Facility: _**DCPP Units 1 & 2**___ Scenario No.: __**NRCSIM-01**__ Op-Test No.: _**01**_

Examiners: ______________________________ Operators: ______________________________

______________________________ ______________________________

______________________________ ______________________________

Initial Conditions:
100% power, equilibrium Xe, 590 ppm, MOL (IC-510). DG 1-1 is tagged out for repairs on starting circuit, OOS for 5 hours, due back in 12 hours (Drill File 34)(Place yellow tags on CB). PRA YELLOW. PDP in service (Drill File 90). Diluting 20 gal/hr. STP I-1C was completed one hour ago, due in seven. Last run two days ago.

Turnover:
Swap from PDP to CCP 1-2.

Event No.	Malf. No.	Event Type*	Event Description
1	Drill File 6020	N, ALL	Secure PDP and place CCP 1-2 in service
2	Xmt pzr40	I, ALL	LT 459 Failure low
3		N, ALL	Restore Letdown
4	Xmt rcs138	I, RO	Loop 4 T_C failure
5		R, ALL	**CALL** - EPOS requests ramp to 900 MW within 30 min. Start ramp in 10 min. (Call 12 minutes before ASW pump trip)
6	Pmp asw1 Pmp asw2	C, BOP	Loss of ASW pumps
7	Cnv mfw5	C, RO	SG 1-2 FRV failure
8	Mal mss6c	M, ALL	SG 1-2 safety valve sticks open
9	Mal rcs4c	M, ALL	SGTR from SG 1-2
10	Pmp rhr1/2	C, ALL	Failure of RHR Pumps 1-1 and 1-2 to AUTO start

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

#2 drl_file 6020

Op-Test No.: _01__ Scenario No.: _01__ Event No.: _01__ Page _1_ of _9_

Event Description: ____Secure PDP and place CCP 1-2 in service.____________________________

Time	Position	Applicant's Actions or Behavior
	SFM	Tailboard the event using OP B-1A:V
	RO	Places FCV-128 in manual to control charging flow.
	BOP	Verify CCP recirc valves open
	BOP	Start CCP 1-2
	RO	Reduce PDP speed while opening FCV-128
	BOP	Secure PDP
	RO	Control charging flow to maintain PZR level and place FCV-128 in Auto
	RO	Adjust seal injection as necessary with HCV-142

Op-Test No.: _01__ Scenario No.: _01__ Event No.: _02__ Page _2_ of _9_

Event Description: ____PZR Pressure Transmitter LT-459 Failure Low_______

Time	Position	Applicant's Actions or Behavior
	BOP	Diagnoses LT-459 failing low
	RO	Takes manual control of PZR level control and reduces charging to minimum **
	SFM	Enters AP-5
	RO	Selects B/U channel for control
	ALL	Re-establishes letdown (event #3)
	SFM	Refers to Tech Specs 3.3.1.M
	SFM	Determines bistables in Protection Set 1, Rack 1 to be tripped
	SFM	Directs Asset Team to investigate

Op-Test No.: __01_ Scenario No.: __01__Event No.: _03_ Page _3_ of _9_

Event Description: ___Restore Letdown____

Time	Position	Applicant's Actions or Behavior
	SFM	Tailboard OP B-1A:XII for restoring Letdown, including reactivity control.
	BOP	Take manual and open TCV-130 and PCV-135 to prescribed position
	BOP	Open Letdown isolation valves
	RO	Increase charging to 87 gpm while maintaining seal injection
	BOP	Adjust PCV-135 and TCV-130 as needed
	RO/BOP	If Letdown Relief Valve lifted, reseat valve
	RO	Return charging flow to auto when level stabilized

Op-Test No.: _01_ Scenario No.: _01__ Event No.: __4___ Page _4_ of _9_

Event Description: ________Loop 4 Tcold Failure High______________

Time	Position	Applicant's Actions or Behavior
	SFM/BOP	Diagnoses Loop T_{AVG} failure of TE-441
	RO	Places rods in manual**
	SFM	Enters AP-5
	RO	Defeats Loop 4 for T_{AVG} and ΔT
	RO	Withdraws rods in manual to restore T_{AVG} **
	SFM	Refers to Tech Specs (3.3.1.E & X and 3.3.2.M)
	RO	Returns rod control to AUTO (as time allows)
	SFM	Determines bistables to be tripped in Racks 15 and 16
	SFM	Notifies Asset Team to investigate

Op-Test No.: _01_ Scenario No.: _01__ Event No.: __5___ Page _5_ of _9_

Event Description: _____Ramp for Path 15 Emergency_________________________________

Time	Position	Applicant's Actions or Behavior
	SFM	Tailboard to include target MW, rate, amount of boration and reactivity oversight to be used.
	RO	Start a boration per OP B-1A:VII
	BOP	Start the ramp per OP C-3:III
	RO	Verify boration
	BOP	Verify ramp

Op-Test No.: _01_ Scenario No.: _01__ Event No.: __6___ Page _6_ of _9_

Event Description: _____Loss of ASW Pumps_________________

Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledge alarm on PK01-03 and loss of ASW pump 1-1
	BOP	Attempt to start other train ASW pump 1-2
	SFM	Enters OP AP-10
	RO/BOP	Direct Unit 2 to start an ASW pump and open cross-connect valve to supply Unit 1 ASW **
	BOP	Open Unit 1 cross-connect valve **
	RO/BOP	Direct Aux Watch to stop any radwaste discharges overboard
	SFM	Enter T.S. 3.0.3
	BOP	Verify CCW temperatures normal or decreasing

Op-Test No.: _01_ Scenario No.: _01__ Event No.: __7___ Page _7_ of _9_

Event Description: _____SG 1-2 FRV Failure________________________

Time	Position	Applicant's Actions or Behavior
	RO	Respond to Steam/Feed Mismatch alarm by checking MFW pump and MFRVs
	BOP	Identifies SG 1-2 level increasing rapidly
	RO	Attempt to take manual control of Feed Reg Valve FCV-520
	RO	Recognizes no control of SG 1-2 level
	SFM	Directs Reactor Trip
	RO/BOP	Trips the reactor **
	SFM	Enters E-0
	ALL	Performs immediate actions from memory

Op-Test No.: _01_ Scenario No.: _01__ Event No.: __8 & 10___ Page _8_ of _9_

Event Description: _____SG 1-2 Safety Valve sticks open and Failure of RHR to Auto Start_______________

Time	Position	Applicant's Actions or Behavior
	ALL	Identifies Faulted SG 1-2
	SFM	Directs SI if did not occur automatically
	SFM	Conducts E-2 tailboard
	BOP	Isolates S/G 1-2 **
		• Closes MSIV
		• Isolates AFW flow
	SFM	Directs transition to E-1.1 (may transition to E-1.0 first)
	BOP	Performs E-0 Appendix E
	BOP	Recognizes RHR pumps failure to start on SI
	BOP	Manually starts RHR pumps and informs SFM of event
	SFM	If in E-1.0, Foldout Page step 5 directs kickout to E-3 on uncontrolled SG level increase; kickout to E-3 (next event, #9)

Op-Test No.: _01_ Scenario No.: _01__ Event No.: __9___ Page _9_ of _9_

Event Description: _____SGTR on SG 1-2 ________________________________

Time	Position	Applicant's Actions or Behavior
	BOP	Identifies Ruptured SG 1-2
	SFM	Transitions to E-3 and Conducts tailboard
	BOP	Sets 10% steam dump to 8.67 turns (1040 psig)
	BOP	Isolates S/G 1-2 **
		• Verifies MSIV Closed
		• Verifies AFW isolated
		• Isolates steam to TDAFP
	SFM	Transitions to ECA-3.1 based on Ruptured SG pressure
	SFM	Conducts tailboard
	RO	Shuts down the RHR pumps
	RO	Cools down the RCS using intact 10% steam dumps if not already cooled down from faulted SG

Facility: _**DCPP Units 1 & 2**___ Scenario No.: __**NRCSIM-02**__ Op-Test No.: _**01**_

Examiners: ______________________________ Operators: ______________________________

______________________________ ______________________________

______________________________ ______________________________

Initial Conditions:
100% power. MOL. 590 ppm boron. Diluting 20 gal/hr. Last dilution 15 minutes ago.

Turnover:
Maintain current plant conditions.

Event No.	Malf. No.	Event Type*	Event Description
1	Pmp ccw1 ccw2	C, BOP	Trip of CCW Pp 1-1 and failure of CCW Pp 1-3 to auto start
2		R, ALL	CALL – EPOS: Path 15 emergency. Ramp to 900 MW within 30 min. Start ramp in next 10 min.
3	Cnh cvc4	C, ALL	Auto RMUW system failure
4	Xmt mfw46	I, ALL	Failure of LT-549, SG 1-4 level transmitter
5	Xmt cvc4	I, RO	Failure of FCV-128 auto control
6	Mal syd3	C, ALL	Grid frequency variation (drops to 58 HZ)
7	Mal gen4	C, ALL	Full load rejection
8	Mal pzr1	M, ALL	PZR steam space break
9	Ovr vx4i222o	C, ALL	Trip of 52-HG-15 (vital bus startup supply)
10	Mal deg1a	C, ALL	Trip of DG1-1
11	Mal ppl1a	I, ALL	Failure of Phase A Train A to actuate
12		M, ALL	SBLOCA Response per E-1 and E-1.2

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

#4 drl_file 6040; drl_file 15 – secure vacuum, SJAE, Gland Seal; drl_file 48 – swap Batt 13 to Batt Chrg 131

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __1__ Page _1_ of _10_

Event Description: _____Trip of CCW Pp 1-1______________________________

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledge PK01-09, CCW Pumps
	BOP	Diagnose CCW Pp 1-1 trip and 1-3 failure to auto start
	BOP	Manually start CCW Pp 1-3
	BOP	Verify action by referencing OP AP-11
	SFM	Reference Tech Spec 3.7.7

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __2__ Page _2_ of _10_

Event Description: ______________Path 15 Emergency Ramp____________________

Time	Position	Applicant's Actions or Behavior
	SFM	Tailboard to include target MW, rate, amount of boration and reactivity oversight to be used.
	RO	Start a boration per procedure OP B-1A:VII (start of failure of boration, event #3)
	BOP	Start the ramp per procedure OP C-3:III
	RO	Verify boration completes as set in
	BOP	Verify ramp progressing to target at set ramp
	RO	Verify rods step in

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __3__ Page _3_ of _10_

Event Description: ________Failure of Reactor Makeup System _____________________

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledge alarm PK05-11 CVCS Makeup Deviation
	RO	Verify 1/MU OFF
	BOP	Verify valves aligned per PK05-11 on VB-2 or AP-6, Emergency Boration
	SFM	May transition to AP-19, Malfunction of Reactor Makeup Control
	SFM	May transition to OP B-1A:VII, CVCS Makeup Control System Operation
	SFM	Tailboards use of Manual for Makeup
	BOP	Verifies control board lineup
	RO	Takes HC-110 to manual and aligns integrators and 43/MU and 1/MU for operation
	RO	Performs boration and verifies proper operation **
		IF AP-6 is used:
	BOP	Start BA Transfer pumps in Hi
	BOP	Close HCV-104 or 105
	BOP	Open 8104

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __4__ Page _4_ of _10_

Event Description: _____Failure of LT-549, SG 1-4 Level Transmitter______________

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Acknowledge DFWCS alarm and diagnose LT-549 failure
	RO/BOP	Verify control systems controlling in auto
	SFM	Enter AP-5
	SFM	Contact Maintenance Services
	SFM	Determine failure in Rack 8
	SFM	Determine Tech Spec and ECG association
	SFM	Determine MDAFW supply to SG 1-2, LCV-113 operability per TS and ECG (3.3.2.D, 3.3.2.J, 3.3.1.E and ECG 4.1) **
	BOP	Place LCV-113 in Manual and Open (may be completed during E-0 actions) **

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __5__ Page _5_ of _10_

Event Description: ______Failure of FCV-128 Auto Control _______

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Recognize increased seal injection flow
	RO	Recognize FI-128 indicates 0 gpm
	RO	Diagnose problem as a failure of FCV-128 to control in auto
	RO	Take manual control of FCV-128 and reduce actual charging flow **
	SFM	Enter AP-5
	RO	Verify charging and seal injection are stable
	BOP	Verify Letdown normal
	SFM	Contact Maintenance Services
	RO	Maintain manual control of FCV-128
	RO	Maintain seal injection 6-12 gpm and control PZR level in band

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __6__ Page _6_ of _10_

Event Description: ___Grid Frequency Variation_______________________________________

Time	Position	Applicant's Actions or Behavior
	SFM	Recognize conditions relating to lowering grid frequency
	RO	Respond to reduced seal injection flow
	ALL	Diagnose problem as grid frequency problem
	ALL	Determine plant response appropriate for condition
	SFM	Tailboard event

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __7__ Page _7_ of _10_

Event Description: _____Full Load Rejection/Reactor Trip_______________

Time	Position	Applicant's Actions or Behavior
	ALL	Recognize Full Load rejection
	RO/BOP	Verify plant control systems operating as expected
	ALL	Recognize reactor trip
	ALL	Perform Immediate Actions **
	SFM	Enter E-0
	ALL	Verify Immediate Actions
	BOP	Verify SI if it occurs
	SFM	Transition to E-0.1 if no SI occurs; Continue in E-0 is SI occurs
	BOP	Control AFW cooldown **
	RO	Verify PZR level and pressure controlling

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __8, 11__ Page _8_ of _10_

Event Description: _____PZR Steam space break / Failure of Phase A Train A to Actuate_____________

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Recognize PZR pressure decrease and level increase
	ALL	Determine need for SI
	RO	Manually SI if not already initiated
	SFM	Enter E-0 again if in E-0.1
	ALL	Perform Immediate Actions
	BOP	Verify Vital Buses F & G energized, H NOT energized
	BOP	Perform Appendix E
	BOP	Recognize Failure of Phase A and align valves accordingly **
	RO	Verify AFW flow and SG levels
	RO	Verify RCS temperature trending to 547°
	RO	Verify SGs intact
	RO	Verify RCS is NOT intact **
	SFM	Transition to E-1

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __9, 10__ Page _9_ of _10_

Event Description: _____Trip of 52-HG-15 and DG 1-1_____________________________________

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize Vital Bus H deenergized
	BOP	Recognize non-vital buses energized
	BOP	Recognize DG 1-1 tripped
	BOP	Diagnose problem as 52-HG-15 trip and power is available to ALL buses except bus H
	RO/BOP	Identify equipment not available because of Bus H (AFWP 1-2, CCWP 1-3, RHRP 1-2, SIP 1-2, CSP 1-2)

Op-Test No.: __1__ Scenario No.: __2__ Event No.: _12__ Page _10_ of _10_

Event Description: ____E-1 and E-1.2____

Time	Position	Applicant's Actions or Behavior
	SFM	Tailboard E-1
	BOP	Check RCPs already secured
	BOP	Check SGs intact
	RO/BOP	Check PORVS intact
	RO	Check Containment Spray not running
	SFM	Check ECCS flow should NOT be reduced
	BOP	Determines DGs can NOT be secured
	SFM	Transition to E-1.2, Post LOCA Cooldown and Depressurization
	SFM	Tailboard transition
	RO	Reset SI and Phase A **
	BOP	Establish air to Containment
	BOP	Cooldown to Cold Shutdown using 10% steam dumps < 100°/hr
	RO	Block Low Steam Line and Low PZR Pressure SI at P-11

Facility: **_DCPP Units 1 & 2___** Scenario No.: **__NRCSIM-03__** Op-Test No.: **_01_**

Examiners: ______________________________ Operators: ______________________________

______________________________ ______________________________

______________________________ ______________________________

Initial Conditions:
100% power(IC-510). MOL with boron at 590 ppm. Diluting 20 gal/hr. Last dilution was 15 minutes ago. It was reported 5 minutes ago that DG 1-1 had an air leak from the turbocharger receiver relief valve. The receiver has been isolated and the compressor secured. Technical Specifications have NOT been reviewed for this event.

Turnover:
Swap Condensate Booster Pumps per procedure for clearance on set 1-1.

Event No.	**Malf. No.**	**Event Type***	**Event Description**
1		N, BOP	Swap Condensate Booster Pump sets
2	Xmt cvc20	I, ALL	VCT Level Indicator LI-114 Fail High
3	Cnh pzr4	I, RO	Failed Auto control of PZR Pressure Controller HC-455
4	Mal cws3a cws3b asw2	C, ALL	Increased screen and condenser DP **(Call from Intake Watch of sudden increase in swells breaking over breakwater; kelp buildup.) (Call as Steve David reporting Environmental report rapidly building storm. Direct crew to reduce to 50% within 1 hour.)**
5		R, ALL	Ramp unit to 50%
6	Xmt mss62	I, BOP	SG 1-1 Pressure Transmitter Fail High (10% Controller Fail Open in Auto)
7	Mal sei1	M, ALL	Earthquake
8	Mal rcs3e	M, ALL	LBLOCA
9	Loa sis1	C, ALL	Loss of RWST (SI-1)
10	Pmp asw2	C, BOP	Failure of ASW pump 1-2 to Auto Start

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

#6 drl_file 6060

Op-Test No.: __01__ Scenario No.: _03_ Event No.: __01__ Page _1__ of _8__

Event Description: ___DG Inoperability and Swap Condensate Booster Pump_______________

Time	Position	Applicant's Actions or Behavior
	SFM	Evaluate DG condition for inoperability per TS 3.8.3 and 3.8.1
	SFM	Declare DG 1-1 inoperable
	SFM	Tailboard swapping from set 1-1 to set 1-3
	BOP	Notify the Polisher Watch of the swap
	BOP	Place set 1-3 in manual and start the pump per OP C-7A:I, section 6.2
	BOP	Secure set 1-1

Op-Test No.: __01__ Scenario No.: _03_ Event No.: __02__ Page _2__ of _8__

Event Description: ______VCT Level Indicator LI-114 Fail High__________

Time	Position	Applicant's Actions or Behavior
	RO	Observe VCT level increase on PPC
	RO/BOP	Observe FCV-112A has diverted from VCT to LHUT
	RO	Channel check VCT level channels (114 on HSP or PPC reading 100%), determines that LT-114 failed high
	SFM	Refers to AP-19, Appendix A, determines that "start-to-open" signal to LCV-112A and VCT LVL LO-LO alarm OOS
	BOP	Places FCV-112A in the VCT position
	SFM	Notify TM to troubleshoot and repair LT-114

Op-Test No.: __01__ Scenario No.: _03_ Event No.: __03__ Page _3__ of _8__

Event Description: ______PZR Pressure Controller HC-455 fails in Auto Mode ____

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledge PK05-17, Low PZR Pressure
	RO/BOP	Observe pressure indications on CC2 not trending with VB-2 indications
	RO	Take manual control of PZR Pressure and control pressure in band **
	SFM	Enter OP AP-5 or OP AP-13
	RO	Diagnose controller failed, not channel
	RO	Maintain PZR Pressure control in manual
	SFM	Contact Maintenance Services

Op-Test No.: __01__ Scenario No.: _03_ Event No.: __04__ Page _4__ of _8__

Event Description: ____Increased Screen and Condenser DP________________________________

Time	Position	Applicant's Actions or Behavior
	RO	Receives alarm PK13-01, Screen Hi Diff Auto Start
	SFM	Referencs to AR PK13-01
	BOP	Has local operator check screens still running continuously, in fast speed and OK
	SFM	Implements OP AP-7, Degraded Condenser, when Screens ΔP cannot be reduced below 8 inches
	BOP	Checks CWPs status normal; verifies screens in high speed.
	SFM	Monitors Screens ΔPs on the PPC
	SFM	References OP O-28, Intake Management

Op-Test No.: __01__ Scenario No.: __03__ Event No.: _05__ Page _5__ of _8__

Event Description: ____Ramp to 50% and securing of CWP 1-2____________________________

Time	Position	Applicant's Actions or Behavior
	SFM	Direct a load reduction to 50% and contacts EPOS
	BOP	Set in ramp and commence turbine ramp if time permits
	RO	Calculate and start boration if time permits
	SFM	Monitor screen DP
	SFM	Observes Screens ΔP for CWP 1-2 increasing above 70"
	SFM	Directs trip of CWP 1-2 (may have been done earlier) **
	BOP	Trips CWP 1-2 (may have been done earlier) **
	RO	Monitors programmed ramp to 50% from trip of CWP 1-2
	ALL	Crew stabilizes plant at 50% and continues to monitor screens, CWPs, and ASW

Op-Test No.: __01__ Scenario No.: __03__ Event No.: _06__ Page _6__ of _8__

Event Description: SG 1-1 Pressure Transmitter PT-516 Fail High____________________________

Time	Position	Applicant's Actions or Behavior
	BOP	Identify SG 1-1 10% Atmospheric open
	BOP	Inform SFM, take manual control and close atmospheric **
	SFM	Enter OP AP-5
	RO/BOP	Verify plant controls operating in automatic
	SFM	Contact Maintenance Services
	SFM	Reference TS 3.3.2.D to ensure operability

Op-Test No.: __01__ Scenario No.: __03__ Event No.: _07__ Page _7__ of _8__

Event Description: ____Earthquake____

Time	Position	Applicant's Actions or Behavior
	ALL	Recognize earthquake
	RO	Place rods in auto if in manual
	ALL	Monitor plant for proper response
	BOP	Determine magnitude of earthquake at 0.4g
	ALL	Recognize reactor trip
	ALL	Perform immediate actions **
	SFM	Enter E-0
	ALL	Verify immediate actions
	BOP	Takes control of AFW to minimize cooldown **
	SFM	Transition to E-0.1
	RO	Verify PZR level control trending to 22%
	BOP	Verify PZR pressure control trending to 2235#

Op-Test No.: __01__ Scenario No.: __03__ Event No.: _08 and 10__ Page _8__ of _8__

Event Description: __LBLOCA and Failure of ASW pump 1-2 to Auto Start___________________

Time	Position	Applicant's Actions or Behavior
	RO	Recognize PZR level and pressure decrease
	SFM	Direct manual SI if recognized early enough
	RO	Manually SI if Auto has not occurred
	SFM	Transition to E-0
	ALL	Verify Immediate Actions **
	BOP	Perform Appendix E
	BOP	Manually start ASW pump 1-2 on failure to auto start **
	RO/BOP	Recognize Adverse Containment and notify SFM
	SFM	Transition to E-1
	SFM	Tailboard transition
	BOP	Verify RCPs tripped
	BOP	Verify SGs intact
	RO/BOP	Recognize CCPs, SIPs, and RHRps cavitating
	RO/BOP	Reset SI and 4kV transfer relays **
	RO/BOP	Secure CCPs, SIPs, RHRps **
	SFM	Diagnose Cold Leg Recirc Capability NOT met **

Facility: _**DCPP Units 1 & 2**___ Scenario No.: __**NRCSIM-04**__ Op-Test No.: _**01**_

Examiners: ______________________________ Operators: ______________________________

______________________________ ______________________________

______________________________ ______________________________

Initial Conditions:
100% power. MOL (IC-510). 590 ppm Boron. AFW Pp 1-2 OOS for repair last 12 hours. RTS in 24 hours (Drill File 43). Diluting 20 gal/hr. Last dilution was 15 minutes ago.

Turnover:
Swap CFCUs from 1-1 to 1-2 for clearance.

Event No.	**Malf. No.**	**Event Type***	**Event Description**
1		N, BOP	Swap CFCU from 1-1 to 1-2.
2		R, ALL	**CALL** – EPOS: Path 15 emergency. Commence ramp in 10 minutes to 900MW in following 30 minutes.
3	pmp cvc2	C, ALL	Trip of running CCP and restoring letdown
4	Xmt tur2	C, ALL	PT-505 hangs up at 100%
5	Xmt pzr27	I, RO	PZR pressure controller bias fails to +100# during ramp
6	Ovr vb3079a	C, BOP	TCV-23 Failure
7	Mal sei1	M, ALL	Earthquake
8	Mal rcs1	M, ALL	LBLOCA (50% DBA loop 2)
9	Mal ppl1b	C, BOP	Failure of phase A Train B to actuate
10	Mal syd1	M, ALL	Loss of Offsite power
11			Transfer to Cold Leg Recirc

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

#7 drl_file 6070

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __01__ Page _1_ of _9_

Event Description: ____Swap CFCU____

Time	Position	Applicant's Actions or Behavior
	SFM	Tailboard swap of CFCU from 1-1 to 1-2
	BOP	Swap CFCU per OP H-2:I

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __02__ Page _2_ of _9__

Event Description: ____Path 15 Emergency Ramp____

Time	Position	Applicant's Actions or Behavior
	SFM	Verify EPOS call for Path 15 Ramp
	SFM	Tailboard crew on emergency ramp and reactivity control
	RO	Start a boration per OP B-1A:VII
	BOP	Start the ramp per OP C-3:III
	RO/BOP	Verify ramp progressing to target at set ramp

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __03__ Page _3_ of _9_

Event Description: ___Trip of CCP and restoring letdown________________________________

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledge alarm PK04-17, CCP 1-2
	BOP	Diagnose CCP 1-2 trip
	SFM	Enter OP AP-17, Loss of Charging
	BOP	Start CCP 1-1 **
	RO	Control PZR level control to return PZR level to band **
	RO	Control Seal Injection flow
	SFM	Tailboard placing letdown in service
	BOP	Place TCV-130 and PCV-135 in manual and open
	RO	Increase charging flow
	BOP	Open letdown orfice isolation valve
	BOP	Place TCV-130 and PCV-135 in auto
	SFM	Reference TS

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __04___ Page _4_ of _9_

Event Description: ____PT-505 Failure High (stuck in position)_______________________

Time	Position	Applicant's Actions or Behavior
	RO	Recognize not enough rod motion for plant condition
	RO	Recognize $T_{AVG} - T_{REF}$ difference not normal for condition
	BOP	Diagnose PT-505 failed as is at 100%
	RO	Place rods in manual to control $T_{AVG} - T_{REF}$ difference **
	SFM	Enter AP-5
	RO/BOP	Verify other plant controllers working normally
	SFM	Identify affected bistables and TS 3.3.1 requirements
	SFM	Contact Maintenance Services

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __05___ Page _5_ of _9_

Event Description: ___PZR pressure controller bias fails to +100 psig___________________________

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledge PZR low pressure alarm PK05-17
	RO	Diagnose PZR pressure indication is about 100# over actual
	RO	Take manual control of PZR master pressure controller **
	RO	Increase PZR pressure to 2235 psig
	SFM	Enter AP-13
	BOP	Stop ramp if ordered
	RO/BOP	Verify Safeties, PORVS and sprays closed
	RO	Verify heaters energized
	RO	Restore pressure to normal band
	SFM	Exit AP-13 and enter AP-5
	RO	Loop out PT-455
	SFM	Contact maintenance services
	ALL	Recommence ramp is secured

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __06___ Page _6_ of _9_

Event Description: ___TCV-23 Failure____

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledge alarm PK14-16, Turbine/Generator Trouble
	SFM	Transition to AP-30, Main Generator Malfunctions
	BOP	Diagnose TCV-23 not functioning properly
	BOP	Take manual control of TCV-23 and restore temperature
	SFM	Contact Maintenance Services

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __07___ Page _7_ of _9_

Event Description: ____Earthquake____

Time	Position	Applicant's Actions or Behavior
	ALL	Recognize Earthquake
	ALL	Monitor plant response
	BOP	Determine magnitude of earthquake
	ALL	Verify reactor/turbine trip **
	ALL	Perform immediate actions **
	SFM	Enter E-0

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __08 & 09___ Page _8_ of _9_

Event Description: ___LBLOCA and failure of Phase A Train B________________________________

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledge alarms for SI Actuation
	ALL	Verify SI actuation **
	BOP	Verify AC Vital Buses energized **
	BOP	Implement Appendix E
	BOP	Diagnoses Phase A Train B has not actuated
	BOP	Manually position valves required to complete Phase A **
	RO	Control AFW flow to minimize cooldown **
	RO	Verify RCPs stopped **
	RO	Verify SGs intact
	ALL	Diagnose LBLOCA
	SFM	Transition to E-1
	SFM	Tailboard E-1
	RO/BOP	Verify Containment Spray required
	RO/BOP	Verify ECCS pumps running
	RO	Check RWST level at 33% **
	SFM	Transition to E-1.3, Transfer to Cold Leg Recirc **
	SFM	May enter FR-P.1
	SFM	Exit FR-P.1 after verifying RHR flow >100 gpm

Op-Test No.: __01__ Scenario No.: __04__ Event No.: __11___ Page _9_ of _9_

Event Description: _____Transfer to Cold Leg Recirc________________________________

Time	Position	Applicant's Actions or Behavior
	SFM	Direct actions of E-1.3
	RO/BOP	Reset SI, Phase A and Phase B **
	RO/BOP	Check ECCS lineup
	RO/BOP	Isolate RHR train discharge headers **
	RO/BOP	Place RHR in service to SIP **
	RO/BOP	Crosstie CCP suction to SIP suction**
	RO/BOP	Place RHR in service to CCP **
	RO/BOP	Close RWST valves **
	RO/BOP	Align Containment Spray
	RO/BOP	Reduce RHR flow as necessary
	RO/BOP	Monitor sumps

Facility: ___**DCPP**____________________ Date of Examination: __**02/07/2005**__
Examination Level (circle one): RO / SRO Operating Test Number: ___**01**_____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations **NRCADM-01SRO** **NRCADM-01RO**	N M	**SRO – Review RCS Water Inventory Balance** **RO – Perform RCS Water Inventory Balance** CFR 43.2/43.3/45.3 RO-3.4 SRO-4.0 2.1.33 Ability to recognize indications for system operating parameters which are entry level conditions for TS
Conduct of Operations **NRCADM-02SRO** **NRCADM-02RO**	N M	**SRO – Review Outage Safety Checklist** **RO – Perform Outage Safety Checklist** CFR 41.10/43.2/45.12 RO-3.4 SRO-3.8 2.1.32 Ability to explain and apply all system limits and precautions
Equipment Control **NRCADM-03SRO** **NRCADM-03RO**	N N	**SRO – Safety Function Determination** CFR 43.2/45.13 SRO-3.8 2.2.24 Ability to analyze the affect of maintenance activities on LCO status **RO – Determine Clearance Points** RO-3.6 2.2.13 Knowledge of tagging and clearance procedures
Radiation Control **NRCADM-04SRO** **NRCADM-04RO**	N N	**SRO – Approve Emergency Exposure** **RO – Determine Posting** CFR 43.4/45.10 RO-2.5 SRO-3.1 2.3.4 Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized
Emergency Plan **NRCADM-05SRO**	M	**SRO – GDT Rupture Release and EAL** CFR 43.5.45.11 SRO-4.1 2.4.41 Knowledge of SRO responsibilities in emergency plan implementation

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria: (C)ontrol room
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)
(S)imulator

Number: NRCADM01RO

Title: PERFORM RCS WATER INVENTORY BALANCE

Examinee: ______________________________

Evaluator: ____________________ ____________________ __________

Print Signature Date

Results: Sat ______ Unsat ______ Total Time: _____ minutes

Comments:

References: STP R-10C, RCS Water Inventory Balance, Rev. 25
Technical Specifications 3.4.14, RCS Leakage

Alternate Path: Yes ____________ No X

Time Critical: Yes ____________ No X

Time Allotment: 30 minutes

Critical Steps: 4, 15

Job Designation: RO/SRO

Task Number: G2.1.33

Rating: 3.4/4.0

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A JPM COORDINATOR	DATE:	
APPROVED BY:	N/A TRAINING LEADER	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, initiating cue, and task standard. 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: STP R-10C, RCS Water Inventory Balance, Rev. 25

Technical Specifications 3.4.14

Initial Conditions: Unit 1 is at BOL, 100% power with the PPC out of service. No other equipment out of service and Zinc Injection is not in service. The SFM has directed a manual RCS leak evaluation per STP R-10C. The prior shift has logged the initial readings, and has taken the final data set, but has not entered the data, nor completed the STP.

The final set of readings, taken one hour ago, are as follows:

- YIC-110 – 40 gal.
- YIC-111 – 0 gal.
- LI-461 – 52.5%
- LI-112 – 25%
- TI-412 – 572.5°
- LI-470 – 83%
- LI-188 – 52%
- FI-64 – 0 gal
- LI-950 – 66%
- LI-952 – 67%
- LI-954 – 65%
- LI-956 – 66%
- RCS to Secondary leak rate – 0.051 gpm
- RCS to CCW leak rate – 0 gpm
- Other IDENTIFIED leak rates – 0 gpm.

Initiating Cue: The SFM has directed you to complete STP R-10C through Data Reduction and Evaluation, and have it ready for his evaluation.

Task Standard: The procedure is completed and ready for SFM review.

Start Time: __________

Step	Expected Operator Actions
1. Verify Start Data Section filled out properly.	1.1 Confirms Unit 1, Mode 1and Date/Time correct. 1.2 Confirms Precaution and Limitations (Section 10) meet plant conditions and are all initialed. 1.3 Confirms Prerequisites (Section 11) meet plant conditions and initialed. **Step was: Sat: ______ Unsat _______***
2. Verify Procedure steps completed properly.	2.1 Confirms Section 12.1.1 data is recorded for Rx Power, Pressure and Temperature. 2.2 Confirms Pressure and Temperature above minimum required on steps 12.1.2 and 12.1.3. 2.3 Confirms Step 12.1.4 marked N/A. 2.4 Confirms Step 12.1.5 marked No and initialed. 2.5 Confirms Step 12.1.6 and 12.1.7 marked yes and initialed, and 12.1.8 initialed. 2.6 Confirms Step 12.2 marked N/A. 2.7 Confirms Step 12.3.1 and 12.3.4 marked N/A, steps 12.3.2 and 12.3.3 initialed. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

	Step	Expected Operator Actions
	3. Verify Table 1 and 2 data.	3.1 Confirms Table 1 data readings appear accurate. 3.2 Enters Table 2 data for Integrator, PZR Level, VCT level and T_{AVG}. **Step was: Sat: ______ Unsat _______***
**	4. Calculates Table 3 data.	4.1 Calculates Δ BA as 40 gal. ** 4.2 Calculates Δ PW as 0 gal. 4.3 Calculates Δ PZR as –217 gal. 4.4 Calculates Δ VCT as –172.8 gal. 4.5 Calculates Δ T_{AVG} as 39.25 gal. **Step was: Sat: ______ Unsat _______***
	5. Calculates Δ T step 12.3.5.	5.1 Calculates Δ T as 240 minutes. **Step was: Sat: ______ Unsat _______***
	6. Calculates RCS leak rate step 12.3.6.	6.1 Calculates RCS leak rate 1.954 gpm. **Step was: Sat: ______ Unsat _______***
	7. Calculates Leak Error Factor step 12.3.7.b.	7.1 Calculates Leak Error Factor 0.317 gpm. **Step was: Sat: ______ Unsat _______***
	8. Caluclates Gross Leak Rate step 12.3.8.	8.1 Calculates Gross Leak Rate 2.271 gpm. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

Step	Expected Operator Actions
9. Determine Gross Leak Rate is >1 gpm and must continue procedure at Table 4.	9.1 Marks 12.3.9 No. 9.2 Marks 12.3.10 N/A. 9.3 Initials 12.3.11. **Step was: Sat: ______ Unsat _______***
10. Verify Table 4 data.	10.1 Confirms initial data readings appear accurate and enters final readings. 10.2 Caluclates Δ PRT is 123 gal. 10.3 Caluclates Δ RCDT is 10.25 gal. 10.4 Caluclates Δ RCDT totalizer is 0 gal. 10.5 Caluclates Δ Accumulators is 0 gal. **Step was: Sat: ______ Unsat _______***
11. Calculates RCS Identified Leak Rate step 12.3.12. (Table 4).	11.1 Calculates Identified Leak Rate at 0.606 gpm. **Step was: Sat: ______ Unsat _______***
12. Calculate Identified Leak Rate Error Factor step 12.3.13.b.	12.1 Calculates Identified Leak Rate Error Factor at 0.458 gpm. **Step was: Sat: ______ Unsat _______***
13. Calculates Identified Leakage step 12.3.14.	13.1 Calculates Identified Leakage at 1.064 gpm. **Step was: Sat: ______ Unsat _______***
14. Signs test performer signature step 12.5.	14.1 Signs test performer. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

	Step	Expected Operator Actions
**	15. Perform step 13, Data Reduction and Evaluation.	15.1 Checks N/A on step 13.1. 15.2 Calculates Total RCS leak rate error factor from Aux Board and Control Boards, step 13.2.1.b. at 0.557 gpm. and initials step. 15.3 Calculates Unidentified Leakage at 1.918 gpm. and initials step.** **NOTE: Critical Task met if Unidentified Leakage Rate calculated > 1gpm. All other calculations in this JPM may vary as long as the final calculation identifies Unidentified Leakage as > 1 gpm.** **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

Initial Conditions: Unit 1 is at BOL, 100% power with the PPC out of service. No other equipment out of service and Zinc Injection is not in service. The SFM has directed a manual RCS leak evaluation per STP R-10C. The prior shift has logged the initial readings, and has taken the final data set, but has not entered the data, nor completed the STP.

The final set of readings, taken one hour ago, are as follows:

- YIC-110 – 40 gal.
- YIC-111 – 0 gal.
- LI-461 – 52.5%
- LI-112 – 25%
- TI-412 – 572.5°
- LI-470 – 83%
- LI-188 – 52%
- FI-64 – 0 gal
- LI-950 – 66%
- LI-952 – 67%
- LI-954 – 65%
- LI-956 – 66%
- RCS to Secondary leak rate – 0.051 gpm
- RCS to CCW leak rate – 0 gpm
- Other IDENTIFIED leak rates – 0 gpm.

Initiating Cue: The SFM has directed you to complete STP R-10C through Data Reduction and Evaluation, and have it ready for his evaluation.

Task Standard: The procedure is completed and ready for SFM review.

- ☐ The simulator is not needed for the performance of this JPM.

TITLE: Reactor Coolant System Water Inventory Balance

1 AND 2

05/20/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

1.1 Determine the gross leak rate or IDENTIFIED and UNIDENTIFIED LEAKAGE from the reactor coolant system (RCS) by taking the difference in RCS and "chemical and volume control system" (CVCS) inventory change over a reasonable period of time without inventory makeup.

2. DISCUSSION

2.1 Tracking the RCS inventory in a consistent manner provides an effective means of quantifying overall system leakages. Non-RCS sources of water added to the RCDT and PRT are eliminated or quantified when utilizing Table 4 to determine IDENTIFIED LEAKAGE.

2.2 If the gross RCS leak rate measured in STP R-10C exceeds 1 gpm (or 0.965 gpm if zinc injection is in service), this procedure will consider the following leakage parameters to allow the SFM to classify the leakage:

2.2.1 PRT Level

2.2.2 RCDT Level

2.2.3 RCDT Flow Totalizer

2.2.4 Accumulator Leakage to the RCDT

2.2.5 RCS Leakage to Secondary (Stm. Gen.)

2.2.6 RCS Leakage to CCW

2.2.7 Other IDENTIFIED LEAKAGE, which may be tracked as necessary with Volume 9

2.2.8 Initiate an Action Request (AR) to document actions taken. Create a PIMS evaluation screen (EVAL) to be routed to the maintenance rule program (PTMR).

2.3 RCS leaks to closed system (steam generators, CCW system, ECCS systems, etc.) are not directly identified in this procedure. These leaks are evaluated by other means. Examples are as follows:

2.3.1 RCS to steam generators - determine from activity analysis of secondary coolant.

2.3.2 RCS to CCW - determine from CCW activity analysis and increasing level in surge tank.

2.3.3 Letdown/Charging - determine from increasing auxiliary building area radiation monitors and airborne activity.

2.3.4 RCS to accumulators are not identified in this procedure.

3. RESPONSIBILITIES

3.1 Shift foreman (SFM), for operation of the equipment as required, for obtaining test data, for data reduction as required by this procedure and for evaluation of reactor coolant system leakage.

3.2 Chemistry engineer, for determining primary system leakage to the secondary system and the component cooling water system.

4. FREQUENCY

4.1 This test shall be performed when required by STP I-1B or as directed by the shift foreman.

4.2 RCS water inventory balance whether performed in STP I-1B or STP R-10C shall be current when operating in MODES 1 through 4 and may be performed in MODES 1 through 5.

5. TECHNICAL SPECIFICATIONS

5.1 This test is performed to satisfy Technical Specification SR 3.4.13.1.

6. ACCEPTANCE CRITERIA

6.1 The terms used herein are defined in the Technical Specifications. Reactor coolant system leakage shall be limited to:

6.1.1 NO PRESSURE BOUNDARY LEAKAGE

6.1.2 1 GPM UNIDENTIFIED LEAKAGE (or 0.965 gpm if zinc injection is in service).

6.1.3 10 GPM IDENTIFIED LEAKAGE

6.2 If these limits are exceeded, comply with the appropriate Technical Specification ACTION requirements.

6.3 If the gross RCS leak rate exceeds 1 GPM (or 0.965 gpm if zinc injection is in service), further evaluation must be performed to determine the source of the leakage and to differentiate between IDENTIFIED and UNIDENTIFIED LEAKAGE as defined in the Technical Specifications.

6.4 UNIDENTIFIED LEAKAGE, and IDENTIFIED LEAKAGE used at the decision points in this test include an error factor for readability.

7. REFERENCES

7.1 STP R-10, "Reactor Coolant System Leakage Evaluation."

7.2 Acceptance Criteria Basis AC R-10C.

7.3 NRC Information Notice 94-46, "Nonconservative Reactor Coolant System Leakage Calculation."

8. APPENDICES

None

9. ATTACHMENTS

9.1 "Pressurizer Level and RCS TAVG Adjustment Factor Curves," 03/20/03

9.2 "Pressurizer Level Correction Curves for Pressurizer Pressures," 03/20/03

START DATA SECTION

UNIT 1 OPERATING MODE 1 DATE/TIME Today / 5 hrs ago

10. PRECAUTIONS AND LIMITATIONS — INITIALS

10.1	This evaluation cannot be made if letdown diversion or excess letdown diversion has occurred during the surveillance interval. This is due to the inability to accurately measure diverted letdown flow.	JO
10.2	Verify adequate margin exists between VCT level and the VCT Level Controller LCV-112A setpoint to prevent diversions for a 35 minute wait period and for the duration of RCSLEAK run. (Suggest a 10% differential.)	JO
10.3	If "RCSLEAK" was run per STP I-1B, and if ONLY the 95% UCL LEAK RATE is ≥ 1 gpm (0.965 gpm if zinc injection is in service), then RCSLEAK may be run a second time before the manual calculation is required.	JO
10.4	If this test is run with RCS pressure and T_{AVG} below 2200 psig and 530°F, the manual calculation of step 12.3 MUST be performed. Minimize changes in pressurizer level and temperature as much as possible and use the appropriate adjustment factors, F1 and F2 (Attachment 9.1) to adjust the conversion factors for the Pressurizer Level and RCS T_{AVG}.	JO
10.5	If pressurizer pressure is below 2185 psig, the indicated level must be corrected to obtain the actual level by using the pressurizer level correction curves (Attachment 9.2).	JO
10.6	If the RCS temperature (T_{AVG}) is <530°F, the narrow-range T_{AVG} channels are out of range. In this situation, determine T_{AVG} by averaging the available computer points for loop temperature RTDs T0406A, T0419A, T0426A, T0439A, T0446A, T0459A, T0466A, and T0479A. Wide range based Avg T_{AVG} is provided by U0491.	JO
10.7	PPC values are preferred. Error factors for the PPC are much smaller than error factors for the control boards.	JO
10.8	If the PPC is unavailable, use YIC-110 and YIC-111 to determine the boric acid and primary water gallons added during the test interval. For Unit 2, the gallons must be manually tracked since the indicators only track batch additions.	JO
10.9	**Do not add primary water to the RCS or the pressurizer relief tank** during the test interval to limit instrument induced error.	JO

INITIALS

10.10 If the amount of primary water supplied to the containment exceeds that accumulated in the RCDT and pumped out of the RCDT, the standard evaluation of IDENTIFIED LEAKAGE is probably invalid. These conditions could develop if excessive RCP seal No. 3 leakage were to develop. In this case, determine the IDENTIFIED LEAKAGE for RCP seal No. 3 standpipes (STP R-10D). JD

10.11 Other IDENTIFIED LEAKAGE sources outside the RCS pressure boundary that affect the RCS water inventory balance may be included in Table 4. The Other IDENTIFIED LEAKAGE amounts may be determined by individual measurement or other suitable means. JD

10.12 Do not run any ECCS pumps taking suction from the RWST when utilizing Table 4 to determine IDENTIFIED LEAKAGE. JD

PERF

11. PREREQUISITES

11.1 The RCS operation is stable. T_{AVG} must not vary more than 5°F/hr. JD

PERF

12. PROCEDURE

12.1 Determine the method for calculating the RCS leak rate as follows:

12.1.1 Record following:

99.98	2237	572.0
Rx power (%)	RCS pressure (psig)	T_{AVG} (°F)

		YES NO	
12.1.2	RCS pressure is ≥ 2200 psig.	[X] [ ]	go
12.1.3	T_{AVG} is ≥ 530°F.	[X] [ ]	go
12.1.4	If RCSLEAK was run with STP I-1B:		
	CALCULATED LEAK RATE <1 gpm (or 0.965 gpm if zinc injection was in service.)	[ ] [ ]	
	AVG LEAK RATE <1 gpm (or 0.965 gpm if zinc injection was in service.)	[ ] [ ]	
		N/A [X]	______

12.1.5 RCSLEAK program is available and the data quality of the PPC addresses, F0111D, F0110D, L0112A, U0483 and U0484 is either 'GOOD', LALM, HALM, or DALM. Quality code of GOO* is acceptable for U0483 or U0484 if the bad input to the average is off scale high or low (quality code BAD) or has been deleted from the calculation of the average by OP O-15 resulting in a quality code of DEL for the bad input to the average. Record the AR number which documents the bad input.
AR # ________________

YES NO
[ ] [X] go

NOTE: The PPC display group 'OP RCSLK' may be used to display and check the data quality of the above addresses.

		YES NO	PERF
12.1.6	No primary water or boric acid has been added to the RCS during the period of 35 minutes before starting the test.	[X] [ ]	JO
12.1.7	No letdown, or excess letdown, diversion has occurred during the period of 35 minutes before starting the test.	[X] [ ]	JO
12.1.8	If step 12.1.2, 12.1.3, 12.1.4, 12.1.5, 12.1.6, and 12.1.7 are all 'YES' or "N/A", run the RCSLEAK program per step 12.2. Otherwise perform the manual RCS leak rate calculation per step 12.3.		JO

PERF

12.2 Run the RCSLEAK program as follows:

N/A [X]

NOTE: If primary water or boric acid is added to the RCS during this test, it will be necessary to invalidate the RCSLEAK computer run and re-run RCSLEAK.

12.2.1 At a PPC terminal, enter the Turn-on Code RCSLEAK. Press F1 to initiate. Enter 50 for number of samples. Enter 1 for time between samples (minutes), verify message appears in top left of PPC screen indicating that RCSLEAK has started. ______

NOTE: The results will print on the control room printer when the calculation is completed. The results will not be displayable on the screen until the copy is printed.

12.2.2 Verify results at a PPC terminal. Enter turn-on code "RCSDISP" at the end of the 54 minute run.

a. Verify FINAL mkeup WTR itegrator value and boric acid integrator value is the same as INITIAL integrator values. ______

b. Verify RCS operation has been stable. ______

NOTE: If makeup water or acid was added to the RCS, or RCS operation was not stable, this RCSLEAK is invalid. Attach the printer results for the invalid test to this STP data sheet and rerun RCSLEAK. Do not perform the following steps if steps 12.2.2a and 12.2.2b are not satisfactory.

c. Record the indicated data below. ______

TIME CALCULATION STARTED ___________

TIME CALCULATION COMPLETED ___________

CALCULATED LEAK RATE ___________GPM

(Gross RCS Leak Rate)

AVG LEAK RATE ___________GPM

95% UCL LEAK RATE ___________GPM

d. Press F3 and verify the status at the bottom of the screen changed to "VALID". ______

e. Zinc injection in service? YES NO [ ] [ ] ______

PERF

f. During zinc acetate injection and if CALCULATED LEAK RATE, AVG LEAK RATE or 95% UCL LEAK RATE recorded above is greater than or equal to 0.965 gpm, perform the manual calculation per step 12.3. If all the leak rates are less than 0.965 gpm, N/A step 12.3 and go to step 12.4.

N/A [ ] ______

OR

g. With NO zinc acetate injection and if CALCULATED LEAK RATE, AVG LEAK RATE or 95% UCL LEAK RATE recorded above is greater than or equal to 1 gpm, perform the manual calculation per step 12.3. If all the leak rates are less than 1 gpm, N/A step 12.3 and go to step 12.4.

N/A [ ] ______

PERF

12.3 Perform the manual RCS leak rate calculations as follows: N/A [ ]

12.3.1 Verify the quality of the PPC data points available to be used for the manual calculation by displaying the group "OP R-10C" on a PPC terminal. N/A [X] ______

12.3.2 Perform the manual RCS leak using only those PPC data with "GOOD" or "DALM" status OR board indicators in Table 1 through Table 4. To save time, start recording data in Table 4 at the same time you start recording data for Table 1. Initial data in Table 4 will be used if the calculated leak rate is ≥ 1 gpm (or ≥0.965 gpm if zinc injection was in service.). Calculate the results from Table 1 through Table 3 first then proceed to finish Table 4 if necessary. gp

12.3.3 All Readings must be taken from the same indicator. (PPC values are preferred.) gp

NOTE: Recommended ΔT in Table 1-Table 3 leak rate determination is 4 hours. Minimum ΔT is 2 hours. If using the control boards, ΔT may be increased beyond 4 hours to decrease the effects on error factor EF_g. See step 12.3.7b. Test Performer may take data at anytime on separate documentation and follow the procedure to determine what the leak rate might be. If the data is taken in less than 2 hours, it is not accurate enough to use for the STP but can be used to continue trouble shooting the problem. gp

12.3.4 If the RCS temperature or pressure are below the normal operating range, the pressurizer level and RCS T_{AVG} CONVERSION FACTOR(S) must be adjusted in Table 3 using the multipliers F1 and F2. N/A [X] ______

TABLE 1

INITIAL READINGS

Take 6 readings over 5 minutes at approximately 1 minute apart starting with t = 0 when using the PPC. N/A T_0 through T_5 and take one set of readings when using the control boards.

START DATE/TIME Today / 5 hours ago

B.A. INTEGRATOR INDICATOR [2] YIC-110 [X] or F0110D [ ] READING: 0 gallons

P.W. INTEGRATOR INDICATOR [2] YIC-111 [X] or F0111D [ ] READING: 0 gallons

PARAMETER	INDICATOR [2]	T_O	T_1	T_2	T_3	T_4	T_5	AVG
PZR LEVEL [3]	LI-461	N/A	N/A	N/A	N/A	N/A	N/A	56% Indicated

If RCS pressure < 2185 psig, determine the actual PZR level from Attachment 9.2. N/A [X] ______ Actual

PARAMETER	INDICATOR [2]	T_O	T_1	T_2	T_3	T_4	T_5	AVG
VCT LEVEL [6]	LI-112	N/A	N/A	N/A	N/A	N/A	N/A	34%
T_{AVG} [4]	TI-412	N/A	N/A	N/A	N/A	N/A	N/A	572.0°

For NOTES see Table 3.

TABLE 2

FINAL READINGS

Take 6 readings over 5 minutes at approximately 1 minute apart starting with t = 0 when using the PPC. N/A T_0 through T_5 and take one set of readings when using the control boards.

START DATE/TIME ______ / ______

B.A. INTEGRATOR INDICATOR [2] YIC-110 [ ] or F0110D [ ] READING: ______ gallons

P.W. INTEGRATOR INDICATOR [2] YIC-111 [ ] or F0111D [ ] READING: ______ gallons

PARAMETER	INDICATOR [2]	T_O	T_1	T_2	T_3	T_4	T_5	AVG
PZR LEVEL [3]								Indicated

If RCS pressure < 2185 psig, determine the actual PZR level from Attachment 9.2. N/A [ ] ______ Actual

PARAMETER	INDICATOR [2]	T_O	T_1	T_2	T_3	T_4	T_5	AVG
VCT LEVEL [6]								
T_{AVG} [4]								

For NOTES see Table 3.

NOTE: The duration of the manual leak rate evaluation should be 4 hours or longer. Minimum ΔT is 2 hours.

TABLE 3

PARAMETER	AVG FINAL from Table 2	AVG INITIAL from Table 1	DIFFERENCE & CONVERSION (FINAL-INITIAL)[1] X FACTOR[5]
a. B.A. Integrator [7]	gal ( )	gal ( )	galx1.0 = gal (ΔBA) ( )x1.0 =( ) gal
b. P.W. Integrator [8]	gal ( )	gal ( )	galx1.0 = gal (ΔPW) ( )x1.0 =( ) gal
c. Pzr Level [3]	% ( )	% ( )	%xF1x62.0 gal/% = gal (ΔPZ) ( )x( )x62 =( ) gal
d. VCT Level	% ( )	% ( )	%x19.2 gal/% = gal (ΔV) ( )x19.2 =( ) gal
e. RCS Tavg [4]	°F ( )	°F ( )	°FxF2x78.5 gal/°F = gal (ΔT_{AVG}) ( )x( )x78.5=( ) gal

NOTES:

1 Sign convention is: If Final >Initial = Positive
If Final < Initial = Negative

2 Computer values are preferred :

3 Pzr level channels are (LI-461 OR L0482A), (LI-459A or L0480A), and (LI-460 or L0481A). If the pressurizer pressure is below 2185 psig, determine actual Pzr level per Attachment 9.2. Refer to precautions and limitations, step 10.5.

4 When the RCS temperature is less than 530°F, determine T_{AVG} by averaging the available computer points for loop temperature RTDs T0406A, T0419A, T0426A, T0439A, T0446A, T0459A, T0466A, and T0479A, or using U0491.

5 If pressurizer pressure is below 2200 psig or T_{AVG} is below 530°F, refer to precautions and limitations, step 10.4.

6 VCT level channels are LI-112 or L0112A.

7 B.A. Integrator YIC-110 or PPC point F0110D.

8 P.W. Integrator YIC-111 or PPC point F0111D.

PERF

12.3.5 ΔT Calculation = End Time - Start Time

ΔT = ____________ (Table 2 Time) − ____________ (Table 1 Time) = __________ min ______

12.3.6

$$\text{Calculated RCS Leak Rate} = \frac{\Delta BA + \Delta PW - \Delta PZ - \Delta V + \Delta T_{AVG}}{\Delta T}$$

$$= \frac{(\quad)+(\quad)-(\quad)-(\quad)+(\quad)}{(\quad)}$$

Calculated RCS Leak Rate = ____________ GPM

NOTE: If the ΔPW is not zero, the RCS leak rate is invalid because the primary water integrator is not a qualified PME device.

12.3.7 Calculated RCS Leak Rate Error Factor (EF_g)

a. When readings are taken from the PPC,

$$EF_g = \frac{14.48 \text{ gal}}{\Delta T\text{min}} = \frac{14.48}{\_\_\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_ \text{ gpm}$$

N/A [ ] ______

b. When readings are taken from the control boards,

$$EF_g = \frac{76.12 \text{ gal}}{\Delta T\text{min}} = \frac{76.12}{\_\_\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_ \text{ gpm}$$

N/A [ ] ______

NOTE: ΔT may be increased beyond 4 hours to lower the effects of EF_g on the leak rates.

12.3.8 Gross RCS Leak Rate

Calculated Leak Rate + EF_g = Gross Leak Rate

____________ (Step 12.3.6) + ____________ (Step 12.3.7a or 12.3.7b) = ____________ gpm ______

PERF

12.3.9 Zinc injection in service? YES [ ] NO [ ] ______

12.3.10 If the gross leak rate calculated in step 12.3.8 is < 1 gpm (or 0.965 gpm if zinc injection was in service) go to step 12.4.

N/A [ ] ______

12.3.11 If the gross leak rate calculated in step 12.3.8 is 9 1 gpm (or 0.965 gpm if zinc injection was in service), fill out below to determine the IDENTIFIED LEAKAGE from the RCS system. Initiate an AR and route Eval to PTMR.

N/A [ ] ______

NOTE: Do NOT run ECCS pumps that take suction from the RWST while performing the IDENTIFIED LEAKAGE portion of this test. This will preclude possible leakage into the RWST or PRT from the ECCS system.

NOTE: The duration of the manual IDENTIFIED LEAKAGE evaluation should be 4 hours or longer. Minimum ΔT is 2 hours.

TABLE 4

PARAMETER INDICATOR	FINAL [1]	INITIAL [1]	DIFFERENCE & CONVERSION (FINAL - INITIAL)[1]
a. PRT Level [4] LI-470	% = gal (=)	% = gal (82 = 11345)	= (ΔPRT)gal
b. RCDT Level LI-188[4]	% = gal (=)	% = gal (50 = 181.17)	= (ΔRCDT)gal
c. RCDT Discharge Totalizer FI-64	gal	gal 0	= gal(ΔRCF) = ( )gal
d. Accumulator Level [4] Accumulator 1 LI-950 Accumulator 2 LI-952 Accumulator 3 LI-954 Accumulator 4 LI-956	% = gal (=) (=) (=) (=)	% = gal (66 = 6340) (67 = 6358) (65 = 6322) (66 = 6340)	 = gal [5](Δ Accum 1) = gal [5](Δ Accum 2) = gal [5](Δ Accum 3) = gal [5](Δ Accum 4)
		Total Δ Accum=	gal (should = 0)
e. Date/Time (decimal hrs)	date/hrs /	date/hrs Today / 5 hrs ago	hrs × 60 min/hr = min (ΔT) ( ) ×60 =( )min

NOTES:

1 Sign convention is: If FINAL > INITIAL = positive
If FINAL < INITIAL = negative

2 Contact chemistry to determine the RCS leak rate to secondary and to CCW systems.

3 Refer to the Volume 9 data for other IDENTIFIED leak rate. Specify source(s) in REMARKS. If excessive RCP No. 3 seal leakage is suspected, perform STP R-10D to determine the seal leakage rate.

4 Accumulator level may be read from the vertical board or PPC points LI950R through LI957R. Using the Volume 9 data, convert % indication to gallons. Then compute the difference in gallons.

5 If the difference is positive, enter 0 and if not equal to 0, write an AR.

12.3.12 RCS CALCULATED IDENTIFIED LEAK RATE

$$\text{Leak Rate} = \frac{\Delta PRT + \Delta RCDT + \Delta RCF + \Delta Accum}{\Delta T\ (\text{Elaspsed Time min})} + \underset{\text{Leak Rate}^2}{\overset{\text{RCS to}}{\text{Secondary}}} + \underset{\text{Leak Rate}^2}{\overset{\text{RCS to}}{\text{CCW}}} + \underset{\text{Leak Rates}^3}{\overset{\text{Other}}{\text{IDENTIFIED}}}$$

$$= \frac{(\quad) + (\quad) + (\quad) + (\quad)}{(\quad)} + \_\_\_\_ + \_\_\_\_ + \_\_\_\_$$

= ____________ gpm

PERF

12.3.13 Calculated IDENTIFIED LEAKAGE Error Factor (EF_{ID})

a. When readings are taken from the Aux Board +PPC,

$$EF_{ID} = \frac{22.17gal}{\Delta Tmin} = \frac{22.17}{\_\_\_\_\_\_\_\_\_\_}\frac{gal}{min} = \_\_\_\_\_\_\_\_\_\_ gpm$$

N/A [ ] ______

b. When readings are taken from the Aux Board + Control Boards,

$$EF_{ID} = \frac{109.8gal}{\Delta Tmin} = \frac{109.8}{\_\_\_\_\_\_\_\_\_\_}\frac{gal}{min} = \_\_\_\_\_\_\_\_\_\_ gpm$$

N/A [ ] ______

NOTE 1: ΔT may be increased beyond 4 hours to lower the effects if EF_{ID} on the leak rates.

NOTE 2: If any control board indicator is used in Table 4, use 12.3.13b.

12.3.14 IDENTIFIED LEAKAGE = RCS Calculated Identified Leak Rate + EF_{ID}.

____________ + ____________ = ____________ gpm ______

Step 12.3.12 Step 12.3.13a or 12.3.13b

12.3.15 If IDENTIFIED LEAKAGE is greater than 10 gpm, refer to Technical Specification 3.4.13 for LCO.

AR # ________________

N/A [ ] ______

12.4 REMARKS: ____

____

____

____

12.5 Test performers and verifiers:

Name	Signature	Date/Time	Init
		/	
		/	
		/	
		/	

PERF

13. DATA REDUCTION AND EVALUATION

NOTE: If the manual RCS LEAK calculation is performed, use the leak rate data from step 12.3.8.

13.1 If the Gross RCS leak rate from step 12.2.2 or 12.3.8 is less than 0.965 gpm if zinc injection is in progress or less than 1 gpm if zinc injection is NOT in progress, assume the following:

N/A [ ] ______

UNIDENTIFIED LEAKAGE < 1 gpm, and

IDENTIFIED LEAKAGE < 10 gpm

13.2 If the Gross RCS leak rate from step 12.3.8 is greater than or equal to 1 gpm, record.

N/A [ ] ______

13.2.1 Calculated Total RCS Leak Rate Error Factor (EF_{TTL}).

a. When readings are taken from the Aux Board + PPC,

$$EF_{TTL} = \frac{26.48 \text{ gal}}{\Delta T\text{min}} = \frac{26.48}{\_\_\_\_\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_\_\_ \text{ gpm}$$

N/A [ ] ______

b. When readings are taken from the Aux Board + Control Boards,

$$EF_{TTL} = \frac{133.6 \text{ gal}}{\Delta T\text{min}} = \frac{133.6}{\_\_\_\_\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_\_\_ \text{ gpm}$$

N/A [ ] ______

NOTE 1: ΔT should be the same for Table 1 through Table 4. If not use the shortest ΔT.

NOTE 2: If any control board indicator is used in Table 1 through Table 4, use 13.2.1b.

13.2.2 UNIDENTIFIED LEAKAGE = Calculated RCS Leak Rate - RCS Calculated Identified Leak Rate + $EF_{TTL.}$

____________	-	____________	+	____________	=
Step 12.3.6		Step 12.3.12		EF_{TTL} 13.2.1a or 13.2.1b	

UNIDENTIFIED LEAKAGE = ______________ ______

PERF

14. PRIMARY REVIEW

14.1 Verify the acceptance criteria have been satisfied for the reactor coolant system leak rate.

UNIDENTIFIED LEAKAGE is less than 0.965 gpm if zinc injection is in progress or less than 1 gpm if zinc injection is NOT in progress. (Steps 13.1 or 13.2.2.) ______

IDENTIFIED LEAKAGE is less than 10 gpm. (Steps 13.1 or 12.3.14) ______

14.2 REMARKS: Describe any malfunctions, explain any NO or N/A entries in any of the data and list any discrepancies.

____

____

____

____

14.3 Review the completed procedure.

If the acceptance criteria has not been satisfied, notify management promptly, write an Action Request and refer to applicable Technical Specifications limiting conditions for operations.

