ENCLOSURE 1

Updates Included In This Submittal

DIABLO CANYON EMERGENCY PLAN
IMPLEMENTING PROCEDURES

Volume 3A

Updated Table of Contents
EP M-7, Revision 7
EP G-4, Revision 6

Volume 3B

Update Table of Contents
EP EF-6, Revision 4
EP RB-3, Revision 1
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EP RB-15:A, Revision 3
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EP RB-15:D, Revision 2
EP RB-15:E, Revision 2
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EP RB-15:G, Revision 1
EP RB-16:A, Revision 2
EP RB-16:B4, Revision 2
EP RB-16:B5, Revision 2

ENCLOSURE 2

Location of Proprietary Information

Procedure:

EP M-7 -- pp. 2 and 3 of 5
EP G-4 -- pp. 4; 5; 7; 8; 9; Summary of Personnel Accountability and Assignments, pp. 1 and 2 of 2.
EP RB-15A -- pp. 3, 9 and 10 of 27
EP RB-16A -- pp. 3, 9 and 10 of 16
EP RB-16B4 -- p. 1 of 7

ENCLOSURE 3

Updates to Diablo Canyon

Emergency Plan Implementing Procedures

CURRENT

EMERGENCY PLAN

IMPLEMENTING PROCEDURES

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Volume 3A

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

TITLE EMERGENCY PROCEDURE
OIL SPILL ISOLATION AND CLEANUP

NUMBER	EP M-7
REVISION	7
DATE	2/25/85
PAGE	1 OF 5

IMPORTANT TO SAFETY

APPROVED R C Thornberry 4-15-85
PLANT MANAGER DATE

SCOPE

This procedure outlines the steps required to isolate and clean up small oil spills that could occur during tank truck loading and unloading or during other plant operations. It is absolutely necessary that no oil reaches Diablo Creek or the ocean from spills that might occur. This procedure and changes thereto requires PSRC review.

IMMEDIATE OPERATOR ACTION

1. Perform any operation which can be done rapidly to stop the spill.

2. Notify the Shift Foreman.

SUBSEQUENT ACTION

1. Notify the following Company personnel.

   a. For all occurrences:

      1) Plant Manager.

      2) Plant Superintendent.

      3) Supervisor of Operations.

      4) Supervisor of Chemistry and Radiation Protection.

   b. If any oil reaches the creek or the ocean:

      1) Manager of Nuclear Plant Operations or his alternate.

2) Supervising Nuclear Generation Engineer (Personnel and Environmental Safety) or his alternate.

3) District Manager, Los Padres District.

4) Onsite DER Marine Biologist.

5) PGandE Law Department.

Mr. David J. Williamson
Company Phone
Home Phone:

6) PGandE Public Information, Diablo Canyon, or San Luis Obispo

Mr. Ron Weinberg
Company Phone:
Home Phone:
Pager: Health Physics Freq.

Ms. Missy Hobson
Company Phone:
Home Phone:
Pager: Health Physics Freq.

2. Notify the following non-Company agencies if any oil reaches the Creek or ocean.

a. Federal National Response Center.

U.S. Coast Guard
Washington, D.C.
Tel. (toll free)

or

Coast Guard
San Francisco (Captain of the Port)
Tel.

or

Coast Guard
Monterey (Captain of the Port)
Tel.

b. California State Office of Emergency Services
Sacramento (ring down line)

or

Tel. [redacted]

Tel. [redacted]

c. Environmental Protection Agency
Tel. [redacted]

d. California State Land Commission
Tel. [redacted]

e. State - Executive Officer

California Regional Water Quality Control Board
Central Coast Region
1122 Laurel Lane
San Luis Obispo, CA 94301
Tel. [redacted]
(Request California Office of Emergency Services to notify in off-hours)

NOTE: A record of all such notifications should be kept on Form [redacted] "Emergency Notification Record" or similar log.

3. Emergency Actions for Spills During Loading and Unloading of Tank Trucks.

NOTE: Operating Procedure K-8 requires that operating personnel be present during loading and unloading of tank trucks. This individual will be responsible for taking necessary action should an oil spill occur during these operations.

a. Types of spills that could be expected:

1) Transfer hose connection at truck or tank breaks loose and oil spills onto pavement.

2) Transfer hose from tank truck breaks or cracks and oil spills onto pavement.

3) Overfilling of the diesel fuel oil tanks or the auxiliary boiler fuel oil tank.

4) Oil drain from the transfer hose after being disconnected.

5) A leak at the lube oil receiving connection occurs.

b. Methods for oil spill containment and cleanup:

1) Sand bags and absorbents are stored near the diesel fuel oil storage tanks and the auxiliary boiler fuel oil storage tank for the purpose of diking and absorbing spilled oil.

2) Sand bags should be used to dike any significant oil spill which could flow to Diablo Creek or the ocean. Once the flow of oil has been stopped, absorbents should be used to clean up the oil.

3) The absorbent should be used by itself only if the leak is of a small nature and a shallow film has been formed on the pavement. The absorbent can contain small spills by absorption.

c. Action to be taken if truck is loading oil:

1) Shut off any transfer pump involved.

2) Isolate all connections to the transfer hose.

d. Action to be taken if truck is unloading oil:

1) Close truck tanker drain valve.

2) If a leak occurs at the lube oil receiving connection, the transfer pumps must also be shut down and the connection isolated from the lube oil storage tank.

4. Emergency Actions for Spill at Circulating Water Pump from Bearing Oil Pot

a. Turn off sump pump at intake structure sump.

b. Before turning on sump pumps mentioned in "a" above, clean oil from sump area.

5. Emergency Actions for Major Oil Spill in an Area Which Leads to the Turbine Building Sump

a. Periodically check the sump to verify that it is not overflowing to the discharge side.

b. Take samples periodically from the effluent of the oil water separator. If significant quantities of oil seem to be coming from the oil water separator, then redirect flow to the oil water separator holding tank.

6. Followup Reports

a. Prepare a Nuclear Plant Problem Report (see Nuclear Plant Administrative Procedure C-12).

b. Written notification to the Executive Officer of the RWQCB is required within 5 days of awareness of the non-compliance.

The written report will include the information required by the RWQCB Water Discharge Requirements. A copy of the report should be provided to the NRC, Region V to meet NRC reporting requirements.

c. Any letters or reports issued outside the company should be reviewed by Mr. David Williamson of the PG&E Law Department.

REFERENCES

1. California Regional Water Quality Control Board - Central Coast Region, Order No. 82-24, NPDES No. CA0003751, Waste Discharge Requirements for PGandE Diablo Canyon Nuclear Power Plant Units 1 and 2, San Luis Obispo County.

2. Diablo Canyon EPA Oil Spill Prevention Control and Countermeasure Plan, Rev. 2, 3/25/80.

ATTACHMENT

1. Form 69-9221, "Emergency Notification Record"

69-9221 3/82 (100)

PACIFIC GAS AND ELECTRIC COMPANY
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

EMERGENCY NOTIFICATION RECORD

EMERGENCY IDENTIFICATION ______________________ DATE __________ SHEET __________

PERSON CALLED	AFFILIATION	TIME	REACHED	BY	MESSAGE GIVEN	RESPONSE

TITLE EMERGENCY PROCEDURE
PERSONNEL ACCOUNTABILITY AND ASSEMBLY

APPROVED R. C. Thornberry 4-11-85
PLANT MANAGER DATE

IMPORTANT TO SAFETY

SCOPE

This procedure describes the immediate emergency personnel assembly and accountability actions to be taken by all on-site personnel, security officers, contractors, and visitors in the event of a plant emergency. This procedure and changes thereto require PSRC review.

GENERAL

In the event of an emergency situation in either Unit 1 or Unit 2, it is imperative that all personnel on-site are notified of the situation, their whereabouts identified for safety and security purposes, and that they respond in a coordinated effort to the emergency.

In certain situations, (e.g., if the emergency is security related), personnel may be directed to respond in a manner other than what is stated in this procedure. In most situations, the primary notification means is the site emergency signal which alerts all personnel in the vicinity of the main plant building that an emergency exists.

1. The signal is produced by electronic warblers placed at numerous locations throughout the plant. It has a characteristic sound; a rapid rise in pitch followed by a slower drop. The sound cycle is repeated continuously for as long as the signal remains energized.

2. Flashing red lights have been provided in the containment and other plant areas where the background noise level may not permit audible perception of the electronic warblers.

3. In an emergency situation, the alarm should sound for a minimum of one minute.

Actuation and reset of the signal shall be as follows:

1. Actuation of the plant emergency signal requires specific approval from the Shift Foreman.

2. The signal can be manually actuated from the operator's control console of either unit by manipulating the control switch to the ON position. Actuation can also be performed from the hot shutdown panel of either unit by a control switch similar to the control console switch.

3. The alarm can be reset from the operator's console or the hot shutdown panel by proper operation of the control switch, or from the auxiliary relay panel EACC3 located at the 128 foot elevation on the Unit 1 equipment side.

Each site employee is assigned a designated assembly area (see Figure 1), and each area is assigned a supervisor. The Designated Assembly Area Supervisor (DAAS) notifies the Security Shift Supervisor or General Construction Security who in turn notifies the Security Shift Supervisor, of personnel accountability. The Security Computer roll call is to be used as the primary method of accountability for personnel potentially within the plant area.

Personnel receive instructions on the assembly process as follows:

1. Site area personnel, visitors and common carriers will be logged in and out and provided with instructions at the Avila Gate guard post or plant site guard post, or the General Construction Security office.

2. Upon arrival and check-in at the security building, protected area visitors will receive instructions explaining what they are to do and where they are to go in the event of sounding of the Site Emergency Alarm.

INITIATING CONDITIONS

The Shift Foreman declares that the plant is in an Alert, a Site Emergency, or a General Emergency status as defined in Emergency Procedure G-1, "Accident Classification and Emergency Plan Activation," or determines that personnel assembly and accountability is desirable, and activates the emergency signal.

IMMEDIATE ACTIONS

1. PGandE plant personnel engaged in critical operations or emergency recovery actions shall call their assigned assembly areas as soon as practical.

2. Plant security personnel shall respond as follows:

   a. Those assigned to the Central Alarm Station, the Secondary Alarm Station, the perimeter posts, and other fixed posts shall remain at their posts and await further instructions.

   b. Those on routine patrol shall continue their patrol unless otherwise instructed by the Security Shift Supervisor.

   c. All other permanent security force personnel shall call in to the Security Building for instructions.

3. Plant personnel with potential immediate emergency response rolls will report to their assigned in-plant assembly area (Control Room, Access Control, Operational Support Center [OSC], and Technical Support Center [TSC]). Operations personnel on shift and at the intake should call the shift foreman. All other personnel at the intake should report directly to their assembly areas. Personnel in the radiologically controlled area of the plant will initially assemble at the Radiological Access Control.

4. All other personnel in the protected area not involved in critical operations or emergency recovery shall proceed to the Security Building exit and "badge out" and then proceed to their assembly area. Personnel outside the protected area will proceed directly to their assembly area.

   NOTE: It is the responsibility of each supervisor to know the general location of his subordinates at any time.

5. All PGandE General Construction, construction contract personnel and their visitors will evacuate the plant buildings and proceed to their assigned Assembly Areas via their assigned badge alleys. Badges will be deposited on exit from the project.

6. PGandE DER, California Department of Fish and Game personnel, and their visitors, will evacuate from the plant buildings and adjacent work areas and proceed immediately to their assembly area, the PGandE Biology Lab.

7. NPO visitors will be escorted to the Security Building and instructed to remain here. Accountability will be maintained by checking off those escorted visitors against the visitor sign-in log maintained at the security office. Escorts themselves will then proceed to their own department or company assembly areas.

8. Visitors to General Construction and associated contractors will be escorted to a visitor assembly area and the escorts will then proceed to their own assembly area. Drivers will park their vehicles and proceed on foot to their assigned area.

SUBSEQUENT ACTIONS - UNIT 1 ONLY

1. The Security Shift Supervisor will ensure that the "badge out" counter is manned for persons leaving the protected area.

2. The Designated Assembly Area Supervisor (DAAS) for each NPO Assembly Area will use the "BADGE-O-MATIC" computer printout, posted on the wall of each Assembly Area to check off the individuals present at the Assembly Area or prepare a list of personnel present by name and badge rack number. When the head-count is complete:

   a) Inside Protected Area: The DAAS for each Assembly Area inside the protected area (Control Room, TSC, Cold Machine Shop, and Radiological Access Control) shall inform the Security Shift Supervisor (normally uses the emergency conference line [redacted]) of the total head-count and the names of any individuals not accounted for. When the required information has been passed on to the Security Shift Supervisor, the DAAS should send the "BADGE-O-MATIC" printout or list to the Security Shift Supervisor by runner.

      NOTE: The DAAS should maintain contact on the conference line at all times for subsequent instructions or to inform the Security Shift Supervisor of late-comers.

b. Outside Protected Area: The Training Building is the major assembly point outside the protected area with a smaller group assembling at the Biology Lab. The Biology Lab DAAS shall inform the Security Shift Supervisor (SSS) using conference line extension [redacted] of the total head-count and the names of individuals not accounted for. The DAAS for each assigned classroom in the Training Building shall report head-count information to the Training Building Communications Coordinator (TBCC). The TBCC will relay accountability information to the SSS via conference extension [redacted] and follow up by sending "Badge-O-Matic" lists to the SSS by runner. He will monitor the conference line and coordinate information flow to the DAAS at each assembly classroom.

NOTE: Contact should be maintained on the conference line at all times for subsequent instructions or to inform the Security Shift Supervisor of any late-comers.

3. The Security Shift Supervisor can access the conference lines by dialing: [redacted]
Inside Protected Area
Outside Protected Area

4. The names of personnel unaccounted for will be determined by the security shift supervisor by comparing the Security Computer Roll Call, or the badge racks against assembly area reports. The results will be reported to the Emergency Liaison Coordinator as soon as possible.

5. The Security Shift Supervisor shall notify the Emergency Liaison Coordinator in the TSC (or Control Room if in off-normal hours) of the site personnel accountability, complete the "Summary of Personnel Accountability and Assignments" log sheet (Form 69-10060), and forward the completed forms to the Emergency Liaison Coordinator.

6. If there are any unaccounted for personnel, the following actions will be initiated:

   a. The Security Shift Supervisor will attempt to identify the last known location of the unaccounted persons from DAAS Reports and the Security Computer Roll Call, and provide this information to the Emergency Liaison Coordinator.

b. The Site Emergency Coordinator will assign appropriate personnel to perform a plant search. If the situation dictates, the Emergency Radiological Advisor will provide a member of the Chemical and Radiation Protection Department for assistance.

c. The person leading the plant search shall contact the Emergency Liaison Coordinator when contact has been made with the unaccounted for personnel.

7. After persons assigned to other assembly areas have assembled at the Radiological Access Control, have been accounted for, and have been processed through the Contamination Control Point, the OAAS will contact the Emergency Liaison Coordinator and inform him of such. Persons assembled at Access Control may then leave the protected area via the Security Building and proceed to their designated assembly areas.

8. The Site Emergency Coordinator will order any necessary relocations or evacuations of assembly areas as appropriate. The OAAS of each area may relocate personnel if deemed necessary for personnel safety.

9. Personnel required for immediate emergency response will be dispatched from the Operational Support Center (access control and cold machine shop assembly areas). Other personnel assembled may be relocated, on order of the Site Emergency Coordinator, to the Security Building ready room to await job assignment.

10. Personnel will be granted access to the plant only on the authorization of the Site Emergency Coordinator.

11. Recordkeeping

All records generated by the utilization of this procedure for an exercise or emergency shall be forwarded the next working day to the Assistant Plant Manager/Support Services for review and retention.

1) Records generated from exercises will be categorized as non permanent and retained for a minimum of five years.

2) Records generated from actual emergency events will be categorized as lifetime and placed into lifetime storage in accordance with procedure "Requirements for Retention and Extended Storage of Operation Phase Activity Records (AP E-1S1)."

ASSEMBLY AREAS

The first available person listed in each group below is designated as the primary DAAS to be responsible for the accountability of personnel at each assembly area. Using the conference lines, [(dial [redacted] or normal number [redacted]] or runner, he shall inform the Security Shift Supervisor of the status of his areas as soon as practicable.

1. Control Room [(Phone [redacted]]
   a. Shift Foreman--interim Site Emergency Coordinator
   b. Assistant Plant Manager/Plant Superintendent
   c. Operators, Control Technicians, STAs, Clerks, and others on shift
   d. Resident NRC Inspector (designated)

2. Technical Support Center [(Phone [redacted]]
   a. Training Manager (Emergency Liaison Coordinator)
   b. Operator Training Instructors (Emergency Liaison Assistants)
   c. Plant Manager--long-term Site Emergency Coordinator
   d. Materials and Project Coordination Manager
   e. Technical Services Manager (Emergency Evaluation and Recovery Coordinator)
   f. Engineering Manager
   g. Operations Manager (Emergency Operations Advisor)
   h. Senior Power Production Engineer (Nuclear)--3
   i. Senior Power Production Engineer (Operations)
   j. Regulatory Compliance Supervisor
   k. Resident NRC Inspector (designated)
   l. C&RP Engineer (designated)
   m. Security Supervisor
   n. Chemistry and Radiation Protection Manager (Emergency Radiological Advisor)
   o. Senior Instrument and Controls Supervisor
   p. Communication Technician
   q. G.C. Resident Startup Engineer
   r. C&RP Systems Analysts (TSC EARS Operators)

3. Cold Machine Shop [(Phone [redacted]

   a. Emergency Safety Supervisor
   b. Maintenance Manager
   c. Maintenance Engineers (designated)
   d. Fire Marshal
   e. Maintenance Fire Brigade Captains
   f. Maintenance Fire Brigade

4. Access Control [(Phone [redacted]

   a. Senior Chemistry and Radiation Protection Engineer (designated)
   b. Chemistry and Radiation Protection Engineers (designated)
   c. C&RP Foreman (designated)
   d. Chemistry and Radiation Protection Technicians (designated)
   e. All other personnel in the controlled areas

5. Security Building [(Phone [redacted]

   a. Security Shift Supervisor
   b. Security personnel not on patrol
   c. New NPO employees not yet assigned a permanent assembly area
   d. NPO visitors

6. Training Building Room 107 [(Phone [redacted]

   a. General Mechanical Foreman
   b. General Electrical Foreman
   c. Mechanical, Electrical, and I&C Foremen and workers
   d. Work Planning personnel
   e. Warehousemen

7. Training Building Room 109 [(Phone [redacted]

   a. Operations Shift Foreman (Administrative)
   b. NPO Operators not on shift
   c. C&RP Technicians not assigned to Access Control
   d. C&RP contractors

8. Training Building Room 121 [(Phone [redacted]

   a. Nuclear Engineers
   b. Power Production Engineers
   c. Computer Engineers and Specialists
   d. Regulatory Compliance
   e. General Office personnel
   f. Coast Valleys personnel
   g. NRC
   h. Document Control
   i. Trainers

9. Training Building Room 122 [(Phone [redacted]

   a. QC Supervisor and QC personnel
   b. QA Supervisor and QA personnel
   c. Westinghouse
   d. Maintenance, QC, and I&C contractors
   e. College Co-op and summer students

10. Training Building Room 123 [(Phone [redacted]

    a. Office Supervisor
    b. Assistant Office Supervisor
    c. Personnel Representatives
    d. Budget Analyst
    e. Employee Counselor
    f. Personnel and General Services Supervisor
    g. Clerical personnel and janitors

11. Training Building Room 222 [(Phone [redacted]

    a. Assistant Plant Manager/Support Services
    b. Senior Power Production Engineer (Emergency Planning)
    c. Interim EOF Staff

12. Biology Lab [(Phone [redacted]

    a. DER Nuclear Section Supervisor
    b. Biology Lab staff, consultants and visitors

NOTE: In off normal working hours, the most senior supervisor present will assume the functions of the DAAS.

PGandE GENERAL CONSTRUCTION AND CONTRACTORS ASSEMBLY AREAS

Construction personnel shall be accounted for by controlling the individual's project I.D. photo badge. Enroute to their assembly areas, each employee shall deposit their I.D. badge at the proper alley of entry. Each contractor will assign a staff member to report to the badge alley to assist in accounting for their personnel and for resolving any discrepancies. Figure 2 shows the assembly area locations for Unit 2 construction personnel. The assembly area supervisor will be the Senior Representative of each group on site.

Group	Area
Plant Thorpe	A-1
Bechtel	A-1
Pullman Power Products	A-2
H.P. Foley and their subcontractors	B
PGandE General Construction	
Engineering Services	C
Quality Control Group	C
Mechanical Group	C
Start-Up Group	C
GO Engineering Group	C
Electrical Group	C

Group	Area
Civil Group	C
Administration Group	C
Station Construction Crew	C
Line Dept./Paint Crews	C
Cal-Poly Foundation	C
Kaiser/Lockheed/EcoMar/Terra	C
Telos	C
Waltek	C
Thermon	C
Towill Inc./Ames & Assoc.	C
Barnes Construction Co.	E
Visitors and other personnel not listed above	D

MISCELLANEOUS

If an emergency occurs during the evening or on a weekend or holiday, the same areas used during working hours shall be utilized. However, personnel who are off-site at the time of the emergency and are notified to report to the site to assist in recovery operations should be instructed as to where they should report when notified. If no instructions are given, personnel reporting to the site shall proceed immediately to the Security Building Ready Room.

ATTACHMENTS

1. Form No. 69-10059, Individual Accountability Sheet
2. Form No. 69-10060, Summary of Personnel Accountability and Assignments.
3. Diablo Canyon Project, Project Instruction PI-39, Rev.1 "Personnel Accountability & Site Evacuation During a Site Emergency"

FIGURES

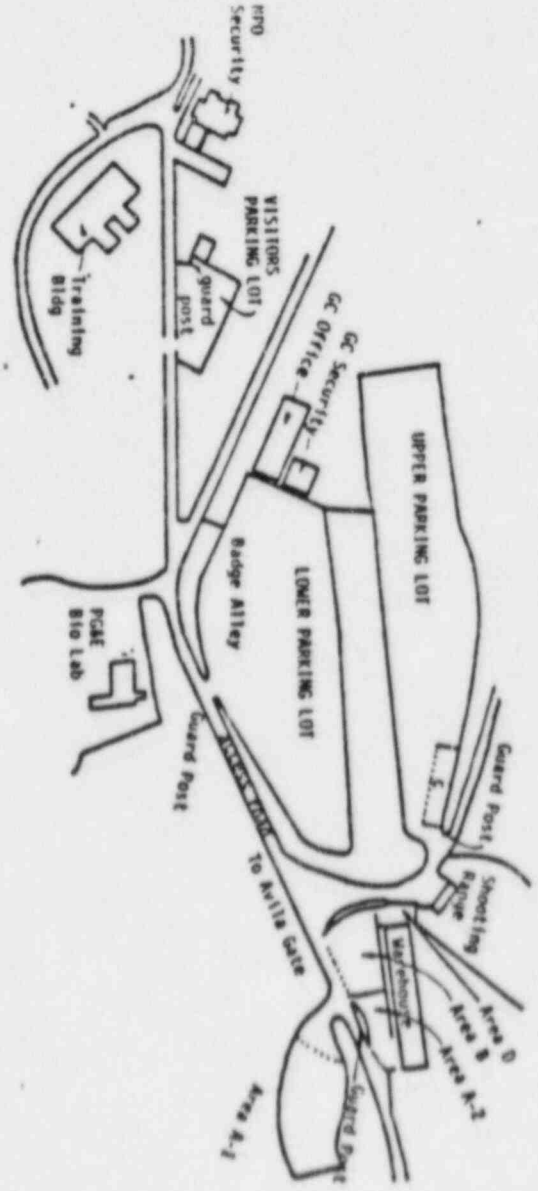
1. Assembly Area Locations.

