PG and E **Pacific Gas and Electric Company**

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY OPERATING PROCEDURE

NUMBER EP OP -15
REVISION 4
DATE 12/31/81
PAGE 1 OF 4

TITLE: LOSS OF FEEDWATER FLOW

APPROVED: R C Thornberry 2/4/82
PLANT MANAGER DATE

SCOPE

This procedure provides instructions to prevent a reactor trip if Main Feedwater is lost during start-up or if both Main Feedwater Pumps (MFP's) are running and one MFP trips. If a reactor trip occurs, the operator is directed to EP OP-5.

SYMPTOMS

1. Indicated S/G feedwater flow and level decreasing.
2. Main Feedwater pump discharge pressure decreasing (PI-49, PI-50).
3. Main Feedwater header pressure decreasing (PI-508).
4. Feedline/Steamline differential pressure decreasing (PI-509).
5. Possible annunciators:
   a. STEAM GENERATOR NO. _____ (PK-09-1, 2, 3, or 4).
      1) S/G level low from reference.
   b. PROTECTION CHANNEL ACTIVATED (PK-04-7).
      1) S/G low level and S/G flow mismatch bistables.
      2) S/G low-low level bistable.
   c. FEEDWATER PUMP TRIP (PK-09-12).
   d. FEEDWATER PUMP NO. ____ (PK-09-13, 14).
      1) Feedwater trouble alarms.

AUTOMATIC ACTIONS

1. Possible auto start of auxiliary feedwater pumps.
2. S/G blowdown isolation due to auto start of AFW pumps.

3. Possible reactor trip on S/G low level coincident with S/G flow mismatch, or S/G low-low level.

4. Possible turbine trip due to reactor trip.

OBJECTIVES

1. Prevent a reactor trip if possible.

2. Ensure sufficient feedwater to all S/G's.

3. Stabilize the primary and secondary coolant systems.

IMMEDIATE OPERATOR ACTIONS	COMMENTS
1. If a reactor trip occurs, discontinue this procedure and go to EP OP-5, Reactor Trip without SI.	
2. MAIN FEEDWATER LOST DURING START-UP:	
a. Attempt to avoid a reactor trip by reducing power to match the capacity of the Auxiliary Feedwater (AFW) system.	a. Design capacity of the AFW system is ~ 6% power.
b. Ensure motor driven AFW pumps are running and supplying flow to S/G's.	
3. BOTH MFP's OPERATING AND ONE MFP TRIPS:	
a. Attempt to avoid a reactor trip by quickly reducing turbine load to < 50%.	
b. Check or place control rods in AUTO and verify rods are stepping in.	b. Drive rods in manually if necessary.

SUBSEQUENT OPERATOR ACTIONS

1. MAIN FEEDWATER LOST DURING START-UP:

   a. Verify AFW level control valves are maintaining program level. Take manual action if necessary.

   b. If feedwater flow is not sufficient:

1) Start turbine driven AFW pump and/or,

2) Further reduce power as necessary, to match feedwater capacity.

2. BOTH MFP's OPERATING AND ONE MFP TRIPS:

a. Check that Main Feedwater regulating valves are automatically controlling S/G levels. Take manual control if necessary to maintain proper level.

a. If manual operation was required, match S/G levels to program level. When control has stabilized, maintain program level for approximately 3 minutes (for control system stabilization) then place in AUTO.

b. Check proper operation of steam dump control system if actuated, and verify TAVG is being reduced to match TREF.

c. Monitor PZR and verify level and pressure are at or returning to programmed values.

d. If Load Transient Bypass action has occurred because of the rapid load rejection, verify the following and take manual action if necessary:

d. Load Transient Bypass relay action will occur if turbine load is > 70% and Turbine load rejection is > 10% in a 2 minute period. NOTE: When all valves are in the proper position, red light on condensate LTB control switch will illuminate.

1) FCV-55 opens

2) FCV-31 opens

3) TCV-23 opens

4) FCV-230 opens

5) FCV-30 closes

6) LCV-12 closed

7) Standby condensate and condensate booster pump set starts automatically.

3. If blowdown isolation occurred, re-establish blowdown when plant conditions have stabilized.

APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. Notify the Plant Superintendent, Supervisor of Operations, and Plant Manager or their designated alternates.

   b. Designate this event a Significant Event. As a minimum, within one hour, notify the NRC Bethesda Operations Center using the red phone in the Control Room. Gather sufficient information from all sources prior to calling so that the phone call is meaningful. Refer to Operating Procedure O-4 "Operating Order (One Hour Reporting Requirements to NRC)" for a suggested format for reporting. Notify the NRC that your call is pursuant to 10 CFR Part 50.72, (Notification of Significant Events).

PG&E **Pacific Gas and Electric Company**

NUMBER EP OP-19
REVISION 2
DATE 2/11/82
FAGE 1 OF 4

DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

TITLE: EMERGENCY OPERATING PROCEDURE
MALFUNCTION OF REACTOR MAKEUP CONTROL SYSTEM

APPROVED: _____ 2/12/82
PLANT MANAGER DATE

SCOPE

This procedure outlines the steps to be taken in the event the automatic reactor makeup control system fails to maintain or adjust the boron concentration or fails to maintain level in the volume control tank.

SYMPTOMS

1. Volume control tank high or low-low level alarm (PK04-24).
2. Unusual or Unwarranted auto control rod movement.
3. Control rod insertion low limit or low-low limit alarm (PK03-13 or 14).
4. Primary water and/or boric acid flow deviation alarm (PK-05-11).
5. Unexpected change in countrate when the reactor is shutdown.
6. Possible Source Range High Flux at shutdown alarm (PK03-07).
7. Possible TAVG-Tref deviation alarm (PK04-01).
8. Gross deviation between calculated and actual boron concentrations.
9. Charging pump suction swap from VCT to RWST.

AUTOMATIC ACTIONS

1. If the volume control tank low-low level (5%) is reached the charging pump suction is switched to the refueling water storage tank (valves 8805A & B open and the volume control tank outlet valves, LCV-112B&C, close).
2. Possible control rod movement if rods are in automatic.
3. Possible letdown diversion to liquid hold up tanks.

OBJECTIVES

1. Restore VCT level.
2. Maintain or restore desired VCT boric acid concentration.
3. Terminate any uncontrolled boron dilution or addition due to malfunction of makeup system.

IMMEDIATE OPERATOR ACTIONS

ACTIONS	COMMENTS
1. If a malfunction resulted in an inadvertent boron dilution or addition.	
a. Take action to terminate the event.	
b. If necessary emergency borate as per EP OP-6.	
c. Restore RCS boron concentration.	
2. If VCT level is not being maintained in auto:	
a. Check VCT makeup system is properly lined up for automatic control.	
b. Check divert valve and controller for proper operation.	
c. Check VCT for possible failed level channel.	
d. Restore automatic control of VCT makeup system if possible.	
3. If automatic control will not function, use manual control as necessary to terminate the emergency and restore the VCT to an adequate level and/or boron concentration.	

SUBSEQUENT OPERATOR ACTION

ACTIONS	COMMENTS
1. If charging pump suction has swapped to the RWST:	
a. Use control rods and/or turbine load to match Tavg and TREF.	
b. When the VCT level has been restored to $\geq$10% and the VCT makeup rate exceeds the charging rate.	

1) Open LCV-112 B and C.

2) Close valves 8805 A and B.

2) Verify proper charging flow.

3) Check for stable or increasing VCT level.

c. Have Rad and Chem department take a RCS sample.

c. RWST is saturated with O_2

2. If normal makeup flows cannot be established proceed as follows:

a. Start a primary water pump and transfer a boric acid pump to high speed.

b. Open or check open FCV 110A

c. Open the manual emergency borate valve (8471). Adjust its position to give desired blend with 70gpm primary water.

c. Establish communication with the control room to set desired boric acid flow.

d. Open the manual emergency primary water valve (8441) and adjust its position to achieve 70gpm flow.

e. When VCT level has been restored to >10% and level is increasing, open LVC-112 B and C. Then close 8805 A & B and verify normal charging flow and stable or increasing VCT level

f. Observe the control rods and adjust the manual borate valve (8471) to avoid any rod position limits.

3. If necessary continue to operate manually to control VCT level until repairs are made to the system.

4. Verify the RCS boron concentration, dissolved O_2 and H_2 concentrations are within limits for existing plant status.

APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. Notify the Plant Superintendent, Supervisor of Operations and Plant Manager or their designated alternates.

   b. Designate this event a Significant Event. As a minimum, within one hour notify the NRC Bethesda Operations Center using the red phone in the Control Room. Gather sufficient information from all sources prior to calling so that the phone call is meaningful. Refer to Operating Procedure O-4 "Operating Order (One Hour Reporting Requirements to NRC)" for a suggested format for reporting. Notify the NRC that your call is pursuant to 10 CFR Part 50.72, (Notification of Significant Events).

   c. Review subsequent plant conditions against the classification criteria in Emergency Procedure G-1 "Accident Classification and Emergency Plan Activation."

PG&E **Pacific Gas and Electric Company**

NUMBER EP OP-20
REVISION 2
DATE 12/15/81
PAGE 1 OF 5

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY OPERATING PROCEDURE

TITLE: EXCESSIVE REACTOR COOLANT SYSTEM LEAKAGE

APPROVED: R E Ayres 2/4/82
PLANT MANAGER DATE

SCOPE

This procedure outlines the steps to be taken in the event of reactor coolant system leakage in excess of the Technical Specifications limits, yet within the capacity of the charging system. If leakage is detected, the primary goal should be to identify and isolate or reduce the magnitude of the leak.

SYMPTOMS

Any one or more of the following symptoms may indicate excessive reactor coolant leakage:

1. Unexpected auto make-up to Volume Control Tank (VCT).
2. Unexpected charging pump speed or flow increase during steady-state operation.
3. Increased level, temperature and/or pressure in the Pressurizer Relief Tank (PRT).
4. Possible annunciators:
   a. HIGH RADIATION (PK11-21)
      1) Containment Area Rad Monitor alarm.
      2) Incore seal table Area Rad Monitor alarm.
      3) Sampling room Area Rad Monitor alarm.
      4) Charging pump room Area Rad Monitor alarm.
      5) Auxiliary building control board Area Rad Monitor alarm.
      6) Process monitor Hi-Rad alarm.
   b. CONTAINMENT ENVIRONMENT (PK01-16)
   c. PRESSURIZER SAFETY OR RELIEF LINE TEMPERATURE (PK05-23).
   d. PRESSURIZER RELIEF/SAFETY VALVES OPEN (PK05-20).
   e. BUILDING SUMPS (PK15-01).

1) Containment sump high level alarm.

2) Reactor cavity sump high level alarm.

f. PRESSURIZER LEVEL HI/LO (05-21)

g. PRESSURIZER LEVEL HI/LO CONTROL (PK05-22).

h. REACTOR FLANGE LEAKOFF TEMP HI (PK11-02).

i. RCS VALVE STEM LEAKAGE (PK05-8).

AUTOMATIC ACTIONS

1. Possible charging pump flow increase.
2. Possible process monitor isolation actions:
   a. Component cooling water surge tank vent valve closure.
   b. Steam generator blowdown and sample line isolation.
   c. Containment ventilation isolation.
3. Possible PRT vent header isolation at 10 PSIG in PRT.
4. Possible pressurizer letdown isolation.

OBJECTIVE

1. Identify the source and rate of leakage.
2. Isolate the leak, if possible.
3. Take actions as necessary to comply with Technical Specifications requirements.

IMMEDIATE OPERATOR ACTIONS	COMMENTS
1. Monitor pressurizer level and start another charging pump as necessary.	
2. If pressurizer level continues to drop, isolate letdown.	
3. If pressurizer level cannot be maintained, manually initiate SI and go to EP OP-0, Reactor Trip with Safety Injection.	

SUBSEQUENT OPERATOR ACTION

1. Monitor the VCT level and take manual control as necessary to maintain VCT level. If charging pump suction is swapped to the RWST, commence a rapid load reduction and proceed to shutdown the reactor.	
2. Attempt to determine the magnitude of the leak while continuing with this procedure.	2. Refer to STP R-10.
3. If S/G tube leakage is indicated, go to EP OP-3B, Minor S/G Tube Leak.	
4. Check for indication of leakage from PZR Safety valves and PORV's by observing discharge temperatures and sonic flow detector. If leakage is indicated from PORV, close the associated block valve.	4. Refer to Technical Specifications 3.4.4 if block valve is closed.
5. If the leak appears to be inside containment:	
a. Check the containment temperature and dewpoint monitoring system and attempt to determine the location of the leak.	a. Monitoring system is located in Mech. Panel 199 next to the HSD Panel. Refer to P&ID drawing No. 102023 sheet 8 for detector location table and map.
b. Consider making containment entry for inspection.	
6. Check other possible sources of leakage:	
a. Primary sampling system.	
b. Component cooling water surge tank.	b. If leakage is indicated in CCW system, go to EP OP-11.
c. If reactor vessel flange leakage is indicated:	
1) Close 8032 on VB2. 2) Close 8069B, then open 8069A. 3) Open 8032 and check for indications of leakage past the outer O-ring.	
4) If leakage occurs past the outer O-ring, proceed with reactor shutdown.	

	d. Check unusual inflow to liquid radwaste system.	
	e. Check for possible discharge into the PRT from relief valves or valve stem leakoff.	e. Refer to OP A-4B:IV, Table 1 & 2 for list of valves that discharge into the PRT.
7.	If leakage is indicated in the auxiliary building, conduct a radiation survey to assist in locating the leak.	7. If leakage is due to a let-down or charging failure, refer to EP OP-18.
8.	If leak is located, attempt to isolate it.	
9.	When the leak rate is determined and classified, take actions as required by the Plant Technical Specifications.	9. Technical Specifications 3.4.6.2.
10.	Continue to monitor leakrate as necessary.	

APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. Designate this event a Notification of Unusual Event. Notify plant staff and response organizations required for this classification by implementing Procedures G-2 "Establishment of the On-Site Emergency Organization" and G-3 "Notification of Off-Site Organizations" in accordance with Emergency Procedure G-1 "Accident Classification and Emergency Plan Activation".

   b. If the RCS leak rate is calculated to be > 50 gpm or one centrifugal charging pump is unable to maintain pressurizer level with normal letdown flow, designate this event an Alert. Notify plant staff and response organizations required by EP G-2 and EP G-3 in accordance with EP G-1.

PG&E **Pacific Gas and Electric Company**

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

NUMBER EP OP-30
REVISION 1
DATE 2/11/82
PAGE 1 OF 3

TITLE: EMERGENCY OPERATING PROCEDURE
INADVERTENT LOADING OF A FUEL ASSEMBLY
INTO AN IMPROPER POSITION

APPROVED: R. C. T Brown 2/12/82
PLANT MANAGER DATE

SCOPE

This procedure addresses the event in which either manufacturing errors or core loading errors result in placing fuel in a core position calling for fuel of lesser enrichment. This can result in power shapes which peak in excess of design values.

SYMPTOMS

1. The resultant high peaking factors would readily be detectable by evaluation of flux maps taken during the performance of STP R-3D.

2. Incore thermocouple maps might indicate an abnormally high enthalpy rise.

3. If the resulting peaking factors are severe enough or if the affected fuel assembly is at an incore flux detector location, the problem will be discovered during low power physics testing.

AUTOMATIC ACTIONS

None

OBJECTIVES

1. To place the reactor in an acceptable mode or power level as per Technical Specifications upon discovery of the problem.

IMMEDIATE OPERATOR ACTIONS	COMMENTS
1. If at power and F_Q (Z) exceeds its limit: with 15 minutes, reduce thermal power at least 1% for each 1% F_Q (Z) exceeds the limit.	1. Technical Specification 3.2.2
2. If at power and R1 exceeds its limits, reduce thermal power to less than 50% within 2 hours.	2. Technical Specification 3.2.3

SUBSEQUENT OPERATOR ACTIONS

ACTION	COMMENTS
1. If power was reduced due to high $F_Q(Z)$:	
a. Within the next 4 hours reduce the power range neutron flux high trip setpoint by the same percent as power was reduced.	a. With setpoints reduced, power operation may continue for up to a total of 72 hours.
b. Within 72 hours place the reactor in at least hot standby.	b. Refer to L-5.
c. If continued power operation is desired while the problem is being investigated:	
1) While in at least hot standby, reduce the $OP\Delta T$ trip setpoint by at least 1% for each 1% $F_Q(Z)$ exceeded its limit.	
2) Bring the reactor to an acceptable power level.	
2. If power was reduced due to high RI condition, within 4 hours reduce the power range neutron flux Hi trip setpoint to 55% rated power.	2. Comply with Technical Specification 3.2.3 action requirements.

APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. Notify the Plant Superintendent, Supervisor of Operations and the Plant Manager or their designated alternates.

   b. Designate this event a significant event. As a minimum, within one hour notify the NRC Bethesda Operations Center using the red phone in the Control Room. Gather sufficient information from all sources prior to calling so that the phone call is meaningful. Refer to Operating Procedure O-4 "Operating Order (One Hour Reporting Requirements to NRC)" for a suggested format for reporting. Notify the NRC that your call is pursuant to 10 CFR Part 50.72, (Notification of Significant Events).

   c. If the plant conditions requires entering a Technical Specification action statement requiring plant shutdown, designate this event a Notification of Unusual Event. Notify plant staff and response organizations in accordance with Emergency Procedures G-2 "Establishment of the On-Site Emergency Organization" and G-3 "Notification of Off-Site Organizations" in accordance with Emergency Procedure G-1 "Accident Classification and Emergency Plan Activation."

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DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

NUMBER EP OP-32
REVISION 1
DATE 2/11/82
PAGE 1 OF 3

TITLE: EMERGENCY OPERATING PROCEDURE
ROD EJECTION

APPROVED: R C Thornburg 2/12/82
PLANT MANAGER DATE

SCOPE

This procedure provides guidance in the event of a control or shutdown rod ejection from the reactor core. The basic assumption is that the reactor is at power with control rods on manual with bank D at the Lo-Lo insertion limit. The ejection occurs as a result of a mechanical failure in the vessel head such that a breach of the reactor coolant system exists.

SYMPTOMS

1. Reactor trip on hi Flux
2. Turbine trip alarms.
3. PZR pressure lo press alarm.
4. SI initiated.

AUTOMATIC ACTIONS

1. Reactor trip.
2. Turbine trip.
3. Auxiliary power transfer to startup power.
4. Steam dump activated.
5. SI activated on RCS Lo pressure.

OBJECTIVES

1. To ensure a reactor shutdown.
2. To prevent core damage by maintaining ECCS systems operating.
3. To ensure the plant stabilizes at a condition where no fuel damage occurs.

TITLE: ROD EJECTION

IMMEDIATE OPERATOR ACTIONS

ACTIONS	COMMENTS
1. Go immediately to OP-0.	

SUBSEQUENT OPERATOR ACTIONS

None

APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. Designate this event a Site Area Emergency. Notify plant staff and response organizations by implementing Emergency Procedures G-2 "Establishment of the On-Site Emergency Organization" and G-3 "Notification of Off-Site Organizations" in accordance with Emergency Procedure G-1 "Accident Classification and Emergency Plan Activiation."

PG&E **Pacific Gas and Electric Company**

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

NUMBER	EP OP-33
REVISION	1
DATE	2/11/82
PAGE	1 OF 4

TITLE: EMERGENCY OPERATING PROCEDURE
LOSS OF INSTRUMENT AIR

APPROVED: R C Thornberg 2/12/82
PLANT MANAGER DATE

SCOPE

This procedure provides guidance to the operator should the instrument air header pressure decrease to alarm levels. It is assumed herein that the Class I backup pneumatic supply system is available. Backup nitrogen system status as noted. In addition, this procedure directs operator action when all available air compressors cannot provide normal system pressure.

SYMPTOMS

1. Low instrument air header pressure alarm (PK13-16).
2. Low instrument air header pressure (PI-380 on VB-4).

AUTOMATIC ACTIONS

1. Air compressor standby start.
2. Probable reactor/turbine trip on Hi or low steam generator levels as MSIV's, cond/bstr pps, FW pps recirc. valves and FW isolation valves begin to move to the failed air position.
3. Possible random air-operated valve movement.

OBJECTIVES

1. Restore proper instrument air header pressure.
2. In the event that normal system pressure cannot be maintained:
   a. Prepare for a reactor trip and minimize the severity of the loss of air.
   b. Maintain the plant in a safe condition.

IMMEDIATE OPERATOR ACTIONS

ACTIONS	COMMENTS
1. Verify all available air compressor control switches are in AUTO. Place all compressors in ON if they fail to start in AUTO.	1. Will allow automatic start of compressors. O-3 and O-4.

ACTIONS	COMMENTS
SUBSEQUENT ACTIONS	
ACTIONS	
1. Monitor air header pressure (PI 380 on VB4).	
2. If pressure increases, go to OP-K-1:IV	2. OP-K-1:IV, Compressed Air System-Abnormal Operation
3. If air header pressure continues to indicate low or is decreasing:	3. Operator should be anticipating a complete loss of instrument air.
a. Initiate turbine runback at 200MWe/min. to approximately a 200MWe load.	
b. When turbine load reaches approximately 200MWe, manually trip the reactor.	
c. Perform the Immediate Operator Actions in OP-5 (Reactor Trip Without Safety Injections).	
d. Verify a heat sink for the RCS exists.	
1) Auxiliary feedwater system is feeding all steam generators.	
2) Steam dump valves open (VB3 indication).	2) If the MISV's have failed closed verify 10% steam dumps open on all stm. generators. Use backup control air bottles if necessary.
e. Trip main feedwater, condensate and booster pumps.	e. Feedwater iso valves and Pp recirc vlvs are air-to-open/fail-closed.
f. Verify RCS temperature and pressure are approacning hot standby values.	
g. Evaluate charging and letdown flow status.	

ACTIONS	COMMENTS
1) Verify charging flow is maintaining pressurizer level above 22%.	1) On loss of air, a) Recip Chg Pp goes to maximum speed. b) FCV-128 opens c) Normal charging paths should be available.
2) Verify seal water flow to all operating reactor coolant pumps.	
h. Maintain steady state hot standby condition until the instrument air system is restored.	

APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. Notify the Plant Superintendent, Supervisor of Operations and the Plant Manager.

   b. Designate this event a significant event. As a minimum, within one hour notify the NRC Bethesda Operations Center using the red phone in the Control Room. Gather sufficient information from all sources prior to calling so that the phone call is meaningful. Refer to Operating Procedure O-4 "Operating Order (One Hour Reporting Requirements to NRC)" for a suggested format for reporting. Notify the NRC that your call is pursuant to 10 CFR Part 50.72, (Notification of Significant Events).

   c. Review subsequent plant conditions against the classification criteria in Emergency Procedure G-1 "Accident Classification and Emergency Plan Activation."

PG&E **Pacific Gas and Electric Company**

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

NUMBER	EP OP-39
REVISION	1
DATE	2/11/82
PAGE	1 OF 3

TITLE: EMERGENCY OPERATING PROCEDURE
REACTOR COOLANT PUMP LOCKED ROTOR ACCIDENT

APPROVED: _____ 2/12/82
PLANT MANAGER DATE

SCOPE

This procedure provides instructions for the condition where one reactor coolant pump rotor locks and the pump comes to an abrupt stop. A reactor trip results from low loop flow or pump breaker overcurrent trip if above P-7. If below P-7 a hi reactor coolant pressure reactor trip will probably occur.

