

INSTRUCTOR WORKSHEET

Step	Standards
** 5. (con't)	<p><u>Note:</u> These are the RHR to containment spray valves, and have not repositioned due to the actuation (require only verification). They are just above and outside of the pump controls.</p> <hr/> <p>5.3 VERIFIES closed 9003A & B.</p> <p>*****</p> <p>Cue: These valves are AS-SEEN (Red light OFF, Green Light ON).</p> <p>*****</p> <hr/> <p><u>Note:</u> These are the spray additive tank outlet valves (above the pumps, below the spray tank mimic).</p> <hr/> <p>5.4 CLOSES 8994A & B (each switch taken to CLOSE). **</p> <p>*****</p> <p>Cue: (for each valve) The Green Light is ON; after a few seconds (stroke time), the Red Light is OFF.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes a Critical Step or substep.

CAUTION: **No plant controls or equipment are to be operated during the performance of this JPM. Controls may be pointed at, but are not to be touched.**

Initial Conditions: Given:

- Units 1 and 2 were ramped down to **25% power, due to a** large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
 - Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue: The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

NUCLEAR POWER GENERATION
DIABLO CANYON POWER PLANT
JOB PERFORMANCE MEASURE

Number: NRCL111-P1

Title: PERFORM A LOCAL START OF DG 1-2 (2-1)

Examinee: _____

Evaluator: _____
Print Signature Date

Testing Method: Perform _____ Simulate X

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from LJP-038)

NOTE: THIS JPM MAY BE PERFORMED ON EITHER UNIT.

References: OP AP-8A, Control Room Inaccessibility, Establishing HSB, Rev. 30 (U1)
OP AP-8A, Control Room Inaccessibility, Establishing HSB, Rev. 23A (U2)

Alternate Path: Yes X No _____

Time Critical: Yes _____ No X

Time Allotment: 25 minutes (average validation time _____ min) (OCT – 12.6 min ave)

Critical Steps: 1, 2, 3, 4, 5, 6, 8, 9, 10

Job Designation: RO/SRO

Rev Comments/TIPs: Rev 1: corrected typos, updated labels on some steps

DCPP Task # / Rating: 589400 4.2

Gen KA # / Rating: 064.A4.01 4.0 / 4.3

AUTHOR: _____ JOHN F. BUCKLEY _____ DATE: _____

Directions:

No plant controls or equipment are to be operated during the performance of this Job Performance Measure. All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Equipment operation "Cues" are contingent on proper operation by the examinee, and should be "adjusted" should equipment operation differ from expected.

Note: Clearly state the Unit for performance during the initial conditions and cue, below. A procedure is attached for each unit (use the correct procedure for the unit selected).

Required Materials: Copy of OP AP-8A (Unit 1, or Unit 2), Attachment 6.3

Initial Conditions: Given:

- A fire in the vertical boards has required an evacuation of the control room.
- **Unit 1 / Unit 2 (specify)** control has been established from the Hot Shutdown Panel.

Initiating Cue: The Shift Foreman directs you to establish local control and start diesel generator **1-2 / 2-1 (specify)** to energize 4KV bus G, in accordance with OP AP-8A, Attachment 6.3, step 3.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Diesel Generator 1-2 or 2-1 has been started in accordance with OP AP-8A, Att 6.3, step 3.