SUPPORTING PROCEDURES

G-1, "Accident Classification and Emergency Plan Activation"

G-5, "Evacuation of Non-essential Site Personnel"

FIGURE 1
ASSEMBLY AREA LOCATIONS
(OUTSIDE PROTECTED AREA)



PACIFIC GAS AND ELECTRIC COMPAN.
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

INDIVIDUAL ACCOUNTABILITY SHEET

DATE _____

AREA ACCOUNTABILITY SUPERVISOR _____

NAME	BADGE RACK #	REMARKS (NOTE ANY INJURIES)

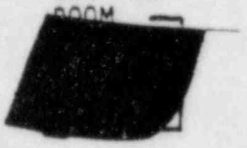
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

SUMMARY OF PERSONNEL ACCOUNTABILITY AND ASSIGNMENTS

BY _____ DATE _____

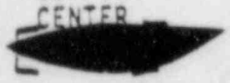
INITIAL PERSONNEL ACCOUNTABILITY

CONTROL ROOM



In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

TECHNICAL SUPPORT CENTER

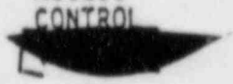


In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

COLD MACHINE SHOP

In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

ACCESS CONTROL



In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

BIOLOGY LAB

In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

SUMMARY OF PERSONNEL ACCOUNTABILITY AND ASSIGNMENTS

BY _____ DATE _____

INITIAL PERSONNEL ACCOUNTABILITY

SECURITY BUILDING

In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

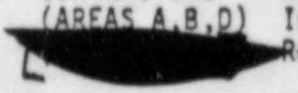
TRAINING BUILDING

In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

GENERAL CONSTRUCTION (AREA C)

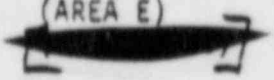
In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

VISITORS & CONTRACTORS (AREAS A,B,D)



In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

GENERAL CONSTRUCTION (AREA E)



In Charge _____ Report In At _____ Hours
No. Of People _____ Accounted For [ ] Yes [ ] No
Missing _____
Injured _____
Remarks _____

DIABLO CANYON PROJECT

UNCONTROLLED COPY
EXPIRATION DATE 3-20-85
INITIALED

PROJECT INSTRUCTION

TITLE: PERSONNEL ACCOUNTABILITY & SITE EVACUATION DURING A SITE EMERGENCY

APPROVED: [signature] 3-3-84
Field Construction Manager Date

1.0 SCOPE

1.1 This Instruction describes the Plant Emergency Signal and the immediate action to be taken by P.G.&E. Construction and Service Personnel, Project Team and Contractor Personnel (including Job Shoppers and subcontractors) and their visitors and service representatives, for an orderly evacuation of the site in response to the Emergency Signal and accountability of all personnel during such an evacuation.

2.0 RESPONSIBILITY

2.1 While construction activities remain in progress, the Field Construction Manager or his designated alternate (Contact GC Security for assigned alternate) have responsibilities and authority over the above personnel, General Construction visitors, and Security Force personnel assigned to construction activities. In this capacity, he or his alternate will be designated as the Construction Force Assembly Coordinator with the following responsibilities:

2.1.1 Communicating with the Site Emergency Coordinator to determine the conditions of any Site Emergency. This communication is normally with the Unit I Security Building through the Shift Security Supervisor.

2.1.2 Transmitting information to Contractors and other construction force related personnel.

2.1.3 Construction force assembly and personnel accountability at the site in the event of an emergency and prior to any site evacuation.

2.1.4 Evacuation of construction force personnel from the site as may be directed by the Site Emergency Coordinator in cooperation with the Evacuation Coordinator.

2.1.5 Provide required traffic control measures.

2.1.6 The decision to evacuate, the type of evacuation (immediately, within 2 hours or within 5 hours), the evacuation route (North or South), the off site assembly area, and the method (by vehicle or foot) will be made by the Site Emergency Coordinator and conveyed to the Construction Force Assembly Coordinator.

2.2 Each Contractor is responsible for the accountability of all their employees working at the site. An accountability program must be implemented by each Contractor to enable the Field Construction Manager/Construction Force Assembly Coordinator to know how many construction personnel are on site at any given time, and their general location on the Project.

2.3 Subcontractors will be responsible for implementing their main Contractor's accountability program. Each Subcontractor will be responsible for the accountability of their employees.

2.4 Each Project Team Department Head is responsible for the accountability of all their subordinates. An accountability program must be implemented to enable each supervisor to know how many of their people are on site at any given time and their general location. Each employee must be indoctrinated on his/her required response to this procedure and details of what is done in the event the Emergency Signal is activated.

3.0 APPLICATION

3.1 This Instruction applies to all construction force-related personnel working in all areas and elevations of the Plant Site and Project.

4.0 PROCEDURE

4.1 EMERGENCY SIGNAL

4.1.1 Identification

4.1.1.1 The Signal is produced by electronic warblers

placed at numerous locations throughout the plant. It has a characteristic sound which is a rapid rise in pitch followed by a slower drop. The sound cycle is repeated continuously for as long as the signal remains energized.

4.1.1.2 Flashing Red Lights have been provided in the Containment and other high noise areas since the background noise level would not permit audible perception of the electronic warblers.

4.1.1.3 Under an emergency situation the alarm should sound for a minimum of one minute.

4.1.2 Testing

The Emergency Signal will be actuated for test purposes every Friday at 12:10 p.m. for a period of approximately ten (10) seconds.

4.2 RESPONSE

4.2.1 Project Team Personnel, Construction Contractors and Subcontractors, and other construction force related personnel will evacuate from the plant buildings and adjacent work areas, exit through their respective assigned badge alleys and proceed immediately to their assigned assembly areas, in response to the Emergency Signal. Assigned alleys are those entrances where the site photo badge is kept for each category of worker. A listing of all categories of personnel governed by this Instruction, and assigned assembly areas is found in Appendix A (Attachment 6.1). A map showing the location of assembly areas is shown on Appendix B (Attachment 6.2). Routes to be taken to assembly areas is shown on Appendix C (Attachment 6.3).

4.2.2 All Unit I construction personnel will exit through the plant security buildings leaving their Unit I badges but not their site photo I.D. badges. Employees will proceed to their assigned badge alley leaving their site photo I.D. badge, and then to their assigned assembly area. All personnel will be accounted for by issuance and control of the individual site photo I.D. badges. Each contractor will assign a staff member to report to the badge alley to assist in the accounting of their personnel and resolution of any discrepancies.

4.2.3 Escorted Visitors

Escorted visitors will respond to the signal and will proceed along with their escorts to their specified visitor assembly area. Accountability of visitors will be maintained by checking off those escorted visitors at the assembly areas against the visitor sign-in-log maintained at the security office. Escorts themselves will proceed to their assigned assembly areas after escorting their visitors to the visitor assembly area.

4.2.4 Unescorted Visitors, Salespersons, Vendor & Manufacturers' Representatives, Local Deliveries

The above persons will also report to their assigned assembly area. Upon arrival and check in at the Project, these persons will be provided with a map and written instructions explaining what they are to do and where they are to go in the event of a site evacuation (refer to Appendix D, Attachment 6.4). Accountability will be maintained by checking off unescorted visitors at the assembly areas against the visitor sign-in-log maintained at the security office. Persons with vehicles will leave them parked and proceed on foot to their designated assembly areas.

4.2.5 Common Carriers

Common carriers will be handled in the same manner as unescorted visitors with the exception that they will be logged in and out and provided with a map and instructions at the plantsite guard post rather than the security office. Drivers will leave their vehicles and proceed on foot to their designated assembly area.

4.2.6 Camp Personnel, Mechanic Services, Communications Personnel and Others working in the switch yards, clarifier, camp & back project areas will report directly to their appropriate assembly area. Vehicles carrying persons from these outlying areas may be driven to the upper lot road area, via the camp road, and parked. These persons will check in at the upper lot guard station upon arrival. The number of vehicles used to move persons from outlying areas to the assembly areas should be kept at a minimum.

4.2.7 Line Crews (off-site G.C. and District) Not Assigned To Diablo Canyon: Crews working on site or on tower line work East of the site who gained access to their work through the site) will check in and report their personnel and work location to the upper lot road guard station daily. These crews will stay in the area of their work.

4.2.8 Pinkerton G.C. Security Guards

In as much as possible G.C. Pinkerton Security personnel will remain at their posts. Mobile & Building Foot Patrols and the Sergeant, will report to the Sergeant's/ Captain's Trailer which will serve as the G.C. Security command post. The G.C. Security Office will immediately, upon the initiation of the signal, contact the G.C. Force Captain and relay information to the Shift Security Supervisor on the specific location of the guards remaining on post to determine the necessity of immediate evacuation of these posts. Guards on post to be included in the evacuation will be notified by radio and ordered to their Sergeant's Trailer for reassignment. Parking lot guards remaining on post will limit access to personal vehicles until instructions for orderly evacuation are received. The Security Guard Captain is responsible for the accountability of all guards assigned to construction activities and will report directly to the Field Construction Manager or his designate.

4.2.9 Instructions On Emergency: Upon arrival at assigned assembly areas, all personnel will receive further instructions on the nature of the emergency. As soon as possible after the signal sounding, an accurate tally must be available to the Field Construction Manager or his designated alternate indicating missing personnel and their last known location on the Project.

4.3 PERSONNEL ACCOUNTABILITY

4.3.1 General

All personnel will be accounted for by the issuance and control of the individual's Project photo I.D. badge. I.D. badges will be issued and controlled at one of the following designated Project "Points of Entry":

4.3.1.1 Administration Building Guard Station: General Construction Project Team (All employees associated

with Depts. of Administration, Electrical, Mechanical, Civil, Startup, Instrumentation, General Services, Quality Control, Communications, On-site Engineering, Project Control), Pullman (Magnaflux), Select H.P. Foley, assigned job shop personnel (Pace Eng., Code III, Cataract, Waltek, Wisco, Innova, Etc.), Krystal Klean personnel.

4.3.1.2 Lower Lot Badge Alley Gates: Alleys #1 thru #9 and #11 thru #14 assigned to personnel of H.P. Foley Co., Pullman Power Products Co., Plant Thorpe, Bechtel G.P.M.A.

4.3.1.3 Lower Lot Badge Alley Gate #10: Assigned to miscellaneous PTGC and Contractor personnel.

4.3.1.4 Upper Lot Road Station: P.G.&E. camp/warehouse personnel, Mechanic Services group.

4.3.1.5 Plantsite Guard Station: (Lower Lot Entrance) Assigned management of: H.P. Foley, Pullman Power, Plant Thorpe, Lundeen, Barnes Construction, and select employees of S.L.O. Garbage Co., Able Maintenance, Western Santitation, Santa Maria Vending, Coperheat, P.T.&T. Co., Bechtel G-bec, Xerox, IBM, R.P. Richards, S & M Sprinkler, Bisco, Santa Cruz Research Group.

4.4 Badge Control

4.4.1 At the beginning of a shift personnel will pick up their photo badges at the appropriate Guard Station where they normally enter the Project. Immediately after shift change each of the guards at the controlling entry stations will determine the status of the employees covered by their posts.

4.4.2 On normal work days, the day shift guards will fill out a form listing the employees NOT ON SITE, by name & badge number, swing shift guards will do likewise for their shift. On other than normal work days, (holidays, weekends, other than normal work hours) guards will fill out a form listing the employees ON SITE, by name & badge number. These listings will be kept current at all times during the shifts by additions or deletions of those entering or leaving the Project, and will be supplied to the Field Construction Manager or his designate when required.

4.4.3 Personnel leaving the site will badge out and back in at the Guard Post where they normally enter the Project, except personnel (such as Station Construction, Line Dept., and Contractor road work crews) leaving the site in Company Vehicles for off site work who will leave their badges with the guards at the plantsite entrance to the lower parking lot, and retrieve them from there upon their return.

4.5 Evacuation

4.5.1 Any evacuation of the Diablo Canyon Site will begin from the EMERGENCY ASSEMBLY AREAS as shown in the Diablo Canyon Power Plant Emergency Procedure G-4 "Personnel Accountability and Assembly". All personnel covered by this procedure are instructed to proceed to these areas on foot upon activation of the Emergency Signal and to wait there for further instructions.

4.5.2 The Construction Force Assembly Coordinator will implement the Site Emergency Coordinator's evacuation decision and see that various groups are accounted for and released sequentially and in an orderly manner so that traffic congestion is minimized and traffic flows smoothly away from the site.

4.5.3 G.C. Security personnel will assist by directing traffic out of the lots and controlling key intersections during the evacuation as directed by the Evacuation Coordinator.

4.5.4 All evacuations whether by vehicle or on foot, will be led by security personnel. Accompanying each assembly area group will be a person who will be in charge of personnel accountability and release at the off site assembly areas. Security personnel will be radio equipped and in contact with the Evacuation Coordinator and the Site Emergency Coordinator.

4.5.5 Once off the site, the evacuation will be led to the off site assembly area by a Sheriff's vehicle (if available). One of the lead guards will transfer to the vehicle with his portable radio and ride to the off site assembly area in the Sheriff's vehicle so that continuous communications are maintained.

4.5.6 In the event of an evacuation on foot, guards or P.G.&E. personnel with radios and first aid kits will be interspersed at appropriate intervals in the group to maintain communication and provide first aid, if necessary.

5.0 REFERENCES

5.1 Department of Nuclear Plant Operations Emergency Procedure G-4, "Personnel Accountability and Assembly".

5.2 Department of Nuclear Plant Operations Emergency Procedure G-5, "Evacuation of Nonessential Site Personnel".

6.0 ATTACHMENTS

6.1 Appendix-A: List of Assigned Assembly Areas

6.2 Appendix-B: Location Map of Assembly Areas

6.3 Appendix-C: Maps of Routes to Assembly Areas

6.4 Appendix-D: Visitor Information on Site Emergencies

ASSIGNED ASSEMBLY AREAS

"A" AREA

A1

Bechtel (G-Bec)
Planthorpe

A2

Pullman Power Products and
their subcontractors

"B" AREA

H. P. Foley and their
subcontractors

"C" AREA

P-T General Construction
- General Services (PT-GC)
- Quality Control Group (PT-GC)
- Mechanical Group (PT-GC)
- Startup Group (PT-GC)
- OnSite Engineering Group (OPEG)
- Instrumentation Group (PT-GC)
- Electrical Group ((PT-GC)
- Civil Group (PT-GC)
- Civil-Hydro Group (PT-GC)
- Administration Group (PT-GC)
- Station Construction/Line Dept.

"D" AREA

Construction Force Assembly
Coordinator
PT-GC Management
PT-PC Management

"C" AREA

Contractors
- Waltek
- Cataract
- Innova
- Wisco
- Code-3
- Pace
- Bisco
- Krystal Klean
- G. O. Personnel
  assigned to project

"D" AREA

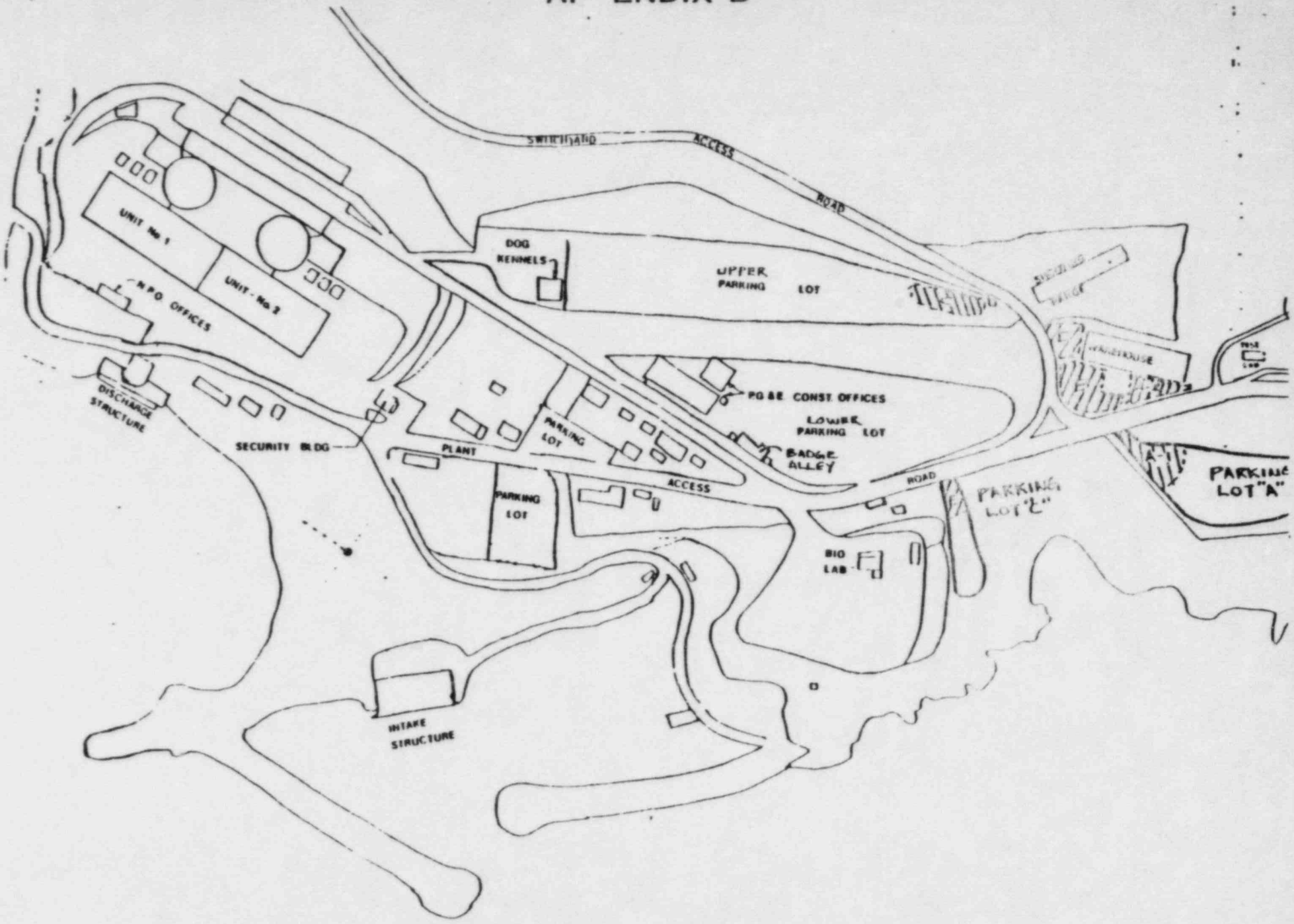
Visitors (Escorted and Unescorted)
Common Carriers
Vendors and Service Companies

"E" AREA

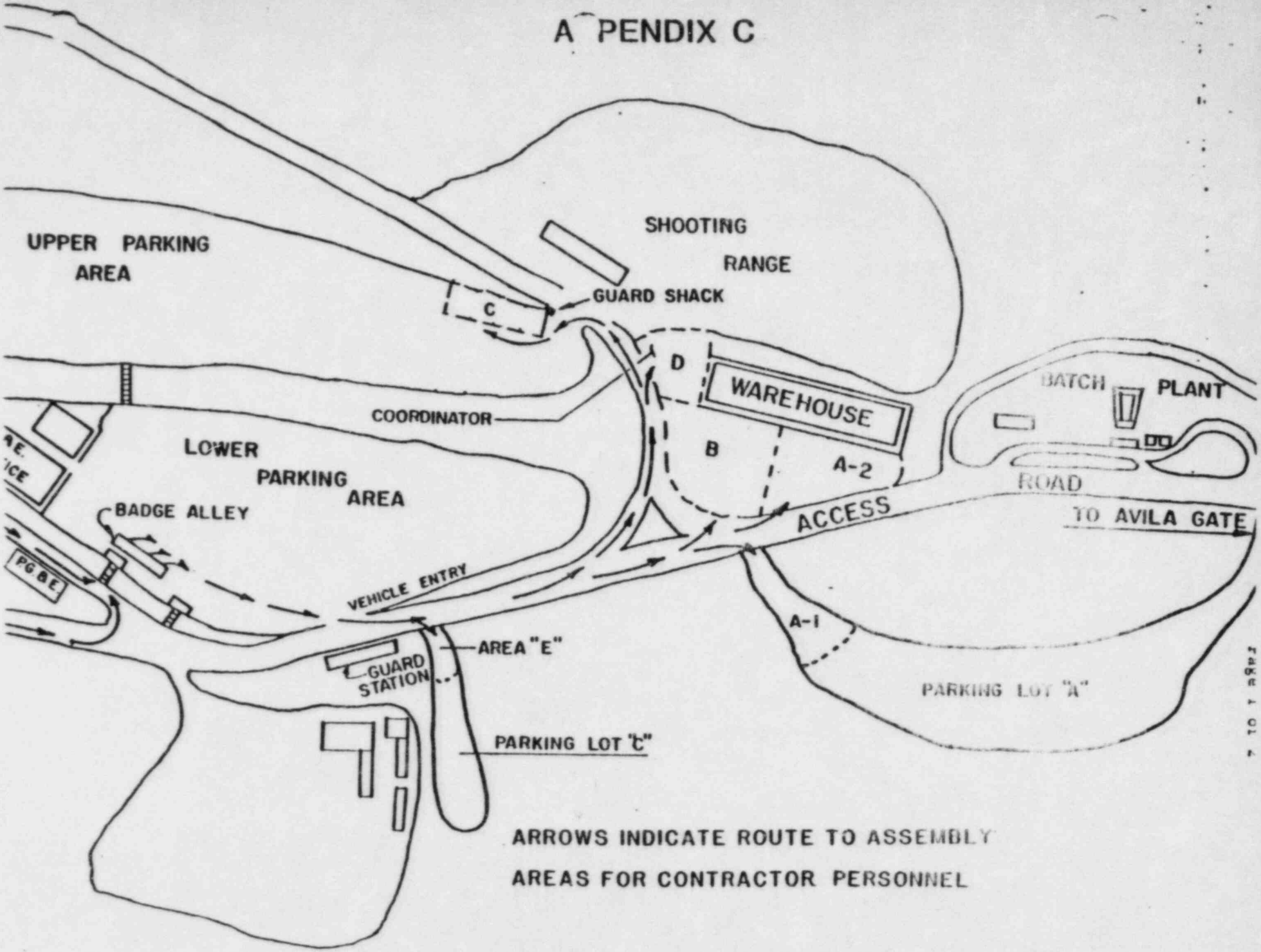
Barnes Construction Co.

DATE 1-20-84

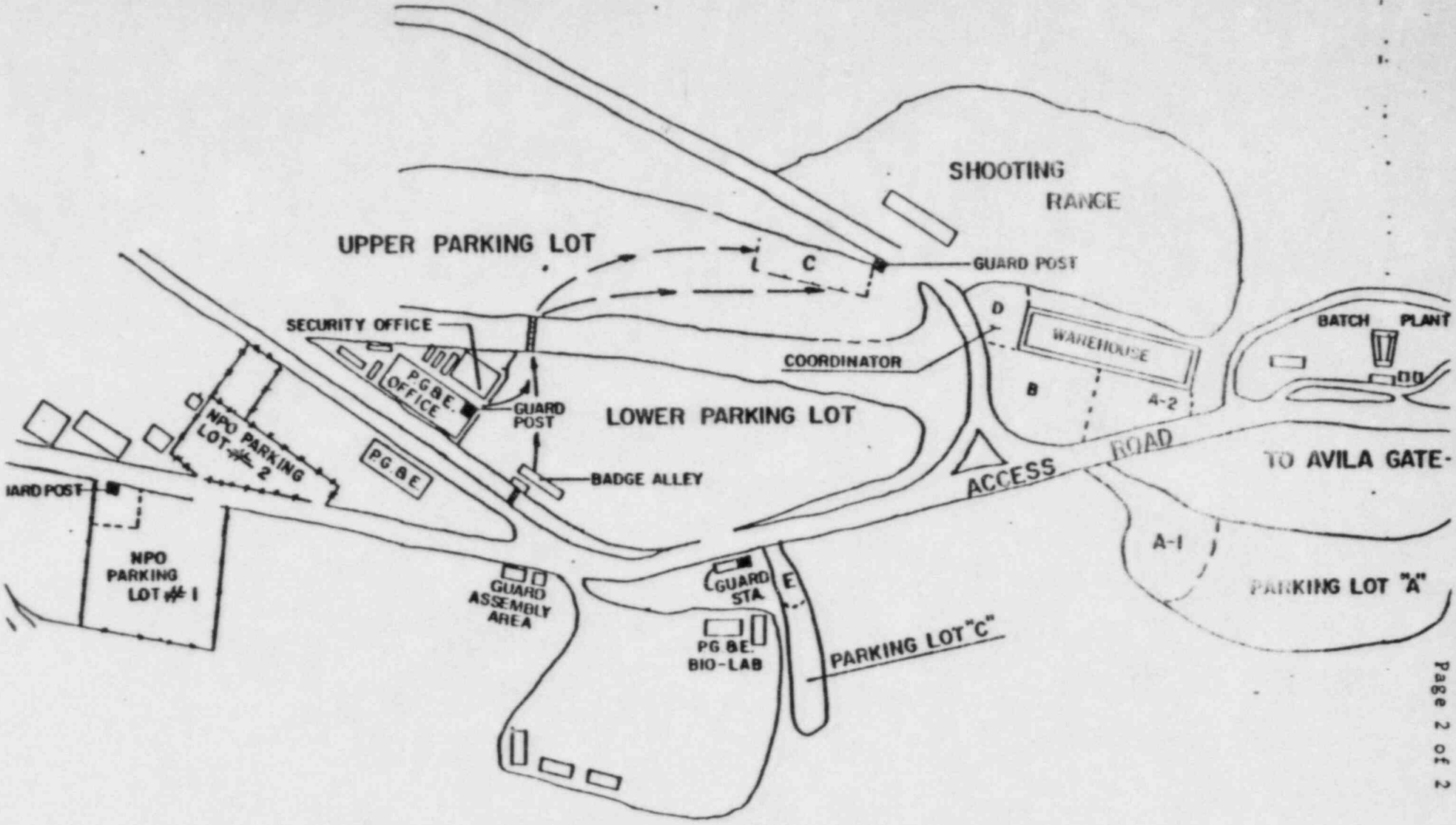
APPENDIX B


SWITCHYARD ACCESS ROAD
UNIT No. 1
UNIT - No. 2
NPO OFFICES
DISCHARGE STRUCTURE
SECURITY BLDG
DOG KENNELS
UPPER PARKING LOT
PG&E CONST. OFFICES
LOWER PARKING LOT
BADGE ALLEY
PLANT
PARKING LOT
ACCESS ROAD
PARKING LOT "2"
PARKING LOT "A"
BIO LAB
INTAKE STRUCTURE

APPENDIX C


UPPER PARKING AREA
SHOOTING RANGE
GUARD SHACK
C
D
WAREHOUSE
B
A-2
COORDINATOR
LOWER PARKING AREA
BADGE ALLEY
PG&E
VEHICLE ENTRY
ACCESS ROAD TO AVILA GATE
BATCH PLANT
A-1
AREA "E"
GUARD STATION
PARKING LOT "A"
PARKING LOT "C"
ARROWS INDICATE ROUTE TO ASSEMBLY AREAS FOR CONTRACTOR PERSONNEL

APPENDIX C



ARROWS INDICATE ROUTE TO ASSEMBLY AREAS FOR P.T.G.C.(ALL GROUPS),O.P.E.G., CONTRACT PERSONNEL (JOB SHOP PERSONNEL) WORKING WITH PROJECT TEAM AND ALL OTHERS ASSIGNED TO AREA "C"

APPENDIX D

VISITOR INFORMATION

Welcome to Diablo Canyon --

As a visitor to this site, there are several rules and procedures which you should be aware of. They have been designed for your safety and must be strictly complied with.