With the abrupt reduction in flow, the primary system heat removal rate is reduced significantly. Primary system pressure and temperature increase and the pressurizer relief and safety valves operate to terminate the pressure transient.

SYMPTOMS

1. Reactor Coolant Pump Trip alarm.
2. Loop Low Flow alarm.
3. Pressurizer High Pressure alarm.
4. Pressurizer High Pressure Reactor Trip alarm.

AUTOMATIC ACTIONS

1. Reactor trip.
2. Turbine-Generator trip.
3. Pressurizer relief valves open.
4. Pressurizer safety valves open.

OBJECTIVES

1. Restore normal primary system pressure and temperature to avoid possible DNBR conditions.
2. Initiate a plant cooldown to a cold shutdown mode.

TITLE: REACTOR COOLANT PUMP LOCKED ROTOR ACCIDENT

IMMEDIATE OPERATOR ACTIONS

ACTIONS	COMMENTS
1. Verify the reactor tripped; follow OP-5.	
2. Verify the turbine tripped.	

SUBSEQUENT OPERATOR ACTIONS

ACTIONS	COMMENTS
1. Verify steam dump operating.	
2. Verify steam generator levels and auxiliary FW pumps operating and delivering flow.	
3. Verify pressurizer sprays operating to regain control of pressurizer pressure.	
4. Verify PORV's closed when pressure drops below 2260 psig.	4. Close backup valves as required.
5. Monitor pressurizer relief tank pressure, temperature and level.	5. If the safety valves lifted and one sticks open, the pressurizer pressure and pressurizer relief tank parameters should indicate this. If safety injection occurs, go to OP-0.
6. Monitor steam generator levels. If any level increases rapidly with decreasing RCS pressure, a steam generator tube may have ruptured due to hi primary system pressure. In this case, an automatic or manual SI must be imposed at a primary system pressure of 1850 psig.	6. Additional indicators are Hi air ejection, off gas activity, and the radiation level in the steam generator blowdown.
7. Using Operating Procedure L-5 proceed to take the plant to cold shutdown to repair the RCP.	

APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. If a pressurizer pressure, overtemperature ΔT or overpower ΔT protection system channel is tripped or reactor power exceeds the safety limit in Technical Specification figure 2.1-1, designate this event a Notification of Unusual Event. Notify plant staff and response organizations required for this classification by implementing Emergency Procedures G-2 "Establishment of the On-Site Emergency Organization" and G-3 "Notification of Off-Site Organizations" in accordance with Emergency Procedure G-1 "Accident Classification and Emergency Plan Activation."

   b. If, subsequent to the pump trip, a reactor coolant sample indicates activity in excess of Technical Specification 3.4.8 limits (Figure 3.4-1 equivalent of I-131 or > 100/$\bar{E}$ uci/cc specific activity) designate this event as an Alert. Notify plant staff and response organizations required by EP G-2 and G-3 in accordance with EP G-1.

   c. If none of the above occur, refer to the reporting requirement of Emergency Operating Procedure OP-9 "Loss of a Reactor Coolant Pump." Review subsequent plant conditions against the classification criteria in Emergency Procedure G-1 "Accident Classification and Emergency Plan Activation."

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DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

NUMBER	EP OP-44
REVISION	2
DATE	2/11/82
PAGE	1 OF 8

TITLE: EMERGENCY OPERATING PROCEDURE
GASEOUS VOIDS IN THE RCS

APPROVED: _____ 2/12/82
PLANT MANAGER DATE

SCOPE

The objective of these instructions is to specify required operator actions and precautions necessary to remove gases from the reactor vessel head by increasing RCS pressure or by operation of the Reactor Vessel Head Vent.

Gases in the reactor coolant system may result from several types of plant events. An accumulator tank discharge or a core uncovery may result in non-condensible gases (e.g. nitrogen or hydrogen) being trapped in the RCS. A rapid RCS cooldown may result in the vessel head temperature being greater than the primary saturation temperature and result in a steam bubble being developed. The operator should suspect the presence of gases in the RCS if any of the above events occur.

SYMPTOMS

1. Reactor vessel level is <u>less</u> than 100% on:

   a. The Reactor Vessel Level (narrow range) indication with no RCP's running (natural circulation).

   b. The Flow Head (wide range) indication with all the RCP's running.

   c. Plenum Level indication with no RCP's running (natural circulation).

2. Abnormal reactor coolant system conditions have occurred such as a large unexpected variation in pressurizer level during normal charging or spraying operations.

3. Reactor vessel head temperatures equal to or greater than saturation temperature.

4. Plant events have occurred (such as accumulator tank discharge, rapid RCS cooldown, or core uncovery events) that may result in the presence of a gaseous void in the vessel head.

AUTOMATIC ACTIONS

None

OBJECTIVES

1. To remove any condensible gases from the RCS by increasing RCS pressure.
2. To vent any noncondensible gases by use of the Reactor Vessel Head Vent System.

PREREQUISITES AND CAUTIONS

1. Do not trip any running or start any non-operating reactor coolant pumps during the performance of this procedure. Tripping an operating reactor coolant pump could result in gases in the reactor coolant loops collecting in the steam generator U-tubes and may disturb natural circulation and primary to secondary heat transfer. Starting reactor coolant pumps would disperse any gases already collected in the vessel head and make their removal more difficult.
2. Place the containment Hydrogen Monitor System in service and perform Appendix A of this procedure prior to the venting operation.
3. The pressurizer level and pressure requirements throughout the procedure do not include error allocations due to an adverse containment environment. Therefore, it is assumed that containment temperature is near normal operating conditions.
4. This venting procedure should not be used as the primary means to mitigate an Inadequate Core Cooling event. The vent flowpath is not sized to provide this capability and should only be used in conjunction with the ICC procedures.
5. During a POST-LOCA cooldown and depressurization operation, if throttling safety injection flow is required, perform the venting operation prior to the throttling of the flow.

IMMEDIATE OPERATOR ACTIONS

None

SUBSEQUENT OPERATOR ACTIONS

ACTIONS	COMMENTS
1. Terminate any changes to the reactor coolant system that may be in progress and bring the RCS to as close to a steady-state condition as possible. Do not trip any running or start any idle RCP during this procedure.	1. Stability will help in determining the size and position of the void.

SUBSEQUENT OPERATOR ACTIONS (con't)

ACTIONS	COMMENTS
2. If the SIS in in operation, disregard this step and go to step 3. If SIS in not in operation, attempt to recombine any condensible gases by increasing RCS pressure through the use of the pressurizer backup heaters and increased charging flow. If this step is successful in condensing the gas volume in the vessel head, then return to the appropriate operating procedure. CAUTION: Increased charging flow with condensible gases in the RCS may result in a decreasing pressurizer level, due to steam bubble collapse. If pressurizer level decreases to less than 20% of span, then attempt to restore level by continuing the charging flow or manually starting safety injection pumps. If level cannot be restored, then manually initiate safety injection and proceed to EP OP-0, Immediate Actions and Diagnostics.	2. This step may be slow acting and if an upward trend is evident on the vessel level indicator continue until the head is refilled or the upward trend stops.
3. In preparation for venting, isolate the containment purge and exhaust system and the pressure vacuum relief line and start all available containment fan coolers.	3. Starting CFCU's will prevent forming H_2 gas pockets and help ensure a representative H_2 conc. reading.
4. Increase the RCS sub-cooling to 85°F by either initiating an RCS pressurization or by dumping steam from the non-faulted steam generators.	4. Increasing RCS pressure is the preferred method.
5. Complete Appendix A to determine the maximum allowable time period for venting.	5. This will limit containment H_2 conc. to <3 volume %.

SUBSEQUENT OPERATOR ACTIONS (con't)

ACTION	
6. If the SIS is in operation, go to step 9. If the SIS is not in operation, isolate letdown and initiate an RCS makeup by the chemical volume and control system to increase pressurizer level to greater than 50% of span.	
7. If not already performed, manually block the low pressure SI initiation if the permissive is energized.	7. The venting operation may result in pressure decreasing below the SI setpoint. Action should be taken to manually block the automatic SI signal when the permissive is energized
8. Increase charging flow to maximum to limit the pressurizer pressure and level decrease during the venting period.	8. Start an additional charging pump if necessary.
9. Observe the pressurizer level trend during the venting (step 10) and, from the following conditions, determine the probable status of the reactor coolant system.	
a. Increasing pressurizer level- Gaseous voids exist in the RCS other than the reactor vessel head or pressurizer.	a. Voids are expanding rapidly due to depressurization.
b. Constant pressurizer level- No significant gaseous voids exist in the reactor coolant system.	b. Steam/water flow rate out the vent = makeup flow rate.
c. Decreasing pressurizer level- Gaseous void exists in the reactor vessel head.	c. Flow rate of the gases is far greater than the makeup flow.
10. Open the vent isolation valves in one head vent flow path. If one or both valves fail to open, close both valves and open the isolation valves in the parallel flow path.	

SUBSEQUENT OPERATOR ACTIONS (con't)

ACTION	COMMENT
11. Close both vent isolation valves when: a. Reactor vessel level indication stabilizes, or b. The time period determined in Step 5 is met, or c. Pressurizer pressure decreases by 200 psi, or d. Pressurizer level decreases below 20 percent of span, or e. Reactor coolant sub-cooling decreases below 35°F, or f. The reactor vessel head is refilled as indicated by a decrease in the rate of a depressurization or a change in the rate of the pressurizer level trend.	11. If during the venting period, a loss of reactor coolant pump operation occurs, continue the venting and allow natural circulation to establish itself.
12. If the SIS is in operation, go to Step 14. If the SIS is not in operation, re-establish normal charging and letdown to maintain the pressurizer water level in the operating range.	
13. Evaluate the response of the pressurizer level trend to determine if a gas bubble existed, and if the venting was terminated prior to the vessel head being completely refilled, then return to Step 4.	13. If multiple venting operations are required and the containment hydrogen concentration is equal to or greater than 3 vol. percent, then provisions must be made to remove or reduce the volume of hydrogen from the containment prior to re-opening the reactor vessel head vent.
14. Return to the appropriate operating instruction following the successful completion of the venting of the reactor vessel head.	

APPENDIX A

DETERMINATION OF VENTING TIME PERIOD

1. Convert the containment free-volume to containment volume at standard temperature and pressure conditions:

   a. Average Containment Temp. = _____°F + 460 = _____°R

   b. Containment Volume @ STP:

      NOTE: For conservatism, the pressure factor for the conversion will be equal to one.

      $$\text{Cont. Vol (STP)} = (2.63 \times 10^6\ \text{Ft}^3) \times \left(\frac{492^\circ\text{R}}{\text{Avg. Cont. Temp., }^\circ\text{R}}\right) \times 1$$

      = _____ Ft^3 Date/Initials _____

2. Determine the containment hydrogen concentration in volume percent units. Place the Containment Hydrogen Monitor in service and open the sample line valves.

   NOTE: The containment hydrogen concentration will be insignificant if there has been no leakage from the PCS to the containment.

   a) H_2 Conc. Recorder No. _____ = _____%

   b) H_2 Conc. Recorder No. _____ = _____%

   Date/Initials _____

3. Calculate the maximum hydrogen volume that can be vented to the containment which will result in a containment hydrogen concentration of less than or equal to 3 volume percent. For conservatism, use the highest value recorded in Step 2.

   $$\text{Maximum } H_2 \text{ Volume to be Vented} = \frac{(3.0\% - \text{CONT. } H_2 \text{ CONC.}\%) \times (\text{Cont. Volume [STP]})}{100\%}$$

   = _____ Ft^3 Date/Initials _____

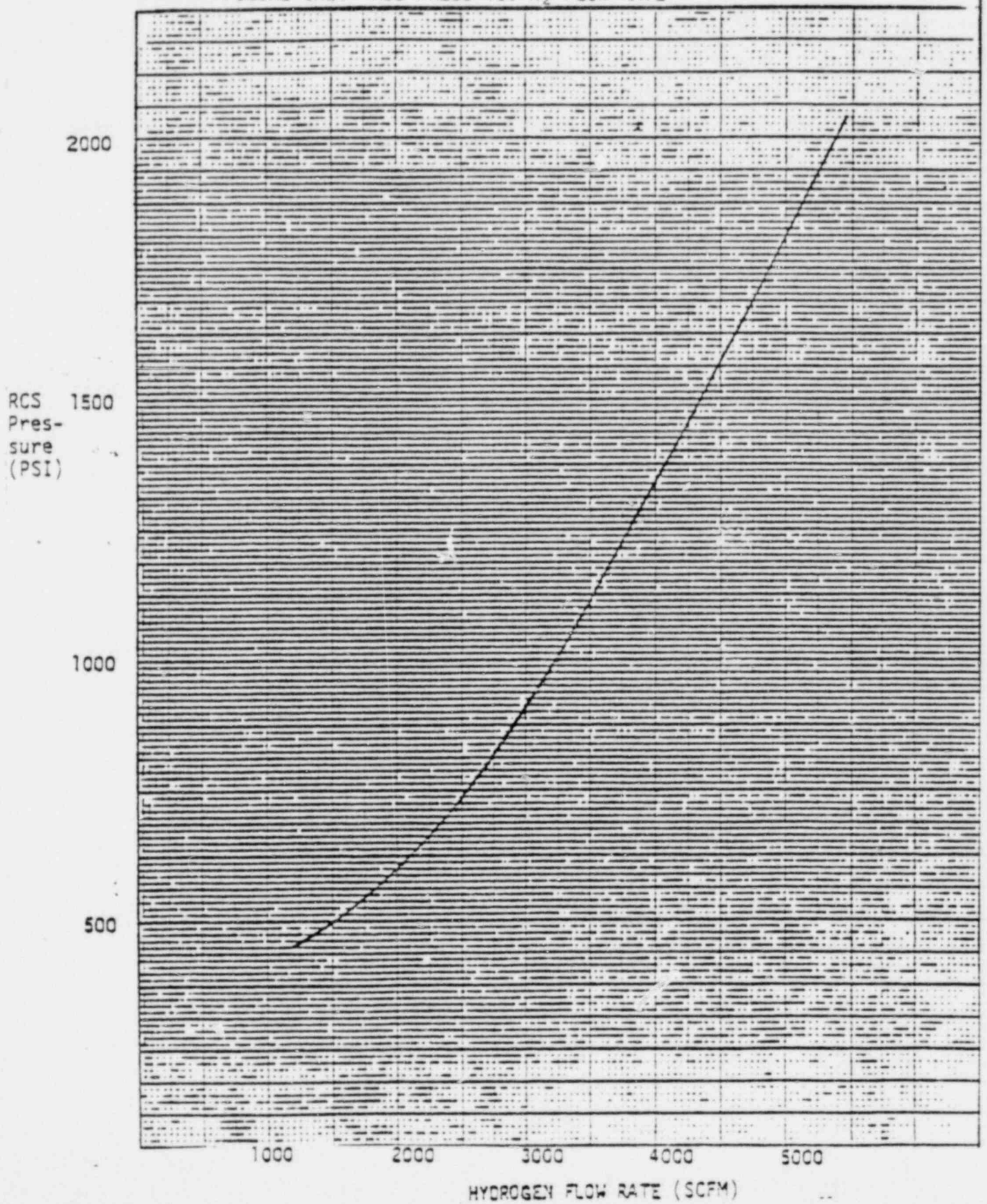
4. From Figure #1 (W.R. RCS Pressure vs. H_2 Flow Rate) determine the H_2 flow rate, then calculate the venting period which will limit the containment hydrogen concentration to 3 volume percent.

   $$\text{Venting Period} = \frac{\text{Max. } H_2 \text{ Vented (From Step 3)}}{H_2 \text{ Flow Rate}}$$

   = _____ Mins. Date/Initials _____

TITLE: GASEOUS VOIDS IN THE RCS

FIGURE ONE: RCS PRESS vs. H_2 FLOW RATE



APPENDIX Z

EMERGENCY PROCEDURE NOTIFICATION INSTRUCTIONS

1. When this emergency procedure has been activated and upon direction from the Shift Foreman, proceed as follows:

   a. Designate this event a Notification of Unusual Event if no other emergency condition exists. Notify plant staff and response organizations required for this classification by implementing Emergency Procedures G-2 "Establishment of the On-Site Emergency Organization" and Emergency Procedure G-3 "Notification of Off-Site Organization" in accordance with Emergency Procedure G-1 "Accident Classification and Emergency Plan Activation."

   b. If a severe loss of fuel clad integrity is evident, by increased reactor coolant activity (> 300 uci/cc equivalent of I-131 or greater than 1% fuel failures within 30 minutes or 5% total fuel failures as indicated by a sample), designate this event a Site Area Emergency. Notify plant staff and response organizations required for this classification by implementing EP G-2 and EP G-3 in accordance with EP G-1.

   c. If inadequate core cooling is verified per procedure OP-0, or containment hydrogen level increases when venting the reactor vessel head, designate this event a General Emergency. Notify plant staff and response organizations required for this classification by implementing EP G-2 and EP G-3 in accordance with EP G-1.

PG&E **Pacific Gas and Electric Company**

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

NUMBER	EP G-1
REVISION	2
DATE	1/28/82
PAGE 1	OF 50

TITLE: EMERGENCY PROCEDURE
ACCIDENT CLASSIFICATION AND EMERGENCY PLAN ACTIVATION

APPROVED: R C Thoburn 2/1/82
PLANT MANAGER DATE

SCOPE

This procedure describes the guidelines for Accident Classification and responsibilities for Activation of the Emergency Plan. Implementation of this procedure constitutes declaration of an emergency condition.

GENERAL

This General Emergency Procedure provides guidance on activating the emergency plan and classifying an accident. The steps required by this procedure are in addition to the steps required to maintain or restore the plant to a safe condition.

Prompt notification of offsite authorities should be given within about 15 minutes for the Unusual Event class and sooner (consistent with the need for other emergency actions) for other classes. The time is measured from the time which the Shift Foreman recognizes that events have occurred which make declaration of an emergency class appropriate.

This procedure is organized as follows:

ACTIVATION OF EMERGENCY PLAN

The initial steps to be taken for each of the established accident classifications are listed below under:

1. Notification of an Unusual Event
2. Alert
3. Site Area Emergency
4. General Emergency

Figure 1 may be used for guidance in assignment of shift personnel to activate the Emergency Organization and implement the Emergency Plan.

ACCIDENT CLASSIFICATION

Table 1 provides guidance and criteria for determining if an event meets the emergency action levels requiring declaration of one of the four accident classifications. Normally the classification guidance contained in the appropriate OP, R, or M series emergency procedures will be used to determine the initial classification. In the event none of the OP, R or M series procedures is appropriate to the immediate situation, Table 1 and judgement should be used for the initial classification (and future events as necessary).

NOTE: If multiple emergency situations are occurring simultaneously such that the probability of a release of radioactive materials is increased over what it would be for the single occurrence, classify the emergency one level higher than it would otherwise have been, based on the most severe single occurrence.

Table 2 summarizes the emergency classification guidance in the OP, R, and M series procedures.

In addition, procedures included in the emergency procedures which meet the NRC reporting requirements for "Significant events" (10 CFR 50.72) but do not meet the criteria for implementing the emergency plan are included in Table 3 for reference. Refer to Operating Procedure, O-4, "Operating Order (1 hour Reporting Requirements to the NRC)" for appropriate reporting for these events.

PROCEDURE

1. NOTIFICATION OF UNUSUAL EVENT

   a. Description

      Unusual events, generally characterize off-normal plant conditions that are in process or have occurred which 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 standpoint. No releases of radioactive material requiring offsite response or monitoring are expected for this classification unless further degradation of the level of safety of the plant occurs.

b. Objectives

1) Evaluate the situation and determine if corrective actions are required to place the plant in a stable, safe condition.

2) Organize the on-shift staff to take actions to maintain, or return to safe plant conditions.

3) Notify offsite emergency support groups, regulatory agencies and off-shift plant personnel of the situation to assure that the first step in any response has been carried out.

c. Actions

1) Assign on-shift personnel to perform the functions required for implementation of the Emergency Plan. Assignments may vary at the discretion of the interim Site Emergency Coordinator, however, a typical organization and assignments are given in Figure 1. Duties and responsibilities are listed in EP G-2, "Establishment of the Onsite Emergency Organization."

a) If organizational requirements are given in the appropriate OP, R, or M Procedure, they should be followed.

b) The minimum functions which must be assigned are:

(1) Operational control of the plant by on-shift personnel (Emergency Operations Coordinator).

(2) Notification of offsite organizations and off-shift staff (Emergency Liaison Coordinator).

2) Notify off-shift plant staff of the emergency situation per EP G-2 "Establishment of the Onsite Emergency Organization."

3) Promptly notify and inform the on-call recovery Manager of the nature of the Unusual Event situation per EP G-3, "Notification of Offsite Organizations."

4) Promptly notify county and state agencies and the NRC of the emergency situation, its classification and their anticipated response per EP G-3 "Notification of Offsite Organizations."

5) Escalate to a more severe class, if appropriate.

OR

6) Close out with a verbal summary of corrective actions or termination of the event to offsite authorities.

7) Retain all notification records and other documentation of the event for use in preparation of a written summary of the event within 24 hours of closeout.

2. ALERT

a. Description

Events are in progress, or have occurred, which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. It is the lowest level of classification where emergency near-site or offsite response may be anticipated. For most Alert events, the plant would be brought to a safe condition, and radioactive releases, if any, would be minimal.

b. Objectives

1) Evaluate the situation and determine corrective actions required to place the plant in a stable, safe condition and minimize the potential for release of radioactive material.

2) Organize the on-shift staff to take actions to maintain, or return to safe plant conditions.

3) Notify and inform offsite emergency support groups, regulatory agencies and off-shift plant personnel of the situation so appropriate emergency response may be initiated as needed.

4) Assess the potential for, or extent of, release of radioactive material to determine what protective action recommendations, if any, should be given to offsite authorities and what protective actions, if any, should be implemented for onsite personnel.

c. Actions

1) Assign on-shift personnel to perform the functions required for implementation of the Emergency Plan. Assignments may vary at the discretion of the interim Site Emergency Coordinator, however, a typical organization and assignments are given in Figure 1. Duties and responsibilities are listed in EP G-2, "Establishment of the Onsite Emergency Organization."

a) If organizational requirements are given in the appropriate OP, M, or R procedure, they should be followed.

b) The minimum functions which must be assigned are:

(1) Operational control of the plant (Emergency Operations Coordinator).

(2) Notification of offsite organizations and off-shift staff (Emergency Liaison Coordinator).

(3) Evaluation of plant conditions and radiological assessment (Emergency Evaluations and Recovery Coordinator).

2) Sound the site emergency signal, if appropriate, to initiate site assembly and accountability per EP G-4, "Personnel Assembly and Accountability."

3) Notify off-shift plant staff of the emergency situation and their assignments in the long-term emergency organization to activate the Technical Support Center (TSC), Emergency Operations Facility (EOF) and Operational Support Center (OSC) per EP G-2, "Establishment of the Onsite Emergency Organization."

4) Promptly notify and inform the county of the alert status and their anticipated response per EP G-3, "Notification of Offsite Organizations."

5) Promptly notify the Recovery Manager of the Nature of the alert status per EP G-3, "Notification of Offsite Organizations."