AR # ____________________________

Signature: ______________________________ Date/Time __________/__________
Shift Foreman

15. SECONDARY REVIEW

15.1 Review procedure for completeness and acceptability. ______

15.2 REMARKS: ____

____

____

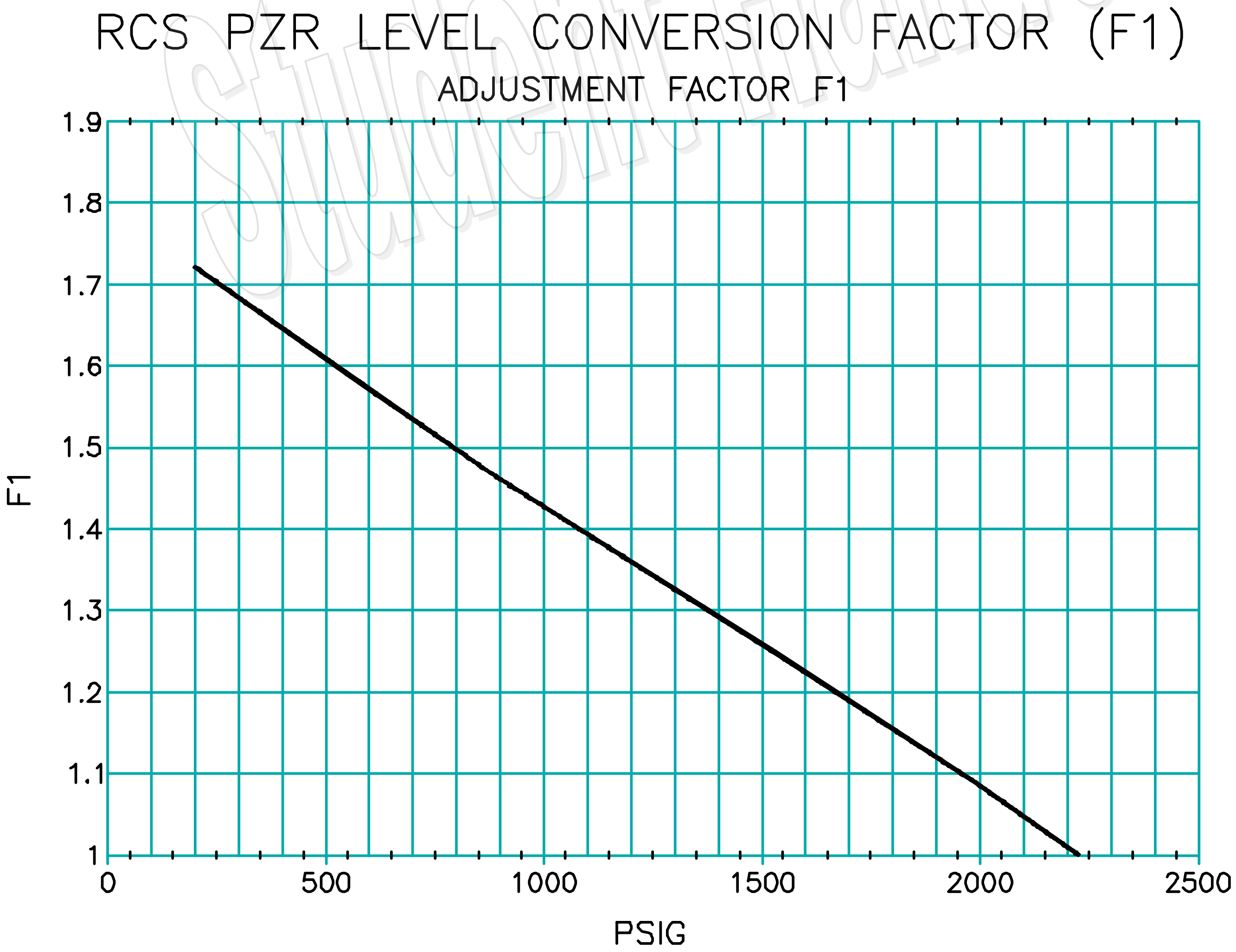
____

Reviewed By: ______________________________ Date ______________________
Second Reviewer

DIABLO CANYON POWER PLANT
STP R-10C
ATTACHMENT 9.1

1 AND 2

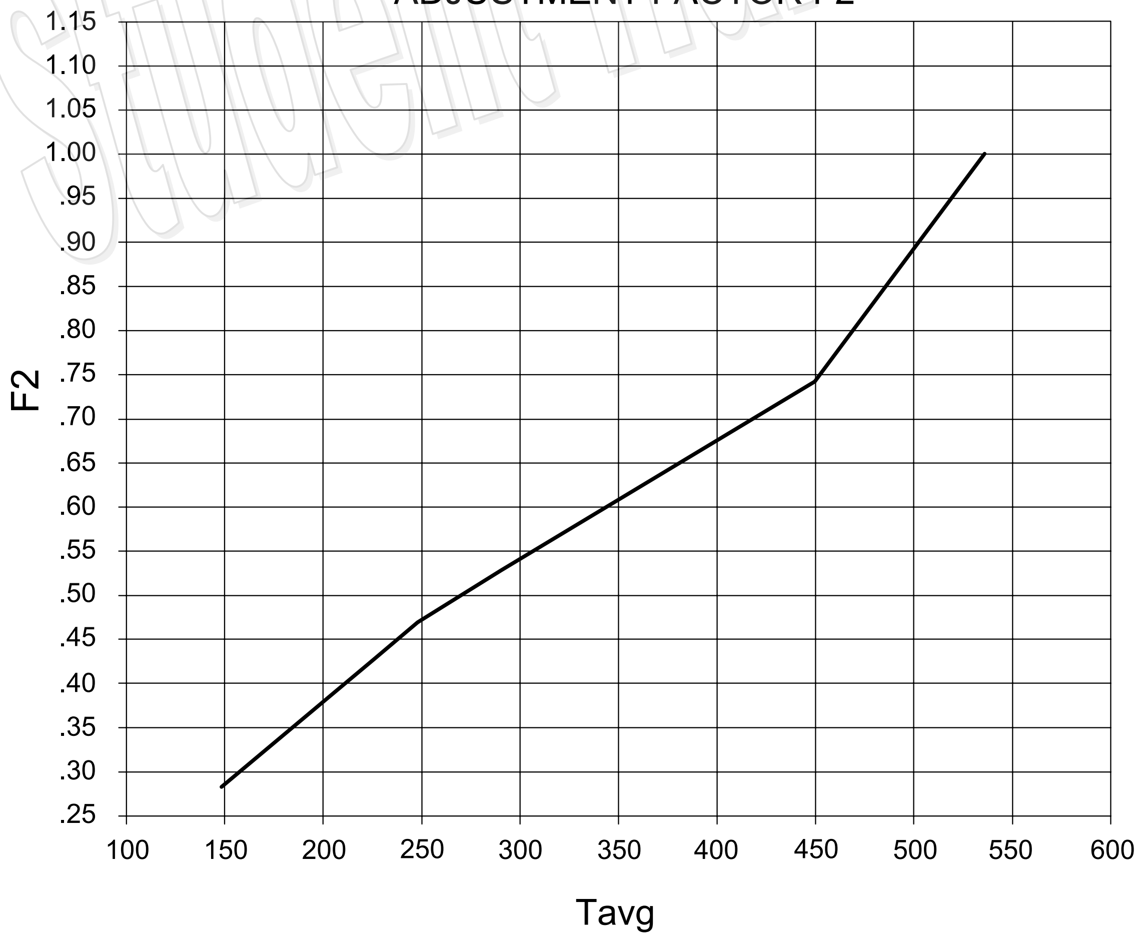
TITLE: Pressurizer Level and RCS TAVG Adjustment Factor Curves



TITLE: Pressurizer Level and RCS TAVG Adjustment Factor Curves

RCS TAVG CONVERSION FACTOR

ADJUSTMENT FACTOR F2



00982802

DIABLO CANYON POWER PLANT
STP R-10C
ATTACHMENT 9.2

1 AND 2

TITLE: Pressurizer Level Correction Curves for Pressurizer Pressures

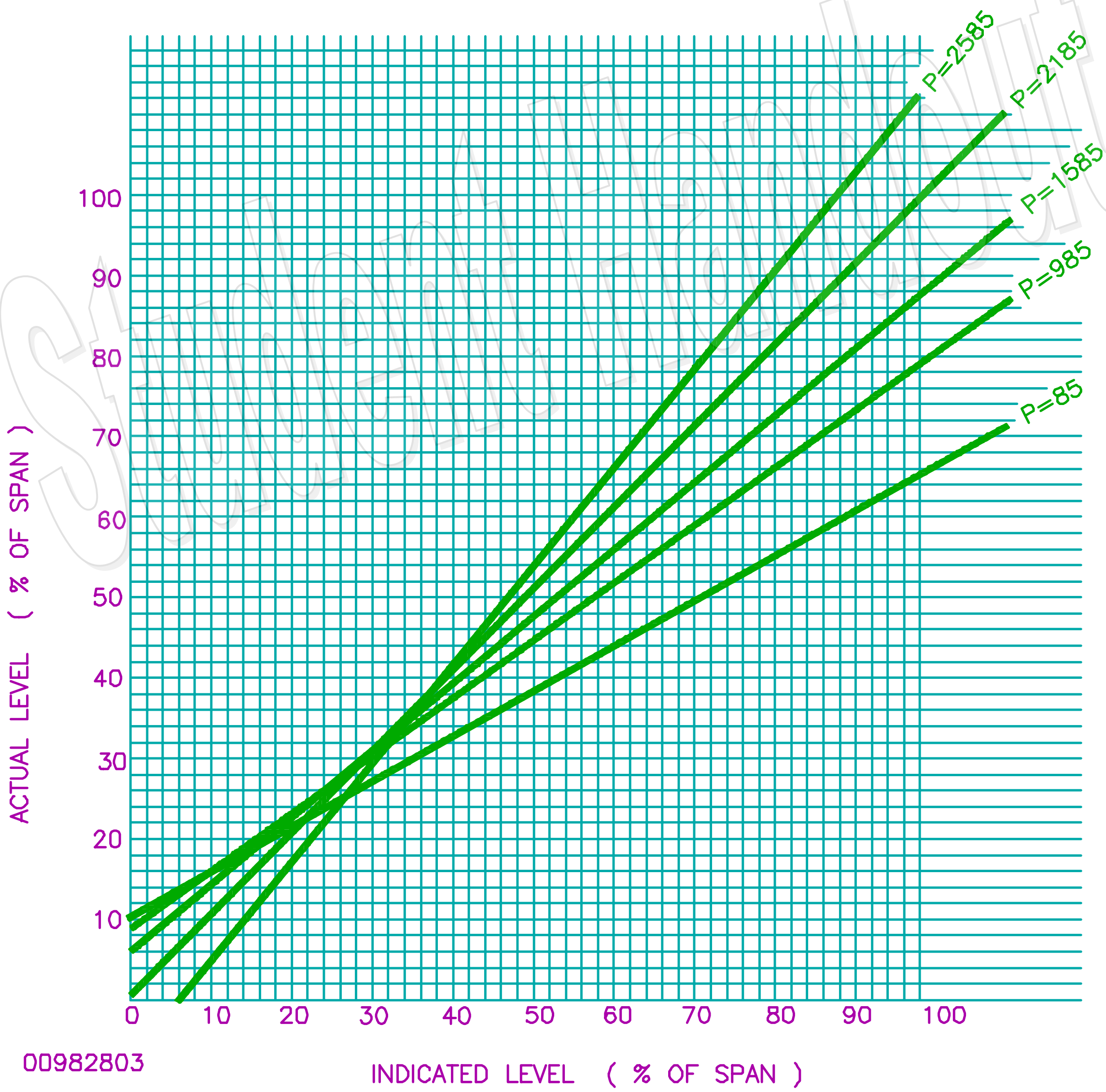


TABLE 1

INITIAL READINGS

Take 6 readings over 5 minutes at approximately 1 minute apart starting with t = 0 when using the PPC. N/A T_0 through T_5 and take one set of readings when using the control boards.

START DATE/TIME Today / 5 hours ago

B.A. INTEGRATOR INDICATOR [2] YIC-110 [X] or F0110D [ ] READING: 0 gallons

P.W. INTEGRATOR INDICATOR [2] YIC-111 [X] or F0111D [ ] READING: 0 gallons

PARAMETER	INDICATOR [2]	T_0	T_1	T_2	T_3	T_4	T_5	AVG
PZR LEVEL [3]	LI-461	N/A	N/A	N/A	N/A	N/A	N/A	56% Indicated
If RCS pressure < 2185 psig, determine the actual PZR level from Attachment 9.2.							N/A [X]	Actual
VCT LEVEL [6]	LI-112	N/A	N/A	N/A	N/A	N/A	N/A	34%
T_{AVG} [4]	TI-412	N/A	N/A	N/A	N/A	N/A	N/A	572.0°

For NOTES see Table 3.

TABLE 2

FINAL READINGS

Take 6 readings over 5 minutes at approximately 1 minute apart starting with t = 0 when using the PPC. N/A T_0 through T_5 and take one set of readings when using the control boards.

START DATE/TIME Today / 1 hour ago

B.A. INTEGRATOR INDICATOR [2] YIC-110 [X] or F0110D [ ] READING: 40 gallons

P.W. INTEGRATOR INDICATOR [2] YIC-111 [X] or F0111D [ ] READING: 0 gallons

PARAMETER	INDICATOR [2]	T_0	T_1	T_2	T_3	T_4	T_5	AVG
PZR LEVEL [3]	LI-461	N/A	N/A	N/A	N/A	N/A	N/A	52.5% Indicated
If RCS pressure < 2185 psig, determine the actual PZR level from Attachment 9.2.							N/A [X]	Actual
VCT LEVEL [6]	LI-112	N/A	N/A	N/A	N/A	N/A	N/A	25%
T_{AVG} [4]	TI-412	N/A	N/A	N/A	N/A	N/A	N/A	572.5°

For NOTES see Table 3.

NOTE: The duration of the manual leak rate evaluation should be 4 hours or longer. Minimum ΔT is 2 hours.

TABLE 3

PARAMETER	AVG FINAL from Table 2	AVG INITIAL from Table 1	DIFFERENCE & CONVERSION (FINAL-INITIAL)[1] X FACTOR[5]
a. B.A. Integrator [7]	gal (40)	gal (0)	galx1.0 = gal (ΔBA) (40)x1.0 =(40) gal
b. P.W. Integrator [8]	gal (0)	gal (0)	galx1.0 = gal (ΔPW) (0)x1.0 =(0) gal
c. Pzr Level [3]	% (52.5)	% (56.0)	%xF1x62.0 gal/% = gal (ΔPZ) (-3.5)x(1)x62 =(-217) gal
d. VCT Level	% (25)	% (34.0)	%x19.2 gal/% = gal (ΔV) (-9)x19.2 =(-172.8) gal
e. RCS Tavg [4]	°F (572.5)	°F (572.0)	°FxF2x78.5 gal/°F = gal (ΔT_{AVG}) (0.5)x(1)x78.5=(39.25) gal

NOTES:

1 Sign convention is: If Final >Initial = Positive
If Final < Initial = Negative

2 Computer values are preferred :

3 Pzr level channels are (LI-461 OR L0482A), (LI-459A or L0480A), and (LI-460 or L0481A). If the pressurizer pressure is below 2185 psig, determine actual Pzr level per Attachment 9.2. Refer to precautions and limitations, step 10.5.

4 When the RCS temperature is less than 530°F, determine T_{AVG} by averaging the available computer points for loop temperature RTDs T0406A, T0419A, T0426A, T0439A, T0446A, T0459A, T0466A, and T0479A, or using U0491.

5 If pressurizer pressure is below 2200 psig or T_{AVG} is below 530°F, refer to precautions and limitations, step 10.4.

6 VCT level channels are LI-112 or L0112A.

7 B.A. Integrator YIC-110 or PPC point F0110D.

8 P.W. Integrator YIC-111 or PPC point F0111D.

PERF

12.3.5 ΔT Calculation = End Time - Start Time

ΔT = Now - 1 hr (Table 2 Time) - Now - 5 hr (Table 1 Time) = 240 min   gd

12.3.6

$$\text{Calculated RCS Leak Rate} = \frac{\Delta BA + \Delta PW - \Delta PZ - \Delta V + \Delta T_{AVG}}{\Delta T}$$

$$= \frac{(40) + (0) - (-217) - (-172.8) + (39.25)}{(240)}$$

Calculated RCS Leak Rate = 1.954 GPM

NOTE: If the ΔPW is not zero, the RCS leak rate is invalid because the primary water integrator is not a qualified PME device.

12.3.7 Calculated RCS Leak Rate Error Factor (EF_g)

a. When readings are taken from the PPC,

$$EF_g = \frac{14.48\ \text{gal}}{\Delta T\text{min}} = \frac{14.48}{}\ \frac{\text{gal}}{\text{min}} = \underline{}\ \text{gpm}$$

N/A [X] ______

b. When readings are taken from the control boards,

$$EF_g = \frac{76.12\ \text{gal}}{\Delta T\text{min}} = \frac{76.12}{240}\ \frac{\text{gal}}{\text{min}} = 0.317\ \text{gpm}$$

N/A [ ] gd

NOTE: ΔT may be increased beyond 4 hours to lower the effects of EF_g on the leak rates.

12.3.8 Gross RCS Leak Rate

Calculated Leak Rate + EF_g = Gross Leak Rate

1.954 (Step 12.3.6) + 0.317 (Step 12.3.7a or 12.3.7b) = 2.271 gpm   gd

PERF

12.3.9 Zinc injection in service? YES NO [ ] [X] *JD*

12.3.10 If the gross leak rate calculated in step 12.3.8 is < 1 gpm (or 0.965 gpm if zinc injection was in service) go to step 12.4. N/A [X] ______

12.3.11 If the gross leak rate calculated in step 12.3.8 is ≥ 1 gpm (or 0.965 gpm if zinc injection was in service), fill out below to determine the IDENTIFIED LEAKAGE from the RCS system. Initiate an AR and route Eval to PTMR. N/A [ ] *JD*

NOTE: Do NOT run ECCS pumps that take suction from the RWST while performing the IDENTIFIED LEAKAGE portion of this test. This will preclude possible leakage into the RWST or PRT from the ECCS system.

NOTE: The duration of the manual IDENTIFIED LEAKAGE evaluation should be 4 hours or longer. Minimum ΔT is 2 hours.

TABLE 4

PARAMETER INDICATOR	FINAL [1]	INITIAL [1]	DIFFERENCE & CONVERSION (FINAL - INITIAL)[1]
a. PRT Level [4] LI-470	% = gal (83 = 11468)	% = gal (82 = 11345)	123 = (ΔPRT)gal
b. RCDT Level LI-188 [4]	% = gal (52 = 191.42)	% = gal (50 = 181.17)	10.25 = (ΔRCDT)gal
c. RCDT Discharge Totalizer FI-64	gal 0	gal 0	0 = gal(ΔRCF) = (0)gal
d. Accumulator Level [4] Accumulator 1 LI-950 Accumulator 2 LI-952 Accumulator 3 LI-954 Accumulator 4 LI-956	% = gal (66 = 6340) (67 = 6358) (65 = 6322) (66 = 6340)	% = gal (66 = 6340) (67 = 6358) (65 = 6322) (66 = 6340)	 0 = gal [5](Δ Accum 1) 0 = gal [5](Δ Accum 2) 0 = gal [5](Δ Accum 3) 0 = gal [5](Δ Accum 4)
		Total Δ Accum=	gal (should = 0)
e. Date/Time (decimal hrs)	date/hrs /	date/hrs Today / 5 hrs ago	hrs × 60 min/hr = min (ΔT) (4) ×60 =(240)min

NOTES:
1. Sign convention is: If FINAL > INITIAL = positive; If FINAL < INITIAL = negative
2. Contact chemistry to determine the RCS leak rate to secondary and to CCW systems.
3. Refer to the Volume 9 data for other IDENTIFIED leak rate. Specify source(s) in REMARKS. If excessive RCP No. 3 seal leakage is suspected, perform STP R-10D to determine the seal leakage rate.
4. Accumulator level may be read from the vertical board or PPC points LI950R through LI957R. Using the Volume 9 data, convert % indication to gallons. Then compute the difference in gallons.
5. If the difference is positive, enter 0 and if not equal to 0, write an AR.

12.3.12 RCS CALCULATED IDENTIFIED LEAK RATE

$$\text{Leak Rate} = \frac{\Delta PRT + \Delta RCDT + \Delta RCF + \Delta Accum}{\Delta T\,(\text{Elaspsed Time min})} + \text{RCS to Secondary Leak Rate}^2 + \text{RCS to CCW Leak Rate}^2 + \text{Other IDENTIFIED Leak Rates}^3$$

$$= \frac{(123) + (10.25) + (0) + (0)}{(\quad)} + 0.051 + 0 + 0$$

$$= 0.606 \text{ gpm}$$

PERF

12.3.13 Calculated IDENTIFIED LEAKAGE Error Factor (EF_{ID})

a. When readings are taken from the Aux Board +PPC,

$$EF_{ID} = \frac{22.17gal}{\Delta Tmin} = \frac{22.17}{\_\_\_\_\_\_} \frac{gal}{min} = \_\_\_\_\_\_ gpm$$

N/A [X] ______

b. When readings are taken from the Aux Board + Control Boards,

$$EF_{ID} = \frac{109.8gal}{\Delta Tmin} = \frac{109.8}{240} \frac{gal}{min} = 0.458 gpm$$

N/A [ ] JO

NOTE 1: ΔT may be increased beyond 4 hours to lower the effects if EF_{ID} on the leak rates.

NOTE 2: If any control board indicator is used in Table 4, use 12.3.13b.

12.3.14 IDENTIFIED LEAKAGE = RCS Calculated Identified Leak Rate + EF_{ID}.

0.606 + 0.458 = 1.064 gpm JO

Step 12.3.12 | Step 12.3.13a or 12.3.13b

12.3.15 If IDENTIFIED LEAKAGE is greater than 10 gpm, refer to Technical Specification 3.4.13 for LCO.

AR # ________________

N/A [X] ______

12.4 REMARKS: ______________________________

12.5 Test performers and verifiers:

Name	Signature	Date/Time	Init
Joe Operator		Today / Now	JO
		/	
		/	
		/	

PERF

13. DATA REDUCTION AND EVALUATION

NOTE: If the manual RCS LEAK calculation is performed, use the leak rate data from step 12.3.8.

13.1 If the Gross RCS leak rate from step 12.2.2 or 12.3.8 is less than 0.965 gpm if zinc injection is in progress or less than 1 gpm if zinc injection is NOT in progress, assume the following:

N/A [X] ______

UNIDENTIFIED LEAKAGE < 1 gpm, and

IDENTIFIED LEAKAGE < 10 gpm

13.2 If the Gross RCS leak rate from step 12.3.8 is greater than or equal to 1 gpm, record.

N/A [ ] SFM

13.2.1 Calculated Total RCS Leak Rate Error Factor (EF_{TTL}).

a. When readings are taken from the Aux Board + PPC,

$$EF_{TTL} = \frac{26.48 \text{ gal}}{\Delta T\text{min}} = \frac{26.48}{\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_ \text{ gpm}$$

N/A [X] ______

b. When readings are taken from the Aux Board + Control Boards,

$$EF_{TTL} = \frac{133.6 \text{ gal}}{\Delta T\text{min}} = \frac{133.6}{240} \frac{\text{gal}}{\text{min}} = 0.557 \text{ gpm}$$

N/A [ ] SFM

NOTE 1: ΔT should be the same for Table 1 through Table 4. If not use the shortest ΔT.

NOTE 2: If any control board indicator is used in Table 1 through Table 4, use 13.2.1b.

13.2.2 UNIDENTIFIED LEAKAGE = Calculated RCS Leak Rate - RCS Calculated Identified Leak Rate + EF_{TTL}.

1.954 (Step 12.3.6) - 0.606 (Step 12.3.12) + 0.557 (EF_{TTL} 13.2.1a or 13.2.1b) =

UNIDENTIFIED LEAKAGE = 1.918

SFM

Number: NRCADM01SRO

Title: Review RCS WATER INVENTORY BALANCE

Examinee: ______________________________

Evaluator: ______________ ______________ ________

Print Signature Date

Results: Sat ______ Unsat ______ Total Time: _____ minutes

Comments:

References: STP R-10C, RCS Water Inventory Balance, Rev. 25
Technical Specifications 3.4.14, RCS Leakage

Alternate Path: Yes ____________ No ____X____

Time Critical: Yes ____________ No ____X____

Time Allotment: 30 minutes

Critical Steps: 4, 15, 16

Job Designation: RO/SRO

Task Number: G2.1.33

Rating: 3.4/4.0

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A JPM COORDINATOR	DATE:	
APPROVED BY:	N/A TRAINING LEADER	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, initiating cue, and task standard. 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:	STP R-10C, RCS Water Inventory Balance, Rev. 25 Technical Specifications 3.4.14
Initial Conditions:	Unit 1 is at BOL, 100% power with the PPC out of service. No other equipment out of service and Zinc Injection is not in service. As the SFM, you have requested the RO to conduct a manual RCS leak evaluation per STP R-10C. The RO has completed the procedure and has returned it for the SFM to complete.
Initiating Cue:	As the SFM, review and complete the STP R-10C and determine appropriate actions as needed.
Task Standard:	The procedure is reviewed, data reduction and evaluation completed, and the primary review comleted and signed.

Start Time: __________

Step	Expected Operator Actions
1. Verify Start Data Section filled out properly.	1.1 Confirms Unit 1, Mode 1and Date/Time correct. 1.2 Confirms Precaution and Limitations (Section 10) meet plant conditions and are all initialed. 1.3 Confirms Prerequisites (Section 11) meet plant conditions and initialed. **Step was: Sat: ______ Unsat _______***
2. Verify Procedure steps completed properly.	2.1 Confirms Section 12.1.1 data is recorded for Rx Power, Pressure and Temperature. 2.2 Confirms Pressure and Temperature above minimum required on steps 12.1.2 and 12.1.3. 2.3 Confirms Step 12.1.4 marked N/A. 2.4 Confirms Step 12.1.5 marked No. 2.5 Confirms Step 12.1.6 and 12.1.7 marked Yes and initialed, and 12.1.8 initialed. 2.6 Confirms Step 12.2 marked N/A. 2.7 Confirms Step 12.3.1 and 12.3.4 marked N/A, steps 12.3.2 and 12.3.3 initialed. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

	Step	Expected Operator Actions
	Step	**Expected Operator Actions**
	3. Verify Table 1 and Table 2 data accurate.	3.1 Confirms Table 1 and Table 2 data for B.A and P.W. integrator readings appear accurate. 3.2 Confirms Table 1 and Table 2 data for PZR Level, VCT level and T_{AVG} appear accurate. 3.3 Confirms start and stop times greater than 2 hours. **Step was: Sat: ______ Unsat _______***
**	4. Verifies Table 3 data accurate.	4.1 Confirms Δ BA is 40 gal. ** 4.2 Confirms Δ PW is 0 gal. 4.3 Confirms Δ PZR is –217 gal. 4.4 Confirms Δ VCT is –172.8 gal. 4.5 Confirms Δ T_{AVG} is 39.25 gal. **Step was: Sat: ______ Unsat _______***
	5. Verify Δ T calculation step 12.3.5.	5.1 Confirms Δ T is 240 minutes. **Step was: Sat: ______ Unsat _______***
	6. Verify Calculated RCS leak rate calculation step 12.3.6.b.	6.1 Confirms Calculated RCS leak rate is 1.954 gpm. **Step was: Sat: ______ Unsat _______***
	7. Verify calculated Leak Error Factor calculation step 12.3.7.b.	7.1 Confirms Calculated Leak Error Factor at 0.317 gpm. **Step was: Sat: ______ Unsat _______***
	8. Verify Gross Leak Rate calculation step 12.3.8.	8.1 Confirms Gross Leak Rate calculated at 2.271 gpm. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

Step	Expected Operator Actions
9. Determine Gross Leak Rate is >1 gpm and must continue procedure at Table 4.	9.1 Confirms 12.3.9 marked No. 9.2 Confirms 12.3.10 N/A. 9.3 Confirms 12.3.11 initialed. **Step was: Sat: ______ Unsat _______***
10. Verify Table 4 data accurate.	10.1 Δ PRT is 123 gal. 10.2 Δ RCDT is 10.25 gal. 10.3 Δ RCDT totalizer is 0 gal. 10.4 Δ Accumulators is 0 gal. **Step was: Sat: ______ Unsat _______***
11. Verify RCS Identified Leak Rate step 12.3.12 (Table 4).	11.1 Confirms Calculated Identified Leak Rate at 0.606 gpm. **Step was: Sat: ______ Unsat _______***
12. Verify Identified Leak Rate Error Factor step 12.3.13.	12.1 Confirms Calculated Identified Leak Rate Error Factor at 0.458 gpm. **Step was: Sat: ______ Unsat _______***
13. Verify Identified Leakage step 12.3.14.	13.1 Confirms Identified Leakage at 1.064 gpm. **Step was: Sat: ______ Unsat _______***
14. Verify test performer signature step 12.5.	14.1 Confirms test performer printed and signed name with date, time and initial. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

	Step		Expected Operator Actions
**	15. Perform step 13, Data Reduction and Evaluation.		15.1 Checks N/A on step 13.1.
			15.2 Calculates Total RCS leak rate error factor from Aux Board and Control Boards, step 13.2.1.b. at 0.557 gpm. and initials step.
		**	15.3 Calculates Unidentified Leakage at 1.918 gpm. and initials step.
			NOTE: Critical Task met if Unidentified Leakage Rate calculated > 1gpm.
			Step was: Sat: ______ Unsat _______*
**	16. Perform step 14, Primary Review.		16.1 Does NOT initial step 14.1.
			16.2 Makes entry in Remarks for Step 14.2 for any N/A or No entries.
			NOTE: Anything is acceptable as long as it relates to the data collected.
		**	16.3 Recognizes Acceptance Criteria NOT accepted and LCO T.S 3.4.13 requires leak reduction in 4 hours or Mode 3 in 6 hours.
			16.4 Recognizes need to write AR.
			**
			Cue: The SM has initiated AR A0762222.
			**
			Step was: Sat: ______ Unsat _______*

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

Initial Conditions: Unit 1 is at BOL, 100% power with the PPC out of service. No other equipment out of service and Zinc Injection is not in service. As the SFM, you have requested the RO to conduct a manual RCS leak evaluation per STP R-10C. The RO has completed the procedure and has returned it for the SFM to complete.

Initiating Cue: As the SFM, review and complete the STP R-10C and determine appropriate actions as needed.

Task Standard: The procedure is reviewed, data reduction and evaluation completed, and the primary review comleted and signed.

- ❑ The simulator is not needed for the performance of this JPM.

PACIFIC GAS AND ELECTRIC COMPANY		**NUMBER**	**STP R-10C**
NUCLEAR POWER GENERATION		**REVISION**	**25**
DIABLO CANYON POWER PLANT		**PAGE**	**1 OF 18**
SURVEILLANCE TEST PROCEDURE		**UNITS**	

TITLE: **Reactor Coolant System Water Inventory Balance**

1 AND 2

05/20/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

1.1 Determine the gross leak rate or IDENTIFIED and UNIDENTIFIED LEAKAGE from the reactor coolant system (RCS) by taking the difference in RCS and "chemical and volume control system" (CVCS) inventory change over a reasonable period of time without inventory makeup.

2. DISCUSSION

2.1 Tracking the RCS inventory in a consistent manner provides an effective means of quantifying overall system leakages. Non-RCS sources of water added to the RCDT and PRT are eliminated or quantified when utilizing Table 4 to determine IDENTIFIED LEAKAGE.

2.2 If the gross RCS leak rate measured in STP R-10C exceeds 1 gpm (or 0.965 gpm if zinc injection is in service), this procedure will consider the following leakage parameters to allow the SFM to classify the leakage:

2.2.1 PRT Level

2.2.2 RCDT Level

2.2.3 RCDT Flow Totalizer

2.2.4 Accumulator Leakage to the RCDT

2.2.5 RCS Leakage to Secondary (Stm. Gen.)

2.2.6 RCS Leakage to CCW

2.2.7 Other IDENTIFIED LEAKAGE, which may be tracked as necessary with Volume 9

2.2.8 Initiate an Action Request (AR) to document actions taken. Create a PIMS evaluation screen (EVAL) to be routed to the maintenance rule program (PTMR).

2.3 RCS leaks to closed system (steam generators, CCW system, ECCS systems, etc.) are not directly identified in this procedure. These leaks are evaluated by other means. Examples are as follows:

2.3.1 RCS to steam generators - determine from activity analysis of secondary coolant.

2.3.2 RCS to CCW - determine from CCW activity analysis and increasing level in surge tank.

2.3.3 Letdown/Charging - determine from increasing auxiliary building area radiation monitors and airborne activity.

2.3.4 RCS to accumulators are not identified in this procedure.

3. RESPONSIBILITIES

3.1 Shift foreman (SFM), for operation of the equipment as required, for obtaining test data, for data reduction as required by this procedure and for evaluation of reactor coolant system leakage.

3.2 Chemistry engineer, for determining primary system leakage to the secondary system and the component cooling water system.

4. FREQUENCY

4.1 This test shall be performed when required by STP I-1B or as directed by the shift foreman.

4.2 RCS water inventory balance whether performed in STP I-1B or STP R-10C shall be current when operating in MODES 1 through 4 and may be performed in MODES 1 through 5.

5. TECHNICAL SPECIFICATIONS

5.1 This test is performed to satisfy Technical Specification SR 3.4.13.1.

6. ACCEPTANCE CRITERIA

6.1 The terms used herein are defined in the Technical Specifications. Reactor coolant system leakage shall be limited to:

6.1.1 NO PRESSURE BOUNDARY LEAKAGE

6.1.2 1 GPM UNIDENTIFIED LEAKAGE (or 0.965 gpm if zinc injection is in service).

6.1.3 10 GPM IDENTIFIED LEAKAGE

6.2 If these limits are exceeded, comply with the appropriate Technical Specification ACTION requirements.

6.3 If the gross RCS leak rate exceeds 1 GPM (or 0.965 gpm if zinc injection is in service), further evaluation must be performed to determine the source of the leakage and to differentiate between IDENTIFIED and UNIDENTIFIED LEAKAGE as defined in the Technical Specifications.

6.4 UNIDENTIFIED LEAKAGE, and IDENTIFIED LEAKAGE used at the decision points in this test include an error factor for readability.

7. REFERENCES

7.1 STP R-10, "Reactor Coolant System Leakage Evaluation."

7.2 Acceptance Criteria Basis AC R-10C.

7.3 NRC Information Notice 94-46, "Nonconservative Reactor Coolant System Leakage Calculation."

8. APPENDICES

None

9. ATTACHMENTS

9.1 "Pressurizer Level and RCS TAVG Adjustment Factor Curves," 03/20/03

9.2 "Pressurizer Level Correction Curves for Pressurizer Pressures," 03/20/03

START DATA SECTION

UNIT 1 OPERATING MODE 1 DATE/TIME Today / 5 hrs ago

10. PRECAUTIONS AND LIMITATIONS — INITIALS

10.1 This evaluation cannot be made if letdown diversion or excess letdown diversion has occurred during the surveillance interval. This is due to the inability to accurately measure diverted letdown flow. — JO

10.2 Verify adequate margin exists between VCT level and the VCT Level Controller LCV-112A setpoint to prevent diversions for a 35 minute wait period and for the duration of RCSLEAK run. (Suggest a 10% differential.) — JO

10.3 If "RCSLEAK" was run per STP I-1B, and if ONLY the 95% UCL LEAK RATE is ≥ 1 gpm (0.965 gpm if zinc injection is in service), then RCSLEAK may be run a second time before the manual calculation is required. — JO

10.4 If this test is run with RCS pressure and T_{AVG} below 2200 psig and 530°F, the manual calculation of step 12.3 MUST be performed. Minimize changes in pressurizer level and temperature as much as possible and use the appropriate adjustment factors, F1 and F2 (Attachment 9.1) to adjust the conversion factors for the Pressurizer Level and RCS T_{AVG}. — JO

10.5 If pressurizer pressure is below 2185 psig, the indicated level must be corrected to obtain the actual level by using the pressurizer level correction curves (Attachment 9.2). — JO

10.6 If the RCS temperature (T_{AVG}) is <530°F, the narrow-range T_{AVG} channels are out of range. In this situation, determine T_{AVG} by averaging the available computer points for loop temperature RTDs T0406A, T0419A, T0426A, T0439A, T0446A, T0459A, T0466A, and T0479A. Wide range based Avg T_{AVG} is provided by U0491. — JO

10.7 PPC values are preferred. Error factors for the PPC are much smaller than error factors for the control boards. — JO

10.8 If the PPC is unavailable, use YIC-110 and YIC-111 to determine the boric acid and primary water gallons added during the test interval. For Unit 2, the gallons must be manually tracked since the indicators only track batch additions. — JO

10.9 **Do not add primary water to the RCS or the pressurizer relief tank** during the test interval to limit instrument induced error. — JO

INITIALS

10.10 If the amount of primary water supplied to the containment exceeds that accumulated in the RCDT and pumped out of the RCDT, the standard evaluation of IDENTIFIED LEAKAGE is probably invalid. These conditions could develop if excessive RCP seal No. 3 leakage were to develop. In this case, determine the IDENTIFIED LEAKAGE for RCP seal No. 3 standpipes (STP R-10D). JD

10.11 Other IDENTIFIED LEAKAGE sources outside the RCS pressure boundary that affect the RCS water inventory balance may be included in Table 4. The Other IDENTIFIED LEAKAGE amounts may be determined by individual measurement or other suitable means. JD

10.12 Do not run any ECCS pumps taking suction from the RWST when utilizing Table 4 to determine IDENTIFIED LEAKAGE. JD

PERF

11. PREREQUISITES

11.1 The RCS operation is stable. T_{AVG} must not vary more than 5°F/hr. JD

PERF

12. PROCEDURE

12.1 Determine the method for calculating the RCS leak rate as follows:

12.1.1 Record following:

99.98	2237	572.0
Rx power (%)	RCS pressure (psig)	T_{AVG} (°F)

		YES	NO	PERF
12.1.2	RCS pressure is ≥ 2200 psig.	[X]	[ ]	90
12.1.3	T_{AVG} is ≥ 530°F.	[X]	[ ]	90
12.1.4	If RCSLEAK was run with STP I-1B:			
	CALCULATED LEAK RATE <1 gpm (or 0.965 gpm if zinc injection was in service.)	[ ]	[ ]	
	AVG LEAK RATE <1 gpm (or 0.965 gpm if zinc injection was in service.)	[ ]	[ ]	

N/A [X] ______

12.1.5 RCSLEAK program is available and the data quality of the PPC addresses, F0111D, F0110D, L0112A, U0483 and U0484 is either 'GOOD', LALM, HALM, or DALM. Quality code of GOO* is acceptable for U0483 or U0484 if the bad input to the average is off scale high or low (quality code BAD) or has been deleted from the calculation of the average by OP O-15 resulting in a quality code of DEL for the bad input to the average. Record the AR number which documents the bad input.
AR # ________________

YES NO
[ ] [X] 90

NOTE: The PPC display group 'OP RCSLK' may be used to display and check the data quality of the above addresses.

		YES NO	PERF
12.1.6	No primary water or boric acid has been added to the RCS during the period of 35 minutes before starting the test.	[X] [ ]	JO
12.1.7	No letdown, or excess letdown, diversion has occurred during the period of 35 minutes before starting the test.	[X] [ ]	JO
12.1.8	If step 12.1.2, 12.1.3, 12.1.4, 12.1.5, 12.1.6, and 12.1.7 are all 'YES' or "N/A", run the RCSLEAK program per step 12.2. Otherwise perform the manual RCS leak rate calculation per step 12.3.		JO

PERF

12.2 Run the RCSLEAK program as follows:

N/A [X]

NOTE: If primary water or boric acid is added to the RCS during this test, it will be necessary to invalidate the RCSLEAK computer run and re-run RCSLEAK.

12.2.1 At a PPC terminal, enter the Turn-on Code RCSLEAK. Press F1 to initiate. Enter 50 for number of samples. Enter 1 for time between samples (minutes), verify message appears in top left of PPC screen indicating that RCSLEAK has started. ______

NOTE: The results will print on the control room printer when the calculation is completed. The results will not be displayable on the screen until the copy is printed.

12.2.2 Verify results at a PPC terminal. Enter turn-on code "RCSDISP" at the end of the 54 minute run.

a. Verify FINAL mkeup WTR itegrator value and boric acid integrator value is the same as INITIAL integrator values. ______

b. Verify RCS operation has been stable. ______

NOTE: If makeup water or acid was added to the RCS, or RCS operation was not stable, this RCSLEAK is invalid. Attach the printer results for the invalid test to this STP data sheet and rerun RCSLEAK. Do not perform the following steps if steps 12.2.2a and 12.2.2b are not satisfactory.

c. Record the indicated data below. ______

TIME CALCULATION STARTED ___________

TIME CALCULATION COMPLETED ___________

CALCULATED LEAK RATE ___________GPM

(Gross RCS Leak Rate)

AVG LEAK RATE ___________GPM

95% UCL LEAK RATE ___________GPM

d. Press F3 and verify the status at the bottom of the screen changed to "VALID". ______

e. Zinc injection in service? YES NO
[ ] [ ] ______

PERF

f. During zinc acetate injection and if CALCULATED LEAK RATE, AVG LEAK RATE or 95% UCL LEAK RATE recorded above is greater than or equal to 0.965 gpm, perform the manual calculation per step 12.3. If all the leak rates are less than 0.965 gpm, N/A step 12.3 and go to step 12.4.

N/A [ ] ______

OR

g. With NO zinc acetate injection and if CALCULATED LEAK RATE, AVG LEAK RATE or 95% UCL LEAK RATE recorded above is greater than or equal to 1 gpm, perform the manual calculation per step 12.3. If all the leak rates are less than 1 gpm, N/A step 12.3 and go to step 12.4.

N/A [ ] ______

PERF

12.3 Perform the manual RCS leak rate calculations as follows:

N/A [ ]

12.3.1 Verify the quality of the PPC data points available to be used for the manual calculation by displaying the group "OP R-10C" on a PPC terminal.

N/A [X] ______

12.3.2 Perform the manual RCS leak using only those PPC data with "GOOD" or "DALM" status OR board indicators in Table 1 through Table 4. To save time, start recording data in Table 4 at the same time you start recording data for Table 1. Initial data in Table 4 will be used if the calculated leak rate is ≥ 1 gpm (or ≥0.965 gpm if zinc injection was in service.). Calculate the results from Table 1 through Table 3 first then proceed to finish Table 4 if necessary. go

12.3.3 All Readings must be taken from the same indicator. (PPC values are preferred.) go

NOTE: Recommended ΔT in Table 1-Table 3 leak rate determination is 4 hours. Minimum ΔT is 2 hours. If using the control boards, ΔT may be increased beyond 4 hours to decrease the effects on error factor EF_g. See step 12.3.7b. Test Performer may take data at anytime on separate documentation and follow the procedure to determine what the leak rate might be. If the data is taken in less than 2 hours, it is not accurate enough to use for the STP but can be used to continue trouble shooting the problem.

12.3.4 If the RCS temperature or pressure are below the normal operating range, the pressurizer level and RCS T_{AVG} CONVERSION FACTOR(S) must be adjusted in Table 3 using the multipliers F1 and F2. go

N/A [X] ______

TABLE 1

INITIAL READINGS

Take 6 readings over 5 minutes at approximately 1 minute apart starting with t = 0 when using the PPC. N/A T_0 through T_5 and take one set of readings when using the control boards.

START DATE/TIME Today / 5 hours ago

B.A. INTEGRATOR INDICATOR [2] YIC-110 [X] or F0110D [ ] READING: 0 gallons

P.W. INTEGRATOR INDICATOR [2] YIC-111 [X] or F0111D [ ] READING: 0 gallons

PARAMETER	INDICATOR [2]	T_0	T_1	T_2	T_3	T_4	T_5	AVG
PZR LEVEL [3]	LI-461	N/A	N/A	N/A	N/A	N/A	N/A	56% Indicated

If RCS pressure < 2185 psig, determine the actual PZR level from Attachment 9.2. N/A [X] ______ Actual

PARAMETER	INDICATOR [2]	T_0	T_1	T_2	T_3	T_4	T_5	AVG
VCT LEVEL [6]	LI-112	N/A	N/A	N/A	N/A	N/A	N/A	34%
T_{AVG} [4]	TI-412	N/A	N/A	N/A	N/A	N/A	N/A	572.0°

For NOTES see Table 3.

TABLE 2

FINAL READINGS

Take 6 readings over 5 minutes at approximately 1 minute apart starting with t = 0 when using the PPC. N/A T_0 through T_5 and take one set of readings when using the control boards.

START DATE/TIME Today / 1 hour ago

B.A. INTEGRATOR INDICATOR [2] YIC-110 [X] or F0110D [ ] READING: 40 gallons

P.W. INTEGRATOR INDICATOR [2] YIC-111 [X] or F0111D [ ] READING: 0 gallons

PARAMETER	INDICATOR [2]	T_0	T_1	T_2	T_3	T_4	T_5	AVG
PZR LEVEL [3]	LI-461	N/A	N/A	N/A	N/A	N/A	N/A	52.5% Indicated

If RCS pressure < 2185 psig, determine the actual PZR level from Attachment 9.2. N/A [X] ______ Actual

PARAMETER	INDICATOR [2]	T_0	T_1	T_2	T_3	T_4	T_5	AVG
VCT LEVEL [6]	LI-112	N/A	N/A	N/A	N/A	N/A	N/A	25%
T_{AVG} [4]	TI-412	N/A	N/A	N/A	N/A	N/A	N/A	572.5°

For NOTES see Table 3.

NOTE: The duration of the manual leak rate evaluation should be 4 hours or longer. Minimum ΔT is 2 hours.

TABLE 3

PARAMETER	AVG FINAL from Table 2	AVG INITIAL from Table 1	DIFFERENCE & CONVERSION (FINAL-INITIAL)[1] X FACTOR[5]
a. B.A. Integrator [7]	gal (40)	gal (0)	galx1.0 = gal (ΔBA) (40)x1.0 =(40) gal
b. P.W. Integrator [8]	gal (0)	gal (0)	galx1.0 = gal (ΔPW) (0)x1.0 =(0) gal
c. Pzr Level [3]	% (52.5)	% (56.0)	%xF1x62.0 gal/% = gal (ΔPZ) (-3.5)x(1)x62 =(-217) gal
d. VCT Level	% (25)	% (34.0)	%x19.2 gal/% = gal (ΔV) (-9)x19.2 =(-172.8) gal
e. RCS Tavg [4]	°F (572.5)	°F (572.0)	°FxF2x78.5 gal/°F = gal (ΔT_{AVG}) (0.5)x(1)x78.5=(39.25) gal

NOTES:

1 Sign convention is: If Final >Initial = Positive
If Final < Initial = Negative

2 Computer values are preferred :

3 Pzr level channels are (LI-461 OR L0482A), (LI-459A or L0480A), and (LI-460 or L0481A). If the pressurizer pressure is below 2185 psig, determine actual Pzr level per Attachment 9.2. Refer to precautions and limitations, step 10.5.

4 When the RCS temperature is less than 530°F, determine T_{AVG} by averaging the available computer points for loop temperature RTDs T0406A, T0419A, T0426A, T0439A, T0446A, T0459A, T0466A, and T0479A, or using U0491.

5 If pressurizer pressure is below 2200 psig or T_{AVG} is below 530°F, refer to precautions and limitations, step 10.4.

6 VCT level channels are LI-112 or L0112A.

7 B.A. Integrator YIC-110 or PPC point F0110D.

8 P.W. Integrator YIC-111 or PPC point F0111D.

PERF

12.3.5 ΔT Calculation = End Time - Start Time

$\Delta T =$ Now - 1 hr (Table 2 Time) − Now - 5 hr (Table 1 Time) = 240 min — gd

12.3.6

$$\text{Calculated RCS Leak Rate} = \frac{\Delta BA + \Delta PW - \Delta PZ - \Delta V + \Delta T_{AVG}}{\Delta T}$$

$$= \frac{(40) + (0) - (-217) - (-172.8) + (39.25)}{(240)}$$

Calculated RCS Leak Rate = 1.954 GPM

NOTE: If the ΔPW is not zero, the RCS leak rate is invalid because the primary water integrator is not a qualified PME device.

12.3.7 Calculated RCS Leak Rate Error Factor (EF_g)

a. When readings are taken from the PPC,

$$EF_g = \frac{14.48 \text{ gal}}{\Delta T \text{min}} = \frac{14.48}{\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_ \text{ gpm}$$

N/A [X] ______

b. When readings are taken from the control boards,

$$EF_g = \frac{76.12 \text{ gal}}{\Delta T \text{min}} = \frac{76.12}{240} \frac{\text{gal}}{\text{min}} = 0.317 \text{ gpm}$$

N/A [ ] gd

NOTE: ΔT may be increased beyond 4 hours to lower the effects of EF_g on the leak rates.

12.3.8 Gross RCS Leak Rate

Calculated Leak Rate + EF_g = Gross Leak Rate

1.954 (Step 12.3.6) + 0.317 (Step 12.3.7a or 12.3.7b) = 2.271 gpm — gd

PERF

12.3.9 Zinc injection in service? YES [ ] NO [X] 90

12.3.10 If the gross leak rate calculated in step 12.3.8 is < 1 gpm (or 0.965 gpm if zinc injection was in service) go to step 12.4. N/A [X] ______

12.3.11 If the gross leak rate calculated in step 12.3.8 is ≥ 1 gpm (or 0.965 gpm if zinc injection was in service), fill out below to determine the IDENTIFIED LEAKAGE from the RCS system. Initiate an AR and route Eval to PTMR. N/A [ ] 90

NOTE: Do NOT run ECCS pumps that take suction from the RWST while performing the IDENTIFIED LEAKAGE portion of this test. This will preclude possible leakage into the RWST or PRT from the ECCS system.

NOTE: The duration of the manual IDENTIFIED LEAKAGE evaluation should be 4 hours or longer. Minimum ΔT is 2 hours.

TABLE 4

PARAMETER INDICATOR	FINAL [1]	INITIAL [1]	DIFFERENCE & CONVERSION (FINAL - INITIAL)[1]
a. PRT Level [4] LI-470	% = gal (83 = 11468	% = gal (82 = 11345)	123 = (ΔPRT)gal
b. RCDT Level LI-188[4]	% = gal (52 = 191.42	% = gal (50 = 181.17)	10.25 = (ΔRCDT)gal
c. RCDT Discharge Totalizer FI-64	gal 0	gal 0	0 = gal(ΔRCF) = (0)gal
d. Accumulator Level [4] Accumulator 1 LI-950 Accumulator 2 LI-952 Accumulator 3 LI-954 Accumulator 4 LI-956	% = gal (66 = 6349 (67 = 6358) (65 = 6322) (66 = 6340)	% = gal (66 = 6340) (67 = 6358) (65 = 6322) (66 = 6340)	 0 = gal [5](Δ Accum 1) 0 = gal [5](Δ Accum 2) 0 = gal [5](Δ Accum 3) 0 = gal [5](Δ Accum 4)
		Total Δ Accum=	gal (should = 0)
e. Date/Time (decimal hrs)	date/hrs /	date/hrs Today / 5 hrs ago	hrs × 60 min/hr = min (ΔT) (4) ×60 =(240)min

NOTES: [1] Sign convention is: If FINAL > INITIAL = positive
If FINAL < INITIAL = negative

[2] Contact chemistry to determine the RCS leak rate to secondary and to CCW systems.

[3] Refer to the Volume 9 data for other IDENTIFIED leak rate. Specify source(s) in REMARKS. If excessive RCP No. 3 seal leakage is suspected, perform STP R-10D to determine the seal leakage rate.

[4] Accumulator level may be read from the vertical board or PPC points LI950R through LI957R. Using the Volume 9 data, convert % indication to gallons. Then compute the difference in gallons.

[5] If the difference is positive, enter 0 and if not equal to 0, write an AR.

12.3.12 RCS CALCULATED IDENTIFIED LEAK RATE

$$\text{Leak Rate} = \frac{\Delta PRT + \Delta RCDT + \Delta RCF + \Delta Accum}{\Delta T\ (\text{Elaspsed Time min})} \quad + \begin{matrix}\text{RCS to}\\ \text{Secondary}\\ \text{Leak Rate}^2\end{matrix} + \begin{matrix}\text{RCS to}\\ \text{CCW}\\ \text{Leak Rate}^2\end{matrix} + \begin{matrix}\text{Other}\\ \text{IDENTIFIED}\\ \text{Leak Rates}^3\end{matrix}$$

$$= \frac{(123) + (10.25) + (0) + (0)}{(\quad\quad)} + 0.051 + 0 + 0$$

= 0.606 gpm

PERF

12.3.13 Calculated IDENTIFIED LEAKAGE Error Factor (EF_{ID})

a. When readings are taken from the Aux Board +PPC,

$$EF_{ID} = \frac{22.17\text{gal}}{\Delta T\text{min}} = \frac{22.17}{\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_ \text{ gpm}$$

N/A [X] ______

b. When readings are taken from the Aux Board + Control Boards,

$$EF_{ID} = \frac{109.8\text{gal}}{\Delta T\text{min}} = \frac{109.8}{240} \frac{\text{gal}}{\text{min}} = 0.458 \text{ gpm}$$

N/A [ ] JO

NOTE 1: ΔT may be increased beyond 4 hours to lower the effects if EF_{ID} on the leak rates.

NOTE 2: If any control board indicator is used in Table 4, use 12.3.13b.

12.3.14 IDENTIFIED LEAKAGE = RCS Calculated Identified Leak Rate + EF_{ID}.

0.606 (Step 12.3.12) + 0.458 (Step 12.3.13a or 12.3.13b) = 1.064 gpm JO

12.3.15 If IDENTIFIED LEAKAGE is greater than 10 gpm, refer to Technical Specification 3.4.13 for LCO.

AR # ________________

N/A [X] ______

12.4 REMARKS: ____________________________________

12.5 Test performers and verifiers:

Name	Signature	Date/Time	Init
Joe Operator	Joe Operator	Today / Now	JO
		/	
		/	
		/	

PERF

13. DATA REDUCTION AND EVALUATION

NOTE: If the manual RCS LEAK calculation is performed, use the leak rate data from step 12.3.8.

13.1 If the Gross RCS leak rate from step 12.2.2 or 12.3.8 is less than 0.965 gpm if zinc injection is in progress or less than 1 gpm if zinc injection is NOT in progress, assume the following:

N/A [ ] ______

UNIDENTIFIED LEAKAGE < 1 gpm, and

IDENTIFIED LEAKAGE < 10 gpm

13.2 If the Gross RCS leak rate from step 12.3.8 is greater than or equal to 1 gpm, record.

N/A [ ] ______

13.2.1 Calculated Total RCS Leak Rate Error Factor (EF_{TTL}).

a. When readings are taken from the Aux Board + PPC,

$$EF_{TTL} = \frac{26.48 \text{ gal}}{\Delta T\text{min}} = \frac{26.48}{\_\_\_\_\_\_\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_\_\_\_\_ \text{ gpm}$$

N/A [ ] ______

b. When readings are taken from the Aux Board + Control Boards,

$$EF_{TTL} = \frac{133.6 \text{ gal}}{\Delta T\text{min}} = \frac{133.6}{\_\_\_\_\_\_\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_\_\_\_\_ \text{ gpm}$$

N/A [ ] ______

NOTE 1: ΔT should be the same for Table 1 through Table 4. If not use the shortest ΔT.

NOTE 2: If any control board indicator is used in Table 1 through Table 4, use 13.2.1b.

13.2.2 UNIDENTIFIED LEAKAGE = Calculated RCS Leak Rate - RCS Calculated Identified Leak Rate + $EF_{TTL.}$

____________	-	____________	+	____________	=
Step 12.3.6		Step 12.3.12		EF_{TTL} 13.2.1a or 13.2.1b	

UNIDENTIFIED LEAKAGE = ______________ ______

PERF

14. PRIMARY REVIEW

14.1 Verify the acceptance criteria have been satisfied for the reactor coolant system leak rate.

UNIDENTIFIED LEAKAGE is less than 0.965 gpm if zinc injection is in progress or less than 1 gpm if zinc injection is NOT in progress. (Steps 13.1 or 13.2.2.) ______

IDENTIFIED LEAKAGE is less than 10 gpm. (Steps 13.1 or 12.3.14) ______

14.2 REMARKS: Describe any malfunctions, explain any NO or N/A entries in any of the data and list any discrepancies.

____

____

____

____

14.3 Review the completed procedure.

If the acceptance criteria has not been satisfied, notify management promptly, write an Action Request and refer to applicable Technical Specifications limiting conditions for operations.

AR # ______________________________

Signature: ______________________________ Date/Time __________/__________
Shift Foreman

15. SECONDARY REVIEW

15.1 Review procedure for completeness and acceptability. ______

15.2 REMARKS: ______________________________

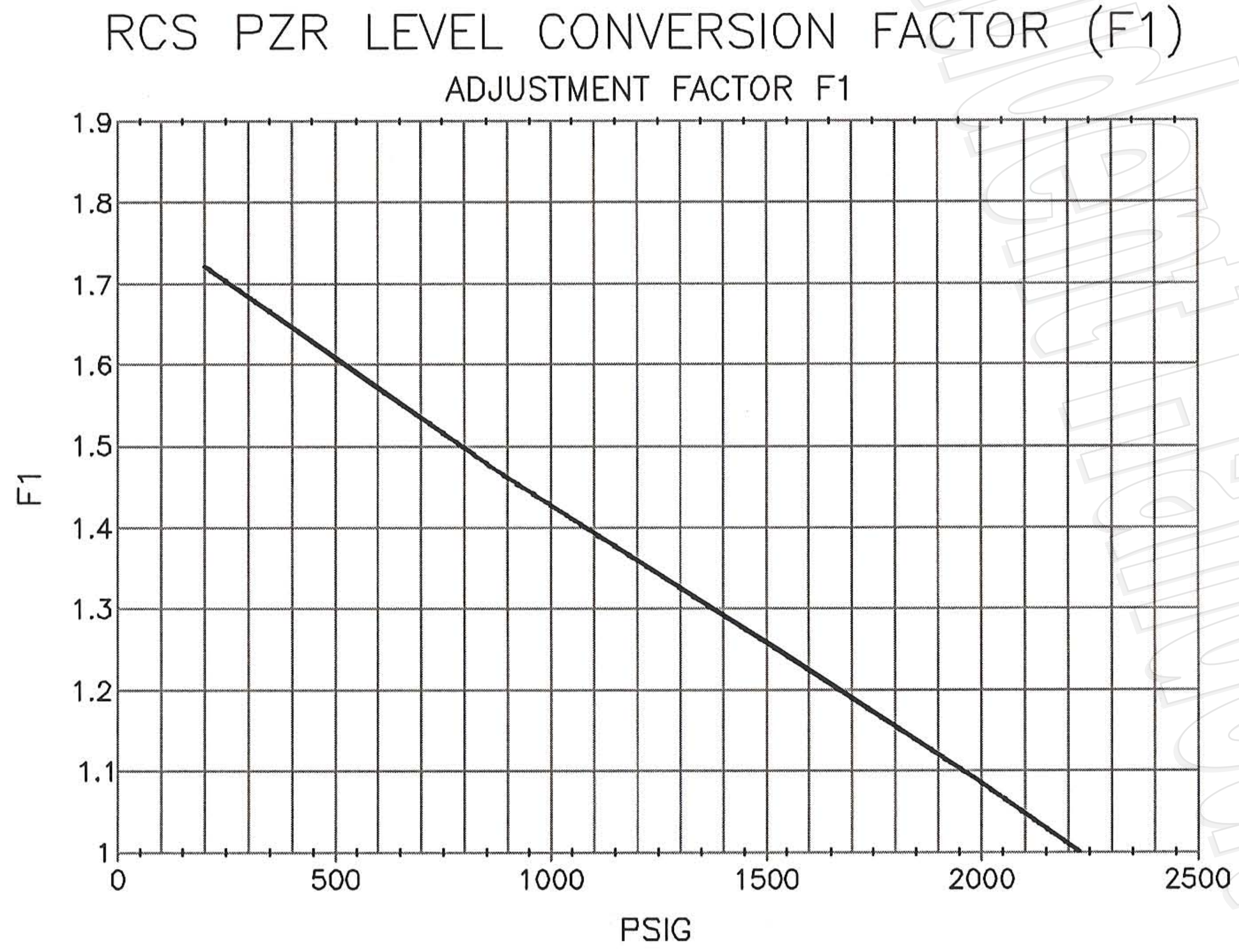
____

____

____

Reviewed By: ______________________________ Date ______________________
Second Reviewer

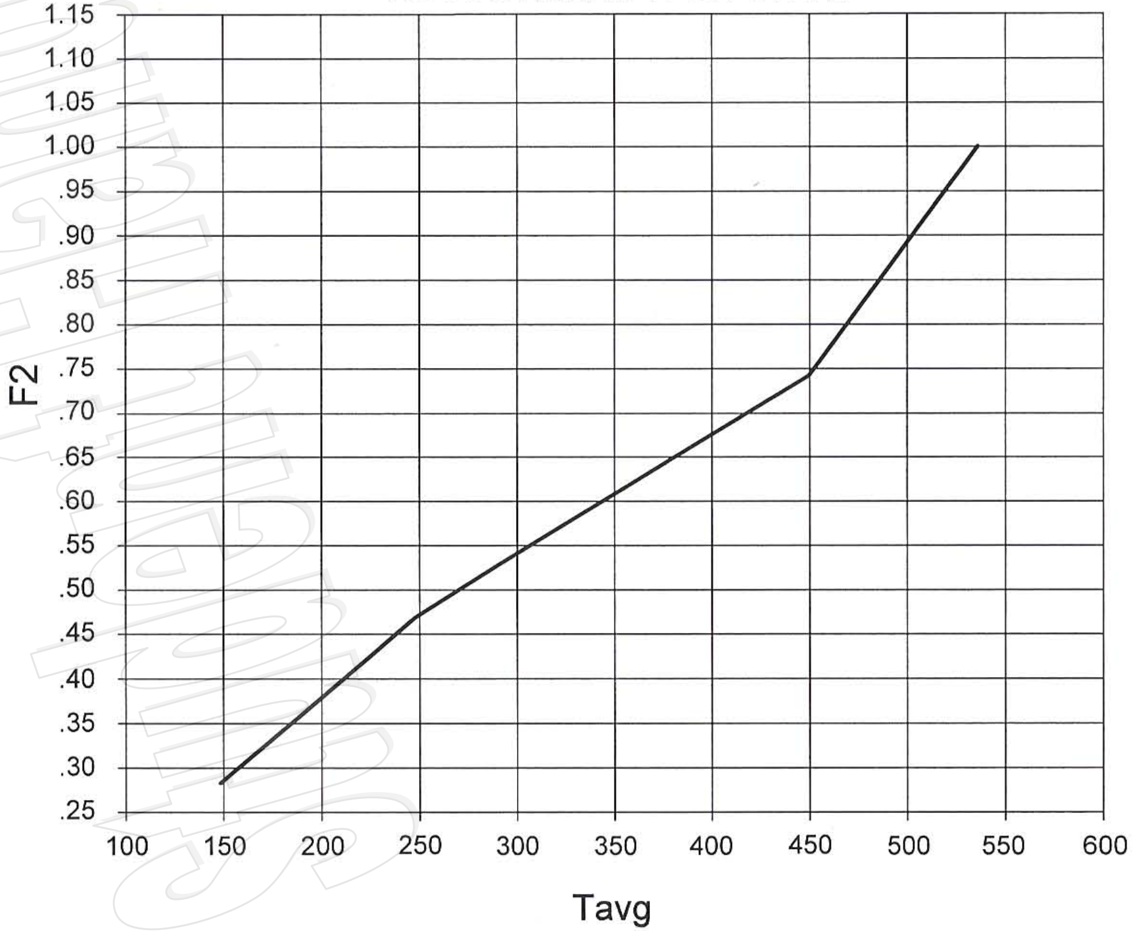
TITLE: Pressurizer Level and RCS TAVG Adjustment Factor Curves



TITLE: Pressurizer Level and RCS TAVG Adjustment Factor Curves

RCS TAVG CONVERSION FACTOR

ADJUSTMENT FACTOR F2

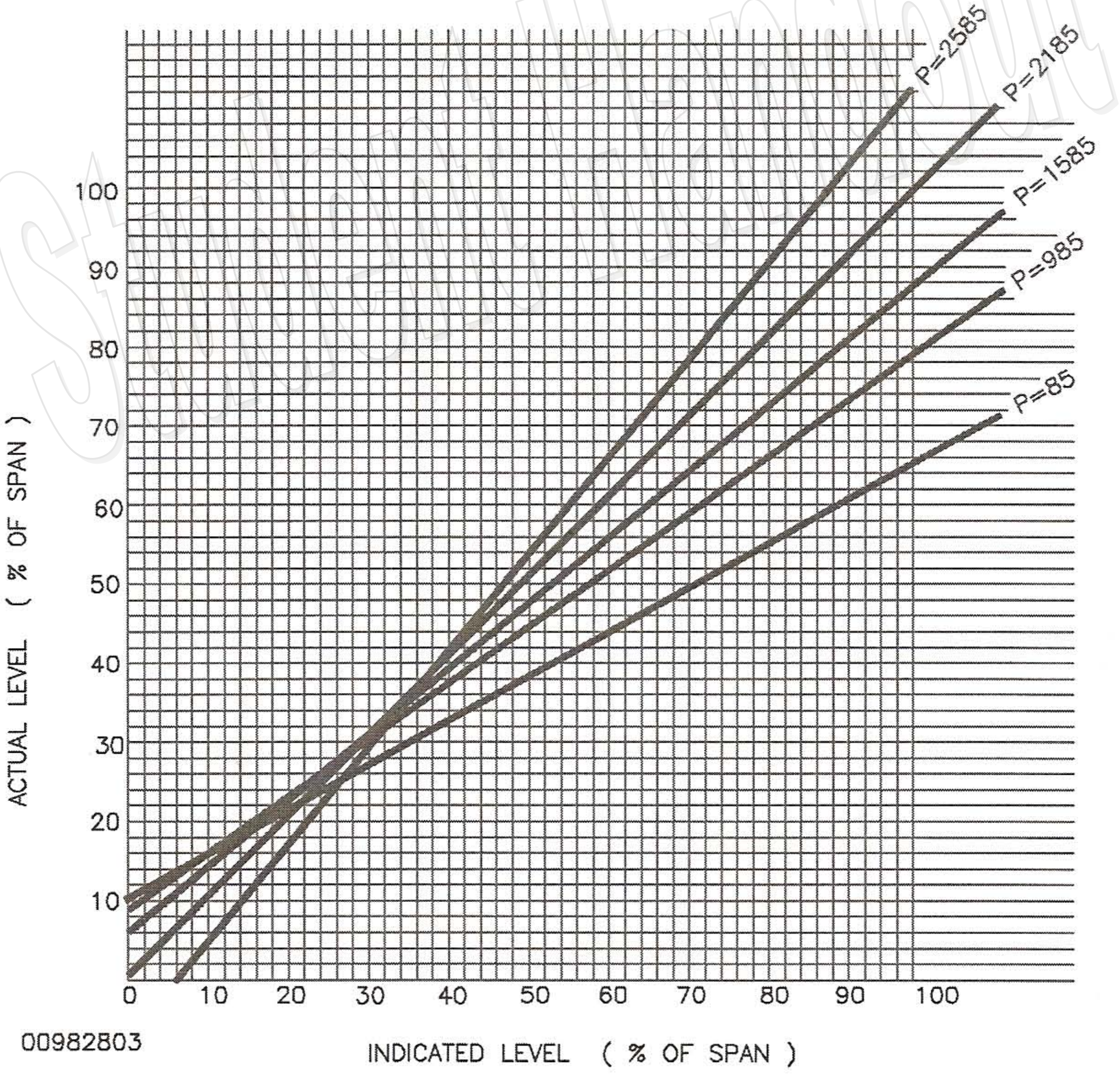


00982802

DIABLO CANYON POWER PLANT
STP R-10C
ATTACHMENT 9.2

1 AND 2

TITLE: Pressurizer Level Correction Curves for Pressurizer Pressures



PERF

13. DATA REDUCTION AND EVALUATION

NOTE: If the manual RCS LEAK calculation is performed, use the leak rate data from step 12.3.8.