1. If you have been issued a hard hat, wear it in all hard hat areas.

2. The visitor badge issued to you is to be worn in plain view at all times. (In certain areas on the site you may be asked to surrender this badge; however, you will be provided with another badge in exchange.)

3. Persons cleared to enter the operating areas of the plant will be provided with additional instructions governing their actions while in these locations, prior to entry.

Emergencies

Should a situation arise which requires the evacuation of this site, the Plant Emergency Signal will be activated. The Signal is produced by electronic warblers placed at numerous locations throughout the plant. It has a characteristic sound which is a rapid rise in pitch followed by a slower drop. The sound cycle is repeated continuously for as long as the signal remains energized.

Flashing red lights have been provided in the Containment since the background noise level would not permit audible perception of the electronic warblers.

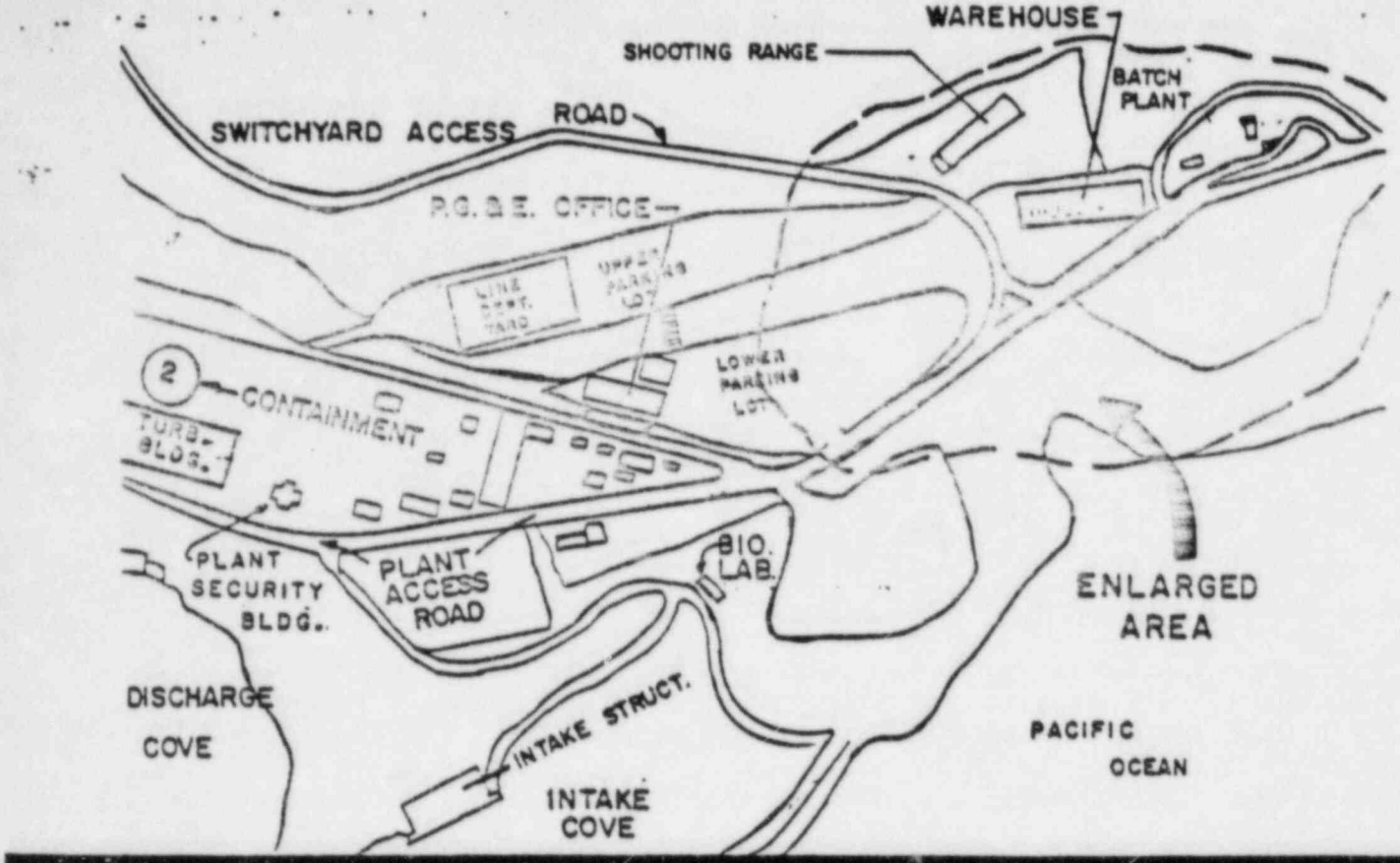
Under an emergency situation the alarm should sound for a minimum of one minute.

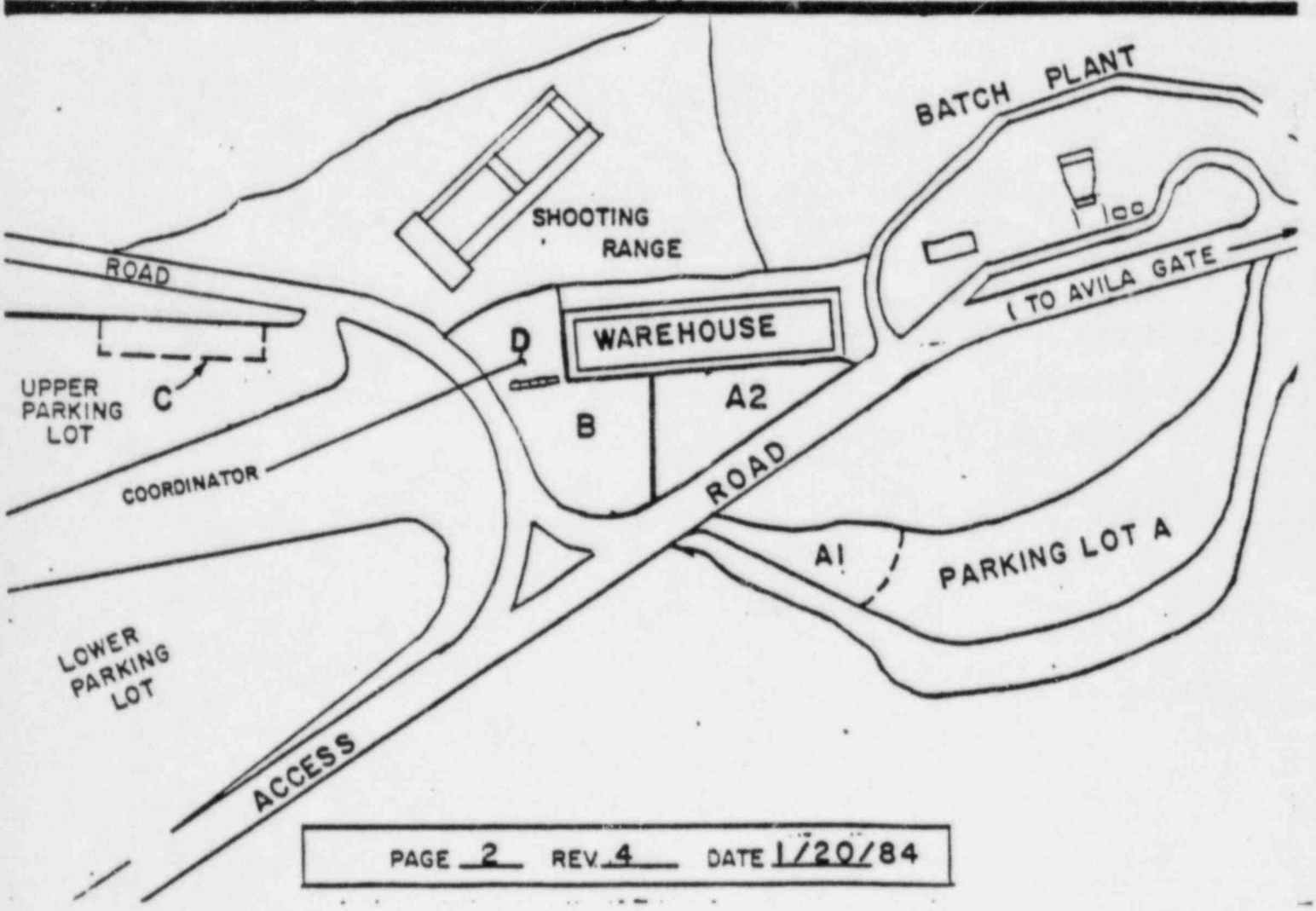
The Emergency Signal will be actuated for test purposes every Friday at 12:10 p.m. for a period of approximately ten (10) seconds.

Should the Signal be activated during your visit other than at the test time, proceed on foot to the area marked "D" on the map provided you and wait for further instructions.

Unescorted Visitors. If uncertain as to the location of Assembly Area "D" ask any Security Officer.

Escorted Visitors will be taken to Assembly Area "D" by their escort.


WAREHOUSE
SHOOTING RANGE
BATCH PLANT
SWITCHYARD ACCESS ROAD
P.G. & E. OFFICE
LINE MAINT. YARD
UPPER PARKING LOT
LOWER PARKING LOT
2
CONTAINMENT
TURB. BLDG.
PLANT SECURITY BLDG.
PLANT ACCESS ROAD
BIO. LAB.
ENLARGED AREA
DISCHARGE COVE
INTAKE STRUCT.
INTAKE COVE
PACIFIC OCEAN


BATCH PLANT
SHOOTING RANGE
ROAD
TO AVILA GATE
WAREHOUSE
D
A2
B
UPPER PARKING LOT
C
COORDINATOR
ROAD
A1
PARKING LOT A
LOWER PARKING LOT
ACCESS

CURRENT

EMERGENCY PLAN

IMPLEMENTING PROCEDURES

TABLE OF CONTENTS

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	TITLE	REV
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RB-15D	SPASS Gas Chromatographic Hydrogen Analysis	2
RB-15E	SPASS RCS Liquid and Gas Sample Handling	2
RB-15F	SPASS Data Analysis	1
RB-15G	SPASS ION Chromatographic Chloride analysis	1
RB-15H	SPASS pH/Conductivity/Dissolved Oxygen	1
RB-15I	SPASS Sample Storage and Disposal	0
RB-16	SPASS Subsequent Sampling	0
RB-16A	SPASS Initial Actions During An Emergency (Not Intended to Meet The 3-Hour Time Limit)	2
RB-16B1	SPASS Diluted Liquid Sampling From Reactor Coolant (Not Intended to Meet The 3-Hour Time Limit)	1
RB-16B2	SPASS Undiluted Liquid Sampling From Reactor Coolant (Not Intended to Meet The 3-Hour Time Limit)	1
RB-16B3	SPASS Reactor Coolant Stripped Gas Sampling (Not Intended to Meet The 3-Hour Time Limit)	1
RB-16B4	SPASS Diluted Liquid Sampling From Radwaste (Not Intended to Meet The 3-Hour Time Limit)	2
RB-16B5	SPASS Undiluted Liquid Sampling From Radwaste (Not Intended to Meet The 3-Hour Time Limit)	2
RB-16C	SPASS Containment Air Sampling (Not Intended to Meet the 3-Hour Time Limit)	1
RB-16D	SPASS Gas Chromatographic Hydrogen Analysis (Not Intended to Meet the 3-Hour Time Limit)	1
RB-16E	SPASS Liquid and Gas Sample Handling (Not Intended to Meet The 3-Hour Time Limit)	1
RB-16F	SPASS Data Analysis (Not Intended to Meet The 3-Hour Time Limit)	0
RB-16G	SPASS Ion Chromatographic Chloride Analysis (Not Intended to Meet The 3-Hour Time Limit)	1
RB-16H	SPASS Ph/Conductivity Dissolved Oxygen (Not Intended to Meet The 3-Hour Time Limit)	1
RB-16I	SPASS Undiluted Containment Air Sampling (Not Intended to Meet The 3-Hour Time Limit)	0
RB-16J	SPASS Sample Storage and Disposal (Not Intended to Meet The 3-Hour Time Limit)	0

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

TITLE EMERGENCY PROCEDURE
OPERATING PROCEDURES FOR EARS 9845C
CONTROLLING STATIONS

APPROVED R. C. Thornberg PLANT MANAGER 4-11-85 DATE

IMPORTANT TO SAFETY

SCOPE

This procedure provides startup instructions and operating flow diagrams for any HP-9845C station capable of functioning as a controlling station for the Emergency Assessment and Response System (EARS). These EARS stations includethe Control Room (CR), Technical Support Center (TSC), and Emergency Operations Facility (EOF).

In addition a discussion of the terminology used, and a brief overview of some of the support software and data file contents and structure used in the EARS is included.

Startup and operating instructions for the EARS TSC HP-1000F computer are contained in procedure EP EF-8.

This procedure and changes thereto requires PSRC review.

CONTENTS

DISCUSSION

The purpose of the EARS is to assist the Company Emergency Response Organization and offsite authorities in quantifying offsite radiological consequences should radioactive isotopes be released during an accident at the DCPP. The system gathers data on meteorological parameters, onsite and offsite real time radiation monitor readings. It performs dispersion computations, disseminates information and displays data to various onsite and offsite stations. These stations include the CR, the TSC, the EOF, the Corporate Incident Response Center (CIRC), and the State Office of Emergency Services (OES) stations.

The CR, TSC, and EOF are all capable of being the controlling station; although only one can be the controller at any one time. Any station that is not functioning as the controller can receive calculational results from the EARAUT (EARS automatic) program via communication links. If the links are disrupted, EARS can function by means of the manual EARS program (EARMAN), using data obtained via voice communication with the controlling station operator.

This procedure provides the necessary information for CR, TSC, and EOF operators to start up the EARS computer hardware and run the three primary EARS programs (STATUS, EARAUT, EARMAN) on the HP-9845C desktop computer at the respective station.

The structures and contents of all EARS data files at the CR, TSC, and EOF EARS stations is given in Ref. 1.

PROCEDURE

1. EARS Hardware at Controlling Stations

All HP hardware at the CR, TSC and EOF is covered by a service maintenance agreement with Hewlett-Packard, Inc. (see Appendix A for a complete list of hardware). In case of any hardware failure, contact the System Manager of the EARS and explain the problem to him. If the System Manager or his alternate cannot be contacted, the EARS operator may call Hewlett-Packard service [800]821-2446 directly during business hours (8 a.m. to 5 p.m., Monday thru Friday).

2. Start-Up Procedures

The following start-up procedures assume that all power to the computer hardware is off when the EARS operator arrives at an EAPS station.

a. Set the power strip switch on. All of the equipment at each station is connected to one power strip which is located on the back of the desk console, except at the TSC-CC where it is attached to the console underneath the HP-9845C. This should turn everything on if the station was left in proper order, with all of the individual component switches set to the "ON" or "1" position. Check to see that all of the switches on all of the components are set to "ON" or "1" at this point.

b. Check to see that the 7906 disc drive RUN/STOP switch is set to "RUN". After about one minute the front panel of the 7906 should display 'DRIVE READY'.

c. Check to see that the HP-9845C computer power switch (on the right side of the computer) is set to "1". The CRT should beep and begin a self-test ("MEMORY TEST IN PROGRESS" message should appear on the CRT). When the self-test is completed, the "9845 READY FOR USE" message and a flashing cursor will appear on the CRT indicating the computer is ready for use.

d. After the entire system at this station is turned on, check the paper reserve in the HP-9845C internal printer. Instructions on how to load a new roll of thermal paper into the HP-9845C internal printer is given in Appendix B.

3. Shut-Down Procedures

a. Place the 7906 disc drive RUN/STOP switch to the STOP position, and wait for the 'DOOR UNLOCKED' light to appear on the front panel of the disc.

b. Turn the power strip switch to off position. This should turn off all of the equipment.

4. Power Failure

Should the power to the system be lost during operation, the system must be shut-down as described in section 3 before power is restored.

Any data in the computer memory is erased by power failure.

5. EARS Software and Flow Diagrams

There are three primary EARS programs stored on the HP-7906 disc drive (select code: C:12): 1) "STATUS: for non-emergency (or idle) mode operations; 2) "EARAUT" automatic EARS program; and 3) "EARMAN" - manual EARS program for emergency mode operations.

There are two basic modes in which the EARAUT program can be operated: CONTROL and NON-CONTROL. Only the CR and the TSC EARS stations at DCPP, and the EOF EARS station at the Sheriff's Office in San Luis Obispo can be operated in the CONTROL mode. Only one station can serve as the controller at any one time. Data is transmitted to all NON-CONTROL stations in fixed data strings containing information about the accident, instrument readings, calculated dose results, and messages.

Once the EARS station is activated, the operator should start running the STATUS program. If the emergency mode of EARS has already been established at another controlling station, EARAUT program will automatically be loaded from the disc and be run on the HP-9845C.

The flow diagrams following each program description are intended to give an EARS operator a general overview of the operator logic flow for each of the main EARS programs. The numbers in the flow diagrams reference other "KEY SETS" within the same program, whereas the letters reference specific entry points within the same or other programs.

a. STATUS

When EARS is not operated in the emergency mode, this program allows all HP-9845C stations to log onto the system for data polling purposes. As long as this station stays 'logged on' to the system, it can be 'scheduled' automatically to go into emergency mode by a CONTROL station when an emergency is declared.

When 'logged on', this program allows the operator to poll the HP-1000 at the TSC for meteorology (MET), plant radiation monitors (RMS), or pressurized ion chambers (PIC) data. It also allows the operator to determine the system network status, such as which stations are currently logged on the system, and when they are logged on or off. In addition, the site and area maps can be displayed and 'dumped' to the thermal printer on the HP-9845C.

Once logged on, the operator of one of the CONTROL stations can initiate the emergency mode of EARS by pressing the key under the CRT labeled 'START EARAUT'. This will load EARAUT and thereby begin the actual assessment of the emergency.

1) After the computer system at this station is up and running STATUS can be loaded and run by entering the following commands from the HP-9845C keyboard.

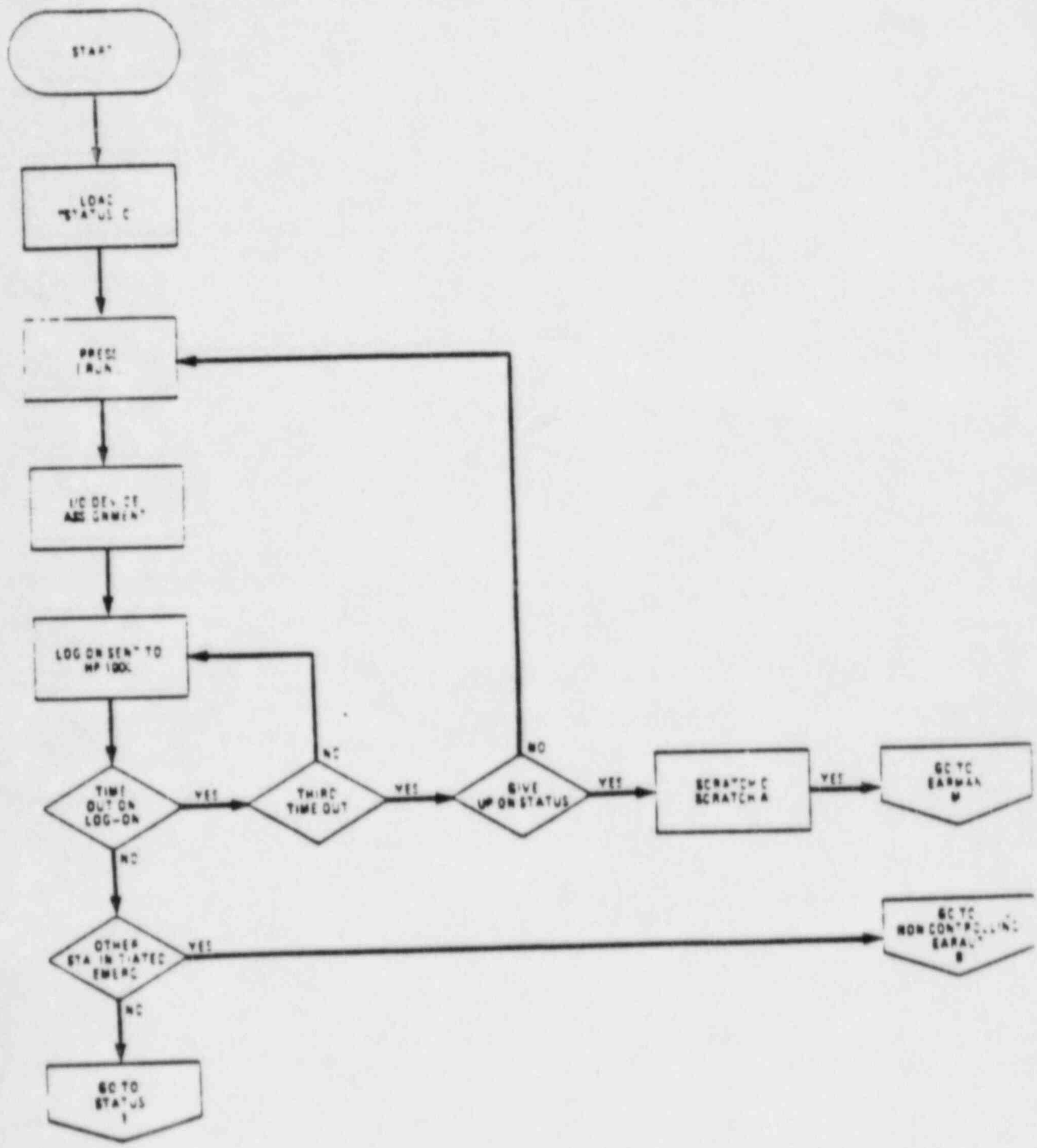
   a) Type in 'SCRATCH A', press [EXECUTE].

   b) Type in 'SCRATCH C', press [EXECUTE].

   c) Type 'LOAD "STATUS: c", 10' and press [EXECUTE] key.

2) The following three pages are flow diagrams for STATUS.