6) Promptly notify the state and NRC of the nature of the alert status per EP G-3, "Notification of Offsite Organizations."

7) Dispatch the Liaison Assistant to activate the Technical Support Center (TSC) telephone console to receive incoming phone calls, if required.

8) Initiate onsite monitoring and associated communications per EP RB-7, "Emergency Onsite Radiological Monitoring Program," if a release is occurring or anticipated.

9) Order evacuation of nonessential site personnel per EP G-5, "Evacuation of Nonessential Site Personnel" if appropriate.

10) Provide periodic (approximately every 15 minutes) plant status updates, meteorological assessments, and dose estimates to offsite authorities. Use Form 18-10262 "Radiological Emergency Status Form" per EP G-3, "Notification of Offsite Organizations."

11) Escalate to a more severe class, if appropriate.

OR

12) Closeout or recommend reduction in emergency class by verbal communication of termination of the event to offsite authorities.

13) Retain all notification records and other documentation of the event for use in preparation of a written summary of the event within 8 hours of closeout.

3. SITE AREA EMERGENCY

a. Description

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. The Site Area Emergency classification reflects conditions where there is a clear potential for significant releases of radioactive material, such releases are likely, or they are occurring, but in all cases a core meltdown situation is not indicated based on current information. Any releases are not expected to exceed EPA protective Action Guideline Exposure levels except near the site boundary.

b. Objectives

1) Evaluate the situation and determine corrective actions required to place the plant in a stable, safe condition and minimize the potential for, or actual release of, radioactive material.

2) Augment on-shift staff to take actions to maintain, or return to safe plant conditions.

3) Assure that on and offsite emergency response centers are manned.

4) Provide consultation with appropriate local and state authorities and the NRC so that appropriate emergency response may be initiated, including protective actions for the general public.

5) Implement protective actions on-site required for personnel safety and to minimize radiation exposure.

6) Provide status updates for the public through offsite response personnel authorities.

c. Actions

1) Assign on-shift personnel to perform the functions required for implementation of the Emergency Plan. Assignments may vary at the discretion of the interim Site Emergency Coordinator; however, a typical organization and assignments are give in Figure 1. Duties and responsibilities are listed in EP G-2, "Establishment of the Onsite Emergency Organization."

a) If organizational requirements are given in the appropriate OP, M, or R procedure, they should be followed.

b) The minimum functions which must be assigned are:

(1) Operational control of the plant (Emergency Operations Coordinator).

(2) Notification of offsite organizations and off-shift staff (Emergency Liaison Coordinator).

(3) Evaluation of plant conditions and radiological assessment (Emergency Evaluations and Recovery Coordinator).

2) Sound the Site Emergency Signal to initiate site assembly and accountability per EP G-4 "Personnel Assembly and Accountability."

3) Notify off-shift plant staff of the emergency situation and their assignments in the long-term emergency organization per EP G-2, "Establishment of the Onsite Emergency Organization."

4) Promptly inform the county authorities of the emergency situation, its classification and their anticipated response per EP G-3 "Notification of Offsite Organizations." Include a recommendation as to whether protective actions for the general public are recommended at this time.

5) Promptly inform the Recovery Manager to insure activation of the Corporate emergency organization per EP G-3, "Notification of Offsite Organizations."

6) Promptly inform the state and NRC of the nature of the Site Area Emergency and maintain communication per EP G-3, "Notification of Offsite Organizations."

7) Activate the Technical Support Center (TSC) Switchboard to receive incoming phone calls.

8) Determine the need for evacuating non-essential on-site personnel per EP G-5 "Evacuation of Non-essential Site Personnel."

9) Initiate on-site and off-site monitoring per EP RB-7, "Emergency On-site Radiological Monitoring Program," and EP RB-8, "Emergency Off-site Radiological Monitoring Program."

10) Provide periodic release and dose projections based on available plant conditions and meteorological information and foreseeable contingencies to NRC, local and state authorities. Use Form 18-10262 "Radiological Emergency Status Form" per EP G-3, "Notification of Offsite Authorities."

11) Escalate to general emergency class, if appropriate.

OR

12) Closeout or recommend reduction in emergency class by verbal communication to offsite authorities at EOF or by phone.

13) Retain all notification records and other documentation of the event for use in preparation of a written summary of the event within 8 hours of closeout.

4. GENERAL EMERGENCY

a. Description

The General Emergency action level reflects accident situations involving actual or imminent substantial core degradation or melting with the potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

b. Objectives

1) Evaluate the situation and determine corrective actions required to restore the plant to a stable, safe condition and minimize the potential or actual release of radioactive material.

2) Augment the on-shift staff to take actions to restore safe plant conditions.

3) Assure that on and off-site emergency response centers are manned.

4) Recommend evacuation of the low population zone and provide consultation with appropriate local, state and federal authorities so that additional appropriate emergency response may be initiated.

5) Evacuate nonessential site personnel per EP G-5, "Evacuation of Nonessential Site Personnel," and implement other protective actions required on-site for personnel safety and to minimize radiation exposure.

6) Provide status updates for the public through offsite response personnel.

c. Actions

1) Assign on-shift personnel to perform the functions required for implementation of the Emergency Plan. Assignments may vary at the discretion of the interim Site Emergency Coordinator; however, a typical organization and assignments are given in Figure 1. Duties and responsibilities are listed in EP G-2, "Establishment of the Onsite Emergency Organization."

a) If organizational requirements are given in the appropriate OP, M, or R procedure, they should be followed.

b) The minimum functions which must be assigned are:

(1) Operational control of the plant (Emergency Operations Coordinator).

(2) Notification of offsite organizations and off-shift staff (Emergency Liaison Coordinator).

(3) Evaluation of plant conditions and radiological assessment (Emergency Evaluations and Recovery Coordinator).

(4) Evacuation of nonessential site personnel (Site Evacuation Coordinator).

(5) Recommendation of protective actions for the general public to appropriate local and state authorities (Site Emergency Coordinator).

2) Sound the site emergency signal to initiate site assembly and accountability per EP G-4, "Personnel Assembly and Accountability."

3) Notify off-shift plant staff of the emergency situation and their assignments in the long-term emergency organization per EP G-2, "Activation and Notification of Onsite Emergency Organization."

4) Promptly notify and inform the county authorities of the emergency situation, its classification and their anticipated response per EP G-3, "Notification of Off-Site Organizations." Recommend evacuation out to the LPZ and alerting of the general public in the basic emergency planning zone to County Authorities.

5) Promptly inform the Recovery Manager to insure activation of the Corporate emergency organization per EP G-3, "Notification of Offsite Organizations."

6) Promptly inform the State and NRC of the nature of the General Emergency and maintain communication per EP G-3, "Notification of Offsite Organizations."

7) Order evacuation of nonessential site personnel per EP G-5, "Evacuation of Nonessential Site Personnel."

8) Activate the Technical Support Center (TSC) Switchboard to receive incoming phones calls.

9) Dispatch onsite and offsite monitoring teams, per EP RB-7 and EP RB-8.

10) Provide release and dose projections based on available plant condition and meteorological information and foreseeable contingencies to the NRC, local and state authorities. Use Form 18-10262 "Radiological Emergency Status Form" per EP G-3, "Notification of Offsite Authorities."

11) Closeout or recommend reduction of emergency class by briefing of offsite authorities at EOF or by phone.

12) Retain all notification records and other documentation of the event for use in preparation of a written summary of the event within 8 hours of closeout.

TABLES

1. "Emergency Action Levels"
2. "Emergency Operating Procedures - Accident Classifications"
3. "Emergency Operating Procedures - Significant Events"
4. Technical Specifications Applicable to Unusual Event Condition No. 9.

FIGURES

1. "Typical On-Shift Emergency Organization and Assignments"

SUPPORTING PROCEDURES

EP G-2 "Establishment of the Onsite Emergency Organization"

EP G-3 "Notification of Offsite Organizations"

EP G-4 "Personnel Assembly and Accountability"

EP G-5 "Evacuation of Nonessential Site Personnel"

TABLE 1

EMERGENCY ACTION LEVELS

NOTIFICATION OF UNUSUAL EVENT

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
1. Emergency Core Cooling System (ECCS) initiated and discharge to vessel.	1. a. Safety Injection Initiate, Safety Injection Activation and Safeguard Channel Activated Alarms. b. ECCS flow indicated.
2. Radiological effluent technical specification limits exceeded.	2. In accordance with Technical Specifications Sections 3.11.1.1 and 3.11.2.1. a. Radiological Effluent Process Monitor High Radiation Alarm with a valid reading in excess of the technical specification alarm setpoint on any of monitors RE 14A or B, RE 28A or B, RE 24, RE 27, RE 18, RE 23, RE 3, or RE 16. b. Unplanned or uncontrolled release exceeding alarm setpoint.
3. Fuel damage indication.	3. Gross Failed Fuel Monitor (hot leg sample line monitor) channel alarms with:

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	a. Sample of RCS confirms dose equivalent I-131 activity greater than Technical Specification limits for an iodine spike (Technical Specification Figure 3.4-1), or
	b. Sample of RCS confirms specific activity greater than 100/E uCi/gm in accordance with Technical specification 3.4.8.
4. Abnormal coolant temperature and/or pressure or abnormal fuel temperatures outside of technical specification limits.	4. a. High T_{ave} or, pzr low press alarm, or
	b. Over temperature delta T or overpower delta T channel activated, or
	c. Reactor Power exceeds safety limits shown in Technical Specification Figure 2.1-1.
5. Exceeding either primary/ secondary leak rate technical specification or primary system leak rate technical specification.	5. Indication of Reactor Coolant PRESSURE BOUNDARY LEAKAGE, or
	a. 1 GPM UNIDENTIFIED LEAKAGE, or

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS		DIABLO CANYON POTENTIAL INDICATED CONDITIONS	
		b.	1 GPM total primary-to-secondary leakage through all steam generators and 500 gallons per day through any one steam generator, or
		c.	10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, or
		d.	40 GPM CONTROLLED LEAKAGE at a Reactor Coolant System pressure of 2230±20 psig, or
		e.	1 GPM leakage at a Reactor Coolant System pressure of 2235±20 psig from any Reactor Coolant System pressure isolation valve specified in Technical Specification Table 3.4-1.
6.	Failure of a safety or relief valve in a safety-related system to close following reduction of applicable pressure.	6.	a. Abnormal system pressure, flow or temperature on affected safety-related system and relief valve verified to be failed open, or

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	b. Pressurizer PORV indicates open, or pzr safety or PORV line high temperature alarm, or sonic detector indicates flow following valve activation.
7. Loss of offsite power or loss of onsite AC power capability.	7. a. Vital 4 KV Bus Auxiliary or Startup Breaker alarm, and auto transfer to startup power or auto start of applicable diesel generator, or
	b. Power sources not operable in accordance with Technical Specification 3.8.1.1.
8. Loss of containment integrity requiring shutdown by technical specifications.	8. a. Inability to close any penetration required to be closed in an accident condition by valves, blind flange, deactivated automatic valves or operable containment automatic isolation valve, or
	b. Air lock leakage exceeds Technical Specification 3.6.1.3.b.

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
9. Loss of engineered safety feature requiring shutdown by technical specifications (e.g., due to malfunction, personnel error, or procedural inadequacy).	9. The malfunction or disabled equipment results in a plant condition not meeting a Technical Specification limiting condition for operation listed in Table 4 and the action required by the Technical Specification requires plant shutdown.
10. Fire within the plant lasting more than 10 minutes.	10. Fire alarm received or fire detection instrument alarm received, fire verified by fire brigade personnel and fire not under control within 10 minutes of initiating fire-fighting efforts.
11. Indications or alarms on process or effluent parameters not functional in control room to an extent requiring plant shutdown or other significant loss of assessment or communication capability (e.g., plant computer, Safety Parameter Display System).	11. a. Loss of seismic trip requiring shutdown or b. Loss of remote shutdown or accident monitoring instrumentation requiring plant shutdown as per Technical Specification 3.3.3.5 or 3.3.3.6 or c. Total loss of communication capabilities with San Luis Obispo County, California State OES or NRC.

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
12. Security threat or attempted entry or attempted sabotage.	12. a. Threat received by Plant Personnel or b. Plant Security Force reports attempted forceable entry or sabotage attempt or c. Plant personnel detect attempted sabotage.
13. Natural phenomenon being experienced or projected beyond usual levels.	
a. Any earthquake felt in-plant or detected on station seismic instrumentation.	a. Seismic monitoring system activated (setpoint 0.01g).
b. 50-year flood or low water, tsunami, hurricane surge.	b. 1) Flooding of any plant structure (turbine building auxiliary building, fuel storage building) that affects the operation of the plant, or 2) Intake structure sump level high alarm with circulating water pump alarm or trip, or

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	3) Observed low water level at the intake structure indicative of a tsunami, or
	4) Significant tsunami or hurricane warning received from State of California, National Oceanic and Atmospheric Administration, NWS, Coast Guard or System Dispatcher, or
	5) Observation of waves exceeding the intake structure main deck elevation.
c. Any tornado onsite.	c. NWS warning and tornado cloud sighted within site boundary.
d. Any hurricane.	d. NWS warning and winds in excess of 75 mph (34 m/sec) at any elevation on the meteorological tower.
14. Other hazards being experienced or projected.	
a. Aircraft crash onsite or unusual aircraft activity over facility.	a. Report of crash onsite or unusual activity over the plant by plant personnel.

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
b. Near or onsite explosion.	b. Report of explosion by plant personnel.
c. Near or onsite toxic or flammable gas release.	c. Report of toxic or flammable gas release by plant personnel.
d. Turbine rotating component failure causing rapid plant shutdown.	d. Turbine trip and turbine supervisory alarm, "High Vibration."

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
15. Other plant conditions exist that warrant increased awareness on the part of a plant operating staff or state and/or local offsite authorities or require plant shutdown under technical specification requirements or involve other than normal controlled shutdown (e.g., cooldown rate exceeding technical specification limits, pipe cracking found during operation).	15. a. Plant conditions require entry into a Technical Specification action statement requiring plant shutdown, or b. Equipment failure, personnel error or procedural error causes plant conditions during shutdown which, in the opinion of the Shift Foreman, indicate a potential degradation in the level of safety of the plant, or c. Personnel error or procedural inadequacy which, during normal operations, anticipated operational occurrences, or accident conditions, prevents or could prevent, by itself the fulfillment of the safety function of those structures, systems, and components important to safety that are needed to: (1) shutdown the reactor safely and maintain it in a safe

NOTIFICATION OF UNUSUAL EVENT (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	condition; or (2) remove residual heat following reactor shutdown; or (3) limit the release of radioactive material to acceptable levels or reduce the potential for such a release.
16. Transportation of contaminated injured individual from site to offsite hospital.	16. Report of injury or over-exposure involving radio-active material onsite and requiring offsite medical assistance or hospitalization.
17. Rapid depressurization of PWR secondary side.	17. a. High steam flow and low steam pressure and/or low T_{ave}, or b. Reduced primary pressure, Safety Injection Initiated and Main Steam Isolation.

ALERT

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
1. Severe loss of fuel cladding:	
a. Very high coolant activity sample (e.g., 300 uCi/cc equivalent of I-131).	a. Reactor Coolant Sample is greater than or equal to 300 uCi/cc equivalent of I-131.
b. Failed fuel monitor indicates increase greater than 1% fuel failures within 30 minutes or 5% total fuel failures.	b. Gross failed fuel monitor channel alarms. Sample of Reactor Coolant confirms conditions as stated.
2. Rapid gross failure of one steam generator tube with loss of offsite power.	2. High Radiation Alarm on Air Ejector Vent, or High Radiation on Steam Generator Blowdown, and Increased charging pump flow rate, or volume control tank low level alarm, and Offsite power loss is indicated by meters and under voltage alarms from 12 KV Bus D&E and 4 KV Bus D&E.
3. Rapid failure of steam generator tubes (e.g., several hundred gpm primary to secondary leak rate).	3. Reactor Trip and Safety Injection initiates, and High Radiation alarm on Air Ejector Vent or High Radiation Alarm on Steam Generator Blowdown, and

ALERT - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	Increasing water level on affected steam generator.
4. Steam line break with significant (e.g., greater than 10 gpm) primary to secondary leak rate.	4. Known significant primary to secondary leakage indicated by high radiation alarms on the air ejector or steam generator blowdown, or by sample, and Steam Line Isolation and Safety Injection initiated on High Steam Line Flow with either Low-Low T_{ave} or Low Steam Pressure alarms.
5. Primary coolant leak rate greater than 50 gpm.	5. a. One or more of the following indications or alarms: 1) Containment High Activity Alarm; 2) Containment Sump High Level Alarm or increased containment sump discharge; 3) Pressurizer Relief Tank has increased temperature/level or pressure; 4) Pressurizer PORV indicates open per safety or PORV Line High Temperature Alarm, or

ALERT - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	sonic detector indicates flow; 5) Air Ejector High Activity Alarm; 6) Steam Generator Blowdown High Activity Alarm; 7) Volume Control Tank low level alarm, and One Centrifugal charging pump is unable to maintain pressurizer level with normal letdown flow.
6. Radiation levels or airborne contamination which indicate a severe degradation in the control of radioactive materials (e.g., increase of a factor of 1,000 in direct radiation readings within the facility).	6 a. An unplanned or unanticipated rise in radiation levels from a contained source so that one of the following situations result: 1) Radiation levels above 1 R/hr outside the boundaries of the controlled areas, or 2) Radiation levels above 1 R/hr in portions of the controlled area which are passageways, are normally occupied or accessible areas and are normally less than 15 mR/hr, or

ALERT - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS		DIABLO CANYON POTENTIAL INDICATED CONDITIONS	
			3) Radiation level increases of 1 R/hr or more in accessible areas normally between 15 and 100 mR/hr. b. The level for airborne radioactivity levels within plant structures is set at an unexplained increase of 100 times MPC.
7.	Loss of offsite power and loss of all onsite AC power (See Site Area Emergency for extended loss).	7.	4 KV Bus F,G, and H Undervoltage Alarm or Auxiliary and Startup Breaker Alarm, and Applicable Diesel Generator inoperable alarm, and Vital 4 KV load center voltmeters indicate zero volts.
8.	Loss of all onsite DC power (see Site Area Emergency for extended loss).	8.	DC Bus 11, 12, and 13 undervoltage.
9.	Coolant pump seizure leading to fuel failure.	9.	One or more of the following indications or alarms: a. Reactor Coolant Pump Trip Alarm. b. Reactor Protection Signal Alarm on Loop Low Flow,

ALERT - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	c. Pressurizer High Pressure Alarm, and d. Subsequent Reactor Coolant system activity is in excess of Unusual Event Condition number 3 levels.
10. Complete loss of any function needed for plant cold shutdown.	10. Loss of both residual heat removal trains.
11. Failure of the reactor protection system to initiate and complete a scram which brings the reactor subcritical.	11. Plant conditions indicate the required coincidence for Reactor Trip has occurred or the required coincidence of bistables have tripped, or trip is manually activated, and Nuclear Instrumentation indicates reactor not subcritical (non-negative start-up rate).
12. Fuel damage accident with release of radioactivity to containment or fuel handling building.	12. a. High Containment Radiogas and/or particulate alarms or Containment Ventilation Isolation caused by high containment activity while in the refueling mode or

ALERT - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	b. High Fuel Handling Building Area Radiation Alarm or Fuel Handling Building Ventilation automatic change to the Iodine Removal Mode, while irradiated fuel is in the building.
13. Fire potentially affecting safety systems.	13. Unusual Event Condition No. 10, and the fire is located in one of the following areas: 1) Containment 2) Control Room 3) Cable Spreading Room 4) Diesel Generator Room 5) Auxiliary Building 6) Intake Structure Pump Room
14. Most or all alarms (annunciators) are lost.	14. All or most of the main control panel annunciators and indicators do not respond.

ALERT - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
15. Radiological effluents greater than 10 times technical specification instantaneous limits (an instantaneous rate which, if continued over 2 hours would results in about 1 mR at the site boundary under average meteorological conditions).	15. Radiological effluent process monitor alarm (Unusual Event Condition No. 2) with effluent analysis or evaluation confirming 10x Technical Specification limits exceeded.
16. Ongoing security compromise.	16. Ongoing security threat involving physical attack on the facility, Security Response Procedure initiated.
17. Severe natural phenomena being experienced or projected:	
a. Earthquake greater than OBE levels.	a. Earthquake greater than 0.2g verified by Seismic Monitors.
b. Flood, low water, tsunami, hurricane surge near design levels.	b. High water exceeding Intake Structure main deck elevation or low water causing temporary shutdown of both ASW pumps.
c. Any tornado striking facility.	c. Unusual Event condition No. 13.c. and tornado cloud strikes the plant.
d. Hurricane winds near design basis level.	d. Sustained wind of 85 mph (38 m/sec) at any elevation on the Meteorological Tower.

ALERT - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
18. Other hazards experienced or projected:	
a. Aircraft crash on facility.	a. Unusual Event condition No. 14.a. and crash occurs involving a plant structure.
b. Missile impacts from whatever source on facility.	b. Confirmed missile impact on a plant structure.
c. Known explosion damage to facility affecting plant operation.	c. Unusual Event condition No. 14.b. and the explosion affects plant operation.
d. Entry into facility environs of uncontrolled toxic or flammable gases.	d. Unusual Event condition No. 14.c. and the gas is detected within plant structures other than the intake structure.
e. Turbine failure causing casing penetration.	e. Confirm report of conditions as stated.
19. Other plant conditions exist that warrant precautionary activation of Technical Support Center and placing near-site Emergency Operations Facility and other key emergency personnel on standby.	19. Conditions as stated in the judgement of the Shift Foreman
20. Evacuation of control room anticipated or required with control of shutdown systems established from local stations.	20. As stated.

SITE AREA EMERGENCY

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
1. Known loss of coolant accident greater than makeup pump capacity.	1. Alert condition number 5, and Safety Injection with abnormally high or increasing levels of containment pressure, containment area radiation or containment recirc sump level.
2. Degraded core with possible loss of coolable geometry (indicators should include instrumentation to detect inadequate core cooling, coolant activity and/or containment radioactivity levels.	2. Refer to General Emergency Section, Condition 8, to classify this condition.
3. Rapid failure of steam generator tubes (several hundred gpm leakage) with loss of offsite power.	3. ALERT Condition number 3 and Offsite power loss is indicated by meters and undervoltage alarms from 12 KV Bus D and E and 4 KV Bus D and E.
4. Steam line break with greater than 50 gpm primary to secondary leakage and indication of fuel damage.	4. ALERT Condition number 4 and ALERT Condition number 1 concurrently.
5. Loss of offsite power and loss of onsite AC power for more than 15 minutes.	5. ALERT Condition number 7 exists for longer than 15 minutes.

SITE AREA EMERGENCY (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
6. Loss of all vital onsite DC power for more than 15 minutes.	6. ALERT Condition number 8 exists for longer than 15 minutes.
7. Complete loss of any function needed for plant hot shutdown.	7. a. Complete loss of emergency feedwater capability, or b. Complete loss of Steam Dump System and steam generator safety valves, or c. Complete loss of Chemical and Volume Control System capability to maintain the RCS inventory or to increase the concentration of the boric acid in the RCS, or d. Complete loss of Chemical and Volume Control System Capability to increase the concentration of Boric Acid in the RCS sufficient to maintain a K_{eff} less than or equal to .99 in Mode 4 (hot shutdown) with a loss of capability to trip control rods.