Start Time: _____

Step	Standards
<p>** 1. Place the 125 V DC Control Power Transfer (EQD-12, for U-1) (EQD-21, for U-2) in NEUTRAL.</p>	<p>1.1 Reads and observes procedure CAUTIONs prior to Step 3.</p> <p>1.2 Locates the 125 V DC Control Power Transfer Switch on the right side of the DG 1-2 (U-1) / DG 2-1 (U-2) DC Cont Pwr Transfer Switch Panel.</p> <p>1.3 Places the 125V DC Control Power Transfer Switch (EQD-12, U-1) / (EQD-21, U2) in NEUTRAL/OFF. **</p> <p>*****</p> <p>Cue: EQD-12 (U-1) / EQD-21 (U-2) is in the NEUTRAL [middle, OFF] position.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>
<p>** 2. Place the droop switch on the excitation cubicle to the ISOC mode.</p>	<p>2.1 Locates the diesel generator 1-2 (2-1) droop switch on the excitation cubicle.</p> <p>2.2 Places the droop switch to the ISOC position.**</p> <p>*****</p> <p>Cue: The Droop Switch is in the ISOC position.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
** 3. Verify the AUTO/TEST selector switch on the local control panel is in the TEST position.	<p>3.1 Locates the Mode Control selector switch on the diesel generator 1-2 (2-1) local control panel.</p> <p>3.2 Places the Mode Control selector switch to the TEST position.**</p> <p>*****</p> <p>Cue: The Mode Control Switch is in the TEST position.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>
** 4. Place the diesel generator control selection switch on the excitation cubicle to the LOCAL position.	<p>4.1 Locates the diesel generator 1-2 (2-1) control selection switch on the excitation cubicle.</p> <p>4.2 Places the diesel generator 1-2 (2-1) control selection switch to the LOCAL position.**</p> <p>*****</p> <p>Cue: The Control Selector Switch is in the LOCAL position.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
** 5. Place the Appendix R fuse selector switch 43DC-12/SS (43DC-21/SS) to the BACKUP position.	<p>5.1 Locates the 43DC-12/SS (43DC-21/SS) switch on the diesel generator 1-2 (2-1) local control panel.</p> <p>5.2 Places the Appendix R fuse selector switch to the BACKUP position.**</p> <p>*****</p> <p>Cue: The Appendix R Switch is in the BACKUP position.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>
** 6. Place the 125V DC Control Power Transfer Switch (EQD-12, for U-1) (EQD-21, for U-2) in NORMAL.	<p>6.1 Places the 125V DC Control Power Transfer Switch to NORMAL.</p> <p>*****</p> <p>Cue: The EQD-12 (EQD-21) is in the NORMAL [top] position.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
7. Depress the alarm relay reset push button.	7.1 Locates the alarm relay reset push button on diesel generator 1-2 (2-1) local control panel. 7.2 Depresses the alarm relay reset push button. ***** Cue: The Alarm Reset PB depressed and then returned to normal. ***** Step was: Sat: _____ Unsat _____
** 8. Place the START/STOP switch on the local control panel to the START position.	8.1 Reads NOTE 8.2 Locates the START/STOP switch at the diesel generator 1-2 (2-1) local control panel. 8.3 Places the START/STOP switch to the START position.** ***** Cue: There was no audible noise level change in the room (the diesel generator did not start). ***** Step was: Sat: _____ Unsat _____

** Denotes Critical Step and Sub Steps.

Step	Standards
** 9. Place the 125VDC Control Power Transfer Switch, EQD-12 (EQD-21), in NEUTRAL, wait for 10 seconds, then Place in BACKUP position.	<p>9.1 Locates control power transfer switch EQD-12 (EQD-21) opposite the diesel generator 1-2 (2-1) local control panel.</p> <p>9.2 Places the 125V DC control Power transfer switch (EQD-12, or EQD-21) in NEUTRAL/OFF, waits 10 seconds, then places in BACKUP position.**</p> <p>*****</p> <p>Cue: The normal power supply light is OFF and the backup power supply light is ON.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>
** 10. Restart the diesel generator.	<p>10.1 Locates the Engine Control switch at the diesel generator 1-2 (2-1) local control panel.</p> <p>10.2 Places the Engine Control switch to the START position. **</p> <p>*****</p> <p>Cue: Normal DG startup noise level is heard.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
11. Notifies the HSDP of DG status.	9.1 Notifies the SFM at the U-1 (U-2) HSDP of DG status, and asks if 4KV bus voltage is satisfactory. ***** Cue: The U-1 (U-2) SFM reports that DG 1-2 (2-1) operation and 4KV bus G voltage are satisfactory. ***** Step was: Sat: _____ Unsat _____

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

EXAMINEE CUE SHEET

CAUTION: **No plant controls or equipment are to be operated during the performance of this JPM. Controls may be pointed at, but are not to be touched.**

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue: The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-P2

Title: OPERATE CONTAINMENT H₂ RECOMBINER 1-2 (2-2)

Examinee: _____

Evaluator: _____
Print Signature Date

Testing Method: Perform _____ Simulate X

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from LJP-004)

NOTE: THIS JPM MAY BE PERFORMED ON EITHER UNIT.