13.1 If the Gross RCS leak rate from step 12.2.2 or 12.3.8 is less than 0.965 gpm if zinc injection is in progress or less than 1 gpm if zinc injection is NOT in progress, assume the following:

N/A [X] ______

UNIDENTIFIED LEAKAGE < 1 gpm, and

IDENTIFIED LEAKAGE < 10 gpm

13.2 If the Gross RCS leak rate from step 12.3.8 is greater than or equal to 1 gpm, record.

N/A [ ] SFM

13.2.1 Calculated Total RCS Leak Rate Error Factor (EF_{TTL}).

a. When readings are taken from the Aux Board + PPC,

$$EF_{TTL} = \frac{26.48 \text{ gal}}{\Delta T\text{min}} = \frac{26.48}{\_\_\_\_} \frac{\text{gal}}{\text{min}} = \_\_\_\_\_\_ \text{ gpm}$$

N/A [X] ______

b. When readings are taken from the Aux Board + Control Boards,

$$EF_{TTL} = \frac{133.6 \text{ gal}}{\Delta T\text{min}} = \frac{133.6}{240} \frac{\text{gal}}{\text{min}} = \underline{0.557} \text{ gpm}$$

N/A [ ] SFM

NOTE 1: ΔT should be the same for Table 1 through Table 4. If not use the shortest ΔT.

NOTE 2: If any control board indicator is used in Table 1 through Table 4, use 13.2.1b.

13.2.2 UNIDENTIFIED LEAKAGE = Calculated RCS Leak Rate - RCS Calculated Identified Leak Rate + $EF_{TTL.}$

$$\underset{\text{Step 12.3.6}}{\underline{1.954}} - \underset{\text{Step 12.3.12}}{\underline{0.606}} + \underset{\substack{EF_{TTL} \\ 13.2.1a \\ \text{or} \\ 13.2.1b}}{\underline{0.557}} =$$

UNIDENTIFIED LEAKAGE = 1.918 SFM

PERF

14. PRIMARY REVIEW

14.1 Verify the acceptance criteria have been satisfied for the reactor coolant system leak rate.

UNIDENTIFIED LEAKAGE is less than 0.965 gpm if zinc injection is in progress or less than 1 gpm if zinc injection is NOT in progress. (Steps 13.1 or 13.2.2.) ① ______

IDENTIFIED LEAKAGE is less than 10 gpm. (Steps 13.1 or 12.3.14) SFM

14.2 REMARKS: Describe any malfunctions, explain any NO or N/A entries in any of the data and list any discrepancies.

① Unidentified leakage > 1 gpm. Enter T.S. 3.4.13 Action A ⇒ Reduce leak in 4 hrs or enter Action B which is Mode 3 in 6 hrs, and Mode 5 in 36 hrs.

14.3 Review the completed procedure.

If the acceptance criteria has not been satisfied, notify management promptly, write an Action Request and refer to applicable Technical Specifications limiting conditions for operations.

AR # XXXXX

Signature: SFM
Shift Foreman

Date/Time Today / Now

15. SECONDARY REVIEW

15.1 Review procedure for completeness and acceptability. ______

15.2 REMARKS: ______

Reviewed By: ______
Second Reviewer

Date ______

Number:	NRCADM02RO
Title:	PERFORM OUTAGE SAFETY CHECKLIST
Examinee:	______________________________
Evaluator:	____________ ____________ ________
	Print Signature Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	AD8.DC55, Outage Safety Scheduling, Rev. 19
	OP AP SD-0, Loss of, or Inadequate Deca Heat Removal, Rev. 8
Alternate Path:	Yes ___X___ No ______
Time Critical:	Yes ______ No ___X___
Time Allotment:	10 minutes
Critical Steps:	1
Job Designation:	RO
Task Number:	2.1.32
Rating:	3.4

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
APPROVED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. 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:

- Student Handout and blank Outage Safety Checklist for Mode 6 RCS Level Greater Than or Equal to 111'

Initial Conditions: Unit 1 was in Mode 6 when a loss of off site power occurred. All three diesels started, but a fault on Bus H occurred, leaving that bus deenergized. Power was restored within 5 minutes and the plant was stabilized, with the exception of Bus H. Plant Conditions are as follows:

- MDAFW Pump 1-3 was cleared.
- S/G 1-1 and 1-4 were drained for SG cleaning related work.
- S/G 1-2 and 1-3 are at 35%.
- CFCUs 1-1 and 1-3 running.

Initiating Cue: The SFM has requested you to complete a new Outage Safety Checklist for Core Cooling for the new condition.

Task Standard: The Core Cooling Outage Safety Checklist for Mode 6 RCS Level Greater Than or Equal to 111' for current plant conditions is completed and SFM informed of results.

Start Time: ___________

	Step		Expected Operator Actions
**	1. Review current Mode 6 Outage Checklist with conditions after the loss of offsite power.		1.1 Compare conditions in Initial Conditions with the current checklist.
		**	1.2 Notes the following safety conditions NOT met: o RHR pump 1-2 NOT operable o SI pump 1-2 NOT operable
		**	1.3 Informs SFM Core Cooling function of Outage Safety Checklist NOT met.
			Step was: Sat: ______ Unsat _______*

Stop Time: ___________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

Initial Conditions: Unit 1 was in Mode 6 when a loss of off site power occurred. All three diesels started, but a fault on Bus H occurred, leaving that bus deenergized. Power was restored within 5 minutes and the plant was stabilized, with the exception of Bus H. Plant Conditions are as follows:

- MDAFW Pump 1-3 was cleared.
- S/G 1-1 and 1-4 were drained for SG cleaning related work.
- S/G 1-2 and 1-3 are at 35%.
- CFCUs 1-1 and 1-3 running.

Initiating Cue: The SFM has requested you to complete a new Outage Safety Checklist for Core Cooling for the new condition.

Task Standard: The Core Cooling Outage Safety Checklist for Mode 6 RCS Level Greater Than or Equal to 111’ for current plant conditions is completed and SFM informed of results.

❑ No simulator associated with this JPM.

Plant conditions PRIOR to loss of offsite power

DIABLO CANYON POWER PLANT
AD8.DC55
ATTACHMENT 7.4

TITLE: Unit 1 Outage Safety Checklist - Mode 6 RCS Level Greater Than or Equal to 111'

CORE COOLING

- ☒ 2 of the following
  - FCV 495 and/or 496 (2nd ASW source)
  - CCW Hx 1-1
  - CCW Hx 1-2
- ☒ 2 of the following
  - ASW pump 1-1
  - ASW pump 1-2
  - ASW X-tie FCV-601
- ☒ 2 of the following
  - CCW pump 1-1
  - CCW pump 1-2
  - CCW pump 1-3
- ☒ 1 of the following
  - Reactor head removed
  - 3 of the following
    - ☒ 2 incore thermocouples
    - ☒ 1 of the following
      - 2 LTOP channels
      - 2.07 square in vent path
    - ☒ 1 of the following
      - Rx head fully detensioned. (If decay heat is >5 MW, at least one PZR safety must also be removed.)
      - 2 of the following
        - ☒ 1 of the following
          - AFW pump 1-2
          - AFW pump 1-3
          - Gravity makeup to S/G
        - ☒ 2 of the following
          - S/G 1-1 ≥ 15% lvl & steam vent path
          - S/G 1-2 ≥ 15% lvl & steam vent path
          - S/G 1-3 ≥ 15% lvl & steam vent path
          - S/G 1-4 ≥ 15% lvl & steam vent path
- ☒ 1 of the following
  - 3 of the following
    - ☐ Cavity level ≥ 23'
    - ☐ Upper internals removed
    - ☒ 1 of the following
      - RHR 1-1 operable
      - RHR 1-2 operable
  - 4 of the following
    - ☒ RHR 1-1 operable
    - ☒ RHR 1-2 operable
    - ☒ 1 of the following
      - SI pump 1-1 & HL or CL path
      - SI pump 1-2 & HL or CL path
    - ☒ 1 of the following
      - 2 CFCU's available for high speed with ≥ 1650 gpm CCW flow
      - 2 of the following
        - ☐ Decay heat level ≤ 7.5 Mw
        - ☐ 1 CFCU available for high speed with ≥ 1650 gpm CCW flow

DIABLO CANYON POWER PLANT
AD8.DC55
ATTACHMENT 7.4

TITLE: Unit 1 Outage Safety Checklist - Mode 6 RCS Level Greater Than or Equal to 111'

CORE COOLING

- ☐ 2 of the following
  - ○ FCV 495 and/or 496 (2nd ASW source)
  - ○ CCW Hx 1-1
  - ○ CCW Hx 1-2
- ☐ 2 of the following
  - ○ ASW pump 1-1
  - ○ ASW pump 1-2
  - ○ ASW X-tie FCV-601
- ☐ 2 of the following
  - ○ CCW pump 1-1
  - ○ CCW pump 1-2
  - ○ CCW pump 1-3
- ☐ 1 of the following
  - ○ Reactor head removed
  - ○ 3 of the following
    - ☐ 2 incore thermocouples
    - ☐ 1 of the following
      - ○ 2 LTOP channels
      - ○ 2.07 square in vent path
    - ☐ 1 of the following
      - ○ Rx head fully detensioned. (If decay heat is >5 MW, at least one PZR safety must also be removed.)
      - ○ 2 of the following
        - ☐ 1 of the following
          - ○ AFW pump 1-2
          - ○ AFW pump 1-3
          - ○ Gravity makeup to S/G
        - ☐ 2 of the following
          - ○ S/G 1-1 ≥ 15% lvl & steam vent path
          - ○ S/G 1-2 ≥ 15% lvl & steam vent path
          - ○ S/G 1-3 ≥ 15% lvl & steam vent path
          - ○ S/G 1-4 ≥ 15% lvl & steam vent path
- ☐ 1 of the following
  - ○ 3 of the following
    - ☐ Cavity level ≥ 23'
    - ☐ Upper internals removed
    - ☐ 1 of the following
      - ○ RHR 1-1 operable
      - ○ RHR 1-2 operable
  - ○ 4 of the following
    - ☐ RHR 1-1 operable
    - ☐ RHR 1-2 operable
    - ☐ 1 of the following
      - ○ SI pump 1-1 & HL or CL path
      - ○ SI pump 1-2 & HL or CL path
    - ☐ 1 of the following
      - ○ 2 CFCU's available for high speed with ≥ 1650 gpm CCW flow
      - ○ 2 of the following
        - ☐ Decay heat level ≤ 7.5 Mw
        - ☐ 1 CFCU available for high speed with ≥ 1650 gpm CCW flow

DIABLO CANYON POWER PLANT
AD8.DC55
ATTACHMENT 7.4

TITLE: Unit 1 Outage Safety Checklist - Mode 6 RCS Level Greater Than or Equal to 111'

CORE COOLING

- ☒ 2 of the following
  - ⊗ FCV 495 and/or 496 (2nd ASW source)
  - ⊗ CCW Hx 1-1
  - ⊗ CCW Hx 1-2
- ☒ 2 of the following
  - ⊗ ASW pump 1-1
  - ⊗ ASW pump 1-2
  - ⊗ ASW X-tie FCV-601
- ☒ 2 of the following
  - ⊗ CCW pump 1-1
  - ⊗ CCW pump 1-2
  - ○ CCW pump 1-3
- ☒ 1 of the following
  - ○ Reactor head removed
  - ⊗ 3 of the following
    - ☒ 2 incore thermocouples
    - ☒ 1 of the following
      - ⊗ 2 LTOP channels
      - ○ 2.07 square in vent path
    - ☒ 1 of the following
      - ○ Rx head fully detensioned. (If decay heat is >5 MW, at least one PZR safety must also be removed.)
      - ⊗ 2 of the following
        - ☒ 1 of the following
          - ○ AFW pump 1-2
          - ○ AFW pump 1-3
          - ⊗ Gravity makeup to S/G
        - ☒ 2 of the following
          - ○ S/G 1-1 ≥ 15% lvl & steam vent path
          - ⊗ S/G 1-2 ≥ 15% lvl & steam vent path
          - ⊗ S/G 1-3 ≥ 15% lvl & steam vent path
          - ○ S/G 1-4 ≥ 15% lvl & steam vent path

- ☐ 1 of the following
  - ○ 3 of the following
    - ☐ Cavity level ≥ 23'
    - ☐ Upper internals removed
    - ☒ 1 of the following
      - ⊗ RHR 1-1 operable
      - ○ RHR 1-2 operable
  - ○ 4 of the following
    - ☒ RHR 1-1 operable
    - ☐ RHR 1-2 operable
    - ☒ 1 of the following
      - ⊗ SI pump 1-1 & HL or CL path
      - ○ SI pump 1-2 & HL or CL path
    - ☒ 1 of the following
      - ⊗ 2 CFCU's available for high speed with ≥ 1650 gpm CCW flow
      - ○ 2 of the following
        - ☐ Decay heat level ≤ 7.5 Mw
        - ☐ 1 CFCU available for high speed with ≥ 1650 gpm CCW flow

Number:	NRCADM02SRO
Title:	REVIEW OUTAGE SAFETY CHECKLIST
Examinee:	______________________________
Evaluator:	____________ Print ____________ Signature ________ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	AD8.DC55, Outage Safety Scheduling, Rev. 19			
Alternate Path:	Yes	X	No	
Time Critical:	Yes		No	X
Time Allotment:	15 minutes			
Critical Steps:	1, 2			
Job Designation:	SRO			
Task Number:	2.1.32			
Rating:	3.8			

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
APPROVED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. 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:

- Handouts of Mode 6 RCS Level Greater Than or Equal to 111’

Initial Conditions: Unit 1 was in Mode 6 when a loss of off site power occurred. All three diesels started, but a fault on Bus H occurred, leaving that bus deenergized. Power was restored within 5 minutes and the plant was stabilized, with the exception of Bus H. Plant Conditions are as follows:

- MDAFW Pump 1-3 was cleared.
- S/G 1-1 and 1-4 were drained for SG cleaning related work.
- S/G 1-2 and 1-3 are at 35%
- CFCUs 1-1 and 1-3 are running

The CO has just completed a new Outage Safety Checklist for current plant conditions.

Initiating Cue: The SFM has directed you to review the new Outage Safety Checklist for compliance to the Outage Safety Plan.

Task Standard: The Outage Safety Checklist for current plant conditions is reviewed and SFM informed of your findings.

Start Time: __________

	Step		**Expected Operator Actions**
**	1. Review current Mode 6 Outage Checklists.		1.1 Compare conditions in Initial Conditions with the current checklist.
		**	1.2 Identifies discrepancy with RHR pump 1-2 NOT being operable.
		**	1.3 Recognizes Outage Safety Checklist NOT met with RHR 1-2 not operable.
			Step was: Sat: ______ Unsat _______*
**	2. Reports discrepancies.	**	2.1 Informs SFM of findings.
			Step was: Sat: ______ Unsat _______*

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

Initial Conditions: Unit 1 was in Mode 6 when a loss of off site power occurred. All three diesels started, but a fault on Bus H occurred, leaving that bus deenergized. Power was restored within 5 minutes and the plant was stabilized, with the exception of Bus H. Plant Conditions are as follows:

- MDAFW Pump 1-3 was cleared.
- S/G 1-1 and 1-4 were drained for SG cleaning related work.
- S/G 1-2 and 1-3 are at 35%
- CFCUs 1-1 and 1-3 are running

The CO has just completed a new Outage Safety Checklist for current plant conditions.

Initiating Cue: The SFM has directed you to review the new Outage Safety Checklist for compliance to the Outage Safety Plan.

Task Standard: The Outage Safety Checklist for current plant conditions is reviewed and SFM informed of your findings.

- ❑ No simulator associated with this JPM.

Conditions AFTER loss of offsite power

DIABLO CANYON POWER PLANT
AD8.DC55
ATTACHMENT 7.4

TITLE: Unit 1 Outage Safety Checklist - Mode 6 RCS Level Greater Than or Equal to 111'

CORE COOLING

- 2 of the following
  - FCV 495 and/or 496 (2nd ASW source)
  - CCW Hx 1-1
  - CCW Hx 1-2
- 2 of the following
  - ASW pump 1-1
  - ASW pump 1-2
  - ASW X-tie FCV-601
- 2 of the following
  - CCW pump 1-1
  - CCW pump 1-2
  - CCW pump 1-3
- 1 of the following
  - Reactor head removed
  - 3 of the following
    - 2 incore thermocouples
    - 1 of the following
      - 2 LTOP channels
      - 2.07 square in vent path
    - 1 of the following
      - Rx head fully detensioned. (If decay heat is >5 MW, at least one PZR safety must also be removed.)
      - 2 of the following
        - 1 of the following
          - AFW pump 1-2
          - AFW pump 1-3
          - Gravity makeup to S/G
        - 2 of the following
          - S/G 1-1 ≥ 15% lvl & steam vent path
          - S/G 1-2 ≥ 15% lvl & steam vent path
          - S/G 1-3 ≥ 15% lvl & steam vent path
          - S/G 1-4 ≥ 15% lvl & steam vent path
- 1 of the following
  - 3 of the following
    - Cavity level ≥ 23'
    - Upper internals removed
    - 1 of the following
      - RHR 1-1 operable
      - RHR 1-2 operable
  - 4 of the following
    - RHR 1-1 operable
    - RHR 1-2 operable
    - 1 of the following
      - SI pump 1-1 & HL or CL path
      - SI pump 1-2 & HL or CL path
    - 1 of the following
      - 2 CFCU's available for high speed with ≥ 1650 gpm CCW flow
      - 2 of the following
        - Decay heat level ≤ 7.5 Mw
        - 1 CFCU available for high speed with ≥ 1650 gpm CCW flow

Conditions PRIOR to loss of offsite power

DIABLO CANYON POWER PLANT
AD8.DC55
ATTACHMENT 7.4

TITLE: Unit 1 Outage Safety Checklist - Mode 6 RCS Level Greater Than or Equal to 111'

CORE COOLING

- ☒ 2 of the following
  - ⊗ FCV 495 and/or 496 (2nd ASW source)
  - ⊗ CCW Hx 1-1
  - ⊗ CCW Hx 1-2
- ☒ 2 of the following
  - ⊗ ASW pump 1-1
  - ⊗ ASW pump 1-2
  - ⊗ ASW X-tie FCV-601
- ☒ 2 of the following
  - ⊗ CCW pump 1-1
  - ⊗ CCW pump 1-2
  - ⊗ CCW pump 1-3
- ☒ 1 of the following
  - ○ Reactor head removed
  - ⊗ 3 of the following
    - ☒ 2 incore thermocouples
    - ☒ 1 of the following
      - ⊗ 2 LTOP channels
      - ○ 2.07 square in vent path
    - ☒ 1 of the following
      - ○ Rx head fully detensioned. (If decay heat is >5 MW, at least one PZR safety must also be removed.)
      - ⊗ 2 of the following
        - ☒ 1 of the following
          - ⊗ AFW pump 1-2
          - ○ AFW pump 1-3
          - ⊗ Gravity makeup to S/G
        - ☒ 2 of the following
          - ○ S/G 1-1 ≥ 15% lvl & steam vent path
          - ⊗ S/G 1-2 ≥ 15% lvl & steam vent path
          - ⊗ S/G 1-3 ≥ 15% lvl & steam vent path
          - ○ S/G 1-4 ≥ 15% lvl & steam vent path
- ☒ 1 of the following
  - ○ 3 of the following
    - ☐ Cavity level ≥ 23'
    - ☐ Upper internals removed
    - ☒ 1 of the following
      - ⊗ RHR 1-1 operable
      - ⊗ RHR 1-2 operable
  - ⊗ 4 of the following
    - ☒ RHR 1-1 operable
    - ☒ RHR 1-2 operable
    - ☒ 1 of the following
      - ⊗ SI pump 1-1 & HL or CL path
      - ⊗ SI pump 1-2 & HL or CL path
    - ☒ 1 of the following
      - ⊗ 2 CFCU's available for high speed with ≥ 1650 gpm CCW flow
      - ○ 2 of the following
        - ☐ Decay heat level ≤ 7.5 Mw
        - ☐ 1 CFCU available for high speed with ≥ 1650 gpm CCW flow

Number:	NRCADM03RO
Title:	DETERMINE CLEARANCE POINTS
Examinee:	____________________
Evaluator:	____________ ____________ ________
	Print Signature Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	OP2.ID1, Clearances, Rev. 12 OVID 106713
Alternate Path:	Yes ______ No ___X___
Time Critical:	Yes ______ No ___X___
Time Allotment:	15 minutes
Critical Steps:	1
Job Designation:	RO
Task Number:	G2.2.13
Rating:	3.6

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A JPM COORDINATOR	DATE:	
APPROVED BY:	N/A TRAINING LEADER	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, initiating cue, and task standard. 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: Access to Plant Diagrams and Schematics

Initial Conditions: A leak on Spent Fuel Pool Cooling pump 1-2 requires maintenance. A Clearance request is part of the work package.

Initiating Cue: The WCSFM has asked you to determine the clearance points for this clearance.

Task Standard: The clearance points are determined and documented on the associated plant drawing.

Start Time: __________

	Step	Expected Operator Actions
**	1. Determine Man On Line clearance points required for SFP 1-2	1.1 The following are the MINIMUM clearance points for this action: ❑ Man On Line tag for SFP 1-2 suction valve 1-61 CLOSED ❑ Man On Line tag for SFP 1-2 discharge valve 1-63 CLOSED ❑ Man On Line tag for SFP 1-2 Normal Supply Breaker 52-1H-47 OPEN ❑ Man On Line tag for SFP 1-2 Backup Supply Breaker 52-1F-33 OPEN **Step was: Sat: ______ Unsat _______***
	2. Determine Caution clearance points for SFP 1-2	2.1 Determine the following CAUTION tag points for the clearance. ❑ SFP 1-2 Vent valve 1-66 OPEN ❑ SFP 1-2 Drain valve 1-68 OPEN ❑ CBI tag on pump controller **NOTE: May include Pressure Indicator valves 1-64 and 1-65 as part of clearance, but are NOT required.** **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

Initial Conditions: A leak on Spent Fuel Pool Cooling pump 1-2 requires maintenance. A Clearance request is part of the work package.

Initiating Cue: The WCSFM has asked you to determine the clearance points for this clearance.

Task Standard: The clearance points are determined and documented on the associated plant drawing.

- ❑ The simulator is not needed for the performance of this JPM.

NOTES

1. LOCATE 1/2" HOLE IN PIPE 1" BELOW LOWEST POSSIBLE WATER LEVEL. (27-D)
2. THERE ARE 12 OF THESE VALVES NUMBERED 41 TO 46 AND 54 TO 59. (28-B)
3. TERMINATE PIPE 8'-0" ABOVE FUEL ASSEMBLIES. (27-C)
4. LOCATE 4'-0" BELOW NORMAL WATER LEVEL. (27-C)
5. REMOVABLE SPOOL WITH BLIND FLANGE.
6. SHADED AREAS ABANDONED EQUIP

* – DENOTES CHEMISTRY VALVE

UNIT ONE

PG & E CO.	106713	REV. 39
SHEET 2		

SYS13\671302

Number:	NRCADM03SRO
Title:	SAFETY FUNCTION DETERMINATION
Examinee:	______________________________
Evaluator:	______________ ______________ ________
	Print Signature Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	OP1.DC38, Safety Function Determination Program, Rev. 1 AD4.ID8, Identification and Resolution of Loose, Missing or Damaged Fasteners, Rev. 9 T.S. 3.5.2, ECCS - Operating
Alternate Path:	Yes ___X___ No _______
Time Critical:	Yes _______ No ___X___
Time Allotment:	15 minutes
Critical Steps:	3, 5, 6
Job Designation:	SRO
Task Number:	G2.2.24
Rating:	3.8

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A JPM COORDINATOR	DATE:	
APPROVED BY:	N/A TRAINING LEADER	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, initiating cue, and task standard. 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: OP1.DC38, Safety Function Determination Program

AD4.ID8, ID and Resolution of Loose, Missing or Damaged Fasteners

Technical Specifications

Initial Conditions: Units 1 and 2 are in Mode 1. Unit 1 SSPS Train A Master Relay Testing has been in progress for 3.5 hours. The test was originally scheduled for 3 hours, however a problem developed that will require an additional 4 hours to complete repairs. The BOPCO has reported that the upper front door for SIP 1-2 breaker cubicle is missing two bolts, and the bottom front door is missing one bolt. There are no maintenance workers in the area, and no work is in progress. No other equipment is out of service.

Initiating Cue: As the SFM, determine operability and safety function, and any appropriate actions.

Task Standard: The safety function and operability of the affected equipment and any appropriate actions determined.

Start Time: __________

	Step	Expected Operator Actions
	1. Obtain the correct procedures.	1.1 References AD4.ID8. **Step was: Sat: ______ Unsat _______***
	2. Determine operability of the cubicle.	2.1 Determines the cubicle is INOPERABLE per step 7.1.1.2, 7.1.1.5.a and 7.1.2.2.a. ********************************** **Cue: <u>IF ASKED</u>, the bolt holes are damaged. Repairs will take approximately 4 hours.** ********************************** **Step was: Sat: ______ Unsat _______***
**	3. Determine SIP 1-2 operability.	3.1 Determines SIP 1-2 INOPERABLE per step 7.1.1 NOTE 2. ** **Step was: Sat: ______ Unsat _______***
	4. Determine operability of the SSPS Train A.	4.1 References T.S. Table 3.3.2-1 Function 1.b and Condition/Required Action C. 4.2 Determines SSPS Train A is INOPERABLE. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

	Step	Expected Operator Actions
**	5. Determine SIP 1-1 operability.	5.1 References OP1.DC38 Attachment 8.1. 5.2 Determines SSPS Train A is a support system for SIP 1-1. 5.3 Determines SIP 1-1 is INOPERABLE. ** **NOTE: May determine SIP 1-1 inoperable through T.S. 3.5.2 and that the ACTION statement cannot be met, placing the plant in T.S. 3.0.3** **Step was: Sat: ______ Unsat _______***
**	6. Determine Safety Function NOT met.	6.1 Using Attachment 8.2, determines a LOSF may exist. 6.2 Determines that both trains of SIP are inoperable, therefore entrance into T.S. 3.0.3 is required. **NOTE: May determine SIP 1-1 inoperable through T.S. 3.5.2 and that the ACTION statement cannot be met, placing the plant in T.S. 3.0.3** 6.3 Determines required actions for T.S. 3.0.3 are to implement actions within 1 hour to place the unit in Mode 3 within 7 hours. ** **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

Initial Conditions: Units 1 and 2 are in Mode 1. Unit 1 SSPS Train A Master Relay Testing has been in progress for 3.5 hours. The test was originally scheduled for 3 hours, however a problem developed that will require an additional 4 hours to complete repairs. The BOPCO has reported that the upper front door for SIP 1-2 breaker cubicle is missing two bolts, and the bottom front door is missing one bolt. There are no maintenance workers in the area, and no work is in progress. No other equipment is out of service.

Initiating Cue: As the SFM, determine operability and safety function, and any appropriate actions.

Task Standard: The safety function and operability of the affected equipment and any appropriate actions determined.

- [ ] The simulator is not needed for the performance of this JPM.

Identification and Resolution of Loose, Missing, or Damaged Fasteners

7/30/04
Effective Date

Sponsoring Organization: Procedure Services
Procedure Classification: Quality Related
Review Level: "A"

1. SCOPE 1
2. DEFINITION 2
3. RESPONSIBILITIES 2
4. INSTRUCTIONS 2
   4.1 IDENTIFYING FASTENER PROBLEMS 2
   4.2 RESOLVING FASTENER PROBLEMS 3
   4.3 EVALUATION OF FASTENER PROBLEMS 4
5. RECORDS 5
6. REFERENCES 5
7. VITAL 4KV SWITCHGEAR – GUIDANCE FOR EVALUATING OPERABILITY APPENDIX 6
   7.1 CUBICLE OPERABILITY 6
   7.2 BUS OPERABILITY 8
   7.3 SISI CONCERNS 10

ATTACHMENTS:
1. Index, 07/15/04

1. SCOPE

1) This procedure establishes the requirements for identifying, evaluating and resolving loose, missing or damaged fasteners.[T34349/T34350]

2) This procedure establishes requirements that allow vital 4kV cubicles to remain operable with cubicle doors open.

3) This procedure applies to fasteners on equipment or systems that:

   a) Have OPERABILITY requirements in the technical specifications or equipment control guidelines (ECG).

   b) Are covered by the quality assurance program, a graded quality assurance program, or are seismically qualified.

      <u>NOTE</u>: Equipment and systems meeting these conditions are classified QA Class Q, R, G, S, T in the Q-List and PIMS component database.

   c) Are required by the Seismically Induced System Interaction Program.

4) This procedure may be applied to fasteners on other equipment or systems at the option of the shift foreman.

5) This procedure does not apply to:

a) Loose, missing or damaged fasteners discovered on equipment or systems cleared for maintenance.

NOTE: If these conditions are problems, they should be reported per OM7.ID1.

b) Fasteners lost or damaged during maintenance.

2. DEFINITION

Fasteners

Screws, bolting material, clips or retaining pins used in or on plant structures, systems and components. Fasteners do not include crimped lug wiring connectors.

Not Properly Installed

A term applied to 4kV switchgear bolting when in the following conditions:

- The bolt is not fully tightened
- The backing washer on the bolt can be rotated by hand

3. RESPONSIBILITIES

Individuals discovering loose, missing or damaged fasteners

Responsible for initiating an action request.

Operations and Maintenance

Responsible for assessing the risk of maintaining 4kV cubicles operable with open doors.

Operations and Engineering

Responsible for evaluating the effect of fasteners problems on equipment operability.

4. INSTRUCTIONS

4.1 IDENTIFYING FASTENER PROBLEMS

NOTE: Paragraph 4.2.3 may be performed prior to initiating the action request.[T34879]

1) The individual who discovers a loose, missing or damaged fastener shall:

a) Initiate an action request per OM7.ID1.

- AR subtype should be **FAST**.

b) Bag and tag any loose pieces or parts of a fastener assembly.

(1) On the tag, note the AR number and other pertinent information concerning the fastener, such as its probable location.

(2) Enter the bag's storage location on the action request.

4.2 RESOLVING FASTENER PROBLEMS

4.2.1 General

1) Except as noted in paragraph 4.2.3, plan and correct loose or missing fastener problems per AD7.DC8.

2) Procurement and installation of missing or damaged fasteners shall be per AD7.DC8.

3) The following information may be useful in resolving fastener problems or determining operability of some equipment:[T34350/T34878]

   - Engineering calculation SQE-42 provides guidance for evaluating panels or covers of cabinets. (SQE-42 is located in RMS at RLOC 04502/4851 through 5792.)
   - Section 7 provides guidance for evaluating vital 4kV switchgear.

4) If necessary, assistance with or evaluation of any fastener problem may be requested from engineering.

4.2.2 MOV Fasteners

1) **Do not** tighten any of the following loose fasteners:
   - Actuator-to-yoke bolting
   - Yoke-to-bonnet bolting
   - Body-to-bonnet bolting

   NOTE: Tightening these fasteners can modify the stiffness of the MOV assembly and invalidate votes sensor calibrations.

2) If any of the above MOV bolting is found loose or missing contact a valve engineer before tightening or reinstalling the fastener.[T35171]

3) Plan and correct these fastener problems per AD7.DC8.

4.2.3 Non-MOV Fasteners

1) **All Fasteners**

   a) Upon discovery, any fastener may be tightened or reinstalled provided:

      (1) The function, location, and material type of the fastener are known.

      (2) A procedure, drawing, manual, etc. that provides requirements for installing or tightening the fastener is used.

      (3) Shift foreman authorization is obtained per OP1.DC18.

b) If any fastener is tightened or reinstalled upon discovery, include the following information on the "FAST" AR.

(1) The "as-found" condition and fastener location with sufficient detail (i.e., location, component ID, size of fastener, etc.) to allow someone to find the fastener.

(2) The "as-left" condition and process for installing and/or tightening the fastener including any special tightening requirements, procedure, drawing, manual, etc. used.

c) If a fastener is tightened or reinstalled upon discovery, maintenance should evaluate the fastener's "as-left" condition to determine if additional corrective action is necessary.

2) **≤1/2" Diameter Fasteners**

a) These fasteners may be tightened or reinstalled upon discovery without using a procedure, drawing, manual, etc. if the fastener:

(1) Provides a mechanical function only, and

(2) Performs no adjustment function.

b) The following actions are allowed:

(1) A loose fastener may be tightened to snug tight.

(2) A fastener that has fallen out of a panel or cabinet and is recovered may be reinstalled and tightened to snug tight.

4.3 EVALUATION OF FASTENER PROBLEMS

1) When notified, the shift foreman shall review the "FAST" AR and evaluate equipment operability. This evaluation, based on general knowledge of machinery, supports and connections, should address the following operability questions:

- Does the loose, missing or damaged fastener have the potential for affecting the operation of systems or equipment as described in the technical specifications or ECGs?
- Does the loose, missing or damaged fastener have a direct affect on the operability of systems or equipment? For example, increased vibration, binding, etc.

2) If assistance is needed in determining operability, the shift manager should proceed with the operability assessment per OM7.ID12, "Operability Determination."

a) Details of the problem may be initially communicated by telephone, but the problem shall be documented on an AR/AE.

5. RECORDS

None

6. REFERENCES

1) Developmental references are listed in background information document BID AD4.ID8. This document is in EDMS, NPG Manual, Admin Procedure Info.

2) Licensing Position – Open Doors on Seismically Qualified Cabinets, Revision 2

7. VITAL 4KV SWITCHGEAR – GUIDANCE FOR EVALUATING OPERABILITY APPENDIX

When applying the guidance for evaluating vital 4kV switchgear operability, the objective is to ensure vital components are operable based on the bus remaining structurally and electrically operable. The following guidance can be used to navigate through the various sections of this appendix.

To maintain the …	See the following for requirements
Component or cubicle operable.	Section 7.1 Table 1
Bus structurally operable.	Section 7.2.1 Table 2
Bus electrically operable.	Section 7.2.2 Table 3

7.1 CUBICLE OPERABILITY

7.1.1 Open Doors to Support Maintenance

NOTE 1: The term "cubicle door" or "cubicle doors" does not include panels.

NOTE 2: The term "cubicle" includes the breaker, the component fed by that breaker, and the components installed in the cubicle.

1) Opening 4kV cubicles doors and maintaining the cubicle operable can be risk significant and should be assessed for risk by **maintenance** and **operations** per MA1.DC11 and/or AD7.DC6, as applicable. Troubleshooting should be assessed per MA1.DC10.

2) Provided the conditions of paragraphs 5) and 6) below are met, 4kV bus cubicles may remain OPERABLE when cubicle doors are open to support maintenance.

3) If the conditions of paragraphs 5) and 6) below are not met when cubicle doors are open, the cubicle is INOPERABLE.

4) The following table specifies cubicle configurations and bus combinations allowed when cubicles are operable with open doors.

Table 1: Operable Cubicles with Open Doors

Mode	Allowed cubicle configurations	Allowed cubicles per bus	Allowed number of busses
1 – 4	See Table 2	2	1
5, 6, and Defueled	See Table 2	2	3

5) In **modes 1 – 4**, to maintain cubicle operability, the following conditions shall be met:

a) The shift foreman shall grant permission, per OP1.DC18, to open cubicle doors. If the cubicle doors will be open more than one shift, shift foreman permission shall be obtained at the beginning of each shift the cubicle doors are open.

b) The open cubicle shall be attended at all times by a person who is familiar with the maintenance. Anytime the cubicle is unattended, the cubicle doors shall be shut and properly bolted.

c) Cubicle doors should not be open longer than 24 continuous hours.

NOTE: The 24 hour period is a nominal period rather than a to-the-minute period. This guideline is intended to control the duration doors on operable cubicles are open. The expectation is that reasonable efforts will be made to ensure cubicle doors are not open longer than the guideline.

6) In **modes 5, 6, and defueled,** to maintain cubicle operability, the following conditions shall be met:[T36309]

a) The shift foreman shall grant permission, per OP1.DC18, to open cubicle doors. If the cubicle doors will be open more that one shift, shift foreman permission shall be obtained at the beginning of each shift the cubicle doors are open.

b) The open cubicle shall be attended at all times by a person who is familiar with the maintenance. Anytime the cubicle is unattended, the cubicle doors shall be shut and properly bolted.

NOTE: The risk assessment for operable cubicles with open doors in modes 5,6, and defueled determined that there is an insignificant increase in risk. Therefore, there is no time limit for having operable cubicle doors open.

7.1.2 Loose or Missing Bolting

1) If a cubicle door or panel is not fully bolted, the cubicle may be INOPERABLE.

2) The criteria for determining operability of an individual cubicle are:

a) **Upper front door bolting --** If two or more bolts are missing or not properly installed, the cubicle is INOPERABLE.

b) **Lower front door bolting --** If two or more bolts are missing or not properly installed, the cubicle is INOPERABLE.

c) **Back door bolting --** If three or more bolts are missing or not properly installed, the cubicle is INOPERABLE.

NOTE 1: For the purposes of determining operability, the vertical panel located just above the back door is be part of the back door.

NOTE 2: The loose or missing bolt criteria stated in a, b, & c above is stand alone and cannot be combined with each other. That is, multiple bolt problems, other than as stated, can make the cubicle inoperable and requires evaluation.

7.2 BUS OPERABILITY

NOTE: Bus maintenance that makes bus G inoperable does not make breaker 52-HG-15, startup power, or cross-tie capability inoperable. (See AR A0477404)

7.2.1 Structural Integrity

1) **Cubicles**

   a) Two cubicles in any bus can have open doors, open panels, or missing or improperly installed bolts without affecting operability of the entire bus. Refer to paragraph 5) below for allowable configurations.

   b) If three or more cubicles have open doors, open panels, or missing or improperly installed bolts, the entire bus is INOPERABLE.

2) **Top Horizontal Panel Bolts**

   a) Up to four bolts can be missing or improperly installed on one or two cubicles in a bus without affecting bus operability.

   b) If bolts are missing or improperly installed on three or more cubicles, the entire bus is INOPERABLE.

      Example:
      - Three bolts missing or improperly installed on one cubicle and one bolt missing or improperly installed on another cubicle is acceptable.
      - One missing or improperly installed bolt on each of three cubicles in a bus makes the bus INOPERABLE.

3) **Side (End) Panel Bolts**

   a) If two or more bolts are missing or improperly installed on the side (end) panel of a bus, the bus is INOPERABLE.

   b) Two bolts, one side (end) panel bolt and one top panel bolt, can be missing or improperly installed without affecting bus operability.

4) **PT Drawers**

   a) The auxiliary feeder PT drawers and startup feeder PT drawers are structurally independent from the 4kV bus; therefore, these PT drawers may be opened without affecting bus operability.

   b) One PT drawer on a bus may be opened at any time without affecting bus operability.

   c) If more than one PT drawer is opened on a bus, the bus is INOPERABLE.

5) **Breaker/Ground Buggy Positions**

a) The door/panel configurations in the following table relate the text of paragraphs 1) through 3) above to breaker/ground buggy positions that have been seismically analyzed to maintain bus structural integrity, thus bus operability.

(1) Maintaining an acceptable breaker/ground buggy position is required for both operable and inoperable cubicles.

(2) Two cubicles per bus can have doors or panels in the indicated configuration. These door/panel configurations are stand alone and cannot be combined with each other.

(3) Unless otherwise indicated, the breaker/ground buggy positions are analyzed for modes 1 – 6 and defueled.

(4) Having a cubicle with the front and rear door open and the breaker racked in(up) is not analyzed. This configuration makes the bus INOPERABLE.

b) Other configurations may be acceptable, contact engineering for evaluation.

Table 2: Acceptable Breaker/Ground Buggy Positions

<table>
<tr><th>Door/Panel Configuration</th><th>Breaker/Ground Buggy Position [1]</th></tr>
<tr><td>Each cubicle has the front door open. [2]</td><td rowspan="3">Breaker rolled out (cubicle empty)
Breaker down on the floor
Ground buggy racked in (up)
Breaker racked in (up)</td></tr>
<tr><td>Each cubicle has the rear door open.</td></tr>
<tr><td>One cubicle has the front door open and the other cubicle has the rear door open. [2]</td></tr>
<tr><td>Each cubicle has the rear door open and one top panel removed.</td><td>Breaker rolled out (cubicle empty)
Breaker down on the floor
Ground buggy racked in (up)</td></tr>
<tr><td>Each cubicle has the front & rear doors open and both top panels removed. [2]</td><td><u>Mode 1-4</u>
Breaker rolled out (cubicle empty)
Breaker down on the floor
<u>Mode 5, 6, defueled</u>
Breaker rolled out (cubicle empty)
Breaker down on the floor
Ground buggy racked in (up)</td></tr>
</table>

[1] Any <u>ONE</u> of the indicated breaker/ground buggy positions is acceptable

[2] Front door means both the upper and lower cubicle doors.

7.2.2 Electrical Operability

1) Certain cubicles have door mounted relays that can affect bus operability and the auto transfer scheme. To maintain bus operability or auto transfer capability with these cubicle doors open, the conditions stated in section 7.1.1 shall be met.

2) If the conditions stated in section 7.1.1 are not met, use the following table to determine the affect on equipment operability, bus operability, or auto transfer capability when the indicated 4kV cubicle conditions exist**.**

Table 3: Bus Operability Impact Matrix

Cubicle Condition [1]	Operability Impact
Front cubicle door open [2]	Tech Spec for the component fed by the cubicle breaker
Front CCW cubicle door open [2]	Auto transfer to D/G <u>and</u> Auto transfer to startup
Front D/G cubicle door open [2]	Auto transfer to D/G
Front AUX feeder cubicle door open [2]	Bus <u>and</u> Auto transfer to startup <u>and</u> Auto transfer to D/G
Front STARTUP feeder cubicle door open [2]	Bus <u>and</u> Auto transfer to startup <u>and</u> Auto transfer to D/G

[1] More than one condition may be applicable

[2] Front cubicle door means both the upper and lower doors.

7.3 SISI CONCERNS

1) If a breaker is racked out, it may remain in the cell.

2) If the breaker is removed from the cell, the breaker shall be stored in the exciter switchgear room.

   a) ***<u>EXCEPTION 1:</u>*** During protective relay functional testing, a breaker may be in the TEST position, outside the cubicle and in the 4kV switchgear room.
      - Comply with the restrictions specified in action request A0400674.
      - These restrictions are specified in the procedures used for protective relay functional testing.

   b) ***<u>EXCEPTION 2:</u>*** Following an engineering analysis for floor loading and seismic considerations, storage of breakers in the vital switchgear rooms is permitted.
      - Floor loading and seismic interaction evaluations are performed by engineering. See MA1.ID7, "Control of Plant Floor Loading."
      - Each breaker stored in a vital switchgear room shall have an INFO tag which:
        - States where the engineering analysis is documented.
        - Specifies an individual to be contacted in case questions arise.

Index

A

action request, initiate, 2

B

bag parts, 2
breaker 52-HG-15, 8
bus G operability, 8
bus operability, 8

C

cross-tie capability, 8
cubicle operability during maintenance, 6

F

fastener problem
  correcting, 3
  discovery, 2
  MOV, 3
  non-MOV - ≤1/2 diameter, 4
  non-MOV - all, 3

P

procedure usage, 3
PT drawers, 8

S

shift foreman evaluation, 4
SISI concerns, 10
startup power, 8

PACIFIC GAS AND ELECTRIC COMPANY	**NUMBER OP1.DC38**
NUCLEAR POWER GENERATION	**REVISION 1**
DIABLO CANYON POWER PLANT	**PAGE 1 OF 10**
ADMINISTRATIVE PROCEDURE	

TITLE: Safety Function Determination Program

07/02/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED
SPONSORING ORGANIZATION: OPERATIONS
REVIEW LEVEL: "A"

1. SCOPE

1.1 This procedure implements the Safety Function Determination Program (SFDP) as required by TS 5.5.15.

2. DISCUSSION

2.1 The purpose of the SFDP is to ensure that the proper actions are taken upon failure to meet one or more TS LCOs. It is also the goal of this program to ensure that the allowed out of service time of supported systems is not inappropriately extended as a result of multiple, overlapping support system inoperabilities.

2.2 TS LCO 3.0.2 establishes that upon discovery of a failure to meet an LCO, the associated ACTIONS shall be met. TS LCO 3.0.6 specifies that when a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. If this option is exercised, a safety function determination evaluation shall be made in accordance with TS 5.5.15.

2.3 When a support systems Required Actions directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, LCO 3.0.2 shall be followed.

3. DEFINITIONS

3.1 Support System

A support system is a structure, system, or component (SSC) required by Technical Specifications, which provides support for supported system(s) in order for the supported system(s) to perform its safety function. An example of a support system required by Technical Specifications would be Component Cooling Water (CCW). CCW supports the Residual Heat Removal (RHR) system by providing cooling to the pumps and heat exchangers.

An SSC that monitors or maintains a process parameter or operating limit is not a support system for the purpose of implementing TS LCO 3.0.6. For example, if the rod position deviation monitor is inoperable, this does not automatically mean that the control rods are no longer within their required alignment. A process parameter or an operating limit is not a support system. For example, exceeding control rod insertion limits does not automatically mean that hot channel factors are out of limits.

3.2 Supported System

A supported system is a structure, system, or component (SSC) required by Technical Specifications, which requires a support system to ensure its safety function can be performed. Process parameters and operating limits are not supported systems for the purpose of implementing TS LCO 3.0.6.

A support system can also be a supported system. For example, the CCW system supports RHR system operation. As such the CCW system is a support system. However, the Auxiliary Saltwater System (ASW) supports operation of the CCW system to remove heat. In this case the CCW system is a supported system.

3.3 Safety Function

In the SFDP, safety function refers to intended function of the component or system to provide mitigation for those accidents previously analyzed and licensed for DCPP. The safety function for a component or system covered by an TS LCO can be obtained from the applicable TS Bases or in the FSAR. A single component or system may be covered by more than one TS LCO and have more than one safety function.

3.4 Loss of Safety Function

3.4.1 A loss of safety function exists when, <u>assuming no concurrent single failure</u>, and assuming no concurrent loss of offsite power or loss of onsite diesel generators, a safety function assumed in the accident analysis cannot be performed for the mode of applicability. If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

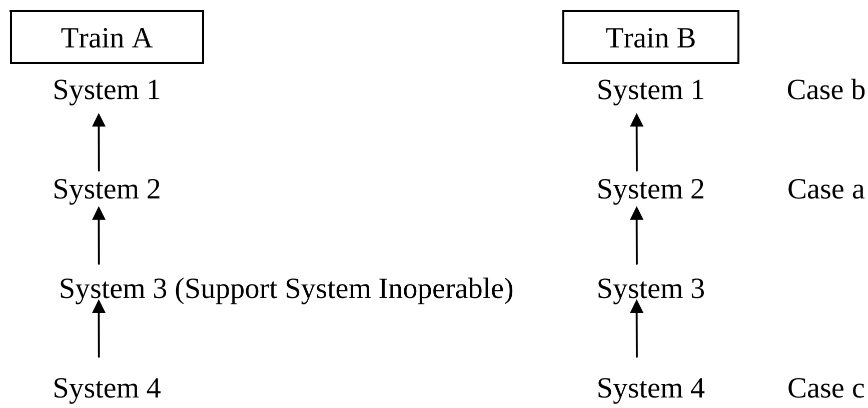
3.4.2 For the purpose of this program, a loss of safety function may exist when a support system is inoperable and:

a. a required system redundant to the system(s) supported by the inoperable support system is also inoperable.

b. a required system redundant to the system(s) in turn supported by the inoperable supported system is also inoperable.

c. a required system redundant to the support system(s) for the supported systems (a) and (b) above is also inoperable.

Generic Diagrammatic Example:



3.4.3 Due to the 3 vital bus and the cross connected design of the CCW/ASW system, DCPP does not neatly fit into the generic example above. The purpose of the program is to ensure that sufficient cross train checks are performed to ensure that inoperabilities of redundant components (functions) in both trains do not go undetected.

3.5 Safety Function Determination Program

This is a program required by TS 5.5.15 to detect a loss of safety function and ensure that appropriate TS actions are implemented.

3.6 Cascading Technical Specifications

When a support system is inoperable such that it results in a supported system inoperability the option always exists to enter the Conditions and Required Actions of the LCO for both systems. This is referred to as cascading technical specification Conditions and Required Actions. However, LCO 3.0.6 provides the option to only enter the support system LCO Conditions and Required Actions provided a loss of safety function has not occurred.

4. RESPONSIBILITIES

4.1 The SFM is responsible for:

4.1.1 Determination if implementation of TS LCO 3.0.6 is appropriate for the existing plant conditions and if allowed by the particular support system that is inoperable. Some technical specifications provide actions on declaring supported systems inoperable upon discovery of support system inoperability.

4.1.2 Performing a loss of safety function determination required by TS Administrative Controls 5.5.15, if appropriate.

4.1.3 Ensuring that no inappropriate completion time extensions exist due to multiple support system inoperabilities.

5.

INSTRUCTIONS

5.1 The Safety Function Determination Program (SFDP) as implemented by this procedure does not change the way in which operability of technical specification equipment is determined. The shift foreman (SFM) shall continue to use the guidance provided in OP1.DC17, "Control of Equipment Required by the Plant Technical Specifications," to evaluate individual equipment operability.

5.2 Entry into TS LCO 3.0.6 can be considered whenever the SFM declares a support TS support structure, system, or components (SSC) inoperable. This in no way precludes the shift manager (SM) or SFM from implementing TS LCO 3.0.2 and tracking the Conditions and Required Actions for all supported equipment affected by the support system inoperability. This is referred to as "cascading" technical specifications and is allowed by TS. Review the following criteria prior to implementing TS LCO 3.0.6.

5.2.1 The unit is in Modes 1 - 4. DCPP will only enter TS LCO 3.0.6 in Modes 1- 4. It has been determined that use of TS LCO 3.0.6 is not advantageous in Modes 5 and 6. See Step 5.4 for more explanation.

5.2.2 Determine if the support systems LCO requires direct entry into the supported systems TS LCO. If so, enter all applicable Required Actions of the support and supported systems TS LCOs. TS LCO 3.0.6 cannot be invoked for that supported system TS LCO.

5.2.3 If the failure of an TS required support system results in the inoperability of an TS supported system, then LCO 3.0.6 may be applied.

5.2.4 If the failure of an TS required support system results in the inoperability of a system outside of TS, and that system is subsequently relied upon by an TS supported system to remain OPERABLE, then LCO 3.0.6 may be applied.

5.2.5 TS LCO 3.0.6 cannot be applied when solely a non TS support item makes an TS LCO item inoperable. There are no Required Actions of the support item to provide the level of protection required for application of TS LCO 3.0.6.

5.2.6 If the failure of an ECG required support system results in the inoperability of an TS supported system, then the ECG and TS LCO Required Actions are required to be entered. TS LCO 3.0.6 cannot be applied.

5.2.7 If there are other support systems which are contributing to the supported systems inoperability, then TS LCO 3.0.6 may NOT be applied without first considering each of the other support systems separately to ensure no loss of safety functions exists.

5.2.8 If the inoperable SSC is not directly addressed by an TS LCO and does not impact the operability of an TS LCO, then no further action with regard to a LOSF evaluation is required and this procedure may be exited.

5.3 Inoperability of a support system does not necessarily render a supported system inoperable. For example:

5.3.1 Declaring CCW Pump 2 inoperable does not render either RHR pump 1 or 2 inoperable due to the cross connected design of the CCW system.

5.3.2 Supported systems are not declared inoperable when an instrumentation support system TS LCO is not met, unless the failure results in a loss of actuation capability or the support system's Required Action directs the supported system to be declared inoperable.

5.3.3 Supported systems are not declared inoperable solely as a result of inoperability of the normal or emergency electrical power source. The Required Actions for inoperable electrical power sources provide the necessary restrictions.

5.4 TS LCO 3.0.6 does not limit the modes of applicability for implementation of SFDP to only Modes 1-4. However, for simplicity DCPP will not use SFDP in Modes 5 and 6. This will require the SFM and SM to consider the effect on supported systems when a support system is inoperable and cascade technical specifications as appropriate. It is assumed that implementation of SFDP in Modes 5 and 6 is not advantageous since most systems only require a single train for the safety function to be met. In those cases where 2 trains are required (e.g., RHR when loops are not filled in Mode 5), the SFM needs to address multiple system inoperability and take the TS Required Actions for all support and <u>supported</u> systems.

5.5 An LOSF evaluation is required if TS LCO 3.0.6 is invoked after considering the criteria of Step 5.2. The LOSF evaluation must be performed as soon as practical for each inoperable TS support or TS supported system.

5.6 Documentation of the LOSF evaluation shall be in the PIMS TS tracking module of the inoperable support equipment evaluated.

5.7 If an LOSF is determined to exist, the appropriate Conditions and Required Actions of the LCO in which the LOSF exists shall be entered. If no Condition within the LCO addresses the LOSF, then TS LCO 3.0.3 shall be entered.

5.8 A considerable amount of judgment may be required to perform an LOSF evaluation. Attachment 8.2, "SFDP Worksheet," is optional for determining if an LOSF evaluation is required. The attachment poses questions to guide the SFM/SM in determining if a more detailed analysis of a loss of safety function is required.

Attachment 8.1, Support System - Supported System Matrix," provides a cross reference of identified support system LCO to supported system LCO relationships. This list is for reference and may be overly conservative depending on the exact cause for declaring the support system inoperable. However, the control room staff can use this list to quickly determine the potential for an LOSF. When a support system TS LCO is not met, Attachment 8.1 can be used to check if any of the listed supported system's TS LCOs are not met. If any supported system Conditions and Required Actions are currently in effect then a more detailed analysis for an LOSF must be performed. This analysis will consist of checking that the supported TS safety function is identified (check TS Bases) and still available assuming no concurrent single failure or loss of offsite power.

5.8.1 Examples:

a. Unit 1 is in Mode 1 and the SFM has declared RHR Pp 1-1 inoperable due to a clearance for maintenance. RHR Pp 1-1 is an SSPS Train B actuated component.

   The asset team has scheduled reactor trip breaker testing for SSPS Train B during the same shift that the RHR pump is cleared. The SFM reviews Attachment 8.1 and determines that TS LCO 3.3.2 is a support system for TS LCO 3.5.2. Closer inspection reveals that the same train is affected and there is no loss of safety function. This evaluation is documented in the PIMS TS tracking module.

b. Unit 2 is in Mode 1 and the SFM has declared the spray additive tank inoperable. The SFM reviews Attachment 8.1 and determines that TS LCO 3.6.7 is not listed as a support system for any other TS LCO. Since the spray additive system is <u>NOT</u> a support system for the containment spray system and there are no other TS LCO Conditions in effect, no LOSF exists. This evaluation is documented in the PIMS TS tracking module.

c. Unit 1 is in Mode 1 and the SFM has authorized SSPS Train A testing that makes that train inoperable. A nuclear operator doing rounds in the turbine building discovers a problem with SIP 1-2 4kV breaker cubicle rendering SIP 1-2 inoperable. TS LCO 3.3.2 is listed as support system for TS LCO 3.5.2. In this condition automatic initiation of SIP 1-1 is prevented due to SSPS testing and SIP 1-2 will not start due to a breaker problem. In this case the LOSF evaluation would show a loss of safety function due to both SIPs inoperable and TS LCO 3.0.3 would be entered.

5.9 Some TS LCOs have Conditions and Required Actions that require technical specification cascading. When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, the applicable conditions and Required Actions are entered in accordance with TS LCO 3.0.2. It should be noted that an LOSF evaluation is still required for the remaining inoperable supported system TS LCOs (Modes 1-4). The directed technical specification cascading may not cover all affected safety functions.

5.10 Common Support Systems

5.10.1 RWST

a. It is recognized that if the RWST is inoperable due to insufficient inventory or inadequate chemical concentration, the acceptance criteria for certain design basis accidents may not be met. Neither the ECCS nor containment spray system can meet their design function with the RWST outside the required TS LCO limits. Since this is clearly stated in the TS Bases for the RWST, the appropriate action is to follow the TS Required Actions for an inoperable RWST and not to enter TS LCO 3.0.3 for the ECCS. The LOSF evaluation will conclude that although there is a degradation in the ECCS, there is not a loss of safety function as long as useable inventory is present. The RWST Required Actions are bounding for this case.

5.10.2 CST/FWST

a. The AFW system will not be able to perform its design function without a supply of water for RCS decay heat removal via the SGs. The Required Actions for inoperability of the CST or FWST is more restrictive than for the case if all three AFW trains are inoperable. The appropriate action is to follow the TS Required Actions for an inoperable CST/FWST and not to enter the Required Actions for an inoperable AFW system. The LOSF evaluation will conclude that although there is a degradation for maintaining an AFW heat sink there is not a loss of safety function as long as there is useable inventory. The CST/FWST Required Actions are bounding for this case.

5.10.3 ULTIMATE HEAT SINK (UHS)

a. The ultimate heat sink provides a heat sink for transferring heat from safety related components during a transient or accident, as well as safety related and nonsafety related heat loads during normal operation. The ASW system is a supported system of the UHS. If the UHS is inoperable the capability to remove heat by the ASW system is impacted. ASW system performance will be degraded with an inoperable UHS but this alone does not make the AWS system inoperable as long as the UHS does not exceed 70degreesF. The appropriate TS Required Actions to ensure the plant is maintained in a safe condition are the Required Actions of TS 3.7.9. Entry into TS 3.7.8 and TS LCO 3.0.3 are not required.

5.10.4 Diesel Fuel Oil, Starting and Turbo Air

a. The DFO storage volume is based on 7 days of minimum ESF loads during a loss off offsite power. In the event insufficient DFO volume is available the Required Action is to restore inventory within 48 hours. The diesel generators are supported systems. Although the diesel generators would not be able to support minimum ESF loads for 7 days, they are still meeting their safety function as long as they are running. The LOSF evaluation for this case concludes that the system is degraded but the safety function of the DGs are met as long as there is useable volume in either DFO storage tank.

b. The TS minimum requirements for DG starting air and turbo air ensure that there is sufficient air capacity for 3 successive DG start attempts. If air pressure is less than 180 psig but greater than 150 psig, there is adequate capacity for one start attempt and the DG can be considered operable until the Completion Time for the Condition expires. The TS LCO Conditions and Required Actions direct declaring any DGs inoperable should they not have at least 150 psig in one starting air receiver or the turbo air receiver. An LOSF evaluation is not required since the TS LCO 3.8.3 Required Actions does not consider the associated DG inoperable within the Completion Time. After expiration of the Completion Time, a directed entry to declare the DG inoperable is required. In this case, entry into TS LCO 3.0.6 is not allowed.

5.11 Cross Connected Systems

Since CCW and ASW are cross connected cooling systems, pumps and heat exchangers do not have strict train relationship with respect to cooling ECCS equipment. It should be noted that there is no analysis for one CCW pump during design basis accidents. If one CCW pump is out of service and the DG associated with an operable CCW pump becomes inoperable, TS 3.8.1 Condition B, Required Action B.2 requires declaring that CCW pump inoperable within 4 hours. With no vital CCW loop available the SFM will direct entry in TS LCO 3.0.3. Application of TS LCO 3.0.6 is inappropriate in this case.

5.12 If an inoperable support SSC is covered by an ECG and this SSC makes an TS supported system inoperable, it is not allowed to invoke TS LCO 3.0.6. The supported system Conditions and Required Actions must be followed if the supported system is inoperable due to the ECG support system inoperability. TS LCO 3.0.6 is dependent on support system Conditions and Required Actions providing the appropriate level of safety and compensatory actions for supported system inoperability. The ECGs have not been reviewed to provide this level of safety.

5.13 Supported System Maximum Completion Time

NOTE: A supported system Completion Time may only be extended when there is no Loss of Safety Function.

5.13.1 A supported system made inoperable by support system inoperabilities may only remain inoperable for a limited period of time without entering the supported system's Conditions and Required Actions. This time limit is defined as the Maximum Completion Time. The Maximum Completion Time for restoring the supported system to operable status is the Completion Time specified for restoration of the first inoperable support system plus the Completion Time specified for the inoperable supported system.

a. If the supported system is not restored to operable status by restoring the support system(s) to operable status within the Maximum Completion Time, enter the Condition and Required Actions for the inoperable supported system's Completion Time not met.

5.13.2 Example of Completion Time Extension

a. The unit is in Mode 1 when 480 V bus H becomes deenergized due to a feeder breaker problem. TS LCO 3.8.9 specifies that this bus must be restored to operable status in 8 hours or a shutdown to Mode 3 is required in the next 6 hours. 480 V bus H (TS LCO 3.8.9) is a support system for containment isolation valves (TS LCO 3.6.3). The seal return penetration has CVCS-8112 (bus H) inside containment and CVCS-8100 (bus G) outside containment. TS LCO 3.6.3 Required Actions gives the operator 4 hours to complete action to restore or isolate the penetration before a shutdown is required. An LOSF evaluation would conclude that there is no loss of safety function since CVCS-8100 is still powered and able to function on a phase A isolation signal assuming no concurrent single failure or loss of offsite power. The Conditions and Required Actions of TS LCO 3.6.3 are not required to be performed for 8 hours since its support system Required Actions are in effect. After 8 hours, then the Required Actions of TS LCO 3.6.3 are applied. Isolation of the seal return penetration, assuming power is not restored to CVCS-8112, must be completed within 12 hours.

5.13.3 Documentation and Tracking of Maximum Completion Time

a. Initiate a PIMS TS Tracking Sheet listing the supported system Maximum Completion Time for the following instances:

1. The support system restoration Completion Time has expired, or

2. Multiple support system inoperabilities have occurred affecting the same supported system.

6.