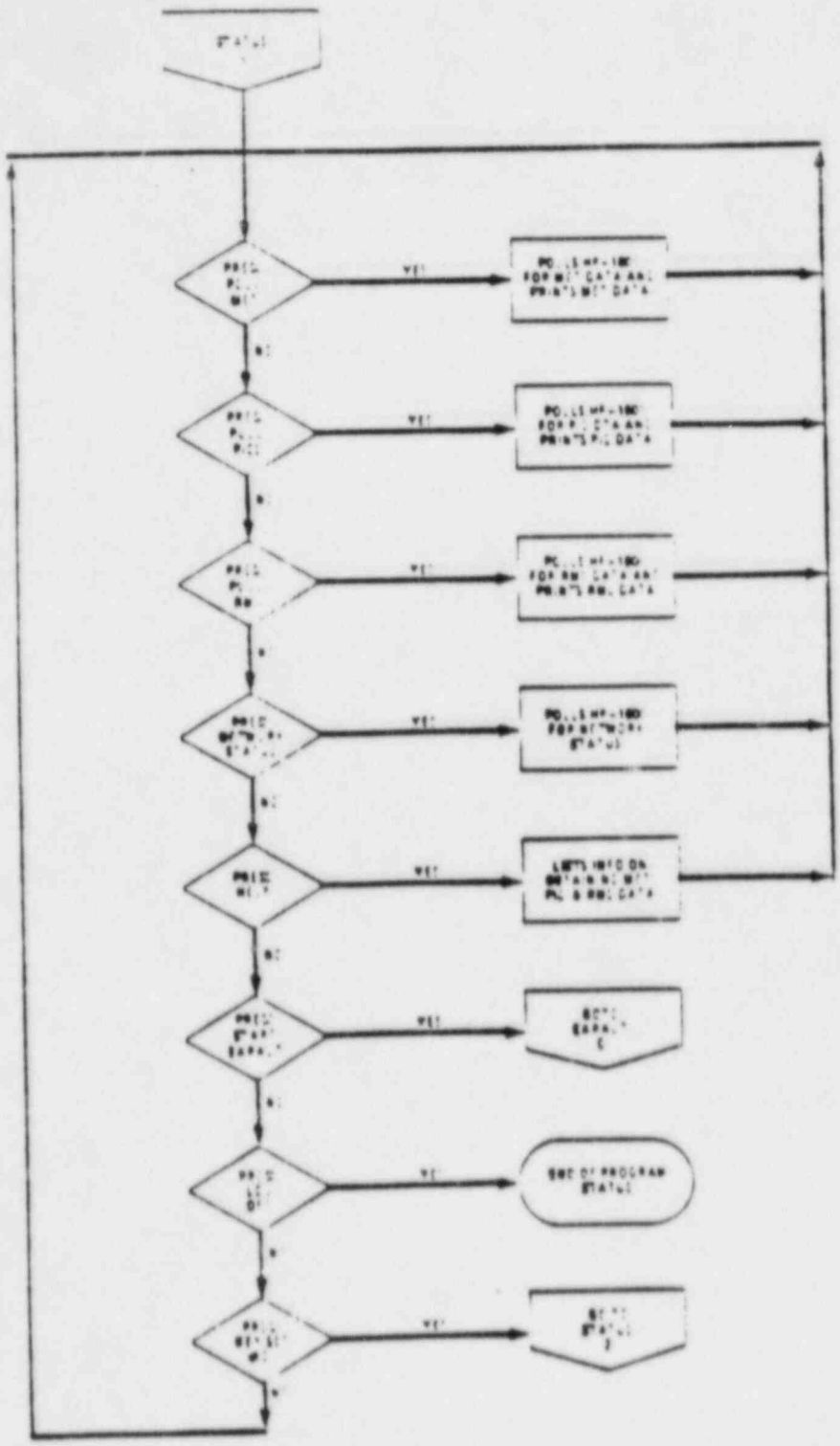
STATUS



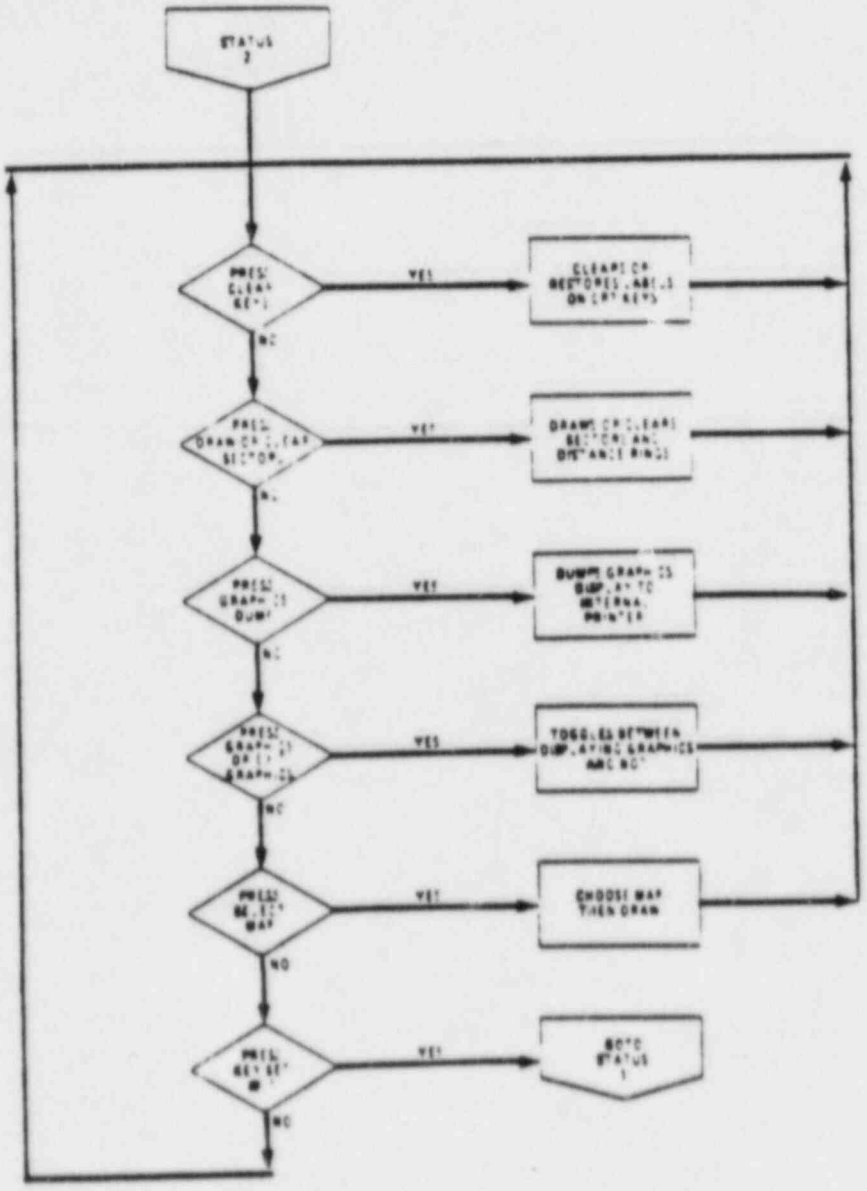
LOG ON SENT TO
TIME
OUT ON
LOG-ON
THIRD
TIME OUT
GIVE
UP ON STATUS
SCRATCH A
OTHER
YES
NO
GO TO
STATUS
1

TITLE OPERATING PROCEDURES FOR EARS
9845C CONTROLLING STATIONS

STATUS KEY SET #1



STATUS KEY SET #2



b. EARAUT PROGRAM (Controller)

The EARS automatic (EARAUT) controller program consists of two subprograms: EARADC (Central processing program for Controlling stations), and EARrdc (Release rate calculation subprogram), in addition to the EARAUT main entry program. These subprograms are loaded in and out of the HP-9845C as needed.

EARAUT can be loaded and run as the CONTROLLING station either by pressing the 'START EARAUT' softkey in the STATUS program, or by manually loading the program from disc and running it. Should you load EARAUT with the intentions of becoming the CONTROLLER, but someone else has already assumed that function from another station, you will automatically be logged on as NON-CONTROLLER when running the program.

1. After the computer system at this station has been started up EARAUT can be loaded and run by entering the following commands from the HP-9845C keyboard.

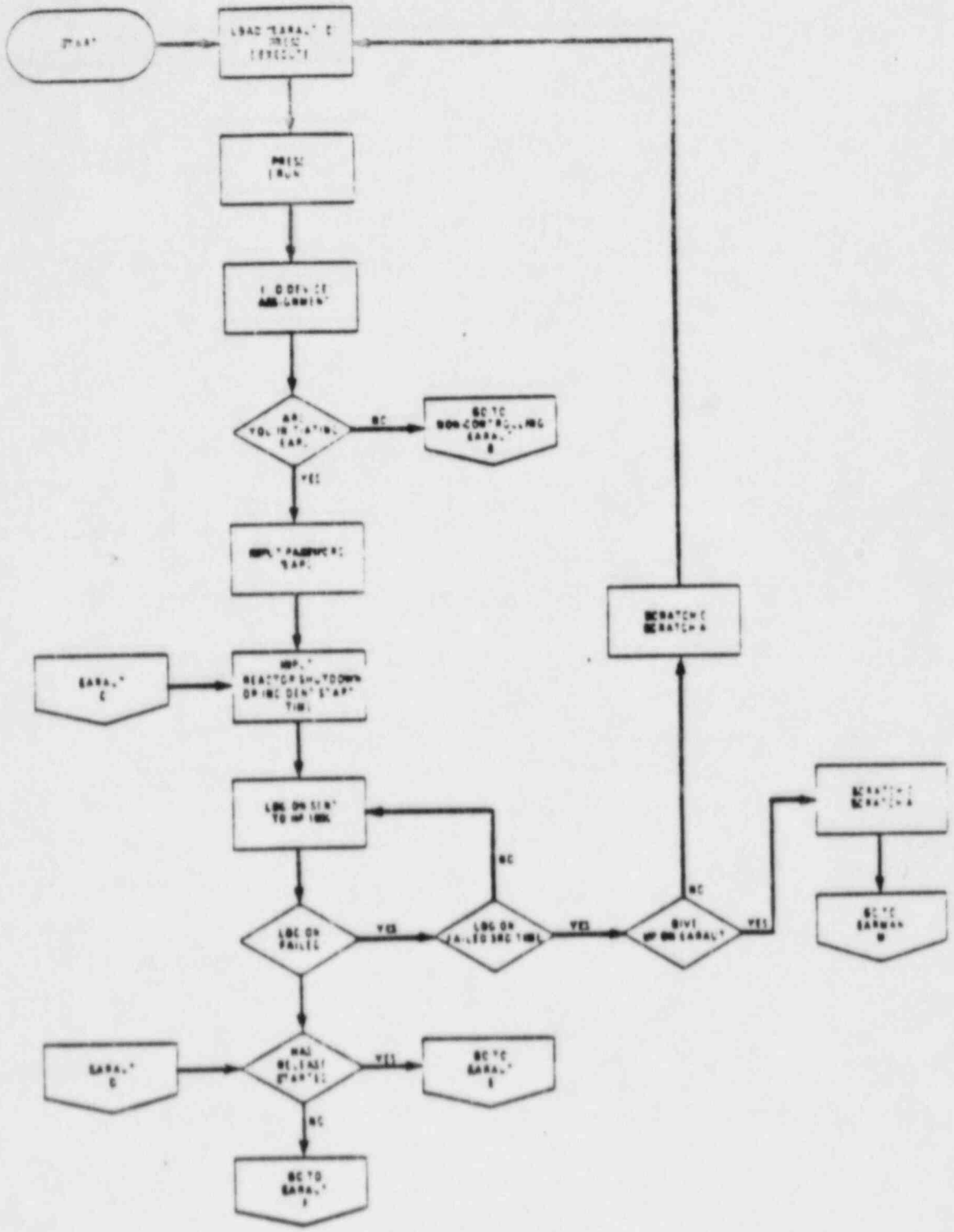
   a. Type in 'SCRATCH A', press [EXECUTE].

   b. Type in 'SCRATCH C', press [EXECUTE].

   c. Type 'LOAD "EARAUT: c", 10' and press the [EXECUTE] key.

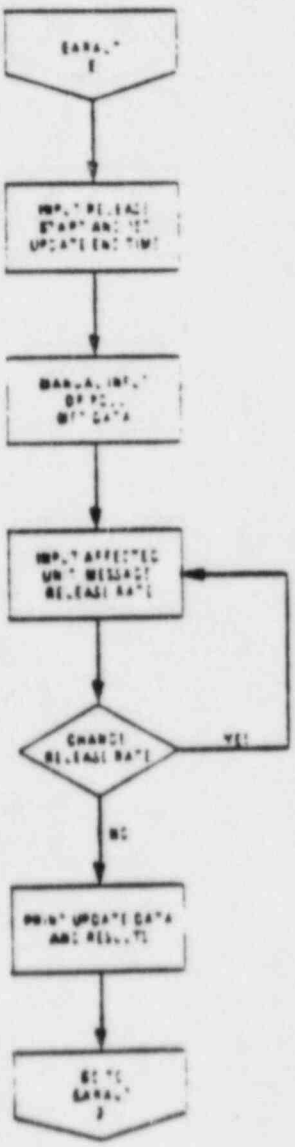
2. The following nine pages are flow diagrams for controlling EARAUT.

EARAUT FOR CONTROLLING STATIONS

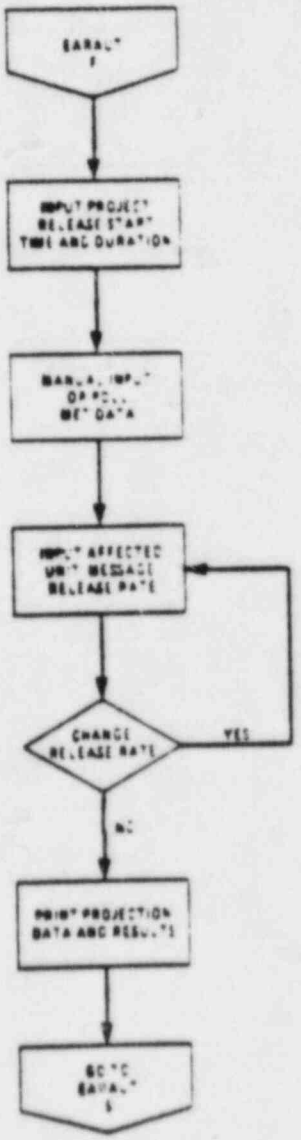


DC0009 10IV

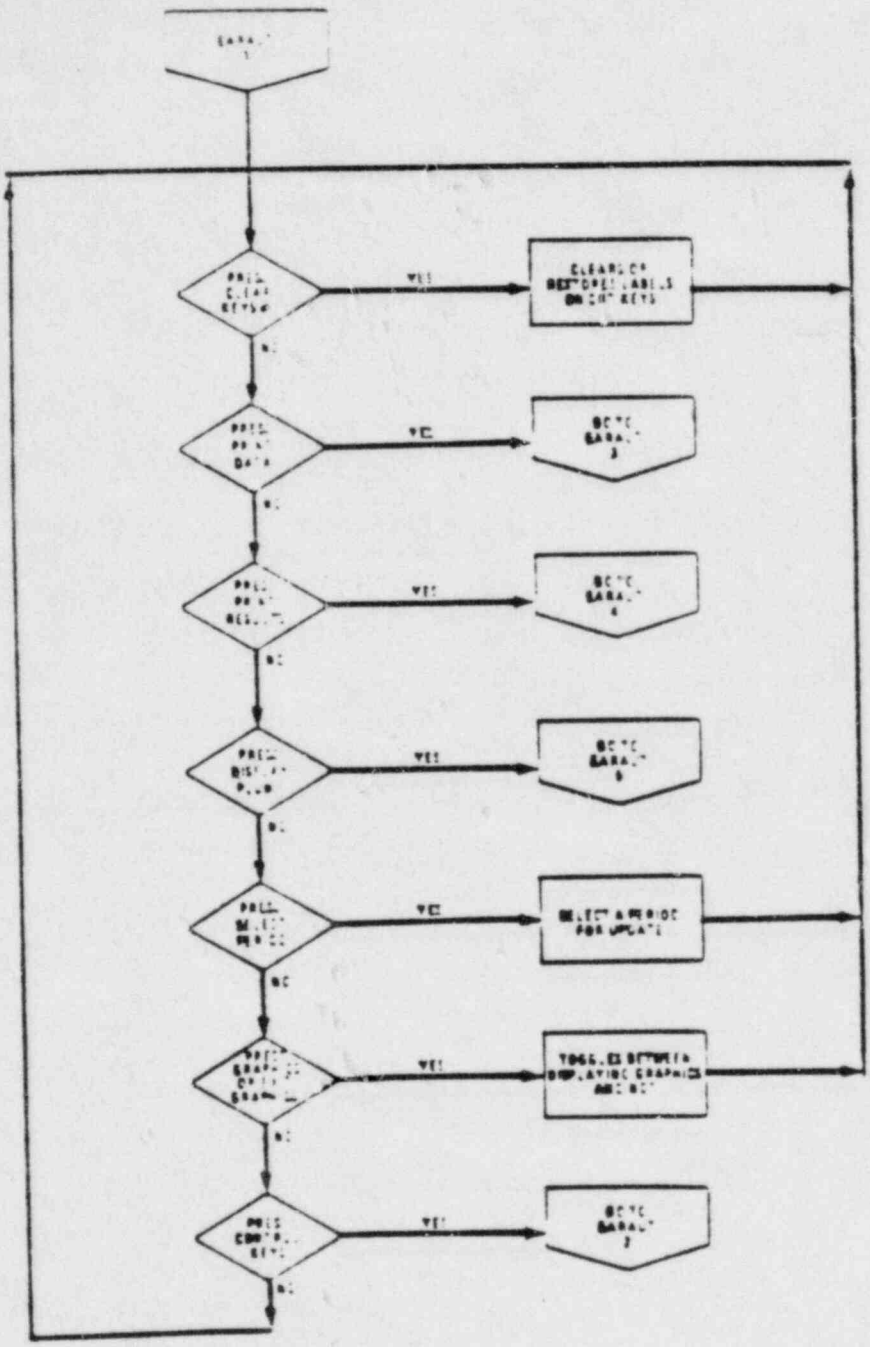
CONTROL EARAUT FIRST UPDATE



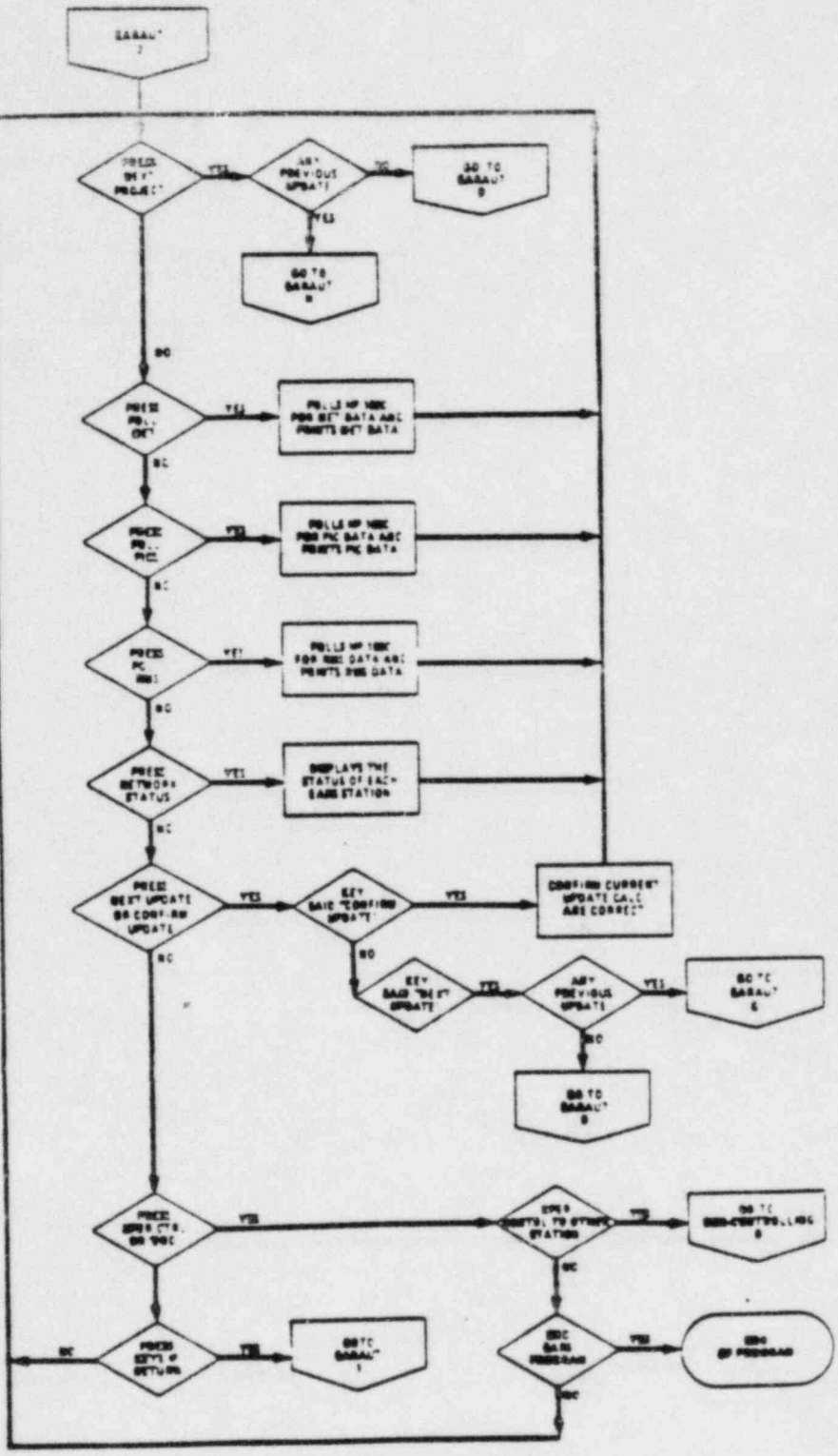
CONTROL EARAUT PROJECTION BEFORE FIRST UPDATE