References: OP H-9, Inside Containment H₂ Recombination System, Rev. 11 (U-1)
OP H-9, Inside Containment H₂ Recombination System, Rev. 7 (U-2)
Volume 9, Table T-VF-1 (1A) Electric Hydrogen Recombination System
Reference Power, Rev. 18 (both units)

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: 35 minutes (average validation time ____ min) (OCT ave time 22.2 min)

Critical Steps: 1, 4, 7, 8, 9

Job Designation: RO/SRO

Rev Comments/TIPs: Minor updates following validation

DCPP Task # / Rating: 306200 3.9

Gen KA # / Rating: 028.A4.01 4.0 / 4.0

AUTHOR: _____ JOHN F. BUCKLEY _____ DATE: _____

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Equipment operation "Cues" are contingent on proper operation by the examinee, and should be "adjusted" should equipment operation differ from expected.

Note: Clearly state the Unit for performance during the initial conditions and cue, below. A procedure is attached for each unit (use the correct procedure for the unit selected).

Required Materials:

- Calculator
- Copy of OP H-9, including attachments (partial procedure OK) (U-1 or U-2).
- Copy of Vol 9 Table T-VF-1 (U-1 or U-2)

Initial Conditions: Given:

- **Unit 1 / Unit 2 (specify)** has experienced a large loss of coolant accident.
- All vital and non-vital buses are being supplied by offsite power.
- Containment hydrogen concentration has increased to 1.2% and the Site Emergency Coordinator has determined that the Internal Hydrogen Recombiner System (IHRS) is to be placed in service.
- All OP H-9 prerequisites are complete and precautions and limitations reviewed.

Initiating Cue: The Shift Foreman directs you to place the **1-2 / 2-2 (specify)** IHRS into service, per OP H-9, section 6.1.

NOTE: Do NOT provide the student with the Task Standard.

Task Standard: Hydrogen Recombiner 1-2 (2-2) is in service at a power setting of ≈ 52.74 KW, 1-2 (56.80 KW, 2-2) . (acceptable ranges are 50.23 – 54.42 KW for 1-2, and 54.10 – 58.60 KW for 2-2)