RECORDS

The LOSF evaluation will be documented in the PIMS TS Tracking Module.

7. REFERENCES

7.1 TS LCO 3.0.6

7.2 TS 5.5.15

8. ATTACHMENTS

8.1 "Support System - Supported System Matrix," 05/21/04

8.2 "SFDP Worksheet," 02/28/2000

DIABLO CANYON POWER PLANT
OP1.DC38
ATTACHMENT 8.1

TITLE: Support System - Supported System Matrix

Support System TS LCO	**Support System**	**Supported System TS LCO Number**	**Supported System**
3.3.2	Engineered Safety Feature Actuation System	3.3.6	Containment Ventilation Isolation Instrumentation
	(ESFAS) instrumentation	3.3.7	Control Room Ventilation System (CRV) Actuation Instrumentation
		3.5.2	ECCS - Operating
		3.5.3	ECCS - Shutdown
		3.6.3	Containment Isolation Valves
		3.6.6	Containment Spray and Cooling Systems
		3.6.7	Spray Additive System
		3.7.2	Main Steam Isolation Valves
		3.7.3	Main Feedwater Isolation, Regulating, and Bypass Valves
		3.7.5	Auxiliary Feedwater System
		3.7.7	Vital Component Cooling Water (CCW) System
		3.7.8	Auxiliary Saltwater (ASW) System
		3.7.12	Auxiliary Building Ventilation System (ABVS)
		3.8.1	AC Sources - Operating
3.3.4	Remote Shutdown System	3.4.9	Pressurizer
		3.7.5	Auxiliary Feedwater System
		3.5.2	ECCS - Operating
		3.5.3	ECCS - Shutdown
		3.7.7	Vital Component Cooling Water (CCW) System
		3.7.8	Auxiliary Saltwater (ASW) System
		3.8.1	AC Sources - Operating
		3.8.2	AC Sources - Shutdown
3.3.5[1]	Loss of Power (LOP) Diesel	3.8.1	AC Sources - Operating
	Generator (DG) Start Instrumentation	3.8.2	AC Sources - Shutdown

[1] Required Action A.1 directs entering applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation (TS LCOs 3.8.1 and 3.8.2), therefore TS LCO 3.0.6 does not apply.

TITLE: Support System - Supported System Matrix

Support System TS LCO	Support System	Supported System TS LCO Number	Supported System
3.3.6[2]	Containment Ventilation Isolation Instrumentation	3.6.3 3.9.4	Containment Isolation Valves. Containment Penetrations
3.3.7[3]	Control Room Ventilation System (CRVS) Actuation Instrumentation	3.7.10	Control Room Ventilation (CRVS)
3.3.8	Fuel Building Ventilation System (FBVS) Actuation Instrumentation	3.7.13	Fuel Handling Building Ventilation System (FHVS)
3.4.14[4]	RCS Pressure Valve (PIV) Leakage	3.4.6 3.4.13 3.5.2 3.5.3	RCS Loops - Mode 4 RCS Operational Leakage ECCS - Operating ECCS - Shutdown
3.5.4[5]	Refueling Water Storage Tank (RWST)	3.5.2[5] 3.5.3[5] 3.6.6[5]	ECCS - Operating ECCS - Shutdown Containment Spray and Cooling Systems
3.6.2[6]	Containment Air Locks	3.6.1	Containment

[2] Required Action B.1 directs entering applicable conditions and Required Actions of LCO 3.6.3 "Containment Isolation Valves," for containment isolation valves made inoperable by isolation instrumentation. Required Action C.2 directs entering Conditions and Required Actions of TS LCO 3.9.4, "Containment Penetrations," for containment ventilation isolation valves made inoperable by isolation instrumentation. Therefore TS LCO 3.0.6 is not applicable for these cases.

[3] Required Action B.1.2 directs entering applicable Conditions and Required Actions for one CRVS train made inoperable by inoperable CRVS actuation instrumentation (TS LCO 3.7.10). In this case TS LCO 3.0.6 does not apply.

[4] Note 2 requires entering applicable Conditions and Required Actions for systems made inoperable by an Inoperable PIV.

[5] Although the RWST is a support system of the ECCS and Containment Spray System, TS 3.5.4 contains sufficient Required Actions. See Step 5.10 for explanation.

[6] Note 3 directs entering applicable Conditions and Required Actions of TS LCO 3.6.1, "Containment," when air lock leakage results in exceeding the overall containment leakage rate, therefore TS LCO 3.0.6 does not apply.

TITLE: Support System - Supported System Matrix

Support System TS LCO	**Support System**	**Supported System TS LCO Number**	**Supported System**
3.6.3[7]	Containment Isolation Valves	3.5.2 3.5.3 3.6.1 3.6.6	ECCS - Operating ECCS - Shutdown Containment Containment Spray and Cooling Systems
3.6.6	Containment Spray and Cooling Systems	3.6.7	Spray Additive System
3.7.4	10% Atmospheric Dump Valves (ADVs)	3.4.5 3.4.6	RCS Loops-Mode 3 RCS Loops-Mode 4
3.7.5	Auxiliary Feedwater (AFW) System	3.4.5 3.4.6	RCS Loops-Mode 3 RCS Loops-Mode 4
3.7.6[8]	Condensate Storage Tank (CST) and Fire Water Storage Tank (FWST)	3.7.5	Auxiliary Feedwater (AFW) System
3.7.7[9]	Component Cooling Water (CCW) System	3.4.6 3.4.7 3.4.8 3.5.2 3.5.3 3.6.6 3.9.5 3.9.6	RCS Loops-Mode 4 RCS Loops-Mode 5, Loops Filled RCS Loops-Mode 5, Loops Not Filled ECCS - Operating ECCS - Shutdown Containment Spray and Cooling Systems Residual Heat Removal (RHR) and Coolant Circulation - High Water Level Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level

[7] Note 3 directs entering applicable Conditions and Required Actions for systems made inoperable by containment isolation valves. Note 4 directs entering applicable Conditions and Required Actions of TS LCO 3.6.1, "Containment," when isolation valve leakage results in exceeding the overall containment leakage rate Acceptance Criteria. Therefore TS LCO 3.0.6 does not apply for these cases.

[8] Although the CST/FWST is a support system for AFW, TS 3.7.6 contains sufficient Required Actions. See Step 5.10 for explanation.

[9] Required Action A.1 Note directs entering applicable Conditions and Required Actions of TS LCO 3.4.6, "RCS Loops - Mode 4," for residual heat removal loops made inoperable by CCW. TS LCO 3.0.6 does not apply to TS LCO 3.4.6.

TITLE: Support System - Supported System Matrix

Support System TS LCO	**Support System**	**Supported System TS LCO Number**	**Supported System**
3.7.8[10]	Auxiliary Saltwater (ASW) System	3.7.7	Component Cooling Water (CCW) System
3.7.9[11]	Ultimate heat Sink (UHS)	3.7.8	Auxiliary Saltwater (ASW) System
3.7.12	Auxiliary Building Ventilation System (ABVS)	3.4.6 3.4.7 3.4.8 3.5.2 3.5.3 3.7.7 3.9.5 3.9.6	RCS Loops-Mode 4 RCS Loops-Mode 5, Loops Filled RCS Loops-Mode 5, Loops Not Filled ECCS - Operating ECCS - Shutdown Component Cooling Water (CCW) System Residual Heat Removal (RHR) and Coolant Circulation - High Water Level Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level
3.8.1[12]	AC Sources - Operating	3.5.2 3.5.3 3.6.6 3.7.5 3.7.7 3.7.8 3.7.10 3.8.7 3.8.9[13]	ECCS - Operating ECCS - Shutdown Containment Spray and Cooling Systems Auxiliary Feedwater (AFW) System Vital Component Cooling Water (CCW) System Auxiliary Saltwater (ASW) System Control Room Ventilation System (CRVS) Inverters - Operating Distribution Systems - Operating

[10] Required Action A.1 Note directs entering applicable Conditions and Required Actions of TS LCO 3.4.6, "RCS Loops - Mode 4," for residual heat removal loops made inoperable by ASW. TS LCO 3.0.6 does not apply to TS LCO 3.4.6.

[11] Although the UHS is a support system for ASW, TS 3.7.9 contains sufficient Required Actions. See Step 5.10 for explanation.

[12] Required Actions B.2 and C.1 direct declaring required feature(s) inoperable when its required redundant feature(s) is inoperable.

[13] A DG inoperable or an offsite circuit inoperable to an ESF bus does not result in TS LCO 3.8.9 not being met. An LOSF is only required when all AC sources to the ESF bus are inoperable.

TITLE: Support System - Supported System Matrix

Support System TS LCO	**Support System**	**Supported System TS LCO Number**	**Supported System**
3.8.2	AC Sources - Shutdown	3.4.7	RCS Loops-Mode 5, Loops Filled
		3.4.8	RCS Loops-Mode 5, Loops Not Filled
		3.7.10	Control Room Ventilation System (CRVS)
		3.8.8	Inverters - Shutdown
		3.8.10[13]	Distribution Systems - Shutdown
		3.9.5	Residual Heat Removal (RHR) and Coolant Circulation - High Water Level
		3.9.6	Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level
3.8.3[14,15]	Diesel Fuel Oil, Lube Oil, Starting Air, and Turbocharger Air Assist	3.8.1	AC Sources - Operating
		3.8.2	AC Sources - Shutdown
3.8.4[16]	DC Sources - Operating	3.8.1	AC Sources - Operating
		3.8.7	Inverters - Operating
		3.8.9	Distribution Systems - Operating
3.8.5[16]	DC Sources - Shutdown	3.8.2	AC Sources - Shutdown
		3.8.8	Inverters - Shutdown
		3.8.10	Distribution Systems - Shutdown
3.8.6[17]	Battery Cell Parameters	3.8.4	DC Sources - Operating
		3.8.5	DC Sources - Shutdown

13 A DG inoperable or an offsite circuit inoperable to an ESF bus does not result in TS LCO 3.8.9 not being met. An LOSF is only required when all AC sources to the ESF bus are inoperable.

14 Required Actions G.1 and H.1 direct declaring the associated DG inoperable. The associated DG is still considered operable until the Required Action and associated Completion Times of TS LCO 3.8.3 are not met. TS LCO 3.0.6 does not apply.

15 Although the DFO Storage tank is a support system of the DGs, the safety function of DGs is satisfied as long as DGs are loaded or can be started and loaded. See Step 5.10 for explanation.

16 An LOSF evaluation is only required when all DC sources to the vital bus are inoperable.

17 The affected battery is still considered OPERABLE until the Required Action and associated Completion Time of TS 3.8.6 are not met. TS LCO 3.0.6 does not apply.

TITLE: Support System - Supported System Matrix

Support System TS LCO	Support System	Supported System TS LCO Number	Supported System
3.8.7[18]	Inverters - Operating	3.8.9	Distribution Systems - Operating
3.8.8	Inverters - Shutdown	3.8.10	Distribution Systems - Shutdown
3.8.9	Distribution Systems - Operating	3.1.7[19]	Rod Position Indication
		3.3.1	Reactor Trip System (RTS) Instrumentation
		3.3.2	Engineered Safety Feature Actuation
		3.3.3	Post Accident Monitoring (PAM) Instrumentation
		3.3.4	Remote Shutdown System
		3.3.5	Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation
		3.3.6	Containment Ventilation Isolation Instrumentation
		3.3.7	Control room ventilation System (CRVS) Actuation Instrumentation
		3.3.8	Fuel Building Ventilation System (FBVS) Actuation Instrumentation
		3.4.4	RCS Loops - Modes 1 and 2
		3.4.5	RCS Loops - Modes 3
		3.4.6	RCS Loops - Modes 4
		3.4.9	Pressurizer
		3.4.11	Pressurizer Power Operated Relief valves (PORVs)
		3.4.12	Low Temperature Overpressure Protection (LTOP) System
		3.4.15	RCS Leakage Detection Instrumentation
		3.5.2	ECCS - Operating
		3.5.3	ECCS - Shutdown

[18] Required Action A.1 Note directs entering applicable Conditions and Required Actions of TS LCO 3.8.9, "Distribution Systems - Operating" with any vital 120 V AC bus deenergized. TS LCO 3.0.6 does not apply.

[19] There is no redundant system for DRPI, enter and follow the Required Actions for TS LCO 3.1.7.

TITLE: Support System - Supported System Matrix

Support System TS LCO	**Support System**	**Supported System TS LCO Number**	**Supported System**
3.8.9	Distribution Systems - Operating (continued)	3.7.3	Main Feedwater Isolation Valves (MFIVs), Main Feedwater Regulating Valves (MFRVs), and MFRV Bypass Valves
		3.7.5	Auxiliary Feedwater (AFW) System
		3.7.7	Vital Component Cooling Water (CCW) System
		3.7.8	Auxiliary Saltwater (ASW) System
		3.7.10	Control Room Ventilation System (CRVS)
		3.7.12	Auxiliary building Ventilation System (ABVS)
		3.8.3	Diesel Fuel Oil, Lube Oil, and Starting Air
		3.8.4[20]	DC Sources - Operating
		3.8.7	Inverters - Operating
3.8.10	Distribution Systems - Shutdown	3.3.1	Reactor Trip System (RTS) Instrumentation
		3.3.6	Containment ventilation Isolation Instrumentation
		3.3.7	Control Room Ventilation System (CRVS) Actuation Instrumentation
		3.4.7	RCS Loops - Mode 5, Loops Filled
		3.4.8	RCS Loops - Mode 5, Loops Not Filled
		3.4.12	Low Temperature Overpressure Protection (LTOP) System
		3.7.10	Control Room Ventilation System (CRVS)
		3.7.13	Fuel Handling Building Ventilation System (FHBVS)

[20] Although the Required Actions for TS LCO 3.8.4 could be delayed per TS LCO 3.0.6, it is considered imperative by the TS bases for TS LCO 3.8.4 to place the battery charger on a backup source within 2 hours.

TITLE: Support System - Supported System Matrix

Support System TS LCO	Support System	Supported System TS LCO Number	Supported System
		3.6.3	Containment Isolation Valves
		3.6.6	Containment Spray and Cooling Systems
3.8.10	Distribution Systems - Shutdown (continued)	3.8.3	Diesel Fuel Oil, Lube Oil, and Starting Air
		3.8.5	DC Sources - Shutdown
		3.9.3	Nuclear Instrumentation
		3.9.4	Containment Penetrations
		3.9.5	Residual Heat Removal (RHR) and Coolant circulation - High Water Level
		3.9.6	Residual Heat Removal (RHR) and Coolant circulation - High Water Level

TITLE: SFDP Worksheet

41## Loss of Safety Function (LOSF) Evaluation

d1##Has the Unit entered the Required Actions of more than one TS LCO?[1]

- If No, then no LOSF exists. No further evaluation and action is required.
- If Yes, Continue with next Step 1.b.

e1##Has the Unit entered the Required Actions of other TS LCOs for redundant train equipment?

- If No, then no LOSF exists. No further evaluation required.
- If Yes, Continue with next Step 1.c.

f1##Has the Unit entered the Required Actions of other TS LCOs for redundant train support or supported equipment applicable to this LCO (consult Attachment 8.1)?

- If No, then no LOSF exists. No further evaluation required.
- If Yes, a LOSF may exist. Perform a LOSF evaluation to ensure that redundant safety equipment is not affected by the support system inoperability.

SUPPORTED SYSTEM REQUIRED ACTION ENTRY TABLE

SUPPORT SYSTEM TS LCO	INOPERABLE TIME/DATE	AFFECTED SUPPORTED SYSTEM TS LCO	MAXIMUM COMPLETION TIME ALLOWED= SUPPORT SYSTEM AOT + SUPPORTED SYSTEM AOT	INOPERABLE TIME/DATE OF THE AFFECTED SUPPORTED SYSTEM

[1] This question provides simplistic screening criteria for an LOSF evaluation. In general, if this is the only TS LCO Condition the unit has entered, then all safety functions should be preserved. Always consider and evaluate common support systems, (i.e., RWST, CST/FWST - See Step 5.11) and single power supply supported systems such as DRPI. The supported system TS LCO list should always be consulted when entering an TS LCO condition to ensure that redundant equipment is available.

TITLE: SFDP Worksheet

ESF EQUIPMENT POWER SUPPLIES and SSPS TRAIN RELATIONSHIP

SAFETY FUNCTION ⇓	BUS (SSPS Trn) ⇒	Vital Bus F	Vital Bus G	Vital Bus H
High head safety injection		CCP 1(Trn A)	CCP 2 (Trn B)	
Medium head safety injection		SIP 1 (Trn A)		SIP 2 (Trn B)
Low head safety injection			RHR Pp 1 (Trn B)	RHR Pp 2 (Trn A)
Ultimate heat sink cooling		ASW Pp 1 (Trn A)	ASW Pp 2 (Trn B)	
ESF and decay heat removal		CCW Pp 1 (Trn A)	CCW Pp 2 (Trn B)	CCW Pp 3 (Trn A & B)
Heat sink inventory		AFW Pp 3 (Trn A)		AFW Pp 2 (Trn B)
Containment cooling		CFCU 1, 2 (Trn A)	CFCU 3, 5 (Trn B)	CFCU 4 (Trn A & B)
Containment cooling			CSP 1 (Trn B)	CSP 2 (Trn A)
Emergency Vital Power		DG 3(Trn A)	DG 2 (1) (Trn B)	DG 1 (2) (Trn A & B)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

---NOTE---
In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valve(s) for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable. <u>AND</u> At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	A.1 Restore train(s) to OPERABLE status	---------NOTE------- The Completion Time may be extended to 7 days for Unit 1 cycle 12 for centrifugal charging pump 1-1 seal replacement ------------------------- 72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the following valves are in the listed position with power to the valve operator removed.	12 hours
	<u>Number</u> / <u>Position</u> / <u>Function</u> 8703 / Closed / RHR to RCS Hot Legs 8802A / Closed / Safety Injection to RCS Hot Legs 8802B / Closed / Safety Injection to RCS Hot Legs 8809A / Open / RHR to RCS Cold Legs 8809B / Open / RHR to RCS Cold Legs 8835 / Open / Safety Injection to RCS Cold Legs 8974A / Open / Safety Injection Pump Recirc. to RWST 8974B / Open / Safety Injection Pump Recirc. to RWST 8976 / Open / RWST to Safety Injection Pumps 8980 / Open / RWST to RHR Pumps 8982A / Closed / Containment Sump to RHR Pumps 8982B / Closed / Containment Sump to RHR Pumps 8992 / Open / Spray Additive Tank to Eductor 8701 / Closed / RHR Suction 8702 / Closed / RHR Suction	
SR 3.5.2.2	Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.5.2.3	Verify ECCS piping is full of water.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.4	Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program.
SR 3.5.2.5	Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	24 months
SR 3.5.2.7	Verify, for each ECCS throttle valve listed below, each mechanical position stop is in the correct position. Charging Injection Throttle Valves: 8810A, 8810B, 8810C, 8810D Safety Injection Throttle Valves: 8822A, 8822B, 8822C, 8822D	24 months
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment recirculation sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	24 months

Number:	NRCADM04RO
Title:	DETERMINE RADIOLOGICAL POSTINGS
Examinee:	______________________________
Evaluator:	____________ Print ____________ Signature ________ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	Radiation Worker Training Handout RCP D-240, Radiological Posting, Rev. 16
Alternate Path:	Yes ________ No ___X___
Time Critical:	Yes ________ No ___X___
Time Allotment:	10
Critical Steps:	1, 2
Job Designation:	RO
Task Number:	2.3.4
Rating:	2.5

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
APPROVED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. 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: Attached Radiological Maps

Copy of RCP D-240, Radiological Posting

Initial Conditions: Radiological Surveys have just been completed to update the baseline data in preparation for scheduled work. RP is short on personnel and has requested Operations assistance in preparing for the work by reviewing the surveys and determining the required postings.

Initiating Cue: The SFM has directed you to review the survey forms and make recommendations with regards to posting to the identified areas.

Task Standard: The required postings are documented below and reported to the SFM.

Radiation Area Survey Map 1

Survey Point ⬡	Rad Posting
1	
2	
3	
4	
5	

Contamination Survey Map 2

Survey Point ⬡	SCA Posting
1	
2	
3	
4	

Start Time: ___________

	Step		Expected Operator Actions
**	1. Determines radiological postings for survey map one.		1.1 Identifies the following areas for Posting based on area surveys:
			o Point 1 – No posting, less than 5mr/hr, part of the RCA
			o Point 2 – No posting, less than 5mr/hr, part of the RCA
		**	o Point 3 – Radiation Area (>5mr/hr but <100mr/hr)
		**	o Point 4 – Radiation Area, (>5mr/hr but <100mr/hr)
		**	o Point 5 – High Radiation Area (>100mr/hr but less than 1000mr/hr)

Step was: Sat: ______ Unsat _______*

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

	Step	Expected Operator Actions
**	2. Determines radiological postings for contamination survey map two.	2.1 Identifies the following contamination area postings based on smears: o Contamination results 1 – No SCA posting required (<1000dpm/100cm^2) ** o Contamination results 2 – SCA posting required (>1000dpm/100cm^2) ** o Contamination results 3 – SCA posting required (>1000dpm/100cm^2) o Contamination results 4 – No SCA posting required (<1000dpm/100cm^2) **Step was: Sat: ______ Unsat _______***

Stop Time: ___________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

Initial Conditions: Radiological Surveys have just been completed to update the baseline data in preparation for scheduled work. RP is short on personnel and has requested Operations assistance in preparing for the work by reviewing the surveys and determining the required postings.

Initiating Cue: The SFM has directed you to review the survey forms and make recommendations with regards to posting to the identified areas.

Task Standard: The required postings are documented below and reported to the SFM.

Radiation Area Survey Map 1

Survey Point	Rad Posting
1	
2	
3	
4	
5	

Contamination Survey Map 2

Survey Point	SCA Posting
1	
2	
3	
4	

- No simulator setup is required for this JPM.

Radiation Area Survey Map 1

Survey Point ⬡	Rad Posting
1	No Posting, <5mr/hr, RCA only
2	No Posting, <5mr/hr, RCA only
3	Radiation Area (>5mr/hr but <100mr/hr)
4	Radiation Area (>5mr/hr but <100mr/hr)
5	High Radiation Area (>100mr/hr but <1000mr/hr)

Contamination Survey Map 2

Survey Point ⬡	SCA Posting
1	Contamination results 1 – No SCA posting required (<1000dpm/100cm^2)
2	Contamination results 2 – SCA posting required (>1000dpm/100cm^2)
3	Contamination results 3 – SCA posting required (>1000dpm/100cm^2)
4	Contamination results 4 – No SCA posting required (<1000dpm/100cm^2)

69- 11510 (3/ 85)

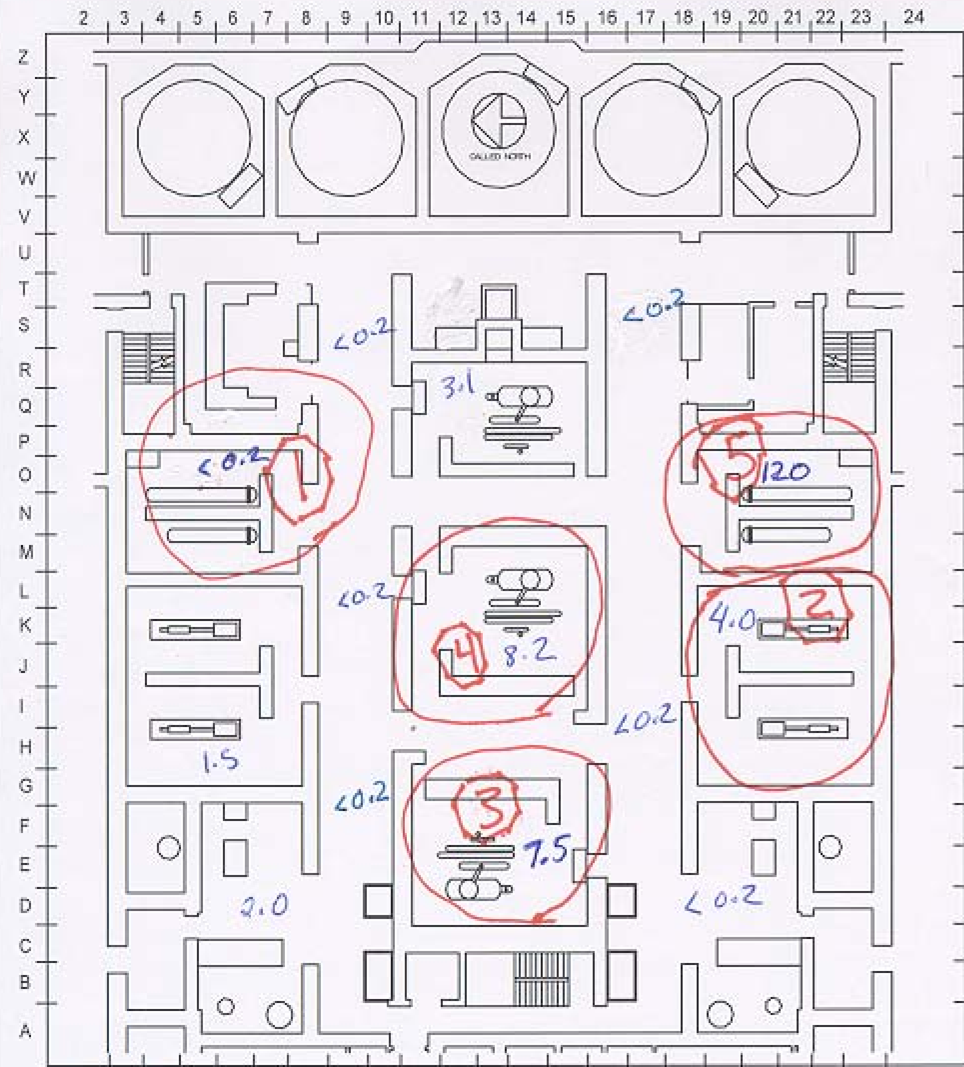
DIABLO CANYON POWER PLANT

RADIATION AND CONTAMINATION SURVEY FORM

0141.00

Student Handout

NAME R Radman	TYPE	DATE	TIME	UNIT	SURVEY
ELEV. 85'	(R) C A	TODAY	1 HR AGO	0	05011
AREA/ EQUIP. AUX. BLDG. - EAST		PURPOSE Baseline Survey Update			
TYPE R02 / INST. RM14	R.P. 3.9.02 / NO. 1.8.46	CAL DUE DATE 4-15-05 / 6-13-05	RWP/ SWP NO. N/A →		1 %PWR 2: 100 / 100



CONTAMINATION RESULTS

NO.	dpm/ 100cm^2

PAGE 1 OF 2

REMARKS All readings in mRem.

REVIEWED BY [signature] Today/1 HR AGO

DIABLO CANYON POWER PLANT

69- 11510 (3/ 85)

RADIATION AND CONTAMINATION SURVEY FORM

0141.00

Student Handout

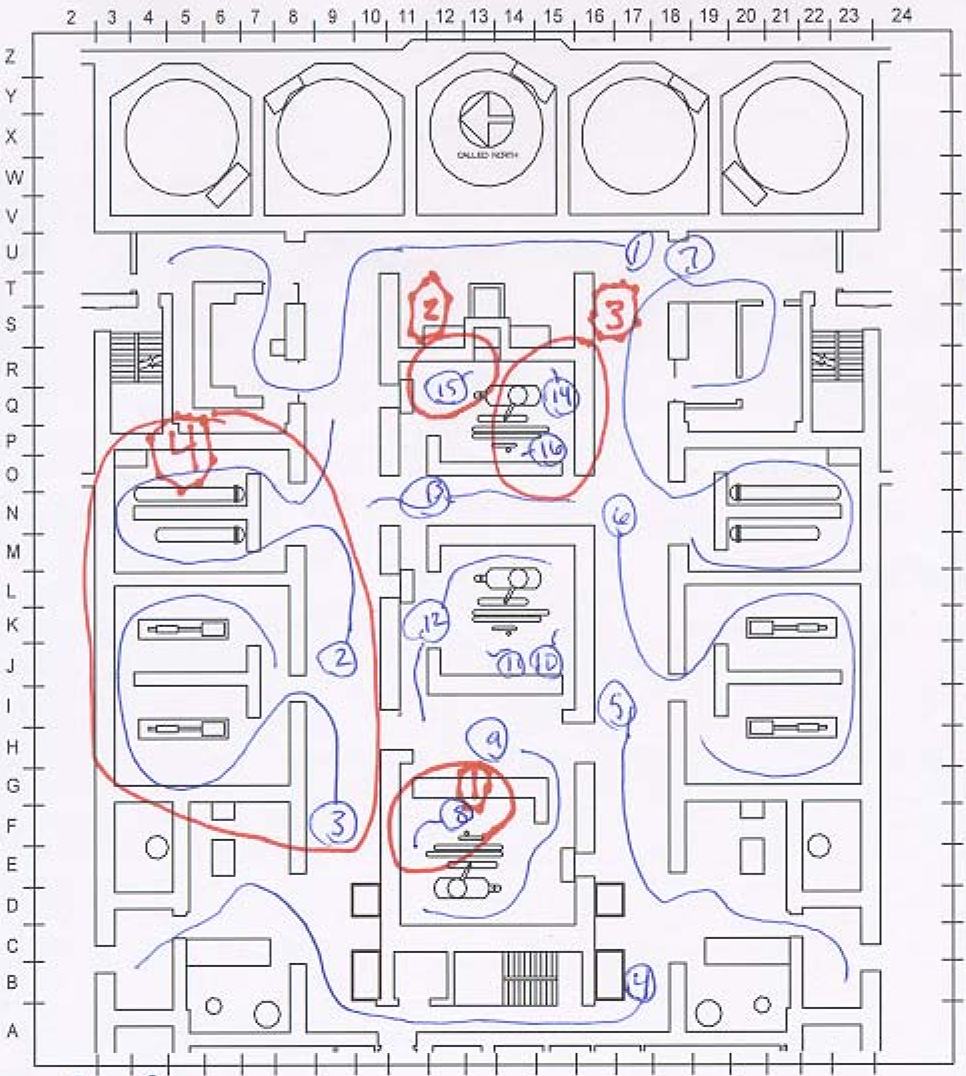
NAME	TYPE	DATE	TIME	UNIT	SURVEY
R Radman	R C A	TODAY	1 HR AGO	0	05011

ELEV. 85'

AREA/ EQUIP. AUX. BLDG. - EAST

PURPOSE

TYPE RO2	R.P. 3.9.02	CAL 4-15-05	RWP/ SWP NO.	1 %PWR 2
INST. RM14	NO. 1.8.46	DUE DATE 6-13-05	N/A →	100 / 100



CONTAMINATION RESULTS

NO.	dpm/ 100cm^2
1-7	< 100 ncpm/LAS
8	300
9	< 100 ncpm/LAS
10	4K
11	17K
12	< 100 ncpm/LAS
13	< 100 ncpm/LAS
14	131K
15	97K
16	150K

PAGE 2 OF 2

REMARKS ncpm = net counts per minute
LAS = large area smear

REVIEWED BY [signature] Today / 1 HR AGO

TITLE: **Radiological Posting**

08/03/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED
LEVEL OF USE: REFERENCE

TABLE OF CONTENTS

SECTION — PAGE

SCOPE 1
DISCUSSION 1
DEFINITIONS 2
RESPONSIBILITIES 4
PREREQUISITES 4
PRECAUTIONS 4
INSTRUCTIONS 4
  General 4
  Radiation Area Posting 6
  High Radiation Area Posting 6
  Locked High Radiation Area Posting 6
  Very High Radiation Area Posting 7
  Surface Contamination Area Posting 7
  Airborne Radioactivity Area Posting 8
RECORDS 8
APPENDICES 8
ATTACHMENTS 8
REFERENCES 9

1. <u>SCOPE</u>

1.1 This procedure describes the proper posting requirements utilized at DCPP for the purpose of radiological control.

2. <u>DISCUSSION</u>

2.1 Routine and special radiological surveys are performed to maintain a knowledge of the radiological conditions of plant areas. Areas with radiological conditions in excess of specified limits are posted to identify the conditions within. Components within these posted areas may require additional markings to identify specific radiological conditions (e.g., contamination under insulation, sample sinks, etc). Consistent and correct radiological posting is essential to maintain compliance with Federal regulations and to inform personnel of the radiological hazards associated with particular areas.

2.2 A standard radiation posting sign is used at DCPP. The sign consists of three sections: a heading, a symbol, and inserts.

2.2.1 The heading contains the words: "CAUTION," "DANGER," or "GRAVE DANGER."

2.2.2 The conventional three bladed radiation symbol is located near the heading. Normally the bladed area is magenta. It may also be black or purple. The background is yellow.

2.2.3 The CAR system of posting radiological areas requires that each sign has an insert for C-contamination, A-airborne, and R-radiation and that they be in the following order under the three bladed symbol:

a. Contamination

b. Airborne

c. Radiation

2.2.4 Each insert is color coded

a. Green: No radiological concern exists.

b. Yellow: Low to moderate radiological concern exists.

c. Red: A high level of radiological concern exists.

2.3 Additional informational signs, placards, labels or tape may be used in conjunction with the CAR posting to provide more specific detail about the radiological condition.

2.4 Components that require additional radiological information may be identified by barrier tape and/or informational labels instead of the CAR posting.

3. DEFINITIONS

3.1 Accessible - means an area that can be occupied by a major portion of an individual's whole body.

3.2 Accessible Overhead Area - An area greater than eight feet is accessible if a platform or ladder is configured such that the area becomes accessible to an individual. All other overhead areas are inaccessible.

3.3 Airborne Radioactivity Area - is (per 10 CFR 20.1003) a room, enclosure or area in which airborne radioactive materials, composed wholly or partly of licensed material, exist in concentrations:

3.3.1 Exceeding 100% of the derived air concentrations (DAC) specified in Appendix B of 10 CFR 20.1001 - 20.2402.

OR

3.3.2 To such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI), or 12 DAC-hours.

3.4 Barricade - a door, gate, chain, rope or any such item that obstructs passage.

3.5 Component - equipment, piping, valves and other parts within an area.

3.6 Controlled Area - is (per 10 CFR 20.1003) an area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason.

3.7 High Radiation Area (HRA) - is (per 10 CFR 20.1601) an area accessible to personnel with radiation levels that could result in an individual receiving a deep dose equivalent (DDE) of greater than 100 mrem in one hour measured at 30 cm from the radiation source or from any surface that the radiation penetrates.

3.8 Locked High Radiation Area (LHRA) - is an area accessible to personnel with radiation levels that could result in an individual receiving a DDE of greater than 1000 mrem PER HOUR measured at 30 cm from the radiation source or from any surface that the radiation penetrates.

3.9 In One Hour - means a cumulative dose averaged over a period of one hour, as opposed to a constant dose rate measured "per hour."

3.10 Radiation Area - is (per 10 CFR 20.1003) an area accessible to personnel with radiation levels that could result in an individual receiving a DDE of greater than 5 mrem in one hour measured at 30 cm from the radiation source or from any surface that the radiation penetrates.

3.11 Radioactive Material Area - is (per 10 CFR 20.1902) a room or area accessible to personnel in which radioactive material is used or stored that exceeds ten times the amounts specified in Appendix C of 10 CFR 20.

3.12 Radiological Controls Area (RCA) - is (per DCPP administrative control) an area in which access is controlled for the purpose of radiation protection, in part, through the use of a Radiation Work Permit. The permanent RCA includes the Containment Buildings, the Fuel Handling Buildings, most of the Auxiliary Building, the Radwaste and Laundry Buildings, the area between the Auxiliary Building and the Radwaste Buildings, and the Calibration Facilities located in the Turbine and Buttress Buildings.

3.13 Restricted Area - is (per 10 CFR 20.1003) an area, access to which is limited for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Normally a restricted area boundary is the same as either the permanent or temporary RCA boundary with which it is associated. Restricted areas not associated with an RCA may be setup with the approval of the RPM or designee provided they are documented in an AR within two working days. The AR should contain the rationale for the setup and steps taken to insure compliance with regulatory and procedural requirements.

3.14 Surface Contamination Area (SCA) - is (per DCPP administrative control) an area accessible to personnel in which smear surveys indicate removable contamination equal to or greater than 20 DPM/100 cm^2 alpha.

OR

Surface Contamination Area (SCA) - is (per DCPP administrative control) an area accessible to personnel in which smear surveys indicate removable contamination equal to or greater than 1000 DPM/100 cm^2 beta-gamma.

3.15 Very High Radiation Area (VHRA) - is an area (per 10 CFR 20.1602) accessible to personnel with radiation levels that could result in an individual receiving an absorbed dose of greater than 500 rads in one hour measured at one meter from the radiation source or from any surface that the radiation penetrates.

4. RESPONSIBILITIES

4.1 Radiation protection is responsible for maintaining the radiological postings in all plant areas in accordance with this procedure.

5. PREREQUISITES

None

6. PRECAUTIONS

6.1 Posting Placement

6.1.1 Where practical, placement of posting materials should avoid attachment to plant piping or components.

a. Posting and barricade material should be attached using metal hasps and an approved adhesive (stock code 73-0664 or 72-6333 or an approved equal). Temporary adhesive attachment anchors, i.e., wall stickies, should not be used. Wire-ties are not temporary adhesive attachments and are acceptable anchor points.

b. The requirements of CF4.ID8, "Temporary Attachments," shall be followed where attachment to piping or components cannot be reasonably avoided.

c. The requirements of CF5.ID12, "Consumable Material Control," shall be followed where contact with affected corrosion resistant alloys cannot reasonably be avoided.

7. INSTRUCTIONS

7.1 General

7.1.1 Signs and postings that meet the wording requirements of sections 7.2 through 7.9 of this procedure, and the requirement for the magenta radiation symbol on a yellow background, are in compliance with the regulations and as such are considered acceptable.

a. The CAR posting should use a standard 3-pocket sign. Barrier rope should be used to identify the area boundaries.

b. Typically such signs and postings are located in infrequently accessed areas and are "holdovers" from the time period before the CAR system was introduced at this plant. Such signs and postings should be brought up to the CAR standards in a timely manner.

7.1.2 When used as required, a "CAUTION," "DANGER," or "GRAVE DANGER" sign shall be visible from each accessible point of entry into the posted area.

7.1.3 When practicable, discrete areas meeting the Radiation Area, High Radiation Area or Locked High Radiation Area criteria should be individually posted. Posting of a very large area or building is generally inappropriate if most of the area does not meet the applicable criteria.

If most of the area within a building or on a floor meets the Radiation Area or High Radiation Area criteria, all entrances to the area may be posted in lieu of posting each discrete area within.

If rooms or areas have components, equipment, or work evolutions which cause variable dose rates, a larger boundary may be established with the postings based on the higher of the expected conditions.

a. Examples of appropriate use of these larger boundaries include:

1. Posting of the area on 140' elevation between Unit 1 and Unit 2 Containment Buildings or large portions of the 115' elevation backyard area during periods of bulk movement of radioactive material, such as during outages.

2. Posting of large portions of the 55' elevation Auxiliary Building due to the automatic discharge function of the Reactor Coolant Drain Tank.

7.1.4 If rooms or areas have work evolutions which cause <u>short</u> <u>term</u> airborne radioactivity, a larger boundary may be established with the postings based on the higher of the expected conditions.

a. The postings within the larger boundary do not require updating.

b. The posting at the larger boundary contains additional information which describes the reason for the short term posting.

7.1.5 Additional informational signs, placards, labels or tape may be used in conjunction with the CAR posting to provide more specific detail about the radiological condition. See Appendix 9.4 for descriptions of the more commonly used informational signs.

7.1.6 Where uses of the color magenta is specified for purposes of posting, the following substitutions may be made:

a. Purple or red may be used for the radiation symbol or radiological barricade rope/tape. Black may also be used for the radiation symbol.

7.1.7 General Posting Exceptions

a. Overhead areas that are inaccessible do not require posting and/or barricading. It is considered a prudent action to place a posting if the area is considered easy to post.

b. <u>Except</u> for a VHRA, the need for any other required posting may be deleted for periods of less than eight hours IF personnel responsible for positive control over access to the affected area are in attendance sufficient to either prevent access, or to control access in accordance with an applicable Radiation Work Permit.

c. Standard signs using the CAR system are not required for permanently installed postings such as the signs at the entrances to inside a containment crane wall. Each sign, either standing alone or in conjunction with other postings, sign shall meet the wording requirements of Sections 7.2 through 7.10 as well as the requirement for the magenta radiation symbol on a yellow background.

NOTE: The first three slots below the radiation symbol should always contain inserts. If conditions do not exist that would require a yellow or red insert, then a green unlabeled insert should be used.

7.2 Radiation Area Posting

7.2.1 Each Radiation Area shall be conspicuously posted as follows:

a. A standard sign shall be used.

b. The heading shall contain the word "CAUTION".

c. The insert in the third slot below the tri-foil should be colored yellow and shall contain the words "Radiation Area".

7.3 High Radiation Area Posting

7.3.1 Each High Radiation Area shall be conspicuously posted as follows:

a. A standard sign shall be used.

b. The heading shall contain the word "CAUTION" or the word "DANGER".

1. The preferred wording is "DANGER".

c. The insert in the third slot below the tri-foil should be colored red and shall contain the words "High Radiation Area".

7.3.2 Magenta and yellow rope, or other similar physical barricade, shall be used in conjunction with the posting requirements of 7.3.1.

7.3.3 Pink Stop signs with contrasting lettering should be posted at unlocked HRAs.

7.3.4 Access controls to High Radiation Areas are discussed in RCP D-220.

7.4 Locked High Radiation Area Posting

7.4.1 Each LHRA shall be conspicuously posted as follows:

a. A standard sign shall be used.

b. The heading shall contain the word "DANGER."

c. The insert in the third slot below the tri-foil should be colored red and shall contain the words "Locked High Radiation Area."

7.4.2 Magenta and yellow rope, or other similar physical barricade, shall be used in conjunction with the posting requirements of 7.4.1.

7.4.3 Pink Stop signs with contrasting lettering should be posted at unlocked LHRAs.

7.4.4 Whenever practical, LHRA postings should be at or on the gate or door that is locked to control access to the area.

7.4.5 Access controls and locking requirements for LHRAs are discussed in RCP D-220.

7.5 Very High Radiation Area Posting

7.5.1 Each VHRA shall be conspicuously posted as follows:

a. A standard sign shall be used.

b. The heading shall contain the words "GRAVE DANGER."

c. The insert in the third slot below the radiation symbol should be colored red and shall contain the words "Very High Radiation Area."

7.5.2 Magenta and yellow rope, or other similar physical barricade, shall be used in conjunction with the posting requirements of 7.5.1.

7.5.3 Whenever practical, VHRA postings should be at or on the gate or door that is locked to control access to the area.

7.5.4 Access controls and locking requirements for VHRAs are discussed in RCP D-220.

7.6 Surface Contamination Area Posting

7.6.1 Each Surface Contamination Area should be conspicuously posted as follows:

a. A standard sign should be used.

b. For contamination levels of $\geq$1K dpm/100 cm^2 but $\leq$100K dpm/100 cm^2 β-γ (or $\geq$20 dpm/100 $cm^2 \alpha$) the insert in the first slot below the tri-foil should be colored yellow and contain the words "Surface Contamination Area."

c. For contamination levels of >100K dpm/100 cm^2 β-γ the insert in the first slot below the tri-foil should be colored red and contain the words "Surface Contamination Area."

7.6.2 The boundaries of Surface Contamination Areas on floors or other surfaces should normally be designated with yellow and magenta rope, or similar physical barrier, to prevent inadvertent entry into the area. Yellow and magenta tape may be used to further delineate the area.

a. When a temporary wall preventing inadvertent access is utilized to delineate a Surface Contamination Area boundary, yellow and magenta rope are not necessary.

b. Small contaminated components such as pump bases, filter housings, etc., are exempt from the above method of posting signs or erecting rope if the boundaries are identified with yellow and magenta tape. If yellow drip bags are used, no tape or wording is needed.

7.6.3 Areas with significantly higher contamination levels than the surrounding contaminated area that mandate different protective clothing entry requirements should be bounded with yellow and magenta rope or yellow and magenta tape (if practicable) to mark the boundaries and posted with the proper contamination level information.

Large areas that have been painted to fix contamination should be identified. Examples of such methods include the use of a designated paint color, stencils, lamicoids or labels.

7.7 Airborne Radioactivity Area Posting

7.7.1 Each Airborne Radioactivity Area <u>shall</u> be conspicuously posted as follows:

a. A standard sign <u>shall</u> be used.

b. The heading <u>shall</u> contain the word "CAUTION" or the word "DANGER".

c. The insert in the second slot below the tri-foil should be colored red and <u>shall</u> contain the words "Airborne Radioactivity Area."

7.8 Radiography Posting Requirements-See Appendix 9.2.

7.9 Radioactive Material Area Posting-see Appendix 9.3.

7.10 For establishment of an RMA outside the permanent RCA, see Appendix 9.3.

7.11 Labeling of containers of radioactive materials is discussed in RCP D-610.

7.12 Labeling or radioactive tools and equipment is discussed in AD4.ID5.

8. <u>RECORDS</u>

None

9. <u>APPENDICES</u>

9.1 Radiological Controls Area: Boundaries, Postings and Special Requirements

9.2 Radiography Posting Requirements

9.3 Radioactive Material Area Posting Requirements

9.4 Description of the some commonly used informational signs/labels/placards

10. <u>ATTACHMENTS</u>

None

11. REFERENCES

11.1 10 CFR 20, "Standards for Protection Against Radiation."

11.2 CF4.ID8, "Temporary Attachments."

11.3 CF5.ID12, "Consumable Material Control."

11.4 AD4.ID5, "Job Site Tool Control."

11.5 RCP D-220, "Control of Access to High Radiation Areas, High-High Radiation and Very High Radiation Areas."

11.6 RP1.ID7, "Control of Radiography."

11.7 RCP D-500, "Radiation and Contamination Surveys."

11.8 Information Notice No. 84-82, "Guidance for Posting Radiation Areas."

11.9 Nonconformance Report DCO-91-TC-N093, "Radiological Labeling and Posting."

11.10 Quality Evaluation, Q0009704, "Lights Found Not Flashing."

11.11 Information Notice No. 88-79, "Misuse of Flashing Lights for High Radiation Area Controls."

11.12 NCRP Report No. 59, 09/15/76.

11.13 SER 10-97, "Unplanned Exposure During Spent Fuel Pool Diving Operations."

11.14 Information Notice No. 97-68, "Loss of Control of Diver in a Spent Fuel Storage Pool."

11.15 Action Request #A0545467

11.16 RCP EM-4, "Area TLD Monitoring."

APPENDIX 9.1

Radiological Controls Area: Boundaries, Postings and Special Requirements

1. SCOPE

This appendix describes the posting of RCA boundaries (excluding radiography) and special controls for limiting dose at those boundaries.

2. DISCUSSION

RCA boundaries are important for controlling dose to Members of the Public. These RCA boundary dose rates have administrative limits that are controlled by radiation surveys, Area TLD Monitoring, and personnel occupancy times.

3. DEFINITIONS

a. Occupancy

1) High Occupancy - means areas such as offices, laboratories and other similar work stations occupied continuously on an annual basis. (i.e., approximately 100% occupancy; 40 hours per normal work week).

2) Intermediate Occupancy - means areas which are populated for shorter periods, such as temporary work stations. (i.e., approximately 25% occupancy; 10 hours per normal work week).

3) Low Occupancy - means areas such as walkways or roads used for pedestrian or vehicular traffic. (i.e., approximately 6.25% occupancy; 2.5 hours per normal work week).

4. RESPONSIBILITIES

a. Radiation protection is responsible for maintaining the radiological postings in all plant areas in accordance with this procedure.

b. The REMP engineer (or designee) is responsible for communicating to RP Supervision posting changes as a result of Area TLD Monitoring.

c. The RP technician or supervision is responsible for initiating an AR (AT-REMP) within two working days when the conditions of step 7.b.3) of this appendix apply

5. PREREQUISITES

None

APPENDIX 9.1 (Continued)

6. PRECAUTIONS

a. Posting Placement

1) Where practical, placement of posting materials should avoid attachment to plant piping or components.

a) Posting and barricade material should be attached using metal hasps and an approved adhesive (stock code 73-0664 or 72-6333 or an approved equal). Temporary adhesive attachment anchors, i.e., wall stickies, should not be used. Wire-ties are not temporary adhesive attachments and are acceptable anchor points.

b) The requirements of CF4.ID8, "Temporary Attachments," shall be followed where attachment to piping or components cannot be reasonably avoided.

c) The requirements of CF5.ID12, "Consumable Material Control," shall be followed where contact with affected corrosion resistant alloys cannot reasonably be avoided.

7. INSTRUCTIONS

a. General Requirements:

1) The radiation level at the RCA boundary shall not exceed 2 mrem in one hour.

2) The total effective dose equivalent (TEDE) to individual Members of the Public shall not exceed 100 mrem in a year.

b. Radiological Controls Area

1) Standard signs using the color coded CAR system are not required at entrances to the RCA.

2) All personnel entrances to an RCA shall be conspicuously posted as follows:

a) The sign or signs shall have the magenta radiation symbol on a yellow background.

b) The sign should include the words "CAUTION, RADIOLOGICAL CONTROLS AREA, PERSONNEL MONITORING DEVICES REQUIRED BEYOND THIS POINT" or other similar wording.

c) In addition, all personnel entrances to an RCA shall be posted as a Radioactive Material Area.

(1) The Radioactive Material designation may be contained on an RCA sign or on a separate RMA posting as described in appendix 9.3 of this procedure.

3) The RP technician or supervisor shall initiate an AR (AT-REMP) within two working days when:

a) RCA boundary dose rates exceed 0.5 mr/hr OR

b) RCA boundary occupancy is intermediate or high by unmonitored personnel and the boundary is not monitored with Area TLDs (RCP EM-4).

NOTE: The permanent RCA boundary is normally monitored with Area TLDs.

APPENDIX 9.1 (Continued)

4) The radiation level at an unattended RCA boundary shall not exceed 2 mrem in one hour.

5) Radioactive material staged for a period of less than 24 hours outside the permanent RCA, and labeled and packaged in accordance with DOT regulations is exempt from the requirement to generate an Action Request.

6) All access points to and from a permanent RCA not staffed by RP personnel should remain locked when practicable to prevent unauthorized entry without the knowledge of the RP personnel. **Doors** which remain unlocked to allow egress from a permanent RCA in the event of an emergency shall have a posting visible at the door requiring notification of RP upon exit at this point. These requirements are not applicable to the normally staffed access control.

7) Other RCA access points may be established by RP if provisions are made for personnel and material access and egress in accordance with appropriate Radiation Control Procedures, Radiation Work Permit or policies.

8) The contiguous boundary of the permanent RCA may be changed by RP supervision provided that the posting of and control of access to the RCA meets the above requirements.

9) Establishing a new RCA/RMA outside of the permanent RCA.

NOTE: Radioactive material staged due to shipment (incoming or outgoing) is exempt from the requirements of this section provided it is for a period of less than 8 hours and the radioactive material is constantly attended by an individual who takes the precautions necessary to prevent the exposure of individuals to radiation or radioactive materials in excess of regulatory limits.

a) Select an appropriate area.

(1) To the extent practicable, RCAs outside of the permanent RCA should be maintained within a lockable enclosure.

b) Consider potential airborne or liquid effluent pathway that may exist due to the storage activities under normal conditions.

c) Consider any postulated airborne and/or liquid effluents due to a fire in the proposed storage area and firefighting water used to control such a fire.

d) Ensure the criteria of this appendix steps 7.b.3) and 7.b.4) are met.

e) After completing all applicable steps above, obtain approval to establish the RCA from the radiation protection manager or designee.

f) Establish and post the new area as applicable.

g) Notify chemistry that a new RCA has been established.

h) Notify the RP access foreman that a new RCA has been established.

APPENDIX 9.2

Radiography Posting Requirements

1. SCOPE

This appendix describes the posting of radiography boundaries and special controls for limiting dose at those boundaries.

2. DISCUSSION

None

3. DEFINITIONS

None

4. RESPONSIBILITIES

a. Radiation protection is responsible for implementing radiological postings that may be needed in addition to the radiographer requirements.

5. PREREQUISITES

None

6. PRECAUTIONS

None

7. INSTRUCTIONS

a. Standard signs using the CAR system are not required for radiography postings.

b. Radiography postings are to include the following:

1) The sign or signs shall have the magenta radiation symbol on a yellow background.

2) Radiography postings used solely for radiography exposures should include wording similar to the following: "RADIOGRAPHY IN PROGRESS:" and "NO ENTRY".

3) The wording for postings of radiation areas and high and very high radiation areas shall be in accordance with 7.2 through 7.5 of this procedure.

4) LHRAs caused by radiography exposures do not need to be posted as a LHRA.

c. Areas controlled solely due to radiography exposures do not need to include the wording required for an RCA posting as described in Appendix 9.1.

APPENDIX 9.3

Radioactive Material Area Posting Requirements

1. SCOPE

   This appendix describes the posting of radioactive material area boundaries.

2. DISCUSSION

   None

3. DEFINITIONS

   None

4. RESPONSIBILITIES

   None

5. PREREQUISITES

   None

6. PRECAUTIONS

   None

7. INSTRUCTIONS

   a. Normally a Radioactive Material Area is contained within a Radiological Controls Area and the RMA posting is located at all personnel entry points to the RCA. (Appendix 9.1 of this procedure)

   b. Under some circumstances an RMA may be designated outside of an RCA. The following areas are examples of RMAs outside of RCAs at DCPP. Any other area located outside of an RCA requires the approval of the RPM or designee to be designated as an RMA.

      1) Areas with low activity sources used for the purpose of source checking, performance checking, or calibrating instruments.

      2) Areas used for storing smoke detectors.

      3) The areas surrounding the setup of the steam generator chemical cleaning equipment located outside of the RCA and also the protected area.

   c. Standard signs using the color coded CAR system are not required for Radioactive Material Area Posting.

   d. The sign or signs shall include the following:

      1) The magenta radiation symbol on a yellow background.

      2) The words "CAUTION RADIOACTIVE MATERIAL" or the words "DANGER RADIOACTIVE MATERIAL".

      3) The preferred wording is "CAUTION RADIOACTIVE MATERIAL".

APPENDIX 9.4

Description of the some Commonly used Informational Signs/Labels/Placards

1. SCOPE

   This appendix lists some of the commonly used informational signs/labels/placards (called signs here for purposes of simplicity) that may be used in conjunction with the CAR posting or to identify sources of radiation and contamination on components. These informational signs are not required to be used. This information in this Appendix is not intended to be and inclusive list of all the various signs. Signs containing handwritten radiological information that are not described in this Appendix may also be used.

2. DESCRIPTION

   a. LOCALIZED RADIATION - used to define and alert personnel to sources of radiation and smaller areas within larger areas in which the exposure rates are be significantly higher than the general area dose rate.

   b. HOT SPOT - used to define a specific radiation source where the physical contact reading is > 100 mrem per hour and is at least 5 times the general area dose rates. See RP1.DC4, "Radiological Hot Spot Identification and Control Program" for specific conditions when posting is required, and when a Hot Spot database entry is required.

   c. COLD AREA - used to define areas which have substantially lower dose rates than the surrounding general area so that personnel may use these areas to maintain exposure ALARA.

   d. RADIOLOGICAL CONDITIONS HAVE CHANGED - used to emphasize significant changes in radiological conditions

   e. STOP - used when a High Radiation Area or Locked High Radiation Area is not locked to control access.

Number: NRCADM04SRO

Title: APPROVE EMERGENCY EXPOSURE

Examinee: ______________________________

Evaluator: ______________ ______________ ______________

Print Signature Date

Results: Sat ______ Unsat ______ Total Time: _____ minutes

Comments:

References: EP RB-2, Emergency Exposure Guides, Rev. 5

EP RB-3, Stable Iodine Thyroid Blocking, Rev. 4

Alternate Path: Yes X No ______

Time Critical: Yes ______ No X

Time Allotment: 15 minutes

Critical Steps: 2, 3, 4, 5

Job Designation: RO/SRO

Task Number: G2.3.4

Rating: 2.5/3.1

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A JPM COORDINATOR	DATE:	
APPROVED BY:	N/A TRAINING LEADER	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, initiating cue, and task standard. 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: EP RB-2, Emergency Exposure Guides

EP RB-3, Stable Iodine Thyroid Blocking

Attached Attachments from EP RB-2, Att. 9.1, 9.6 and 9.7 and RB-3 Att. 5.1

Initial Conditions: Unit 1 was at 100% power when an earthquake resulted in major equipment damage, especially in the GE 100 penetration area. A Large Break LOCA is in progress and a Site Area Emergency has been declared. The TSC has not been manned yet, and you are the ISEC. Two employees were last seen in GE 100 penetration area. Radiation Protection estimates radiation exposure to be 55 Rem/hour whole body with airborne contamination, therefore requiring SCBAs. There have been five volunteers to perform a search and rescue operation. They are:

- Frank Fireman, Fireman, male, age 37
- Fred Fireman, Fireman, male, age 47
- Joe Operator, Nuclear Operator, male, age 50
- Rebecca Radman, RP Tech., female, age 32, declared pregnant woman.
- Oscar Operator, Licensed Operator, male, age 47, prior emergency exposure at another utility.

All volunteers have been briefed, special hazards identified and protective measures implemented. The expected stay time is from 20 to 50 minutes. All operators are self-monitoring trained. A backup team is being assembled.

Initiating Cue: The RP Supervisor has presented forms for KI distribution and authorization for emergency exposure for your approval.

Task Standard: The search and rescue is approved and the appropriate forms signed by the ISEC.

Start Time: __________

	Step		Expected Operator Actions
	1. Obtain the correct procedure.		1.1 Refers to EP RB-2, attachment 9.1. **Step was: Sat: ______ Unsat _______***
**	2. Determines volunteers meet requirements and are briefed.	**	2.1 Determines Rebercca Radman and Oscar Operator do not qualify. **NOTE: May also determine Frank Fireman not eligible due to age.** 2.2 Initials appropriate block. **Step was: Sat: ______ Unsat _______***
**	3. Ensure activity necessary, hazards identified, protective measures implemented, and backup team established.	**	3.1 Recognizes the necessity of the activity, that the team has been briefed on hazards and protective measures, and a backup team is being assembled. ************************************** **Cue: <u>If asked</u>, all hazards have been discussed and protective measures implemented.** ************************************** 3.2 Initials appropriate blocks. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

	Step		Expected Operator Actions
**	4. Implement EP RB-3, "Stable Iodine Thyroid Blocking," and directs RA to administer KI.		4.1 Reviews procedure.
		**	4.2 Removes Rebecca Radman and Oscar Operator from list. **(May remove Frank Fireman also)**
		**	4.3 Approves administering KI to remaining volunteers.
			4.4 Initials appropriate block.
			Step was: Sat: ______ Unsat _______*

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

Step	Expected Operator Actions
** 5. Sign Permit to approve Authorized Limit.	** 5.1 Removes Rebecca Radman and Oscara Operator from list. **(May remove Frand Fireman also)** ** 5.2 Verifies Permit accurate. ❑ Nuclear Operator and older Fireman assigned for entry. (May also assign other Fireman) ** ❑ Max TEDE Rate of 55 Rem/hr ❑ Stay time of 50 minutes ❑ Anticipated TEDE of 46 Rem ❑ NO LIMIT checked ** 5.3 Signs for approval of Permit. 5.4 Initials appropriate block on Attachment 9.1. **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes a Critical Step.

Initial Conditions: Unit 1 was at 100% power when an earthquake resulted in major equipment damage, especially in the GE 100 penetration area. A Large Break LOCA is in progress and a Site Area Emergency has been declared. The TSC has not been manned yet, and you are the ISEC. Two employees were last seen in GE 100 penetration area. Radiation Protection estimates radiation exposure to be 55 Rem/hour whole body with airborne contamination, therefore requiring SCBAs. There have been five volunteers to perform a search and rescue operation. They are:

- Frank Fireman, Fireman, male, age 37
- Fred Fireman, Fireman, male, age 47
- Joe Operator, Nuclear Operator, male, age 50
- Rebecca Radman, RP Tech., female, age 32, declared pregnant woman.
- Oscar Operator, Licensed Operator, male, age 47, prior emergency exposure at another utility.

All volunteers have been briefed, special hazards identified and protective measures implemented. The expected stay time is from 20 to 50 minutes. All operators are self-monitoring trained. A backup team is being assembled.

Initiating Cue: The RP Supervisor has presented forms for KI distribution and authorization for emergency exposure for your approval.

Task Standard: The search and rescue is approved and the appropriate forms signed by the ISEC.

- ❑ The simulator is not needed for the performance of this JPM.

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.7

1 AND 2

TITLE: Emergency Exposure Permit

Date: TODAY Time: NOW Permit #: 2005-001

Responder(s): FRANK FIREMAN FRED FIREMAN
(Print) ~~REBECCA RADMAN~~ RM ~~OSCAR OPERATOR~~ RM

RP Support: JOE OPERATOR

Description of Activity: SEARCH AND RESCUE - LIFESAVING.

Special Hazards: Airborne present. Earthquake damage may cause some access problems. Egress with injured may be possible.

Special Instructions:

Anticipated TEDE Rate: 55 (rem/hr)

Anticipated Stay Time: .84 (hr)

Anticipated TEDE: 46.2 (rem)

AUTHORIZED LIMIT: (Check One)

[ ] 5 rem TEDE
[ ] 10 rem TEDE
[ ] 25 rem TEDE
[✓] NO LIMIT

*Voluntary Consent (For potential exposures of ≥ 25 rem TEDE): I hereby volunteer to perform the activity described above and I acknowledge having received a radiological briefing. I am fully aware of the health risks associated with the anticipated exposure. (Sign Below.)

Frank Fireman Fred Fireman
~~Rebecca Radman~~ RM ~~Oscar Operator~~ RM
Joe Operator

Authorization of Site Emergency Coordinator or Recovery Manager: Recovery Manager/SEC

Time: NOW

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.1

1 AND 2

TITLE: Recovery Manager (or Sec) Checklist

Actions	Initial
NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.	
1. INITIAL ACTIONS	
Review the completed Emergency Exposure Permit, Form 69-10554, with the RA (or ERM) and evaluate the justification for authorization.	
1.1 Ensure volunteers (if necessary) have been obtained and thoroughly briefed on the potential health consequences of this exposure. (See Criteria in Attachment 9.3)	SEC
1.2 Ensure emergency activity is necessary (no reasonable alternatives) and can be successful in outcome.	SEC
1.3 Ensure special hazards have been identified and protective measures implemented.	SEC
1.4 Direct the EMC to establish a back-up team of volunteers for rotation, relief, or rescue if very high dose rates or other life threatening conditions are applicable.	SEC
1.5 Implement EP RB-3, "Stable Iodine Thyroid Blocking," and direct the RA to Administer KI distribution, if needed.	SEC
1.6 Sign the Permit to approve the Authorized Limit. (Refer to Attachment 9.6 for Exposure Limits.)	LOG
NOTE: Each Permit is specific to the individuals or volunteers identified and specified activity. Any changes or additions require a new authorization.	
2. SUBSEQUENT ACTIONS	
2.1 Direct the Administrative Advisor to callout anticipated replacement personnel for the potentially overexposed volunteers.	______
2.2 Ensure other emergency measures taken concurrently do not increase the accepted risks to the volunteers or jeopardize a successful outcome.	______
2.3 Ensure overexposed personnel are promptly transported to off-site medical facilities for evaluation and treatment. (Refer to CP M-13.)	______
2.4 Ensure that the NRC is notified immediately in accordance with 10 CFR 20.2202(a) for any individual exposure of ≥ 25 rem TEDE, ≥ 250 rad SDE, or ≥ 75 rem LDE.	______

DIABLO CANYON POWER PLANT
EP RB-3
ATTACHMENT 5.1

1 AND 2

TITLE: Record of Distribution of Potassium Iodide

1. Fill out time and date KI is administered.
2. Your initials indicate you have been made aware of possible adverse effects to iodine sensitive personnel.