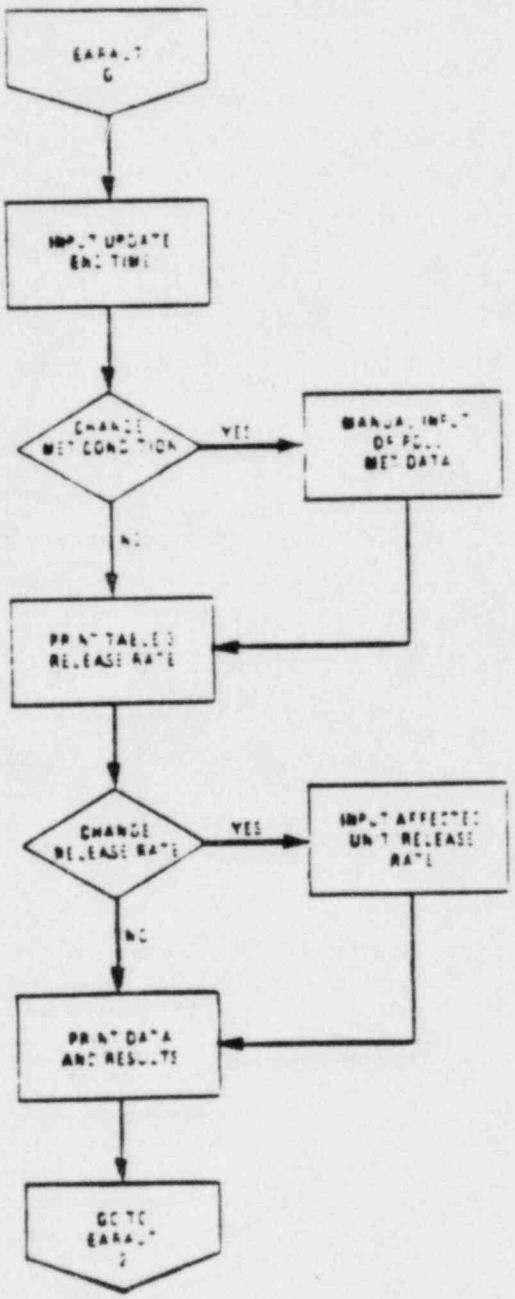
CONTROL EARAUT KEY SET #1



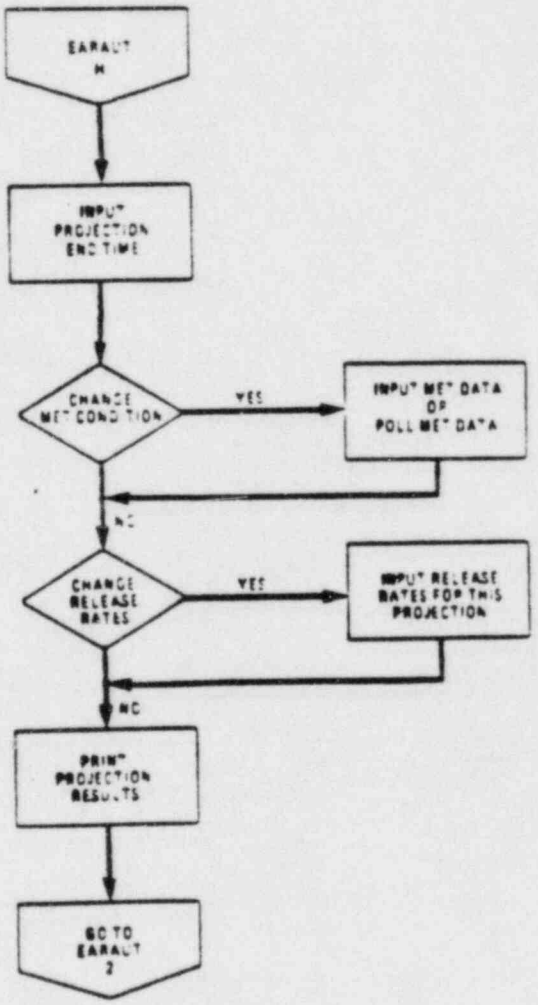
CONTROL EARAUT KEY SET #2



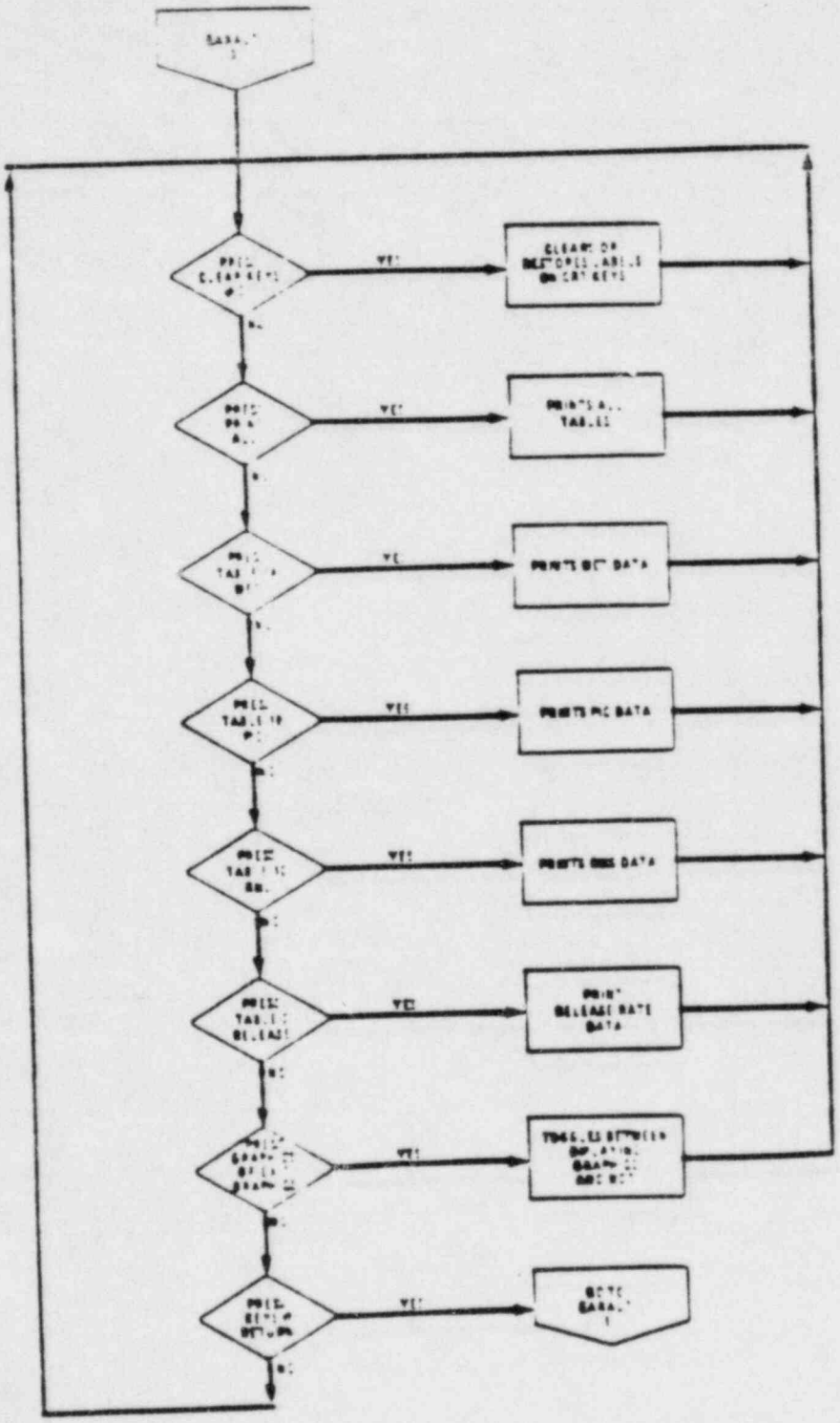
CONTROL EARAUT NEXT UPDATE



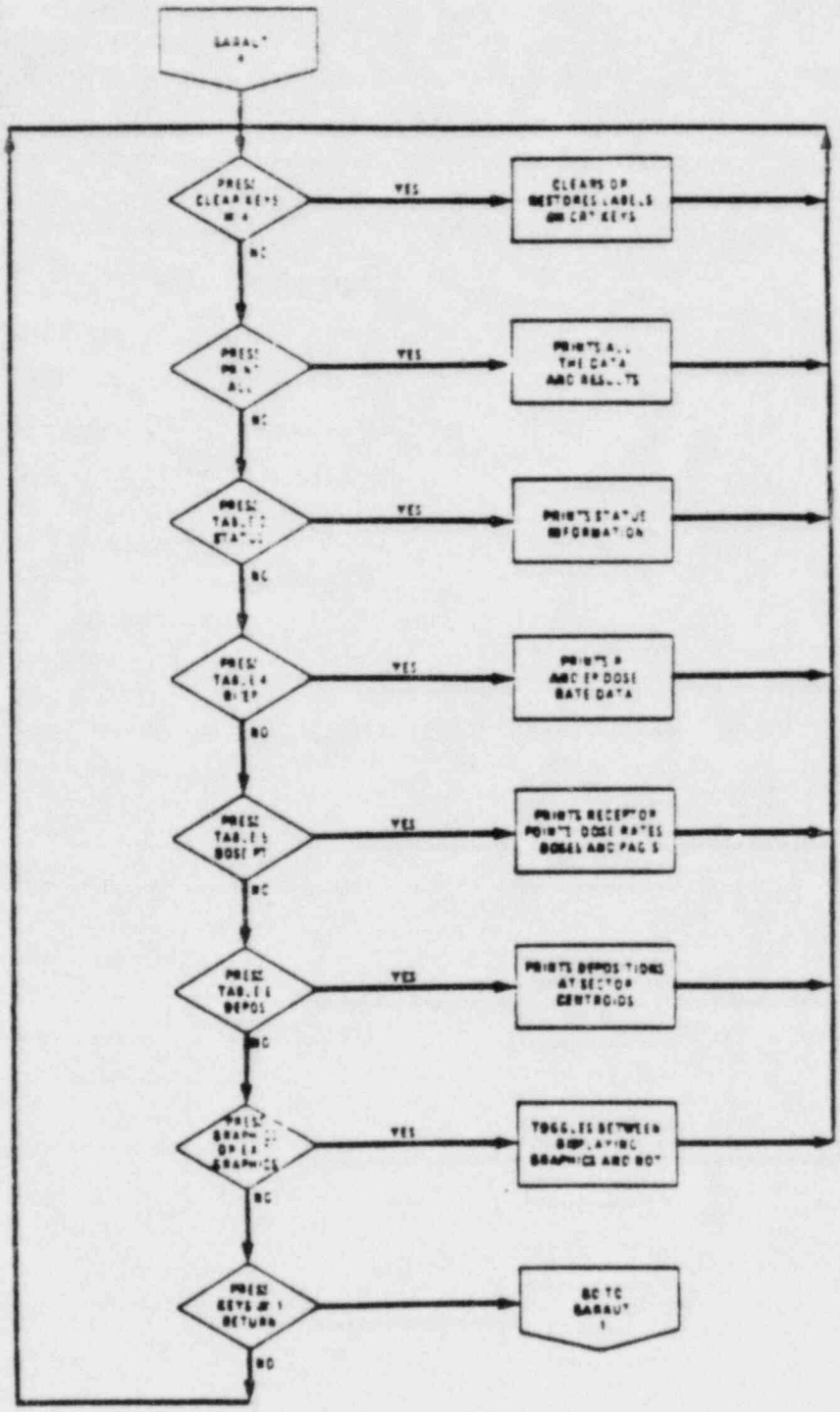
CONTROL EARAUT NEXT PROJECTION



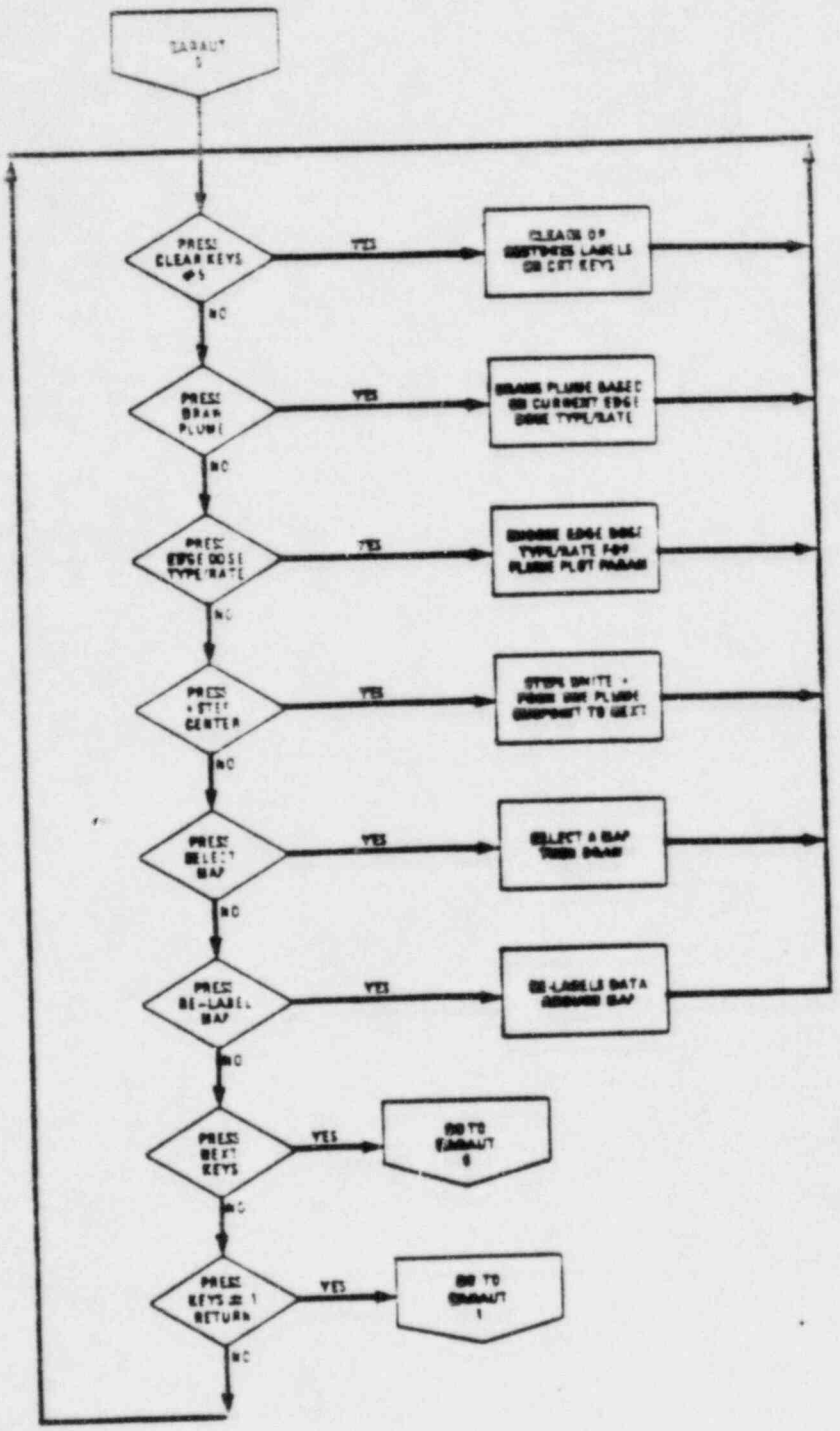
CONTROL EARAUT KEY SET #3



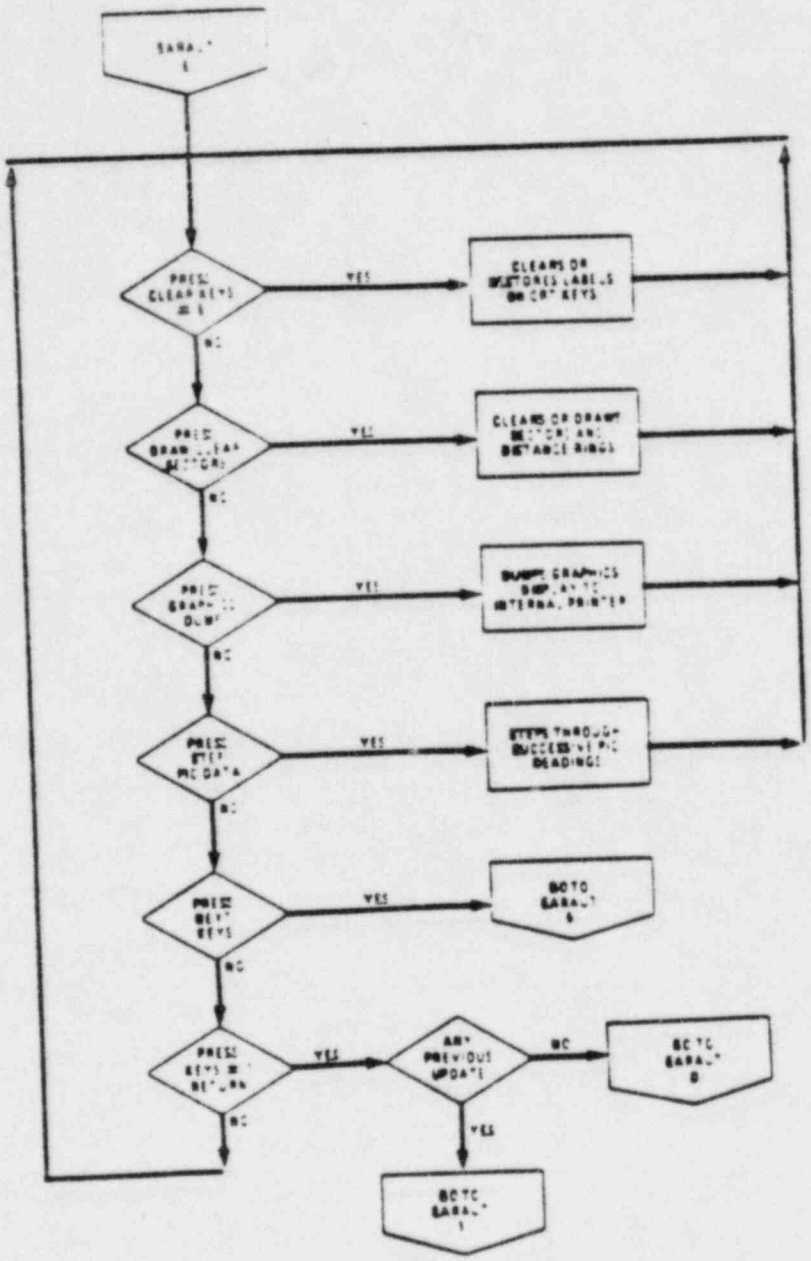
CONTROL EARAUT KEY SET #4



CONTROL TABAUT KEY SET #3



CONTROL EARAUT KEY SET #3



c. EARAUT PROGRAM (Non-Controller)

The EARS automatic (EARAUT) non-controller program consists of one subprogram: EARNDC (Central processing program for Non-Controlling stations), in addition to the EARAUT main entry program. These subprograms are loaded in and out of the HP-9845C as needed.

The function of EARAUT as a non-controller is to receive periodic updates of plume release parameters, and observe the resulting plume displays, as based on input from a EARS CONTROL station.

EARAUT (Non-controller) can be run in either one of two ways. The user can load the STATUS program and wait for one of the 'CONTROL' stations to log on as the 'CONTROLLER', or the user can load the EARAUT program and specify a non-controlling mode, provided the controlling station is logged on.

1. After the computer system at this station has been started up EARAUT can be loaded and run independently of the 'STATUS' program by entering the following commands from the HP-9845C keyboard.

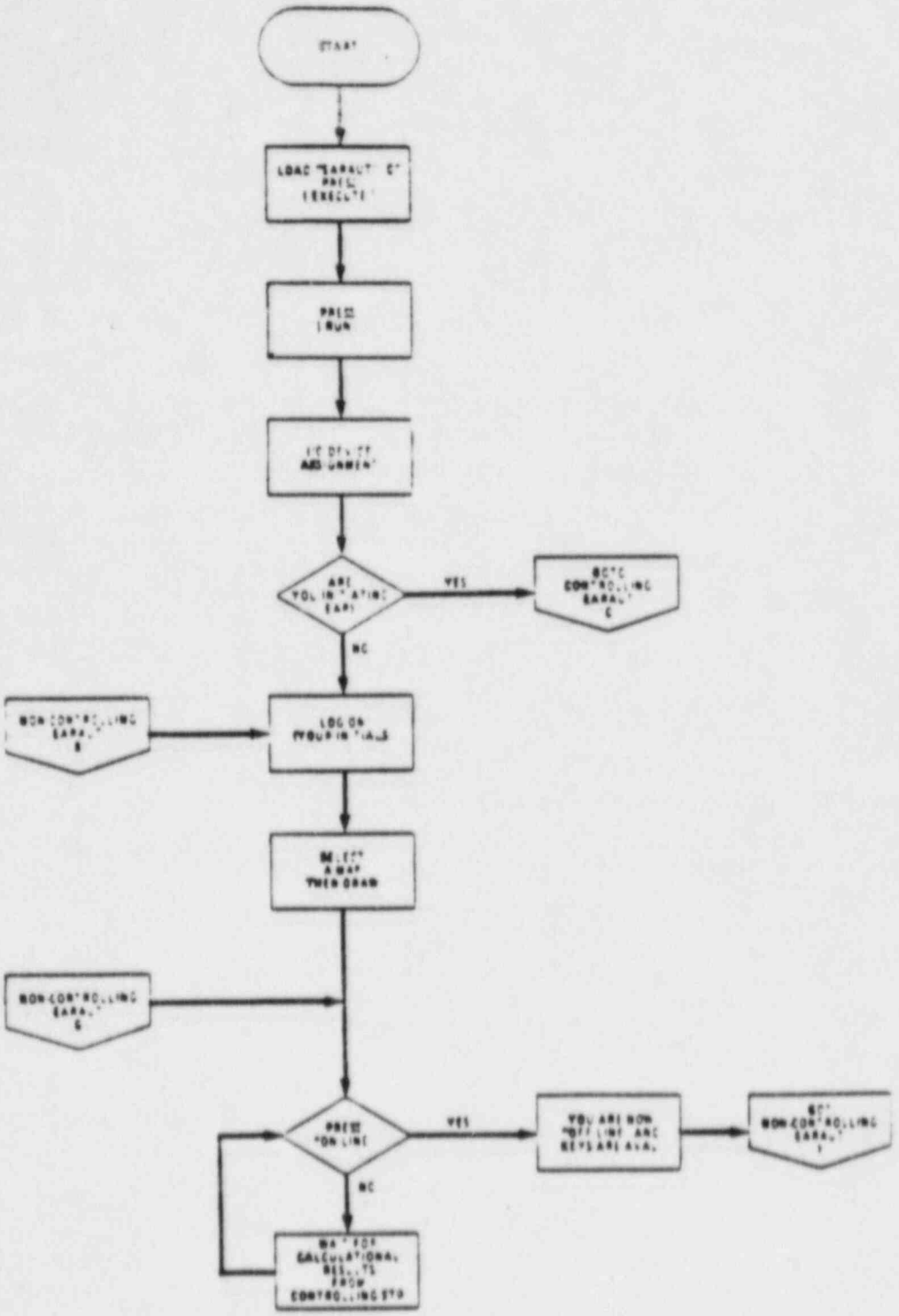
   a. Type in 'SCRATCH A', press [EXECUTE].

   b. Type in 'SCRATCH C', press [EXECUTE].

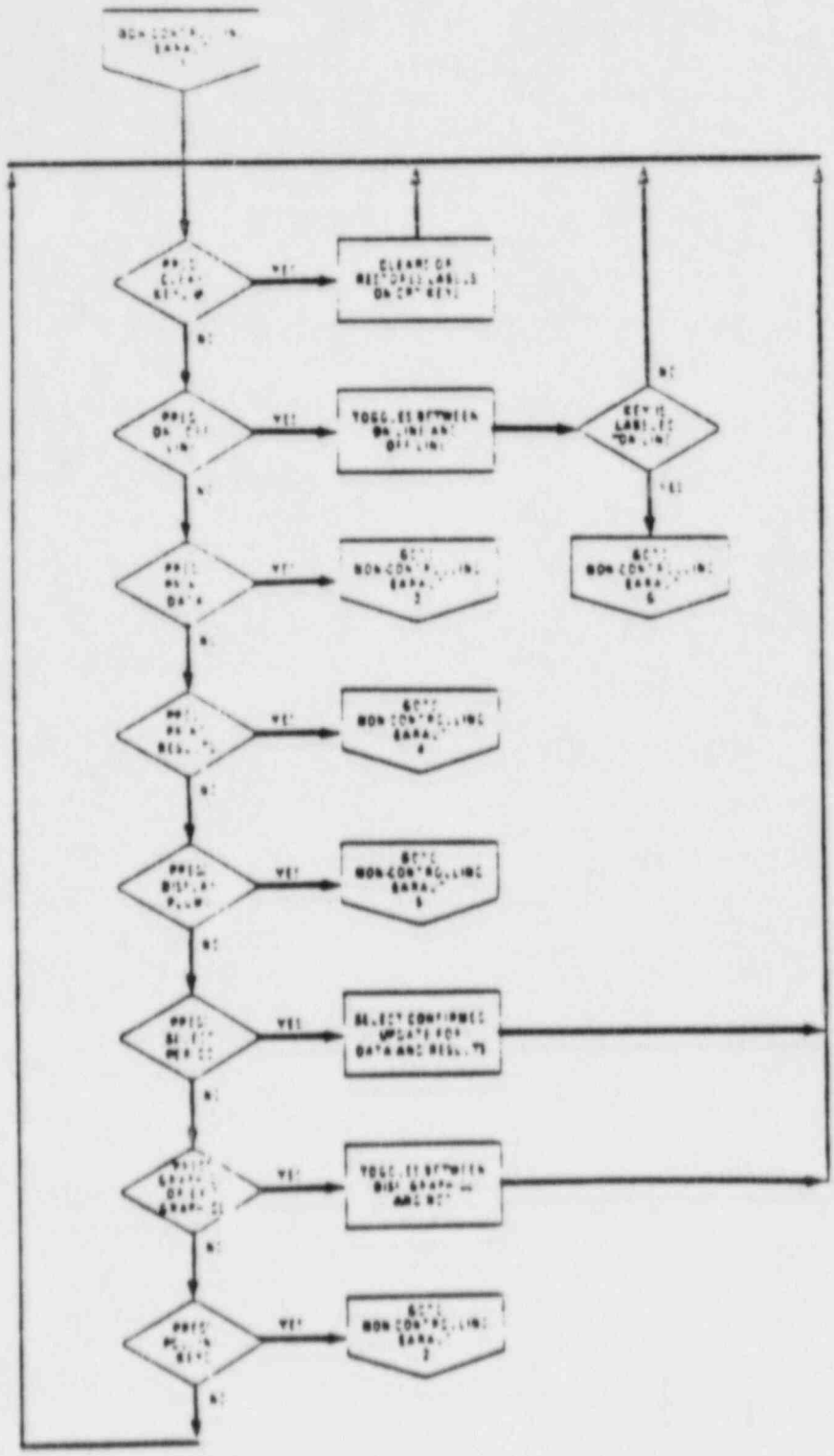
   c. Type in 'LOAD "EARAUT: c", 10' and press the [EXECUTE] key.