Start Time: _____

Step	Standards
** 1. Prepare recombiner for operation.	<p>1.1 Reads first note prior to step 6.1.1.</p> <p>1.2 Notes that step 6.1.1 to check DG loading is N/A (part of initial conditions that all busses are on offsite power).</p> <p>1.3 Reads note prior to step 6.1.2.</p> <p>1.4 Verifies Recombiner Unit 1-2 (2-2) redundant breaker 52-1H-35R (52-2H-35R) is closed.</p> <p>*****</p> <p>Cue: The breaker handle is in the full up (ON) position.</p> <p>*****</p> <p>1.5 Closes Recombiner Unit 1-2 (2-2) normal breaker 52-1H-35 (52-2H-25). **</p> <p>*****</p> <p>Cue: (for the "normal" breaker) An audible "clunk" is heard as the breaker handle was pushed upward. It stayed in the full up (ON) position. (the backup breaker can be checked, and is normally closed in; you may provide the same cue as above if the backup breaker is not closed).</p> <p>*****</p> <p>Step was: Sat: _____ Unsat: _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
2. Verify power is available to recombinaer unit 1-2.	<p>2.1 Locates Recombiner Unit 1-2 (2-2), and reads the note and initial part of the step.</p> <p>2.2 Verifies white "POWER IN AVAILABLE" light in ON.</p> <p>*****</p> <p>Cue: The Power In Available white light in ON.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>
3. Verify the potentiometer labeled "POWER ADJUST" is set to zero.	<p>3.1 Verifies that "POWER ADJUST" potentiometer is set to zero.</p> <p>*****</p> <p>Cue: (only if not at "000") "POWER ADJUST" is at "000".</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
** 4. Turn the switch labeled "POWER OUT SWITCH" to the ON position.	<p>4.1 Turns "POWER OUT SWITCH" on the recombiner control panel to the ON position.**</p> <p>4.2 Verifies that the red lamp on the switch plate is ON.</p> <p>*****</p> <p>Cue: A small audible click was heard, and the switch is in the full UP (ON) position. The Red Light is ON.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>
5. Measure and record on Attachment 3 the present containment pressure reading.	<p>5.1 Goes to or contacts the control room and requests containment pressure readings from PI-934 through PI-937.</p> <p>*****</p> <p>Cue: The Control Room CO reports that U-1 (U-2) containment pressure readings on PI-934 through PI-937 are 2.8 psig, 3.2 psig, 3.4 psig, and 2.6 psig, respectively.</p> <p>*****</p> <p>5.2 Calculates average containment pressure and records 17.7 psia on Attachment 3.</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
6. Determine and record pre-LOCA containment temperature on Att 3.	<p>6.1 Goes to or contacts control room and requests the PPC history trend or YR-26 pre-LOCA containment temperature reading.</p> <p>*****</p> <p>Cue: Containment temperature before the LOCA was 90° F (from PPC).</p> <p>*****</p> <p>6.2 Records containment temperature of 90° F on Attachment 3.</p> <p>Step was: Sat: _____ Unsat _____</p>
** 7. Determine and record pressure factor, Cp, on Att 3.	<p>7.1 Uses Figure 1, Attachment 9.1, to determine Cp is approximately 1.26 ** (range of 1.2 to 1.3 is acceptable, due to graph reading).</p> <p>7.2 Records Cp on Attachment 3.</p> <p>Note: Reference power for recombining 1-2 (2-2) from Vol 9 Table T-VF-1 (1A) is 41.86 KW (45.08 KW) (supplied to the examinee at start of task)</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
** 8. Calculate the power setting by multiplying the reference power by Cp.	<p>8.1 Multiplies the reference power by Cp to obtain the power setting of approximately 52.74 KW, 1-2 (56.80 KW, 2-2) . ** (acceptable range is 50.23 – 54.42 KW for 1-2, and 54.10 – 58.60 KW for 2-2)</p> <p>8.2 Records calculated power setting on Attachment 3.</p> <p>Step was: Sat: _____ Unsat: _____</p>
** 9. Turn the potentiometer clockwise until the calculated power level is obtained on the “POWER OUT” meter.	<p>9.1 Turns the potentiometer clockwise until 5 KW is obtained on “POWER OUT” meter and holds for 10 min. **</p> <p>*****</p> <p>Cue: The potentiometer rotated CW; 5 KW is indicated on the AC power meter. Using time compression, the unit has been at 5 KW for 10 minutes.</p> <p>*****</p> <p>9.2 Turns the potentiometer clockwise until 10 KW is obtained on “POWER OUT” meter and holds for 10 min. **</p> <p>*****</p> <p>Cue: The potentiometer rotated CW; 10 KW is indicated on the AC power meter. Using time compression, the unit has been at 10 KW for 10 minutes.</p> <p>*****</p> <p style="text-align: right;"><i>(con't on next page)</i></p>

** Denotes Critical Step and Sub Steps.

Step	Standards
** 9. (continued)	<p>9.3 Turns the potentiometer clockwise until 20 KW is obtained on “POWER OUT” meter and holds for 5 min. **</p> <p>*****</p> <p>Cue: The potentiometer rotated CW; 20 KW is indicated on the AC power meter. Using time compression, the unit has been at 20 KW for 5 minutes.</p> <p>*****</p> <p>9.4 Advances to the calculated reference power setting. **</p> <p>*****</p> <p>Cue: The potentiometer rotated CW until \approx 52.7 KW (56.8 KW) was indicated on the AC power meter and the power reading is stable. The SFM has directed another operator to monitor the unit and continue this procedure.</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

CAUTION: No plant controls or equipment are to be operated during the performance of this JPM. Controls may be pointed at, but are not to be touched.

Initial Conditions: Given:

- Units 1 and 2 were ramped down to 25% power, due to a large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue: The U-2 Shift Foreman (SFM) has directed **you to perform step 11** of STP I-1A to determine if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

*** ISSUED FOR USE BY: _____ DATE: _____ EXPIRES: ***
DIABLO CANYON POWER PLANT NUMBER TABLE T-VF-1
VOLUME 9 CURVES AND MISCELLANEOUS DATA SHEET REVISION 18
PAGE 1 OF 1
UNIT

TITLE: Electric Hydrogen Recombiner System Reference Power

1
4/26/09
EFFECTIVE DATE

NOTE: The following data is the reference power levels of the Electric Hydrogen Recombiner System (EHRS) as determined by the referenced startup test. This reference power is operational data required for OPH-9.