Date	Time	Dosage	Name	Initials	SSN	Organization	Address
Today	Now	130 mg	Frank Fireman	FF	111-11-1111	NFO	123 Grand Ave. A.G.
		~~130 mg~~	~~Rebecca Radman~~	~~RR~~	~~222-22-2222~~	~~RP~~	~~321 Grand Ave. SLO~~
Today	Now	130 mg	Fred Fireman	FF	333-33-3333	NFO	456 Grand Ave. GB
Today	Now	130 mg	Joe Operator	JO	444-44-4444	OPS	654 Grand Ave. AG
		~~130 mg~~	~~Oscar Operator~~	~~OO~~	~~555-55-5555~~	~~OPS~~	~~789 Grand Ave. SLO~~

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.1

1 AND 2

TITLE: Recovery Manager (or Sec) Checklist

Actions	Initial

NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.

1. INITIAL ACTIONS

Review the completed Emergency Exposure Permit, Form 69-10554, with the RA (or ERM) and evaluate the justification for authorization.

1.1 Ensure volunteers (if necessary) have been obtained and thoroughly briefed on the potential health consequences of this exposure. (See Criteria in Attachment 9.3) ______

1.2 Ensure emergency activity is necessary (no reasonable alternatives) and can be successful in outcome. ______

1.3 Ensure special hazards have been identified and protective measures implemented. ______

1.4 Direct the EMC to establish a back-up team of volunteers for rotation, relief, or rescue if very high dose rates or other life threatening conditions are applicable. ______

1.5 Implement EP RB-3, "Stable Iodine Thyroid Blocking," and direct the RA to Administer KI distribution, if needed. ______

1.6 Sign the Permit to approve the Authorized Limit. (Refer to Attachment 9.6 for Exposure Limits.) LOG

NOTE: Each Permit is specific to the individuals or volunteers identified and specified activity. Any changes or additions require a new authorization.

2. SUBSEQUENT ACTIONS

2.1 Direct the Administrative Advisor to callout anticipated replacement personnel for the potentially overexposed volunteers. ______

2.2 Ensure other emergency measures taken concurrently do not increase the accepted risks to the volunteers or jeopardize a successful outcome. ______

2.3 Ensure overexposed personnel are promptly transported to off-site medical facilities for evaluation and treatment. (Refer to CP M-13.) ______

2.4 Ensure that the NRC is notified immediately in accordance with 10 CFR 20.2202(a) for any individual exposure of ≥ 25 rem TEDE, ≥ 250 rad SDE, or ≥ 75 rem LDE. ______

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.6

1 AND 2

TITLE: DCPP Emergency Exposure Guidelines

The following table contains guidelines for use in authorizing emergency exposures when lower doses are not practicable:

	RADIOLOGICAL ASSESSMENT SAMPLING	PROPERTY SAVING	DOSE SAVING TO POPULATION*	LIFESAVING TO INDIVIDUAL*
Emergency Actions----> Part of Body Irradiated	Sampling Under Emergency Conditions	Mitigating Damage to Valuable Property	Corrective Actions, stop/reduce a release	Lifesaving Actions, 1st Aid, Search and rescue
Whole Body	5 rem TEDE	10 rem TEDE	25 rem TEDE	25 rem TEDE
Skin & any Extremity	50 rem SDE	100 rem SDE	250 rem SDE	250 rem SDE
Lens of the Eye	15 rem LDE	30 rem LDE	75 rem LDE	75 rem LDE
Any Organ or Tissues	50 rem (CDE+DDE)	100 rem (CDE+DDE)	250 rem (CDE+DDE)	250 rem (CDE+DDE)

NOTES:

1. Radiological Assessment Sampling, includes collection of atmospheric, liquid, and environmental radiological activity samples as well as chemistry samples involving high activity or high radiation. Emergency exposure limits may be authorized for selected individuals, for emergency assessment functions, in addition to annual occupational dose to date.

2. Property Saving, for example, might be dispatching the Fire Brigade to extinguish a fire in a Very High Radiation Area to protect plant equipment though no immediate threat exists to compromising Plant Safety.

3. Dose Saving to Population, includes activities that justify a potential overexposure to a few workers in order to save even a small average dose in a large population. (May also include Traffic Control for Evacuees or other Security Plan Functions.)

4. Lifesaving to Individual, includes the activity of search and rescue in very high dose rates or high airborne activity.

   * Extreme situations may occur in which a dose in excess of 25 rem TEDE would be unavoidable for either Dose Saving to (Large) Population or Lifesaving to (An) Individual.

   An authorization of emergency exposure with **NO LIMITS** may be made under those conditions, but only to volunteers who are fully aware of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and the numerical estimates of the risk of delayed effects.

NOTES: (Continued)

5. If any of the above emergency exposure limits would prevent successful completion of the activity then the RM or SEC should ensure that back-up teams are standing by to rotate in and relieve the primary responders.

6. Volunteers for any authorized exposures above 25 rem TEDE should be made aware that there is some risk of acute health effects involved, however remote.

   The dose limit of 75 rem to the whole body previously recommended by the EPA for lifesaving action represents a very high level of risk of both acute and delayed effects.

   A dose of 100 rem is expected to result in an approximately 15 percent risk of temporary incapacity from non lethal acute effects and an indeterminate, but less than 5 percent, chance of death within 60 days. This is in addition to a risk of about 1 in 30 of incurring fatal cancer.

   Such high risk levels can only be accepted by a recipient who has been made aware of the risks involved.

   (Reference, EPA Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, May 1992)

   NOTE: Although EPA-400 guidelines say that no limit is applicable under extreme situations it is also true that the RM/SEC must make the authorization and may impose a more restrictive limit if so desired consistent with the availability of personnel resources, alternative actions and the desire to avoid acute health effects of the volunteers.

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.7

1 AND 2

TITLE: Emergency Exposure Permit

Date: TODAY Time: NOW Permit #: 2005-ØØ1

Responder(s): FRANK FIREMAN FRED FIREMAN
(Print) REBECCA RADMAN OSCAR OPERATOR

RP Support: JOE OPERATOR

Description of Activity: SEARCH AND RESCUE - LIFESAVING.

Special Hazards: Airborne present. Earthquake damage may cause some access problems. Egress with injured may be possible.

Special Instructions:

Anticipated TEDE Rate: 55 (rem/hr)

Anticipated Stay Time: .84 (hr)

Anticipated TEDE: 46.2 (rem)

AUTHORIZED LIMIT: (Check One)

[ ] 5 rem TEDE
[ ] 10 rem TEDE
[ ] 25 rem TEDE
[✓] **NO LIMIT**

*Voluntary Consent (For potential exposures of ≥ 25 rem TEDE): I hereby volunteer to perform the activity described above and I acknowledge having received a radiological briefing. I am fully aware of the health risks associated with the anticipated exposure. (Sign Below.)

Frank Fireman Fred Fireman
Rebecca Radman Oscar Operator
Joe Operator

Authorization of Site Emergency Coordinator or Recovery Manager: Time:

DIABLO CANYON POWER PLANT
EP RB-3
ATTACHMENT 5.1

1 AND 2

TITLE: Record of Distribution of Potassium Iodide

1. Fill out time and date KI is administered.
2. Your initials indicate you have been made aware of possible adverse effects to iodine sensitive personnel.

Date	Time	Dosage	Name	Initials	SSN	Organization	Address
		130 mg	Frank Fireman	FF	111-11-1111	NFO	123 Grand Ave. A.G.
		130 mg	Rebecca Radman	RR	222-22-2222	RP	321 Grand Ave. SLO
		130 mg	Fred Fireman	FF	333-33-3333	NFO	456 Grand Ave. GB
		130 mg	Joe Operator	JO	444-44-4444	OPS	654 Grand Ave. AG
		130 mg	Oscar Operator	OO	555-55-5555	OPS	789 Grand Ave. SLO

TITLE: EMERGENCY EXPOSURE GUIDES

1 AND 2

03/23/03
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

TABLE OF CONTENTS

SECTION PAGE

SCOPE 1
DISCUSSION 2
DEFINITIONS 3
RESPONSIBILITIES 4
PREREQUISITES 4
PRECAUTIONS 5
INSTRUCTIONS 5
RECORDS 5
ATTACHMENTS 6
Recovery Manager (or SEC) Checklist 6
TSC Radiological Advisor Checklist 6
OSC Site Radiation Protection Coordinator Checklist 6
OSC Emergency Maintenance Coordinator Checklist 6
EOF Radiological Manager Checklist 6
DCPP Emergency Exposure Guidelines 6
Emergency Exposure Permit 6
REFERENCES 6
SPONSOR 6

1. SCOPE

1.1 This procedure provides guidance in the process of determining the need for authorizing and controlling emergency radiological exposure to selected individuals that is beyond the 10 CFR 20 annual exposure limits.

2. DISCUSSION

2.1 Authorization of emergency exposure is an extraordinary measure, but justifiable under four sets of circumstances.

When the intended action requiring a potential overexposure to an emergency worker, is expected to result in;

- Saving or preserving the quality of a human life that would otherwise be lost.
- Significant projected dose saving to others.
- Protection of valuable property.
- Sampling results required to redefine or adjust existing Protective Actions for the public or site personnel.

All of the above situations require that no reasonable method is immediately available (or readily apparent) to avoid exceeding the established annual limits and that every effort will be made to keep the emergency exposure ALARA.

2.2 The emergency exposure guidelines implemented at DCPP are consistent with the Environmental Protection Agency (EPA) guidance for controlling doses to workers under emergency conditions. (Reference 10.3)

2.3 Authorized dose limits for workers during emergencies are based on avoiding acute health effects and limiting the risk of delayed health effects.

2.4 Emergency worker exposures are not controlled by Planned Special Exposures.

NOTE: Planned Special Exposures may be implemented during non-emergency situations including Recovery Operations. Refer to RP1.ID8, "Planned Special Exposures."

2.5 An emergency exposure should be authorized only once in an individual's lifetime and is in addition to any prior occupational exposure from normal or planned special exposures.

2.6 The emergency exposure limits specified in this procedure are applicable to both in-plant team response activities and off-site field monitoring by the company's ERO personnel.

2.7 Emergency exposure above 25 rem TEDE shall require the voluntary consent of the authorized individual.

3. DEFINITIONS

3.1 Annual Administrative Exposure Guidelines An administrative dose restriction for individual occupational radiation exposure established by the company to control personnel exposures within non-regulatory recommendations prescribed by NCRP and ICRP.

3.2 Annual Administrative Exposure Limits Dose limits established by the company to ensure that personnel do not exceed regulatory limits.

3.3 Committed Dose Equivalent (CDE) The dose to the organs or tissues that would be received from an intake of radioactive material by an individual during the 50 years following the intake.

3.4 Committed Effective Dose Equivalent (CEDE) The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the CDE to these organs or tissues.

3.5 Corrective Actions Those emergency measures taken to mitigate or terminate an emergency situation at or near the source of the problem in order to prevent an uncontrolled release of radioactive material or reduce the magnitude of a release.

3.6 Declared Pregnant Woman (DPW) A woman who has voluntarily informed her supervision, in writing, of her pregnancy and the estimated date of conception.

3.7 Deep Dose Equivalent (DDE) Dose associated with external exposure of the whole body at a depth of 1 cm.

3.8 Lens Dose Equivalent (LDE) External exposure to the lens of the eye at a depth 0.3 cm.

3.9 Lifesaving Action Any of several activities that are necessary to save human life including search and rescue, first aid, transport and emergency medical care.

3.10 Occupational Dose Dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation and to radioactive material.

3.11 Planned Special Exposure Dose received in addition to and accounted for separately from the doses received under the limits of 10 CFR 20.1201 as a planned and specially authorized exposure in accordance with 10 CFR 20.1206.

3.12 Shallow Dose Equivalent (SDE) External exposure of the skin or any extremity (depth 0.007 cm).

3.13 Total Effective Dose Equivalent (TEDE) The sum of the DDE (for external exposure) and CEDE (for internal exposure).

4.

RESPONSIBILITIES

4.1 The Recovery Manager (RM) or Site Emergency Coordinator (SEC) prior to turnover, has the unilateral authority and non-delegable responsibility for authorizing an individual emergency worker to exceed normal 10 CFR 20 exposure limits.

The RM/SEC is furthermore responsible for ensuring that the NRC is notified of any overexposure that may result.

4.2 The TSC Radiological Advisor (RA) is responsible for evaluating the conditions requiring an emergency exposure authorization and advising the RM (or SEC) on its justification and when all prerequisite requirements have been met.

4.3 The EOF Radiological Manager (ERM) is responsible for evaluating radiological conditions and exposures to off-site emergency response personnel and advising the RM when an emergency exposure authorization is justified.

4.4 The Site Radiation Protection Coordinator (SRPC) is responsible for identifying the necessity of obtaining an emergency exposure authorization and in assisting with volunteer selection as needed.

4.5 The Emergency Maintenance Coordinator (EMC) is responsible for ensuring that the maximum protection and support is provided to those personnel dispatched from the OSC under the extraordinary conditions of emergency exposure.

4.6 The emergency worker is responsible for knowing the potential health consequences of the emergency exposure and for signing the Emergency Exposure Permit when volunteering for potential emergency exposures of $\geq$ 25 Rem TEDE.

The emergency worker is responsible for maintaining his/her emergency exposure ALARA consistent with the successful completion of the emergency activity.

5. PREREQUISITES

5.1 Emergency classification of Alert or higher has been declared.

5.2 An essential emergency action is required (refer to Attachment 9.6) and cannot be performed without one or more workers potentially exceeding 10 CFR 20 annual exposure limits.

6. PRECAUTIONS

6.1 Selection of volunteers shall be based upon established criteria and on the specific skills and knowledge of the workers needed to successfully complete the activity.

6.2 Individuals shall not be authorized to enter any area where exposure rates are unknown or beyond the highest range of portable monitoring instruments.

6.3 Any individual who receives (or is suspected to have received) an actual overexposure shall be removed from further participation in the emergency response.

6.4 Those personnel receiving a dose of 25 rem TEDE or greater shall be promptly transported off-site for evaluation by appropriate medical personnel.

6.5 An Emergency Exposure Authorization considers only the radiological hazards involved. Other potential hazards to health (i.e., heat stress, hazardous chemicals, biological hazards, confined space entry, etc.) shall be taken into consideration as well and shall be explained to the emergency workers prior to dispatching the team.

7. INSTRUCTIONS

NOTE 1: Emergency exposure authorization is specific to each volunteer (individually) for performing the specific activity authorized. Any changes in the specific conditions that established the basis for the authorization are not valid until approved by both the volunteer(s) (for potential emergency exposures $\geq$ 25 Rem TEDE) and the RM/SEC.

NOTE 2: Individual voluntary emergency exposure should be limited to once in a lifetime.

7.1 The Recovery Manager (or Site Emergency Coordinator) shall implement Attachment 9.1 of this procedure.

7.2 The TSC Radiological Advisor (RA) shall implement Attachment 9.2 of this procedure.

7.3 The OSC Site Radiation Protection Coordinator (SRPC) shall implement Attachment 9.3 of this procedure.

7.4 The OSC Emergency Maintenance Coordinator (EMC) shall implement Attachment 9.4 of this procedure.

7.5 The EOF Radiological Manager (ERM) shall implement Attachment 9.5 of this procedure.

8. RECORDS

8.1 All records generated by the utilization of this procedure for an exercise or emergency shall be forwarded the next working day to the emergency planning supervisor, for review and retention.

8.1.1 Completed forms and documents generated during drills are non-quality related records and shall be retained a minimum of 3 years in accordance with AD10.ID2.

8.1.2 Completed forms and documents generated during real events are quality related records and shall be retained in accorance with AD10.ID1.

9.

ATTACHMENTS

9.1 Form 69-20628, "Recovery Manager (or Sec) Checklist," 01/09/03

9.2 Form 69-20629, "TSC Radiological Advisor Checklist," 01/09/03

9.3 Form 69-20630, "OSC Site Radiation Protection Coordinator Checklist," 01/09/03

9.4 Form 69-20631, "OSC Emergency Maintenance Coordinator Checklist," 01/09/03

9.5 Form 69-20632, "EOF Radiological Manager Checklist," 01/09/03

9.6 "DCPP Emergency Exposure Guidelines," 10/07/93

9.7 Form 69-10554, "Emergency Exposure Permit," 01/09/03

10. REFERENCES

10.1 NUREG-0737, November 1980.

10.2 Title 10, Code of Federal Regulations, Part 20.

10.3 "Manual of Protective Actions for Nuclear Incidents," USEPA, 400-R-92-001, May 1992.

10.4 RP1.ID6, "Personnel Dose Limits and Monitoring Requirements."

10.5 EP RB-1, "Personnel Dosimetry."

10.6 EP RB-3, "Stable Iodine Thyroid Blocking."

10.7 CP M-13, "Personnel Injury (or Illness) with Radioactive Contamination or Personnel Overexposure.”

10.8 EP G-2, "Activation and Operation of the Interim Site Emergency Organization."

10.9 EP EF-1, "Activation and Operation of the Technical Support Center."

10.10 EP EF-2, "Activation and Operation of the Operational Support Center."

10.11 EP EF-3, "Activation and Operation of the Emergency Operations Facility."

11. SPONSOR

Gray

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.1

1 AND 2

TITLE: Recovery Manager (or Sec) Checklist

Actions	Initial
NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.	
1. INITIAL ACTIONS	
Review the completed Emergency Exposure Permit, Form 69-10554, with the RA (or ERM) and evaluate the justification for authorization.	
1.1 Ensure volunteers (if necessary) have been obtained and thoroughly briefed on the potential health consequences of this exposure. (See Criteria in Attachment 9.3)	______
1.2 Ensure emergency activity is necessary (no reasonable alternatives) and can be successful in outcome.	______
1.3 Ensure special hazards have been identified and protective measures implemented.	______
1.4 Direct the EMC to establish a back-up team of volunteers for rotation, relief, or rescue if very high dose rates or other life threatening conditions are applicable.	______
1.5 Implement EP RB-3, "Stable Iodine Thyroid Blocking," and direct the RA to Administer KI distribution, if needed.	______
1.6 Sign the Permit to approve the Authorized Limit. (Refer to Attachment 9.6 for Exposure Limits.)	LOG
NOTE: Each Permit is specific to the individuals or volunteers identified and specified activity. Any changes or additions require a new authorization.	
2. SUBSEQUENT ACTIONS	
2.1 Direct the Administrative Advisor to callout anticipated replacement personnel for the potentially overexposed volunteers.	______
2.2 Ensure other emergency measures taken concurrently do not increase the accepted risks to the volunteers or jeopardize a successful outcome.	______
2.3 Ensure overexposed personnel are promptly transported to off-site medical facilities for evaluation and treatment. (Refer to CP M-13.)	______
2.4 Ensure that the NRC is notified immediately in accordance with 10 CFR 20.2202(a) for any individual exposure of $\geq$ 25 rem TEDE, $\geq$ 250 rad SDE, or $\geq$ 75 rem LDE.	______

TITLE: TSC Radiological Advisor Checklist

Actions	Initial
NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.	
1. INITIAL ACTIONS	
Obtain a FAXed copy of Emergency Exposure Permit, Form 69-10554, from the OSC and confirm it's completeness by contacting the SRPC.	
1.1 Volunteers (if needed) have been obtained and thoroughly briefed on the potential health consequences of this exposure. (See Criteria in Attachment 9.3.)	______
1.2 Emergency activity is necessary (no reasonable alternatives) and can be successful in outcome.	______
1.3 Ensure special hazards have been identified and protective measures implemented.	______
1.4 Recommend a back-up team to be assembled and standing by if very high dose rates are anticipated.	______
1.5 Obtain authorization from the RM/SEC for Thyroid Blocking Agent per EP RB-3, if necessary.	______
1.6 Evaluate justification for the Authorized Limit and advise the RM/SEC to authorize the permit. (Refer to Attachment 9.6 for Exposure Limits.)	______
NOTE: TEDE exposure is the controlling limit for continuous monitoring of the team. Other exposures (SDE, LDE, and CDE+DDE) require appropriate protective measures (i.e., KI, respirator use, clothing, etc.) and are important for planning purposes only, unless capability of direct monitoring exists.	
1.7 Determine any appropriate Dose Correction Factors to adjust the Authorized TEDE Limit if conditions indicate that other doses are more likely to be limiting and notify the SRPC.	______

TITLE: TSC Radiological Advisor Checklist

Actions	Initial
2. SUBSEQUENT ACTIONS	
2.1 Notify SRPC that RM/SEC authorization has been obtained and provide any special instructions, conditions or revised limits, if needed.	______
2.2 Direct SRPC to prepare an SWP, if not already done.	______
NOTE: If the situation requires immediate action the SWP may be completed afterward, but verbal authorization is required beforehand.	
2.3 Ensure that CP M-13, "Personal Injury (or Illness) with Radioactive Contamination or Personnel Overexposure," is implemented in anticipation of overexposed personnel.	______
2.4 Implement EP RB-3, "Stable Iodine Thyroid Blocking," as directed by the RM/SEC.	______
2.5 Implement EP RB-1, "Personnel Dosimetry," to ensure that;	______

- adequate personnel exposure monitoring is provided for the extraordinary conditions
- dosimetry devices are collected and dose evaluated promptly after task completion
- dosimetry incidents (off-scale or erratic readings) are evaluated promptly

TITLE: OSC Site Radiation Protection Coordinator Checklist

Actions	Initial

NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.

1. INITIAL ACTIONS

When a pre-departure analysis of radiological conditions, in accordance with EP EF-2, indicates that the planned or anticipated dose to any emergency response team member will exceed 10 CFR 20 annual limits, perform the following;

1.1 Review your dose evaluation with the EMC and EOC to determine if any alternative actions can achieve the desired results without requiring an emergency exposure. ______

1.2 Obtain qualified volunteers (if needed) from those personnel available. (Criteria in Section 3.0, next page) ______

1.3 Obtain a working copy of Form 69-10554, Emergency Exposure Permit (Attachment 9.7), and fill in the required information. ______

NOTE: Complete a new Permit form for each team activity that is analyzed to require emergency exposure. ______

1.4 Calculate and record the anticipated exposure to the most limiting team member and determine the authorized limit appropriate to the activity in accordance with Attachment 9.6, DCPP Emergency Exposure Guidelines. ______

1.5 Brief the volunteers on the radiological hazards and ensure they are informed about the potential health consequences associated with authorized exposure. ______

1.6 For potential exposures of $\geq$ 25 Rem TEDE, obtain the signature on the Emergency Exposure Permit of each volunteer, including the C&RP technician assigned to monitor the team. ______

1.7 Obtain authorization from the RM/SEC for Thyroid Blocking Agent per EP RB-3, if necessary. ______

1.8 FAX the completed form to the Recovery Manager (or SEC if EOF is not activated) and contact the RA to review the Permit and advise the RM/SEC. ______

Actions	Initial

2. SUBSEQUENT ACTIONS

When the emergency exposure authorization is approved by the RM/SEC then ensure that all conditions and limitations are understood by the response team prior to departure in accordance with EP EF-2 and SWP documentation requirements.

With regard to the extraordinary circumstances of this activity ensure that the following additional actions are taken;

2.1 Ensure that appropriate personnel dosimetry is issued in accordance with EP RB-1, "Personnel Dosimetry." ______

2.2 Ensure that a portable radiation monitoring instrument with adequate range capability is supplied to the C&RP Technician. ______

****

CAUTION: IT IS FORBIDDEN TO ENTER ANY AREA WHERE THE DOSE RATES ARE UNKNOWN OR BEYOND THE RANGE OF INSTRUMENTATION AVAILABLE.

****

2.3 Ensure that the Team Leader understands that whenever practical (without compromising the mission) ALARA principles should be used to minimize team exposure. ______

NOTE: If the situation requires immediate action, the SWP may be completed afterward, but verbal authorization is required beforehand.

3. CRITERIA FOR VOLUNTEER SELECTION

3.1 Professional rescue personnel for lifesaving activities who volunteer by choice of employment should be chosen for search and rescue.

3.2 RCA Qualified personnel should be selected for missions involving very high dose rates and high contamination levels.

3.3 Volunteers shall be fully aware of the risks involved.

3.4 Volunteers should be above the age of 45 years old.

3.5 Declared Pregnant Women (DPW) shall not be chosen.

3.6 Individuals who have already received an emergency exposure should not be chosen.

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.4

1 AND 2

TITLE: OSC Emergency Maintenance Coordinator Checklist

Actions	Initial

1. INITIAL ACTIONS

When a pre-departure analysis of radiological conditions, in accordance with EP EF-2, indicates that the planned or anticipated dose to the emergency response team members will exceed 10 CFR 20 annual limits, perform the following;

1.1 Contact the Operations Coordinator and the SEC to determine if any alternative actions can achieve the desired results without requiring an emergency exposure. ______

Consideration may be given to any one or combination of the following possible alternatives and should be pursued in parallel, as time permits to avoid unnecessary risk to individuals;

- use of robotics or fabrication of special tools
- use of temporary shielding
- changing plant system lineups to reduce background exposure rates near operating equipment
- use of short cut procedures, elimination of double checks and hold points, non-QA parts, tools, etc.
- installation of jumpers and bypasses to achieve remote operation of equipment from lower dose areas

NOTE: Some of the above options may involve intentionally violating Technical Specifications*, written procedures, or Quality Standards, but may be equally justifiable to the RM/SEC as emergency exposure of personnel, depending on circumstances.

1.2 Determine the optimum team composition in terms of skills and experience to ensure the highest degree of confidence in mission success in the least amount of time for exposure of personnel available. ______

NOTE: Emergency exposure is unwarranted in circumstances where alternative actions can achieve equal or better results.

1.3 Review the Permit form prepared by the SRPC and concur with seeking emergency dose authorization. ______

* NRC Notification required per EP G-3

TITLE: OSC Emergency Maintenance Coordinator Checklist

	Actions	Initial
2.	SUBSEQUENT ACTIONS	
2.1	Ensure that the Team Leader is briefed on potential hazards that are expected and the limits of authority that he/she may exercise in making ad hoc decisions in the field.	______
2.2	Ensure that a back-up team is chosen and prepared for immediate dispatch to rotate in, relieve, or rescue the primary response team, as needed.	______
	NOTE: Back-up Team shall be briefed, dressed out, pre-authorized, pre-staged in low dose area, standing by if needed for immediate action.	
2.3	Control any other concurrent activities that may hamper, impede, or otherwise increase the risk to the primary emergency response team.	______
2.4	Ensure that the emergency operations coordinator is aware of the team location so that Operations activities from the Control Room do not change radiological conditions adversely without warning.	______
2.5	Maintain an open communication line with the EOC, as needed, to ensure that changes in plant status are immediately recognized and factored into ongoing risk assessment.	______

TITLE: EOF Radiological Manager Checklist

Actions	Initial

NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 Rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.

1. INITIAL ACTIONS

When an analysis of radiological conditions, in accordance with EP EF-3, indicates that the planned or anticipated dose to any emergency response off-site field team member will exceed 10 CFR 20 annual limits, perform the following:

1.1 Review the dose evaluation with the ESE and RMD to determine if any alternative actions can achieve the desired results without requiring an emergency exposure such as rotation or replacement of team members, shorter sampling times, team movement tactics to avoid higher exposures, etc. ______

1.2 Obtain a working copy of Form 69-10554, "Emergency Exposure Permit" (Attachment 9.7), and fill in the required information. ______

NOTE: Complete a new Permit form for each off-site field team that is analyzed to require emergency exposure authorization, when needed.

1.3 Calculate and record the anticipated exposure to the most limiting team member and ensure that the authorized limit of 5 rem TEDE (total emergency exposure, not counting occupational dose prior to the emergency) will not be exceeded. ______

1.4 Provide the completed Form 69-10554 to the RM for emergency exposure authorization. ______

NOTE: Voluntary consent is not necessary for emergency exposures authorized at less than 25 rem TEDE, but written authorization is required.

1.5 Obtain authorization from the RM for Thyroid Blocking Agent per EP RB-3, if necessary. ______

1.6 Notify the RMD to communicate the authorizations to the Field Team Leaders affected when obtained from the RM. ______

NOTE: These authorizations are for company personnel only and separate authorizations for SLO County team members, if needed, must be obtained through the UDAC from the County Health Officer (CHO).

Actions	Initial

2. SUBSEQUENT ACTIONS

When the emergency exposure authorization is approved by the RM then ensure that all conditions and limitations are understood by the field monitoring team prior to directing them to continue with their activities in the plume or plume affected areas.

With regard to the extraordinary circumstances of this activity ensure that the following additional actions are taken:

2.1 Ensure that each Team Member understands that whenever practical (without compromising the mission) ALARA principles should be used to minimize team exposure. ______

2.2 Ensure that Turn-back dose rates are re-analyzed for the present or projected characteristics of the plume and revised as needed. ______

****

<u>CAUTION</u>: IT IS FORBIDDEN TO ENTER ANY AREA WHERE THE DOSE RATES ARE UNKNOWN <u>OR</u> BEYOND THE RANGE OF INSTRUMENTATION AVAILABLE.

****

2.3 Ensure that the RMD makes more frequent checks on accumulated dose (SRD readings) and is controlling team deployment to minimize unnecessary exposures. ______

2.4 Begin the process of obtaining reliefs and replacements for the field monitoring team members, if necessary, to ensure continuous monitoring capability. ______

2.5 Consider deployment of additional teams in standby locations in case an active team can no longer function due to any of the following: ______

- gross contamination of vehicle, equipment, or personnel requires decontamination efforts.
- respirator use in field conditions creating additional heat stress and fatigue.
- higher than anticipated dose rates cause authorized exposure limits to be exceeded.
- vehicle breakdown or accident necessitates assistance to personnel stuck in plume pathway.

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.6

1 AND 2

TITLE: DCPP Emergency Exposure Guidelines

The following table contains guidelines for use in authorizing emergency exposures when lower doses are not practicable:

	RADIOLOGICAL ASSESSMENT SAMPLING	PROPERTY SAVING	DOSE SAVING TO POPULATION*	LIFESAVING TO INDIVIDUAL*
Emergency Actions----> Part of Body Irradiated	Sampling Under Emergency Conditions	Mitigating Damage to Valuable Property	Corrective Actions, stop/reduce a release	Lifesaving Actions, 1st Aid, Search and rescue
Whole Body	5 rem TEDE	10 rem TEDE	25 rem TEDE	25 rem TEDE
Skin & any Extremity	50 rem SDE	100 rem SDE	250 rem SDE	250 rem SDE
Lens of the Eye	15 rem LDE	30 rem LDE	75 rem LDE	75 rem LDE
Any Organ or Tissues	50 rem (CDE+DDE)	100 rem (CDE+DDE)	250 rem (CDE+DDE)	250 rem (CDE+DDE)

NOTES:

1. Radiological Assessment Sampling, includes collection of atmospheric, liquid, and environmental radiological activity samples as well as chemistry samples involving high activity or high radiation. Emergency exposure limits may be authorized for selected individuals, for emergency assessment functions, in addition to annual occupational dose to date.

2. Property Saving, for example, might be dispatching the Fire Brigade to extinguish a fire in a Very High Radiation Area to protect plant equipment though no immediate threat exists to compromising Plant Safety.

3. Dose Saving to Population, includes activities that justify a potential overexposure to a few workers in order to save even a small average dose in a large population. (May also include Traffic Control for Evacuees or other Security Plan Functions.)

4. Lifesaving to Individual, includes the activity of search and rescue in very high dose rates or high airborne activity.

   * Extreme situations may occur in which a dose in excess of 25 rem TEDE would be unavoidable for either Dose Saving to (Large) Population or Lifesaving to (An) Individual.

   An authorization of emergency exposure with **NO LIMITS** may be made under those conditions, but only to volunteers who are fully aware of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and the numerical estimates of the risk of delayed effects.

NOTES: (Continued)

5. If any of the above emergency exposure limits would prevent successful completion of the activity then the RM or SEC should ensure that back-up teams are standing by to rotate in and relieve the primary responders.

6. Volunteers for any authorized exposures above 25 rem TEDE should be made aware that there is some risk of acute health effects involved, however remote.

   The dose limit of 75 rem to the whole body previously recommended by the EPA for lifesaving action represents a very high level of risk of both acute and delayed effects.

   A dose of 100 rem is expected to result in an approximately 15 percent risk of temporary incapacity from non lethal acute effects and an indeterminate, but less than 5 percent, chance of death within 60 days. This is in addition to a risk of about 1 in 30 of incurring fatal cancer.

   Such high risk levels can only be accepted by a recipient who has been made aware of the risks involved.

   (Reference, EPA Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, May 1992)

   NOTE: Although EPA-400 guidelines say that no limit is applicable under extreme situations it is also true that the RM/SEC must make the authorization and may impose a more restrictive limit if so desired consistent with the availability of personnel resources, alternative actions and the desire to avoid acute health effects of the volunteers.

TITLE: Emergency Exposure Permit

Date: ______________ Time: ______________ Permit #: ______________________

Responder(s): ________________________________ ______________________________
(Print) ________________________________ ______________________________

RP Support: ________________________________ ______________________________

Description of Activity: ____

____

____

____

____

Special Hazards: ____

____

Special Instructions: ____

____

____

Anticipated TEDE Rate: ______________ (rem/hr)

Anticipated Stay Time: ______________ (hr)

Anticipated TEDE: __________________ (rem)

AUTHORIZED LIMIT: (Check One)

[ ] 5 rem TEDE
[ ] 10 rem TEDE
[ ] 25 rem TEDE
[ ] **NO LIMIT**

*<u>Voluntary Consent</u> (For potential exposures of $\geq$ 25 rem TEDE): I hereby volunteer to perform the activity described above and I acknowledge having received a radiological briefing. I am fully aware of the health risks associated with the anticipated exposure. (Sign Below.)

________________________________ ______________________________

________________________________ ______________________________

________________________________ ______________________________

Authorization of Site Emergency Coordinator or Recovery Manager: Time:

____ ______________________

TITLE: Stable Iodine Thyroid Blocking

03/30/00
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

TABLE OF CONTENTS

SECTION PAGE

SCOPE 1
RESPONSIBILITIES 1
Radiological Advisor 1
Site Emergency Coordinator 1
TSC Liaison Coordinator 1
Radiological Manager 2
Recovery Manager 2
INSTRUCTIONS 2
Evaluating When to Administer KI 2
Approval of KI Administration 3
Administration of KI 3
RECORDS 3
Drills 3
Emergency 3
ATTACHMENTS 3
Form 69-9395, "Record of Distribution of Potassium Iodide 3

1. SCOPE

1.1 This procedure provides instructions for the administration of stable iodine in the form of Potassium Iodide (KI) under emergency conditions for emergency personnel.

1.2 This procedure was rewritten; therefore, revision bars are not included.

2. RESPONSIBILITIES

2.1 Radiological Advisor

2.1.1 Responsible for evaluating when KI should be administered.

2.1.2 Responsible for coordinating the issuance of KI to onsite personnel.

2.2 Site Emergency Coordinator

2.2.1 Responsible for authorizing administration of KI to onsite personnel.

2.2.2 Responsible for authorizing administration of KI to offsite personnel until relieved by the Recovery Manager.

2.3 TSC Liaison Coordinator

2.3.1 Responsible for informing onsite personnel of the decision to administer KI.

2.4 Radiological Manager

2.4.1 Responsible for evaluating when KI should be administered.

2.4.2 Responsible for advising the Recovery Manager when the County Health Officer has elected to issue KI to emergency workers.

2.4.3 Responsible for coordinating the issuance of KI to offsite personnel.

2.5 Recovery Manager

2.5.1 Responsible for authorizing administration of KI to offsite personnel.

3. INSTRUCTIONS

3.1 Evaluating When to Administer KI

3.1.1 KI is most effective when administered immediately prior to exposure to radioiodine, therefore administration of KI should be considered when:

a. Exposure situations exist where calculated iodine dose equivalent to the thyroid can be 25 rem or greater.

NOTE: Refer to **Figure 1** below to determine thyroid dose equivalent as a function of the airborne I-131 concentration.

b. No current air analysis is available and high levels of radio-iodine release are suspected prior to undertaking an emergency response operation.

NOTE: If the County Health Officer approves KI administration to the County emergency workers, then approving KI administration for PG&E workers may be considered below the 25 rem exposure Protective Action Guideline.

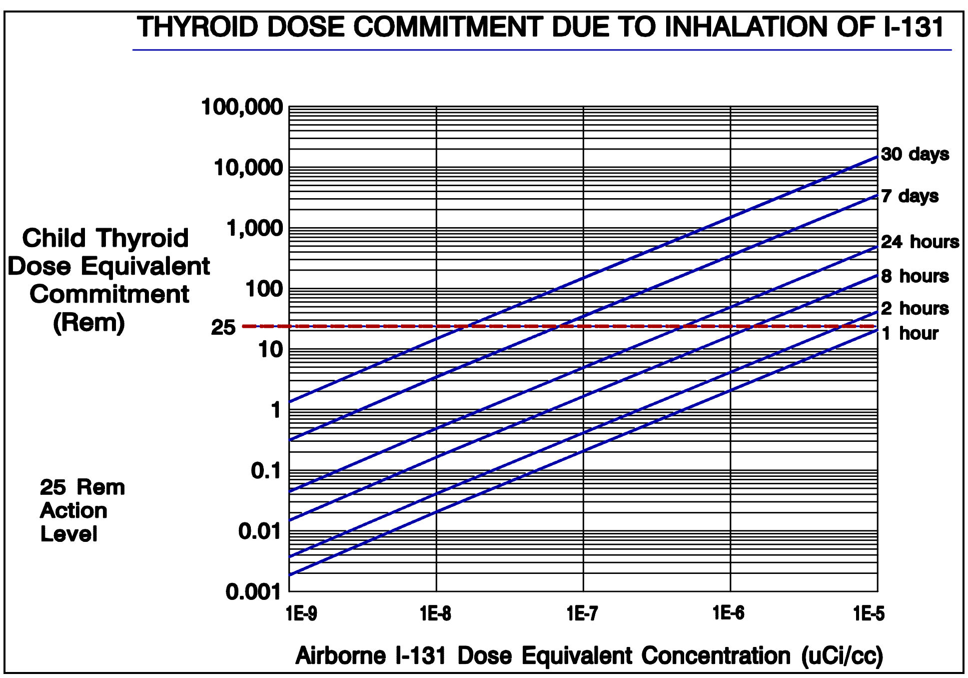


FIGURE 1

3.2 Approval of KI Administration

3.2.1 Radiological Advisor shall obtain Site Emergency Coordinator authorization prior to administering KI to onsite personnel.

3.2.2 Radiological Manager shall obtain Recovery Manager authorization prior to administering KI to offsite personnel.

3.3 Administration of KI

****

CAUTION: Personnel with sensitivity to iodine may develop adverse symptoms from KI tablet ingestion. A history of shellfish allergies may indicate iodine sensitivity.

****

3.3.1 Prior to issue of KI, warn personnel of the possible effects to personnel with iodine sensitivity.

3.3.2 Instruct personnel to review the "Patient Package Insert for THYRO-BLOCK Tablets, Wallace Laboratories."

3.3.3 Ensure personnel complete Attachment 5.1, "Record of Distribution of Potassium Iodide."

3.3.4 Instruct affected personnel to take one 130 mg KI tablet.

3.3.5 Tablets should be administered for ten days after verified exposure. Dosage is one tablet, once a day.

3.3.6 Individuals suspected of inhalation of airborne contamination should receive thyroid counts on a regular basis throughout the KI treatment period to verify effectiveness of treatment and to estimate dose commitment.

4. RECORDS

4.1 Drills

4.1.1 When used for drills, Attachment 5.1 is a good business record and shall be retained by Emergency Planning for 3 years.

4.2 Emergency

4.2.1 When used for an actual emergency, Attachment 5.1 shall be retained as a quality record in accordance with AD10.ID1.

5. ATTACHMENTS

5.1 Form 69-9395, "Record of Distribution of Potassium Iodide," 03/23/00

DIABLO CANYON POWER PLANT
EP RB-3
ATTACHMENT 5.1

1 AND 2

TITLE: Record of Distribution of Potassium Iodide

1. Fill out time and date KI is administered.
2. Your initials indicate you have been made aware of possible adverse effects to iodine sensitive personnel.

Date	Time	Dosage	Name	Initials	SSN	Organization	Address

Number:	NRCADM-05SRO
Title:	GDT RUPTURE – DOSE ASSESSMENT/PAR/EAL
Examinee:	______________________________
Evaluator:	____________ ____________ ________ Print Signature Date
Results:	Sat ______ Unsat ______ Total Time: __________ minutes
Comments:	The Simulator is not required for the performance of this JPM EP R-2, Attachment 10.1 & 10.2 answer key is included for evaluator use
References:	EP R-2, Release of Airborne Radioactive Materials Initial Assessment, Rev. 22 EP G-1, Emergency Classification and Emergency Plan Activation, Rev. 33B
Alternate Path:	Yes __X__ No ______
Time Critical:	Yes ______ No __X__
Time Allotment:	15 minutes
Critical Steps:	2, 3, 4, 5, 7
Job Designation:	SRO
Task Number:	2.4.41
Rating:	4.1

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.

Required Materials: Calculator, and copies of EP R-2.

Initial Conditions: Both units are at 100% power, MOL, equilibrium conditions. Gas Decay Tank 11 rupture disk failed and the relief valve was isolated after 45 minutes of release. The Shift Manager has activated the Emergency Response Organization and is currently the ISEC. The following conditions exist:

- 1 FHB Exhaust Fan running
- 2 Aux Blg Exhaust Fans running
- 1 GE/GW Area Fan running
- 1 Containment Purge fan running
- RM-14/87 is OOS
- RM-29 is 25 mR/hr
- Wind is from 294° at 1.84 m/s from the backup tower. X/Q is not available.

Initiating Cue: The Shift Manager has directed you to perform the necessary assessments to determine the event classification. The PPC program for R-2 calculations is unavailable.

Task Standard: Assessments made and classification of event ready for the ISEC.

Start Time: __________

	Step	Expected Operator Actions
	1. Obtain the correct procedure.	1.1 References EP R-2. **Step was: Sat: ______ Unsat _______***
**	2. Determine the plant vent flow rate.	2.1 References Attachment 10.1, page 1, of EP R-2. 2.2 Fills out section 1. 2.3 Uses alternate method to determine plant vent flow rate. ************************************** **NOTE: This information is on the turnover. 1 FHB fan, 2 aux building fan, 1 GE/GW area fan and 1 Cont. Purge fan are running.** ************************************** ** 2.4 Calculates plant vent flow rate is 262,750 cfm. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step		Expected Operator Actions
**	3. Determine the Noble Gas Release Rate	**	3.1 Calculates noble gas release rate to be 31 $\pm$1 Ci/sec. **Step was: Sat: ______ Unsat _______***
**	4. Determine the total effluent release rate.		4.1 References Attachment 10.1, page 3, of EP R-2 and determines GDT Rupture = RCS source term. 4.2 Determines Total Effluent Conversation Factor to be 1.00 (RCS).** 4.3 Calculates total effluent release rate to be 31 $\pm$1 Ci/sec.** **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step		Expected Operator Actions
**	5. Perform dose calculations.		5.1 References Attachment 10.2 of EP R-2.
			5.2 Observes met data from PPC not available.
			5.3 Determines Site Boundary X/Q at 0.8km using Default Values.
		**	5.4 Determines DCF to be 1.1 E+5 (RCS).
		**	5.5 Calculates TEDE rate of 1804 $\pm$ 10 mrem/ hr.
		**	5.6 Using .75 hours duration, calculates total dose of 1353$\pm$10 mrem.
			5.7 Determines thyroid CDE calculation to be N/A.
			Step was: Sat: ______ Unsat _______*

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step		Expected Operator Actions
	6. Obtain correct procedure.		6.1 References EP G-1, Attachment 7.1 **Step was: Sat: ______ Unsat _______***
**	7. Recommend event classification.	**	7.1 Determines event classification as a GENERAL EMERGENCY #4 (due to exceeding 1,000 mRem TEDE) **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

Initial Conditions: Both units are at 100% power, MOL, equilibrium conditions. Gas Decay Tank 11 rupture disk failed and the relief valve was isolated after 45 minutes of release. The Shift Manager has activated the Emergency Response Organization and is currently the ISEC. The following conditions exist:

- 1 FHB Exhaust Fan running
- 2 Aux Blg Exhaust Fans running
- 1 GE/GW Area Fan running
- 1 Containment Purge fan running
- RM-14/87 is OOS
- RM-29 is 25 mR/hr
- Wind is from 294° at 1.84 m/s from the backup tower. X/Q is not available.

Initiating Cue: The Shift Manager has directed you to perform the necessary assessments to determine the event classification. The PPC program for R-2 calculations is unavailable.

Task Standard: Assessments made and classification of event ready for the ISEC.

- ❑ The Simulator is not required for the performance of this JPM.

DIABLO CANYON POWER PLANT
EP R-2 (UNITS 1 AND 2)
ATTACHMENT 10.1

TITLE: Release Rate Calculations

PLANT VENT RELEASE

1. **GENERAL INFORMATION**

Date: *Today* Time: *Now* Assessment No. *1*

Assessment By: *Name of Examinee* Unit Releasing *1*

2. **PLANT VENT FLOW RATE DETERMINATION**

A. DIRECT - Plant Vent Flow Rate FR-12 (0-30x10^4 CFM (CFM) | *OOS* | (CFM)

OR

B. ALTERNATE - Operating Ventilation Equipment

	(Max No. possible)	#Fans		(CFM/Fan)		
FHB Exhaust	(1)	*1*	x	35,750	= *35,750*	(CFM)
Aux Bldg Exhaust	(2)	*2*	x	73,500	= *147,000*	(CFM)
GE/GW Area	(1)	*1*	x	25,000	= *25,000*	(CFM)
Cont. Purge	(1)	*1*	x	55,000	= *55,000*	(CFM)
Cont. Hydrogen	(1)		x	300	=	(CFM)

Plant Vent Flow Rate = *262,750* (CFM)

3. **RELEASE RATE CALCULATION**

****
CAUTION: Do NOT use SPDS to obtain monitor readings.
****

A. NOBLE GAS RELEASE RATE

	Circle Monitor Used	Reading (Units)		Conversion Factor		Plant Vent Flow Rate (CFM)	Noble Gas Release Rate (Ci/sec)
Primary	RE-14/14R/87		µCi/cc	x 4.72E-04	x		
Backup	RE-29	*25*	mR/hr	x *4.72E-06*	x	*262,750*	= *31*

B. TOTAL EFFLUENT RELEASE RATE

NOTE: Refer to Page 3 for criteria in choosing RCS, GAP, or CORE below.

Noble Gas Release Rate (Ci/sec)		Total Effluent Conversion Factor	Total Effluent Release Rate (Ci/sec)
31	x	*1.00 (RCS)*	= *31*
		1.11 (GAP)	
		1.50 (CORE)	

NOTE: If it is not possible to calculate a release rate, refer to the DEFAULT RELEASE RATES on Page 3 of this attachment.

GO TO ATTACHMENT 10.2

DIABLO CANYON POWER PLANT
EP R-2 (UNITS 1 AND 2)
ATTACHMENT 10.1

TITLE: Release Rate Calculations

1. **GENERAL INFORMATION** **ATMOSPHERIC STEAM RELEASE**

Date: ________ Time: ________ Assessment No. ________

Assessment By: ________ Unit Releasing ________

****

CAUTION: WHEN CRITICAL, N-16 ACTIVITY SEEN BY MSL RAD MONITORS CAUSES INVALID READINGS FOR OFFSITE DOSE. POST-TRIP, RE-7X READING IS VALID IF THE RE-7X MONITOR SHOWED AN INITIAL N-16 RESPONSE, OR RESPONDS TO CHECKSOURCE.

****

NOTE: If it is not possible to calculate a release rate, refer to the DEFAULT RELEASE RATES on Page 3.

2. **STEAM RELEASES -** Use this form to calculate steam releases to the atmosphere WHEN NOT critical.

A. Required Information (RUPTURED GENERATOR ONLY)

Check Ruptured S/G	MSL Rad Monitor	Reading (cpm)	S/G Lvl Narrow Range	Level (%)	S/G Flow Rate	Flow Rate (lbs/hr) If <4E5 use 4E5
☐ SG 1	RE-71		LI-517		FI-512	
☐ SG 2	RE-72		LI-527		FI-522	
☐ SG 3	RE-73		LI-537		FI-532	
☐ SG 4	RE-74		LI-547		FI-542	

B. Alternate Steam Flow Rate (Only if the RUPTURED S/G Flow Rate is otherwise not available)

Valve Type	# Valves Lifted		Capacity (lbs/hr)		Flow Rate (lbs/hr)
10% Steam Dump (1 per S/G)		x	4.0E+05	=	
Safety Reliefs (5 per S/G)		x	8.5E+05	=	

Total Steam Flow Rate (lbs/hr) ________ (lbs/hr)

3. **RADIATION MONITOR FACTORS** (Determined based on S/G NR Level indication) (Enter in Section 4 below.)

S/G Level Narrow Range	EMPTY < 4%	NORMAL 4% - 96%	FLOODED > 96%
Monitor Factor	6.08E-10	6.75E-10 (DEFAULT)	3.07E-10

4. **RELEASE RATE CALCULATIONS**

A. TOTAL EFFLUENT RELEASE RATE (RE-7x)

MSL Monitor Reading (cpm)		Flow Rate (lbs/hr)		Monitor Factor	Total Effluent Release Rate (Ci/sec)
	x		x		

GO TO ATTACHMENT 10.2

TITLE: Release Rate Calculations

1. **SOURCE TERM SELECTION AND DEFAULT RELEASE RATES**

NOTE: Use default release rate only if actual data is not available or if the release is not being monitored.

A. Check the accident type which most closely resembles the current event.

	Accident Source	Default Release Rate (Ci/sec)	Condition	Source Term
☐	LOCA (w/ core melt)	1.74 E+1	RE-30 or 31 >300R/hr	CORE
☐	LOCA (w/o core melt)	5.74 E+0	RE-30 or RE-31 <300R/hr	GAP
			RE-30 or RE-31 not on scale	RCS
☐	Main Steam Line Break	8.61 E-3		RCS
☐	Feedwater Line Break	8.61 E-3		RCS
☐	Blackout	8.62 E-1		RCS
☐	Locked Rotor	1.57 E-2		GAP
☐	FHB Accident	1.45 E+1		GAP
☐	Rod Ejection	1.08 E-2		GAP
X	**GDT Rupture**	4.14 E+1		**RCS**
☐	LHUT Rupture	3.10 E+1		RCS
☐	VCT Rupture	8.29 E-2		RCS
☐	S/G Tube Rupture	1.65 E+0	NR S/G Level < 4%	SG - Empty
			NR S/G Level 4-96%	SG- Normal
			NR S/G Level > 96%	SG - Flooded
☐	Containment FHA Accident with Equip. Hatch Open	S.B. Dose Rates	TEDE = 13.4 mrem/hr Thy.CDE = 51.4 mrem/hr	Go Directly to EP G-1
		S.B. Doses	TEDE = 6.7 mrem Thy. CDE = 25.7 mrem	

B. Record the Default Release Rate in Attachment 10.2, Section 4 and use the DCF choice that is listed for the specific accident source above.

GO TO ATTACHMENT 10.2

DIABLO CANYON POWER PLANT
EP R-2 (UNITS 1 AND 2)
ATTACHMENT 10.2

TITLE: Off-Site Dose Calculations

1. **GENERAL INFORMATION**

Date: ***Today*** Time: ***Now*** Assessment No. ***1***

Assessment By: ***Name of Examinee*** Unit Releasing ***1***

2. **METEOROLOGICAL DATA** - PPC (Plant Process Computer)

Turn On Codes for Met Data are "METP" (Primary Data) or "METB" (Back-up Data)

Parameter	Reading	Units	DEFAULT
Wind Speed (10 Meter Level)	***1.86***	meters/sec	
Wind Direction (10 Meter Level)	***294***	Degrees	
Site Boundary X/Q (0.8 km)		Sec/m^3	***5.29E-04***

3. **DCF Determination** - Select the most appropriate source term for the DCF using the criteria in Attachment 10.1. Circle the corresponding DCF in Section 4 below.

4. **DOSE CALCULATIONS** - (From data calculated using Attachment 10.1)

A. TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)

Total Effluent or Default Release Rate (Ci/sec)		Site Boundary X/Q (0.8 km) (Sec/m^3)		DCF (circle one)	TEDE Rate (mrem/hr)		Projected Release Duration (hr) (DEFAULT 3 hrs)	TEDE (mrem)
31 (Attachment 10.1)	x	***5.29E-04***	x	**1.1E + 05 (RCS)** 3.0E + 06 (Gap) 1.1E + 07 (Core) 1.1E + 05 (SG-Empty) 4.3E + 04 (SG-Normal) 9.3E + 05 (SG-Flooded)	= ***1804***	x	***.75***	= ***1353***

B. THYROID COMMITTED DOSE EQUIVALENT (CDE) (DO NOT COMPLETE FOR GDT, LHUT, OR VCT RUPTURE)

Total Effluent or Default Release Rate (Ci/sec)	Site Boundary X/Q (0.8 km) (Sec/m^3)		DCF (circle one)	Thyroid CDE Rate (mrem/hr)		Projected Release Duration (hr) (DEFAULT 3 hrs)	Thyroid CDE (mrem)
(Attachment 10.1)		x	1.5E + 06 (RCS) 6.5E + 07 (Gap) 7.7E + 07 (Core) 1.5E + 06 (SG-Empty) 1.5E + 05 (SG-Normal) 1.4E + 07 (SG-Flooded)	=	x		=

5. **REPORTING THE RESULTS** - (Refer to Section 7.3 of Instructions for details)

A. Refer to EP G-1 for EAL criteria.

B. Implement EP RB-10 for PAR criteria

TITLE: Emergency Action Level Classification Chart

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
II. FUEL DAMAGE OR VESSEL DAMAGE (Modes 1-4) (Continued)	3. Pressurized Thermal Shock is verified by entry into EOP FR-P.1 <u>AND</u> Left of Limit A curve (EOP F-0). (Continued)			C) Indication of Fuel Damage (See Alert #2) <u>AND</u> Determination of a SGTR which requires entry into EOP E-3 <u>AND</u> Indication of a steam line break outside containment with inability to isolate the break. D) Potential fuel damage indicated by 5 or more thermocouple readings > 700 deg. F or RVLIS < 32% <u>AND</u> LOCA as indicated by RCS leakage and SI <u>AND</u> Loss of containment integrity.
III. FUEL HANDLING ACCIDENT (All Modes)		3. Fuel Handling Accident causing a release in Containment or the Fuel Handling Building <u>WITH</u> The potential to exceed the criteria listed in Alert #4 or #5.	2. Fuel Handling Accident causing a release in Containment or the Fuel Handling Building <u>WITH</u> The potential to exceed the criteria listed in SAE #3.	
IV. LOSS OF CONTROL OR RELEASE OF RADIOACTIVE MATERIAL (All Modes)	4. Projected dose rate at the Site Boundary (800 meters) is ≥ 0.057 mRem/hr TEDE <u>OR</u> ≥ 0.170 mRem/hr Thyroid CDE for actual or expected release. Category IV Continued on next page.	4. Projected dose rate at the Site Boundary (800 meters) is ≥ 0.57 mRem/hr TEDE <u>OR</u> ≥ 1.7 mRem/hr Thyroid CDE for actual or expected release. Category IV Continued on next page.	3. Projected dose at the Site Boundary (800 meters) is ≥ 100 mRem TEDE <u>OR</u> ≥ 500 mRem Thyroid CDE for actual or expected release. Category IV Continued on next page.	4. Projected dose at the Site Boundary (800 meters) is ≥ 1,000 mRem TEDE <u>OR</u> ≥ 5,000 mRem Thyroid CDE for actual or expected release. Category IV Continued on next page.

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

TITLE: **Release of Airborne Radioactive Materials Initial Assessment**

03/18/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

1.1 This procedure describes the steps to be taken by on-shift personnel to initially evaluate the off-site consequences of an accidental airborne release that may result in Emergency Plan Activation.

1.2 It does not describe the operation of the plant equipment necessary to terminate or minimize the release. This latter subject is covered in the appropriate E, ECA, and FR series Emergency Procedures for the particular release mechanism.

****

CAUTION: Revisions to this procedure require the PPC display be updated (Reference A0595224).

****

2. DISCUSSION

2.1 An accidental airborne release of radioactive materials that may result in site boundary dose rates in excess of the limits specified in the EP G-1 shall require a prompt initial assessment by the operating staff. This initial release rate and dose assessment is performed using either the Plant Process Computer (PPC) program "EPR2," or manually using Section 7 of this procedure.

2.2 This procedure shall only be used by Control Room personnel to perform initial accident dose assessments. This procedure shall not be used to evaluate compliance with Technical Specification limits during planned effluent releases conducted as part of normal plant operations. The methodology contained in this procedure is intended to provide a rapid and conservative calculation of the projected off-site doses due to an accidental release of airborne radioactive materials. More advanced methodologies are contained in procedures EP RB-9 and EP RB-11 or the appropriate chemistry procedures.

3. DEFINITIONS

3.1 Accidental Release - A release of radioactive material unrelated to any planned effluent release evolutions.

3.2 Committed Dose Equivalent (CDE) - The dose to the organs or tissues that would be received from an intake of radioactive material by an individual during the 50 years following the intake.

3.3 Committed Effective Dose Equivalent (CEDE) - The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the CDE to these organs or tissues.

3.4

Deep Dose Equivalent (DDE) - Dose associated with exposure of the whole body (depth of 1 cm).

3.5 Total Effective Dose Equivalent (TEDE) - The sum of the DDE (for external exposure) and CEDE (for internal exposure).

3.6 TEDE Rate - The time rate of change of Total Effective Dose Equivalent as a function of immersion and inhalation exposure time.

3.7 Thyroid CDE Rate - The time rate of change of Thyroid Committed Dose Equivalent as a function of immersion and inhalation exposure time.

4. RESPONSIBILITIES

4.1 Emergency Evaluation Coordinator (EEC) is responsible for performing an initial assessment of an airborne radiological release when directed by the ISEC.

4.2 Interim Site Emergency Coordinator (ISEC) is responsible for determining when an assessment is needed and directing the EEC to implement this procedure based on emergency evaluation priorities.

5. PREREQUISITES

5.1 Unified Dose Assessment Center (UDAC) is not activated and performing the function of radiological assessment.

5.2 Interim Site Emergency Coordinator (ISEC) has determined, based on plant accident conditions or symptoms of an accidental radiological release, that an initial assessment of projected off-site doses has priority over other actions being performed by the EEC.

The following listed symptoms indicate that an airborne release may be occurring from within the RCA as guidance to the ISEC:

- There is actual or suspected leakage of water, steam, or noncondensible gases from any vessel or piping system containing primary coolant, liquid radwaste, or gaseous radwaste.
- Damage occurs to a submerged, irradiated fuel assembly with the resultant release of significant quantities of noncondensible gases.
- Alarms occur on CAMs.
- A fire occurs involving radioactive materials.
(Refer to EP M-6)
- Verified alarm on radiation monitors RE-14/14R, RE-28/28R, RE-29, RE-15/15R, or RE-24/24R.
- A major radioactive material spill occurs.

6.

PRECAUTIONS

6.1 Do not use SPDS to obtain RMS readings. Radiological Monitor readings off SPDS may be based on different units of measurement than required as input to the calculations.

6.2 If the Main Condenser is available during a SGTR event with a stuck open Safety Relief or 10% Steam Dump to atmosphere, there are two release pathways.

6.3 Obtain an independent verification of your calculation whenever time permits to confirm no errors or incorrect assumptions about plant conditions.

6.4 Default release rates are extremely conservative and may result in higher classifications or PARs than would be warranted if actual release indications were available.

6.5 N-16 will be detected on the MSL Radiation Monitors while at power and may cause a false high off-site dose calculation.

6.6 This procedure shall not be used to evaluate compliance to Technical Specifications during planned effluent releases. Such evaluations shall be performed by the Chemistry Department.

6.7 Fuel Handling Accident (FHA) in Containment with Equipment Hatch open is a special case. Use the analyzed default dose rates and doses listed in Attachment 10.1 and go directly to EP G-1 for comparison to the Emergency Action Levels (EALs).

7. INSTRUCTIONS

NOTE: This calculation can be performed on the PPC using the turn-on code "EPR2."

7.1 RELEASE RATE CALCULATIONS

7.1.1 Obtain a working copy of Attachment 10.1.

7.1.2 Determine release source location as Plant Vent, Atmospheric Steam Release, or Unmonitored.

****

CAUTION: Do NOT use SPDS to obtain radiation monitor readings.

****

7.1.3 Gather and record the required information in accordance with the appropriate section of the form.

NOTE: Plant Vent Extended Range Rad Monitor RE-87 will automatically activate if the Normal Range Gas Monitors RE-14/14R approach their maximum reading.

7.1.4 Perform the required calculation to determine the release rate of Total Effluent and record the results in both this Attachment and Attachment 10.2.

7.1.5 If it is not possible to calculate a release rate, refer to the DEFAULT RELEASE RATES on Page 3 of Attachment 10.1 and choose the most appropriate value for input to Attachment 10.2. For an FHA in containment with equipment hatch open, use default dose rates and doses from Attachment 10.1 and go directly to EP G-1 for comparison to the EALs.

7.2 OFF-SITE DOSE CALCULATIONS

NOTE: Calculations may be performed using the PPC routine "EPR2," or by hand, as follows:

7.2.1 Obtain a working copy of Attachment 10.2.

7.2.2 Gather and record the required information in accordance with the appropriate section of the form.

NOTE: Plant Process Computer (PPC) Meteorological Data turn on codes are "METP" (Primary Data) and "METB" (Back-up Data).

7.2.3 Determine the appropriate activity source term and circle the associated DCFs to be used in Section 4A and 4B.

7.2.4 Perform the required calculations to determine the TEDE and THYROID CDE RATES.

7.2.5 Project the RELEASE DURATION in hours as input to determining projected doses.

7.2.6 If a duration cannot be projected, use the DEFAULT DURATION of 3 hours.

7.2.7 Perform the required calculations to determine the TEDE and THYROID CDE at the Site Boundary (800 meters).

7.3 REPORTING THE RESULTS

7.3.1 Refer to EP G-1 and compare the results of the above calculations with the Emergency Action Levels.

7.3.2 Refer to EP RB-10 and compare the results of the dose calculations with the PAR determination criteria.

7.4 Advise the ISEC of any EAL thresholds that are exceeded based on site boundary dose rates and doses, or the need to revise PARs due to changing conditions.

7.5 CONTINUOUS ACTIONS

7.5.1 As directed by the ISEC, continue to perform assessment of airborne releases to support evaluation of EAL status and PARs by repeating the above instructions.

7.5.2 Contact Chemistry to request:

a. A sample of the radioactive effluent (if possible) and in-plant airborne activity.

b. A confirmatory assessment of the site boundary dose rate from the release.

8. RECORDS

8.1 All checklists generated during activation of the EOF for drills and exercises are non-quality Good Business Records and shall be retained by Emergency Planning Group for three years.

8.2 All checklists generated during activation of the EOF for a real event are non-quality records and shall be retained in RMS in accordance with AD10.ID2.

9. APPENDICES

None

10. ATTACHMENTS

10.1 ""Release Rate Calculations," 10/31/02

10.2 ""Off-Site Dose Calculations," 08/05/94

11. REFERENCES

11.1 EP G-1, "Accident Classification and Emergency Plan Activation."

11.2 EP G-2, "Activation and Operation of the Interim Site Emergency Organization (Control Room)."

11.3 EP RB-9, "Calculation of Release Rate."

11.4 EP RB-10, "Protective Action Recommendations."

11.5 EP RB-11, "Emergency Off-site Dose Calculations."

11.6 EP RB-12, "Mid and High Range Plant Vent Radiation Monitors."

11.7 EP M-6, "Fire."

11.8 NRS-RES Calculation No. RA 93-12, New Dose Conversion Factors for EP R-2 and RB-11, Validation and Verification, Rev. 1, 12/15/93.

11.9 NOS-RECE Calculation No. RA 93-04, EP RB-9, Calculation of Release Rate, Rev. 7 and R-2, Release of Airborne Radioactive Materials, Rev. 12, Validation and Verification, Rev. 0, 4/12/93.

11.10 SH&ES Calculation No. EP-94-01, Rev 0, EP R-2, Release of Airborne Radioactive Materials, Rev 17, Validation and Verification.

11.11 PG&E Calculation PAM-0-04-517, Rev. 4, 4/6/97 "Steam Generator Narrow Range Level Uncertainty."

11.12 PG&E Calculation STA-160, Freq., "Estimate of Expected Exposures Associated with a Fuel Handling Accident with Containment Open."