2. The following SEVEN pages are flow diagrams for non-controlling EARAUT.

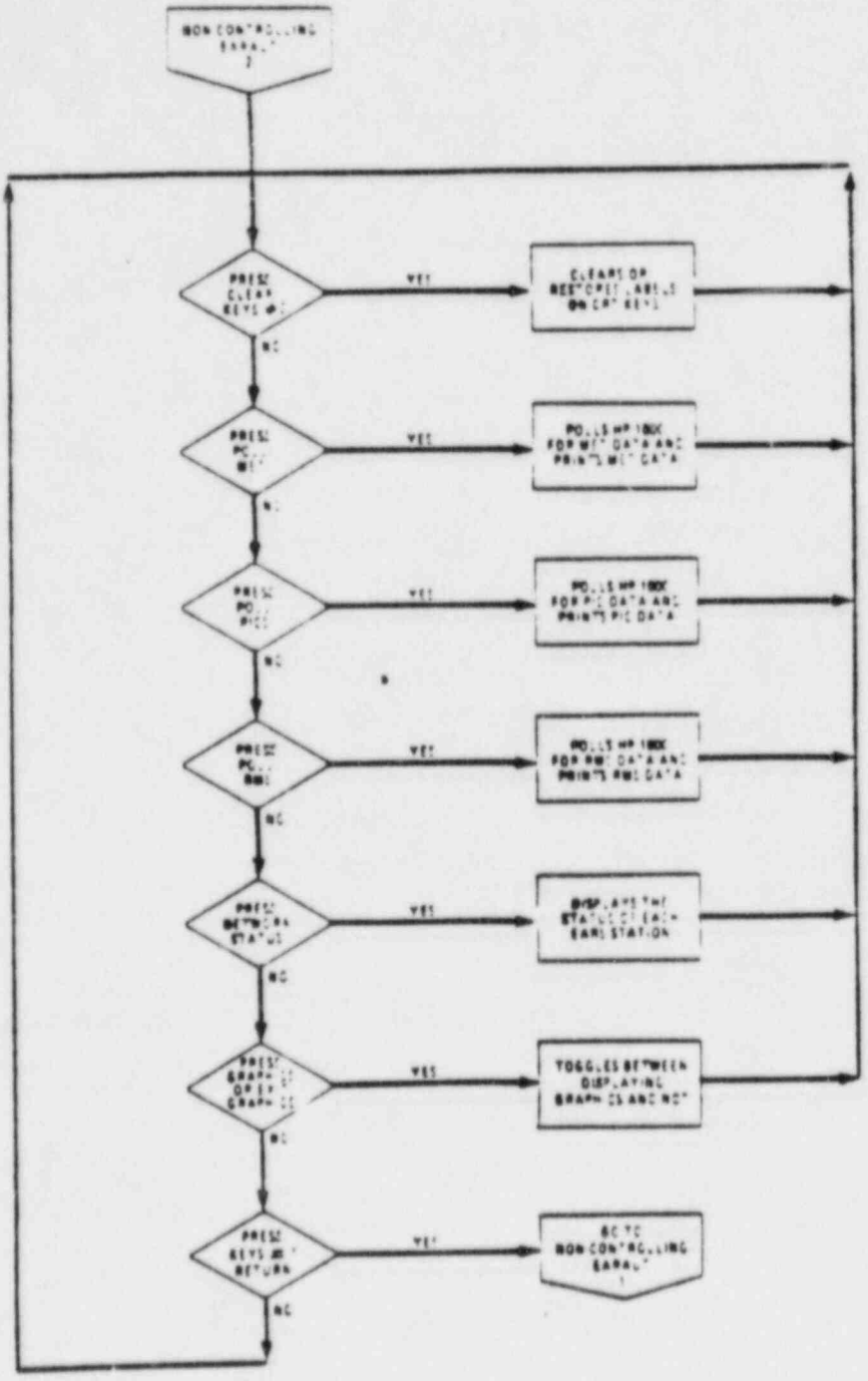
EARAUT FOR NON-CONTROL STATIONS



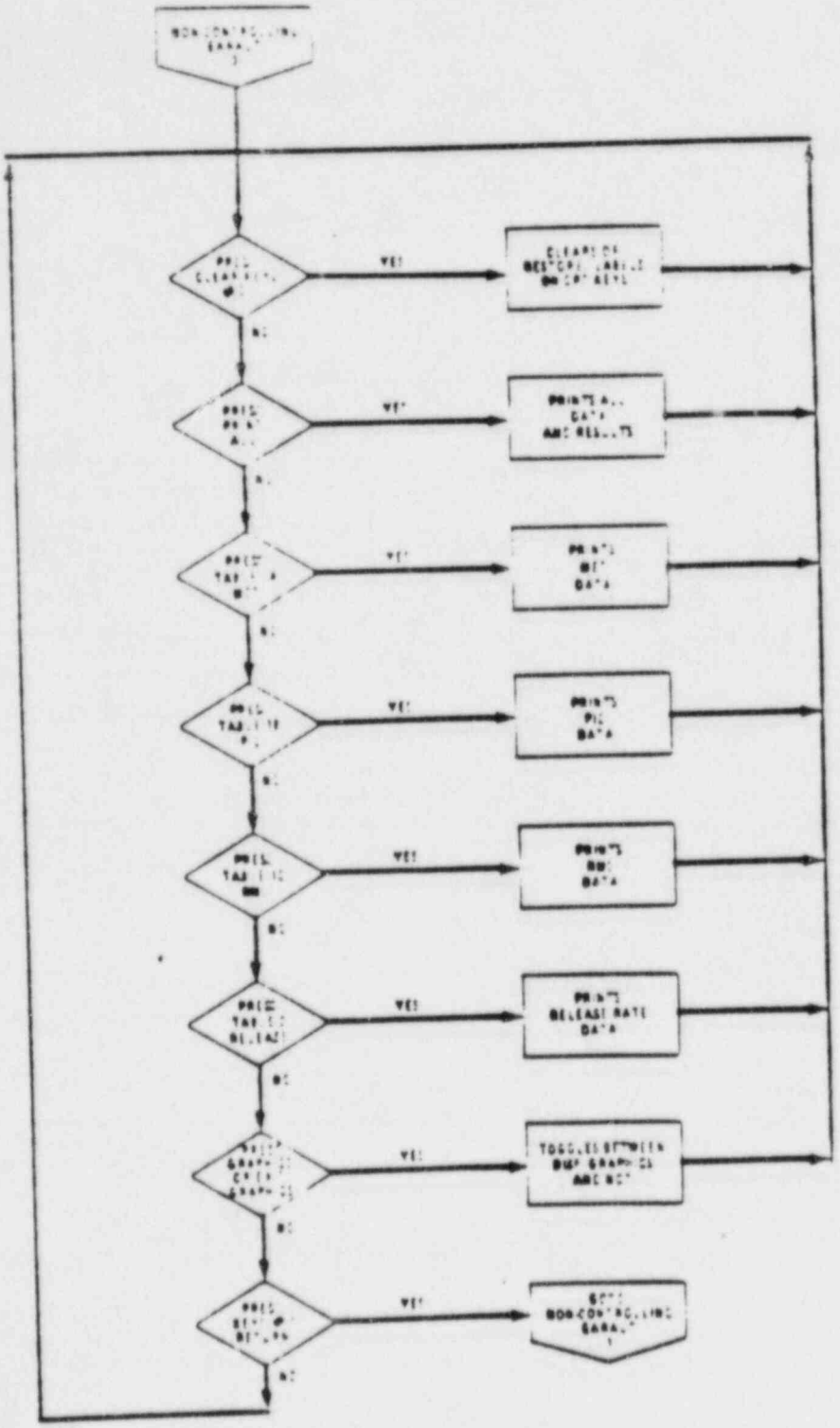
NON-CONTROL EARAUT KEY SET #1



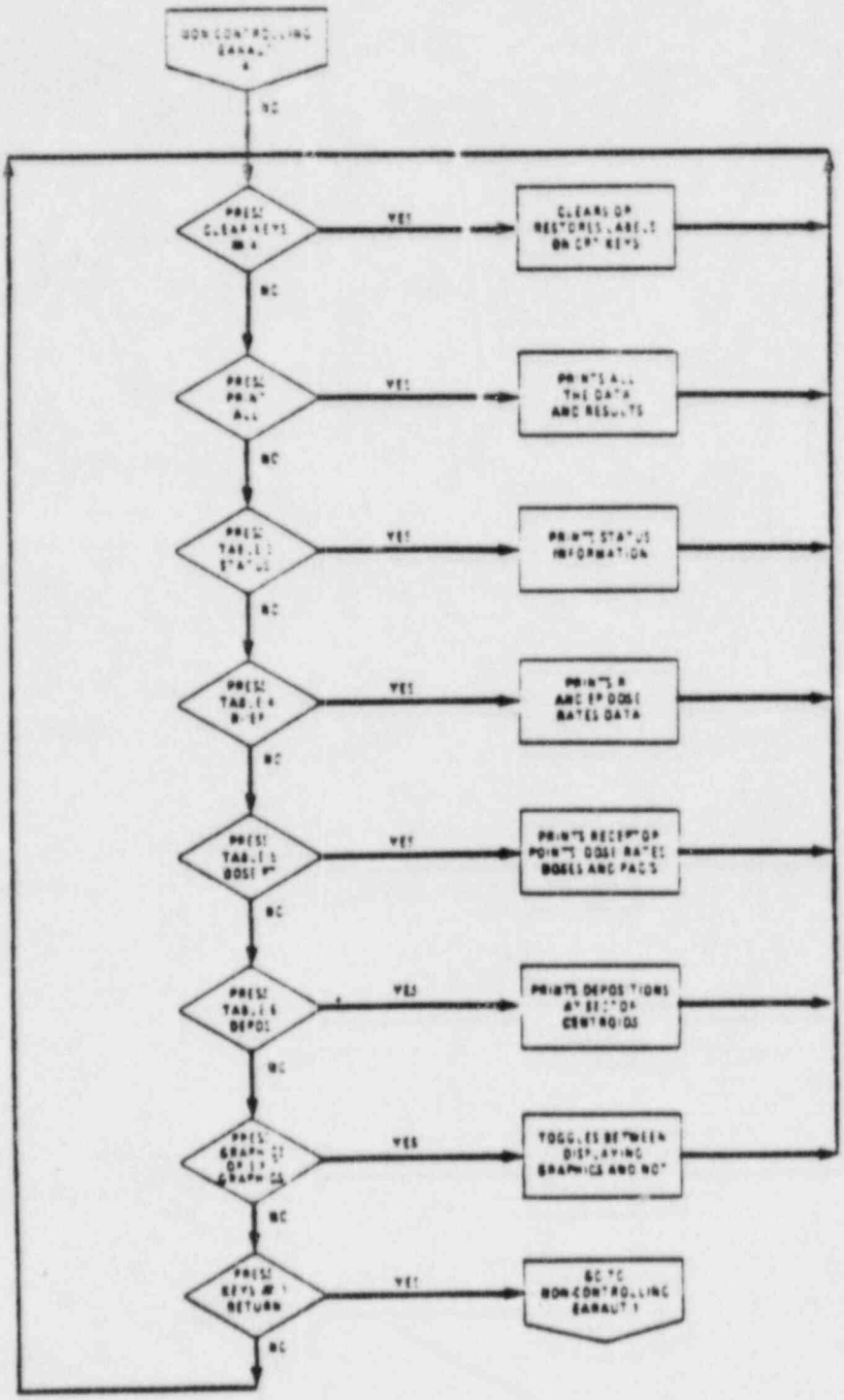
NON-CONTROL EARAUT KEY SET #2



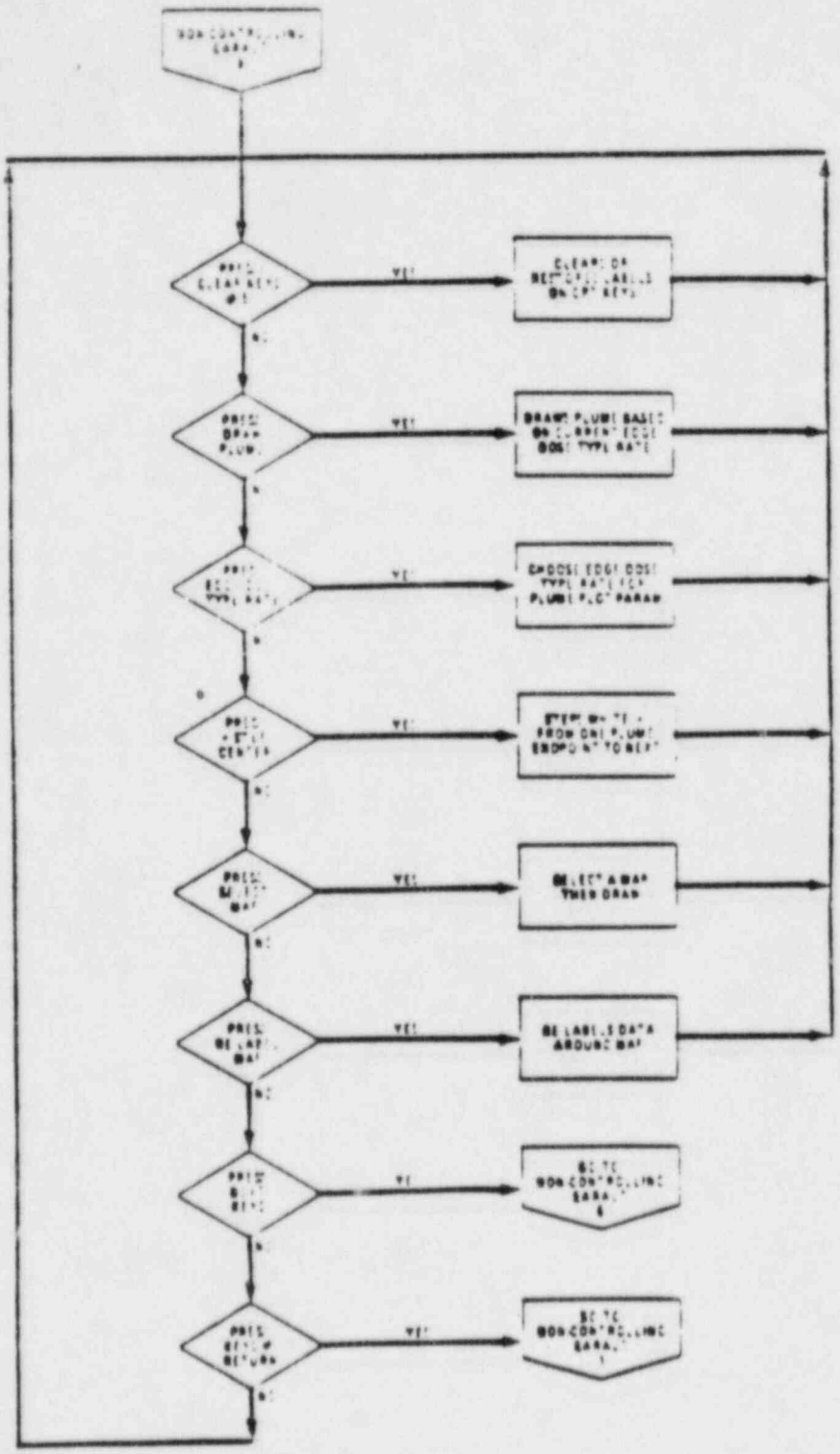
NON-CONTROL EARAUT KEY SET #3



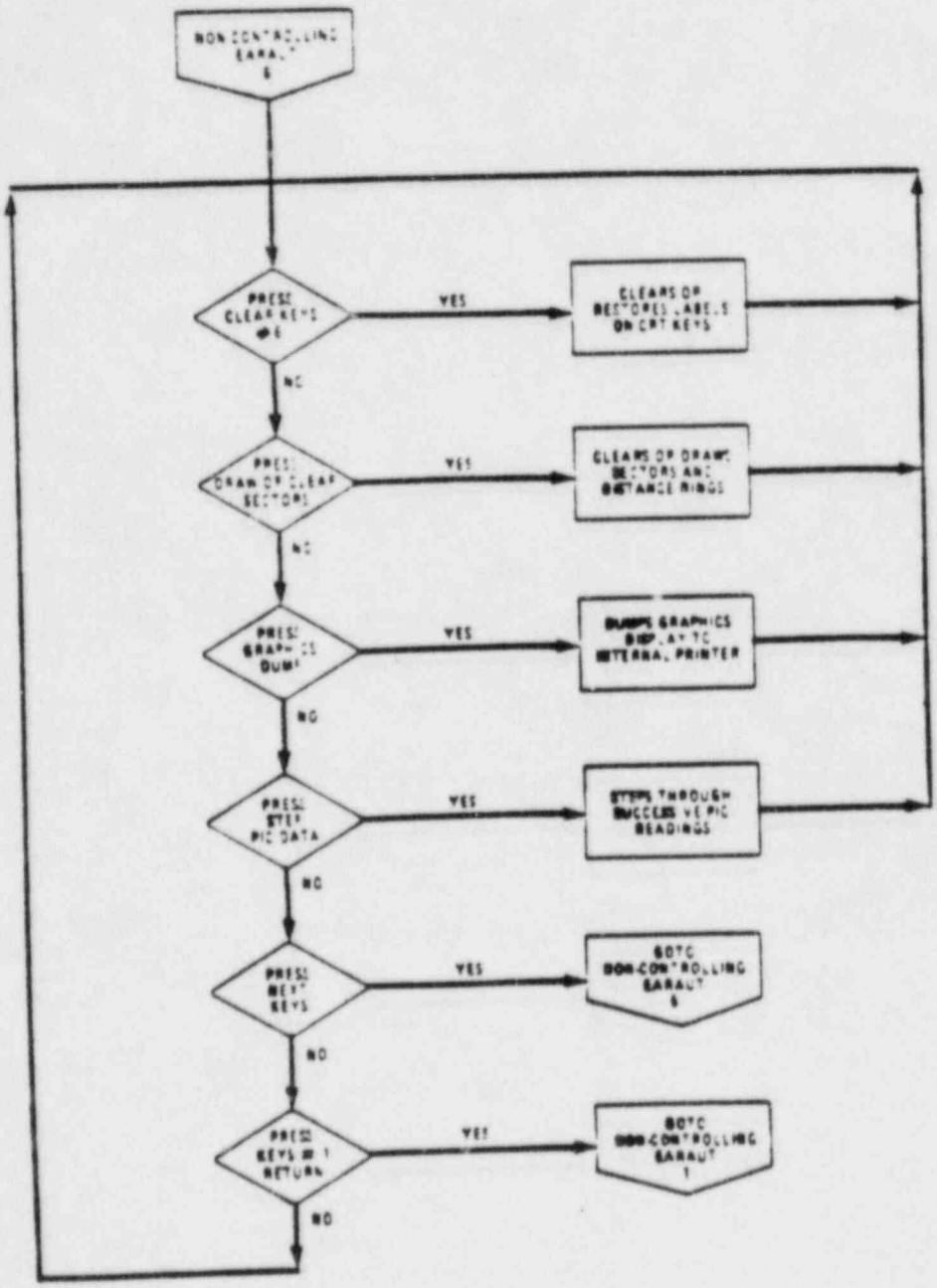
NON-CONTROL EARAUT KEY SET #4



EARAUT NON-CONTROL KEY SET #8



NON-CONTROL EARAUT KEY SET #6



d. EARMAN PROGRAMS

The EARS Manual (EARMAN) program is the manual version of the EARS programs. All of its functions are performed at the individual HP-9845C stations independant of the operation of the other stations and the HP-1000 at the TSC. Any data input such as MET data or release rate data is manually entered from the keyboard. In addition no data is transmitted to or from a station that is operating EARMAN. EARMAN consists of two separate subprograms: EARMDC (Core subprogram), and EARRDC (Release rate definition subprogram), in addition to the initial entry program EARMAN.

In the event of a hardware failure of the HP-1000 at the TSC and/or the loss of communications between various HP-9845C EARS stations and the HP-1000, EARMAN program can be initiated. Essential data can be obtained by telephone communication via PGandE or PT&T lines with EARS operators at the other 'CONTROLLING STATIONS' (CR, TSC, or EOF).

1. To load and run the EARMAN program type in the following commands from the keyboard.

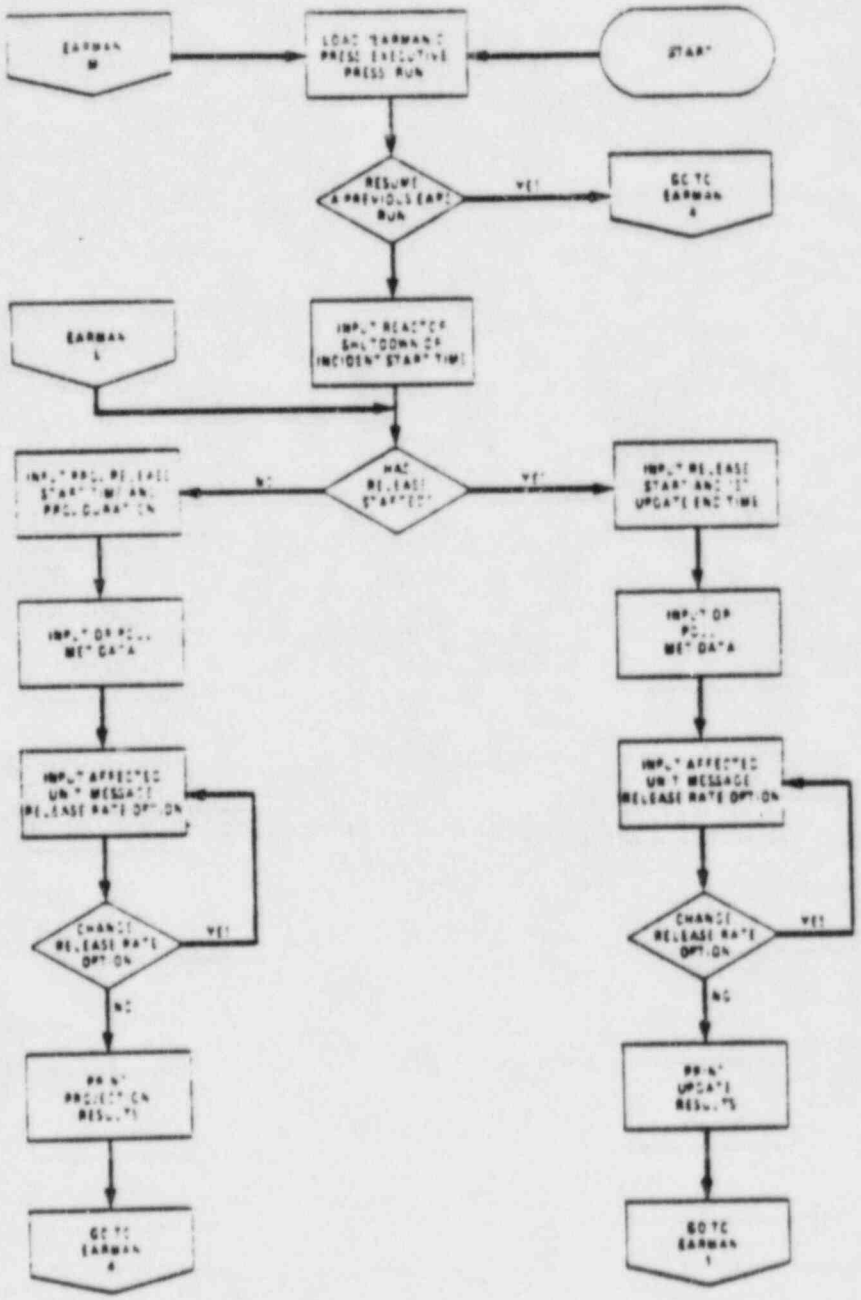
   a. Type in 'SCRATCH A', press [EXECUTE].

   b. Type in 'SCRATCH C', press [EXECUTE].

   c. Type in 'LOAD "EARMAN: c" 10' and press [EXECUTE].

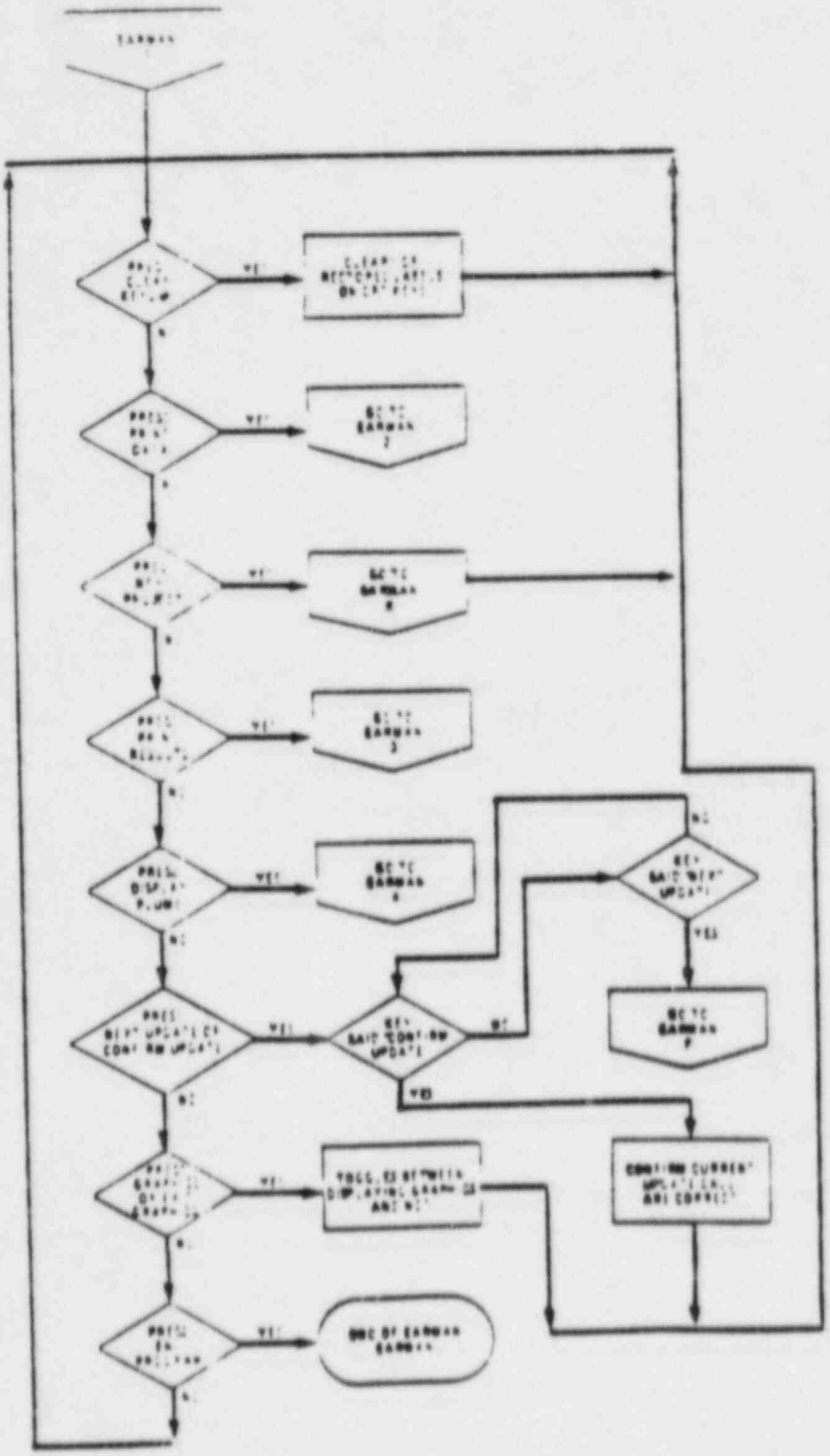
2. The following nine pages are flow diagrams for EARMAN.