SITE AREA EMERGENCY (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	e. Complete loss of Auxiliary Saltwater System or Component Cooling Water System, or f. Complete loss of Vital 4160 Volt buses, or g. Complete loss of Instrumentation or Controls required for any of the systems capabilities in items 7.a-f. above.
8. Transient requiring operation of shutdown systems with failure to scram (continued power generation but no core damage immediately evident).	8. ALERT Condition number 11 and power generation indicated on power range channels, and No gross fuel failure evident, (absence of Alert Condition No. 1).
9. Major damage to spent fuel in containment or fuel handling building (e.g., large object damages fuel or water loss below fuel level).	9. Alert Condition number 12, and Confirmed gross fuel damage or loss of water level to below fuel level.
10. Fire compromising the functions of safety systems.	10. ALERT Condition number 13, and Confirmed loss of safety systems functions that causes entry into a Technical Specification action statement.

SITE AREA EMERGENCY (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
11. Most or all alarms and indicators lost for more than 15 minutes and plant transient is initiated or in progress or not in cold shutdown.	11. ALERT Condition number 14 lasting for more than 15 minutes, and Plant is not in cold shutdown or plant transient occurs.
12. a. Effluent monitors detect levels corresponding to greater than 50 mR/hr for 1/2 hour or greater than 500 mR/hr W.B. for two minutes (or five times these levels to the thyroid) at the site boundary for adverse meteorology.	12. a. An actual or projected release which is calculated on EARS, or in accordance with EP R-2, to exceed the following criteria at the site boundary (800 m.): 50 mR/hr for 1/2 hr., whole body. 17 mR total dose, whole body. 250 mR/hr for 1/2 hr., thyroid. 85 mR total dose, thyroid. or, a peak release rate exceeding two minutes duration which exceeds the following criteria at the site boundary when calculated in accordance with EP R-2: 500 mR/hr for 2 minutes, whole body. 2500 mR/hr for 2 minutes, thyroid.

SITE AREA EMERGENCY (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
b. The dose rates are projected based on other plant parameters (e.g., radiation level in containment with leak rate appropriate for existing containment pressure) or are measured in the environs.	b. As stated.
c. EPA Protective Guidelines are projected to be exceeded outside the site boundary.	c. As stated.
13. Imminent loss of physical control of the plant.	13. On-going security threat involving physical attack on the facility which may result in the loss of physical control of the station. Security response procedure initiated.
14. Severe natural phenomenon being experienced or projected with the plant not in cold shutdown:	
a. Earthquake greater than SSE levels.	a. Earthquake greater than 0.6g verified by Seismic Monitors.
b. Flood, low water, tsunami, hurricane surge, greater than design levels or failure of protection of vital equipment at lower levels.	b. High water causing flooding of ASW pump compartments or low water causing the shutdown of both ASW pumps for more than 15 minutes.

SITE AREA EMERGENCY (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
c. Sustained winds or tornados in excess of design levels.	c. Meteorological Instrumentation indicates sustained wind speed greater than 100 mph (m/sec).
15. Other hazards being experienced or projected with plant not in cold shutdown:	
a. Aircraft crash affecting vital structures by impact or fire.	a. Alert condition No. 18.a and crash occurs involving the main plant structures or the intake structure.
b. Severe damage to safe shutdown equipment from missiles or explosion.	b. Alert condition No. 18.b or 18.c and damage to plant equipment requires entry into a technical specification action statement.
c. Entry of uncontrolled flammable gases into vital areas. Entry of uncontrolled toxic gases into vital areas where lack of access to the area constitutes a safety problem.	c. Alert condition No. 18.d. and the gas is detected in the Control Room, hot shutdown panel or other area where a plant manipulation required for safe shutdown must be performed.

SITE AREA EMERGENCY (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
16. Other plant conditions exist that warrant activation of emergency centers and monitoring teams or a precautionary notification to the public near the site.	16. Condition as stated in the judgment of the Shift Foreman
17. Evacuation of control room and control of shutdown systems not established from local stations in 15 minutes.	17. As stated.

GENERAL EMERGENCY

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
1. a. Effluent monitors detect levels corresponding to 1 rem/hr W.B. or 5 rem/hr thyroid at the site boundary under actual meteorological conditions.	1. a. As calculated in Emergency Procedures, R-2 "Release of Airborne Radioactive Material" or RB-11 "Emergency Offsite Dose Calculations" or projected on EARS.
b. These dose rates are projected based on other plant parameters (e.g., radiation levels in containment with leak rate appropriate for existing containment pressure with some confirmation from effluent monitors) or are measured in the environs.	b. As calculated in Emergency Procedure RB-11 Emergency Offsite Dose Calculations or projected on EARS, and confirmed by near-site monitors, vent monitors or in-plant radiation samples.
2. Loss of 2 of 3 fission product barriers with a potential loss of 3rd barrier, (e.g., loss of primary coolant boundary, clad failure, and high potential for loss of containment).	2. a. SITE AREA EMERGENCY Condition number 2 and ALERT Condition number 5 with high potential for loss of containment isolation or pressure suppression capability (e.g., loss of all Containment Spray capability or loss of two fan coolers and one Containment Spray Train), or
	b. SITE AREA EMERGENCY Condition number 2 and 3, concurrently or

GENERAL EMERGENCY - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
	c. SITE AREA EMERGENCY Condition number 4 in Containment with high potential for loss of containment isolation or pressure suppression capability (e.g., loss of all Containment Spray capability or loss of two fan coolers and one containment spray train), or,
	d. SITE AREA EMERGENCY condition number 4 outside containment with inability to isolate the break.
	e. SITE AREA EMERGENCY condition number 2 and UNUSUAL EVENT condition number 8, concurrently.
	f. SITE AREA EMERGENCY condition number 1 and UNUSUAL EVENT condition number 8, concurrently.
3. Loss of physical control of the facility.	3. On-going Security threat which results in the entry of unauthorized persons to the facility (Turbine Building, auxiliary or fuel handling building or intake structure).

GENERAL EMERGENCY - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
4. Other plant conditions exist, from whatever source, that make release of large amounts of radioactivity in a short time period possible, e.g., any core melt situation.	4. Condition as stated in the judgment of the Shift Foreman
a. Small and large LOCA's with failure of ECCS to perform leading to severe core degradation or melt in from minutes to hours. Ultimate failure of containment likely for melt sequences. (Several hours likely to be available to complete protective actions unless containment is not isolated).	a. Site Area Emergency Condition Number 1, with verified inadequate core cooling per Appendix F of EP OP-1 or failure of the ESF per Appendix H of EP OP-1.
b. Transient initiated by loss of feedwater and condensate systems (principal heat removal system) followed by failure of emergency feedwater system for extended period. Core melting possible in several hours. Ultimate failure likely if core melts.	b. Loss of feedwater followed by complete loss of auxiliary feedwater (Site Area Emergency Condition No. 7a) and loss of level indication in all operating steam generators.

GENERAL EMERGENCY - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
c. Transient requiring operation of shutdown systems with failure to scram which results in core damage or additional failure of core cooling and makeup systems (which could lead to core melt).	c. Site Area Emergency Condition No. 7 and Alert Condition No. 1, concurrently or Site Area Emergency Condition No. 8 requiring safety injection and subsequent failure of ESF per Appendix H of EP OP-1.
d. Failure of offsite and onsite power along with total loss of emergency feedwater makeup capability for several hours. Would lead to eventual core melt and likely failure of containment.	d. Site Area Emergency Condition No. 5 and number 7.a, concurrently with loss of level indication in all operating steam generators.
e. Small LOCA and initially successful ECCS. Subsequent failure of containment heat removal systems over several hours could lead to core melt and likely failure of containment.	e. Loss of coolant accident with failure of Containment spray and cooling per Appendix H of EP OP-1.
7. Any major internal or external events (e.g., fires, earthquakes, substantially beyond design basis) which could cause massive common damage to plant systems resulting in any of the above.	7. Condition as stated in the judgement of the Shift Foreman

GENERAL EMERGENCY - (cont.)

NUREG-0654, APPENDIX 1 CONDITIONS	DIABLO CANYON POTENTIAL INDICATED CONDITIONS
8. Degraded core with possible loss of coolable geometry (indicators should include instrumentation to detect inadequate core cooling, coolant activity and/or containment radioactivity levels). (Note: This condition is a reclassification of Site Area Emergency Condition No. 2).	8. a. One or more of the following indications of inadequate core cooling: 1) One or more RCS hot leg wide range RTD's are at their upper scale limit., or 2) Five (5) or more plant computer incore thermocouple readings are greater than 1200°F, or 3) Three (3) of the ten (10) core center thermocouple readings on the Incore Board exceed 700°F, or 4) Safety Injection System flow to RCS and feedwater flow to the Steam Generators cannot be verified, and b. Reactor Coolant activity exceeds ALERT Condition No. 1 or cannot be determined.

TABLE 2

EMERGENCY OPERATING PROCEDURES - ACCIDENT CLASSIFICATIONS

PROCEDURE		EMERGENCY CLASSIFICATION
EP OP-0	Rx Trip with SI	Unusual Event
EP OP-1	Loss of Coolant Accident	Site Area Emergency
EP OP-2	Loss of Secondary Coolant	Unusual Event
EP OP-3A	Stm. Gen. Tube Rupture	Alert
EP OP-3B	Minor Stm. Gen. Tube Failure	Unusual Event if leakage exceeds Tech Spec Limits
EP OP-4	Loss of Electrical Power	Unusual Event
EP OP-8	Control Room Inaccessibility	Alert
EP OP-10	Loss of Aux. Salt Water	Unusual Event
EP OP-11	Loss of Component Cooling Water	Unusual Event for loss of one vital loop
EP OP-14	High Activity in RCS	Unusual Event
EP OP-18	Failure of Charging or Letdown Line	Unusual Event
EP OP-20	Excessive RCS leakage	Unusual Event
EP OP-22	Emergency Shutdown	Alert
EP OP-23	Natural Circulation of Reactor Coolant	Unusual Event
EP OP-24	Loss of Containment Integrity	Unusual Event
EP OP-25	Tank Ruptures	Unusual Event
EP OP-27	Irradiated Fuel Damage	Alert

TABLE 2 (cont.)

PROCEDURE		EMERGENCY CLASSIFICATION
EP OP-32	Rod Ejection	Site Area Emergency
EP OP-35	Loss of Vital or Non-Vital Instrument AC System	Unusual Event
EP OP-38	Anticipated Transient Without Trip	Alert
EP OP-39	RCP Locked Rotor Accident	Unusual Event
EP OP-40	Accidental Depressurization of Main Steam System	Unusual Event
EP OP-41	Hydrogen "Explosion" Inside Containment	General Emergency
EP OP-44	Gaseous Voids in the RCS	Unusual Event
EP M-3	Chlorine Release	Unusual Event
EP M-4	Earthquake	Unusual Event if greater than 0.01g
EP M-5	Tsunami Warning	Unusual Event
EP M-6	Nonradiological fire	Unusual Event/if greater than 10 minutes to control.
EP R-1	Personnel Injury (Radiologically Related) and/or Overexposure	Unusual Event if offsite assistance is required.

TABLE 2 (cont.)

PROCEDURE		EMERGENCY CLASSIFICATION
EP R-2	Release of Airborne Radioactive Materials	Unusual Event if greater than Technical Specification Limits.
EP R-3	Release of Radioactive Liquids	Unusual Event if greater than Technical Specification Limits
EP R-4	High External Radiation (In-plant)	Unusual Event
EP R-6	Radiological Fire	Unusual Event
RP R-7	Offsite Transportation Accidents:	Unusual Event if shipment originates or is destined for the plant.

NOTE: The emergency classification listed is the least significant classification for that procedure. The event covered by each procedure may progress into a more severe classification.

TABLE 3

EMERGENCY OPERATING PROCEDURES - SIGNIFICANT EVENTS

Activation of the emergency plan requires notification to the County offsite authorities within 15 minutes. Emergency procedures that are not initially classified in the Emergency Plan but may be reportable (within one hour) to the NRC only as a "Significant Event' (10 CFR 50.72) are listed below:

EP-OP-5	Reactor Trip Without Safety/Injection
EP-OP-6	Emergency Boration
EP-OP-7	Loss of Condenser Vacuum
EP-OP-9	Loss of Reactor Coolant Pump
EP-OP-12	Malfunctions of Automatic Reactor Control System
EP-OP-13	Malfunction of Reactor Pressure Control System
EP-OP-15	Loss of Feedwater Flow
EP-OP-16	Nuclear Instrumentation Malfunction
EP-OP-17	Malfunction of RHR System
EP-OP-19	Malfunction of Reactor Makeup Control System
EP-OP-21	Loss of a Coolant Loop RTD
EP-OP-26	Excessive Feedwater Flow
EP-OP-28	Start-up of an Inactive Reactor Coolant Loop
EP-OP-29	Excessive Load Increase
EP-OP-30	Inadvertent Loading of a Fuel Assembly Into an Improper Position
EP-OP-31	System Underfrequency
EP-OP-33	Loss of Instrument Air

TABLE 3 - (cont.)

EMERGENCY OPERATING PROCEDURES - SIGNIFICANT EVENTS

EP-OP-34	Generator Trip - Full Load Rejection
EP-OP-36	Turbine Trip
EP-OP-37	Loss of Protection System Channel
EP-M-1	Employee Injury (Nonradiological)
EP-M-2	Injury to Nonemployee (Third Party)
EP-R-5	Radioactive Liquid Spill

NOTE: Refer to Operating Procedure O-4, "Operating Order (One Hour Reporting Requirements to NRC)", for appropriate reporting for these events.

TABLE 4

TECHNICAL SPECIFICATIONS APPLICABLE TO UNUSUAL EVENT CONDITION NO. 9

NUMBER	TITLE
3.1.2.2	Reactivity Control System--Operable Flow Paths
3.1.2.4	Reactivity Control System--Operable Changing Pumps
3.1.2.6	Reactivity Control System--Borated Water Sources--Operating
3.1.3.1	Reactivity Control System--Movable Control Ass'y--Group Height
3.1.3.6	Reactivity Control System--Control Rod Insertion Limits
3.3.1	Instr--Reactor Trip System Instr
3.3.2	Instr--Engineered Safety Feature Actuation System
3.3.3.5	Instr--Remote Shutdown Instrumentation
3.3.3.6	Instr--Accident Monitoring Instrumentation
3.3.4.1	Instr--Turbine Overspeed Protection
3.4.1	RCS--RC Loops and Coolant Circulation
3.4.2.2	RC--Safety Valves
3.4.3	RCS--Pressurizer
3.4.4	RCS--Relief Valves
3.4.6.1	RCS Leakage Detection System
3.4.6.2	RCS--Operational Leakage
3.4.7	RCS--Chemistry
3.4.8	RCS--Specific Activity
3.4.9.1	RCS--Pressure/Temperature Limits
3.4.9.2	RCS--Pressurizer
3.5.1	ECCS--Accumulators
3.5.2	ECCS--ECCS Subsystems
3.5.4.2	ECCS--Heat tracing
3.6.1.1	Containment Systems--Primary Integrity
3.6.1.3	Containment Systems--Containment Air Locks
3.6.1.4	Containment Systems--Internal Pressure
3.6.1.5	Containment Systems--Air Temperature
3.6.1.6	Containment Systems--Containment Structural Integrity
3.6.1.7	Containment Systems--Containment Ventilation
3.6.2.1	Containment Systems--Containment Spray System
3.6.2.2	Containment Systems--Spray Additive System
3.6.2.3	Containment Systems--Containment Cooling System
3.6.3	Containment Systems--Containment Isolation Valves
3.6.4.1	Containment Systems--Hydrogen Analyzers/Monitors
3.6.4.2	Containment Systems--Electric Hydrogen Recombiners
3.7.1.1	Plant Systems--Turbine Cycle--Safety Valves
3.7.1.2	Plant Systems--Auxiliary Feedwater System

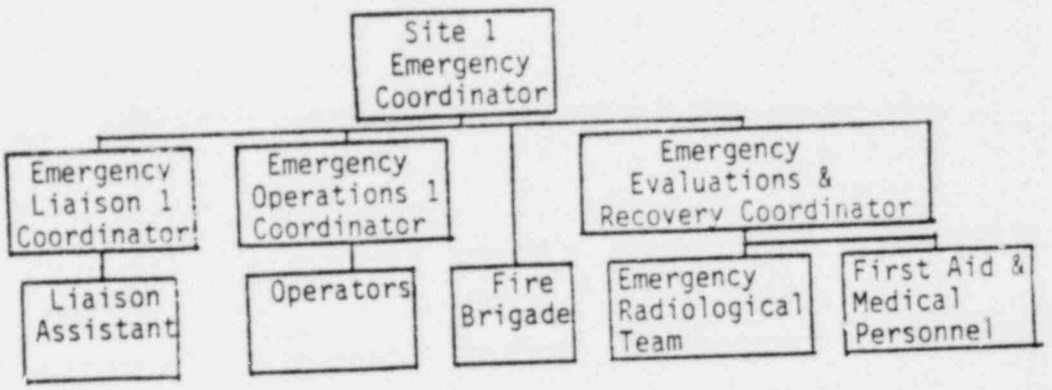
TABLE 4 (Cont'd)

TECHNICAL SPECIFICATIONS APPLICABLE TO UNUSUAL EVENT CONDITION NO. 9

NUMBER	TITLE
3.7.1.3	Plant Systems--Condensate Storage Tank
3.7.1.4	Plant Systems--Activity
3.7 1.5	Plant Systems--Main Steam Line Isolation Valves
3.7.3.1	Plant Systems--Vital Component Cooling Water System
3.7.4.1	Plant Systems--Auxiliary Saltwater System
3.7.5.1	Plant Systems--Control Room Ventilation Systems
3.7.6.1	Plant Systems--Auxiliary Building Safeguards Air Filtration System
3.8.1.1	Electrical Power Systems--AC Sources
3.8.2.1	Electrical Power Systems--Onsite Power Distribution
3.8.3.1	Electrical Power Systems--DC Sources Operating

FIGURE 1

TYPICAL ON-SHIFT EMERGENCY ORGANIZATION AND ASSIGNMENTS



POSITION	TYPICAL ASSIGNMENT
Interim Site Emergency Coordinator[1]	Shift Foreman (STA if not available)
Interim Emergency Liaison Coordinator[1]	Shift Control Technician, or Auxiliary Operator
Interim Emergency Operations Coordinator[1]	Sr. Control Operator or Control Operator
Interim Emergency Evaluations & Recovery Coordinator	Shift Engineer (Assisted by Shift C&RP technician if necessary)
Liaison Assistant	Shift Control Technician or Shift Clerk
Operators	Assignments per the Interim Site Emergency Coordinator
Fire Brigade Captain	Sr. Control Operator
Fire Brigade	See Procedure M-6 or R-6.
Emergency Radiological Team	Shift C&RP Technician or Auxiliary Operator (if required)
First Aid and Medical	Employees at the Scene

[1]Required Assignment

PG&E
Nuclear Plant Operations
69-10709 (1/82)

DIABLO CANYON POWER PLANT
PROCEDURE ON-THE-SPOT CHANGE

ORIGINATOR

Procedure No. EP RB-6 Rev. 0 Unit No. 1 ☐ 2 ☐ 1 & 2 ☒

Title Area and Equipment Decontamination

Type of Change: ☒ PERMANENT (green) ☐ TEMPORARY (yellow)

Requesting Department Technical Assistant Originator W. J. Keyworth

Proposed Change: (Does this alter the intent of original procedure? ☐ Yes ☒ No)

Add a page 9 - Table 3 " Hard Surface Decontamination Effiaienaies in Percent", attached

RENUMBER PAGES 1 of 9, 2 of 9, ... of 9 etc.

Reason for Change: Table inadvertantly not included in original procedure issue.

Authorizations: _____ (Plant Management Staff) W. B. Kaufer (Plant Management Staff w/SRO License) 2/10/82 Date

DOCUMENT CONTROL

Date Received by Document Control 2-10-82

PSRC Review and Plant Manager's approval no later than 2-23-82 Date above *plus 13days

PSRC POST CHANGE REVIEW

Review Date _____

PSRC recommends approval ☐ Yes ☐ No

Meeting Number ☐☐ - ☐☐☐

_____ Plant Manager's Approval ☐ N/A

RECIPIENT DEPARTMENT

Follow-up To Rejected On-the-Spot Change ☐ Additional Information ☐

Action Taken/Remarks:

DISTRIBUTION: ☐ Same as Original Procedure Distribution ☐ Others _____ Please see additional sheets ☐

TABLE 3

HARD SURFACE DECONTAMINATION EFFICIENCIES IN PERCENT[a]

Material	Vacuum (D+2)[b]	Hi-Pressure Water (D+3)[b]	Hi-Pressure Wtr.w/Scrub (D+12)[b]	Hi-Pressure Wtr. & Detergent (D+4)[b]	Hi-Press. Wtr. & Detergent with Scrub (D+5)[b]	Sand-blasting (D+9)[b]	Steam Cleaning (D+14)[b]
Glass	98.95	98.85	97.79	100.00	99.76	100.00	97.86
Stucco	48.00	97.94	95.22	100.00	99.59	100.00	27.00
Painted wood	99.28	98.43	96.77	99.69	99.97	100.00	91.61
Unpainted wood	36.00	85.00	93.18	99.54	95.54	99.90	85.00
Aluminum	89.00	99.45	97.33	99.62	100.00	98.49	84.00
Plate steel	93.04	97.26	94.19	100.00	93.83	99.72	91.46
Asbestos shingles	61.00	99.97	98.91	96.89	99.36	100.00	63.00
Unpainted wood shingles	61.00	97.16	90.49	95.01	57.93	99.82	71.00
Brick	29.99	99.46	99.32	99.14	99.56	99.92	97.50
Tarpaper	55.00	98.66	95.04	95.32	95.83	99.51	52.00
Galvanized roofing	89.00	99.36	97.19	99.73	99.86	100.00	85.00
Highway asphalt	32.00	99.90	96.25	90.82	99.48	99.90	44.00
Highway asphalt (10x10 ft)	72.00	92.45	94.95	98.85	96.34	92.73	22.00
Steel asphalt	71.00	98.67	90.00	100.00	99.72	99.61	84.00
Steel asphalt (10x10 ft)	64.00	90.00	82.00	96.31	97.54	90.42	48.00
Steel trowel concrete	74.00	98.94	--	96.91	99.53	100.00	--
Steel trowel concrete (10x10 ft)	--	73.00	97.34	--	99.58	98.96	27.00
Wood float concrete	--	98.00	92.03	100.00	97.47	100.00	65.00
Wood float concrete (10x10 ft)	56.00	97.84	--	98.09	98.28	98.78	85.00
Avg. of all surfaces	65.40	96.12	94.59	98.61	98.64	98.83	67.80

[a] Decontamination factor (DF) = 100/[100 - decontamination efficiency (%)]

[b] (D+n) = number of days between contamination and decontamination

WASH 1400, Appendix VI, October 1975, "Reactor Safety Study."