RECOMBINER	REFERENCE POWER
EHRS 1-1	40.89 kW
EHRS 1-2	41.86 kW

REFERENCE: EHRS 1-1, STP M-88C, 68001264, 03/26/09

EHRS 1-2, STP M-88C, 64003217, 06/25/09

PAGE VF-1

01252518.6aa

9B

0626.0830

*** ISSUED FOR USE BY: _____

DATE: _____

EXPIRES: _____

DIABLO CANYON POWER PLANT

NUMBER TABLE T-VF-1A

VOLUME 9 CURVES AND MISCELLANEOUS DATA SHEET

REVISION 18

PAGE 1 OF 1

UNIT

TITLE: Electric Hydrogen Recombiner System Reference Power

2

2/9/12

EFFECTIVE DATE

NOTE: The following data is the reference power levels of the Electric Hydrogen Recombiner System (EHRS) as determined by the referenced heatup test. This reference power is operational data required for OPH-9.

RECOMBINER	REFERENCE POWER
EHRS 2-1	45.50 kW
EHRS 2-2	45.08 kW

REFERENCE: EHRS 2-1, STP M-38C, 64019202, 01/25/12EHRS 2-2, STP M-38C, 64019216, 11/10/11

PAGE VF-1A

TABLE T-VF-1A-2008.DOC

Nuclear Power Generation
Diablo Canyon Power Plant
Job Performance Measure

Number: NRCL111-P3

Title: ESTABLISH CCW TRAIN SEPARATION

Examinee: _____

Evaluator: _____
Print Signature Date

Testing Method: Perform _____ Simulate X

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (modified from LJP-158)

NOTE: THIS JPM MAY BE PERFORMED ON EITHER UNIT.

References: Unit 1 EOP E-1.4, Transfer to Hot Leg Recirculation, Rev 19
Unit 2 EOP E-1.4, Transfer to Hot Leg Recirculation, Rev 10
OVID 106714 (107714), Sheet 2

Alternate Path: Yes X No _____

Time Critical: Yes _____ No X

Time Allotment: 35 minutes (average validation time ____ min) (OCT ave time 19.5 / 21.4 min)

Critical Steps: 3, 4

Job Designation: RO/SRO

Rev Comments/TIPs: Rev 1: corrected typos, minor updates

DCPP Task # / Rating: 131400 4.0

Gen KA # / Rating: 011.EA1.11 4.2 / 4.2

AUTHOR: _____ **GARY HUTCHISON** **DATE:** _____

- Directions:** **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.
- Equipment operation "Cues" are contingent on proper operation by the examinee, and should be "adjusted" should equipment operation differ from expected.
- Note:** Clearly state the Unit for performance during the initial conditions and cue, below. A procedure is attached for each unit (use the correct procedure for the unit selected).
- Required Materials:** Copy of :
- OVID 106714 (107714), Sheet 2
 - Unit 1 (or Unit 2) EOP E-1.4, step 10 (partial procedure OK).
- Initial Conditions:** Given:
- A large break LOCA has occurred on **Unit 1 / Unit 2 (specify)**.
 - The Control Room operators are transferring to hot leg recirculation and are ready to establish CCW train separation.
 - The following conditions exist:
 - CCW pumps 12 and 13 (22 and 23) are running. CCW pump 11 (21) is shutdown.
 - FCV-430 and 431, CCW HX outlet stop valves, are OPEN.
 - FCV-355, CCW header C isolation valve, is OPEN.
- Initiating Cue:** The Shift Foreman directs you to locally separate the CCW on **Unit 1 / Unit 2 (specify)** trains in accordance with EOP E-1.4, step 10.
- Note:** Do NOT provide the student with the Task Standard.
- Task Standard:** CCW headers are split per E-1.4 step 10.c