EARMAN

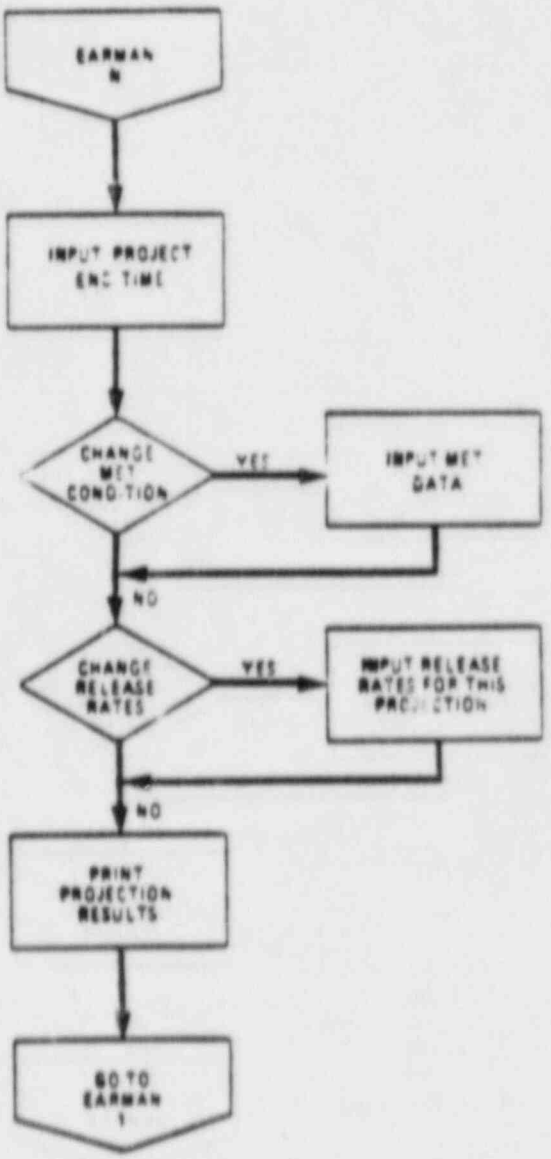

EARMAN M
LOAD "EARMAN" PRESS EXECUTIVE PRESS RUN
START
RESUME A PREVIOUS EARS RUN
YES
GO TO EARMAN 4
EARMAN 1
INPUT REACTOR SHUTDOWN OR INCIDENT START TIME
HAS RELEASE STARTED
NO
YES
INPUT REL RELEASE START TIME AND PROJ DURATION
INPUT RELEASE START AND IT UPDATE END TIME
INPUT OR PO... MET DATA
INPUT OR PO... MET DATA
INPUT AFFECTED UNIT MESSAGE RELEASE RATE OPTION
INPUT AFFECTED UNIT MESSAGE RELEASE RATE OPTION
CHANGE RELEASE RATE OPTION
YES
NO
CHANGE RELEASE RATE OPTION
YES
NO
PRINT PROJECTION RESULTS
PRINT UPDATE RESULTS
GO TO EARMAN 4
GO TO EARMAN 1

TITLE OPERATING PROCEDURES FOR EARS
9845C CONTROLLING STATIONS

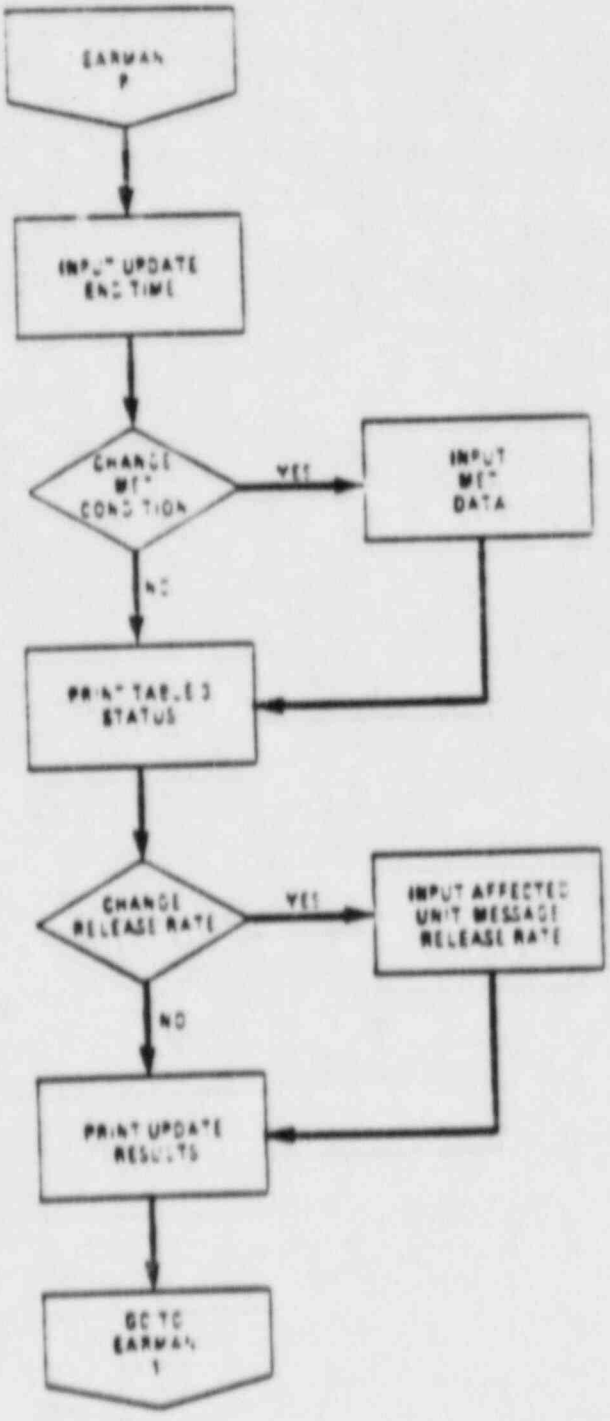
EARMAN KEY DCT #1



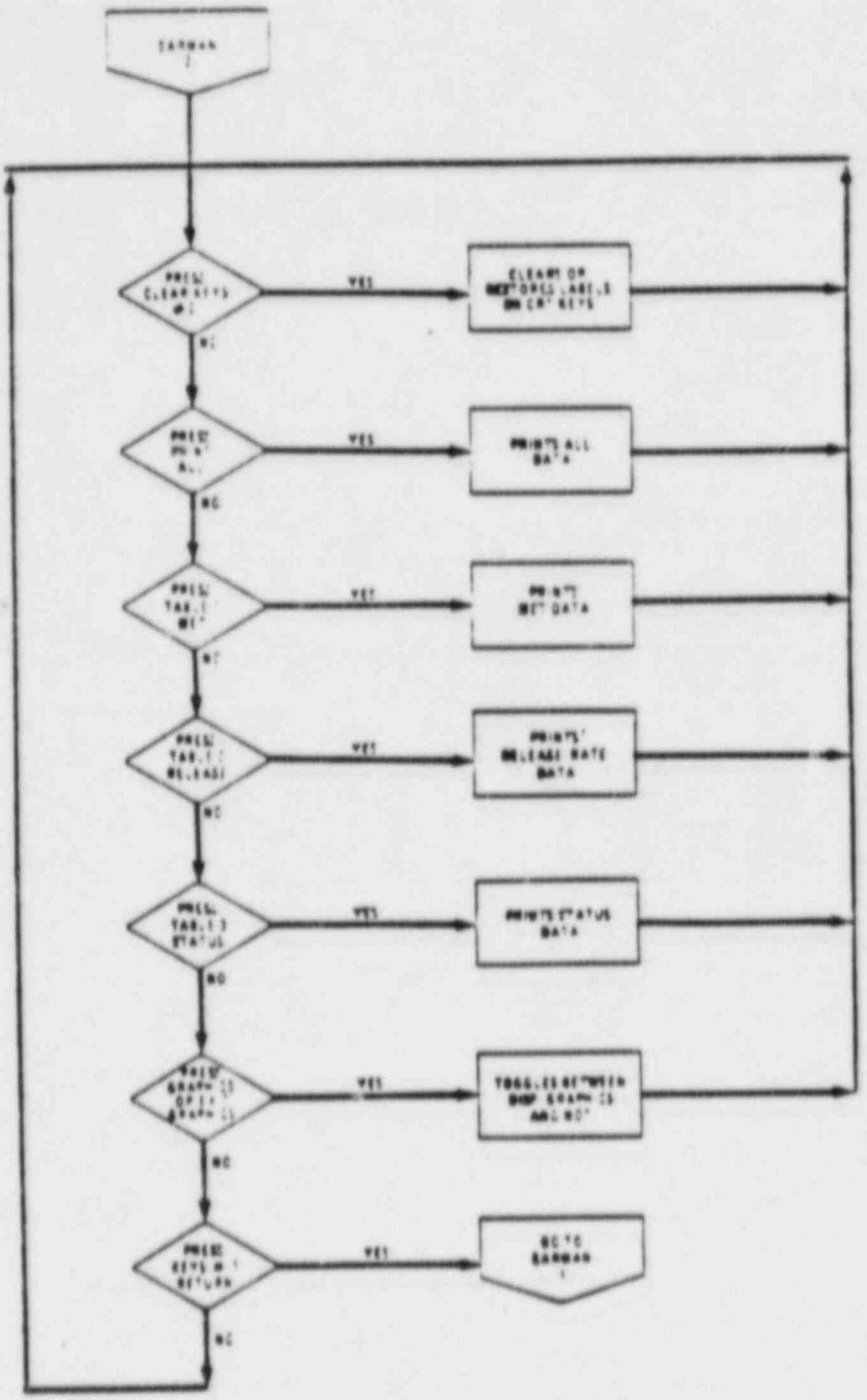
EARMAN NEXT PROJECTION



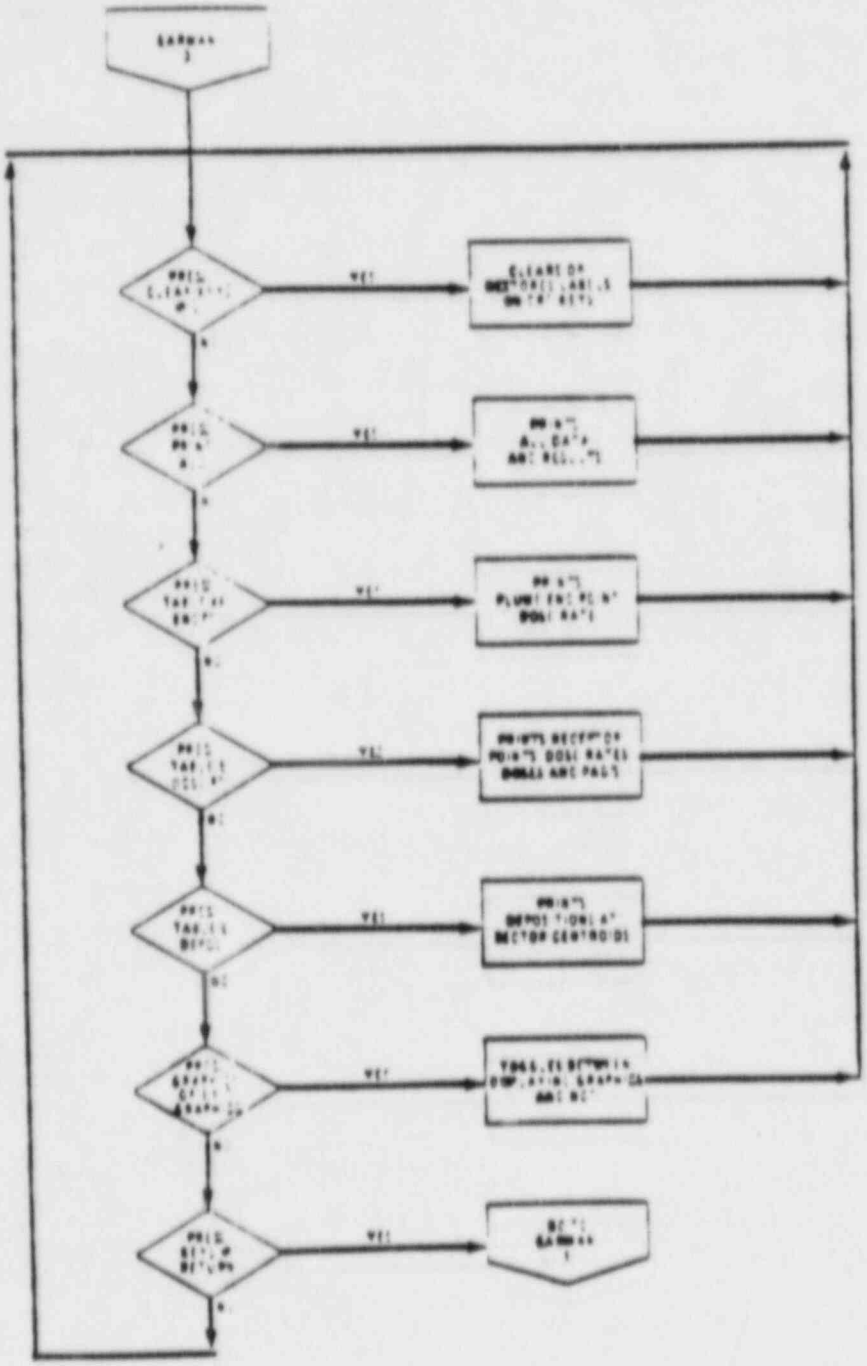
EARMAN NEXT UPDATE



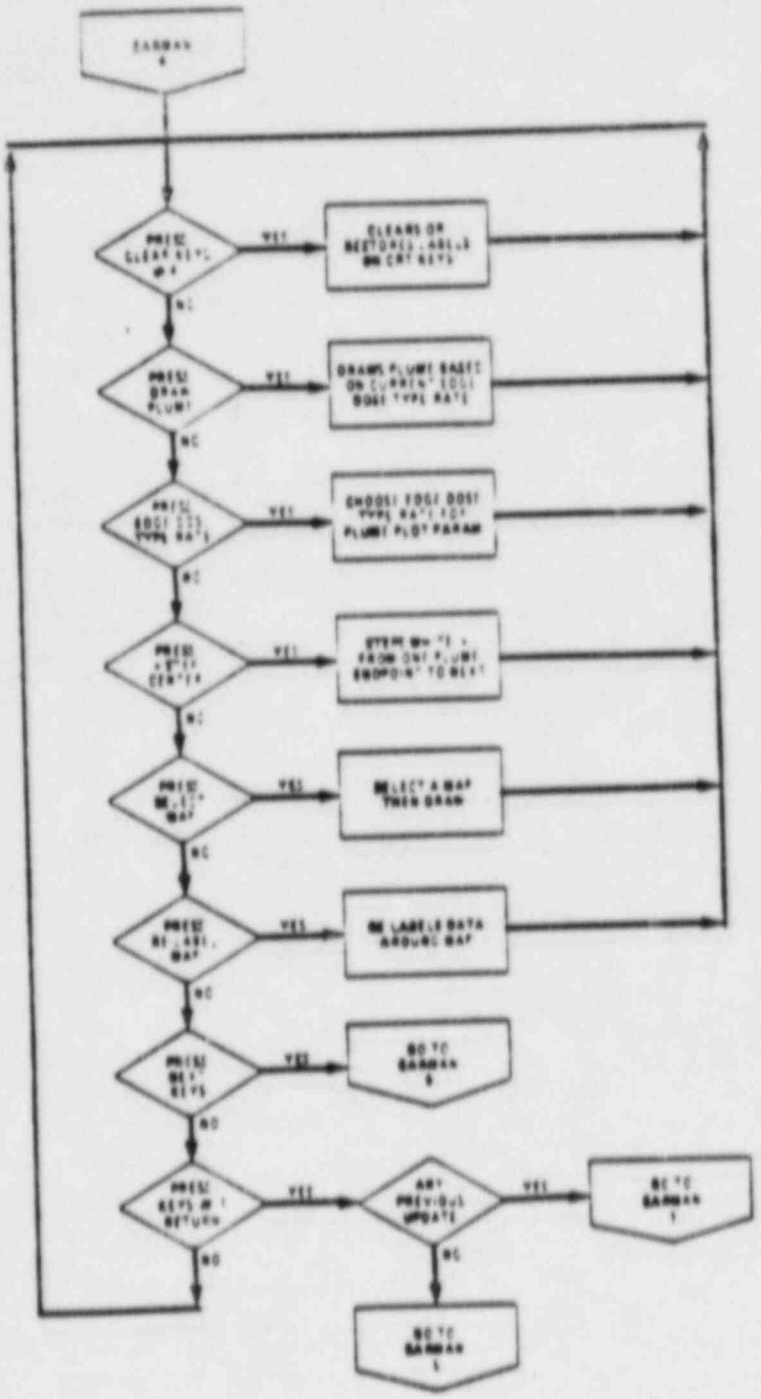
EARMAN KEY SET #2



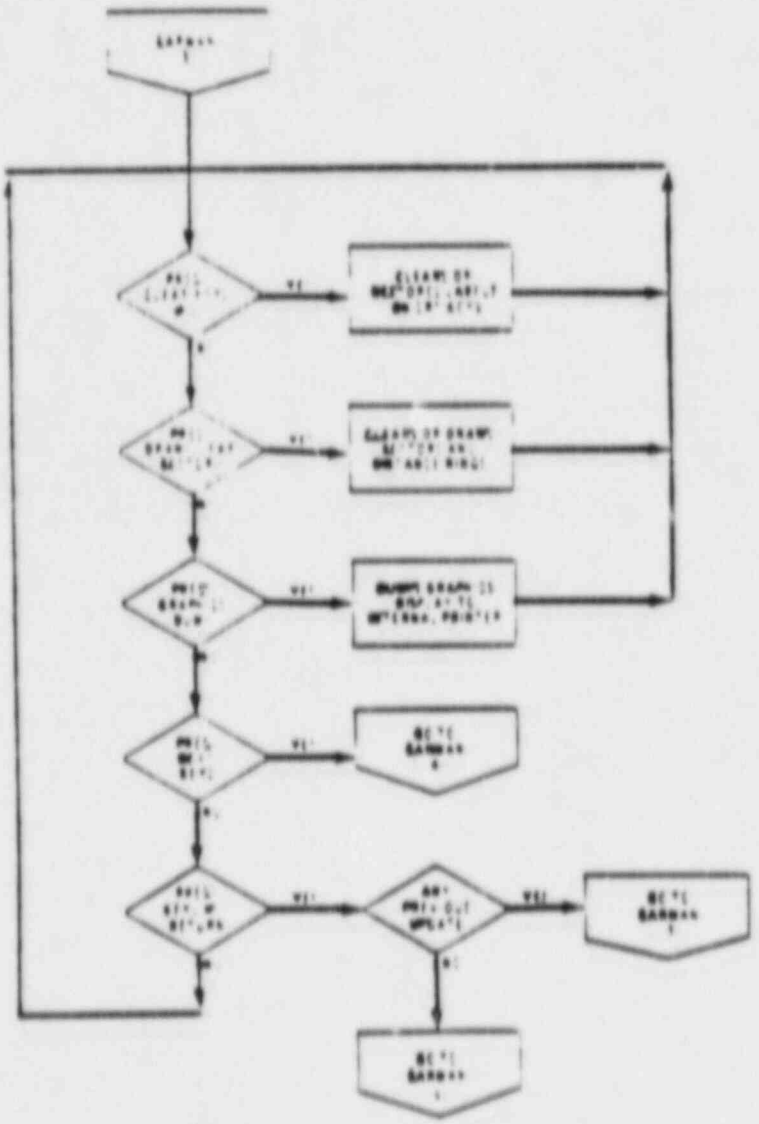
EARMAN KEY SET #3



EARMAN KEY SET #4



BARMAN KEY SET #5



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e. EARRDC/EARrdc PROGRAMS

The release rate definition program EARRDC/EARrdc is linked by the core program EARMDC/EARADC. Thirteen different release options are available in these programs. The logic for each option is outlined in the following fourteen pages of flow diagrams.