PG&E **Pacific Gas and Electric Company**

NUMBER EP RB-7
REVISION 1
DATE 1/28/82
PAGE 1 OF 20

DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY PROCEDURE

TITLE: EMERGENCY ON-SITE RADIOLOGICAL ENVIRONMENTAL MONIORING

APPROVED: R C T [signature] 2/1/82
PLANT MANAGER DATE

SCOPE

This procedure describes an initial emergency radiological environmental monitoring program to determine gamma and beta dose rates and air particulate and radioiodine levels due to an accidental release of gaseous radionuclides. This data will be used to make initial assessments concerning the magnitude of the accident and decisions concerning evacuation of nonessential site personnel. This program can be undertaken early in the accident assessment process by a single team working on or near the site.

GENERAL INSTRUCTIONS

1. The on-site radiological environmental monitoring team(s) are unde the direction of the Emergency Radiological Advisor (ERA). If the ERA has not arrived on-site, the Emergency Evaluations and Recovery Coordinator will direct the monitoring team(s).

2. As a minimum, the on-site radiological environmental monitoring team(s) will be comprised of two on-shift personnel; a Chemical and Radiation Protection Technician (C&RP) (team leader) and an Auxiliary Operator (assigned by the Emergency Evaluations and Recovery Coordinator).

3. The on-site monitoring team(s) will maintain communication with the Control Room and/or TSC through the use of hand-held radios. Use the Health Physics channel.

4. The team should have the following equipment:

   a. A copy of this procedure - EP RB-7, "Emergency On-Site Radiological Environmental Monitoring."

   b. A radiation monitoring instrument. At least one of the following should be used in order of preference:

      1) HPI-1010 - located in emergency kit.
      2) E-140 W/GM probe - in emergency kit.
      3) Rad Owl - located in emergency kit.
      4) Vitoreen Radgun - located in Control Room.

   c. Portable air sampler HD-28B.

d. Filter paper, charcoal cartridges and/or AgX cartridges.

e. Plastic bags, envelopes and labels for air samples.

f. Form 18-9259 "Emergency Environmental Monitoring Field Data Sheet."

g. Hand-held radio from the TSC.

h. Vehicular transport.

i. Life jacket, if monitoring is to be done on the breakwater.

j. Paper and pen/pencil.

k. Flashlight.

l. Self-reading dosimeters (low range and high range) and TLD.

5. When traveling from one location to another, always have a detector on so that if a portion of the plume is traversed, it will be recognized immediately. If traveling in a vehicle, hold a detector out of the window. If any location is identified as being above background, measurements should be taken and data recorded.

6. Prior to onsite out-of-plant monitoring, readings from the fixed monitors, PICs, should be obtained as well as information from any preliminary surveys conducted in-plant. This will provide some insight as to what onsite out-of-plant situations might be encountered.

PROCEDURE

1. Determine Affected Downwind Sectors

   a. Receive information from the Emergency Evaluations and Recovery Coordinator, or:

   b. Determine wind direction from meteorological computer output or other suitable means. Wind directions are given as the direction from which the wind is blowing.

   c. Figure 1, "Onsite Assembly and Monitoring Locations," shows a site map indicating sixteen 22.5° sectors. In general, the areas which may be affected include the 22.5° sector directly downwind plus the 22.5° sector on either side of the downwind sector.

2. Determine if Personnel Assembly Areas are Affected

   Figure 1 also shows the various personnel assembly areas. If any occupied assembly areas are in an affected sector(s), make the measurements specified in Step 5 below at the affected assembly area(s).

3. Check Site Monitoring Locations

After checking the personnel assembly areas, make the measurements specified in Step 5 below in each of the three affected sectors. Measurements should be made at as many of the locations shown on Figure 1 as it is feasible to reach. Table 1 provides a description of emergency onsite monitoring locations.

a. Take the first measurement at the location which best approximates the direct downwind location, then take measurements at the adjacent locations on either side of this location.

b. It may be necessary to make measurements at additional locations, depending upon meteorological conditions.

NOTE: The onsite monitoring locations shown on Figure 1 are identified by a white pole, approximately six feet high, topped with a red circular di .

CAUTION: Do not attempt to make measurements on the breakwaters if there is a hazard from high seas. At any time measurements are made on the breakwater, the Liaison Coordinator should be informed immediately before and after entry onto the breakwater. Life jackets should be worn, if possible, whenever a person goes onto the breakwater.

4. Initiate Population Center Monitoring

a. If the monitoring performed in Step 2 or 3 shows levels of 3 mr/hr of 9,000 cpm, then a monitoring team should be dispatched to the nearest downwind population center as soon as possible.

b. Figure 2, "Emergency Offsite Monitoring Locations," shows the standard offsite environmental monitoring locations. Table 2, "Description of Emergency Offsite Monitoring Locations," describes each location; and Table 3, "Preferred Monitoring Locations for Initial Population Center Monitoring Locations," recommends those which should be considered for initial population center monitoring as a function of wind direction.

c. The measurement sequence at each location for the initial population center monitoring program is summarized in Step 6.

5. Measurement Sequence at Onsite Locations

The following measurements should be made at each onsite location. The data should be entered on Form 18-9259, "Emergency Environment Monitoring Field Data Sheet."

a. Determine external ydose rate and/or count rate. For those instruments with windows (or beta shields), take both window open and window closed readings.

Use Table 4 to obtain appropriate instrument backgrounds.

b. Collection of Air Particulate and Radioiodine Samples

If time and manpower considerations permit, collect an air sample of at least 10 ft^3 (30-50 ft^3 is preferred).

The sample should be drawn through both a particulate filter and a halogen cartridge. Air samples must be taken immediately if: 1) dose rate measurement $\geq$3 mR/hr, or 2) count rate measurement $\geq$9,000 cpm.

1) Equipment Required

a) RADECO Model HD-28B (120V AC powered).

b) 2" diameter absolute particulate filter paper.

c) Coin envelope for retention of filter.

d) CESCO or HI-Q 2-1/4" diameter charcoal cartridge.

e) AgX cartridge.

f) Plastic bag for retention of cartridge.

g) Gummed or other label for labeling cartridge container.

h) Wristwatch or stopwatch.

2) Procedure

a) Assemble the filter and halogen cartridge in the sampling head as shown in Figure 3. Draw an arrow on the cartridge to indicate the direction of flow.

b) Place the filter head on the sampler.

c) Plug in the sampler, turn on the power, and simultaneously start a stopwatch.

d) Quickly adjust the flow rate to the desired value (typically 2 cfm).

e) For a flow rate of 2 cfm, the sampling time should be at least 5 minutes.

f) Periodically check the flow indicators to verify that the flow rate is being maintained. If the flow rate changes significantly during sample collection, note the value at the end of the sample period and determine the average value of the flow rate. Record the value of the flow rate in cfm.

g) Allow the sampler to run until at least 10 ft^3 (preferably 30-50 ft^3) is collected. The greater the volume sampled, the better. Record the sample time.

h) Stop the sampler and remove the filter head.

i) Place the particulate filter in the coin envelope and label the envelope.

j) Place the cartridge in a plastic bag and label the bag. Cartridges which are collected in the field shall be placed in a sealed plastic bag, and identified with a firmly attached label which states the following information:

(1) Date and time (note a.m. or p.m.) of collection

(2) Name of person who collected the sample

(3) The time the sampling was started and the time the sampling was terminated

(4) Sampler flow rate

(5) Location of sample

k) Determine airborne I-131 concentration from air sample. It is preferred to return the halogen cartridge to the counting room or TSC lab if this can be done expeditiously. Otherwise, use the field technique. Since the field technique gives you gross iodine, the easiest and most conservative approach is to assume it is all I-131. Record results on Form 18-9259.

6. Measurement Sequence for Initial Population Center Monitoring

The following measurement program should be followed during the initial population center monitoring phase. These measurements may be preempted should the Emergency Evaluations Coordinator determine that an alternate schedule is appropriate.

a. External γ Measurements

1) Measure γ dose rate or count rate at the time that monitoring is initially established.

2) For those locations where an instrument can be left unattended, leave a Rad Owl of HPI-1010 in the integrate mode. The integrated exposure should be recorded at lease every two hours.

3) For those locations where an instrument cannot be left unattended, a dose-rate or count-rate measurement should be made on an hourly basis.

b. Air Samples

1) For those locations where ac power is available and a sampler can be left unattended, place an HD-28B sampler and allow it to run continuously. Collect the first filters and determine the iodine concentration after about 30 ft^3 have been collected. This is ten minutes on an HD-28B set at 3 cfm. Thereafter, collect the filters every two hours.

2) For those locations where ac power is not available, or a sampler cannot be left unattended, collect a sample every two hours of at least 30 ft^3, using a 12V dc-powered sampler operated from an automobile.

SUPPORTING PROCEDURES

R-2	Release of Airborne Radioactive Material
RB-11	Emergency Offsite Dose Calculations
RB-8	Offsite Emergency Radiological Environmental Monitoring
EF-4	Activation of the Mobile Environmental Monitoring Laboratory

TABLES

1. Description of Emergency Onsite Monitoring Locations
2. Description of Emergency Offsite Monitoring Locations
3. Preferred Monitoring Locations for Initial Population Center Monitoring Program
4. Instrument Background for Gamma-Beta Dose Rate Measurements and/or Count Rate Measurements (3' above ground)

FIGURES

1. Onsite Assembly and Monitoring Location
2. Emergency Offsite Monitoring Locations
3. Exploded View of Cartridge and Particulate Filter in Sampling Head

FORMS

No. 69-9259 "Emergency Environmental Monitoring Field Data Sheet"

FIGURE 1

ONSITE ASSEMBLY AND MONITORING LOCATIONS

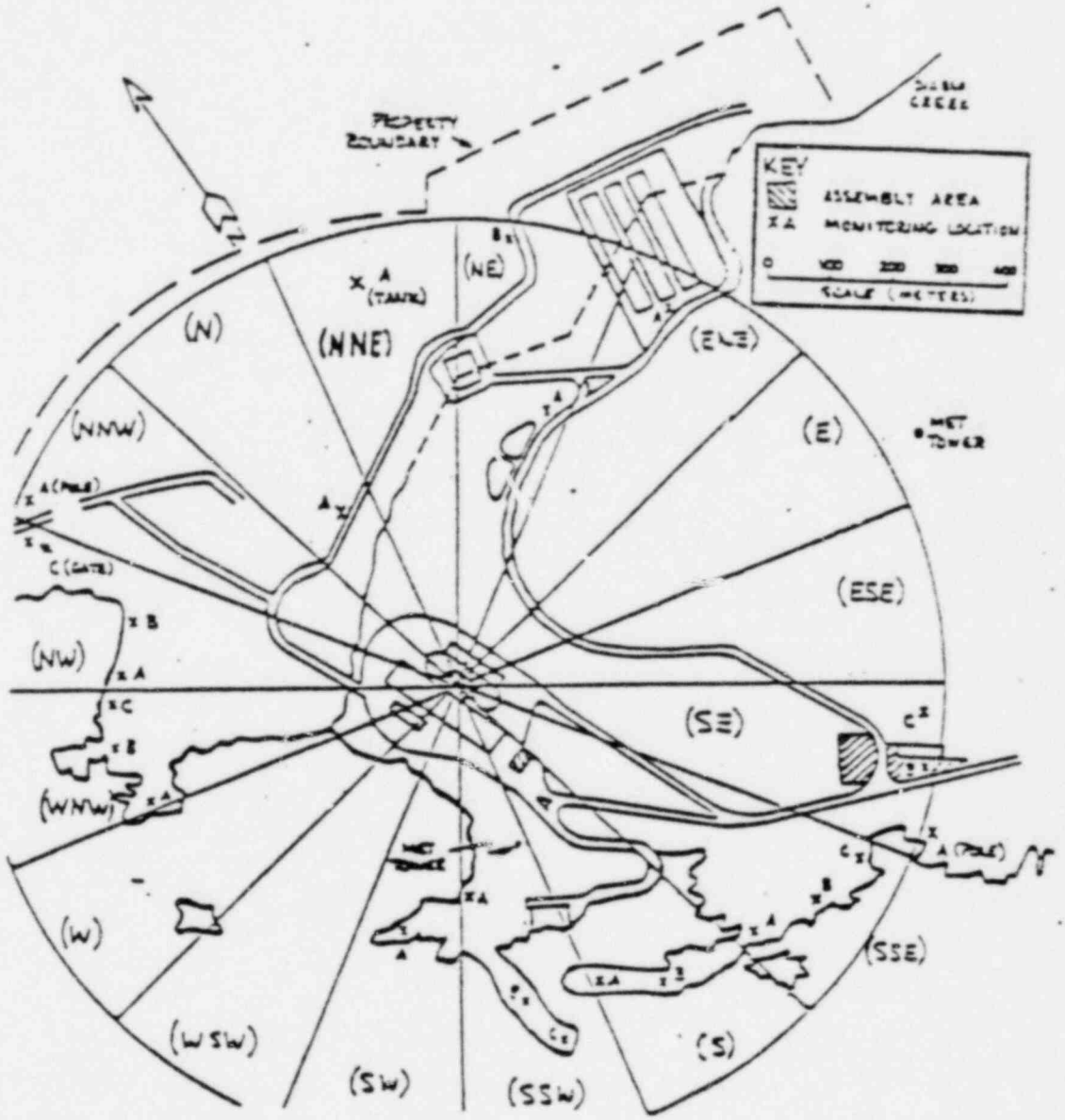


FIGURE 2

EMERGENCY OFFSITE MONITORING LOCATIONS

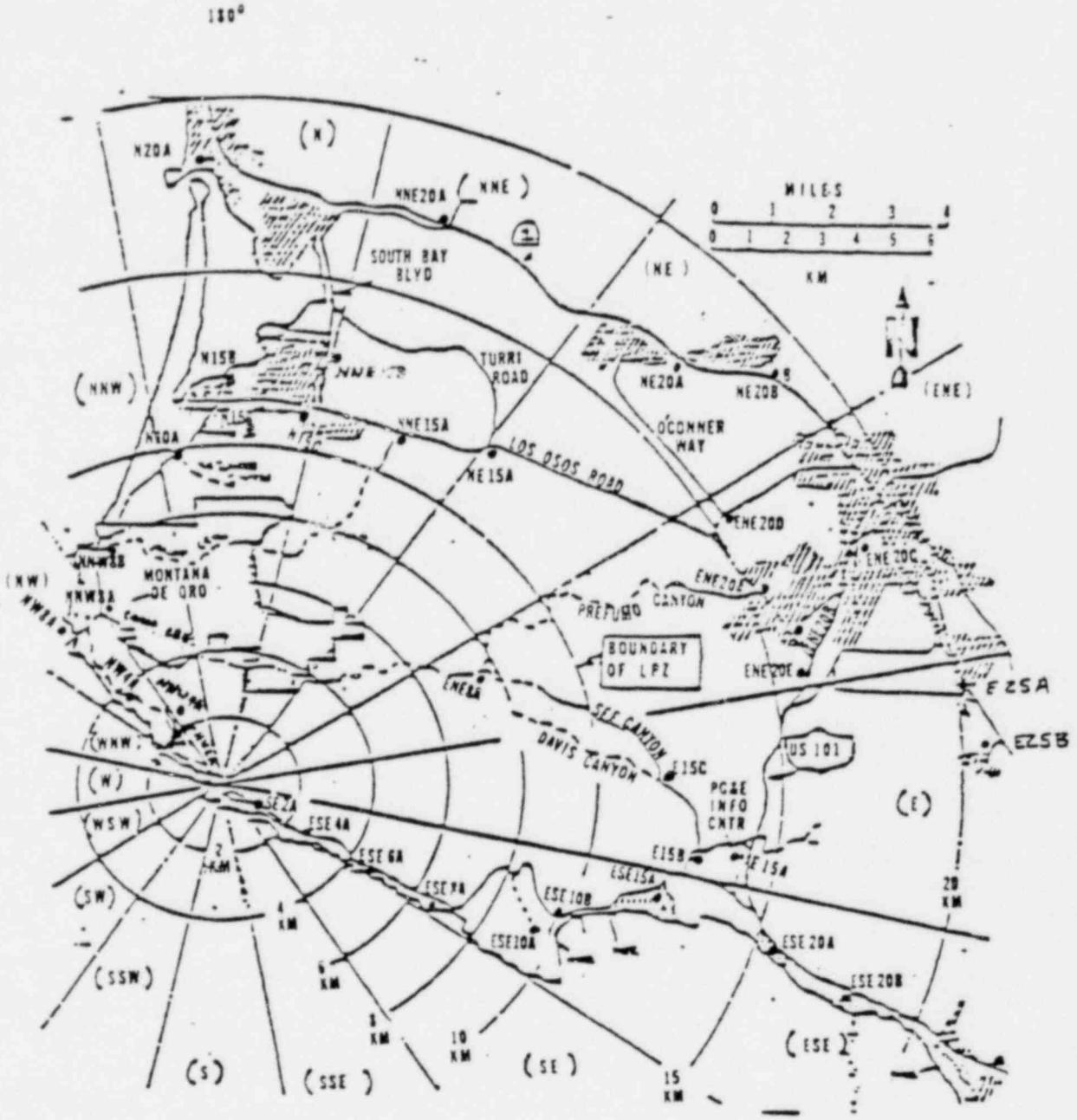


FIGURE 3

EXPLODED VIEW OF HALOGEN CARTRIDGE AND PARTICULATE FILTER IN SAMPLING HEAD

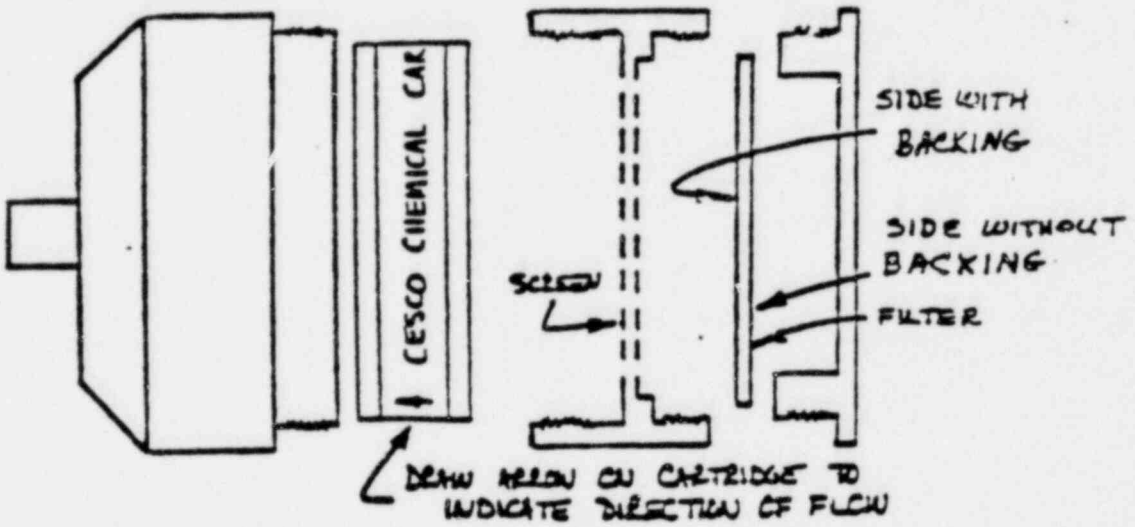


TABLE 1

DESCRIPTION OF EMERGENCY ONSITE MONITORING LOCATIONS

Coordinate	Straight Line Distance From Plant (Meters)	Description	AC Power Available
N,A	300	South side of road.	No
N,NE,A	700	In front of wooden water tank.	No
NE,A	3,000	Adjacent to east reservoir.	Yes
NE,B	800	North side of road in the gulley.	No
ENE,A	700	South side of switchyard at fence.	No
SE,C	700	PIC unit, DER air sampler--behind fourth SEC of GC warehouse.	Yes
SE,B	800	Front of GC warehouse.	Yes
SE,A	800	40 feet off the road on the west side of road--no accessible by vehicle.	No
SSE,A	700	Adjacent to guard shack on bluff.	Yes
SSE,B	700	Adjacent to culvert on west side of dirt road.	No
SSE,C	700	West side of sandblasting area.	No
S,A	-	On breakwater.	No
S,B	-	On breakwater.	No
SSW,A	400	West of met tower--requires 53 key for gate--not accessible by vehicle.	No
SSW,B	-	On breakwater.	No

TABLE 1 (Continued)

DESCRIPTION OF EMERGENCY ONSITE MONITORING LOCATIONS

Coordinate	Straight Line Distance From Plant (Meters)	Description	AC Power Available
SSW,C	-	On breakwater.	No
SW,A	500	West of met tower--requires 53 key for gate--not accessible by vehicle.	Yes
WNW,A	500	Near gulley on south side--requires 53 key for gate.	No
WNW,B	600	40 feet in front gate--requires 53 key.	No
WNW,C	600	North side of road in clearing.	No
NW,A	600	North side of road in clearing area of bushes.	No
NW,B	600	Northwest side of dirt road.	No
NW,C	800	At gate on road leading to north road.	No
NNW,A	800	30 feet north of steps leading to pond.	No

TABLE 2

DESCRIPTION OF EMERGENCY OFF-SITE MONITORING LOCATIONS

Coordinate	Straight Line Distance From Plant (KM)	Description[a]	AC Power Available
N,10,A	9.8	West of Montano de Oro State Park sign (0.6 miles SW of Rodman Drive on Pecho Road. Good radio at path off road south of State Park sign. Sign on path reads "No Vehicles".	No
N,15,A	10.0	End of Alamo Drive in Cabrillo Estates (Turn off Pecho Road at Rodman and go to the top of the hill. Turn right onto Alamo and follow it to the end.) Good Radio. Phone available.	
N,15,B	11.6	Sunset Terrance Golf Course at clubhouse. Good radio at west end of Howard Drive or on road running north of the golf course.	Yes[2]
N,15,C	11.3	Baywood Park Fire Station (Turn south off of Los Osos Road onto Bayview Heights Drive. Has a TASC-4. DER's monitoring Station 10 is located at Sunnyside School next door.) Good radio. Phone available.	Yes
N,20,A	18.0	Morro Bay Power Plant. DER's monitoring Station 9 is located here. Good radio. Phone available.	Yes

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
NNE,15,A	11.3	Intersection of Los Osos Valley Road and Clark Valley Road (under PG&E transmission lines). Good radio.	No
NNE,15,B	12.9	Los Osos Jr. High School on South Bay Boulevard in the playing field. Good radio.	No
NNE,20,A	17.6	0.2 miles north along San Bernardo Creek Road is on the northeast side of Highway 1. Good radio.	No
NE,15,A	10.6	Intersection of Los Osos Valley Road and Turri Road. DER's monitoring Station 11 is located nearby. Good radio at intersection.	No
NE,20,A	17.4	Sheriff's headquarters. Turn south on Highway 1 at sign indicating Sheriff's Operational Center. Good radio. Phone available.	Yes
NE,20,B	19.2	PG&E substation near Men's Colony, adjacent to northeast side of High 1. Good radio reception. Phone available.	Yes

TABLE 2 (Continued)

Coordinate	Straight Line Distance from Plant (KM)	Description	AC Power Available
ENE,8,A	9.0	See Canyon Road, 4.2 miles up from San Luis Bay Drive intersection. Good radio. Telephone available. Rattlesnake hazard.	Yes[1]
ENE,20,A	14.8	Laguna Jr. High School at intersection of Los Osos Road and Perfumo Canyon Road. Good radio.	Yes[3]
ENE,20,B	16.0	Fire Station at intersection of Los Osos Valley and Madonna Roads. Good radio.	Yes
ENE,20,C	18.6	PGandE Information Zone 1 substation at corner of Walker and Pacific Streets. DER's Station 12 is also located here. Good radio.	Yes
ENE,20,D	15.6	Corner of Foothill Boulevard and O'Conner Way. Good radio.	Yes[1]
ENE,20,E	15.8	Yancy's Restaurant (formerly Hob Nob) parking lot. Good radio.	Yes[2]
E,15,A	14.5	PGandE Information Center. Good radio.	Yes
E,15,B	13.4	Bellevue-Santa Fe School. Good radio.	Yes[5]

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
E,15,C	11.3	See Canyon Road, 1.7 miles up from San Luis Bay Drive intersection. Survey at intersection of See Canyon Road and Davis Canyon Road. Good radio.	Yes[1]
E,25,A	20.2	SLO County Airport. The field on the right of the road to the parking lot. Good radio.	Yes
E,25,B	21.5	SLO Country Club. East side of parking lot in the fairway. Good radio.	Yes[2]
ESE,4,A	2.6	Turnout on access road, 1.6 miles from Security Building. Marked with red/white fence post. Radio near plant or near location ESE,10,A	No
ESE,6,A	4.5	Turnout on access road 2.8 miles from Security Building. Marked with red/white fence post. Radio near plant or near location ESE,10,A	No
ESE,8,A	6.9	Gate next to shack at road to ruins, 4.3 miles from Security Building along access road. Marked with red/white fence post. DER station 16 is near here. Radio near plant or near location ESE, 10,A	No
ESE,10,A	9.6	Top of San Luis Hill[5]. Gate at 6.2 miles from the Security Building. Some radio.	No

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
ESE,10,B	10.0	Port San Luis Gate. TASC-4 and DER's Station 27 are located here. Radio on road to Pirates Cove.	Yes
ESE,15,A	11.6	Parking lot behind Avila Beach Post Office. Radio on road to Pirates Cove.	Yes
ESE,20,A	15.3	Pismo Beach Fir Dept. on Shell Beach Road. Good radio.	Yes
ESE,20,B	19.2	0.5 miles northwest of the Shorecliff Inn on Shell Beach Road. Good radio.	Yes[1]
SE,2,A	1.3	Turnout on access road, 0.8 miles from Security Building near meteorological Tower A. Marked with red/white fence post. DER Station 7 is near here. Good radio.	No
NW,2,A	1.6	0.6 miles north from Field's property gate (1 mile north from plant, just ENE of Lion Rock).	No
NW,4,A	3.5	Fields' road near large watering pond.	No
NW,8,A	6.1	Near residence by park gate.	Yes[1]
NNW,4,A	2.7	Near wood paneled house.	Yes[1]

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
NNW,8,A	5.8	Parking lot near end of road at southern park boundary (near gate to Fields' property). Good radio.	No[5]
NNW,8,B	7.6	Ranger station overlooking Spooner's Cove. Good radio on road south of ranger station at "Locked Gate Ahead" sign (near parking overlook of Spooners' Cove.)	