DIABLO CANYON POWER PLANT
EP R-2
ATTACHMENT 10.1

1 AND 2

TITLE: Release Rate Calculations

PLANT VENT RELEASE

1. **GENERAL INFORMATION**

Date: ____________ Time: ________ Assessment No. ____________

Assessment By: ____________________ Unit Releasing ____________

2. **PLANT VENT FLOW RATE DETERMINATION**

A. DIRECT - Plant Vent Flow Rate FR-12 (0-30x10^4 CFM (CFM) = ________ (CFM)

OR

B. ALTERNATE - Operating Ventilation Equipment

	(Max No. possible)	#Fans		(CFM/Fan)		
FHB Exhaust	(1)	________	x	35,750	= ________	(CFM)
Aux Bldg Exhaust	(2)	________	x	73,500	= ________	(CFM)
GE/GW Area	(1)	________	x	25,000	= ________	(CFM)
Cont. Purge	(1)	________	x	55,000	= ________	(CFM)
Cont. Hydrogen	(1)	________	x	300	= ________	(CFM)

Plant Vent Flow Rate = ________ (CFM)

3. **RELEASE RATE CALCULATION**

****

CAUTION: Do NOT use SPDS to obtain monitor readings.

****

A. NOBLE GAS RELEASE RATE

	Circle Monitor Used	Reading (Units)		Conversion Factor		Plant Vent Flow Rate (CFM)	Noble Gas Release Rate (Ci/sec)
Primary	RE-14/14R/87	________	μCi/cc	x 4.72E-04	x	________	= ________
Backup	RE-29	________	mR/hr	x 4.72E-06	x	________	

B. TOTAL EFFLUENT RELEASE RATE

NOTE: Refer to Page 3 for criteria in choosing RCS, GAP, or CORE below.

Noble Gas Release Rate (Ci/sec)		Total Effluent Conversion Factor	Total Effluent Release Rate (Ci/sec)
________	x	1.00 (RCS)	= ________
		1.11 (GAP)	
		1.50 (CORE)	

NOTE: If it is not possible to calculate a release rate, refer to the DEFAULT RELEASE RATES on Page 3 of this attachment.

GO TO ATTACHMENT 10.2

TITLE: Release Rate Calculations

1. **GENERAL INFORMATION** **ATMOSPHERIC STEAM RELEASE**

Date: ______________ Time: ______________ Assessment No. ______________

Assessment By: ______________________ Unit Releasing ______________

****

CAUTION: WHEN CRITICAL, N-16 ACTIVITY SEEN BY MSL RAD MONITORS CAUSES INVALID READINGS FOR OFFSITE DOSE. POST-TRIP, RE-7X READING IS VALID IF THE RE-7X MONITOR SHOWED AN INITIAL N-16 RESPONSE, OR RESPONDS TO CHECKSOURCE.

****

NOTE: If it is not possible to calculate a release rate, refer to the DEFAULT RELEASE RATES on Page 3.

2. **STEAM RELEASES -** Use this form to calculate steam releases to the atmosphere WHEN NOT critical.

A. Required Information (RUPTURED GENERATOR ONLY)

Check Ruptured S/G	MSL Rad Monitor	Reading (cpm)	S/G Lvl Narrow Range	Level (%)	S/G Flow Rate	Flow Rate (lbs/hr) If <4E5 use 4E5
☐ SG 1	RE-71	________	LI-517	________	FI-512	________
☐ SG 2	RE-72	________	LI-527	________	FI-522	________
☐ SG 3	RE-73	________	LI-537	________	FI-532	________
☐ SG 4	RE-74	________	LI-547	________	FI-542	________

B. Alternate Steam Flow Rate (Only if the RUPTURED S/G Flow Rate is otherwise not available)

Valve Type	# Valves Lifted		Capacity (lbs/hr)		Flow Rate (lbs/hr)
10% Steam Dump (1 per S/G)	________	x	4.0E+05	=	________
Safety Reliefs (5 per S/G)	________	x	8.5E+05	=	________

Total Steam Flow Rate (lbs/hr) = ________ (lbs/hr)

3. **RADIATION MONITOR FACTORS** (Determined based on S/G NR Level indication) (Enter in Section 4 below.)

S/G Level Narrow Range	EMPTY < 4%	NORMAL 4% - 96%	FLOODED > 96%
Monitor Factor	6.08E-10	6.75E-10 (DEFAULT)	3.07E-10

4. **RELEASE RATE CALCULATIONS**

A. TOTAL EFFLUENT RELEASE RATE (RE-7x)

MSL Monitor Reading (cpm)		Flow Rate (lbs/hr)		Monitor Factor		Total Effluent Release Rate (Ci/sec)
________	x	________	x	________	=	

GO TO ATTACHMENT 10.2

1. **SOURCE TERM SELECTION AND DEFAULT RELEASE RATES**

NOTE: Use default release rate only if actual data is not available or if the release is not being monitored.

A. Check the accident type which most closely resembles the current event.

	Accident Source	Default Release Rate (Ci/sec)	Condition	Source Term
☐	LOCA (w/ core melt)	1.74 E+1	RE-30 or 31 >300R/hr	CORE
☐	LOCA (w/o core melt)	5.74 E+0	RE-30 or RE-31 <300R/hr RE-30 or RE-31 not on scale	GAP RCS
☐	Main Steam Line Break	8.61 E-3		RCS
☐	Feedwater Line Break	8.61 E-3		RCS
☐	Blackout	8.62 E-1		RCS
☐	Locked Rotor	1.57 E-2		GAP
☐	FHB Accident	1.45 E+1		GAP
☐	Rod Ejection	1.08 E-2		GAP
☐	GDT Rupture	4.14 E+1		RCS
☐	LHUT Rupture	3.10 E+1		RCS
☐	VCT Rupture	8.29 E-2		RCS
☐	S/G Tube Rupture	1.65 E+0	NR S/G Level < 4% NR S/G Level 4-96% NR S/G Level > 96%	SG - Empty SG - Normal SG - Flooded
☐	Containment FHA Accident with Equip. Hatch Open	S.B. Dose Rates S.B. Doses	TEDE = 13.4 mrem/hr Thy.CDE = 51.4 mrem/hr TEDE = 6.7 mrem Thy. CDE = 25.7 mrem	Go Directly to EP G-1

B. Record the Default Release Rate in Attachment 10.2, Section 4 and use the DCF choice that is listed for the specific accident source above.

GO TO ATTACHMENT 10.2

DIABLO CANYON POWER PLANT
EP R-2
ATTACHMENT 10.2

1 AND 2

TITLE: Off-Site Dose Calculations

1. **GENERAL INFORMATION**

Date: ________ Time: ________ Assessment No. ________

Assessment By: ________________ Unit Releasing ________

2. **METEOROLOGICAL DATA -** PPC (Plant Process Computer)

Turn On Codes for Met Data are "METP" (Primary Data) or "METB" (Back-up Data)

Parameter	Reading	Units	DEFAULT
Wind Speed (10 Meter Level)	________	meters/sec	
Wind Direction (10 Meter Level)	________	Degrees	
Site Boundary X/Q (0.8 km)	________	Sec/m^3	5.29E-04

3. **DCF Determination** - Select the most appropriate source term for the DCF using the criteria in Attachment 10.1. Circle the corresponding DCF in Section 4 below.

4. **DOSE CALCULATIONS -** (From data calculated using Attachment 10.1)

A. TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)

Total Effluent or Default Release Rate (Ci/sec)		Site Boundary X/Q (0.8 km) (Sec/m^3)		DCF (circle one)	TEDE Rate (mrem/hr)		Projected Release Duration (hr) (DEFAULT 3 hrs)	TEDE (mrem)
________ Attachment 10.1	x	________	x	1.1E + 05 (RCS) 3.0E + 06 (Gap) 1.1E + 07 (Core) 1.1E + 05 (SG-Empty) 4.3E + 04 (SG-Normal) 9.3E + 05 (SG-Flooded)	=	x	________	=

B. THYROID COMMITTED DOSE EQUIVALENT (CDE) (DO NOT COMPLETE FOR GDT, LHUT, OR VCT RUPTURE)

Total Effluent or Default Release Rate (Ci/sec)		Site Boundary X/Q (0.8 km) (Sec/m^3)		DCF (circle one)	Thyroid CDE Rate (mrem/hr)		Projected Release Duration (hr) (DEFAULT 3 hrs)	Thyroid CDE (mrem)
________ Attachment 10.1	x	________	x	1.5E + 06 (RCS) 6.5E + 07 (Gap) 7.7E + 07 (Core) 1.5E + 06 (SG-Empty) 1.5E + 05 (SG-Normal) 1.4E + 07 (SG-Flooded)	=	x	________	=

5. **REPORTING THE RESULTS** - (Refer to Section 7.3 of Instructions for details)
   - A. Refer to EP G-1 for EAL criteria.
   - B. Implement EP RB-10 for PAR criteria

PACIFIC GAS AND ELECTRIC COMPANY	**NUMBER** EP G-1
NUCLEAR POWER GENERATION	**REVISION** 33B
DIABLO CANYON POWER PLANT	**PAGE** 1 OF 3
EMERGENCY PLAN IMPLEMENTING PROCEDURE	**UNITS**

TITLE: Emergency Classification and Emergency Plan Activation

1 AND 2

07/30/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

TABLE OF CONTENTS

SECTION PAGE

SCOPE 1
DISCUSSION 1
DEFINITIONS 1
RESPONSIBILITIES 2
INSTRUCTIONS 3
RECORDS 3
ATTACHMENTS 3
REFERENCES 3

1. SCOPE

1.1 This procedure describes accident classification guidelines and Emergency Plan activation responsibilities.

2. DISCUSSION

2.1 The steps required by this procedure are in addition to the steps required to maintain the plant in, or restore the plant to, a safe condition.

2.2 Events not meeting the minimum classification criteria contained in this procedure should be reviewed for reportability in XI1.ID2, "Regulatory Reporting Requirements and Reporting Process."

2.3 Copies of the Emergency Action Level Classification Chart (Attachment 7.1) are provided as job aids in the following locations: JMC EPIM Office (2), EOF, Recovery Manager Office, TSC Site Emergency Coordinator Office, Unit 1 crash cart, Unit 2 crash cart, and the Simulator crash cart (Ref. OP1.DC23, "Control of Posted Plant Signs and Information").

3. DEFINITIONS

3.1 Emergency Classification Levels (ECLs)

3.1.1 Notification of Unusual Event (NUE) - characterized by off-normal conditions that:

a. May not in themselves be particularly significant from an emergency preparedness standpoint, but could reasonably indicate a potential degradation of the level of safety of the plant if proper action is not taken or if circumstances beyond the control of the operating staff render the situation more serious from a safety stand point. No releases of radioactive material requiring off-site response or monitoring are expected.

3.1.2 Alert - events in progress or having occurred, involving an actual or potentially substantial degradation of the plant safety level.

a. Small releases of radioactivity may occur (greater than Technical Specification limits for normal operation, but only a small fraction of the EPA Protective Action Guideline (PAG) exposure levels at the site boundary). It is the lowest level where emergency offsite response may be anticipated.

b. The lowest classification level where off-site emergency response is anticipated.

3.1.3 Site Area Emergency (SAE) - events which are in progress or have occurred involving actual or likely major failures of plant functions needed for protection of the public, but a core meltdown situation is not indicated based on current information.

a. Any releases are not expected to exceed EPA Protective Action Guides except near the site boundary. However, because the possible release is significant, care must be taken in alerting offsite authorities to distinguish whether the release is merely potential, likely, or actually occurring. Response of offsite authorities will be guided initially by this determination.

3.1.4 General Emergency (GE) - event(s) in progress or having occurred which indicate:

a. Imminent substantial core degradation or melting.

b. Potential for containment loss.

c. Radioactive releases can be reasonably expected to exceed EPA PAGs off-site for more than the immediate area.

4. RESPONSIBILITIES

4.1 Interim Site Emergency Coordinator (Interim SEC or ISEC) - Control room shift manager is responsible for initial event classification and emergency plan activation. The ISEC may upgrade the event classification until relieved by either the SEC or RM. In addition, the ISEC may downgrade a NUE to no ECL.

4.2 Site Emergency Coordinator (SEC) - The SEC may upgrade the classification of an event until relieved by the recovery manager.

4.3 Recovery Manager (RM) - The RM, once staffed, is responsible for upgrading or downgrading ECLs, and may direct the SEC to change ECLs.

5.

INSTRUCTIONS

5.1 The Interim Site Emergency Coordinator shall:

5.1.1 Initially classify and declare the event using ONLY the guidance in Attachment 7.1 of this procedure.

NOTE: Simultaneous EALs that increase the probability of release require escalation of the ECL to one level above the higher EAL.

5.1.2 Formally announce all emergency classification declarations to the control room, TSC, or EOF, respectively.

5.2 The ISEC or SEC may:

5.2.1 Upgrade the event to a higher ECL until the recovery manager arrives at and assumes responsibility in the EOF. However, the ISEC and SEC shall not downgrade an event classified at the Alert or higher level at any time. The ISEC may downgrade a NUE to no ECL.

5.2.2 Only the recovery manager may downgrade an ECL at the Alert or higher level according to the most current controlling EAL.

6. RECORDS

6.1 There are no quality or nonquality records generated by this procedure.

7. ATTACHMENTS

7.1 "Emergency Action Level Classification Chart," 07/28/04

8. REFERENCES

8.1 EP EF-1, "Activation and Operation of the Technical Support Center."

8.2 EP EF-2, "Activation and Operation of the Operational Support Center."

8.3 EP EF-3, "Activation and Operation of the Emergency Operations Facility."

8.4 EP OR-3, "Emergency Recovery."

8.5 EP G-3, "Emergency Notification of Off-Site Agencies."

TITLE: Emergency Action Level Classification Chart

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
I. FIRE (All Modes)	1. Fire not under control within 15 minutes of initiating fire fighting efforts AND affecting plant equipment or power supplies in or near the Protected Area(s).	1. Fire not under control within 15 minutes of initiating fire fighting efforts AND threatening the loss of function of any of the following Safety Related systems required for safe shutdown: - Vital Power Supplies: D/Gs, DFOT, Vital 4kV, 480V, 120VAC, or 125VDC - Primary Systems and Auxiliaries: RCS, CCW, RHR, or Charging and Boration - Heat Sinks: AFW, ASW, 10% Dumps, S/G Safeties, or MSIVs - Control Room, Cable Spreading Rooms, or HSDP.	1. Fire causing the complete loss of function of any one of the following safety related systems required for safe shutdown: - Vital Power Supplies: D/Gs, DFOT, Vital 4kV, 480V, 120VAC, or 125VDC - Primary Systems and Auxiliaries: RCS, CCW, RHR, or Charging and Boration - Heat Sinks: AFW, ASW, 10% Dumps, S/G Safeties, or MSIVs - Control Room, Cable Spreading Rooms, or HSDP.	1. Site Emergency Coordinator judges that a fire could cause common damage to plant systems which is determined to have the potential to release radioactive material in quantities sufficient to cause exposures comparable to General Emergency #4.
II. FUEL DAMAGE OR VESSEL DAMAGE (Modes 1-4)	2. Indication of Fuel Damage as shown by: Confirmed RCS sample shows >100/$\overline{E}$ μCi/gm specific activity (Tech Spec 3.4.16) OR Confirmed RCS sample shows dose equivalent I-131 activity > Tech Spec limit for Iodine Spike (Tech Spec Fig. 3.4-1).	2. Indication of Fuel Damage as shown by: Confirmed RCS sample >300 μCi/cc of equivalent I-131 specific activity OR equivalent fuel failure is measured by exposure rate from systems carrying reactor coolant per EP RB-14A	See SAE #14 for Steam Line Break	2. Degraded core with possible loss of coolable geometry as indicated by: 5 or more thermocouple readings > 1200 deg. F. OR LOCA with no indication of ECCS flow AND indication of fuel damage (See Alert #2)

TITLE: Emergency Action Level Classification Chart

	Category II Continued on next page.	Category II Continued on next page.	Category II Continued on next page.	OR LOCA with containment rad levels > values for 100% gap release in EP RB-14. Category II Continued on next page.

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

TITLE: Emergency Action Level Classification Chart

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
II. FUEL DAMAGE OR VESSEL DAMAGE (Modes 1-4) (Continued)	3. Pressurized Thermal Shock is verified by entry into EOP FR-P.1 <u>AND</u> Left of Limit A curve (EOP F-0).			3. Loss of 2 of 3 Fission Product Barriers: A) Indication of fuel damage (See Alert #2) <u>AND</u> Determination of a Steam Generator Tube Rupture (SGTR) which requires entry into EOP E-3 <u>AND</u> Steam release from ruptured S/G, either used for plant cooldown purposes or due to a steamline break. B) Indication of Fuel Damage (See Alert #2) <u>AND</u> Determination of a SGTR requiring entry into EOP E-3 <u>AND</u> Indication of a steam line break inside containment <u>AND</u> High potential for loss of containment integrity (e.g., loss of function of both Containment Spray trains <u>OR</u> loss of function of one Containment Spray train and four CFCUs).

<u>NOTE</u>: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
II. FUEL DAMAGE OR VESSEL DAMAGE (Modes 1-4) (Continued)	3. Pressurized Thermal Shock is verified by entry into EOP FR-P.1 AND Left of Limit A curve (EOP F-0). (Continued)			C) Indication of Fuel Damage (See Alert #2) AND Determination of a SGTR which requires entry into EOP E-3 AND Indication of a steam line break outside containment with inability to isolate the break. D) Potential fuel damage indicated by 5 or more thermocouple readings >700 deg. F or RVLIS <32% AND LOCA as indicated by RCS leakage and SI AND Loss of containment integrity.
III. FUEL HANDLING ACCIDENT (All Modes)		3. Fuel Handling Accident causing a release in Containment or the Fuel Handling Building WITH The potential to exceed the criteria listed in Alert #4 or #5.	2. Fuel Handling Accident causing a release in Containment or the Fuel Handling Building WITH The potential to exceed the criteria listed in SAE #3.	
IV. LOSS OF CONTROL OR RELEASE OF RADIOACTIVE MATERIAL	4. Projected dose rate at the Site Boundary (800 meters) is $\geq$ 0.057 mRem/hr TEDE OR $\geq$ 0.170 mRem/hr Thyroid CDE for actual or expected release.	4. Projected dose rate at the Site Boundary (800 meters) is $\geq$ 0.57 mRem/hr TEDE OR $\geq$ 1.7 mRem/hr Thyroid CDE for actual or expected release.	3. Projected dose at the Site Boundary (800 meters) is $\geq$ 100 mRem TEDE OR $\geq$ 500 mRem Thyroid CDE for actual or expected release.	4. Projected dose at the Site Boundary (800 meters) is $\geq$ 1,000 mRem TEDE OR $\geq$ 5,000 mRem Thyroid CDE for actual or expected release.

(All Modes)	Category IV Continued on next page.	Category IV Continued on next page.	Category IV Continued on next page.	Category IV Continued on next page.

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
IV. LOSS OF CONTROL OR RELEASE OF RADIOACTIVE MATERIAL (All Modes) (Continued)	5. A valid reading in excess of the isolation setpoint, which fails to isolate the release on any of the Radiological Process Effluent Monitors: RE-18 OR RE-23 During discharge <u>only</u>.	5. Valid alarm on plant vent high range noble gas monitor RE-29. **<u>NOTE</u>:** ALARMS AT STATE OES SACRAMENTO.		
	6. An actual liquid release which exceeds the limits of 10 CFR 20, Appendix B, Table 2, Col. 2 per CY2.ID1.	6. An actual liquid release which exceeds 10x the limits of 10 CFR 20, Appendix B, Table 2, Col. 2 per CY2.ID1.		
	7. Radiological Effluent Process Monitor High Radiation Alarm with valid reading in excess of alarm setpoint on any of the following monitors: RE-14/14R RE-24/24R RE-28/28R.	7. Unplanned or unanticipated increase of 1 R/hr or greater in any of the following areas: Passageways, <u>OR</u> Normally occupied areas, <u>OR</u> Accessible areas normally < 100 mR/hr, <u>OR</u> Outside boundaries of Radiologically Controlled Areas <u>AND</u>, for any area above, a potential exists for <u>EITHER</u> an uncontrolled release to the environment <u>OR</u> a loss of ability to maintain plant safety functions.		
	8. Unplanned or uncontrolled release to the environment exceeding alarm setpoints on RE-3.	8. Unexplained increase of 50 X DAC in airborne radioactivity outside the boundary of the Radiologically Controlled Areas, but within the Plant		

		Protected Area.		

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

TITLE: Emergency Action Level Classification Chart

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
V. LOSS OF CONTROL ROOM (All Modes)		9. Entry into OP AP-8A, "Control Room Accessibility," AND controls established within 15 minutes.	4. Entry into OP AP-8A, "Control Room Accessibility," AND controls not established within 15 minutes.	
VI. LOSS OF ENGINEERED SAFETY FEATURE	9. Plant is not brought to required operating Mode within any applicable Tech Spec Action Statement time limit (Modes 1-4).		5. Complete loss for greater than 15 minutes of any of the following functions needed to reach or maintain Hot Shutdown (while in Modes 1-4): AFW capability Steam Dump System and S/G Safety Valves Loss of the capability to maintain RCS inventory as evidenced by a loss of all charging pumps coincident with the inability to depressurize and inject with the Safety Injection pumps Loss of capability to increase the Boric Acid concentration sufficient to maintain Keff less than .99 in Mode 4 with a loss of capability to trip control rods ASW or CCW Systems Loss of electrical power or I&C for any of the above listed systems, causing a complete loss of function.	5. Loss of Heat Sink indicated by: Entry into EOP FR H.1 AND Loss of water inventory in 3 S/Gs (<23% [34%] Wide Range).
	10. Loss of function of both RHR trains for greater than 15 minutes while in Mode 5-or 6.	10. Loss of function of both RHR trains for greater than 15 minutes in Modes 1-4.		
	11. A loss of function of all charging pumps for greater than 15 minutes when normally used for RCS inventory control (Modes 1-4).	11. An unplanned shutdown of the RHR System (while in Mode 5 or 6) for > 1 hour with no other normal means of decay heat removal available (e.g., flooded reactor cavity or steam generators with loops filled).		
		12. An unplanned loss of function of the RHR System (Mode 5 or 6) for greater than 15 minutes AND RCS thermocouple temperature is projected to exceed 200 deg.F within 1 hour of RHR loss (see Appendix B of OP AP SD series) OR RCS thermocouple temperature exceeds 200		

		deg.F.		

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

TITLE: Emergency Action Level Classification Chart

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
VII. LOSS OF POWER OR ALARMS OR ASSESSMENT OR COMMUNICATIONS	12. Loss of all off-site power for greater than 15 minutes AND at least 2 D/Gs are supplying their vital busses (Modes 1-4).	13. Loss of all off-site power for greater than 15 minutes AND only 1 D/G is supplying its vital bus (Modes 1-4).	6. Loss of all on-site AND off-site AC power for > 15 minutes (Modes 1-4).	See General Emergency Condition #5 under LOSS OF ENGINEERED SAFETY FEATURE.
	13. Loss of all off-site power for greater than 15 minutes AND at least 1 D/G is supplying its vital bus (Modes 5 and 6).	14. Loss of all off-site and on-site AC power for greater than 15 minutes in Modes 5 or 6.		
	14. Loss of all vital DC power as indicated by DC Bus 11(21), 12(22), and 13(23) undervoltage for A 15 minutes (Modes 5-and 6)	15. Loss of all vital DC power as indicated by DC Bus 11(21), 12 (22) and 13 (23) undervoltage for < 15 minutes (Modes 1-4).	7. Loss of all vital DC power as indicated by DC Bus 11 (21), 12 (22) and 13 (23) undervoltage for > 15 minutes (Modes 1-4).	
	15. Loss of assessment capabilities as indicated by a total loss of SPDS in the Control Room AND simultaneous loss of all displays for any "Accident Monitoring" variable in Tech Spec Table 3.3.3-1 for > 1 hour while in Modes 1, 2 or 3.			
	16. Main Control Room Annunciators PKs 1 through 5 AND display capabilities AND the seismically qualified annunciator display all do not respond to an alarm condition in Modes 1-4 for over 15 minutes.	16. Main Control Room Annunciators PKs 1 through 5 AND display capabilities AND the seismically qualified annunciator display all do not respond to an alarm condition in MODES 1-4 for over 15 minutes AND the plant is in a significant transient (plant trip, SI, or generator runback	8. Main Control Room Annunciators PKs 1 through 5 AND display capabilities AND the seismically qualified annunciator display all do not respond to an alarm condition in MODES 1-4 for over 15 minutes AND the plant is in a significant transient AND backup, nonannunciating systems are	

		A25 Mw/min), nonannunciating systems available.	not available (PPC, SPDS).	

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

TITLE: Emergency Action Level Classification Chart

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
VII. LOSS OF POWER OR ALARMS OR ASSESSMENT OR COMMUNICATIONS (Continued)	17. Total loss of communication capability with off-site agencies (all Modes) as indicated by the inability to communicate with SLO County (by telephone and radio) <u>OR</u> the NRC Operations Center.			
VIII. NATURAL PHENOMENA (All Modes)	18. Ground motion felt and recognized as an earthquake by a consensus of Control Room operators on duty <u>AND</u> measuring greater than 0.01g on the Earthquake Force Monitor.	17. Earthquake > 0.2 g verified by Seismic Monitors.	9. Earthquake > 0.4 g verified by Seismic Monitors.	6. Site Emergency Coordinator's judgment that major internal or external events (e.g., earthquakes, wind damage, explosions, etc.) which could cause massive common damage to plant systems which is determined to have the potential to release radioactive material in quantities sufficient to cause exposures comparable to General Emergency #4.
	19. Flooding of any plant structure that causes initiation of entry to Mode 3 due to a Tech Spec action statement.	18. High water exceeding Intake Structure main deck elevation or low water causing cavitation and shutdown of both ASW pumps for < 15 minutes.	10. High water causing flooding of ASW pump compartments or low water causing the shutdown of both ASW pumps for > 15 minutes.	
	20. Tsunami or Hurricane Warning from the State, NOAA, NWS, Coast Guard or System Dispatcher <u>OR</u> Observation of low or high	19. Sustained wind of 85 mph (38 m/sec) at any elevation on the Met. Tower.	11. Sustained wind speed > 100 mph (45 m/sec). at any elevation on the Met. Tower.	

	water levels at the Intake Structure indicative of a Tsunami or Hurricane.			
	21. A tornado sighted within Site Boundary.	20. Tornado strikes the plant protected area.		

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
IX. OTHER HAZARDS (All Modes)	22. Report of airplane crash within the Site Boundary or unusual airplane activity threatening the plant.	21. Confirmed missile, airplane crash or explosion involving a plant structure in the protected area.	12. Missile, airplane crash or explosion causing complete loss of a safety system function that causes entry into a Tech Spec Action Statement.	See General Emergency #6 above.
	23. Confirmed explosion on-site.			
	24. Turbine failure causing casing penetration OR damage to turbine or generator seals	22. Turbine failure generating missiles that cause visual damage to other safety related structures, equipment, controls OR power supplies.		
	25. Significant release of flammable OR toxic gas OR liquid that prevents, even with SCBAs, operations inside the power block OR intake structure (ref. CP M-9a).	23. Release of flammable OR toxic gas OR liquid that jeopardizes operation of safety related systems by either preventing required access OR by threatening imminent damage.		
X. PRIMARY OR PRI/SEC OR SECONDARY LEAK) (Modes 1-4	26. RCS unidentified OR pressure boundary leakage that exceeds 10 gpm OR identified leakage that exceeds 25 gpm.	24. Primary leak rate >50 gpm.	13. Known primary system LOCA during which RCS subcooling cannot be maintained A20 °F OR PZR level cannot be maintained A4% (28% with adverse containment).	See General Emergency #3 under Fuel or Vessel Damage.
	27. SI Actuation with ECCS injection into the RCS resulting from a valid signal based on actual plant conditions. **NOTE:** SI ACTUATION ALSO ALARMS AT OES IN SACRAMENTO.	25. Determination of a SGTR which results in entry into EOP E-3.	14. Determination of a SGTR coincident with steam release from ruptured S/G, either used for plant cooldown purposes or due to a steamline break.	
	28. Steam line break which results in SI actuation.	26. Determination of a steam line break with >10 gpm Primary		

		to Secondary leakage.		
	29. Failure of a PZR PORV AND Block Valve OR Safety Valve fails to reseat, excluding allowable leakage, following a pressure reduction below the reset point.			

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

TITLE: Emergency Action Level Classification Chart

	UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
XI. REACTOR PROTECTION SYSTEM FAILURE (Modes 1-4)		27. Anticipated Transient Without Scram (ATWS) as indicated by: Failure of an automatic reactor trip to trip the reactor.	15. An ATWS condition with no fuel damage evident AND An additional failure of a system required for Hot Shutdown (See SAE #5) to actuate.	7. ATWS with Fuel Damage indications (see Alert Condition #2 under FUEL DAMAGE) OR ATWS with potential Core Melt indicated by 5 or more thermocouple readings > 700 deg. F AND RVLIS < 32%.
XII. SECURITY THREAT (All Modes)	30. Security reports the notification of a credible site-specific security threat or attempted entry or attempted sabotage.	28. Security reports ongoing security threat involving physical attack on the facility or a sabotage device has been detected that threatens the operability of safety related equipment (see Alert #1).	16. Security reports ongoing physical attack on the facility or a sabotage device causing a confirmed loss of function of any one of the following safety related systems required for safe shutdown: - Vital Power Supplies: D/Gs, DFOT, Vital 4kV, 480V, 120VAC, or 125VDC - Primary Systems and Auxiliaries: RCS, CCW, RHR, or Charging and Boration - Heat Sinks: AFW, ASW, 10% Dumps, S/G Safeties, or MSIVs - Control Room, Cable Spreading Rooms, or HSDP.	8. Security reports ongoing security threat which causes loss of control of the operations of the plant to hostile forces.
XIII. SITE EMERGENCY COORDINATOR'S JUDGMENT (All Modes)	31. Site Emergency Coordinator determines conditions warrant increased awareness on the part of off-site authorities of initiation of a plant shutdown per Tech Spec LCOs or involve other than normal controlled	29. Site Emergency Coordinator judges plant conditions exist that warrant precautionary activation of the TSC and placing the EOF and other key emergency personnel on stand-by.	17. Site Emergency Coordinator judges that conditions exist that warrant activation of the emergency centers and monitoring teams or a precautionary notification to the public near the site.	9. Site Emergency Coordinator judges conditions exist which have a potential to release radioactive material in quantities sufficient to cause

	shutdown.			exposures comparable to General Emergency #4.

NOTE: SIMULTANEOUS EALS THAT INCREASE THE PROBABILITY OF RELEASE REQUIRE ESCALATION OF THE CLASSIFICATION TO ONE LEVEL ABOVE THE HIGHER EAL.

Facility: _____**DCPP**___________________ Date of Examination: __**02/07/2005**__
Exam Level (circle one): RO / SRO-I / SRO-U Operating Test No.: _____**01**________

Control Room Systems@ (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. 004 – Dilution w/o Makeup Control Operable (NRCLJC-301) **RO/SROI**	A/N/S	01
b. W/E05 – Initiate Bleed and Feed for Loss of Heat Sink (NRCLJC-116) **RO/SROI**	D/E/L/P/S	04p
c. 009 – Respond to Loss of RHR Inventory (Mode 5) (NRCLJC-093) **RO/SROI/SROU**	A/E/L/M/S	03
d. 008 – Respond to a Loss of CCW (NRCLJC-103) **RO/SROI**	A/E/L/M/S	08
e. 026 – Secure Containment Spray (NRCLJC-081) **RO/SROI**	E/D/S	05
f. 059– Establish MFW (NRCLJC-052) **RO/SROI**	D/S	04s
g. 062 – Crosstie Vital Bus G to H (NRCLJC-032) **RO**	D/E/L/S	06
h. 006 – Align SIS for Hot Leg Recirc (NRCLJC-123) **RO/SROI/SROU**	A/E/M/S	02

In-Plant Systems@ (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i. 024 – Align Emergency Boration (NRCLJP-088) **RO/SROI/SROU**	D/E/R	01
j. 062 – Transfer PZR Htr Group 13 to Backup (NRCLJP-079) **RO/SROI/SROU**	D/L	06
k. 061 – Reset TDAFW Pump (NRCLJP-012) **RO/SROI/SROU**	D/E/L/P/R	04S

@ All control room (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Number:	NRCLJC-032
Title:	CROSSTIE OF VITAL BUS G TO H
Examinee:	______________________________
Evaluator:	____________ Print ____________ Signature ______ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes

Comments:

References:	EOP ECA-0.3, Restore 4kV Buses, Appendix X, Rev. 12
Alternate Path:	Yes ________ No ___X___
Time Critical:	Yes ________ No ___X___
Time Allotment:	15 minutes
Critical Steps:	2, 3, 4, 5, 8, 9, 10, 11, 12
Job Designation:	RO/SRO
Task Number:	062/06/A2.05
Rating:	2.9/3.3

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.

Required Materials: None

Initial Conditions: A reactor trip and safety injection has occurred concurrent with a loss of all off-site power. Diesel generator 11 and diesel generator 13 have failed due to lube oil pressure problems. Diesel generator 12 is supplying 4kV bus G. CCW Pp 12 has failed resulting in a complete loss of CCW flow.

Initiating Cue: The Shift Foreman directs you to crosstie 4kV bus G to 4kV bus H per EOP ECA-0.3, Appendix X, commencing at step 3. Steps 1 and 2 have been completed. The Site Emergency Coordinator has concurred with this implementation.

Task Standard: 4kV and 480V bus H are energized after being crosstied to 4kV bus G in accordance with ECA-0.3.

Start Time: ___________

	Step	Expected Operator Actions
	1. Obtain the correct procedure.	1.1 References ECA-0.3, Appendix X. **Step was: Sat: ______ Unsat _______***
**	2. Cut in the DIR PWR, LOSS OF FIELD, & BKR OC PROT RLYS for diesel generator 12.	2.1 Places D/G DIR PWR, LOSS OF FLD & BKR OC PROT RLYS C/O SW to CUT-IN. ** **Step was: Sat: ______ Unsat _______***
**	3. Reset SI.	3.1 Checks PK08-21 "Safety Injection Actuation" status. 3.2 Manually depresses both SI Reset pushbuttons, if required. ** 3.3 Checks at least one of the following: • Monitor Light Box B "Safety Injection" red light OFF, **OR** • PK08-21, "Safety Injection Actuation" not ON. **Step was: Sat: ______ Unsat _______***
**	4. Cutout the auto transfer FCOs for 4kV and 12kV buses.	4.1 Places all Xfer to S/U PWR C/O toggle switch to CUT-OUT. ** **Step was: Sat: ______ Unsat _______***
**	5. Depress all auto transfer reset pushbuttons.	5.1 Reads NOTE. 5.2 Depresses all AUTO XFER RESET pushbuttons, if required. ** 5.3 Verifies that all Auto Xfer indicating blue lights are off. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
	6. Verify OPEN all vital 4kV bus auxiliary feeder breakers.	6.1 Verifies all vital 4kV bus aux feeder breakers are OPEN: • 52-HH-13 OPEN • 52-HG-13 OPEN • 52-HF-13 OPEN **Step was: Sat: ______ Unsat _______***
	7. Verify OPEN all vital 4kV bus startup feeder breakers.	7.1 Verifies all vital 4kV bus startup feeder breakers are OPEN: • 52-HH-14 OPEN • 52-HG-14 OPEN • 52-HF-14 OPEN **Step was: Sat: ______ Unsat _______***
**	8. Verify OPEN the 4kV startup feeder breaker 52-HG-15.	8.1 Opens 52-HG-15. ** 8.2 Verifies that 52-HG-15 has opened. **Step was: Sat: ______ Unsat _______***
**	9. Verify OPEN the 4kV to 480 VAC bus feeder breaker for the deenergized bus to be reenergized.	9.1 Opens 52-HH-10. ** 9.2 Verifies that 52-HH-10 has opened. **Step was: Sat: ______ Unsat _______***
**	10. Close 4kV startup feeder breaker for the deenergized bus being reenergized.	10.1 Reads CAUTION and NOTE. 10.2 Inserts sync key for 4kV bus H startup feeder breaker 52-HH-14. 10.3 Turns sync switch to ON. ** 10.4 Closes 52-HH-14. ** 10.5 Verifies that 52-HH-14 has closed. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	11. Close the 4kV startup feeder breaker for the bus that will be supplying power to the deenergized bus.	11.1 Inserts sync key for 4kV bus G startup feeder breaker 52-HG-14. 11.2 Turns sync switch to ON. ** 11.3 Closes 52-HG-14. ** 11.4 Verifies that 52-HG-14 has closed. 11.5 Verifies running diesel generator remains stable. **Step was: Sat: ______ Unsat _______***
**	12. Close the 4kV to 480V bus feeder breaker for the reenergized bus.	12.1 Reads CAUTION. ********************************** **Cue: An Operator has been stationed at VB4 to monitor the diesel generator.** ********************************** 12.2 Closes 52-HH-10. ** 12.3 Verifies that 52-HH-10 has closed. **Step was: Sat: ______ Unsat _______***

Stop Time: ___________

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

 * Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

Initial Conditions: A reactor trip and safety injection has occurred concurrent with a loss of all off-site power. Diesel generator 11 and diesel generator 13 have failed due to lube oil pressure problems. Diesel generator 12 is supplying 4kV bus G. CCW Pp 12 has failed resulting in a complete loss of CCW flow.

Initiating Cue: The Shift Foreman directs you to crosstie 4kV bus G to 4kV bus H per EOP ECA-0.3, Appendix X, commencing at step 3. Steps 1 and 2 have been completed. The Site Emergency Coordinator has concurred with this implementation.

Task Standard: 4kV and 480V bus H are energized after being crosstied to 4kV bus G in accordance with ECA-0.3.

- ❑ Initialize the simulator to the IC-510 (100%, MOL).
- ❑ Enter drill file 1032 or manually insert the following:

Command	Description
1. mal deg1a act,2,0,0,d,0	Fails DG 11
2. mal deg1c act,2,0,0,d,0	Fails DG 13
3. mal syd1 act,1,1,0,d,0	Loss of offset power
4. mal ppl2a act,0,0,0,d,2	Inadvertent SI, Train A
5. mal ppl2b act,0,0,0,d,2	Inadvertent SI, Train B
6. pmp ccw2 4,0,0,4,d,0	CCW pp 1-2 OC trip
7. loa afw14 act,f,0, 60,d,0	Opens knife switch for AFW pp 1-2
8. loa css8 act,f,0,60,d,0	Opens knife switch for cont. spray pp 1-2
9. loa rhr10 act,f,0,60,d,0	Opens knife switch for RHR pp 1-2
10. loa ccw31 act,f,0,60,d,0	Opens knife switch for CCW pp 1-3
11. loa sis2 act,f,0,60,d,0	Opens knife switch for SI pp 1-2
12. dsc ven14 act,f,0,60,d,0	Opens breaker for CFCU 1-4
13. run 90	freezes simulator after 90 seconds

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

APPENDIX X
CROSSTIE OF VITAL BUS

SCOPE

Implementation of this Appendix requires approval of the Site Emergency Coordinator. This Appendix should be performed to energize two vital buses from one diesel. If two vital buses are energized, enough ESF equipment should be energized to establish one ESF train.

DISCUSSION

As a general guideline, in this situation several options may be available depending on plant conditions and RCS status. If SI is not required, the Shift Foreman may elect to stay in a hot shutdown status awaiting restoration of off-site power or he may decide to cooldown. If SI is required, a minimum of one ECCS flow path must be established. The type of ECCS flowpath desired would depend on RCS conditions.

PRECAUTIONS AND LIMITATIONS

1. Some equipment may have to be operated on a continuous basis and some on an "as needed" basis. Existing conditions will determine which equipment is needed (plant cooldown, SI, etc.).

2. The maximum capacity of the diesel generator should not be exceeded. Appendix Q identifies the diesel generator load limits. Appendix Q, Table 1 provides loads for various vital 4KV and 480 vital equipment. STP M-9M also contains specific loads on all 480 volt vital equipment.

3. The DG that is to be used is assumed to be supplying its own vital bus and running in Auto. The DG should remain in Auto during the performance of this procedure to allow the Isoc feature to maintain proper frequency. If manual is used the operator will need to make frequency adjustments as the DG is loaded.

PROCEDURE

1. Obtain permission from the Site Emergency Coordinator.

2. On the deenergized bus being reenergized, verify ALL the breakers AND DC control power switches are OPEN for the following loads AND ALL the 480V Breakers are open. This prevents automatic loading and overloading the diesel. Continue with steps 3 through 10 while performing this step.

F VITAL BUS		G VITAL BUS		H VITAL BUS	
ASW Pp 1	(52-HF-08)	ASW Pp 2	(52-HG-06)	AFW Pp 2	(52-HH-08)
AFW Pp 3	(52-HF-09)	CS Pp 1	(52-HG-07)	CS Pp 2	(52-HH-09)
CCP 1	(52-HF-11)	RHR Pp 1	(52-HG-08)	RHR Pp 2	(52-HH-11)
CCW Pp 1	(52-HF-12)	CCW Pp 2	(52-HG-12)	CCW Pp 3	(52-HH-12)
SI Pp 1	(52-HF-15)	CCP 2	(52-HG-09)	SI Pp 2	(52-HH-15)
		PDP 3	(52-HG-11)		

APPENDIX X (Continued)

3. Cutin the D/G DIR PWR, LOSS OF FIELD & BKR OC PROT RLYS C/O SW for the diesel generator selected to supply power to the deenergized bus.

4. Reset SI (if applicable) so that the affected bus will not try to auto load when the bus becomes energized.

5. Cutout the AUTO Transfer FCO's for 4KV buses and 12KV buses.

NOTE: If the D/G associated with the deenergized bus is running but will not load on the bus, it must be shutdown to permit the Auto Transfer Relay to be reset.

6. Depress all AUTO Transfer Reset Push Buttons, verify the BLUE lights go OUT.

7. Verify OPEN all vital bus 4KV auxiliary feeder breakers, 52-HH-13, 52-HG-13 and 52-HF-13.

8. Verify OPEN all vital bus 4KV startup feeder breakers, 52-HH-14, 52-HG-14 and 52-HF-14.

9. Verify OPEN startup feeder breaker 52-HG-15, to the vital buses F, G and H.

10. Verify OPEN the 4KV to 480V bus feeder breaker for the deenergized bus to be reenergized:

DEENERGIZED BUS	FEEDER BREAKER
F	52-HF-10
G	52-HG-10
H	52-HH-10

****

CAUTION:
- o The breaker alignment in step 2 must be completed prior to performing Step 11.
- o If the diesel generator appears unstable at any time beyond this point in the procedure, immediately open startup feeder breaker for the operable bus to separate the diesel from the inoperable bus.

****

NOTE: Although the DG will not be synchronized with other buses during the performance of these steps, most of the breakers to be closed will require the sync key to be on.

11. CLOSE the 4KV startup feeder breaker for the deenergized bus being reenergized.

DEENERGIZED BUS	FEEDER BREAKER
F	52-HF-14
G	52-HG-14
H	52-HH-14

APPENDIX X (Continued)

12. Close the 4KV startup feeder breaker for the bus that will be supplying power to the deenergized bus.

OPERATING D/G	FEEDER BREAKER
No. 1	52-HH-14
No. 2	52-HG-14
No. 3	52-HF-14

****

CAUTION: Station an operator at the VB4 to monitor the diesel generator. If an SI should occur, immediately open the 4KV startup feeder breaker for the bus with the operable diesel generator to prevent overloading the operable diesel generator when the SI loads sequence on the bus.

****

13 CLOSE the 4KV to 480V bus feeder breaker for the reenergized bus:

BUS	BREAKER
F	52-HF-10
G	52-HG-10
H	52-HH-10

14 Return to procedure and step in effect and IMPLEMENT Appendix Q for equipment starting instructions and diesel generator load limits.

Number: NRCLJC-052

Title: ESTABLISH MAIN FEEDWATER FLOW

Examinee: ______________________________

Evaluator: ____________ ____________ ________
Print Signature Date

Results: Sat ______ Unsat ______ Total Time: __________ minutes

Comments:

References: EOP FR-H.1, Loss of Secondary Heat Sink, Rev. 19

Alternate Path: Yes ____________ No ____X____

Time Critical: Yes ____________ No ____X____

Time Allotment: 30 minutes

Critical Steps: 4, 5, 6, 8, 9, 10, 11, 15, 16

Job Designation: RO/SRO

Task Number: 059/04S /A4.11

Rating: 3.1/3.3

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A MANAGER – OPERATIONS	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.
Required Materials:	None
Initial Conditions:	A plant trip has occurred. The crew has diagnosed a total loss of AFW flow with no immediate prospects for regaining AFW flow. Actions of EOP FR-H.1, up to and including Step 6, have been completed.
Initiating Cue:	The Shift Foreman directs you to start the # 1 MFW pump and establish flow to the steam generators, in accordance with EOP FR-H.1, Step 7.
Task Standard:	The #1 MFW pump is started from the Control Room and main feedwater flow is established to at least one steam generator in accordance with EOP FR-H.1.

Start Time: ___________

	Step	Expected Operator Actions
	1. Obtains the correct procedure.	1.1 References EOP FR-H.1. **Step was: Sat: ______ Unsat _______***
	2. Check at least one condensate/booster pump set running in recirc.	2.1 Reads CAUTION prior to step. 2.2 Observes that at least one condensate/booster pump set is already running. **Step was: Sat: ______ Unsat _______***
	3. Check main feedwater isolation valves – OPEN.	3.1 Observes that all feedwater isolation valves are CLOSED. **Step was: Sat: ______ Unsat _______***
**	4. Reduce RCS pressure to less than 1915 psig.	4.1 Observes that letdown is NOT in service. 4.2 Positions any PZR PORV's control switch to OPEN. ** 4.3 Lowers PZR pressure to less than 1915 psig. ** 4.4 Returns selected PZR PORV's control switch to AUTO. ********************************** **Cue: Another operator will maintain RCS pressure less than 1865 psig.** ********************************** **Note: An instructor should open a PZR PORV as necessary to ensure that PZR pressure remains less than 1865 psig. Be careful NOT to reset P-11, since this could lead to an SI actuation.** **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	5. Block the Low PZR Pressure SI.	5.1 Observes PK08-06, PZR S.I. PERMISSIVE P-11, ON. 5.2 Positions the PZR SI RESET/BLOCK TRAIN A and TRAIN B switches to BLOCK. ** 5.3 Verifies that PZR Low Pressure SI has blocked by observing PK08-16, PZR S.I. BLOCKED – ON. **Step was: Sat: ______ Unsat _______***
**	6. Block the Low Steam Line Pressure Pressure SI	6.1 Positions the LO STM LINE PRESS SI RESET/BLOCK TRAIN A and TRAIN B switches to BLOCK. ** 6.2 Verifies that Low Steamline Presure SI has blocked by observing PK08-17, LO STM LINE PRESSURE S.I. BLOCKED – ON. **Step was: Sat: ______ Unsat _______***
	7. Maintain RCS pressure 1500 - 1865 psig.	********************************** **Cue: Another operator will maintain RCS pressure between 1500 & 1865 psig.** **********************************
**	8. Reset SI.	8.1 Depresses the SAFETY INJECTION RESET TRAIN A and TRAIN B pushbuttons. ** 8.2 Verifies that SI is reset by observing PK08-22 ON and/or SI Monitor Box red status light OFF. **Step was: Sat: ______ Unsat _______***
**	9. Cycle Reactor Trip Breakers.	9.1 Momentarily positions the REACTOR TRIP RESET/TRIP switch to RESET (CC1). ** **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	10. Reset Feedwater Isolation.	10.1 Resets feedwater isolation by depressing the FDWTR ISOL RESET pushbuttons.** 10.2 Verifies feedwater isolation has reset by observing F.W. ISOL red light OFF and/or PK09-11 OFF. **Step was: Sat: ______ Unsat _______***
**	11. Open Main Feedwater Isolation Valves.	11.1 Opens MFW isolation valves FCV-438, 439, 440, and 441.** **Note: Opening only one isolation valve satisfies critical task.** 11.2 Verifies Main Feedwater isolation valves have opened. **Step was: Sat: ______ Unsat _______***
	12. Verify condenser – AVAILABLE.	12.1 Observes PK08-14, CONDENSER AVAILABLE C-9 – ON. or Observes adequate condenser vacuum on PI-44 and one circulating water pump running. **Step was: Sat: ______ Unsat _______***
	13. Verifies MSIVs – OPEN.	13.1 Observes that all MSIVs are open. **Step was: Sat: ______ Unsat _______***
	14. Verify manual isolation for HP Steam to MFW Pumps - OPEN. o MS-1-95 (MFW Pp1-1) o MS-1-92 (MFW Pp1-2)	14.1 Requests that another operator verify MS-1-95 and MS-1-92 OPEN. ********************************** **Cue: MS-1-95 and MS-1-92 are OPEN.** ********************************** **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

Step	Expected Operator Actions
** 15. Restart MFW pumps.	**Note: Starting MFP 1-2 also satisfies the critical task.**
	15.1 Verifies MFWP latched.
	15.2 Verifies FCV-53 and FCV-54 switches in RECIRC.
	15.3 Presses ALARM/TRIP RESET on the MFWP 1-1 S/U STATION. **
	15.4 Latches the MFW pump turbine by holding the PUMP 1-1 TRIP/LATCH SELECT switch in RESET until the LATCHED light is ON. **
	Note: Latch time is ≈ 2 minute. Operator may elect to have pump latched locally. If so, latch the pump from the Sim booth.
	15.5 Presses RAMP UP TO IDLE. **
	15.6 Observes speed rising to IDLE setpoint verifies to ~ 600 RPM.
	15.7 Presses IDLE TO STBY. **
	15.8 Observes speed rising to STBY setpoint.
	15.9 When speed reaches 3000, raises MFP speed until discharge pressure is approximately 100 psig greater than S/G pressure (PI-509A or PI-509). **
	Note: Operator may raise speed by pressing the RAISE pushbutton at the S/U station, or by selecting DFW CONTROL at the S/U station and then raising the output of the CC3 controller.
	Step was: Sat: ______ Unsat _______*

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	16. Throttle open MFW control bypass valves.	16.1 Throttles open at least one MFW bypass valve and establishes flow.**
		Note: Opening a MFW control valve satisfies the critical task.
		16.2 Verifies feedwater flow to at least one S/G.
		Step was: Sat: ______ Unsat _______*

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

Initial Conditions:	A plant trip has occurred. The crew has diagnosed a total loss of AFW flow with no immediate prospects for regaining AFW flow. Actions of EOP FR-H.1, up to and including Step 6, have been completed.
Initiating Cue:	The Shift Foreman directs you to start the # 1 MFW pump and establish flow to the steam generators, in accordance with EOP FR-H.1, Step 7.
Task Standard:	The #1 MFW pump is started from the Control Room and main feedwater flow is established to at least one steam generator in accordance with EOP FR-H.1.

- ❑ Initialize the simulator to the RELAP INIT 510 (100%, MOL).
- ❑ If possible, a second instructor should be available during this JPM to control PZR pressure when required.
- ❑ Enter drill file 1052 or manually insert the following:

Command	Description
1. mal afw1 act,0,0,d,0	Trips AFW pp 1-1
2. pmp afw1 4,0,0,0,d,0	Trips AFW pp 1-2 from starting
3. pmp afw2 4,0,0,0,d,0	Trips AFW pp 1-3 from starting
4. ovr xrei022h act,1,0,0,c,fnispr.1t.10,5	Reset MSRS
5. delm bsgnwrr1	Removes bsgnwrr1 from monitor
6. monv bsgnwrr1	Monitors steam generator wide range level
7. run 120	
8. mal pp12a act,0,0,0,d,2	Inadvertent SI, Train A
9. mal pp12b act,0,0,0,d,2	Inadvertent SI, Train B
10. ovr xv2i260o act,1,0,0,c,fnispr.1t.10,0	Trips RCP 11
11. ovr xv2i261o act,1,0,0,c,fnispr.1t.10,0	Trips RCP 12
12. ovr xv2i262o act,1,0,0,c,fnispr.1t.10,0	Trips RCP 13
13. ovr xv2i263o act,1,0,0,c,fnispr.1t.10,0	Trips RCP 14

- ❑ Perform the following:
  1. Place FCV-53/54 in RECIRC.
  2. Place Steam Dump Control in Steam Pressure Mode.
  3. Place LCV-12 in CONT ONLY.
  4. Stop all but one Condensate/Booster Pump set.
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **CHECK If Condenser Steam Dump Should Be In Pressure Control Mode:**	IF Condenser Steam Dump is NOT available, THEN Adjust 10% Steam Dump controllers as needed to maintain S/G pressure LESS THAN OR EQUAL TO 1005 PSIG (8.38 turns)
a. Check MSIVs - OPEN	
b. Check Condenser - AVAILABLE	
c. Increase setting on HC-507 to achieve 0% demand OR Transfer HC-507 to manual and decrease demand to 0%.	- -
d. Place Steam Dump in Steam Pressure Mode	
e. Adjust Steam Dump controller as needed to maintain S/G pressure LESS THAN OR EQUAL TO 1005 PSIG (8.38 turns)	

7. **TRY To Establish Mn Fdwtr Flow To At Least One S/G:**

****

CAUTION: Hotwell level should be monitored when supplying S/Gs with Condensate/Booster Pps and Mn Fdwtr Pps.

****

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a. Check Condensate System - IN SERVICE 1) At least one Condensate/Booster Pp Set running in recirc	a. Try to place condensate system in service. REFER TO OP C-7A series. IF NOT, THEN GO TO Step 11 (Page 12).

THIS STEP CONTINUED ON NEXT PAGE

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **TRY To Establish Mn Fdwtr Flow To At Least One S/G:** (Continued)	
b. Check Mn Fdwtr Isol Vlvs - OPEN	b. Open Mn Fdwtr Isol Vlvs as follows: 1) Reduce RCS Pressure to LESS THAN 1915 PSIG as follows: o Use PZR PORV OR o If Letdown is in service, use Aux Spray 2) Block the Low PZR Pressure SI 3) Block the Low Stmline Pressure SI 4) Maintain RCS pressure 1500 - 1865 PSIG. 5) Reset SI 6) Cycle Reactor Trip Bkrs (CC1) 7) Reset Fdwtr Isolation 8) Open Mn Fdwtr Isol Vlvs OR Locally Open Mn Fdwtr Isol Vlvs IF NO Mn Fdwtr path can be opened, THEN GO TO Step 11 (Page 12)

THIS STEP CONTINUED ON NEXT PAGE

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **TRY To Establish Mn Fdwtr Flow To At Least One S/G:** (Continued)	
c. Establish Mn Fdwtr flow capability:	c. GO TO Step 9 (Page 9).
1) Verify Condenser - AVAILABLE	
2) Verify MSIVs - OPEN	
3) Verify manual isolation for HP steam to MFW Pumps - OPEN o MS-1-95 (MFW Pp 1-1) o MS-1-92 (MFW Pp 1-2)	
4) Check ANY MFW Pp – LATCHED	4) Restart a MFW Pp as follows: (a) Verify FCV-53 AND FCV-54 switches in RECIRC. (b) Press ALARM/TRIP RESET on MFW Pp S/U station (VB3). (c) Take Trip/Latch switch to RESET to latch the MFW Pp Turbine (Hold until latched, ~ 2 min). (d) Press RAMP UP TO IDLE, verify ramp to ~ 600 RPM. (e) Press IDLE TO STANDBY, verify ramp to ~ 3000 RPM. IF MFW Pps will not start, THEN REFER TO APPENDIX K to restart locally.
5) Increase MFW Pp speed until discharge pressure is 100 PSIG GREATER THAN S/G Pressure	

THIS STEP CONTINUED ON NEXT PAGE

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **TRY To Establish Mn Fdwtr Flow To At Least One S/G:** (Continued)	
6) Check PK09-11, FEEDWATER ISOLATION – OFF	6) Reset Fdwtr Isolation.
7) Throttle open: o Mn Fdwtr Cont Bypass Vlvs OR o Mn Fdwtr Cont Vlvs	7) Locally Throttle open Mn Fdwtr Cont Vlvs IF NO Mn Fdwtr path can be opened THEN GO TO Step 11 (Page 12)
d. IF This Step was implemented from Step 22, THEN GO TO Step 23 (Page 18)	
8. **CHECK S/G NR Levels:**	
a. S/G NR Level in at least one S/G - GREATER THAN 6% [16%]	a. IF Feedflow to at least one S/G - verified, THEN Maintain flow to restore S/G NR Level to GREATER THAN 6% [16%]. IF Feedflow NOT verified, THEN GO TO Step 9 (Next Page).
b. RETURN TO procedure and step in effect	

Number:	NRCLJC-081
Title:	SECURE CONTAINMENT SPRAY
Examinee:	______________________________
Evaluator:	______________ Print ______________ Signature ________ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	EOP E-1, Loss of Reactor or Secondary Coolant, Rev. 19
Alternate Path:	Yes ________ No ___X___
Time Critical:	Yes ________ No ___X___
Time Allotment:	10 minutes
Critical Steps:	3, 4, 5, 6, 7, 9
Job Designation:	RO/SRO
Task Number:	026/05/A4.01
Rating:	4.5/4.3

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.

Required Materials: None

Initial Conditions: Unit 1 has experienced a steam line break inside Containment. The faulted steam generator was isolated and the crew has transitioned to EOP E-1.

Initiating Cue: The Shift Foreman directs you to evaluate and secure, as appropriate, Containment Spray per EOP E-1, Step 5.

Task Standard: The criterion for stopping Containment Spray has been evaluated, and the system is aligned as required by EOP E-1.

Start Time: ___________

	Step	Expected Operator Actions
	1. Obtain the correct procedure.	1.1 References EOP E-1. **Step was: Sat: ______ Unsat _______***
	2. Check PK01-18, CONTMT SPRAY ACTUATION, ON.	2.1 Observes that PK01-18 is ON. **Step was: Sat: ______ Unsat _______***
**	3. Check containment radiation levels.	3.1 Observes PK11-21, HIGH RADIATION is OFF. ** 3.2 Observes normal indication on RE-2/RE-7. (SPDS, PPC, RNRM-A) ** 3.3 Observes PK11-19 CONTMT RADIATION is OFF. ** 3.4 Observes normal indication on R-30/R-31. (PAM2) ** **Step was: Sat: ______ Unsat _______***
**	4. Check containment pressure less than 20 psig.	4.1 Observes containment pressure (PI-934-937) less than 20 psig. ** **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	5. Reset Containment Spray Trains A and B.	5.1 Depresses both Containment Spray reset push buttons. ** 5.2 Checks that PK01-18, CONTMT SPRAY ACTUATION is OFF. **Step was: Sat: ______ Unsat _______***
**	6. Stop containment spray pumps.	6.1 Stops both Containment Spray pumps. ** 6.2 Verifies both Containment Spray pumps have stopped. **Step was: Sat: ______ Unsat _______***
**	7. Close 9001A and B.	7.1 Closes 9001A and B. ** 7.2 Verifies 9001A and B have closed. **Step was: Sat: ______ Unsat _______***
	8. Verify 9003A and B closed.	8.1 Observes that 9003A and B are closed. **Step was: Sat: ______ Unsat _______***
**	9. Close 8994A and B.	9.1 Closes 8994A and B. ** 9.2 Verifies that valves have closed. **Step was: Sat: ______ Unsat _______***

Stop Time: ___________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

Initial Conditions: Unit 1 has experienced a steam line break inside Containment. The faulted steam generator was isolated and the crew has transitioned to EOP E-1.

Initiating Cue: The Shift Foreman directs you to evaluate and secure, as appropriate, Containment Spray per EOP E-1, Step 5.

Task Standard: The criterion for stopping Containment Spray has been evaluated, and the system is aligned as required by EOP E-1.

- ❑ Initialize the simulator to IC-510 (100%, MOL).
- ❑ Enter drill file 1081 or manually insert the following:

Command	Description
mal mssla act,4e+07,0,0,d,0	Break SG 1 INSIDE CNMT
vlv afw3 2,0,0,0,D,0 #rafl106 cnv afw1 2,0,0,0,D,0 #rafl110	Isolate afw to s/g 11
ovr xv3i149m act,1,0,0,d,5 #vb3024I	lcv-110 cntlr to man
ovr XV1I113C act,1,0,0,d,5 #vb1106a ovr XV1I114C act,1,0,0,d,5 #vb1107a	ACTUATE PHASE B (CNMT SPRAY)
ovr XV2I2600 act,1,0,0,d,5 #vb2163e ovr XV2I2610 act,1,0,0,d,5 #vb2164e ovr XV2I2620 act,1,0,0,d,5 #vb2165e ovr XV2I2630 act,1,0,0,d,5 #vb2166e	Selects stop for each rcp
cnh mss2 1,0,0,0,d,0 #xcnh516e cnh mss3 1,0,0,0,d,0 #xcnh526e cnh mss4 1,0,0,0,d,0 #xcnh536c cnh mss5 1,0,0,0,d,0 #xcnh546c	Stop 10% dumps from opening.
Ovr xreo006h act,1,0,0,c,fnispr (1) .lt.10,5 #vb3164r	RESET MSRS
ovr xc3I136M act,1,0,0,c,fnispr (1) .lt.10,5 #cc3050c ovr xc3I136L act,1,0,0,c,fnispr (1) .lt.10,60 #cc3050f ovr xc3I137M act,1,0,0,c,fnispr (1) .lt.10,5 #cc3051c ovr xc3I137L act,1,0,0,c,fnispr (1) .lt.10,60 #cc3051f ovr xc3I138M act,1,0,0,c,fnispr (1) .lt.10,5 #cc3052c ovr xc3I138L act,1,0,0,c,fnispr (1) .lt.10,60 #cc3052f ovr xc3I139M act,1,0,0,c,fnispr (1) .lt.10,5 #cc3053c ovr xc3I139L act,1,0,0,c,fnispr (1) .lt.10,60 #cc3053f	TAKE FWRV'S TO MANUAL AND CLOSE.

Command	Description
ovr xv3i224o act,1,0,0,c,fnispr.lt.10,5 #vb3062e	STOP CND/BSTR PP 1-2 & 1-3
ovr xv3i180c act,0,0,0,d,0 #vb3060b	
ovr xv3i194c act,1,0,0,c,fnispr.lt.10,0 #vb3131b ovr xv3i197c act,1,0,0,c,fnispr.lt.10,0 #vb3132b	Recirc on fw pp recirc valves.
Ovr xv4i388o act,0,0,0,d,0 #vb4303a ovr xv4i388c act,1,0,1,d,0 #vb4303b	Turn on charcoal filter preheater.
Run 60	Runs 60 seconds

- ❑ When simulator freezes, place:
  - FCV-53 & 54 in RECIRC
  - Cnd/Bstr set 13 to MAN
  - Char Fltr Prehtr to ON
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
5. **CHECK If Containment Spray Should Be Stopped:**	
a. Check PK01-18 CONTAINMENT SPRAY ACTUATION - ON	a. GO TO Step 6 (Next Page).
b. Check Containment Radiation Levels o PK11-21, HIGH RADIATION - OFF o RE-2/RE-7-NORMAL o PK11-19, CONTMT RADIATION - OFF o R-30/R-31-NORMAL (PAM 2)	b. IF Containment Radiation Levels are above normal, THEN Verify spray system is still in operation AND GO TO Step 6 (Next Page).
c. Check Containment Pressure - LESS THAN 20 PSIG	c. Perform the following: 1) Verify Containment Spray system is still in operation. 2) WHEN Containment Pressure is LESS THAN 20 PSIG, THEN Perform Steps 5d through 5.h
d. Reset Containment Spray Trains A and B	
e. Stop Containment Spray Pps	
f. Close 9001A & B	
g. Verify 9003A & B - Closed	
h. Close 8994A & B	

Number:	NRCLJC-093
Title:	RESPOND TO LOSS OF RHR INVENTORY IN MODE 5
Examinee:	________________________________
Evaluator:	____________ Print ____________ Signature ______ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	OP AP SD-2, Loss of RCS Inventory, Rev. 15
Alternate Path:	Yes ___X___ No ________
Time Critical:	Yes ________ No ___X___
Time Allotment:	15 minutes
Critical Step(s):	4, 5
Job Designation:	RO/SRO
Task Number:	009/03/EA1.04
Rating:	3.7/3.5

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the procedure and told the step with which to begin.
Required Materials:	None
Initial Conditions:	Unit 1 is in MODE 5, eight days after a plant shutdown for refueling. RCS level has been at 109'. No work is currently in progress on the RCS.
Initiating Cue:	Reactor Vessel level has just started decreasing, as noted on wide range and narrow range RVRLIS on the PPC. The Shift Foreman has directed you to respond to the loss of inventory in accordance with OP AP SD-2,
Task Standard:	Required actions have been taken to stabilize reactor vessel level in accordance with OP AP SD-2.