Start Time: _____

Step	Standards
1. Verifies two CCW Pps running.	1.1 Notes that CCW Pps 2 and 3 running (from initial conditions). Step was: Sat: _____ Unsat _____
2. Open FCV-430 or FCV-431, Idle CCW HX Outlet Stop Vlv.	2.1 Notes that FCV-430 and FCV-431 are OPEN (from initial conditions). Step was: Sat: _____ Unsat _____
** 3. Performs initial steps in Aux Bldg to separate CCW header B from A and C.	<p>*****</p> <p>Cue: Provide a copy of OVID 106714 (107714), if referenced by the examinee.</p> <p>*****</p> <p>*****</p> <p>Cue: The Shift Foreman has given permission to break component seals, and another operator will follow through with the sealed component paperwork.</p> <p>*****</p> <p>3.1 Evaluates step 10 of E-1.4 and determines that step 10c RNO must be performed (from initial conditions).</p> <p>3.2 Notes that CCW Pps 2 and 3 are running (from initial conditions).</p> <p>3.3 Notes that FCV-355 is OPEN (from initial conditions).</p> <p style="text-align: right;"><i>(con't on next page)</i></p>

** Denotes Critical Step and Sub Steps.

Step	Standards
3. (con't)	<p>3.4 Closes CCW-19, CCW pump 2 discharge to header A.**</p> <p><u>Note:</u> Valve is located in O/H in the #2 CCW Pp room, near and above pump on west wall. It is a normal handwheel operated valve, CW to CLOSE.</p> <p>*****</p> <p>Cue: (once valve operation described) The position pointer is pointing at "C".</p> <p>*****</p> <p>3.5 Closes CCW-17, CCW pump 13 discharge to header B.**</p> <p><u>Note:</u> Valve is located in O/H in the #3 CCW Pp room, near and above pump on west wall. It is a normal handwheel operated valve, CW to CLOSE.</p> <p>*****</p> <p>Cue: (once valve operations described) The position pointer is pointing at "C".</p> <p>*****</p> <p>Step was: Sat: _____ Unsat _____</p>

** Denotes Critical Step and Sub Steps.

Step	Standards
** 4. Continues steps in Turbine Bldg and Aux Bldg to separate CCW header B from A and C.	4.1 Closes CCW-23, CCW header A to C isolation valve.**
	<u>Note:</u> The following cue <u>may</u> be used to minimize the trips in and out of the Aux Bldg. It does not have to be used.

	Cue: (if/once the examinee verbalizes that CCW-23 is located in the TB, give the following cue) The SFM authorizes the performance of steps out of sequence.

	<u>Note:</u> Valve is located in O/H platform between the two CCW HXs in the CCW HX room (turbine bldg). It is a normal handwheel operated valve, CW to CLOSE.

	Cue: (once valve operations described) The position pointer is pointing at "C".

	(con't on next page)

** Denotes Critical Step and Sub Steps.

Step	Standards
** 4. (con't)	4.2 Closes CCW-5, suction crosstie header A to C.**
	<u>Note:</u> Valve is located adjacent to and behind the #3 CCW Pp (#3 CCW Pp room) (aux bldg), towards north (south for U-2)) wall. It is a normal handwheel operated valve, CW to CLOSE.

	Cue: (once valve operations described) The position pointer is pointing at "C".

	Step was: Sat: _____ Unsat _____

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub Steps.

EXAMINEE CUE SHEET

CAUTION: **No plant controls or equipment are to be operated during the performance of this JPM. Controls may be pointed at, but are not to be touched.**

Initial Conditions: Given:

- Units 1 and 2 were ramped down to **25% power, due to a** large storm moving in (impending "kelp attack").
- Unit 2 is currently at 25% power, and stable (per U4300A05/A15).
- Current group step counter readings on Unit 2 are as follows:

	CBA	CBB	CBC	CBD
Group 1	231	231	147	19
Group 2	231	231	147	19

- PK03-13, ROD LO INSERTION LIMIT, has just alarmed, and the crew is responding to that alarm.

Initiating Cue: **The U-2 Shift Foreman (SFM) has directed you to perform step 11 of STP I-1A to determine** if control banks are above the Rod Insertion Limit (RIL). Note your results on the STP, and on this Cue / Answer Sheet.