NOTES:

[1]Power is available at nearby residences.

[2]During working hours. Also power is available at nearby residences.

[3]During school hours. Also at nearby residences.

[4]During school hours.

[5]A dirt road leads to the top of the hill. The intersection of this road with access road is marked with a red/white fence post. A 90909 key is required on the gate. A four-wheel drive vehicle is preferred. Alternatively; take reading on the access road at the marked fence post.

[6]Power is available at nearby residence on Fields' property (NE,8,A) and monitoring can be performed at this latter location is practical.

[7]During daylight hours.

[8]Radio comments refer to unaided handi-talkie use of Davis Peak Repeater (H.P. Frequency) only - other transmitter sites not considered.

TABLE 3

PREFERRED MONITORING LOCATIONS FOR
INITIAL POPULATION CENTER MONITORING PROGRAM

WIND DIRECTION	DOWNWIND SECTOR	LOCATIONS[1]
CALM	--	NONE
348°45' - 11°15'	S	NONE
11°15' - 33°45'	SSW	NONE
33°45' - 56°15'	SW	NONE
56°15' - 78°45'	WSW	NONE
78°45' - 101°15'	W	NONE
101°25' - 123°45'	MNW	(NNW,8,A)
123°45' - 146°15'	NW	(NNW,8,B)
146°15' - 168°45'	NNW	(NNW,8,B) (N,15,B)
168°45' - 191°15'	N	(NNW,8,B) (N,15,B)
191°15' - 213°45'	NNE[2]	(N,15,D) (NNE,15,A)
213°45' - 236°15'	NE[2]	(NE,15,A) (ENE,8,A) (ENE,20,C)
236°15' - 258°45'	ENE[2]	(ENE,8,A) (ENE,20,A) (ENE,20,C)
258°45' - 281°15'	E[2]	(ENE,8,A) (E,15,B) (ESE,15,A)
281°15' - 303°45'	ESE	(E,15,B) (E,15,A) (ESE,20,B)
303°45' - 326°15'	SE	(ESE,8,A) (ESE,15,A) (ESE,20,B)
326°15' - 348°45'	SSE	(ESE,15,A)

NOTES:

[1]See Table and Figure 2.

[2]This wind direction rarely persists for more than a few hours, so anticipate wind change.

TABLE 4

INSTRUMENT BACKGROUND FOR GAMMA-BETA DOSE RATE MEASUREMENTS AND/OR COUNT RATE MEASUREMENTS (3' ABOVE GROUND)

INSTRUMENT	BACKGROUND DOSE RATE (mR/hr) WINDOW CLOSED	WINDOW OPEN
Rad Owl	0	0
Victoreen Radgun	0.02	0.02
HPI 1010	0.015	NA

GM PROBE	BACKGROUND COUNT RATE (cpm) SHIELD ON	SHIELD OFF
HP-240	60	60
HP-260	NA	50
HP-210	NA	50

PG&E **Pacific Gas and Electric Company**

NUMBER EP RB-8
REVISION 1
DATE 1/28/82
PAGE 1 OF 39

DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

EMERGENCY PROCEDURE

TITLE: EMERGENCY OFFSITE RADIOLOGICAL ENVIRONMENTAL MONITORING

APPROVED: R E T [signature] 2/1/82
PLANT MANAGER DATE

SCOPE

This procedure describes the emergency offsite radiological environmental monitoring program which would be undertaken in the event of an airborne release of radioactive materials from the Diablo Canyon Power Plant. The procedure provides instruction for implementation of the program. Also provided are instructions to monitoring teams for locating sample points, collecting samples, and performing field analyses of samples.

INITIATING CONDITIONS

The Site Emergency Coordinator declares a Site Area or General Emergency in accordance with EP G-1, "Accident Classification and Emergency Plan Activation." Offsite environmental monitoring teams may be dispatched for an Alert classification if judged appropriate by the Site Emergency Coordinator.

DIRECTION AND CONTROL

Offsite monitoring teams and the Mobile Environmental Monitoring Laboratory (MEML) will be dispatched at the direction of the Emergency Evaluations and Recovery Coordinator (EERC). The offsite monitoring teams and MEML will receive operating instructions from the Emergency Radiological Advisor (ERA). The ERA will keep the EERC informed of the offsite monitoring team activities.

After the EOF has been fully manned and activated, the Radiological Emergency Recovery Manager (RERM), will assume control of and responsibility for offsite radiological assessemnt activities. This includes the emergency offsite radiological monitoring activities. The Radiological Monitoring Director will be responsible for communication with the monitoring teams, the MEML, and provide them with operating instructions. The RERM will be kept informed of the offsite monitoring teams activities.

Transfer of control and responsibility for offsite radiological assessment activities will be initiated by the Site Emergency Coordinator and the Recovery Manager. The decision to transfer control and responsibility shall be conveyed by the SEC and RM to their respective staffs. This shall be done by direct communication and entered on the status board.

The Emergency Liaison Coordinator, at the TSC, will then inform the offsite environmental monitoring teams and the MEML, by radio, that communications and data will be transmitted to and from the EOF to the Radiological Monitoring Director.

COMMUNICATIONS

1. The primary communication links between the TSC, EOF, MEML, and field monitoring teams will be by radio communications on the health physics frequency. The field monitoring teams will use hand-held radios. The location and numbers are listed below:

Location	Radio Type	Number (Spares)
OSC (Security Building)	H	8 (2)
	P	2
Plant Gate	H	2
PG&E Service Center (MEML)	H	6 (2)
PG&E Information Center	H	2 (2)
EOF	H	2 (2)
	P	1
MEML	P	1 (1)
DER Vehicle	P	1 (1)

H Hand-held. P Permanent.

NOTE: Field teams should obtain hand-held radios from the OSC or MEML. Other locations should be used as a back-up only.

a. For ease of communication with the radios, the field monitoring teams will be given call names using the International (ICAO) Phonetic Alphabet:

A - Alpha	E - Echo	I - India
B - Bravo	F - Foxtrot	J - Juliett
C - Charlie	G - Golf	K - Kilo
D - Delta	H - Hotel	L - Lima

b. Radio Technique

1) Hold the radio upright, directly in front of the mouth with antenna oriented 90° from direction of receiving station (i.e., EOF).

2) Before transmitting make certain that someone else is not already transmitting on the frequency.

3) After pushing transmit button, wait two seconds to allow automatic radio encoding to occur.

4) Begin all communications per the following example:

"EOF, this is Alpha team. Do you read me?"

5) Close all communications per the following example:

"This is Alpha team. Over."

2. Communications back-up would be by telephone:

DCPP: ( )
EOF: ( )
TSC: ( )

3. Each monitoring team leader and the MEML shall contact the TSC or EOF under the following conditions:

a. Prior to beginning the monitoring program, in order to obtain initial instructions.

b. Upon completion of monitoring at each location.

or

c. At least once per hour.

MONITORING TEAMS

1. Composition

a. A minimum of four teams are available for offsite environmental monitoring.

b. Each team will have two members. One team member will be designated the team leader.

c. Teams will be comprised of 1 (one) PG&E C&RP Technician as the team leader and 1 (one) additional PG&E Technician and/or 1 (one) SLO County (SLOCO) Environmental Sanitarian.

a. Day Shift

1) Teams will be dispatched from DCPP.

2) Each team will be supplied with a hand-held radio and an emergency kit.

3) Mobilization and dispatch on the day shift will take approximately 20 minutes.

b. Back Shifts

1) Teams notified on an on-call basis will be directed to assemble at the Operations Support Center (OSC) or other location where kits are available (PG&E Information Center, EOF or Morro Bay Power Plant).

2) Mobilization and dispatch on a backshift will take approximately one hour.

c. The Emergency Liaison Coordinator will transmit the assembly location to the SLOCO Emergency Organization.

GENERAL INSTRUCTIONS

1. Locations to Monitor

a. Affected Sectors

The 360° of the compass have been divided into sixteen 22.5° sectors which are identified by the compass point of their centerline: i.e., N, NNE, NE, ENE, E, etc. In this procedure, all directions are referenced to true north, so N means true north. If the wind direction has been reasonably steady, the monitoring program should emphasize the sector immediately downwind plus one adjacent 22.5° sector on either side of the downwind sector. If the wind direction is changing considerably, the sectors monitored will have to be appropriately increased.

b. Distance Downwind

The EERC will use the EARS system or manual overlays as described in EP RB-11 to determine distance affected downwind. Generally, it is best to send at least one team as far downwind as appropriate, and then have them work their way back in toward the plant.

c. Identification of Emergency Monitoring Locations

1) Monitoring locations used in this procedure are identified in Figure 1, "Onsite Assembly and Monitoring Locations" and Figure 2, "Emergency Offsite Monitoring Locations." Table 1, "Description of Emergency Onsite Monitoring Locations," and Table 2, "Description of Emergency Offsite Monitoring Locations" are included for reference.

2) Coordinate System

Each monitoring location is identified by three coordinates: a compass point, a distance in kilometers, and a letter designation, (i.e., NNE, 8, A).

The compass point refers to the sector in which the sample was taken.

To help locate the distance from the plant at which the sample was taken, concentric circles have been drawn on the map at the following distances from the plant: 0.8 km (800 m), 2 km, 4 km, 6 km, 10 km, 15 km, 20 km, 30 km, etc. This defines segments of a circle which are 22.5° in arc, and either 0.8, 1.2, 2 or 5 km deep, depending upon the particular location of the segment. The km designation in the identification refers to the distance of the farthest segment boundary, not the actual downwind distance.

In cases where samples are taken at locations other than those previously labeled, some other identification means must be used. Thus, the following might be typical sample location designations:

(ESE, 15, Avila Post Office)
(ENE, 20, corner of March and Broad Streets, SLO)
(NNW, 8, campground at mouth of Islay Creek)

d. Environmental Sampling Stations

1) There are a number of environmental monitoring and sampling stations which are part of the continuing program conducted by the Department of Engineering Research. For reference, these stations are shown in Figure 3, "Location of Departments of Engineering Research Environmental Monitoring and Sampling Stations."

NOTE 1: Field monitoring teams will not collect data from DER monitors unless expressly directed by the Radiological Monitoring Director (located at the EOF).

NOTE 2: The TLD's are located in a grey plastic container. Opening the container requires a 1/8-inch Allen wrench and a hammer which are in the emergency kits.

2) The Nuclear Regulatory Commission also has posted TLD's in the area. Information may be obtained from the NRC Representative onsite. See Table 4, "Environmental Radiation Monitoring Network Stations - Nuclear Regulatory Commission," for locations of the TLD's.

e. Dairies

Because the milk pathway is often the limiting pathway, it may be desirable to collect milk samples. The locations of dairies in the DCPP area are described in Table 5, "Locations of Selected Dairies."

2. Sample Identification and Data Sheets

a. Identification and Retention of Samples

Samples or filters which are collected in the field shall be placed in a sealed plastic bag, envelope, or bottle, as appropriate, and identified with a firmly attached label which states the following information:

1) Date of collection.

2) Time of collection (for air sample filters, record the time the sampling was started and the time the sampling was terminated).

3) Sampler flow rate (air samples only).

4) Location of sample.

5) Team name and name of person who collected the sample.

All samples and filters shall be taken to the MEML for preliminary field screening.

b. Field Data Sheets

Field data shall be recorded on the Emergency Environmental Monitoring Field Data Sheets (Form 18-9259). Each monitoring team shall maintain a notebook with the data sheets and other pertinent instructions.

The data sheet contains provisions for entering the data from all of the various field monitoring techniques. At any given monitoring location, only a few of the possible types of measurements may actually be performed. A new data sheet shall be started for each series of measurements at each monitoring location.

MONITORING PROGRAM

An external dose rate measurement shall be taken and an air sample shall be collected at each offsite monitoring location.

If the TASC-4 continuous environmental monitors are in an affected sector, they shall be read. The TASC-4 are located at the Avila Beach Gate (ESE, 10, B) and the Los Osos fire station (N, 15, C).

If the Pressurized Ion Chambers (PICs) are located in an affected sector, they shall be read. PIC locations are described in Table 6.

Collection of any other types of samples (i.e., ground deposition measurements, vegetation, soil, water of milk samples) will be at the direction of the Emergency Evaluations and Recovery Coordinator or the Radiological Monitoring Director.

1. External Dose Rate and/or Count Rate Measurements

   a. Equipment Required

      1) Any of the following instruments can be used for external dose rate measurements:

         a) Rad Owl.

         b) Victoreen Radgun.

         c) HPI-1010.

      For measuring an external count rate, use an Eberline E-140 survey meter equipped with either an HP-240 standard GM probe and HP-260 pancake GM probe, or an HP-210 shielded pancake GM probe.

   b. Procedure

      1) Dose or Count Rate Measurements

         a) Make a dose rate and/or count rate measurement with the detector held about three feet off the ground (i.e., approximately at waist level). If the detector is so equipped, take the data both window (or shield) on and off.

            NOTE: When using the HP-210 probe, take both shield up (GM window down) and shield down (GM window up) readings. These readings may be required later to account for sky shine.

         b) Identify the type of instrument (or probe) used, time survey was started, and calibration due date of the instrument on the Field Data Sheet.

         c) Calculate the net dose or count rate values by subtracting the appropriate background values given in Table 7.

         d) Report both the open window (or shield) on and off values and the type of instrument used, to the Emergency Evaluations and Recovery Coordinator, or Radiological Monitoring Director.

2) Integral Dose

The Rad Owl and the HPI-1010 have the capability for dose integration if desired. If an integrated measurement is made, the data can be entered in Section 2.c. of the Field Data Sheet. Integral measurements with the Rad Owl should be made with the window open. Report the integral dose and the time period over which it was collected to the EERC or RMD, as appropriate.

2. Collection of Air Samples

a. Equipment Required

1) One of the following air samplers, equipped with sample head for two-inch filters:

a) RADECO Model HD-28B (120V AC-powered).

b) RADECO Model H-809B (12V DC-powered, with battery).

c) RADECO Model H-809C (12V DC-powered, without battery).

2) Two-inch diameter absolute particulate filter paper.

3) Coin envelope for retention of filter.

4) CESCO or HI-Q 2-1/4"-diameter charcoal cartridge or AgX cartridge.

5) Plastic sandwich bag for retention of cartridge.

6) Gummed or other label for labeling cartridge container.

7) Wristwatch or stopwatch.

b. Procedure

1) Assemble the filter and halogen cartridge in the sampling head as shown in Figure 5. Draw an arrow on the cartridge to indicate the direction of flow.

2) Place the filter head on the sampler.

3) For an HD-28B, proceed as follows:

a) Plug in the sampler, turn on the power, and simultaneously start a stopwatch (or reset the timer on the sampler itself, if a sampling time of several hours is contemplated).

b) Quickly adjust the flow rate to the desired value (typically 2 cfm).

4) For an H-809C, proceed as follows:

   a) Attach the sampler to the car battery by attaching the red cable to the positive battery terminal and the black cable to a chassis ground.

      NOTE: Close the hood and place the air sampler on top of it to avoid engine fan turbulence.

   b) Turn the vehicle engine on. Start the sampler and quickly adjust the flow rate to the desired value (typically 5 cfm).

5) For an H-809B, proceed as follows:

   a) If an automobile is available, put the toggle switch on the black battery pack in EXT. Connect the red cable to the positive terminal of the battery and the black cable to a chassis ground.

      NOTE: Close the hood and place the air sampler on top of it to avoid engine fan turbulence.

   b) If an automobile is not available, put the toggle switch on the black battery pack in INT.

      NOTE: The unit will not run using 120V AC, so do not sample while charging.

   c) Dial in the appropriate sampling time, using the toggle switches provided.

   d) Turn on vehicle engine. Start the sampler and quickly adjust the flow rate to the desired value (typically 5 cfm).

      NOTE: The maximum flow rate is ~1 cfm when the unit is using its own battery.

6) Periodically check the flow indicators to verify that the flow rate is being maintained. If the flow rate changes significantly during sample collection, note the value at the end of the sample period and determine the average value of the flow rate. This average value should be used to determine the size of the sample collected.

7) Allow the sampler to run until at least 10 ft^3 (but preferably 30-50 ft^3) is collected. The greater the volume sampled, the better.

8) Stop the vehicle engine. Stop the sampler and remove the filter head.

9) Make the halogen and particulate measurements discussed in steps 3 and 4 below, if desired.

10) Label the envelope and then place the particulate filter in the coin envelope.

11) Place the iodine cartridge in a sandwich bag and label the bag.

12) Enter the collection data in Section 4 of the Field Data sheet.

3. Determination of Gross Iodine (Field Technique)

a. Equipment Required

1) Eberline E-140 survey meter equipped with either an HP-240 standard GM probe, an HP-260 pancake GM probe, or an HP-210 shielded pancake GM probe. The HP-210 probe is preferred.

2) Cylinder of dry air equipped with regulator.

3) Plastic bag.

b. Procedure

1) Remove the iodine cartridge from the air sampler head.

2) Insert the cartridge into the adapter sample head shown on Figure 6.

3) Attach the air cylinder to the filter head as shown in Figure 6 and gently blow air through the head in the reverse direction until the bottle pressure drops 200 psi. Set the air discharge pressure at about 5 psig. This removes noble gases from the halogen cartridge.

NOTE: Check the pressure in the air cylinder before starting to see if there is enough to permit this operation.

4) Make a background count rate measurement using the GM probe (window open when using the HP-240 probe). When using the HP-210 or HP-260 probe, the reading is taken with the detector faced down. Record value on Field Data Sheet.

5) Place the probe (window open when using the HP-240 probe) directly adjacent to the upstream side of the cartridge, as shown in Figure 7, and measure and count rate. Get the probe as close to the cartridge as possible without actually touching (in order to avoid contaminating the probe).

6) Record the count rate in Section 5 of the Field Data Sheet. Note time sample was started and calibration due date of the instrument.

7) Bag and label the cartridge.

8) Calculate gross iodine concentration from the following expression:

$$\mu Ci/cc = \frac{(1.59 \times 10^{-11})\ (CR_{net})}{(\varepsilon_2)\ (E_c)\ (V)}$$

where:

CR_{net} = net cpm on cartridge

ε_2 = probe efficiency from Table 8

E_c = cartridge collection efficiency, assumed to be 0.8

V = volume of airborne sample (ft^3)

9) Report gross iodine concentration, probe used, and volume of sample to the Emergency Evaluations and Recovery Coordinator or the Radiological Monitoring Director.

4. Determination of Gross Particulate (Field Technique)

a. Equipment Required

1) Eberline E-140 survey meter equipped with either an HP-240 standard GM probe, an HP-260 pancake GM probe, or an HP-210 shielded pancake GM probe.

2) Coin envelop.

3) Forceps.

b. Procedure

1) Remove the filter from the air sampler head.

2) Make a background count rate measurement using the GM probe (window open when using the HP-240 probe), and record this value in the appropriate location in Section 6 of the Field Data Sheet. When using the HP-210 or HP-260 probe, the reading is taken with the detector faced down.

3) Place the probe (window open using the HP-240 probe, shield up using HP-210 probe) directly adjacent to the upstream side of the filter in an analagous manner to the counting of halogen cartridges shown in Figure 7. Filters should be handled with forceps, and the probe should not touch the filter, in order to avoid contamination of the probe.

4) Record the count rate in Section 6 of the Field Data Sheet. Note time sample was started and calibration due date of the instrument.

5) Label the envelope and place the filter in the coin envelope, using the forceps.

6) Determine the net count rate and calculate the gross particulate activity from the expression:

$$\mu Ci/cc = \frac{(1.59 \times 10^{-11})\ (CR_{net})}{(\varepsilon_3)\ (E_f)\ (V)} \qquad (6)$$

where:

CR_{net} = net cpm on the filter

ε_3 = probe efficiency from Table 9

E_f = filter collection efficiency, assumed to be 0.9

V = volume of airborne sample (ft^3)

7) Report the activity, type of probe used, and volume of sample, to the Emergency Evaluations and Recovery Coordinator or Radiological Monitoring Director.

5. Soil and Vegetation Sampling

a. Equipment Required

1) Trowel.

2) Scissors or knife.

3) 18"x24" plastic bags.

4) Masking tape.

5) Labels.