Start Time: ___________

Step	Expected Operator Actions
1. Obtain the correct procedure.	1.1 Refers to OP AP SD-2. 1.2 Reads CAUTIONs prior to Step 1. **Step was: Sat: ______ Unsat _______***
2. Check RVRLIS level <108 feet or inventory loss is rapid.	2.1 Checks any or all of the following RVRLIS indications: o WR RVRLIS (PPC Pt. U2012). o NR RVRLIS (PPC Pt. U2014). o RVRLIS Ultrasonic (PPC Pt. L0470A). o Standpipe level ********************************** **Cue: If Containment contacted, report level at approx. 107.5'.** ********************************** 2.2 Determines RVRLIS level <108 feet or Decreasing Rapidly. **Step was: Sat: ______ Unsat _______***
3. Check if RHR pumps should be stopped.	3.1 Observes that RHR pump 1-1 is running 3.2 Observes RVRLIS level greater than 107'3". 3.3 Observes RHR flow at 2000 gpm. 3.4 Reduces flow to around 1550 – 1675 gpm using HCV-637 or 638. 3.4 Checks RHR pump not cavitating by observing RHR flow and amps. 3.5 Observes that RCS level is STILL decreasing and continues with step 2 RNO. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step		Expected Operator Actions
**	4. Isolate letdown and increase RCS makeup.	**	4.1 Closes HCV-133 or PCV-135.
			4.2 Verifies that letdown is isolated.
			Note: A 500 gpm RHR leak is used to simulate a letdown leak. The malfunction will NOT clear when letdown is isolated.
		**	4.3 Increases RCS makeup by using any of the following methods: o Open 8805A or 8805B o Open 8980 o Open FCV-128 and HCV-142 o Increases charging o Start an SI pump
			4.4 Checks all known drain paths closed.
			*************************************** **Cue: No known drain paths exist.** ***************************************
			4.5 Observes that RCS level is still decreasing.
			4.6 Sounds Containment Evacuation.
			4.7 Verifies personnel clear of SG manways.
			*************************************** **Cue: Manways and immediate area are clear.** ***************************************
			Step was: Sat: ______ Unsat _______*

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	5. Check RHR system intact.	5.1 Checks PRT level normal 5.2 Verifies RHR pump room sump alarm, PK02-16 ON. ** 5.3 Stops RHR pump. ** 5.4 Closes: o 8701 or 8702 o HCV-133, Letdown to CVCS 5.5 Checks RCPs secured. **Step was: Sat: ______ Unsat _______***
	6. Depressurize RCS to Atmospheric pressure.	6.1 Verifies PORV block valves open. 6.2 Verifies PORV open. **Step was: Sat: ______ Unsat _______***
	7. Restore RCS inventory.	7.1 Add makeup as needed by either: o Increase charging o Open 8805 A or B o Open 8980 o Open 8741 o Any ECCS pump/path 7.2 Verify RCS level stable or increasing. **Step was: Sat: ______ Unsat _______***

Stop Time: ___________

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

Initial Conditions:	Unit 1 is in MODE 5, eight days after a plant shutdown for refueling. RCS level has been at 109'. No work is currently in progress on the RCS.
Initiating Cue:	Reactor Vessel level has just started decreasing, as noted on wide range and narrow range RVRLIS on the PPC. The Shift Foreman has directed you to respond to the loss of inventory in accordance with OP AP SD-2,
Task Standard:	Required actions have been taken to stabilize reactor vessel level in accordance with OP AP SD-2.

- ❑ Initialize the simulator to IC_704 (109’, one RHR pump operating).
- ❑ ❑ Set Group Display RVRLIS on a PPC and QP RVRLIS on another PPC screen. Set BIG to U2014 on the PPC screen by the crash cart.
  - ❑ Put RHR lamicoids on 8726A and B and 8734A and B (red OPEN valve lamicoids).
- ❑ OR Perform the following:
  - ❑ Initialize the simulator to IC_537
  - ❑ Enter drill file 6501 (a modified 1093 from LJC-093)

    OR manually enter the following:

Command	Description
delm bsiscore	monitors RVRLIS level
monv bsiscore	monitors RVRLIS level
mal rhr2 act,500,120,0,d,wldsldhx.lt.0.5	RHR System Break, clears when letdown isolated
run	sim in RUN

  - ❑ Allow the simulation to run until RCS level is at 107.9’ then go to freeze.
- ❑ Inform the instructor the simulation is ready.

Loss of AC Power

08/31/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

1.1 This procedure is used in Mode 5 or 6 when it is apparent that the electrical buses needed for effective Decay Heat Removal are not energized and measures more complex than closing or reclosing the bus feeder breakers are required.

1.2 This procedure may be entered from Shutdown Emergency Procedure OP AP SD-0, or directly when the loss of AC power is recognized.

1.3 This procedure provides guidance for regaining AC power to the Vital 4kV buses and the Nonvital 4kV buses.

1.3.1 The possible Recovery power sources are:

a. Steps 2 and 3 - Affected Unit's Aux Power system

b. Steps 5 and 6 - Affected Unit's SU Power system

c. Steps 8 and 9 - Other Unit's SU Power system

d. Steps 11 thru 16 - Other Unit's Aux Power system

e. Appendix X - Cross-tie of Vital buses using an operating Diesel Generator

f. Appendix N - Energizing Non-Vital buses using an operating Diesel Generator

1.3.2 The selection of the best Recovery power source will depend on factors that are impossible to predict during an outage, therefore it is not necessary to select the Recovery power source in the order given in this procedure. The shift foreman may choose not to use a Recovery power source, the procedure reader may then assume that power source is not available and follow the instructions in the Response not Obtained column to get to the implementation instructions for the Recovery power source of choice.

2. SYMPTOMS

2.1 Loss of AC power to any required electrical bus.

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED

****

CAUTION: RHR pumps and the SFP cooling pump must be manually STARTED following power restoration to the bus.

****

NOTE: If there are three or less empty fuel assembly locations in the core, then the SRO should consider placing the hanging fuel assembly in the upender and lowering the upender.

1. CHECK Fuel Handling Equipment:

a. Manipulator Crane - NO FUEL ASSEMBLY LATCHED

Response Not Obtained: a. IF The assembly is NOT a new fuel assembly, THEN Manually crank the Bridge until over the core AND lower the assembly until approximately one foot above the lower core support plate. Turn power on the bridge - OFF

****

CAUTION: DO NOT lower the fuel assembly without power to the load cell.

****

b. Spent Fuel Pool Bridge Crane - NO FUEL ASSEMBLY SUSPENDED

Response Not Obtained: b. Open the power supply breaker to the Bridge Crane.

2. CHECK Status of 500kV System:

Response Not Obtained: GO TO step 5.

- VERIFY PCB 532(542) or 632(642) - CLOSED
- Aux Transformer 1-2 (2-2) Power Available White Lights - ON (VB5)

3. IMPLEMENT OP J-2:V To Backfeed From 500kV System

Response Not Obtained: GO TO step 5.

4. RETURN To Procedure And Step In Effect

5. CHECK Status Of Own Unit's Startup Power:

Response Not Obtained: GO TO step 8.

- OCB-212 - CLOSED
- S/U Transformer 1-1 (2-1) Power Available White Status Light - ON (VB5)

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. Make S/U Transformer 1-2 (2-2) Available AND Energize Desired 4kV Buses:	GO TO step 8.
a. Place AUTO TRANSFER TO START-UP CUTOUT Switch in the CUTOUT position for ALL 4kV AND 12kV buses (affected Unit only)	
b. Depress the AUTO BUS TRANSFER Reset Pushbuttons on ALL 4kV and 12kV buses (affected Unit only) • Blue lights - OFF	
c. Implement OP J-2:II to make S/U Transformer 1-2 (2-2) available and energize desired 4kV buses	
7. RETURN To Procedure And Step In Effect	
8. CHECK Status Of Other Unit's S/U Power: • OCB-212 - CLOSED • S/U Transformer 2-1 (1-1) Power Available White Status Light - ON (OTHER UNIT'S VB5)	• GO TO step 11.

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9. ENERGIZE 4kV Buses From Other Unit's S/U Power:

a. Place AUTO TRANSFER TO START-UP CUTOUT Switch in the CUTOUT position for ALL 4kV AND 12kV buses (affected Unit only)

b. Depress the AUTO BUS TRANSFER Reset Pushbuttons on ALL 4kV and 12kV buses (affected Unit only)

- Blue lights - OFF

c. Verify 52-VU-12 (52-VU-24) - OPEN

d. Open S/U Feeder Bkrs on the affected Unit for ALL 4kV AND 12kV buses:

UNIT 1	UNIT 2
52-HF-14	(52-HF-14)
52-HG-14	(52-HG-14)
52-HH-14	(52-HH-14)
52-HD-14	(52-HD-05)
52-HE-03	(52-HE-13)
52-VD-04	(52-VD-06)
52-VE-06	(52-VE-04)

e. CLOSE 52-VU-11

f. VERIFY 52-VU-14 (52-VU-23) - CLOSED

g. VERIFY 52-VU-15 - CLOSED

THIS STEP CONTINUED ON NEXT PAGE

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9. ENERGIZE 4kV Buses From Other Unit's S/U Power: (Continued)

****

CAUTION: Closely monitor the unaffected units' Startup transformer loading as additional loads are placed on the Startup bus. The transformer is capable of 75 MVA if forced air and oil cooling are available.

****

h. Limit the added load on Startup transformer 2-1(1-1) to 30 MVA

Recall that MVA =
$$\sqrt{(MW^2 + MVAR^2)}$$

NOTE: 1 RCP equals approx. 6.6 MVA

1 CWP equals approx. 11.4 MVA

i. CLOSE S/U Feeder Bkrs to Desired 4kV Vital AND Non-Vital buses

10. RETURN To Procedure And Step In Effect

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. CHECK Other Unit's Aux Power - AVAILABLE:	GO TO step 18.

- Aux Transformer 2-1 (1-1) Power Available White Status Lights - ON (Other Unit's VB5)

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. **ENERGIZE Both Unit's 12kV S/U Buses From Other Unit's Aux Power:**

    a. VERIFY the following Bkrs - OPEN

        1) 52-VU-12

        2) 52-VU-14

        3) This Unit's 12kV Bus E S/U Feeder Bkr

            - Unit 1- 52-VE-06
            - (Unit 2- 52-VE-04)

        4) This Unit's 12kV Bus D S/U Feeder Bkr

            - Unit 1- 52-VD-04
            - (Unit 2- 52-VD-06)

        5) 52-VU-24

        6) 52-VU-23

    b. Place AUTO TRANSFER TO STARTUP CUTOUT Switch in the CUTOUT position for ALL 4kV AND 12kV buses on the affected Unit only

    c. Depress AUTO TRANSFER reset pushbuttons for all 4kV and 12kV buses (for the affected unit only)

        - Blue lights - OFF

THIS STEP CONTINUED ON NEXT PAGE

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. ENERGIZE Both Unit's 12kV S/U Buses From Other Unit's Aux Power: (Continued)

****

CAUTION: Both Startup feeders 52-VU-15 and 52-VU-20 to the 12kV Underground system must be opened since the aux transformer's ground system is inadequate in the event of a fault on the 12kV underground loop.

****

NOTE: Permission to open 52-VU-15 and 52-VU-20 from MBSC need not be obtained.

d. Open the feeders to the 12kV Underground system:

1) 2-VU-15

2) 52-VU-20

e. CLOSE the following Bkrs:

1) Other Unit's 12kV Bus D S/U Feeder Bkr

- Unit 1 - 52-VD-04
- (Unit 2 - 52-VD-06)

RESPONSE NOT OBTAINED:

1) Other Unit's 12kV Bus E S/U Feeder Bkr

- Unit 1-52-VE-06
- (Unit 2-52-VE-04)

2) 52-VU-11

13. CHECK Status of Own Unit's 12kV Bus:

a. 12kV S/U Bus Power Available White Status Light - ON

RESPONSE NOT OBTAINED:

a. VERIFY the following Bkrs - CLOSED

- 52-VU-21
- 52-VU-22

****

CAUTION: Closely monitor other unit's Aux transformer loading as additional loads are placed on the Startup bus. The transformer is capable of 56.25 MVA.

****

b. Total load must be limited to the load capacity of the transformer (56.25 MVA - forced cooling)

Recall that MVA =

$$\sqrt{(MW^2 + MVAR^2)}$$

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. ENERGIZE Own Unit's 12/4kV S/U Transformer:	
a. Depress the AUTO BUS TRANSFER Reset Pushbuttons on ALL 4kV and 12kV buses	
• Blue lights - OFF	
b. Open S/U Feeder Bkrs for ALL 4kV buses: UNIT 1 — UNIT 2 52-HF-14 — (52-HF-14) 52-HG-14 — (52-HG-14) 52-HH-14 — (52-HH-14) 52-HD-14 — (52-HD-05) 52-HE-03 — (52-HE-13)	
c. CLOSE 52-VU-14 (52-VU-23)	
15. ENERGIZE The Vital S/U Feeder Bkrs: VERIFY 52-HG-15 - CLOSED	
16. CLOSE S/U Feeder Bkrs To Desired 4kV Vital AND Nonvital Buses • Refer to OP AP-26, section B for desired buses and loads	
17. RETURN To Procedure And Step In Effect	
18. VERIFY AT LEAST ONE 4kV Vital Bus Energized From Associated Diesel Generator	Refer to AR PK16, 17, OR 18 to restart a Diesel Generator.

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED

****

CAUTION: Monitor Diesel Generator loading while cross-tying buses. Refer to Appendix Q for load limits.

****

19. **CROSS-TIE 4kV Buses As Required:**

    a. IMPLEMENT Appendix X to cross-tie Vital Buses

    b. IMPLEMENT Appendix N to energize 480V Nonvital Buses as required

20. **VERIFY Required 4kV AND 480V buses - ENERGIZED**

    RESPONSE NOT OBTAINED:

    IF Power is NOT sufficient to ensure sufficient Decay Heat Removal,

    THEN IMPLEMENT OP AP SD-0, LOSS OF OR INADEQUATE DECAY HEAT REMOVAL, Step 7 AND RETURN To Step 2 in this procedure.

21. **RETURN To Procedure And Step In Effect**

END

3.

APPENDICES

3.1 Appendix B, Estimation of Decay Heat and Heatup Rate

3.2 Appendix N, Energizing Nonvital 480V Buses With Diesel Generator

3.3 Appendix Q, Diesel Generator Load Limits

3.4 Appendix X, Crosstie of Vital Bus

4. ATTACHMENTS

4.1 "FoldOut Page," 12/30/03

5. REFERENCES

5.1 PG&E NOS/ISAG Calculational File No. 920815-0, "Heatup Rates During an Outage", August 21, 1992.

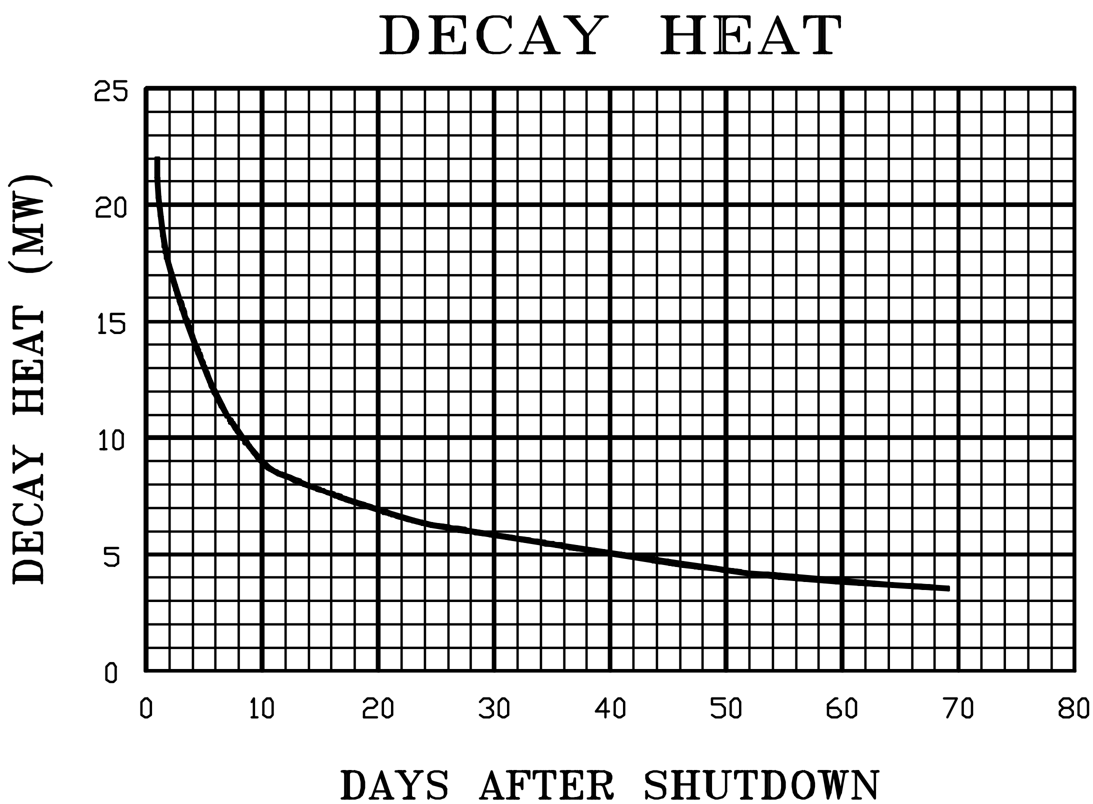
5.2 PG&E NOS/ISAG Calculational File No. 920831-0, "Revised Inventory Factors for Reduced Inventory Operations", September 1, 1992.

5.3 NESNE Calculational file No. N-147, "Inventory Factors for RCS Heatup", August 19, 1994.

APPENDIX B

ESTIMATION OF DECAY HEAT AND HEATUP RATE

1. PREDICTED HEAT LOAD



2. REDUCTION FACTOR FOR REFUELED CORES

________ MW	X	________________	=	____________________ MW
Predicted Heat Load		Fraction of Previously Used assemblies Installed in Core *		Estimated Decay Heat Load

* Use 1.0 if unknown

APPENDIX B (Continued)

3. HEAT UP RATE PREDICTION

__________	MW X	__________	=	__________	Degrees per
Estimated Decay Heat Load		Inventory Factor		Predicted Heat Up Rate	Minute

a. INVENTORY FACTOR - Degrees/MW Min

	Nozzle Dams Installed **OR** SG Tubes Voided	**NO** Nozzle Dams Installed **AND** SG Tubes Not Voided
107'	0.52	
108'	0.45	
110'	0.40	
112'	0.36	0.29
114'	0.33	0.27
116'	0.31	0.26
≥ 118'	0.31	0.054

Upper Internals Removed (Use ≥118' if Upper Internals Installed)

120'	0.06
130'	0.03
138'	0.02

4. ESTIMATED TIME TO REACH 200 DEGREES

200			____________ Delta Temp		
-______	Existing Temperature	÷	Actual or Predicted	=	__________ Minutes to
_______	Delta Temp		____________ Heat Up Rate		reach 200

APPENDIX N

ENERGIZING NONVITAL 480V BUSES WITH DIESEL GENERATOR

1. SCOPE

1.1 This Appendix provides general instructions for restoring power to plant auxiliaries which will facilitate plant recovery until off-site power is restored.

1.2 Use of this Appendix requires the approval of the Shift Manager.

2. INSTRUCTIONS

2.1 Verify Auto Transfer Cutouts for all 4kV and 12kV Buses - CUTOUT.

2.2 Reset Auto Bus Transfer for all 4kV and 12kV Buses - BLUE LIGHT OFF.

2.3 Verify All Vital 4kV Bus Auxiliary Feeder Breakers - OPEN.

- 52-HH-13, Bus H
- 52-HG-13, Bus G
- 52-HF-13, Bus F

2.4 Verify All Vital 4kV Bus Startup Feeder Breakers - OPEN.

- 52-HH-14, Bus H
- 52-HG-14, Bus G
- 52-HF-14, Bus F

2.5 Verify Vital 4kV Bus Common Startup Feeder Breaker - OPEN.

- 52-HG-15

2.6 Verify Nonvital 4kV Bus D Auxiliary Feeder Breaker - OPEN.

- 52-HD-15 (52-HD-4)

2.7 Verify Nonvital 4kV Bus E Auxiliary Feeder Breaker - OPEN.

- 52-HE-2 (52-HE-14)

2.8 Verify Nonvital 4kV Bus D Startup Feeder Breaker - OPEN.

- 52-HD-14 (52-HD-5)

2.9 Verify Nonvital 4kV Bus E Startup Feeder Breaker - OPEN.

- 52-HE-3 (52-HE-13)

2.10 Verify Startup Transformer Feeder Breaker - OPEN.

- 52-VU-14 (52-VU-23)

APPENDIX N (Continued)

2.11 Verify 4kV Bus D Feeder Breakers to 480V Buses - OPEN.

- 52-HD-6, Bus 15D (52-HD-6, Bus 23D)
- 52-HD-8, Bus 14D (52-HD-7, Bus 22D)
- 52-HD-10, Bus 11D (52-HD-9, Bus 21D)
- 52-HD-11, 230kV SWYD (52-HD-11, Bus 24D)
- 52-HD-12, Bus 12D (52-HD-13, Bus 25D)
- 52-HD-13, Bus 13D

2.12 Verify 4kV Bus E Feeder Breakers To 480V Buses - OPEN.

- 52-HE-4, Bus 13E (52-HE-4, Bus 25E)
- 52-HE-5, Bus 12E (52-HE-6, Bus 24E)
- 52-HE-7, 500kV SWYD (52-HE-8, Bus 21E)
- 52-HE-8, Bus 11E (52-HE-11, Bus 22E)
- 52-HE-10, Bus 14E (52-HE-12, Bus 23E)
- 52-HE-12, Bus 15E

2.13 Dispatch operators to ALL Nonvital 480V load centers on the affected Unit. Open all individual load supply breakers.

- 11D (21D) 11E (21E)
- 12D (22D) 12E (22E)
- 13D (23D) 13E (23E)
- 14D (24D) 14E (24E)
- 15D (25D) 15E (25E)

2.14 Diesel Generator Protection

At SFM discretion, cutin the FCOs for the diesel generator selected to supply the Nonvital Buses.

****

CAUTION: The following steps will reenergize nonvital buses. If the diesel generator appears unstable, immediately reopen nonvital bus supply breakers.

****

2.15 CLOSE the startup feeder breaker for the D/G feeding the nonvital loads.

- 52-HF-14 for D/G 1-3 (2-3)
- 52-HG-14 for D/G 1-2 (2-1)
- 52-HH-14 for D/G 1-1 (2-2)

APPENDIX N (Continued)

NOTE: There will be a load surge on the diesel generator as the startup transformer is reenergized when 52-HG-15 is closed.

2.16 CLOSE breaker 52-HG-15, startup power common supply to vital Buses F, G, and H.

2.17 CLOSE startup feeder to 4kV Bus D.

- 52-HD-14 (52-HD-05)

2.18 CLOSE startup feeder to 4kV Bus E.

- 52-HE-03 (52-HE-13).

2.19 Determine desired loads. Refer to Table 1 to determine power supply and power requirements of key plant auxiliaries. When determining load power requirements, consider the starting current surge.

2.20 Evaluate diesel generator reserve capacity (REFER TO APPENDIX Q).

2.21 Determine power requirements of desired load.

2.22 Determine power supply of desired load.

2.23 Verify load control switch position - OFF.

2.24 Verify the desired load center is energized.

****

CAUTION: Evaluate diesel generator stability as each additional load is energized and immediately shed nonvital load if the diesel generator appears overloaded or unstable.

****

2.25 Close the load supply breaker.

2.26 Refer to OP AP-26 for other non-vital loads which may be desirable if it is determined that normal non-vital power supplies will not be available for an extended length of time.

APPENDIX N (Continued)

TABLE 1

	LOAD	BUS	PWR	REQ	BREAKER
1.	Screen Wash Pp				
	1-1	14D	290	KW	52-14D-03
	1-2	14E	290	KW	52-14E-03
	2-1	24D	290	KW	52-24D-03
2.	Service Cooling Wtr Pp				
	1-1	11D	83	KW	52-11D-05
	1-2	11E	83	KW	52-11E-05
	2-1	21D	83	KW	52-21D-05
	2-2	21E	83	KW	52-21E-05
3.	Air Compressors (Control Power for 0-1 to 0-4 is selectable from 52-1F-27 OR 52-11E-27)				
	0-1	15D	62	KW	52-15D-05
	0-2	15E	62	KW	52-15E-05
	0-3	25D	62	KW	52-25D-05
	0-4	25E	62	KW	52-25E-05
	0-5*	25D	124	KW	52-25D-11
	0-6*	11E	124	KW	52-11E-15
	0-7	15E	124	KW	52-15E-37
	* Requires either SCW Booster Pp to be running				
	SCW Booster Pumps				
	0-1	11E	2	KW	52-11E-03
	0-2	25D	2	KW	52-25D-31
4.	Nonvital 280VDC				
	Battery Chargers				
	ED15 (25)	15D (25D)	23 (34)	KW	52-15D-36 (52-25D-36)
	ED16 (26)	15E (25E)	23 (34)	KW	52-15E-13 (52-25E-13)
5.	Digital FW Cont Sys				
	Rect/Chgr	12J (22J)	10	KVA	52-12J-26 (52-22J-05)
6.	Plt Process Computer				
	Inverter - IC111	12I (22I)	30	KVA	52-12I-17 (52-22I-36)
7.	SPDS UPS				
	Battery Charger EJBC	(25D)	10	KVA	(52-25D-39)
	Inverter Alternate AC	(25E/I)	10	KVA	(52-25I-28A)

APPENDIX N (Continued)

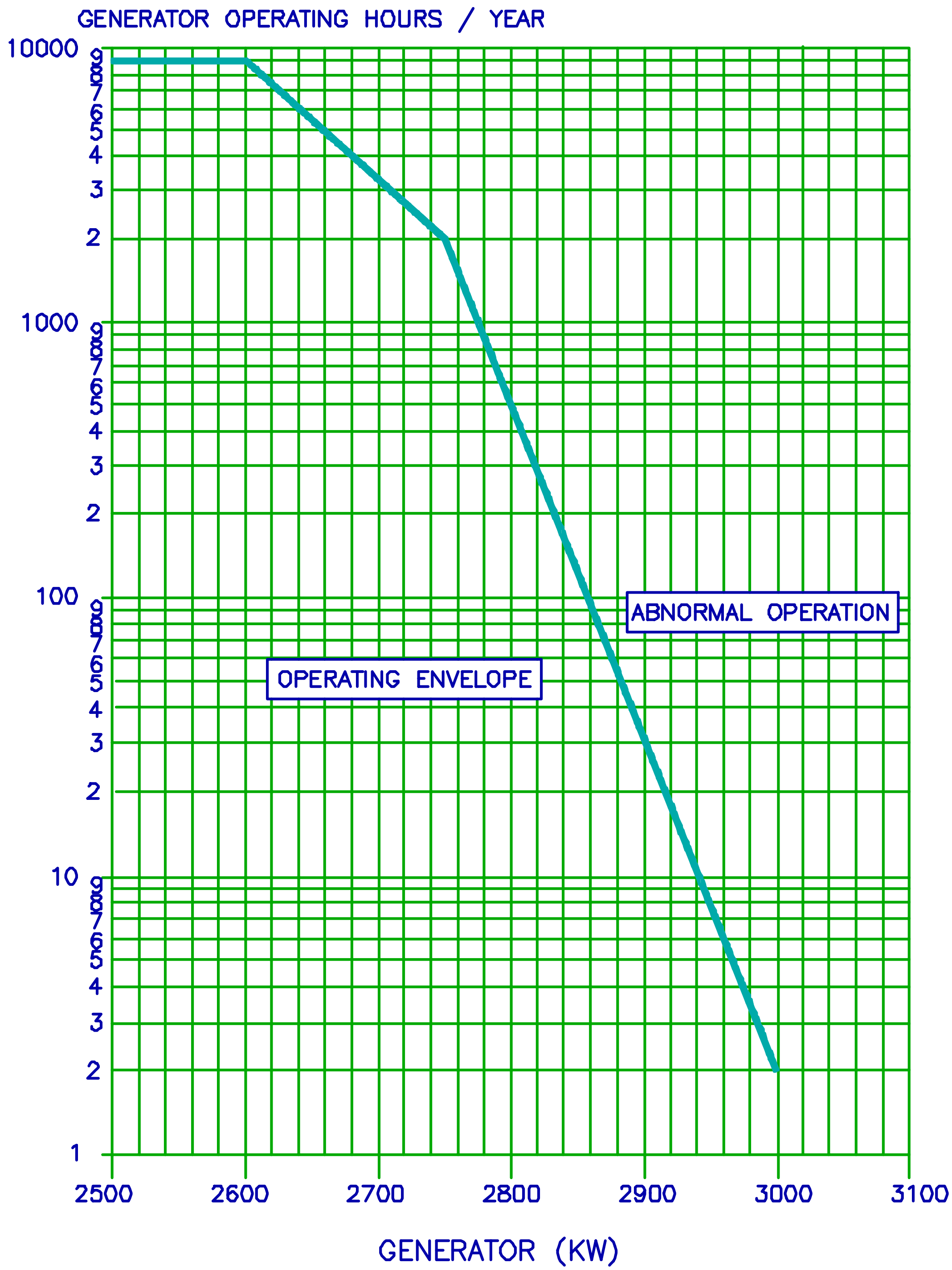
	LOAD	BUS	PWR	REQ	BREAKER

NOTE: Power requirements indicated for the 500kV and 230kV Station Services Transformers represent transformer ratings for THPW-1 and THPF-1 (powered from Unit 1 only). Normally, the transformers carry almost no load. Coordinate with the switchyard operator to summarize initial load requirements by placing switchyard loads in service sequentially.

	LOAD	BUS	PWR	REQ	BREAKER
8.	230kV Swyd Sta Serv Trans	4kV BUS D	150	KVA	52-HD-11
9.	500kV Swyd Sta Serv Trans	4kV BUS E	750	KVA	52-HE-7

APPENDIX Q

DIESEL GENERATOR LOAD LIMITS



APPENDIX X

CROSSTIE OF VITAL BUS

1. SCOPE

1.1 Implementation of the Appendix requires approval of the Site Emergency Coordinator or his designate. This Appendix should be performed to energize two vital buses from one diesel. If two vital buses are energized, enough ESF equipment should be energized to establish effective Decay Heat Removal.

2. DISCUSSION

2.1 As a general guideline, in this situation several options may be available depending on plant conditions and RCS status.

3. PREREQUISITES

3.1 Verify all the breakers AND DC control power switches are OPEN for the 4kV loads AND ALL 480V Breakers are racked out on the deenergized bus being reenergized to prevent automatic loading and overloading the diesel. Refer to list below:

F VITAL BUS			G VITAL BUS			H VITAL BUS		
ASW	Pp 1	52-HF-08	ASW	Pp 2	52-HG-06	AFW	Pp 2	52-HH-08
AFW	Pp 3	52-HF-09	CS	Pp 1	52-HG-07	CS	Pp 2	52-HH-09
CCP	1	52-HF-11	RHR	Pp 1	52-HG-08	RHR	Pp 2	52-HH-09
CCW	Pp 1	52-HF-12	CCP 2		52-HG-09	CCW	Pp 3	52-HH-12
SI	Pp 1	52-HF-15	PDP		52-HG-11	SI	Pp 2	52-HH-15
			CCW	Pp 2	52-HG-12			

4. PRECAUTIONS AND LIMITATIONS

4.1 Some equipment may have to be operated on a continuous basis and some on an "as needed" basis. Existing conditions will determine which equipment is needed.

4.2 The maximum capacity of the diesel generator should not be exceeded. Appendix Q identifies the diesel generator load limits. Table 1 provides loads for various vital 4kV and 480V vital equipment. STP M-9M also contains specific loads on all 480V vital equipment.

4.3 Start only one piece of equipment at a time, allowing at least 4 seconds between each start, since starting current may cause bus failure.

APPENDIX X (Continued)

5. **INSTRUCTIONS**

5.1 Obtain permission from the Site Emergency Coordinator or his designate.

5.2 Reset SI (if applicable) so that the affected bus will not try to auto load when the bus becomes energized.

5.3 Cutout the AUTO Transfer FCOs for 4kV Buses and 12kV Buses.

NOTE: If the D/G associated with the deenergized bus is running but will not load on the bus, it must be shutdown to permit the Auto Transfer Relay to be reset.

5.4 Depress all AUTO Transfer Reset Pushbuttons, verify the BLUE lights go OUT.

5.5 Verify OPEN all vital Bus 4kV auxiliary feeder breakers, 52-HH-13, 52-HG-13 and 52-HF-13.

5.6 Verify OPEN all vital Bus 4kV startup feeder breakers, 52-HH-14, 52-HG-14 and 52-HF-14.

5.7 Verify OPEN startup feeder breaker 52-HG-15, to the vital Buses F, G and H.

5.8 Verify OPEN the 4kV to 480V Bus feeder breaker for the deenergized Bus to be reenergized:

DEENERGIZED BUS	FEEDER BUS
F	52-HF-10
G	52-HG-10
H	52-HH-10

5.9 Determine the D/G to supply the deenergized bus. Station an operator at VB4 to monitor the diesel generator to supply the deenergized bus.

****

CAUTION: The prerequisites of this Appendix must be completed prior to performing step 5.10.

****

5.10 CLOSE the 4kV startup feeder breaker for the Bus that will be supplying power to the deenergized Bus.

OPERATING D/G	CLOSE
No. 1	52-HH-14 (52-HG-14)
No. 2	52-HG-14 (52-HH-14)
No. 3	52-HF-14 (52-HF-14)

APPENDIX X (Continued)

****
CAUTION: If the diesel generator appears unstable during the performance of step 5.11 or at any time beyond this point in the procedure, immediately open startup feeder breaker for the inoperable bus to separate the diesel from the inoperable bus.
****

5.11 CLOSE the 4kV startup feeder breaker for the deenergized bus being reenergized.

DEENERGIZED BUS	FEEDER BREAKER
F	52-HF-14
G	52-HG-14
H	52-HH-14

5.12 CLOSE the 4kV to 480V bus feeder breaker for the reenergized bus:

BUS	BREAKER
F	52-HF-10
G	52-HG-10
H	52-HH-10

****
CAUTION: CCP and CCW Pps require their 480V aux lube oil Pp and the ASW Pp requires its 480V exhaust fan breaker to be shut prior to starting the Pp.
****

5.13 Operate only the equipment needed for the existing conditions. Evaluate the load on the diesel generator prior to energizing each additional load to ensure its capacity limit is not exceeded REFER TO APPENDIX Q. Note that this curve is based on the number of hours the diesel was operated in an overloaded condition, not total run hours. Refer to Table 1 to identify the expected maximum loads for each piece of equipment. If the diesel overloads, it may only be necessary to trip the last load added rather than the entire bus.

NOTE: Battery chargers are necessary within two hours to ensure continued instrument AC power.

5.14 Energize DC buses from their battery chargers within the limits of the diesel capacity (max 64 KW each). Refer to OP J-9:II, "Operating the Battery Chargers."

11 (21)	52-1F-42 (2F-42)
121 (221)	52-1H-60 (2H-60)
12 (22)	52-1G-42 (2G-42)
131 (231)	52-1F-52 (2F-52)
132 (232)	52-1H-34 (2H-34)

APPENDIX X (Continued)

TABLE 1: EQUIPMENT LOADS

			Rating	Max Demand in KW		
	Load	Qty	(Each)	Bus F	Bus G	Bus H
1.	Centrifugal Charging Pumps	2	600 Hp	515	515	-----
2.	Safety Injection Pumps	2	400 Hp	330	-----	330
3.	Containment Spray Pumps	2	400 Hp	-----	350	350
4.	Residual Heat Removal Pumps	2	400 Hp	-----	333	333
5.	Containment Fan Cooler	5				
	a. Slow Speed		100 Hp	82 ea	82 ea	82
	b. Fast Speed		300 Hp	240 ea	240 ea	240
6.	Component Cooling Water Pumps	3	400 Hp	342	342	342
7.	Auxiliary Saltwater Pumps	2	440 Hp	361	361	-----
8.	Auxiliary Feedwater Pumps	2	600 Hp	395	-----	395
9.	Fire Pumps	2	200 Hp	147	-----	147
10.	Pressurizer Heaters *	2		483/207		483/207
11.	Remaining 480V loads are extensive (Refer to STP M-9M for a specific listing)	-----	-----	-----	-----	-----

* 483 KW for 7 Heaters; 207 for 3 Heaters

1.0 EVALUATION OF HEATUP RATE - STA

If Decay heat removal is lost for > 2 minutes:

****

CAUTION: In core T/C's will not reflect actual core exit temperatures if ECCS injection is into RCS hot legs.

****

- Evaluate rate of RCS heatup using Appendix B and change in actual In-core T/C temperatures.
- Determine time until RCS will exceed 200°, inform SS and SFM.

2.0 CONTAINMENT CLOSURE INITIATION CRITERIA

Initiate Containment closure if:

- RCS pressurization takes place due to loss of decay heat removal.
- RCS temperature is projected to increase to > 200° in < one hour.
- RCS refilling efforts may cause a spill of the RCS into containment.
- Rx Vessel level decreases to < 107' 3" with fuel in vessel.
- RHR not restored within 10 minutes with fuel in vessel.

3.0 CONTAINMENT CLOSURE ACTIONS

If containment closure is required:

- Sound the Containment Evacuation alarm
- Evacuate non-essential personnel from containment
- Periodically monitor Containment Radiation monitors RM 2, 7, 30, 31
- Verify Equipment hatch closed
- Verify at least one personnel hatch door closed
- Verify at least one emergency personnel hatch door closed
- Verify Steam generator secondary sides isolated
- Verify SFS-50 closed or transfer tube flange installed
- Verify Containment Ventilation Isolation Operable
- Run all available CFCUs in fast speed

4.0 ALTERNATIVE HEAT REMOVAL METHODS

<u>IF</u> -

- RCS begins to pressurize due to loss of RHR
- Reactor Vessel level falls below 106' 1"
- RHR cooling unavailable
- RCS temperature is projected to increase above 200°

<u>THEN</u> -

Refer to OP AP SD-0 step 7 to select and implement the alternative method(s) of decay heat removal.

Number:	NRCLJC-103
Title:	RESPOND TO A LOSS OF CCW FLOW TO ONE RCP
Examinee:	______________________________
Evaluator:	______________ Print ______________ Signature ________ Date
Results:	Sat ______ Unsat ______ Total Time: __________ minutes
Comments:	

References:	AR PK01-08, CCW HEADER C, Rev 16 OP AP-11, Malfunction of Component Cooling Water System, Rev 21
Alternate Path:	Yes __X__ No ______
Time Critical:	Yes ______ No __X__
Time Allotment:	15 minutes
Critical Steps:	4,5,6
Job Designation:	RO/SRO
Task Number:	008/08/A2.01
Rating:	3.3/3.6

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.
Required Materials:	None
Initial Conditions:	Unit 1 is operating at 100% power.
Initiating Cue:	PK01-08, CCW HEADER C, has just alarmed. Input 428, "RCP Thermal Barrier CCW Flow Lo" is causing the alarm.
Task Standard:	The alarms have been responded to and appropriate actions have been taken in accordance with applicable plant procedures.

Start Time: ___________

Step	Expected Operator Actions
1. Obtain the correct procedure.	1.1 References AR PK01-08. **Note: Operator may go directly to OP AP-11** **Step was: Sat: ______ Unsat: _______***
2. Perform actions for RCP lube oil cooler low flow.	2.1 Observes that two CCW pumps are running. 2.2 Observes that FCV-355 and FCV-356 are open. **Note: Operator may use PPC PICTURE "RCP" or Group Display PK05-02 to monitor RCP 1-2.** 2.3 Observes RCP lower bearing temps normal and proper seal injection flow on RCPs. 2.4 Refers to OP AP-11, Section E. **Step was: Sat: ______ Unsat _______***
3. Verify CCW Flow To All RCP Lube Oil Coolers: a. Verify CCW Vlvs - OPEN b. RCP L.O. Clr CCW Flow LO Alarm (PK01-08) - NOT IN c. RCP Temp PPC Alarm (PK05-01), 02, 03, 04) - NOT IN	3.1 Reads CAUTION. 3.2 Observes that the following valves are open: • FCV-355 • FCV-356 • FCV-749 • FCV-363 3.3 Observes that PK01-08 is in alarm. 3.4 Determines RCP Lube Oil coolers have CCW flow. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps

	Step	Expected Operator Actions
**	4. VERIFY RCP Seal Injection In Service.	4.1 Observes Seal Injection between 8 and 13 gpm. 4.2 Observes RCP Seal #1 Outlet Temps and Radial Brg Outlet Temps NORMAL. **Step was: Sat: ______ Unsat _______***
**	5. VERIFY CCW Flow to All RCP Thermal Barriers Normal.	5.1 Reads Caution. 5.2 Verifies FCV-357 Closed and PK01-08 IN. ** 5.3 Goes to Step 5.b of Section B. **Step was: Sat: ______ Unsat _______***
**	6. Isolate Leak.	6.1 Closes FCV-750. 6.2 Locally closes CCW valves for RCPs 1, 2, 3, 4. ********************************** **Cue: An Operator in the field will close the valves.** ********************************** 6.3 Monitors containment sump for expected level increase. 6.4 Implements OP AP-1 for excessive RCS leakage. ********************************** **Cue: The SFM will take care of sump monitoring and AP-1.** ********************************** **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps

Initial Conditions: Unit 1 is operating at 100% power.

Initiating Cue: PK01-08, CCW HEADER C, has just alarmed. Input 428, “RCP Thermal Barrier CCW Flow Lo” is causing the alarm.

Task Standard: The alarms have been responded to and appropriate actions have been taken in accordance with applicable plant procedures.

- ❑ Initialize the simulator to IC-510 (100%, MOL).
- ❑ Manually insert the following:

Command	Description
1. vlv ccw8 2,0,0,0,d,0	CCW RCP Thermal Barrier Return Isolation FCV-357

- ❑ Ensure the annunciator CRT and alarm viewer contain the alarm inputs required by the JPM.
- ❑ Ensure PPC alarms acknowledged.
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee completes reading the cue sheet.

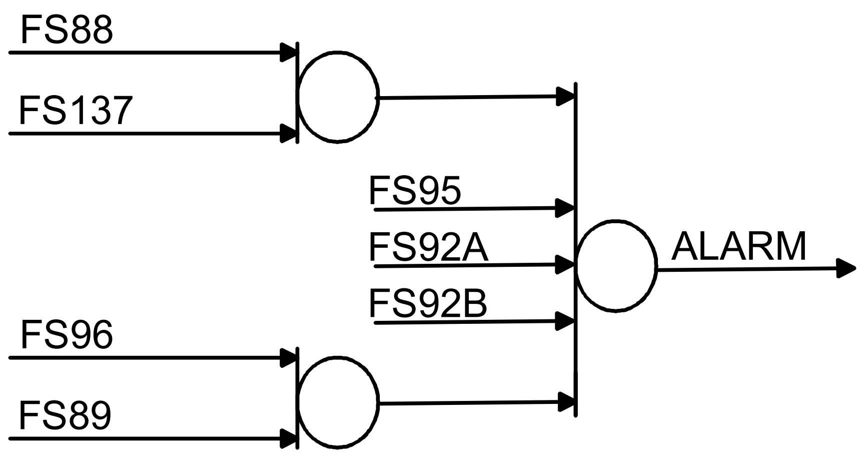
TITLE: CCW HEADER C

1

02/14/03
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. LOGIC DIAGRAM



2. ALARM INPUT DESCRIPTION

DEVICE NUMBER	ALARM INPUT	ANNUNCIATOR TYPEWRITER PRINTOUT	SETPOINT
FS 92A	264	RCP Thermal Barrier CCW Flo Hi (Hi Flow Isolation at 250 ± GPM)	GT 220 GPM
FS 92B	428	RCP Thermal Barrier CCW Flo Lo	LT 140 GPM
FS 88	265	RCP 1-1 or 1-3 L.O. Clr CCW Flo Lo	LT 106 GPM
FS 137	265	RCP 1-1 or 1-3 L.O. Clr CCW Flo Lo	LT 106 GPM
FS 96	1372	RCP 1-2 or 1-4 L.O. Clr CCW Flo Lo	LT 106 GPM
FS 89	1372	RCP 1-2 or 1-4 L.O. Clr CCW Flo Lo	LT 106 GPM
FS 95	429	CCW Hdr-C Flo Lo	LT 2500 GPM

3. PROBABLE CAUSE

3.1 Thermal Barrier High Flow

3.1.1 CCW flow manual control valve set too high.

3.1.2 Failure of RCP thermal barrier pressure integrity.

NOTE: The following alarms will actuate on a Phase B Containment Isolation due to the isolation of CCW header C.

3.2 Thermal Barrier Low Flow

3.2.1 CCW flow manual control valves out of adjustment.

3.2.2 Not sufficient CCW pumps running.

3.2.3 CCW supply valve FCV-355 or FCV-356 closed.

3.3 RCP Lube Oil Cooler Low Flow

3.3.1 CCW manual flow control valves out of adjustment.

3.3.2 Not sufficient CCW pumps running.

3.3.3 CCW supply header valves closed FCV-355 or 356.

3.4 Header C Low Flow

3.4.1 CCW pumps trip without standby start.

3.4.2 Closing of supply or return valve on a large load such as FCV-356 to containment.

3.4.3 Misalignment of FCVs at CCW Hx.

3.4.4 Low frequency on 4KV vital bus F, G, or H.

4. AUTOMATIC ACTIONS

4.1 Thermal Barrier High Flow

4.1.1 Possible isolation of all RCP thermal barrier CCW return.

4.1.2 Possible isolation of CCW surge tank vent valve.

5.

<u>OPERATOR ACTIONS</u>

5.1 Thermal Barrier High Flow, **ALARM INPUT 264**

5.1.1 Check annunciator printout

5.1.2 Check FCV-357 OC and FCV-750 IC position.

5.1.3 Check RCP lower bearing temps - verify proper RCP Seal Flow

5.1.4 Refer to OP AP-11, Section B, "CCW System Inleakage," or OP AP SD-4, "Loss of CCW."

<u>NOTE</u>: If header C has isolated due to a Containment Isolation Phase B, stop the reactor coolant pumps within 5 minutes in accordance with EOP E-0 foldout page.

5.2 Thermal Barrier Low Flow, **ALARM INPUT 428**

5.2.1 Check annunciator printout for item.

5.2.2 Check 2 CCW pumps running.

5.2.3 Check indicating lights for FCV-355 and 356 open or red.

5.2.4 Check RCP lower bearing temp - verify proper RCP Seal Injection Flow.

5.2.5 Refer to OP AP-11, Section E, "Loss of CCW Flow to RCPs," or OP AP SD-4, "Loss of CCW."

5.3 RCP Lube Oil Cooler Low Flow, **ALARM INPUT 265, 1372**

5.3.1 Check annunciator printout for item.

5.3.2 Check 2 CCW pumps running.

5.3.3 Check FCV-355 and 356 open or red light on.

5.3.4 Check RCP bearing temps on PPC.

5.3.5 Refer to OP AP-11, Section E, "Loss of CCW Flow to RCPs," or OP AP SD-4, "Loss of CCW."

5.4 Header C Low Flow, **ALARM INPUT 429**

5.4.1 Check annunciator printout.

5.4.2 Check FI-46 on VB1 for flow.

5.4.3 If zero flow is indicated and one or more pumps are running check open or open FCV-355.

a. Check vital 4KV busses for low frequency

5.4.4 Monitor RCP Brg temps.

5.4.5 Refer to OP AP-11, Section E, "Loss of CCW Flow to RCPs," or OP AP SD-4, "Loss of CCW."

5.4.6 Refer to OP F-2 as necessary.

TITLE: Malfunction of Component Cooling Water System

1 AND 2

03/25/03
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

   1.1 This procedure covers Component Cooling Water (CCW) System leakage or loss of cooling to various vital components while in MODES 1-4. If in MODE 5 or 6, OP AP SD-4, Loss of Component Cooling Water, should be used if Decay Heat Removal is threatened.

   1.2 Prompt corrective action is vital to prevent complete deterioration of the system. The primary action is to isolate the defective component or section and terminate the leakage.

SECTION A:	LOSS OF A CCW PUMP/HIGH CCW SYSTEM TEMP - pg. 2
SECTION B:	CCW SYSTEM INLEAKAGE - pg. 4
SECTION C:	CCW SYSTEM OUTLEAKAGE - pg. 12
SECTION D:	LOSS OF CCW FLOW TO THE LETDOWN HX - pg. 15
SECTION E:	LOSS OF CCW FLOW TO THE RCPs - pg. 16
SECTION F:	LOSS OF SURGE TANK - pg. 18
APPENDIX A:	CLEARING A CCW HEADER DUE TO HEADER FAILURE - pg. 21
APPENDIX B:	CCW HEAT LOAD ISOLATION - pg. 27
APPENDIX C:	BACKUP COOLING TO A CENTRIFUGAL CHARGING PUMP - pg. 31
APPENDIX D	INSTRUCTIONS FOR LOSS OF ULTIMATE HEAT SINK
APPENDIX E	ESTIMATION OF DECAY HEAT/HEAT REMOVAL CAPABILITY GRAPHS – pg. 37

2. SYMPTOMS

   See Appropriate Section

SECTION B: CCW SYSTEM INLEAKAGE

SYMPTOMS

1. Surge tank level indicators reading high
2. Possible Main Annunciator Alarms
   a. CCW SURGE TANK (PK01-07)
      CCW Surge Tk Lvl Hi
   b. CCW Header C (PK01-08)
      RCP Thermal Barrier CCW Flo Hi
   c. RCP _____ (PK05-01, 02, 03, 04)
      1) RCP _____ Radial Brg Temp Hi
      2) RCP _____ No. 1 Seal Outlet Temp Hi
   d. HIGH RADIATION (PK11-21)
      Process Monitor Hi-Rad (RE-17A and B)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
1. **CHECK RE-17A AND B NOT In Alarm** • PK11-21 NOT in alarm	VERIFY CCW Surge Tk Vent RCV-16 CLOSED.

****

CAUTION 1: If RCP No. 1 Seal Outlet temperature exceeds 235°F **OR** RCP Radial Bearing temperature exceeds 225°F, DO NOT restore RCP seal cooling.

CAUTION 2: If FCV-357 closed on high flow, do not attempt to open FCV-357 until condition causing high flow is cleared.

****

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
2. **VERIFY RCP Operability:**	
a. Verify thermal barrier CCW outlet valve FCV-357 OPEN	a. VERIFY RCP seal injection flow. -
b. Verify RCP Radial Bearing Temperature LESS THAN 225°F AND RCP No. 1 Seal Outlet temperature LESS THAN 235°	b. Shutdown the RCPs 1) TRIP the reactor 2) TRIP affected RCPs 3) GO TO EP E-O, REACTOR TRIP OR SAFETY INJECTION

SECTION B: CCW SYSTEM INLEAKAGE (Continued)

<u>ACTION/EXPECTED RESPONSE</u>	**<u>RESPONSE NOT OBTAINED</u>**
3. **<u>VERIFY CCW Surge Tank Makeup NOT The Source Of Inleakage</u>**: Check CCW Surge Tank makeup supply valves: • LCV-69 CLOSED • LCV-70 CLOSED	Locally ISOLATE makeup supply valve. -
4. **<u>REQUEST Sample Analysis</u>**: Request CARP To Sample CCW To Assist In Leak Location	

<u>NOTE</u>: Various methods may be used to identify leakage from the following components, including:

- Observance of related flows and temperatures.
- Radiation surveys of associated lines.
- Selective isolation of primary water side of components.
- Selective isolation of CCW to components.

5. **<u>DETERMINE Leak Location:</u>** Verify the following components are not the source of RCS inleakage:	
a. Letdown Heat Exchanger	a. ISOLATE heat exchanger per Appendix B Step 3.3. <u>AND</u> Refer to OP AP-18, LETDOWN LINE FAILURE. -
b. RCP Thermal barriers	1) Verify FCV-750 CLOSED 2) Locally ISOLATE Thermal Barrier CCW return (inside containment) by closing as applicable: RCP 1: CCW-234 RCP 2: CCW-242 RCP 3: CCW-251 RCP 4: CCW-262

THIS STEP CONTINUED ON NEXT PAGE

SECTION B: CCW SYSTEM INLEAKAGE (Continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
5. **DETERMINE Leak Location: (Continued)**	
b. RCP Thermal barriers (Continued)	3) Monitor containment sump for expected level increase 4) IMPLEMENT OP AP-1, EXCESSIVE REACTOR COOLANT SYSTEM LEAKAGE -
c. Excess Letdown Heat Exchanger	1) ISOLATE RCS flow to Heat Exchanger (VB2) • Close CVCS-8166 - OR - Close CVCS-8167 • Close HCV-123 2) ISOLATE CCW flow to Heat Exchanger: • Locally Close CCW-426 • Locally Close CCW-431 - OR - Close FCV-361 3) Adjust charging flow to minimum or restore normal letdown. -

THIS STEP CONTINUED ON NEXT PAGE

SECTION B: CCW SYSTEM INLEAKAGE (Continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
5. **DETERMINE Leak Location: (Continued)**	
d. RHR Heat Exchanger No. 1	1) ISOLATE RCS flow to HX: • Locally CLOSE RHR-8724A, RHR HX No. 1 inlet • CLOSE HCV-638, RHR Hx No. 1 Outlet to RC loops • Locally CLOSE RHR-8734A, RHR No. 1 Train bypass to LTDN HX inlet • CLOSE FCV-641A, RHR PP No. 1, Recirc • VERIFY CLOSED CS-9003A, RHR HX No. 1 Outlet Hdr to CNTMT Spray Hdr A • VERIFY CLOSED SI-8804A, RHR PP disch to Charging PP suction 2) ISOLATE CCW flow to RHR HX No. 1: • Locally CLOSE CCW-457 • Locally CLOSE CCW-459 - OR - Close FCV-365 **NOTE**: CCW-457/459 are sealed-open valves and require Valve Seal Change Form to break seal. -

THIS STEP CONTINUED ON NEXT PAGE

SECTION B: CCW SYSTEM INLEAKAGE (Continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
5. **DETERMINE Leak Location: (Continued)**	
e. RHR Heat Exchanger No. 2	1) ISOLATE RCS flow to HX: • Locally CLOSE RHR-8724B, RHR HX No. 2 inlet • CLOSE HCV-637, RHR HX No. 2 outlet to RC loops • Locally CLOSE RHR-8734B, RHR No. 2 Train Bypass to LTDN HX inlet • CLOSE FCV-641B, RHR PP No. 2 Recirc • VERIFY CLOSED CS-9003B, RHR HX No. 2 Outlet Hdr to CNTMT Spray Hdr B • VERIFY CLOSED SI-8804B, RHR HX No. 2 Outlet to SI Pp No. 2 suction 2) ISOLATE CCW flow to RHR HX No. 2 • Locally CLOSE CCW-150 (50) • Locally CLOSE CCW-151 (50) - OR - CLOSE FCV-364 **NOTE:** CCW-150/151 are sealed-open valves and require a Sealed Component Change Form to break their seals. -

THIS STEP CONTINUED ON NEXT PAGE

SECTION B: CCW SYSTEM INLEAKAGE (Continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
5. **DETERMINE Leak Location:** **(Continued)**	
f. RHR Pump Seal Coolers	f. Locally ISOLATE CCW flow to cooler by closing the following valves, as applicable: • Pump 1: CCW-460 AND CCW 462 • Pump 2: CCW-153 AND CCW 154 **NOTE**: The above valves are sealed-open (S.O.) valves and require Sealed Component Change Form to break their seal.
g. PZR Steam Space Sample Cooler	1) Locally CLOSE NSS-9371A reactor coolant supply to cooler. 2) Locally ISOLATE CCW flow to cooler: • CLOSE CCW-379 • CLOSE CCW-380
h. PZR Liquid Space Sample Cooler	1) Locally CLOSE NSS-9371B, RC supply to cooler 2) Locally ISOLATE CCW flow to cooler: • CLOSE CCW-377 • CLOSE CCW-378

THIS STEP CONTINUED ON NEXT PAGE

SECTION B: CCW SYSTEM INLEAKAGE (Continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
5. **DETERMINE Leak Location: (Continued)**	
i. RCS Hot Legs 1 & 4 Sample Cooler	1) ISOLATE RC supply to cooler by locally closing NSS-9371C. 2) ISOLATE CCW flow to Cooler: • Locally close CCW-375 • Locally close CCW-376
6. **VERIFY CCW Inleakage Is Isolated:**	
a. CCW surge tank level - NOT INCREASING	a. Return to Step 1, Page 4.
b. Perform an RCS Water Inventory Balance per STP R-10C	
c. Notify CARP before reopening RCV-16	

SECTION B: CCW SYSTEM INLEAKAGE (Continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
7. **NOTIFY Maintenance Services to institute repair/tube plugging of leaky components**	
8. **RETURN to Procedure and Step in Effect**	

- END -

SECTION E: LOSS OF CCW FLOW TO RCPs

SYMPTOMS

1. Thermal barrier and lube oil cooler cooling water return high temperature indication.
2. Possible Main Annunciator Alarms
   a. CCW HEADER C (PK01-08)
      1) RCP L.O. Clr CCW Flo Lo
      2) RCP Thermal Barrier CCW Flo Lo
      3) CCW Hdr C Flo Lo
   b. RCP No. _____ (PK05-01, 02, 03, 04)
      RCP _____ Temp PPC

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**

****
CAUTION: IF RCP No. 1 Seal Outlet Temperature exceeds 235°F **OR** RCP Radial Bearing Temperature exceeds 225°F, DO NOT restore RCP seal cooling.
****

1. **VERIFY CCW Flow To All RCP Lube Oil Coolers**:
   a. Verify CCW Vlvs - OPEN
      - FCV-355
      - FCV-356
      - FCV-749
      - FCV-363
   b. RCP L.O. Clr CCW Flow LO Alarm (PK01-08) - NOT IN
   c. RCP Temp PPC Alarm (PK05-01), 02, 03, 04) - NOT IN

RESPONSE NOT OBTAINED:

IF CCW Flow to RCP(s) CANNOT be restored to Lube Oil Coolers within 5 minutes,
THEN
1) TRIP reactor.
2) TRIP affected RCP.
3) GO TO EOP E-O, REACTOR TRIP OR SAFETY INJECTION.

SECTION E: LOSS OF CCW FLOW TO RCPs (Continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
2. **VERIFY RCP Seal Injection - IN SERVICE**: • RCP Seal Injection Flow between 8 and 13 GPM • RCP Seal No. 1 Outlet Temp - NORMAL • RCP Radial Brg Outlet Temp - NORMAL	IF Both thermal barrier and seal injection flow are lost AND CANNOT be immediately restored, THEN 1) Manually TRIP reactor. 2) TRIP affected RCP(s). 3) GO TO EOP E-O, REACTOR TRIP OR SAFETY INJECTION while implementing the next two steps, as applicable. 4) Isolate seal injection to the affected RCP(s) before restarting a charging pump: Locally close CVCS-8369A,B,C, OR D as appropriate, RCP SEAL INJ WTR (100' Pen Area, GE). 5) If all RCPs are affected, close FCV-357, RCP Thermal Barrier CCW Return Isolation.
3. **VERIFY CCW Flow To All RCP Thermal Barriers - NORMAL:**	

****
CAUTION: If FCV-357 closed on high flow, do not attempt to open FCV-357 until condition causing high flow is cleared.
****

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
a. Verify FCV-357 did not close on high flow	a. GO TO Section B Step 5.b, page 5.
b. Verify Thermal Barrier Return Vlvs FCV-750 and FCV-357 - OPEN	
c. Verify RCP Thermal Barrier CCW Flow Lo Alarm (PK01-08) - NOT IN	
4. **INCREASE Surveillance on RCPs:** Monitor RCP temperatures closely until CCW system can be returned to normal status	

- END -

Number: NRCLJC-116

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

Examinee: ______________________________

Evaluator: ______________ ______________ ________
Print Signature Date

Results: Sat ______ Unsat ______ Total Time: _____ minutes

Comments:

References: EOP FR-H.1, Response to Loss of Secondary Heat Sink, Rev.19

Alternate Path: Yes ________ No ___X___

Time Critical: Yes ________ No ___X___

Time Allotment: 15 minutes

Critical Steps: 2, 4, 5, 6, 7

Job Designation: RO/SRO

Task Number: W/E05/04P/EA1.1

Rating: 4.1/4.0

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A MANAGER – OPERATIONS	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.

Required Materials: None

Initial Conditions: Unit 1 has experienced a loss of secondary heat sink. EOP FR-H.1 has been implemented and all efforts to establish AFW, MFW, and condensate flow have failed.

Initiating Cue: All steam generator wide range levels are less than 23% and the Shift Foreman directs you to establish and verify RCS bleed and feed using Steps 12 through 18 of EOP FR-H.1.

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

Start Time: ___________

	Step	Expected Operator Actions
	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 or VB-1 to ACTUATE. ** **Step was: Sat: ______ Unsat _______***
	3. Verify RCS feed paths.	3.1 Observes that at least one CCP or one SI pump is running. 3.2 Observes that ECCS valves are in their proper emergency alignment on the VB1 and VB2 mimic. **Step was: Sat: ______ Unsat _______***
**	4. Reset Safety Injection.	**Note: 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 _______***
**	5. Reset Containment Isolation Phase A and Phase B.	5.1 Depresses the CONTMT ISOL PHASE A RESET pushbuttons. ** 5.2 Verifies Phase A red lights are OFF or PK02-01 is OFF. 5.3 Observes that Phase B is NOT actuated or depresses the Phase B RESET pushbuttons. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	6. Establish instrument air to containment.	6.1 Opens FCV-584. ** 6.2 Verifies that FCV-584 has opened. 6.3 Observes that instrument air header pressure is > 90 psig on PI-380. **Step was: Sat: ______ Unsat _______***
**	7. Establish RCS bleed path.	7.1 Observes that power is available to the PORV block valves: o 8000A o 8000B o 8000C 7.2 Observes that PORV block valves are already open. o 8000A o 8000B o 8000C 7.3 Opens all PORVs by taking switches to the OPEN position. ** o PCV-474 o PCV-455C o PCV-456 7.4 Verifies all PORVs have opened. **Step was: Sat: ______ Unsat _______***
	8. Verify adequate RCS bleed path.	8.1 Observes that at least two PZR PORVs <u>and</u> associated block valves have opened. **Step was: Sat: ______ Unsat _______***

Stop Time: ___________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

Initial Conditions:	Unit 1 has experienced a loss of secondary heat sink. EOP FR-H.1 has been implemented and all efforts to establish AFW, MFW, and condensate flow have failed.
Initiating Cue:	All steam generator wide range levels are less than 23% and the Shift Foreman directs you to establish and verify RCS bleed and feed using Steps 12 through 18 of EOP FR-H.1.
Task Standard:	RCS bleed and feed has been established and verified as required by EOP FR-H.1.

- ❑ Initialize to JPM IC 716.
- ❑ This SNAP allows entry into EOP FR-H.1 at Step 12. Steam generator wide range levels are 22% and steam generator pressures are at 1005 psig with the 10% steam dumps in AUTO at 8.38 turns.
- ❑ 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.

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**

****

CAUTION: Steps 12 through 18 must be performed without delay in order to establish RCS heat removal by RCS bleed and feed.

****

12. **ACTUATE SI**

13. **VERIFY RCS Feed Paths:**	Manually start ECCS Pps and align ECCS Injection Valves to establish RCS feed path.
a. Check ECCS Pp status: o CCP - AT LEAST ONE RUNNING OR o SI Pps - AT LEAST ONE RUNNING	IF An RCS feed path CANNOT be established, THEN Activate the monitor lights for monitor light Box C by turning the Monitor Test Light Switch to ON.
b. Verify ECCS valve alignment - PROPER EMERGENCY ALIGNMENT	Use White Status lights to verify ECCS valve alignment. IF An RCS feed path CANNOT be established, THEN Continue attempts to establish RCS feed flow AND RETURN TO Step 4 (Page 3).