6) Eberline E-140 survey meter with HP-240 standard GM probe.

b. Procedure

1) Vegetation Sampling and Counting

a) Cut the vegetation from the approximately 1 m^2 of ground; the aim being to collect approximately one pound. Cut the vegetation at a height of 1-2 cm from top of vegetation to approximate what a grazing animal would consume. Do not contaminate the sample with dirt.

b) Place the vegetation in the plastic bag. Compress the air out of the bag and seal with tape. One pound of material will fill the bag about half full.

c) Label the bag.

d) Make a background count (window open) and enter in Section 7 of the Field Data Sheet.

e) Flatten the bag and lay the probe on the center of the bag.

f) Fold the bag over the probe and note the reading. Record the reading on the field data sheet along with time of survey and instrument calibration due date.

g) The activity level in μCi/gm can be obtained from the following expression:

$$\mu Ci/gm = 2.5 \times 10^{-6} \times CR_{net} \qquad (7)$$

where:

CR_{net} = net cpm on a standard GM tube (HP-240)

h) Report the type of vegetation sampled and the activity level to the Emergency Evaluations and Recovery Coordinator or the Radiological Monitoring Director.

2) Soil Sampling

a) Sample the soil from about a m^2 area. Remove only the top surface (to a depth of ≈ 1/4" or less) using the trowel.

b) Place the sample in a bag, seal, and label.

c) No field counting of soil samples is required. The samples are taken for follow-up analysis only. Scan the bag to determine if there is a high count rate (>1,000 cpm).

6. Liquid Sampling and Counting

a. Equipment Required

1) Sample bottle (1 liter)

2) Labels.

3) Eberline E-140 survey meter equipped with HP-240 standard GM probe.

4) Sheet plastic or p. astic bag.

b. Procedure

1) Wrap the GM probe (window open) in thin plastic to protect it against liquid damage and contamination.

2) Immerse the probe in as large a body of liquid as is available (reservoir, cattle trough, 10-gallon milk can, etc.) to obtain the gross open window reading. Enter the reading in Section 8 of the Field Data Sheet along with the time of survey and calibration due date of the instrument.

3) Use 60 cpm as a background count rate to determine the net count rate.

4) Report the type of sample, volume of sample counted, and net count rate to the Emergency Evaluations and Recovery Coordinator or Radiological Monitoring Director.

5) Collect the label a 1-liter sample and retain for later analysis.

7. Ground Surveys

a. Equipment Required

Eberline E-140 survey meter equipped with either an HP-240 standard GM probe and HP-260 pancake GM probe, or an HP-210 shielded pancake GM probe. The HP-210 is the preferred detector because its shield reduces the influence of sky shine.

b. Procedure

1) Hold the GM probe, window open using HP-240 probe (shield up when using HP-210 probe) not more than two inches above the ground, and measure the count rate. The following precautions should be taken when making this measurement.

a) Make the measurement over short grass on undisturbed land (common grazing, permanent pasture).

b) Make the measurement at least 20 yards from any building, road, railway, bridge, or heaps of material such as gravel, rubble, or road-cut. These all contain varying amounts of natural uranium and thorium.

c) Haystacks or silos should be avoided because they may contain in a concentrated form the total deposition on grass which originally covered a large area. Trees and hedges also act as collectors of fallout which is washed out to a variable extent by rain. In an emergency, they may trap large amounts of airborne particulate and give a falsely high reading.

d) Care must be taken to avoid any contamination of the instrument.

2) Identify the type of probe used and enter the data in Section 3 of the Field Data Sheet. Include the time the survey was started and the calibration due date of the instrument.

3) Calculate the net count rate value by subtracting the background value given in Table 7.

NOTE 1: It is not possible to correct the background values for sky shine if an HP-240 or HP-260 is being used. Significant sky shine will invalidate ground surveys taken with these probes.

NOTE 2: If an HP-210 is being used, the effect of sky shine can be estimated. To do this, take a second measurement with the GM window facing the sky (shield down reading). Then add 1/10 of this figure to the normal background from Table 7 and use this sum as the corrected background. That is:

$$(Bckg)_{Corrected} = (Bckg)_{Table\ 5} + 0.10(CPM)_{Sky} \qquad (3)$$

where:

$(Bckg)_{Corrected}$ = background corrected for sky shine (cpm)

$(CPM)_{sky}$ = gross cpm with detector window facing upward

4) Calculate the ground deposition from the following equation:

$$\text{Ground Deposition } (\mu Ci/m^2) = \varepsilon_1 \times CR_{net} \qquad (4)$$

where:

ε_1 = probe efficiency factor given in Table 10

CR_{net} = net count rate (in cpm) from ground survey

5) Report location of measurement, ground deposition, and the type of instrument used to the Emergency Evaluations and Recovery Coordinator or Radiological Monitoring Director.

8. Determination of Smearable Contamination

a. Equipment Required

1) Two-inch diameter filters.

2) Coin envelopes.

3) Eberline E-140 survey meter equipped with an HP-240 Standard Probe, an HP-260 pancake probe, or an HP-210 shielded pancake GM probe.

b. Procedure

1) Select a representative smooth surface to smear-test. Examples are tops of cars, store windows or sills, and walls of buildings.

2) Wipe the area with the side opposite from the backing, using a uniform, moderate fingertip pressure. Estimate the total area smeared, in square feet.

3) Take a background count rate measurement and then a count of the filter. Enter the data in Section 9 of the Field Data Sheet along with the time of the survey and the calibration due date of the instrument.

4) Put the filter into a labeled coin envelope and save it for later analysis in the counting room.

5) Calculate the smearable contamination as follows:

$$dpm/dm^2 = \frac{(0.11)\ (CR_{net})}{(\varepsilon_3)A}$$

where:

CR_{net} = net cpm on filter

ε_3 = probe efficiency factor from Table 9

A = area smeared, in square feet

6) Report the type of surface smeared, instrument used, and the smearable contamination level to the Emergency Evaluations and Recovery Coordinator or Radiological Monitoring Director.

9. How to Read the TASC-4

NOTE: For purposes of emergency monitoring standardize the scaler-timer by using a ten-second count.

a. On the NT-29 timer, set ten-seconds.

1) The top thumbwheel is set at 1; the middle and lower ones are set at 0 (i.e., a reading of 1.00).

2) The MIN-SEC toggle switch is set in SEC.

3) The RANGE MULTIPLIER is set at X10.

b. On the NS-12 scaler, set the TEST/SCALER toggle switch to SCALER.

c. Press the STOP pushbutton, then press the RESET pushbutton (the RESET pushbutton should never be depressed while counts are being applied to the register; first stop the count by pressing the STOP pushbutton).

d. Press the START pushbutton to start a count.

e. Set the PRESET rotary switch to the OFF position.

f. The scaler will begin to accumulate counts and will continue doing so until the preset time period has elapsed. At this point, counting will automatically stop.

g. The dose rate is determined from the following expression:

$$DR\ (\mu R/hr) = \frac{(\text{total counts})}{(\text{counting time in seconds})}$$

For a ten-second count, this becomes:

$$DR\ (\mu R/hr) = \frac{(\text{total counts})}{10}$$

h. Report dose rate to the Emergency Evaluations and Recovery Coordinator or Radiological Monitoring Director.