- -

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. **RESET SI**	
15. **RESET Containment Isolation Phase A And Phase B**	
16. **ESTABLISH Instrument Air To Containment:**	
a. Open FCV-584	
b. Check Instrument Air Header Pressure GREATER THAN 90 PSIG, PI-380 (VB4 UNIT 1)	b. IMPLEMENT OP AP-9, LOSS OF INSTRUMENT AIR.
	- -
17. **ESTABLISH RCS Bleed Path:**	
a. Verify PZR PORV Block Vlvs - OPEN	a. Restore power to block valves AND OPEN:
o 8000A for PCV-474	8000A: 52-1F-40 AND 52-1F-40R
o 8000B for PCV-455C	8000B: 52-1G-46 AND 52-1G-46R
o 8000C for PCV-456	8000C: 52-1H-33 AND 52-1H-33R
b. Open all PZR PORVs	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

18. **VERIFY Adequate RCS Bleed Path:**

****

CAUTION: The second off head vent valves may open spuriously if the first off valve is opened first.

****

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a. Verify PZR PORVs and associated Block Vlvs - AT LEAST TWO OPEN	a. Perform the following: 1) Open Reactor Vessel Head Vents: (a) 8078A & D (PAM 1) (b) 8078B & C (PAM 1) 2) Align any available water source to the S/Gs. o Main Feed or Condensate. Refer to Step 7 (Page 5) or Step 9 (Page 9). OR o Any low pressure water source. Refer to EOP FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, Appendix F, Step 6, for guidance IF No water source can be aligned, THEN GO TO Step 19 (Next Page) 3) IF A low pressure water source is aligned, THEN Depressurize at least one intact S/G to atmospheric pressure using 10% Steam Dump to inject water source. S/G with highest indicated level is preferred. -

Number:	NRCLJC-123
Title:	ALIGN SAFETY INJECTION PUMP 11 FOR HOT LEG RECIRCULATION
Examinee:	______________________________
Evaluator:	____________ Print ____________ Signature ________ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	EOP E-1.4, Transfer to Hot Leg Recirculation, Rev. 15
Alternate Path:	Yes ___X___ No ________
Time Critical:	Yes ________ No ___X___
Time Allotment:	15 minutes
Critical Steps:	2,3,4
Job Designation:	RO/SRO
Task Number:	006/02/A4.05
Rating:	3.9/3.8

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A MANAGER – OPERATIONS	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.

Required Materials: None

Initial Conditions: A Unit 1 Reactor Trip and Safety Injection has occurred due to a LOCA. Cold leg recirculation was initiated 10.5 hours ago. Preparation for hot leg recirculation per EOP E-1.4, Step 1, is complete.

Initiating Cue: The Shift Foreman directs you to align Safety Injection pump 1-1 for hot leg recirculation per EOP E-1.4, Step 2.

Task Standard: Safety Injection is aligned for hot leg recirculation in accordance with EOP E-1.4.

Start Time: ___________

	Step	Expected Operator Actions
	1. Obtain the correct procedure.	1.1 References EOP E-1.4 **Step was: Sat: ______ Unsat _______***
**	2. Align SI Pump 1-1 for HL Recirc.	2.1 Observes that RHR pump 11 is NOT running. 2.2 Closes 8804A. 2.3 Verifies SIP 1-1 is stopped. 2.4 Closes 8821A. 2.5 Opens 8802A. 2.6 Start SIP 1-1 but trips after start. **Step was: Sat: ______ Unsat _______***
**	3. Align SI Pump 1-2 for HL Recirc.	3.1 Checks RHRP 1-2 running. 3.2 Verify 8804B Open. 3.3 CUTIN 8809B Series Contractor. 3.4 Close 8809B. 3.5 Verify 9003B Closed. 3.6 Verify SIP 1-2 stopped. 3.7 Close 8821B. 3.8 Close 8835. 3.9 Open 8802B. **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	4. Start SI Pump 1-2.	4.1 Start SIP 1-2. 4.2 Verify RHR 2 < 57 amps. 4.3 Verify SIP 2 discharge flow on FI-922. **Step was: Sat: ______ Unsat _____***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

Initial Conditions: A Unit 1 Reactor Trip and Safety Injection has occurred due to a LOCA. Cold leg recirculation was initiated 10.5 hours ago. Preparation for hot leg recirculation per EOP E-1.4, Step 1, is complete.

Initiating Cue: The Shift Foreman directs you to align Safety Injection pump 1-1 for hot leg recirculation per EOP E-1.4, Step 2.

Task Standard: Safety Injection is aligned for hot leg recirculation in accordance with EOP E-1.4.

- ❑ Initialize to JPM IC 780.
- ❑ Load Drill File 6302, or manually input the following:
  - ❑ pmp sis1 6,8,0,0,c,xv1o240r, (SIP 1-1 trip on overcurrent when pump red light is on)
- ❑ This SNAP allows entry into EOP E-1.4 at Step 2.
- ❑ Hang control board CAUTION tags on 8105 and 8106.
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

TITLE: TRANSFER TO HOT LEG RECIRCULATION **1** #

12/01/98
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1.0 SCOPE

1.1 This procedure provides the necessary instructions for transferring the safety injection system to hot leg recirculation.

1.2 The major actions in EOP E-1.4 are:

- o Align the RHR flow path for hot leg recirculation,
- o Align the SI Pp flow path for hot leg recirculation,
- o Separate the CCW trains if directed by the TSC.

2.0 VERIFY ENTRY CONDITION FOR EOP E-1.4

2.1 EOP E-1, Step 18

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**

NOTE: It is important during this phase that two separate and redundant trains of recirculation outside containment are established unless an inoperable 4 KV vital bus prevents total separation.

1. **PREPARE For Hot Leg Recirculation 10 hours After Event Initiation:**

   a. Check the following control switches in their required position:

   RNO: a. Place the Valve Control Switches in the required position.

   -

   o 8802A - CLOSED, SI to Hot Legs 1 & 2

   o 8835 - OPEN, SI Pp to Cold Leg

   o 8703 - CLOSED, RHR to Hot Legs 1 & 2

   o 8802B - CLOSED, SI to Hot Legs 3 & 4

   b. Close the following 480V breakers:

   o 52-1F-48, 8802A

   o 52-1G-24, 8835

   o 52-1G-56, 8703

   o 52-1G-56R, 8703

   o 52-1H-26, 8802B

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. **At 10.5 hours ALIGN SI Pp 1 For Hot Leg Recirculation:**	
a. Verify both RHR Pps are running	a. Manually Start any RHR Pp <u>NOT</u> running. <u>IF</u> RHR Pp 1 is <u>NOT</u> Operable, <u>THEN</u> Close 8804A <u>AND</u> GO TO Step 2f. <u>IF</u> RHR Pp 2 is <u>NOT</u> Operable, <u>THEN</u> Continue with Step 2b. -
b. Verify 8804A, RHR Hx No. 1 to Chg and SI Pps Suction - OPEN	
c. Cutin 8809A series contactor toggle switch	
d. Close 8809A, RHR to Cold Legs 1 and 2	
e. Verify Closed 9003A, RHR Pp 1 to Spray Hdr A - CLOSED	
f. Verify SI Pp 1 - STOPPED	
g. Close 8821A, SI Pp No. 1 Disch Crosstie Vlv	
h. Open 8802A, SI to Hot Legs 1 and 2	
i. Perform the following 1) Start SI Pp 1 2) Verify operating RHR Pp motor current LESS THAN 57 AMPS	i. <u>IF</u> SI Pp 1 is <u>NOT</u> Operable, <u>THEN</u> GO TO Step 2k (Next Page). -

THIS STEP CONTINUED ON NEXT PAGE

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. **At 10.5 hours ALIGN SI Pp 1 For Hot Leg Recirculation (Continued):**	
j. Check for SI Pp 1 Disch Flow on FI-918	j. RETURN TO Step 1 (Page 2), AND reverify system lineup downstream of RHR Pp 1.
	- -
k. Verify Both RHR Pps - RUNNING	k. GO TO Step 3 (Next Page).
	- -
l. Close 8923A, SI Pp 1 RWST Suction	

<u>ACTION/EXPECTED RESPONSE</u>	<u>RESPONSE NOT OBTAINED</u>
3. **<u>ALIGN SI Pp 2 for Hot Leg Recirculation</u>:**	
a. Check RHR Pp 2 - RUNNING	a. <u>IF</u> RHR Pp No. 2 is <u>NOT</u> running, <u>THEN</u> Close 8804B RHR to SI Pp 2 <u>AND</u> GO TO Step 3f.
b. Verify 8804B, RHR to SI Pp No. 2 Suction Vlv - OPEN	
c. Cutin series contactor toggle switch for 8809B	
d. Close 8809B, RHR to Cold Legs 3 and 4	
e. Verify 9003B, RHR Pp 2 to Spray Hdr B - CLOSED	
f. Verify SI Pp 2 - STOPPED	
g. Close 8821B, SI Pp No. 2 Disch Crosstie Vlv	
h. Close 8835, SI to Cold Legs Vlv	
i. Open 8802B, SI to Hot Legs 3 and 4	
j. Perform the following: 1) Start SI Pp 2 2) Verify operating RHR Pp motor current LESS THAN 57 AMPS.	j. <u>IF</u> SI Pp 2 is <u>NOT</u> operable, <u>THEN</u> GO TO Step 3l.
k. Verify SI Pp 2 Disch Flow on FI-922	k. RETURN TO Step 1 (Page 2), <u>AND</u> Reverify system lineup downstream of RHR Pp 2.
l. Verify Both RHR Pps - RUNNING	l. GO TO Step 4 (Next Page).
m. Close 8923B, SI Pp 2 RWST Suction	

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
4. **CHECK RHR Pp 2 Is Running**	IF RHR Pp 2 is NOT operable, THEN GO TO Step 6 (Next Page).
5. **ALIGN RHR Pp 2 For Hot Leg Recirculation:**	
a. Open 8716B, RHR Pp 2 Disch Crosstie Vlv	a. Perform the following: 1) Open 8809B 2) Close 8716B, RHR Pp 2 Disch Crosstie Vlv AND GO TO Step 6 (Next Page). Maintain RHR Pp current between 50 AMPS and 57 AMPS.
b. Open 8703, RHR to Hot Legs 1 and 2	b. Perform the following: 1) Open 8809A AND B 2) Close 8716B, RHR Pp 2 Disch Crosstie Vlv AND GO TO Step 7 (Next Page). Maintain RHR Pp current between 50 AMPS and 57 AMPS.
c. Adjust HCV-637, RHR Hx 2 Outlet Flow Control Vlv to maintain suction to SI Pps AND RHR Pp 2 motor current between 50 AMPS and 57 AMPS	
d. GO TO Step 7 (Next Page)	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **ALIGN RHR Pp 1 For Hot Leg Recirculation:**	Perform the following:
a. Open 8716A, RHR Pp 1 Disch Crosstie Vlv	1) Open 8809A
b. Open 8703, RHR to Hot Legs 1 and 2	2) Close 8716A, RHR Pp 1 Disch Crosstie Vlv AND GO TO Step 7. Maintain RHR Pp current between 50 AMPS and 57 AMPS.
c. Adjust HCV-638 to maintain suction to SI Pps AND RHR Pp 1 motor current between 50 AMPS and 57 AMPS	- -

NOTE: The Technical Support Center shall determine train separation requirements within 24 hours of event initiation.

7. **CONTACT Plant Engineering In Technical Support Center To Evaluate CCW System Train Separation**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Technical Support Center Directs CCW Train Separation:**	GO TO Step 9 (Next Page)
a. Verify at least two CCW Pps - RUNNING	a. GO TO Step 9 (Next Page).
b. Open FCV-430 or 431, Idle CCW Hx Outlet Stop Vlv	
c. Check CCW Pp 1 - RUNNING	c. CCW Pp 2 AND CCW Pp 3 are running 1) Open FCV-355, CCW Header C Isol Vlv. 2) Locally Close CCW-19, CCW Pp 2 Discharge Vlv to CCW Header A. 3) Locally Close CCW-17, CCW Pp 3 Discharge Vlv to CCW Header B. 4) Locally Close CCW-23 CCW Header A to C Isol Vlv. 5) Locally Close CCW-5, Suction Header Crosstie Vlv between CCW Headers A and C. 6) GO TO Step 9 (Next Page).
d. Open FCV-355, CCW Header C Isol Vlv	
e. Locally close CCW-18, CCW Pp 1 Discharge Vlv to CCW Header A	
f. Locally Close CCW-16, CCW Pp 2 Discharge Vlv to CCW Header B	
g. Locally Close CCW-17, CCW Pp 3 Discharge Vlv to CCW Header B	
h. Locally Close CCW-24, CCW Header B to C Isol Vlv	
i. Locally Close CCW-4, Suction Header Crosstie Vlv between CCW Headers B and C	

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
9. **EVALUATE Long Term Plant Status:**	
a. Maintain Cold Shutdown conditions: o RCS Temperature LESS THAN 200°F o Keff LESS THAN .99	
b. Contact the Chemistry Dept to obtain the following samples: 1) Reactor Coolant System to assess o RCS activity o Fuel damage o Hydrogen concentration 2) Recirculation Sump to determine o Boron Concentration o PH 3) Sample Containment atmosphere:	
(a) Hydrogen concentration LESS THAN 3.5%	(a) Consult Plant Engineering Staff (TSC) for additional recovery action with potential explosive HYDROGEN/AIR mixture in containment AND GO TO Step 9c.
(b) Hydrogen concentration LESS THAN 0.5%	(b) IMPLEMENT OP H-9, INSIDE CONTAINMENT H_2 RECOMBINATION SYSTEM, to reduce Hydrogen Concentration.
c. Consult Plant Engineering Staff in Technical Support Center for additional guidance on long term action	

- END -

3.0 <u>APPENDICES</u>

3.1 Appendix A, Blackout Emergency Loading of Vital Buses

4.0 <u>ATTACHMENTS</u>

4.1 "Foldout Page for EOP E-1.4," 2/98

5.0 <u>SPONSOR</u>

Steve Derks

Number: NRCLJC-301

Title: Dilution without Makeup Control Operable

Examinee: ______________________________

Evaluator: ____________ ____________ ________

Print Signature Date

Results: Sat ______ Unsat ______ Total Time: _____ minutes

Comments:

References: OP B-1A:VII, CVCS – Makeup Control System Operation, Rev. 33

Alternate Path: Yes ____X____ No __________

Time Critical: Yes __________ No ____X____

Time Allotment: 20 minutes

Critical Steps: 4

Job Designation: RO

K/A Reference: 004/01/A2.25

RO/SRO Rating: 3.8

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
APPROVED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. 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: (Required materials here)

Initial Conditions: Unit 1 was at 100% power when a runback occurred to 75%. The condition causing the runback has cleared, approvals have been obtained, and the crew is preparing to ramp back to 100%.

Initiating Cue: The shift foreman has directed you to dilute 200 gallons to compensate for Xenon and in preparation for the ramp up in power.

Task Standard: A dilution is completed per procedure.

Start Time: __________

Step		Expected Operator Actions
1. Obtains procedure.		1.1 Obtains a copy of OP B-1A:VII.
		1.2 Determines Section 6.2 is appropriate.
		Step was: Sat: ______ Unsat _______*
2. Performs Dilution With Makeup System In Automatic per Section 6.2		2.1 Places 1/MU to STOP.
		2.2 Places 43/MU in DILUTE.
		2.3 Verifies 200 gal. set in primary water integrator using BATCH function.
		2.4 Enables integrator.
		2.5 Selects SUM on YIC-111.
		2.6 Takes 1/MU to START
	**	2.7 Determines 1/MU will NOT START
		Step was: Sat: ______ Unsat _______*
		NOTE: May enter OP AP-19 and complete steps there. When notifiying TM to troubleshoot, then perform CUE below.
3. Notify SFM that Makeup is inoperable.		3.1 Notifies SFM makeup will not start and is inoperable.
		**********************************
		Cue: SFM directs you to use section 6.9 of the procedure to dilute.
		**********************************
		Step was: Sat: ______ Unsat _______*

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

Step	Expected Operator Actions
** 4. Peform Dilution per Section 6.9	4.1 Select and Verify CLOSED: • FCV-111A/B • FCV-110A/B 4.2 Reads CAUTION 4.3 Verify intergrators still set for dilution. 4.4 Places HC-111 in MANUAL and adjusts as necessary. 4.5 OPEN FCV-111A. 4.5 OPEN FCV-111B and confirm flow. 4.6 CLOSE FCV-111B when integrator count complete. (200 gal ± 20) 4.7 CLOSE FCV-111A **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes a Critical Step.

Initial Conditions: Unit 1 was at 100% power when a runback occurred to 75%. The condition causing the runback has cleared, approvals have been obtained, and the crew is preparing to ramp back to 100%.

Initiating Cue: The shift foreman has directed you to dilute 200 gallons to compensate for Xenon and in preparation for the ramp up in power.

Task Standard: A dilution is completed per procedure.

- ❑ Initialize the simulator to IC-511 (75%, MOL).
- ❑ 1. Load drill file 6301 into the the following path:
    - o T:\simtrn\cmd_file

  2. Enter the following on the Expert Screen:
    - o tc xc2i031b,file drl_6301.txt

  OR

  Enter drill file 6301 when 43/MU taken to Dilute, or manually insert the following when 43/MU taken to Dilute:

Command	Description
ovr xc2i031a act,0,0,0,d,0 #cc2010a ovr xc2i031e act,0,0,0,d,0 #cc2010b ovr xc2i031c act,0,0,0,d,0 #cc2010c ovr xc2i031c act,0,0,0,d,0 #cc2010c ovr xc2i031b act,0,0,0,d,0 #cc2010d ovr xc2i031d act,0,0,0,d,0 #cc2010e ovr xc2i031f act,1,0,0,d,0 #cc2010f	Fails 43/MU to OFF

- ❑ Perform the following:

  1. None
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.
- ❑ **ON COMPLETION OF JPM:** Reset Integrators to 10 gal boration and 20 gal dilution

TITLE: CVCS - Makeup Control System Operation

1

12/03/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

1.1 This procedure provides instructions for the various modes of operating the Makeup Control System. It also includes instructions for Deborator 1-2 operation at End-of-Life.

1.2 This procedure has been re-written, therefore no revision bars have been included.

2. DISCUSSION

2.1 Sections 6.2 and 6.3 contain the instructions for dilution and boration with the makeup system aligned for automatic operation, respectively. Checklist style forms are also provided in Attachments 9.1 and 9.2 which contain the same essential actions as these sections and can be used as stand alone instructions.

2.2 Attachment 9.3 is a summary of the functions of the boric acid and primary water integrators replaced during 1R12.

2.3 The specific instructions included in this procedure are as follows:

2.3.1 Section 6.1 - Place in Automatic

2.3.2 Section 6.2 – Dilution With Makeup System in Automatic

2.3.3 Section 6.3 – Boration With Makeup System in Automatic

2.3.4 Section 6.4 - Continuous Dilution at Adjustable Flowrates

2.3.5 Section 6.5 - Continuous Boration at Adjustable Flowrates

2.3.6 Section 6.6 - Dilute/Alternate Dilute

2.3.7 Section 6.7 - Borate

2.3.8 Section 6.8 - Manual Operation

2.3.9 Section 6.9 - Manual Operation With Makeup Control System Inoperable

2.3.10 Section 6.10 - Makeup to the RWST

2.3.11 Section 6.11 - Deborator Operation

2.3.12 Section 6.12 - Flush to an LHUT

2.3.13 Section 6.13 - Emergency Boration using CVCS-1-8104.

2.3.14 Section 6.14 - Manual Operation While on Excess Letdown

3.

RESPONSIBILITIES

3.1 SFM is responsible for operation of equipment as described in this procedure.

3.2 Chemistry is responsible for sampling, as required.

4. PREREQUISITES

4.1 Applicable portions of OP B-1A:IX , "CVCS - Alignment Verification For Plant Startup" have been completed.

4.2 The 4% Boric Acid System is in normal operation.

4.3 Primary Water System is in normal operation.

4.4 A charging pump (either reciprocating or centrifugal) is in service.

4.5 If performing section 6.10, a sealed component change form has been prepared for CVCS-1-8428.

5. PRECAUTIONS AND LIMITATIONS

5.1 When boric acid is supplied to the charging system, the flow shall be routed through FCV-110B directly to the charging pump suction. This is necessary since the flowpath to the VCT (FCV-111B) is only partially heat traced. Routing boric acid through this flowpath can result in crystallization of the boric acid and plugging of the volume control tank spray nozzle. If on Excess Letdown, boric acid in concentrations ≤ RCS boron may be directed through FCV-111B per section 6.14 of this procedure.

5.2 When volume control tank pressure is increased above the normal range due to level increases, volume control tank pressure and reactor coolant pump No. 1 seal leakoff flows should be monitored. The VCT should be vented to the vent header continuously during significant level increases by opening CVCS-1-8101, "VCT to Vent Hdr Isol Vlv."

5.3 Prior to operations requiring large amounts of makeup, the Gaseous Radwaste System should be verified in service with a Waste Gas Compressor operating.

5.4 Equalization of boron concentration between the RCS and the Pressurizer shall be initiated for major boration/dilution evolutions (i.e. greater than 50 PPM change). The difference in boron concentration between the RCS and Pressurizer should not exceed 50 PPM.

5.5 Towards EOL, when the automatic makeup mode is selected, consideration should be given for maintaining the control switch for FCV-110A in the closed position.

5.6 Review the following Technical Specifications/ECG items:

5.6.1 ECG 8.8 Borated Water Sources - Shutdown

5.6.2 ECG 8.9 Borated Water Sources - Operating

5.6.3 T.S. 3.5.4 Refueling Water Storage Tank

5.7 The chemistry technician should be notified whenever RCS makeup addition > 2000 gal/day is anticipated.

5.8 Following major (greater than 50 PPM change) dilution/boration evolutions, the actual RCS boron concentration should be determined by sampling and compared to the expected value prior to any additional boration or dilution evolutions.

5.9 When changing the setting of the batch integrators, the proper setting should be verified prior to initiating boration or dilution.

5.10 When operating with Hagan controllers (HC-110 and HC-111) in manual, CVCS make up deviation alarm and subsequent termination of the selected operation may occur if the potentiometer on the selected Hagan controller is not adjusted to the actual flow achieved, as set by the manual push buttons (30 second time delay). The tolerance is ± 0.8 gpm for boric acid flow and ± 5.0 gpm for primary flow.

5.11 The boric acid integrator will stop counting if the flowrate falls below 0.4 gpm and the primary water integrator will stop counting if the flowrate falls below 2.0 gpm. This prevents spurious counts if the flow transmitter output does not fall to exactly zero when the system is shutdown.

5.12 One or two extra gallons of boric acid may be added at the end of borations due to the time it takes for FCV-110A to stroke closed.

5.13 Two or three extra gallons of water may be added at the end of dilutions due to the time it takes for FCV-110B to stroke closed.

5.14 Sections of this procedure will prevent automatic makeup to the VCT during the evolution. VCT level should be monitored closely to ensure expected response is obtained.

5.15 Some sections of this procedure require manual operation of controllers or control switches. Failure to restore the system to normal following these evolutions may result in unplanned reactivity additions.

5.16 Consider potential changes in reactivity that could occur due to actions taken in this procedure, and perform a reactivity brief if required by the Reactivity Management Program.

6.

INSTRUCTIONS

6.1 PLACE MAKEUP CONTROL SYSTEM IN AUTOMATIC

6.1.1 Verify the makeup mode selector switch (43/MU) in the "OFF" position.

6.1.2 Verify the following control switches in the "AUTO" position:

- FCV-110A
- FCV-110B
- FCV-111A
- FCV-111B

6.1.3 Check open FCV-110A.

6.1.4 Check closed the following valves:

- FCV-110B
- FCV-111A
- FCV-111B

NOTE: With HC-111 in "AUTO" and 43/MU in "AUTO", a reference setting between 70 and 120 gpm is preset into the controller. The reference setting is variable and is posted on a lamicoid on HC-111. The 10 turn pot is inoperable in this mode.

6.1.5 Verify primary water blend controller (HC-111) in "AUTO".

6.1.6 Verify boric acid blend controller (HC-110) in "AUTO".

6.1.7 Determine the required boric acid flowrate (0-35 gpm) from the boration spreadsheet program to give a blend equal to the existing reactor coolant system boron concentration. Ensure that the current reference flowrate for primary water is used in the program.

NOTE: If the RCS concentration is higher than the makeup system can supply in automatic, then HC-110 should be set to maximum.

6.1.8 Set the 10 turn pot on HC-110 to the required position.

6.1.9 Place the makeup mode selector switch (43/MU) in the "AUTO" position.

6.1.10 Reset the primary water batch integrator as follows (if desired):

a. Depress the "RESET" key.

b. Depress the "START" key.

6.1.11 Reset the boric acid batch integrator as follows (if desired):

a. Depress the "RESET" key.

b. Depress the "START" key.

NOTE: Once the makeup control switch is placed in "START", automatic makeup should start at 14% VCT level (LI-112) and terminate at 24%.

6.1.12 Turn the makeup control switch (1/MU) to the "START" position.

6.2 DILUTION WITH MAKEUP SYSTEM IN AUTOMATIC

NOTE 1: The following instructions apply to dilution with the makeup system aligned for automatic operation per section 6.1.

NOTE 2: A checklist style form is provided in Attachment 9.1 which contains the same essential actions of this entire section and can be used as a stand alone instruction.

6.2.1 Place the makeup control switch (1/MU) in the "STOP" position.

6.2.2 Place the makeup mode selector switch (43/MU) in the "DILUTE" position.

6.2.3 If not already set for the proper quantity, enter the required number of gallons in the primary water integrator using the BATCH function and data entry keys. (Refer to Attachment 9.3)

6.2.4 Enable the integrator as follows, if required:

a. Press "RESET" key.

b. Press the "START" key.

6.2.5 Select "SUM" on YIC-111 to display delivered quantity of water, if required.

6.2.6 Turn the makeup control switch (1/MU) to "START".

6.2.7 Confirm expected primary water flow.

6.2.8 When the desired number of gallons is reached on the primary water integrator, verify primary water flow stops.

6.2.9 Place the mode selector switch (43/MU) in the "AUTO" position.

6.2.10 Turn the makeup control switch (1/MU) to "START".

6.2.11 Reset the primary water batch integrator as follows:

a. Depress the "RESET" key.

b. Depress the "START" key.

6.3

BORATION WITH MAKEUP SYSTEM IN AUTOMATIC

NOTE 1: The following instructions apply to boration with the makeup system aligned for automatic operation per section 6.1.

NOTE 2: A checklist style form is provided in Attachment 9.2 which contains the same essential actions of this entire section and can be used as a stand alone instruction.

6.3.1 Place the makeup control switch (1/MU) in the "STOP" position.

6.3.2 Place the makeup mode selector switch (43/MU) in the "BORATE" position.

6.3.3 If not already set for the proper quantity, enter the required number of gallons in the boric acid integrator using the BATCH function and data entry keys. (Refer to Attachment 9.3)

6.3.4 Enable the integrator as follows, if required:

a. Press the "RESET" key.

b. Press the "START" key.

6.3.5 Select "SUM" on YIC-110 to display delivered quantity of boric acid, if required.

6.3.6 Turn the makeup control switch (1/MU) to "START".

6.3.7 Confirm expected boric acid flow.

6.3.8 When the desired number of gallons is reached on the boric acid integrator, verify boric acid flow stops.

6.3.9 Place the mode selector switch (43/MU) in the "AUTO" position.

6.3.10 Turn the makeup control switch (1/MU) to "START".

6.3.11 Reset the boric acid batch integrator as follows:

a. Depress the "RESET" key.

b. Depress the "START" key.

6.9 MANUAL OPERATION WITH MAKEUP CONTROL SYSTEM INOPERABLE

NOTE 1: With 43/MU in OFF or removed, the Boric Acid Blend Controller (HC-110) does not work. The Primary Water Blend Controller (HC-111) works in manual when FCV-111A is selected to OPEN.

NOTE 2: This section is also applicable when 120 VAC control power has been removed from the reactor coolant makeup control system control circuit (PY1422, Ref: Dwg 437596).

6.9.1 Verify the makeup mode selector switch (43/MU) is in OFF or removed.

6.9.2 Initial Lineup:

a. Verify the makeup control switch (1/MU) in the STOP position.

b. Select the following valves to CLOSE:

- FCV-111B
- FCV-111A
- FCV-110B
- FCV-110A

c. Verify the following valves are closed:

- FCV-111B
- FCV-111A
- FCV-110B
- FCV-110A

NOTE: There is no practical way to supply blended makeup in this configuration.

6.9.3 If blended makeup is desired:

a. Calculate the total amount of boric acid and primary water desired.

b. Borate the calculated amount of boric acid using step 6.9.4.

c. When boration is complete, then dilute the calculated amount of primary water using step 6.9.5.

6.9.4 To Borate:

****
CAUTION: The system will **NOT** automatically stop when the integrator count is complete. Boration must be stopped manually.
****

a. Determine the number of gallons of boric acid necessary to make the required boron concentration change. As necessary, use the boration spreadsheet program.

b. Set up the boric acid integrator as follows:

   1. Set the required number of gallons of boric acid into the integrator using the BATCH function and the data setting keys.

   2. Enable the integrator as follows:

      a) Press "RESET" key.

      b) Press the "START" key.

c. Select FCV-110A to OPEN.

d. Select FCV-110B to OPEN.

e. Confirm boric acid flow.

f. If desired, select Hi Speed on the in-service boric acid transfer pump to raise flow rate.

g. When the boric acid flow integrator count is complete, then select FCV-110B to CLOSE.

h. Verify that boric acid flow stops.

i. Select FCV-110A to CLOSE.

j. If the in-service boric acid transfer pump is in Hi Speed, then return the pump to Lo Speed.

6.9.5 To Dilute:

****

CAUTION: The system will **NOT** automatically stop when the integrator count is complete. Inadvertent dilution is possible if the flow is not stopped manually.

****

a. Determine the number of gallons of primary water necessary to make the required boron concentration change. As necessary, use the boration spreadsheet program.

b. Set up the primary water integrator as follows:

1. Set the required number of gallons of primary water into the integrator using the BATCH function and the data setting keys.

2. Enable the integrator as follows:

a) Press "RESET" key.

b) Press the "START" key.

c. Place the Primary Water Blend Controller (HC-111) in MANUAL, and adjust the demand to the desired flow rate.

d. Select FCV-111A to OPEN.

e. Perform ONE of the following:

- Select FCV-111B to OPEN, and confirm primary water flow, OR
- Select FCV-110B to OPEN (alternate dilute), and confirm primary water flow.

f. When the primary water flow integrator count is complete:

1. Verify FCV-111B selected to CLOSE.

2. Verify FCV-110B selected to CLOSE.

3. Confirm primary water flow stops.

g. Select FCV-111A to CLOSE.

DIABLO CANYON POWER PLANT
OP B-1A:VII
ATTACHMENT 9.1

1

TITLE: Dilution Checklist

DATE: ____________ TIME: ____________

DILUTE

[ ] 1. Verify at least once/shift that this checklist is the proper version by comparing the date in the upper left corner to the date on a Priority 1 copy of the procedure or Procedure Navigator.

[ ] 2. 1/MU to STOP

[ ] 3. 43/MU to DILUTE

[ ] 4. Verify gallons - BATCH key

[ ] 5. Verify integrator enabled - RESET / START keys

[ ] 6. Verify SUM on YIC-111

[ ] 7. 1/MU to START

[ ] 8. Verify expected primary water flow

[ ] 9. Verify flow stops

[ ] 10. 43/MU to AUTO

[ ] 11. 1/MU to START

[ ] 12. Reset integrator - RESET / START keys

Total Amount Added This Dilution: _______________ Gallons

Completed form should be given to the SFM for tracking of reactivity changes. This form is for information purposes only and there are no retention requirements.

DIABLO CANYON POWER PLANT
OP B-1A:VII
ATTACHMENT 9.2

1

TITLE: Boration Checklist

DATE: ____________ TIME: ____________

BORATE

[ ] 1. Verify at least once/shift that this checklist is the proper version by comparing the date in the upper left corner to the date on a Priority 1 copy of the procedure or Procedure Navigator.

[ ] 2. 1/MU to STOP

[ ] 3. 43/MU to BORATE

[ ] 4. Verify gallons - BATCH key

[ ] 5. Verify integrator enabled - RESET / START keys

[ ] 6. Verify SUM on YIC-110

[ ] 7. 1/MU to START

[ ] 8. Verify expected boric acid flow

[ ] 9. Verify flow stops

[ ] 10. 43/MU to AUTO

[ ] 11. 1/MU to START

[ ] 12. Reset integrator - RESET / START keys

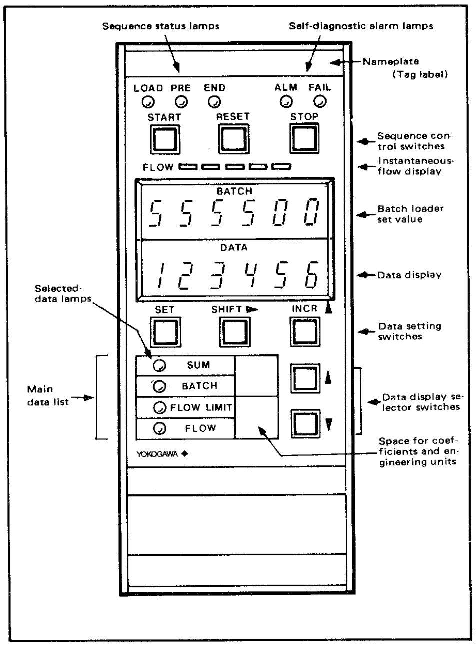
Total Amount
Added This Boration: _______________ Gallons

Completed form should be given to the SFM for tracking of reactivity changes. This form is for information purposes only and there are no retention requirements.

DIABLO CANYON POWER PLANT
OP B-1A:VII
ATTACHMENT 9.3

1

TITLE: Boration/Dilution Batch Integrator Function



FLOW LEDS

Instantaneous bar display of input from flow transmitter

BATCH DISPLAY

Displays current batch set value in gallons.

DATA DISPLAY

Displays the data from the list selected below.

DATA SETTING SWITCHES

SET Pressed after setting data quantity to enter the value into the integrator.

SHIFT Selects the digit in the data display that is to be changed by the INCR switch.

INCR Increments the digit selected in the data display.

MAIN DATA LIST AND DATA DISPLAY SELECTOR SWITCHES

SUM Displays the total number of gallons pumped since last reset.

BATCH Displays batch quantity in gallons set by the operator.

FLOW LIMIT This function disabled.

FLOW Displays instantaneous flow in gallons per minute.

STATUS LIGHTS

LOAD Lit during batching. Flashes when batch is interrupted.

PRE Lit when batching is secured and reset. Flashes when batch is interrupted.

END Lit when batch ends, off when batch is reset. Flashes when batch is interrupted.

ALM Flashes when memory backup battery voltage is low.

FAIL Lit if the controller fails, i.e. loss of power (PY-2119) or major malfunction.

SEQUENCE CONTROL SWITCHES

START Initiates batch, i.e. closes the integrator output relay allowing batching to start. When starting a new batch, reset must be pressed first. When resuming an interrupted batch, press only this switch to restart.

RESET Enables the batch sequence and resets the batch totalizer.

STOP Stops a batch in the middle of a sequence, i.e. output relay opens.

Integrator Setup Sequence:

[ ] Select BATCH with Data display Selector [↑↓].

[ ] Set desired gallons with SHIFT [→] & INCR [↑] keys.

[ ] Press SET twice to 'load' setting, verify value displayed in batch window.

[ ] Press RESET and START to enable integrator.

[ ] Select SUM with Data Display Selector [↑↓], verify reading at zero, to view count up to batch setting.

[ ] Select FLOW with Data Display Selector [↑↓] to view flowrate.

<u>**NOTE 1**</u>: Once a batch is complete, if the same batch is desired again, just press RESET and START to enable integrator.

<u>**NOTE 2**</u>: A batch may be interrupted by pressing STOP button and restarted with the START button.

Number:	NRCLJP-012
Title:	RESET THE TURBINE DRIVEN AUX FEEDWATER PUMP
Examinee:	______________________________
Evaluator:	____________ Print ____________ Signature ______ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	

References:	OP D-1:IV, Steam-Driven Auxiliary Feed Pump - Restart or Make Available After Overspeed Trip, Rev. 15
Alternate Path:	Yes ________ No ___X___
Time Critical:	Yes ________ No ___X___
Time Allotment:	10 minutes
Critical Steps:	3, 4, 5
Job Designation:	RO/SRO
Task Number:	061/04S/A2.04
Rating:	3.4/3.8

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.

Required Materials: Copy of OP D-1:IV.

Initial Conditions: Unit 1 has tripped from 100% power. All four Steam Generator narrow range levels are below 4%. AFW pump 1-1 has tripped on overspeed and is needed for a plant heat sink.

Initiating Cue: The Shift Foreman directs you to restart AFW pump 1-1 in accordance with OP D-1:IV.

Task Standard: AFW pump 1-1 has been restarted in accordance with OP D-1:IV.

Start Time: __________

	Step	Expected Operator Actions
	1. References procedure.	1.1 References step 6.1 of OP D-1:IV.
	2. Verify that the speed setting knob on the turbine govenor is positioned to the maximum speed setting.	2.1 Verifies the speed setting knob on FCV-15 is positioned to the maximum setting (fully clockwise.) ************************************ **Cue: Knob is fully clockwise.** ************************************ **Step was: Sat: ______ Unsat _______***
**	3. Turn the turbine throttle trip valve MS-1-FCV-152 handwheel in the clockwise direction.	3.1 Turns FCV-152 in the clockwise direction until the spring is fully compressed.** ************************************ **Cue: Spring is fully compressed.** ************************************ **Step was: Sat: ______ Unsat _______***
**	4. Latch up the latching lever by means of the trip hook.	4.1 Reads Note and refers to Att. 9.1. 4.2 Checks latch plate fully depressed into the latching mechanism. ************************************ **Cue: Latch plate is NOT depressed into the latching mechanism.** ************************************ 4.3 Presses down on the treaded stud until the latch plate is fully seated on the latching mechanism.** ************************************ **Cue: Latch plate is fully seated into the latching mechanism.** ************************************ **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	5. Open MS-1-FCV-152 fully by turning the handwheel in the counter clockwise direction.	5.1 Turns the handwheel in the counter clockwise direction until FCV-152 is fully open.** ************************************ **Cue: Turbine speed is increasing as FCV-152 is manually opened.** ************************************ ************************************ **Cue: FCV-152 is fully open and the turbine has not tripped.** ************************************ **Step was: Sat: ______ Unsat _______***
	6. Check that the Governor is controlling speed properly.	6.1 Locates the local RPM indication to verify the turbine is at full speed. **OR** 6.2 Contacts the Control Room to verify turbine speed. ************************************ **Cue: Turbine speed indicates approximately 4200 RPM.** ************************************ **Step was: Sat: ______ Unsat _______***

Stop Time: _________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

Initial Conditions: Unit 1 has tripped from 100% power. All four Steam Generator narrow range levels are below 4%. AFW pump 1-1 has tripped on overspeed and is needed for a plant heat sink.

Initiating Cue: The Shift Foreman directs you to restart AFW pump 1-1 in accordance with OP D-1:IV.

Task Standard: AFW pump 1-1 has been restarted in accordance with OP D-1:IV.

TITLE: Steam-Driven Auxiliary Feed Pump - Restart or Make Available After Overspeed Trip

07/06/04
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

1.1 This procedure provides instructions for relatching the Steam-Driven Auxiliary Feed Pump Turbine, and returning it to service.

2. DISCUSSION

2.1 The following sections should be used as applicable after an overspeed trip of the auxiliary feed pump turbine:

Section 6.1 - Restart of the Steam-Driven Auxiliary Feed Pump After an Overspeed Trip

Section 6.2 - Make the Steam-Driven Auxiliary Feed Pump Available After an Overspeed Trip

3. RESPONSIBILITIES

3.1 The shift foreman (SFM) is responsible for proper alignment and operation of equipment discussed in this procedure.

4. PREREQUISITES

4.1 The following systems should be in service:

4.1.1 Main steam supply to AFW Pump 1-1 via FCV-37 and FCV-38.
AFW Pump 1-1 is operable only if it is capable of being powered from two operable and redundant steam supply sources.

4.1.2 Condensate Storage Tank or alternate auxiliary feedwater supply. (Refer to OP D-1:V.)

5. PRECAUTIONS AND LIMITATIONS

5.1 Review Technical Specifications 3.7.5 and 3.7.6.

5.2 If the turbine room fills with an excessive amount of steam, the oil in the turbine bearings and pump bearings should be changed and sampled for water. An excessive amount of steam would be enough to condense and drip onto the floor such that the better part of the pump room floor is slick or has puddles.

5.3 If the MSIVs are isolated, ensure that the steam traps upstream of the MSIVs are in service with the MSIV bypass valves open for loops 2 and 3. If the air operated MSIV bypass valves can not be opened, locally open the manual bypass valves. If the steam traps for loops 2 and 3 cannot be placed in service, declare AFW Pump 1-1 INOPERABLE, and close FCV-37 and FCV-38.

5.4 If AFW PP 1-1 turbine relief valve RV-57 is found to be lifting, investigate for possible obstruction in the turbine exhaust path.

6. INSTRUCTIONS

6.1 Restart of the Steam-Driven Auxiliary Feedwater Pump After an Overspeed Trip

6.1.1 Verify that the speed setting knob on the turbine governor MS-1-FCV-15 is positioned to the maximum speed setting (fully clockwise).

6.1.2 Turn the turbine throttle trip valve MS-1-FCV-152 handwheel in the clockwise direction until the spring is fully compressed.

6.1.3 Latch up the latching lever by means of the trip hook.

6.1.4 Ensure the trip mechanism on top of the bearing housing has been properly reset per Attachment 9.1.

NOTE: This is accomplished by pulling the connecting rod slightly towards the trip valve (FCV-152) while pushing down on the trip tappet and nut. Once the tappet nut is properly seated, gently release tension applied to connecting rod.

6.1.5 Open MS-1-FCV-152 fully by turning the handwheel in the counterclockwise direction.

NOTE: The turbine will roll up to speed as the handwheel is turned in the counterclockwise direction. The governor should come into action to maintain full speed (approximately 4150-4240 RPM). If the turbine again trips on overspeed, reperform steps 6.1.1 through 6.1.4, then open the throttle trip valve handwheel only until full speed is attained. RPM indication is both local and in the Control Room. If manual throttling of MS-1-FCV-152 is required, this indicates a failure of the Woodward Governor.

6.1.6 Leave the throttle trip valve in the latched position.

6.2 Make the Steam-Driven Auxiliary Feed Pump Available After an Overspeed Trip

6.2.1 Verify that plant conditions do not require restart of the Steam-Driven Auxiliary Feedwater Pump.

6.2.2 Close MS-1-FCV-95, Turbine Steam Inlet Valve.

6.2.3 Slowly open MS-1-950, Trap 118 Bypass Valve, to verify steam bypass line is depressurized (refer to PRECAUTIONS section).

6.2.4 Turn the turbine throttle trip valve MS-1-FCV-152 handwheel in the clockwise direction until the spring is fully compressed.

6.2.5 Latch up the latching lever by means of the trip hook.

6.2.6 Ensure the trip mechanism on top of the bearing housing has been properly reset per Attachment 9.1.

NOTE: This is accomplished by pulling the connecting rod slightly towards the trip valve (FCV-152) while pushing down on the trip tappet and nut. Once the tappet nut is properly seated, gently release tension applied to connecting rod.

6.2.7 Open MS-1-FCV-152 fully by turning the handwheel in the counterclockwise direction.

6.2.8 Leave the throttle trip valve in the latched position.

6.2.9 Open MS-1-925 and MS-1-926, turbine casing drain valves, to drain any condensate from turbine casing.

6.2.10 Verify that the speed setting knob on the turbine governor MS-1-FCV-15 is positioned to the maximum speed setting (fully clockwise).

6.2.11 Close trap 118 bypass valve (MS-1-950) and turbine casing drain valves (MS-1-925 and MS-1-926).

6.2.12 Verify turbine at rest.

6.2.13 Complete Attachment 9.1 and forward to the SFM.

6.2.14 SFM, review Attachment 9.1 and document with a formal log entry that the Steam-Driven Auxiliary Feed Pump Turbine has been properly relatched.

NOTE: Depending upon the nature of the overspeed trip, initiate an A/R as necessary.

7. REFERENCES

7.1 OVID 106703 SHT 3, and 106704 SHT 4.

8. RECORDS

8.1 There are no formal requirements for record retention.

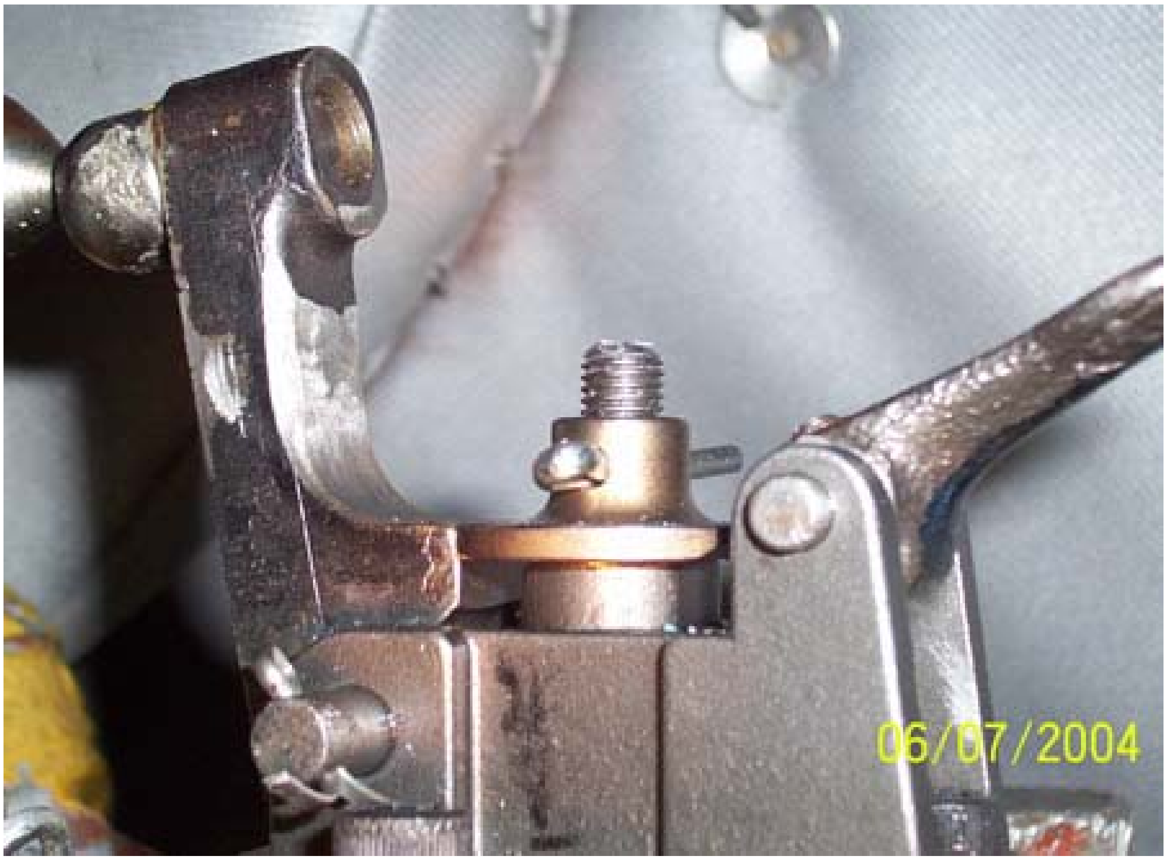
9. ATTACHMENTS

9.1 "Latching Mechanism for Steam-Driven Auxiliary Feedwater Pump Turbine," 06/25/04

9.2 "Restarting Steam-Driven Auxiliary Feedwater Pump After an Overspeed Trip," 10/01/92

1

TITLE: Latching Mechanism for Steam-Driven Auxiliary Feedwater Pump Turbine



1. Initial and perform an Independent Verification within 4 hours section 6.2 only);

	Performed By	Indep. Verif.
THROTTLE TRIP VALVE LATCHED IAW PICTURE.	______________	______________
GOVERNOR SPEED SETTING AT MAXIMUM SETTING.	______________	______________

2. Forward this Attachment to SFM for review.

1

TITLE: Restarting Steam-Driven Auxiliary Feedwater Pump After an Overspeed Trip

The following instructions are for emergency use only in restarting the Steam-Driven Auxiliary Feedwater Pump after an overspeed trip. They are posted on lamicoid in the Auxiliary Building at the Steam-Driven Auxiliary Feedwater Pump.

Restarting the Steam-Driven Auxiliary Feedwater Pump after an overspeed trip.

1. VERIFY THE SPEED SETTING ON TURBINE GOVERNOR MS-1-FCV-15 IS SET TO MAXIMUM (fully clockwise).
2. TURN THE TURBINE TRIP THROTTLE VALVE MS-1-FCV-152 HANDWHEEL IN THE CLOCKWISE DIRECTION UNTIL THE SPRING IS FULLY COMPRESSED.
3. LATCH UP THE LATCHING LEVER USING THE TRIP HOOK.
4. ON TOP OF THE OUTBOARD TURBINE BEARING, CHECK THE LATCH PLATE FULLY DEPRESSED INTO THE LATCHING MECHANISM TO VERIFY THE TRIP MECHANISM PROPERLY RESET.
   a. If necessary, press down on the threaded stud until the latch plate is fully seated on the latch mechanism.
5. FULLY OPEN TURBINE TRIP THROTTLE VALVE MS-1-FCV-152 BY TURNING THE HANDWHEEL IN THE COUNTERCLOCKWISE DIRECTION. (The turbine will roll up to speed as MS-1-FCV-152 is opened. The governor will maintain full speed of approximately 4150-4240 RPM.)
6. IF THE TURBINE TRIPS ON OVERSPEED, THEN DO THE FOLLOWING:
   a. Perform steps 1 through 4.
   b. Slowly open Turbine Trip Throttle Valve MS-1-FCV-152 by turning the handwheel in the counterclockwise direction until full speed is attained.
7. LEAVE TURBINE TRIP THROTTLE VALVE MS-1-FCV-152 IN THE LATCHED POSITION.

Number: NRCLJP-079

Title: TRANSFER PRESSURIZER HEATER GROUP 13 TO BACKUP POWER

Examinee: ______________________________

Evaluator: ____________________ ____________________ __________
Print Signature Date

Results: Sat ______ Unsat ______ Total Time: _____ minutes

Comments:

References: OP A-4A:I, Pressurizer - Make Available, Rev 17

Alternate Path: Yes __________ No ____X____

Time Critical: Yes __________ No ____X____

Time Allotment: 15 minutes

Critical Steps: 3, 4, 5, 6, 7, 9, 10, 11, 12

Job Designation: RO/SRO

Task Number: 062/06/A2.10

Rating: 3.0/3.3

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.
Required Materials:	Copy of OP A-4A:I, Section 6.3
Initial Conditions:	The Unit 1 Reactor Coolant System is being filled and vented. All house loads are being supplied by startup power.
Initiating Cue:	The Shift Foreman directs you to make available pressurizer heater group 13 from its backup power supply in accordance with OP A-4A:I, step 6.3.1.c.
Task Standard:	Pressurizer heater group 13 has been made available from its backup power supply in accordance with OP A-4A:I.

Start Time: __________

	Step	Expected Operator Actions
	1. Reads Caution.	1.1 **Reads Caution.** ********************************** **Cue: Another Operator has been assigned to monitor the loading of Bus H 480V transformer.** **********************************
	2. Place control switch for heater group 13 in the OFF position.	2.1 Goes to or calls the Control Room to check the position of the control switch for heater group 13. ********************************** **Cue: The control switch for heater group 13 is in the OFF position and the green light is ON.** ********************************** **Step was: Sat: ______ Unsat _______***
**	3. Verify that heater group 13 normal breaker, 52-13E-2 is open.	3.1 Locates the normal breaker for heater group 13 on load center 13E. 3.2 Verifies that the breaker is open. ** **Step was: Sat: ______ Unsat _______***
**	4. Place the DC control power switch for pressurizer heater group 13 normal breaker in the OFF position.	4.1 Locates the DC control power switch for heater group 13 normal breaker on load center 13E. 4.2 Places the control power toggle switch in the OFF position. ** **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	5. Places 480v transformer THH10 fan switch 43T to MAN.	5.1 Locates fan switch 43T in 480V Bus H room. 5.2 Places 43 T switch in MAN. ** 5.3 Checks amber FANS ON light is on. ********************************* **Cue: Amber light is on** ********************************* **Step was: Sat: ______ Unsat _______***
**	6. Check heater group 13 backup breaker, 52-1H-74 open.	6.1 Locates heater group 13 backup breaker 52-1H-74 at 480V Bus H. 6.2 Checks that the breaker is open. ** **Step was: Sat: ______ Unsat _______***
**	7. Check open the DC control power knife switch for heater group 13 backup breaker.	7.1 Locates the DC knife switch cabinet located above the vital breaker. ********************************* **Cue: You may open the cabinet.** ********************************* 7.2 Checks that the knife switch is open. ** *********************************** **Cue: The knife switch is open.** *********************************** **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
	8. Verify that both white potential lights on the manual transfer switch are not lit.	8.1 Locates the manual transfer switch on the wall next to the 52-1H-74 breaker. **Note: Since the normal breaker is available, a white light may be ON.** 8.2 Checks that neither light is ON. ************************************ **Cue: Both lights are OFF.** ************************************ **Step was: Sat: ______ Unsat _______***
**	9. Move the transfer switch down to the backup (vital) bus position.	********************************** **Cue: The Shift Foreman has assigned another operator to complete all required seal valve change forms.** ********************************** 9.1 Positions the transfer switch to the backup supply. ** **Step was: Sat: ______ Unsat _______***
**	10. Check the heater group 13 backup breaker, 52-1H-74 racked in.	10.1 Verifies that the heater group 13 backup breaker is racked in. ** **Step was: Sat: ______ Unsat _______***
**	11. Close the DC control power knife switch for heater group 13 backup breaker.	11.1 Locates the DC knife switch cabinet located above the vital breaker. 11.2 Places the knife switch in the CLOSE position. ** ************************************ **Cue: The knife switch is closed.** ************************************ **Step was: Sat: ______ Unsat _______***

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

	Step	Expected Operator Actions
**	12. Verify the D.C. Charging Power Switch for heater group 13 backup breaker (52-1H-74) is on and springs charged.	12.1 Locates the D.C. charging power switch on the lower front of 52-1H-74. 12.2 Verifies the following: • CHARGING POWER switch in the ON position ** • SPRINGS CHARGED flag displayed **Step was: Sat: ______ Unsat _______***
	13. Notify the control room of the status of heater group 13.	13.1 Notifies the control room that heater group 13 is available from the backup power supply. *********************************** **Cue: The Control Operator will complete the procedure and energize heater group 13.** *********************************** **Step was: Sat: ______ Unsat _______***

Stop Time: __________

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

* Denotes an entry required on the JPM cover sheet.
** Denotes Critical Step and Sub Steps.

Initial Conditions: The Unit 1 Reactor Coolant System is being filled and vented. All house loads are being supplied by startup power.

Initiating Cue: The Shift Foreman directs you to make available pressurizer heater group 13 from its backup power supply in accordance with OP A-4A:I, step 6.3.1.c.

Task Standard: Pressurizer heater group 13 has been made available from its backup power supply in accordance with OP A-4A:I.

****
CAUTION: Monitor the load on 480V Vital Bus/Transformer when transferring pressurizer heaters to the backup power supply. Pressurizer heaters and CFCUs in fast speed could result in exceeding normal maximum load. Load in excess of normal maximum load rating is allowed for short periods of time, see AR A0509579 for description of load and time limits.
****

6.3 Pressurizer Heaters - Make Available from Backup Power Supply

6.3.1 To energize the pressurizer heaters from the back up power supply, IF off-site power is available THEN go to step 6.3.1c below; IF off-site power is not available (diesels supplying vital busses) THEN perform the following:

a. Select the backup power supply to be used (vital Bus G for heater group 12 or vital Bus H for heater group 13), based on the bus with the lowest load indicated on the diesel.

b. Determine if loads must be stripped from the selected vital bus.

1. IF the bus load is <2.6 MW, THEN go to step c below, it will not be necessary to strip any loads.

****
CAUTION: Any safety injection signal must be reset before loads can be stripped and before the heaters can be energized. Reset only if applicable reset criteria is met in the specific Emergency Operating Procedures.
****

2. IF the bus load is >2.6 MW, THEN strip some load using the criteria below:

a) IF all containment fan coolers are running and average containment air temperature is below 120°F, THEN shut down fan cooler 1-3, 1-4 or 1-5, as applicable.

b) IF all three component cooling water pumps are running, THEN one may be shut down. (Either 1-2 or 1-3, as applicable.)

c) IF the ECCS pump shutdown criteria in the applicable Emergency Operating Procedure is met, THEN the following may be shut down as applicable.

1) SI Pump 1-2

2) RHR Pump 1-1 OR RHR Pump 1-2

c. Energize the heaters as follows:

1. Place the control switch for the selected heater group (12 or 13) to the OFF position and check the green light on.

2. Verify that the selected heater group normal breaker (52-13D-6 for heater group 12 or 52-13E-2 for heater group 13) is open, (at the appropriate Bus D or E).

3. Place the D.C. Control Power Switch for the selected heater group normal breaker in the OFF position (located at Load Center 13 D or E).

4. For heater group 13 only, place 480V Transformer THH10 fan switch 43T to MAN. (Located in 480V Bus H room).

   a) Check amber FANS ON light is on.

5. Check the heater group backup breaker (52-1G-72 for heater group 12 or 52-1H-74 for heater group 13) open (at the appropriate vital bus room G or H).

6. Check open the D.C. Control Power Knife Switch for the selected heater group backup breaker (located above the vital breaker).

7. Verify that both white potential lights on the manual transfer switch are not lit.

8. Move the transfer switch down to the backup (vital) bus position. Fill out the Sealed Component Change Form in accordance with OP1.DC20.

9. Rack in, or check racked in, the selected heater group backup breaker (52-1G-72 or 52-1H-74).

10. Close the D.C. Control Power Knife Switch for the selected heater group backup breaker (located above the vital breaker).

11. Verify the D.C. Charging Power Switch for the selected heater group backup breaker is in the ON position (located on the lower front of the vital breaker) and springs are charged.

****

CAUTION: The pressurizer heater group breaker auto trip on low pressurizer level is defeated when heaters are on backup power supply. Manually turn heaters OFF if pressurizer level drops below 17%.

****

12. Place the control switch for the selected heater group in the ON position in the Control Room.

    NOTE: The indicating lights for this group will not illuminate since they are associated with the normal power supply breaker position.

13. Verify that the heaters are energized by observing the individual wattmeter for the selected heater group.

14. If the selected heater group does not energize as indicated by the associated watt meter, manually close breaker as follows (ref. A0481018).

    a) Verify the control switch on CC1 is selected to Auto.

    b) Verify closing springs are charged (charging the closing springs electrically requires the local DC knife switch above the breaker to be closed and the toggle switch on the breaker to be in the "on" position).

    c) Pull up on the local close lever.

15. Verify that the diesel generator is not overloaded by referencing the capability curve in OP J-6B.

6.4 Pressurizer Heaters - Return to Normal Power Supply from Backup

6.4.1 To energize pressurizer heaters from the normal power supply after being energized from the backup power supply proceed as follows:

a. Place the control switch for the selected heater group (12 or 13), to the OFF position.

b. Verify that the selected heater group backup breaker (52-1G-72 for heater group 12 or 52-1H-74 for heater group 13) is open, (at the appropriate vital bus room G or H).

c. Open the D.C. Control Power Knife Switch for the selected heater group backup breaker (located above the vital breaker).

d. Check the heater group normal breaker (52-13D-6 for heater group 12 or 52-13E-2 for heater group 13) open (at the appropriate Bus D or E).

e. For heater group 13 only, place 480V Transformer THH10 fan switch 43T to AUTO. (Located in 480V Bus H room).

f. Verify the D.C. Control Power Switch for the selected heater group normal breaker is in the OFF position.

g. Verify that both white potential lights on the manual transfer switch are not lit.

h. Move the transfer switch up to the normal bus position. Complete the Sealed Component Change Form in accordance with OP1.DC20.

i. Rack in, or check racked in, the selected heater group normal breaker (52-13D-6 or 52-13E-2).

Number:	NRCLJP-088
Title:	ALIGN EMERGENCY BORATION
Examinee:	____________________
Evaluator:	____________ Print ____________ Signature ______ Date
Results:	Sat ______ Unsat ______ Total Time: _____ minutes
Comments:	This is a Unit 2 JPM.

References:	OP AP-6, Emergency Boration, Rev 15			
Alternate Path:	Yes	______	No	X
Time Critical:	Yes	______	No	X
Time Allotment:	5 minutes			
Critical Steps:	1			
Job Designation:	RO/SRO			
Task Number:	024/01/AA1.20			
Rating:	3.2/3.3			

AUTHOR:	JACK BLACKWELL	DATE:	01/18/2005
REVIEWED BY:	N/A TRAINING LEADER	DATE:	
APPROVED BY:	N/A LINE MANAGER	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, initiating cue, and task standard. The examiner will then ask if any clarifications are needed. The examinee may be given the applicable procedure and step with which to begin.

Required Materials: None.

Initial Conditions: Due to a CWP trip and a rapid ramp to 50% power on Unit 2, control rods are below the rod insertion limit. The Unit 2 operating crew has been unable to borate from the Control Room.

Initiating Cue: The Unit 2 Shift Foreman directs you to locally open CVCS-2-8471, manual emergency boration valve, and inform the control room when it is opened.

Task Standard: The manual emergency boration valve is opened.

Start Time: ___________

	Step	Expected Operator Actions
**	1. Open Unit 2 emergency borate valve CVCS-8471.	1.1 Opens local manual emergency borate valve CVCS-8471 (Unit 2 VCT blender room).**
		Note: Actual conditions within the blender room will determine how close the operator can approach the valve. Entry into a surface contamination area should not be allowed. Describing the location and operation of the valve satisfies the critical task.
		Step was: Sat: ______ Unsat _______*
	2. Notify the Unit 2 Shift Foreman.	2.1 Notifies the control room that CVCS-8471 is open.
		Step was: Sat: ______ Unsat _______*

Stop Time: ___________

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

* Denotes an entry required on the JPM cover sheet.

** Denotes Critical Step and Sub Steps.

Initial Conditions:	Due to a CWP trip and a rapid ramp to 50% power on Unit 2, control rods are below the rod insertion limit. The Unit 2 operating crew has been unable to borate from the Control Room.
Initiating Cue:	The Unit 2 Shift Foreman directs you to locally open CVCS-2-8471, manual emergency boration valve, and inform the control room when it is opened.
Task Standard:	The manual emergency boration valve is opened.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Emergency Boration Flowmeter FI-113 may peg high at 50 GPM. XFIT-113 in the Cable Spreading room may be used for higher flowrates or to determine total gallons of boric acid added via the Emergency Boration flowpath.

2. **INITIATE Alternate Boration Method**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a. OPEN CVCS-8104 and verify approximately 30 GPM or greater Emergency Boration Flow	a. Perform one of the following in order of preference: 1) Swap Charging Pp suction to the RWST. a. OPEN 8805A AND 8805B. b. CLOSE LCV-112B AND LCV-112C. c. VERIFY GREATER THAN 90 GPM charging flow. OR 2) Locally OPEN CVCS-8471 (100' Blender Room).

3. **CHECK Sufficient Boric Acid Available:**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
In Service Boric Acid Tank level GREATER THAN required gallons of Boric Acid per Appendix A	a. Stop the Boric Acid Transfer Pp not aligned to the blender. b. Locally OPEN CVCS-8476, Boric Acid Transfer Pp crosstie. (100' Behind Suction to BA Transfer Pp 1-1/2-2). WHEN Sufficient BA inventory restored, THEN Realign the system per OP B-1C:II, 4% BORIC ACID SYSTEM - PLACE IN SERVICE.