FIGURES

1. Onsite assembly and Monitoring Locations.

2. Emergency Offsite Monitoring Locations.

3. Locations of DER Onsite Environmental Sampling and Monitoring Locations.

4. Locations of DER Offsite Environmental Sampling and Monitoring Locations.

5. Exploded View of Halogen Cartridge and Particulate Filter in Sampling Head.

6. Method for Blowing Noble Gases from Halogen Cartridge.

7. Position of GM Tube and Cartridge for Gross Iodine Determination.

TABLES

1. Description of Emergency Onsite Monitoring Locations.

2. Description of Emergency Offsite Monitoring Locations.

3. DER Environmental Sampling Locations.

4. Environmental Radiation Monitoring Network Station of the NRC.

5. Locations of Selected Dairies.

6. PIC Locations.

7. Background Data for β/γ Dose and/or Count Rate Measurements.

8. GM Probe Efficiency Factors for Iodine Determinations.

9. GM Probe Efficiency Factors for Particulate Determinations.

10. GM Probe Efficiency Factors for Ground Surveys.

ATTACHMENTS

1. Form 69-9259, "Emergency Environmental Monitoring Field Data Sheet."

FIGURE 1
ONSITE ASSEMBLY AND MONITORING LOCATIONS

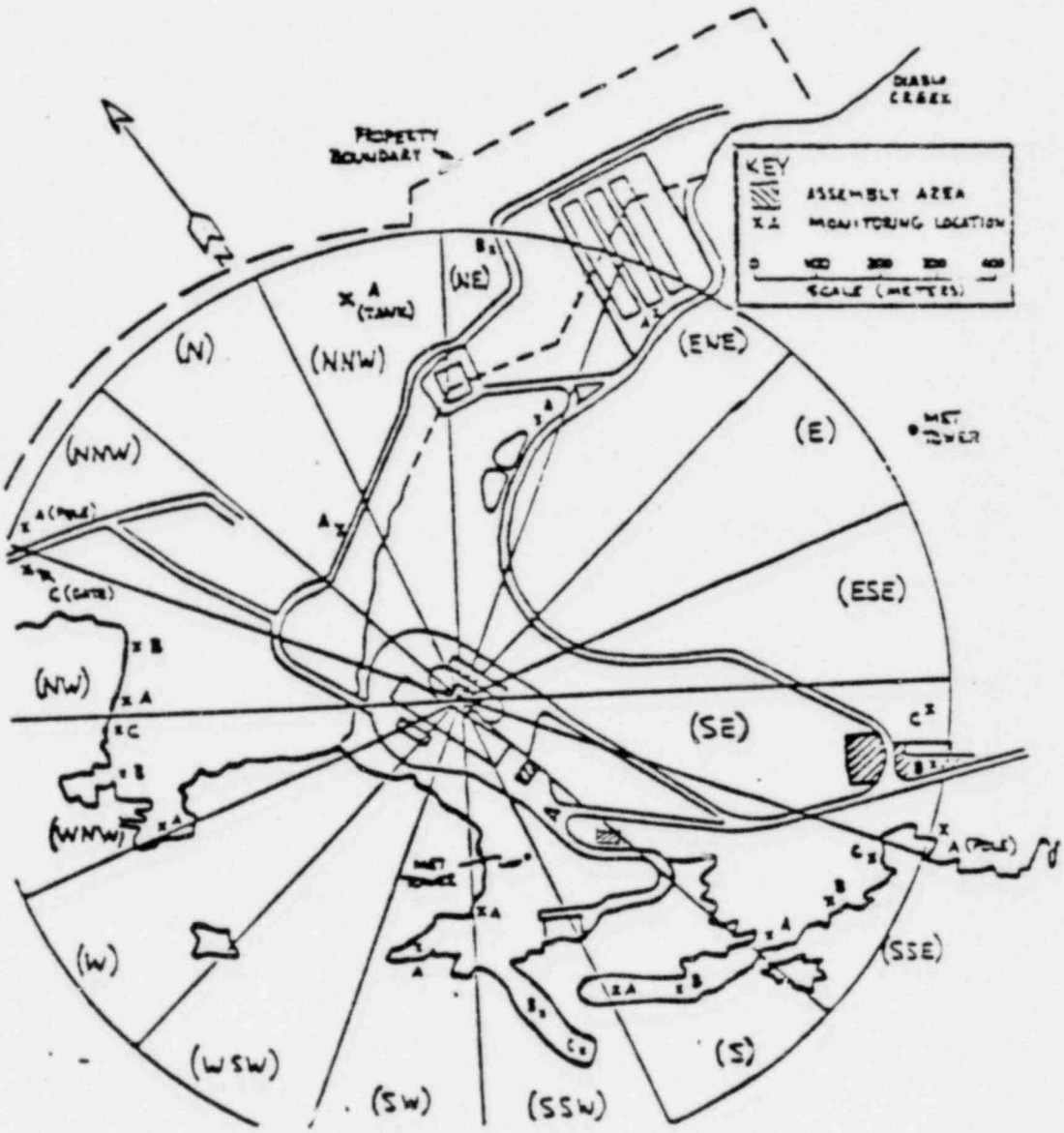


FIGURE 2
EMERGENCY OFFSITE MONITORING LOCATIONS

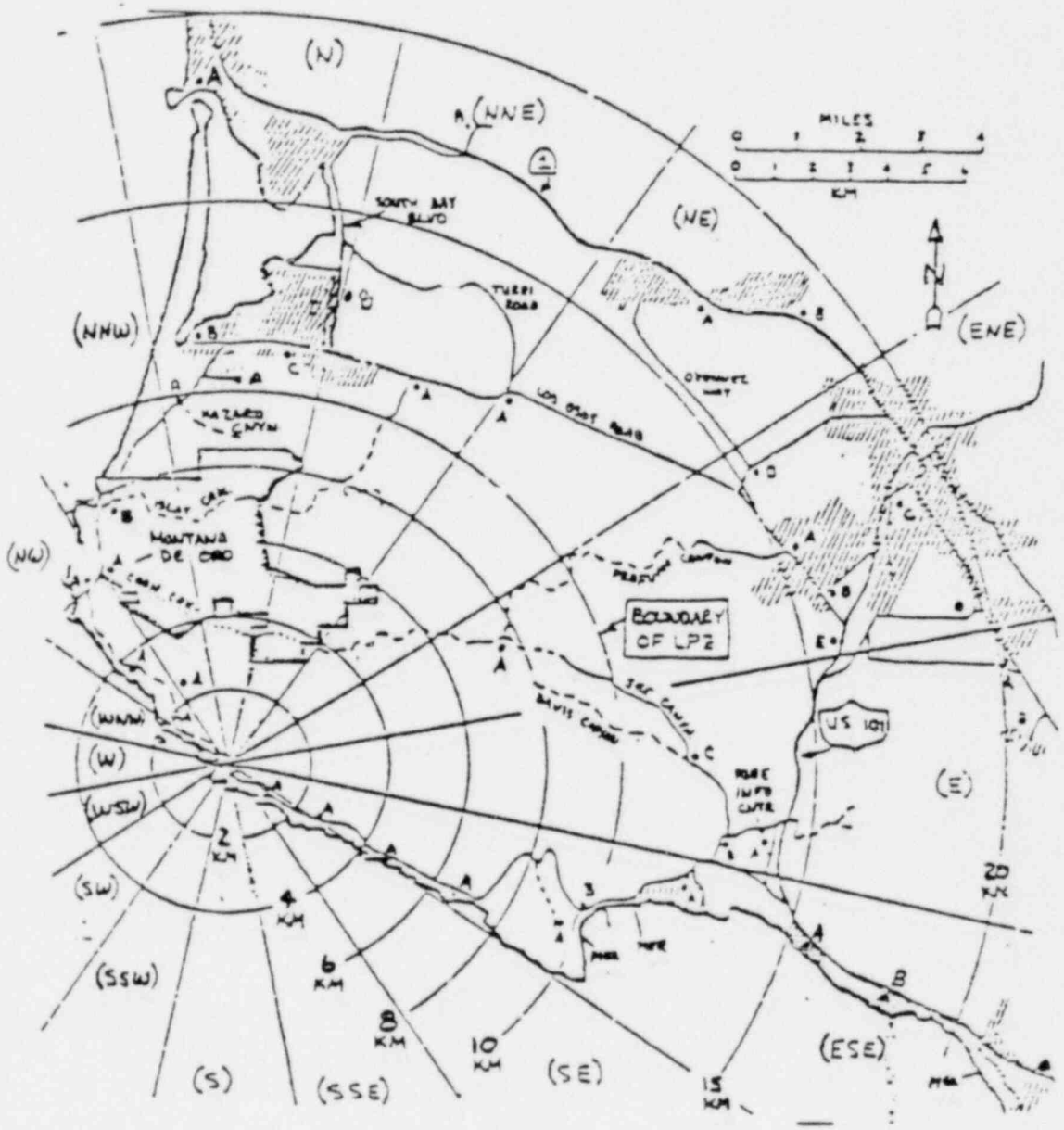


FIGURE 3
LOCATIONS OF DEPARTMENT OF ENGINEERING RESEARCH'S
ONSITE ENVIRONMENTAL SAMPLING AND MONITORING STATIONS

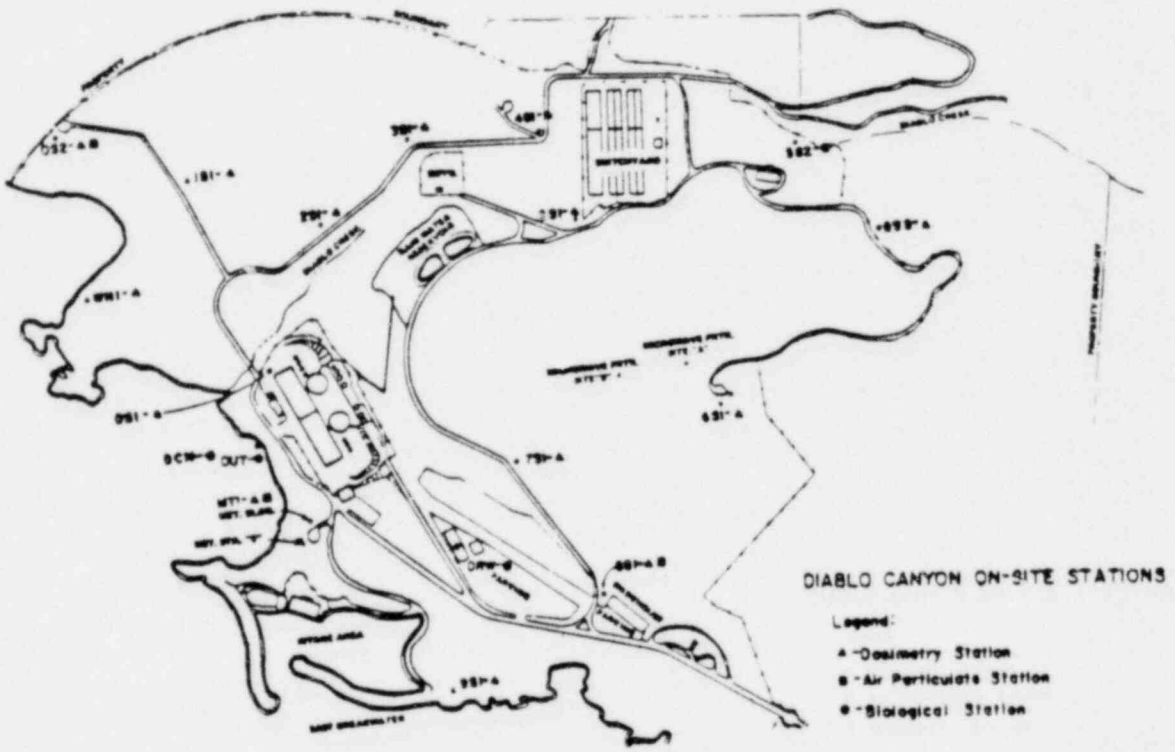


FIGURE 4
LOCATIONS OF DEPARTMENT O ENGINEERING RESEARCH'S
OFFSITE ENVIRONMENTAL SAMPLING AND MONITORING STATIONS

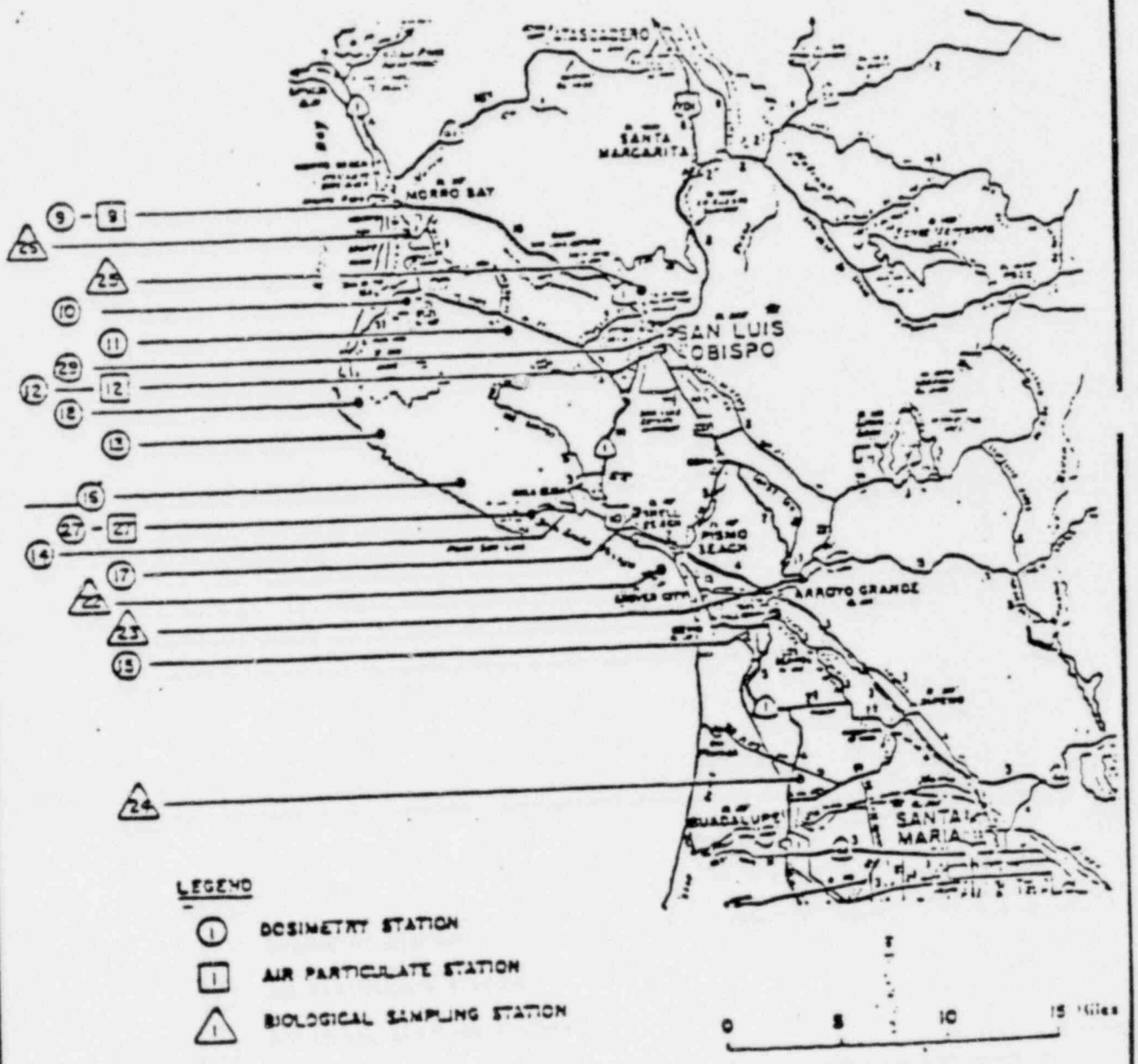


FIGURE 5
EXPLODED VIEW OF HALOGEN CARTRIDGE AND PARTICULATE FILTER IN SAMPLING HEAD

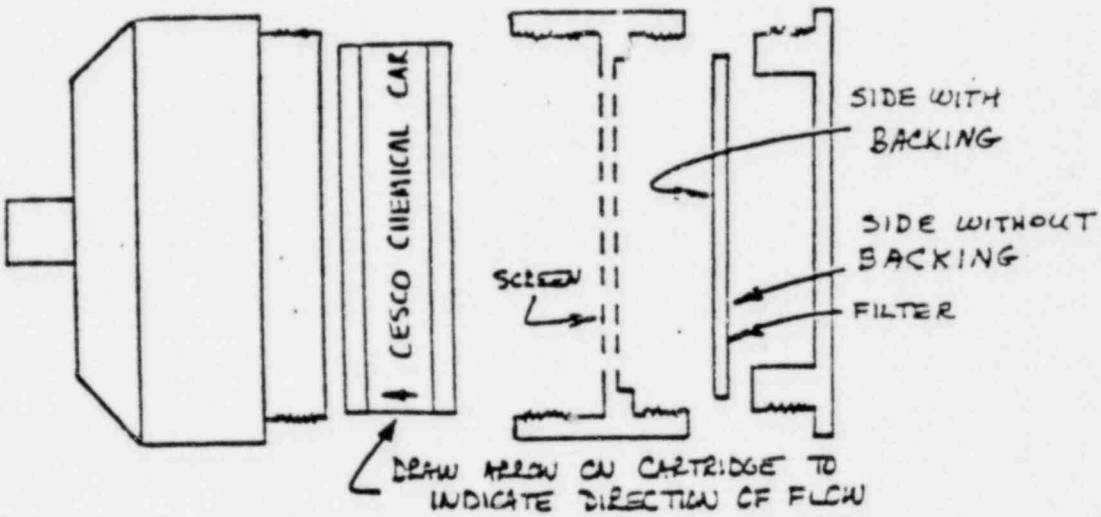


FIGURE 6
METHOD FOR BLOWING NOBLE GASES FROM HALOGEN CARTRIDGE

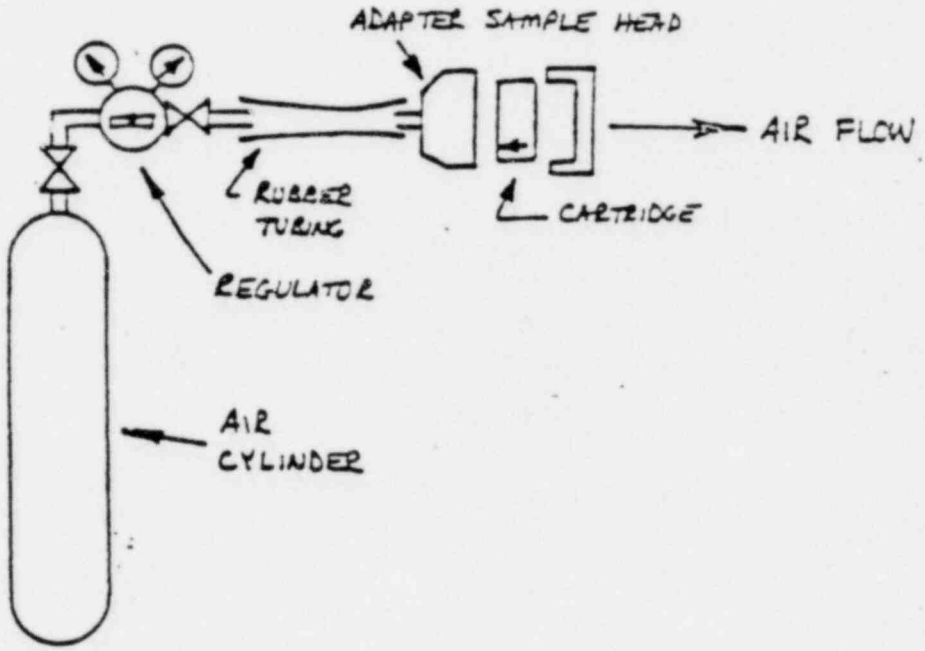


FIGURE 7
POSITION OF GM TUBE AND CARTRIDGE FOR
GROSS IODINE DETERMINATION

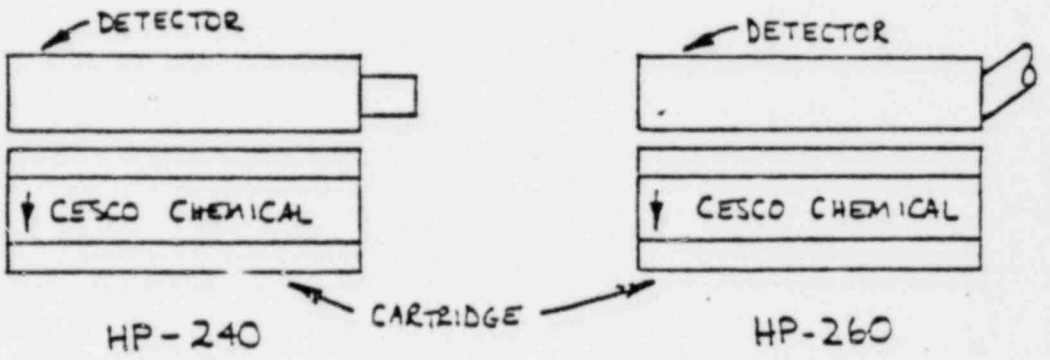


TABLE 1
DESCRIPTION OF EMERGENCY ONSITE MONITORING LOCATIONS

Coordinate	Straight Line Distance From Plant (Meters)	Description	AC Power Available
N,A	300	South side of road	No
N,NE,A	700	In front of wooden water tank	No
NE,A	300	Adjacent to cast reservoir	Yes
NE,B	800	North side of wood in the gulley	No
ENE,A	700	South side of switch-yard at fence	No
SE,C	700	Air sampler-behind forth side of GC warehouse	Yes
SE,B	800	Front of GC warehouse	Yes
SE,A	800	40 feet off the road on the west side of road - no accessible by vehicle	No
SSE,A	700	Adjacent to guard shade on bluff	Yes
SSE,B	700	Adjacent to culvert on west side of dirt road	No
SSE,C	700	West of sandblasting area	No
S,A	—	On breakwater	No
S,B	—	On breakwater	No
SSW,A	400	West of met tower - requires - 53 - key for gate - not accessible by vehicle	No

TABLE 1 (Continued)

Coordinate	Straight Line Distance From Plant (Meters)	Description	AC Power Available
SSW,B	___	On breakwater	No
SSW,C	___	On breakwater	No
SW,A	500	West of met tower - requires - 53 - key for gate - not accessible by vehicle	Yes
WNW,A	500	Near gulley on south side - requires - 53 - key for gate	No
WNW,B	600	40 feet in front gate - requires - 53 - key	No
WNW,C	600	North side of road in clearing	No
NW,A	600	North side of road in clearing area of bushes	No
NW,B	600	Northwest side of dirt road	No
NW,C	800	At gate on road leading to north road	No
NNW.A	800	30 feet north of steps leading to pond	No

TABLE 2

DESCRIPTION OF EMERGENCY OFF-SITE MONITORING LOCATIONS

Coordinate	Staight Line Distance From Plant (KM)	Description[9]	AC Power Available
N,10,A	9.8	West of Montana de Oro State Park sign (0.6 miles SW of Rodman Drive on Pecho Road. Good radio at path off road south of State Park sign. Sign on path reads "No Vehicles".	No
N,15,A	10.0	End of Alamo Drive in Cabrillo Estates. (Turn off Pecho Road at Rodman and go to the top of the hill. Turn right onto Alamo and follow it to the end.) Good radio. Phone available.	Yes[1]
N,15,B	11.6	Sunset Terrance Golf Course at clubhouse. Good radio at west end of Howard Drive or on road running north of the golf course.	Yes[2]
N,15,C	11.3	Baywood Park Fire Station (Turn south off of Los Osos Road onto Bayview Heights Drive. Has a TASC-4. DER's monitoring Station 10 is located at Sunnyside School next door.) Good radio. Phone available.	Yes
N,20,A	18.0	Morro Bay Power Plant. DER's monitoring Station 9 is located here. Good radio. Phone available.	Yes

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
NNE,15,A	11.3	Intersection of Los Osos Valley Road and Clark Valley Road (under PG&E transmission lines). Good radio.	No
NNE,15,B	12.9	Los Osos Jr. High School on South Bay Boulevard in the playing field. Good radio.	No
NNE,20,A	17.6	0.2 miles north along San Bernardo Creek Road is on the northeast side of Highway 1. Good radio.	No
NE,15,A	10.6	Intersection of Los Osos Valley Road and Turri Road. DER's monitoring Station 11 is located nearby. Good radio at intersection.	No
NE,20,A	17.4	Sheriff's headquarters. (EOF) Turn south on Highway 1 at sign indicating Sheriff's Operational Center. Good radio. Phone available.	Yes
NE,20,B	19.2	PG&E substation near Men's Colony, adjacent to northeast side of High 1. Good radio. Phone available.	Yes

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
ENE,8,A	9.0	See Canyon Road, 4.2 miles up from San Luis Bay Drive intersection. Good radio. Telephone available. Rattlesnake hazard.	Yes[1]
ENE,20,A	14.8	Laguna Jr. High School at intersection of Los Osos Road and Perfumo Canyon Road. Good radio.	Yes[3]
ENE,20,B	16.0	Fire station at intersection of Los Osos Valley and Madonna Roads. Good radio.	Yes
ENE,20,C	18.6	PG&E Information Zone 1 substation at corner of Walker and Pacific Streets. DER's Station 12 is also located here. Good radio.	Yes
ENE,20,D	15.6	Corner of Foothill Boulevard and O'Conner Way. Good radio.	Yes[1]
ENE,20,E	15.8	Yancy's Restaurant (formerly Hob Nob) parking lot. Good radio.	Yes[2]
E,15,A	14.5	PG&E Information Center Good radio.	Yes
E,15,B	13.4	Bellevue-Santa Fe School. Good radio.	Yes[5]

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
E,15,C	11.3	See Canyon Road, 1.7 miles up from San Luis Bay Drive intersection. Survey at intersection of See Canyon Road and Davis Canyon Road. Good radio.	Yes[1]
E,25,A	20.2	SLO County Airport. The field on the right of the road to the parking lot. Good radio.	Yes
E,25,B	21.5	SLO Country Club. East side of parking lot in the fairway. Good radio.	Yes[2]
ESE,4,A	2.6	Turnout on access road, 1.6 miles from Security Building. Marked with red/white fence post. Radio near plant or near location ESE,10,A	No
ESE,6,A	4.5	Turnout on access road 2.8 miles from Security Building. Marked with red/white fence post. Radio near plant or near location ESE,10,A.	No
ESE,8,A	6.9	Gate next to shack at road to ruins, 4.3 miles from Security Building along access road. Marked with red/white fence post. DER station 16 is near here. Radio near plant or near location ESE,10,A	No
ESE,10,A	9.6	Top of San Luis Hill[5]. Gate at 6.2 miles from the Security Building. Some radio.	No

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
ESE,10,B	10.0	Port San Luis Gate. TASC-4 and DER's Station 27 are located here. Radio on road to Pirates Cove.	Yes
ESE,15,A	11.6	Parking lot behind Avila Beach Post Office. Radio on road to Pirates Cove.	Yes
ESE,20,A	15.3	Pismo Beach Fir Dept. on Shell Beach Road. Good radio.	Yes
ESE,20,B	19.2	0.5 miles northwest of the Shorecliff Inn on Shell Beach Road. Good radio.	Yes[1]
SE,2,A	1.3	Turnout on access road, 0.8 miles from Security Building near meteorological Tower A. Marked with red/white fence post. DER Station 7 is near here. Good radio.	No
NW,2,A	1.6	0.6 miles north from Field's property gate (1 mile north from plant, just ENE of Lion Rock).	No
NW,4,A	3.5	Fields' road near large watering pond.	No
NW,8,A	6.1	Near residence by park gate.	Yes[1]
NNW,4,A	2.7	Near wood paneled house.	Yes[1]

TABLE 2 (Continued)

Coordinate	Straight Line Distance From Plant (KM)	Description	AC Power Available
NNW,8,A	5.8	Parking lot near end of road at southern park, boundary (near gate to Fields' property). Good radio.	No[6]
NNW,8,B	7.6	Ranger station overlooking Spooner's Cove. Good radio on road south of Ranger Station at "Locked Gate Ahead" sign (near parking overlook of Spooner's Cove).	Yes[7]

NOTES:

[1]Power is available at nearby residences.

[2]During working hours. Also power is available at nearby residences.

[3]During school hours. Also at nearby residences.

[4]During school hours.

[5]A dirt road leads to the top of the hill. The intersection of this road with access road is marked with a red/white fence post. A 90909 key is required on the gate. A four-wheel drive vehicle is preferred. Alternatively; take readings on the access road at the marked fence post.

[6]Power is available at nearby residence on Fields' property (NW,8,A) and monitoring can be performed at this latter location.

[7]During daylight hours.

[8]Radio comments refer to unaided handi-talkies use of Davis Peak repeater (H.P. Frequency) only - other transmitter sites not considered.

TABLE 3
DER ENVIRONMENTAL SAMPLING LOCATIONS

Code	Description	Radial Direction*	Radial Distance (Miles)
08l	Point Buchon (Station 18)	325	3.6
0S1	Exclusion Fence-Northwest Corner (Station 3)	320	0.1
0S2	North Gate (Station 31)	320	0.5
1A1	Crowbar Canyon (Station 13)	327	1.6
1C1	Montana de Oro Campground (Station 38)	336	4.7
1S1	Wastewater Pond (Station 32)	330	0.4
2D1	Sunnyside School (Station 10)	10	6.9
2F1	Morro Bay (Station 26)	0	10.9
2F2	Moor Bay Power Plant (Station 9)	358	11.2
2S1	Back Road-300 m North of Plant (Station 33)	0	0.2
3D1	Clark Valley (Station 40)	24	6.2
3S1	Road NW of 230 kv Switchyard (Station 34)	23	0.4
4C1	Clark Valley - Gravel Pit	45	5.8
4D1	Los Osos School (Station 11)	36	7.6
4S1	Back Road Between Switchyards (Station 35)	43	0.5
5C1	Junction Perfumo/See Canyon Roads (Station 39)	64	4.7
5F1	SLO Zone 1 Substation (Station 12)	68	11.2
5F2	Cal Poly Farm (Station 25)	60	12.6
5F3	SLO County Health Department (Station 29)	70	12.7
5S1	400 kv Switchyard (Station 4)	58	0.4
5S2	Diablo Creek Weir (Station 20)	65	0.5
5S3	Microwave Tower Road (Station 8)	70	0.7
6D1	Junction See/Davis Canyon Roads (Station 41)	89	7.5
6S1	Microwave Tower (Station 5)	94	0.5
7C1	Pecho Creek Ruins (Station 16)	118	4.1
7D1	Avila Gate (Station 27)	120	6.6
7D2	Avila Beach (Station 14)	110	7.6
7F1	Shell Beach (Station 17)	110	10.8
7F2	Pismo Beach (Station 22)	115	12.6
7G1	Arroyo Grande (Station 23)	115	16.8
7G2	Oceano Substation (Station 15)	118	17.3
7G3	Woodland Dairy (Station 30)	122	17.9
7S1	Overlook Road (Station 36)	112	0.3
7S2	Diablo Peak (Station 28)	103	1.1
8S1	Target RAnge (Station 6)	125	0.5
8S2	Southwest Site Boundary (Station 7)	128	1.1
9S1	South Cove (Station 37)	167	0.4
DCC	Diablo Creek at Diablo Cove (Station 21)	270	0.1
DCM	Diablo Cove (Station 19)	270	0.2
ICO	Iodine Cartridge Composite	0	0.0
LO	Lompoc	154	44.6
MT1	Meteorological Tower (Station 1)	185	0.2
SM	Santa Maria	127	29.7
SV	Solvang	144	56.7
WN1	Northwest Guard Shack (Station 2)	290	0.2

TABLE 4
ENVIRONMENTAL RADIATION MONITORING NETWORK STATION
OF THE NUCLEAR REGULATORY COMMISSION

NRC STATION NO.	SECTOR	AZIMUTH	ZENITH	DESCRIPTION
1	SE	125°	1.0 mi.	Site entrance road
2	ESE	119°	4.2 mi.	Site entrance road
3	ESE	107°	6.9 mi.	San Miguel Street, Avila Beach
4	ESE	109°	10.6 mi.	Corner of Naomi Avenue and Seacliff Drive, Sunset Palisades area
5	ESE	113°	14.1 mi.	Corner of Atlantic City Avenue and Front Street, Grover City
6	ENE	68°	9.6 mi.	Parfumo Canyon Road, Laguna Lake Park Area
7	N	359°	11.1 mi.	PG&E Morro Bay Power Plant
8	N	359°	6.6 mi.	Pecho Valley Road, Cuesta by the Sea Area
9	NNW	339°	4.7 mi.	Montana De Oro State Park
10	NNW	328°	3.5 mi.	Private Property Road at end of Pecho Valley Road
11	NNW	332°	1.3 mi.	Private Property Road North of Diablo Canyon Plant
12	NE	37°	21.4 mi.	San Diego Road, Atascadero
13	NE	37°	21.4 mi.	San Diego Road, Atascadero
14	NE	37°	21.4 mi.	San Diego Road, Atascadero

TABEL 5
LOCATIONS OF SELECTED DAIRIES

DAIRY HERD	LOCATION RELATIVE TO DCPP
L.F. Domenghini (500 cows)	NNE, 12.5 miles
Roemer and Jones (200 cows)	NNE, 11 miles
Dutch Maid Farm (100 cows)	NE, 8 miles
Don Warden (200 cows)	NE, 8 miles
Jim Spreafico (150 cows)	E, 9.5 miles
SLO Cal Poly Farm	ENE, 10 miles
Albertoni Farm	SE, 23.5 miles (Guadalupe)

TABLE 6
PIC LOCATIONS

LOCATION	DESCRIPTION
Site 1	DCPP North Gate Guard Post.
Site 2	SSW corner of Target Range.
Site 3	715 Harbor Street, Morro Bay. Small fenced yard on NE corner of Harbor Street and Piney Street intersection.
Site 4	SLO County Sheriff's Office. South of EOF trailer behind retaining wall.
Site 5	SLO Police Department. Intersection of Santa Rosa Street and Walnut Street. Behind fe[illegible] SW of Walnut Street driveway.
Site 6	SLO County Airport on HWY 227. At southern most corner inside fenced airport annex area.
Site 7	PG&E Energy Information Center. Take San Luis Bay Drive exit from U.S. 101. On hill above employee parking lot.
Site 8	Pismo Beach. From Bello Street go NE onto Main Street. Turn right at first road to the water storage tank. On top of hill N of pump house and W of water storage tank.
Site 9	SLO County Building, Grover City. SW corner of SLO County Social Services Building on Longbranch Street, Grover City.

TABLE 7

BACKGROUND DATA FOR β/γ DOSE AND/OR COUNT RATE MEASUREMENTS
(3' ABOVE GROUND)

INSTRUMENT	BACKGROUND DOSE RATE (mR/hr) WINDOW CLOSED	WINDOW OPEN
Rad Owl	0	0
Victoreen Radgun	0.02	0.02
HPI-1010	0.015	NA

GM PROBE	BACKGROUND COUNT RATE (cpm) SHIELD ON	SHIELD OFF
HP-240	60	60
HP-260	NA	50
HP-210	NA	50

TABLE 8
GM PROBE EFFICIENCY FACTORS, ε_2, FOR IODINE DETERMINATIONS

GM PROBE	ε_2 (counts/dis)
HP-240	0.013
HP-260	0.09
HP-210	0.09

TABLE 9
GM PROBE EFFICIENCY FACTORS, ε_3, FOR PARTICULATE DETERMINATIONS

GM PROBE	ε_3 (counts/dis)
HP-240	0.018
HP-260	0.20
HP-210	0.18

TABLE 10
GM PROBE EFFICIENCY FACTORS, ε_1, FOR GROUND SURVEYS

GM PROBE	ε_1 ($Ci/m^2/cpm$)
HP-240	0.0041
HP-260	0.0012
HP-280	0.0011

DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT

EMERGENCY ENVIRONMENTAL MONITORING FIELD DATA SHEET

TEAM _____ LEADER _____ MEMBER _____

MONITORING LOCATION _____

1. TASC-4 READING CAL DUE _____
   SCALER COUNT _____; COUNT TIME _____ SEC; DR(μR/hr)=(COUNTS) ÷ (SECONDS) = _____

2. PIC READING CAL DUE _____
   DOSE RATE (μR/hr) _____

3. BETA/GAMMA RADIATION FIELD MEASUREMENTS

   a. DOSE RATE CAL DUE _____ TIME OF SURVEY _____

	mR/hr (WINDOW OPEN)			mR/hr (WINDOW CLOSED)		
INSTRUMENT	GROSS	BCKG*	NET	GROSS	BCKG*	NET

   b. COUNT RATE CAL DUE _____ TIME OF SURVEY _____

	cpm (SHIELD OFF)			cpm (SHIELD ON)		
TYPE OF PROBE	GROSS	BCKG*	NET	GROSS	BCKG*	NET

   c. INTEGRAL DOSE

	①	②	③	④	⑤
INSTRUMENT	TIME STARTED	TIME COMPLETED	DURATION (HOURS) ② − ①	TOTAL DOSE (mR)	DOSE RATE (mr/hr) ④ ÷ ③

4. GROUND SURVEYS CAL DUE _____ TIME _____

		cpm (SHIELD OFF)			②	③ (μCi/cm2)
DESCRIPTION OF LOCATION	TYPE OF PROBE	GROSS	BCKG*	NET ①	ϵ_1*	① x ②

5. AIR SAMPLE DATA

SAMPLER	TIME STARTED	TIME COMPLETED	DURATION (MINUTES)	FLOW RATE (CFM)	SAMPLE VOL (FT^3)

*Numerical value found in Emergency Procedure RB-7 and RB-8.

6. IODINE DETERMINATION CAL DUE _____

TYPE OF PROBE	cpm (SHIELD OFF) GROSS	BCKG	NET (1)	(2) ε_2*	(3) E_c*	(4) VOLUME (ft^3)	$\frac{(1) \times 1.59 \times 10^{-11}}{(2) \times (3) \times (4)}$ ($\mu Ci/ml$)

7. PARTICULATE DETERMINATION CAL DUE _____

TYPE OF PROBE	cpm (SHIELD OFF) GROSS	BCKG	NET (1)	(2) ε_3*	(3) E_f*	(4) VOLUME (ft^3)	$\frac{(1) \times 1.59 \times 10^{-11}}{(2) \times (3) \times (4)}$ ($\mu Ci/ml$)

8. VEGETATION SAMPLES CAL DUE _____ TIME OF SURVEY _____

SAMPLE DESCRIPTION	cpm (SHIELD OFF) GROSS	BCKG	NET (1)	$(1) \times (2.5 \times 10^{-6})$ ($\mu Ci/gm$)

9. LIQUID SAMPLES CAL DUE _____ TIME OF SURVEY _____

SAMPLE DESCRIPTION	VOLUME OF SAMPLE COUNTED	IMMERSION DATA GROSS CPM	BCKG*	NET CPM

10. SMEAR SAMPLES
CAL DUE _____
TIME OF SAMPLE _____

SAMPLE DESCRIPTION	cpm (SHIELD OFF) GROSS	BCKG	NET (1)	(2) ε_3*	(3) AREA SMEARED (ft^2)	$\frac{(1)}{(0.11) \times (2) \times (3)}$ (dpm/dm^2)

11. MISCELLANEOUS REMARKS

CURRENT

EMERGENCY PLAN

IMPLEMENTING PROCEDURES

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OP-25	Tank Ruptures	0
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OP-29	Excessive Load Increase	0
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