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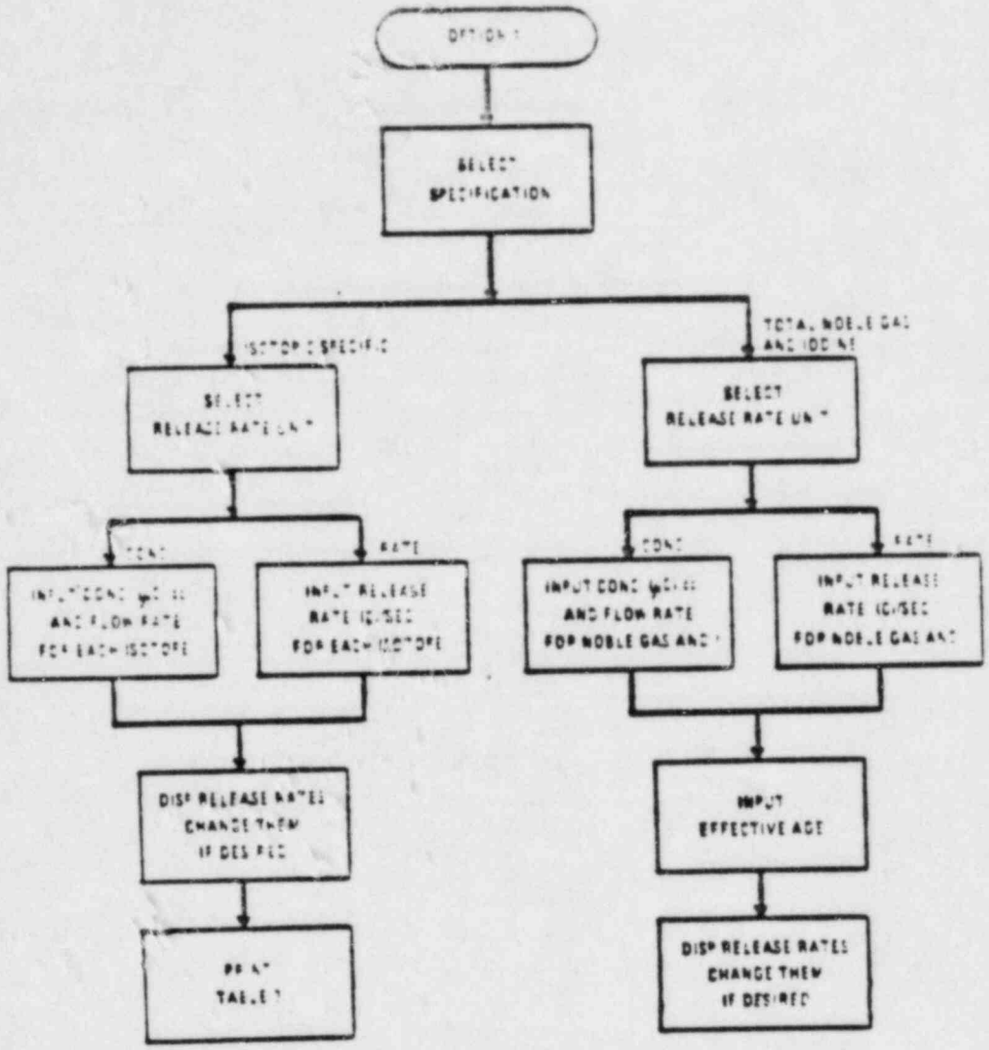
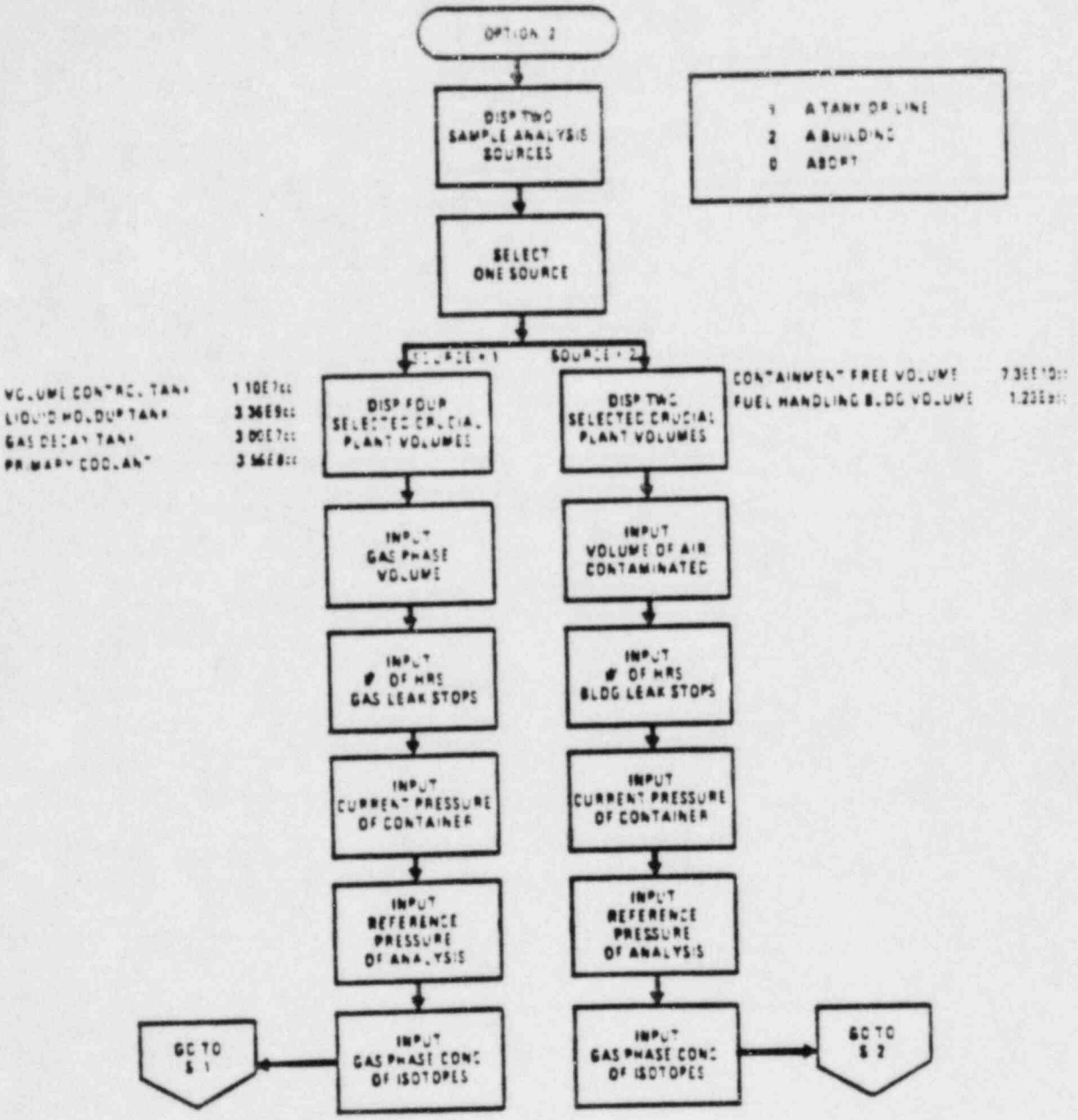
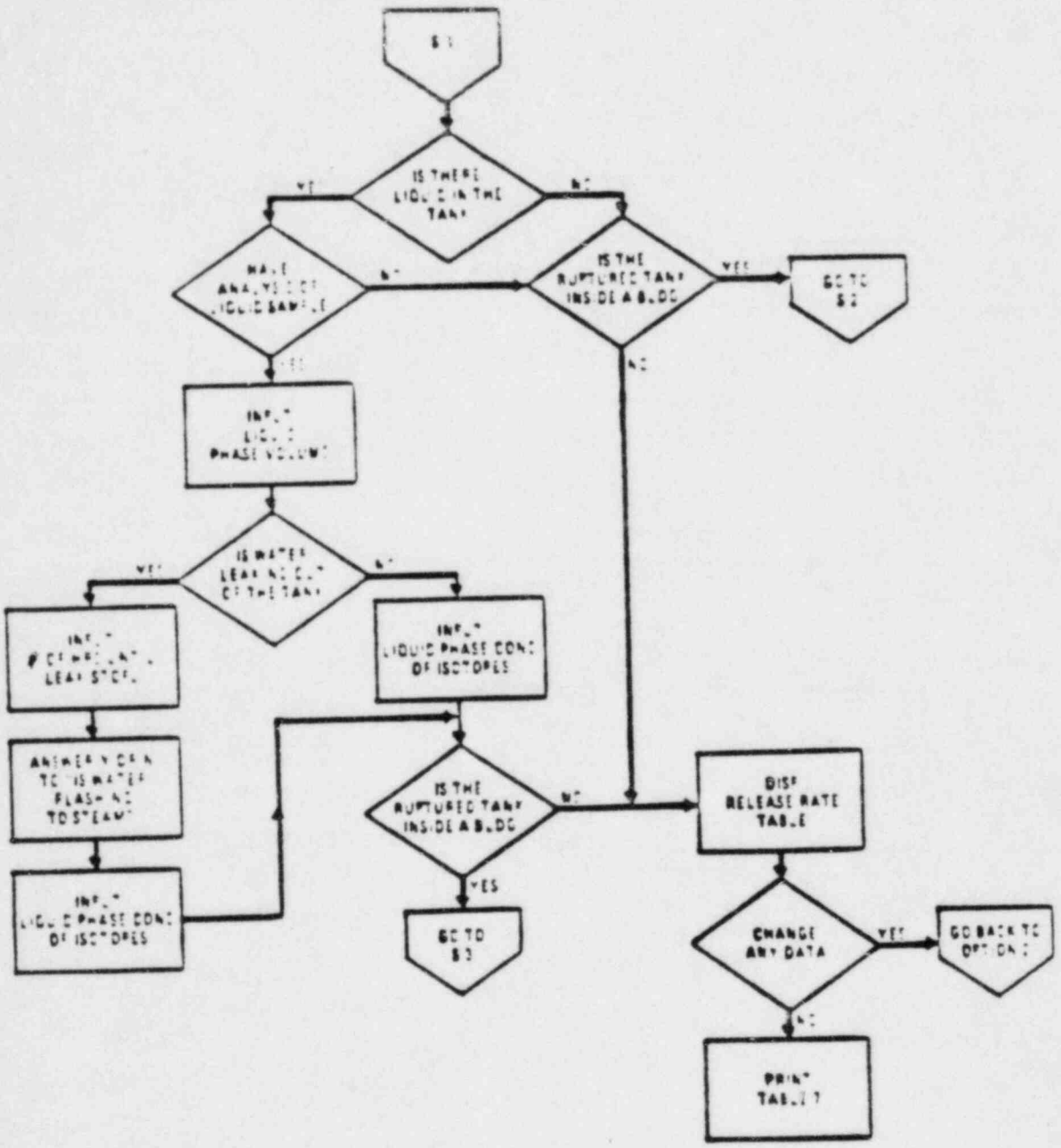
RELEASE RATES MANUAL SPECIFICATION



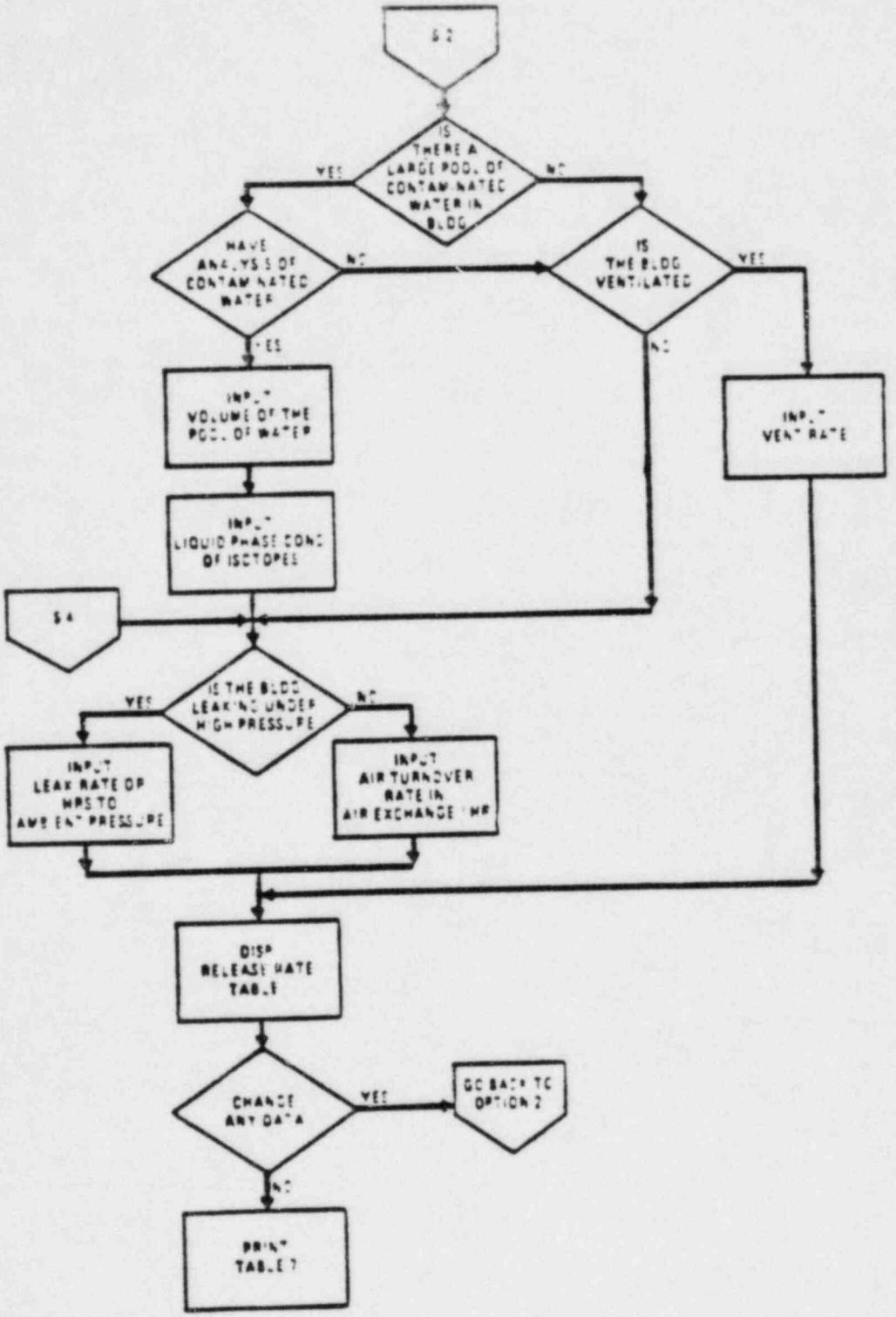
TANK / BLDG INVENTORY FROM SAMPLE ANALYSIS (1 OF 4)



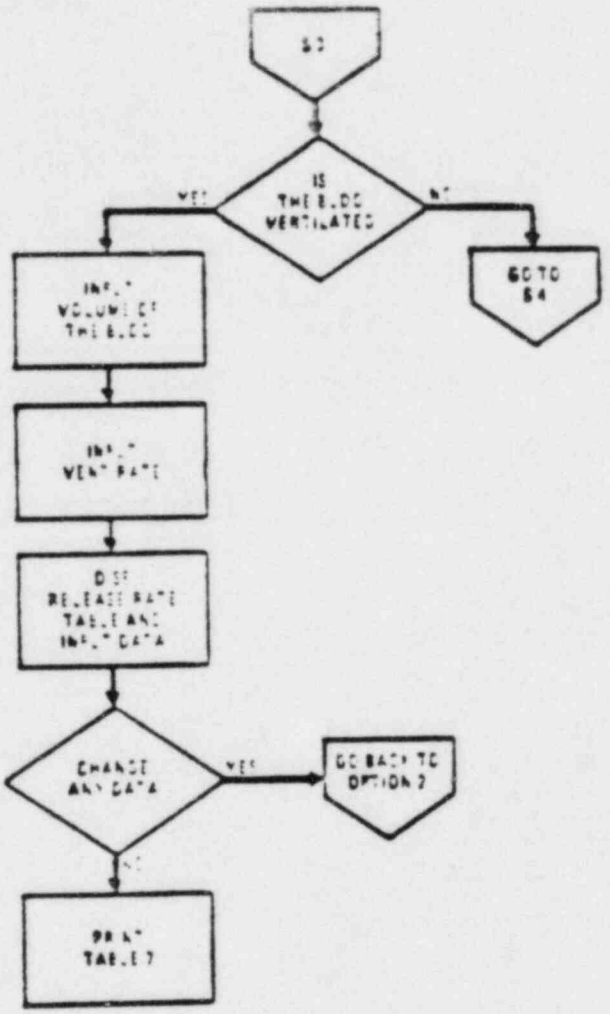
TANK BLDG INVENTORY FROM SAMPLE ANALYSIS (2 OF 4)



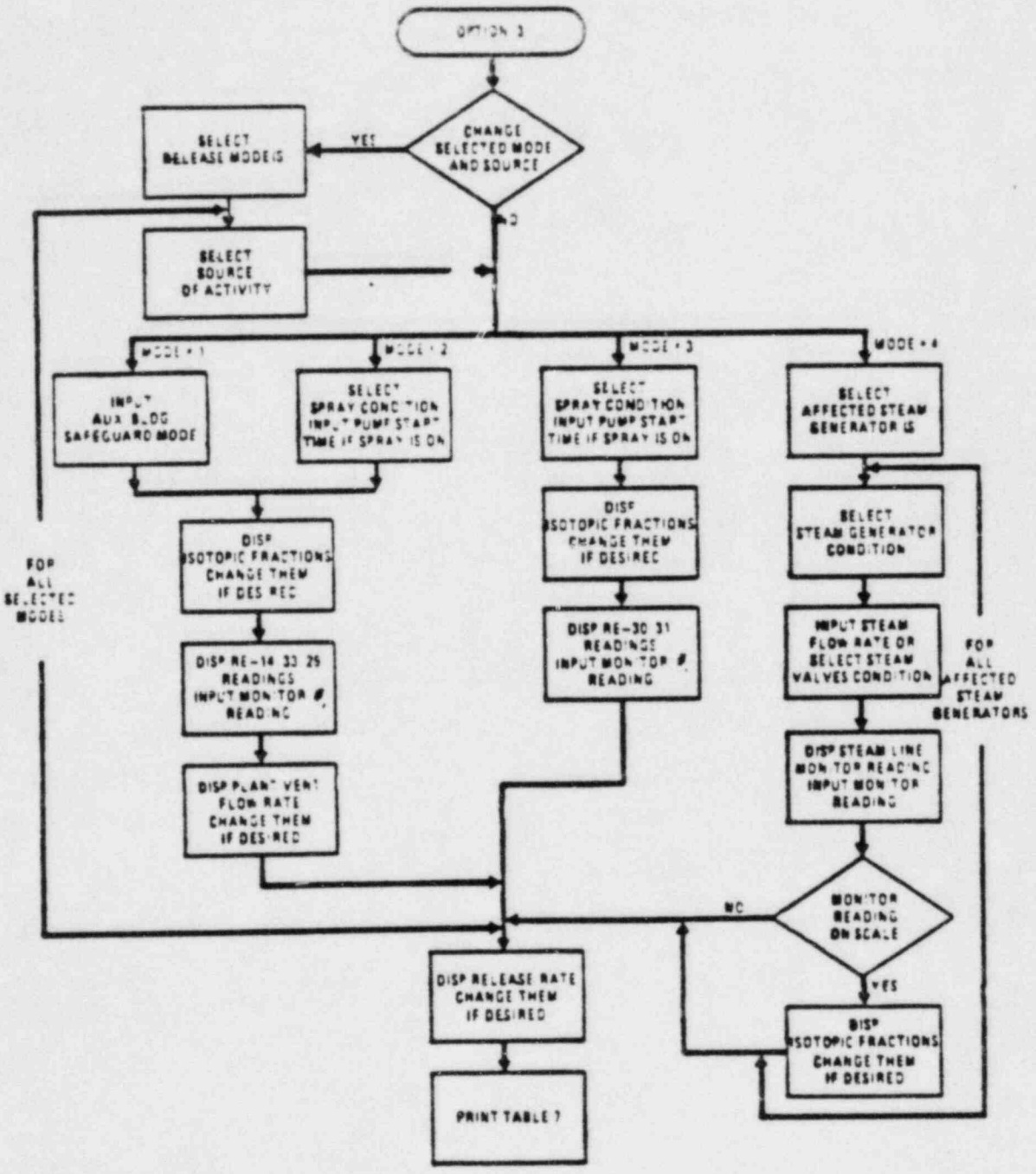
TANK / BLDG INVENTORY FROM SAMPLE ANALYSIS (3 OF 4)



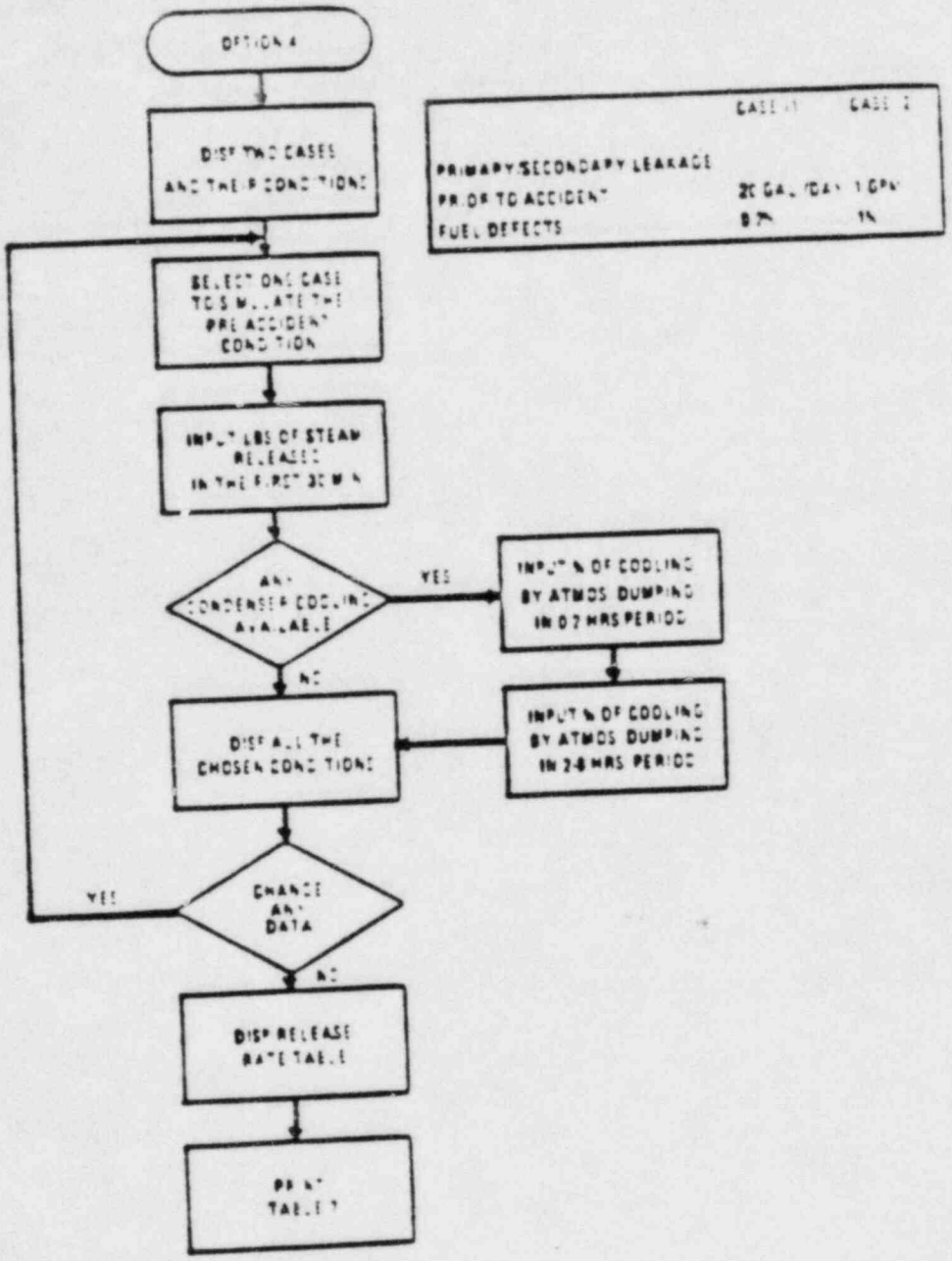
TANK BLDG INVENTORY FROM SAMPLE ANALYSIS (4 OF



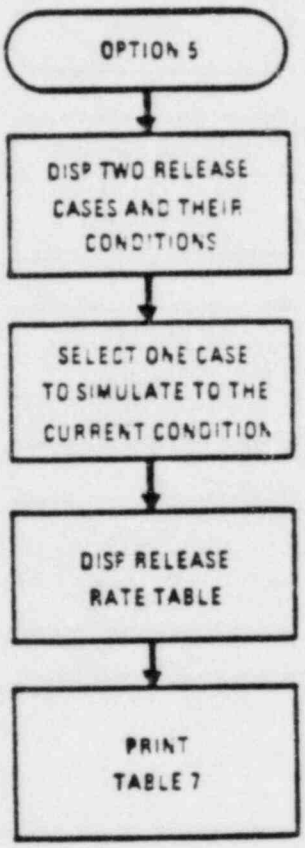
CONVERSION FROM RMS READINGS



STEAM GENERATOR TUBE RUPTURE

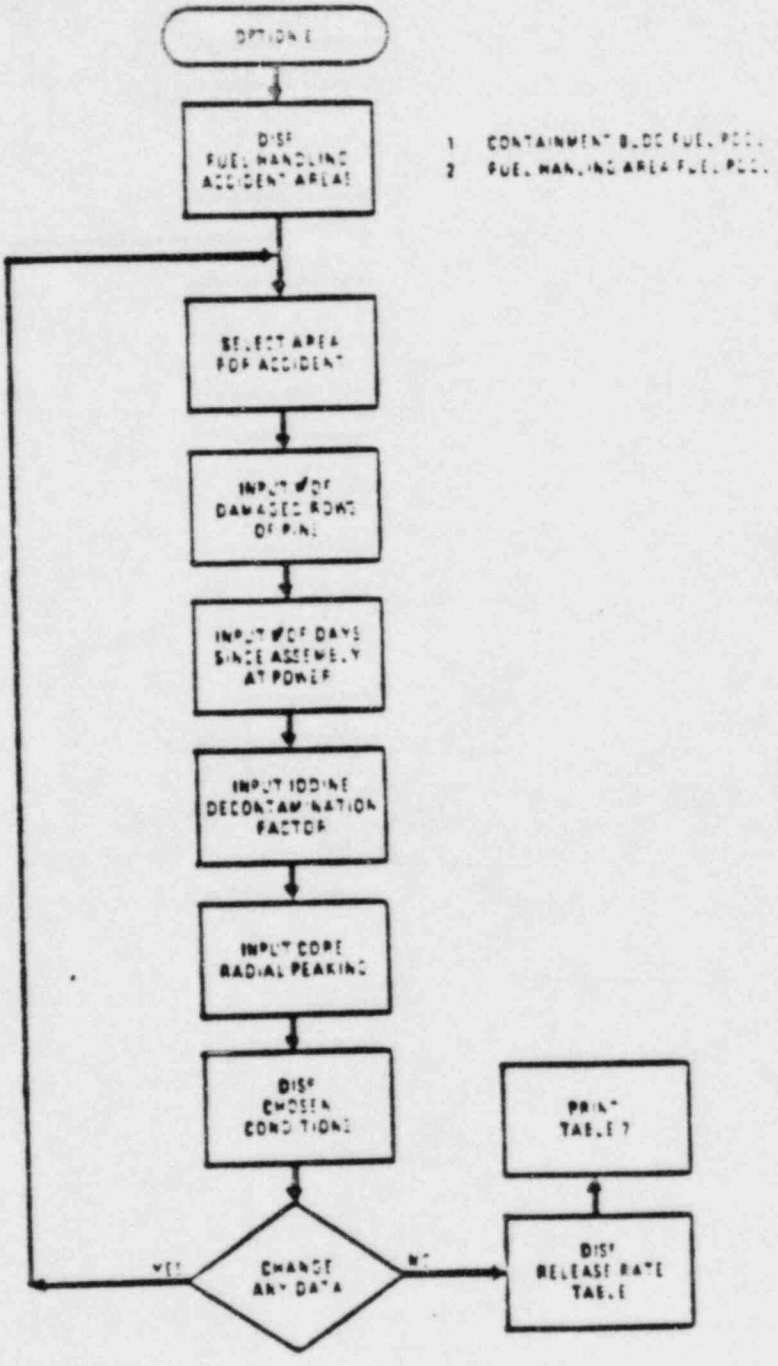


LOSS OF COOLANT ACCIDENT

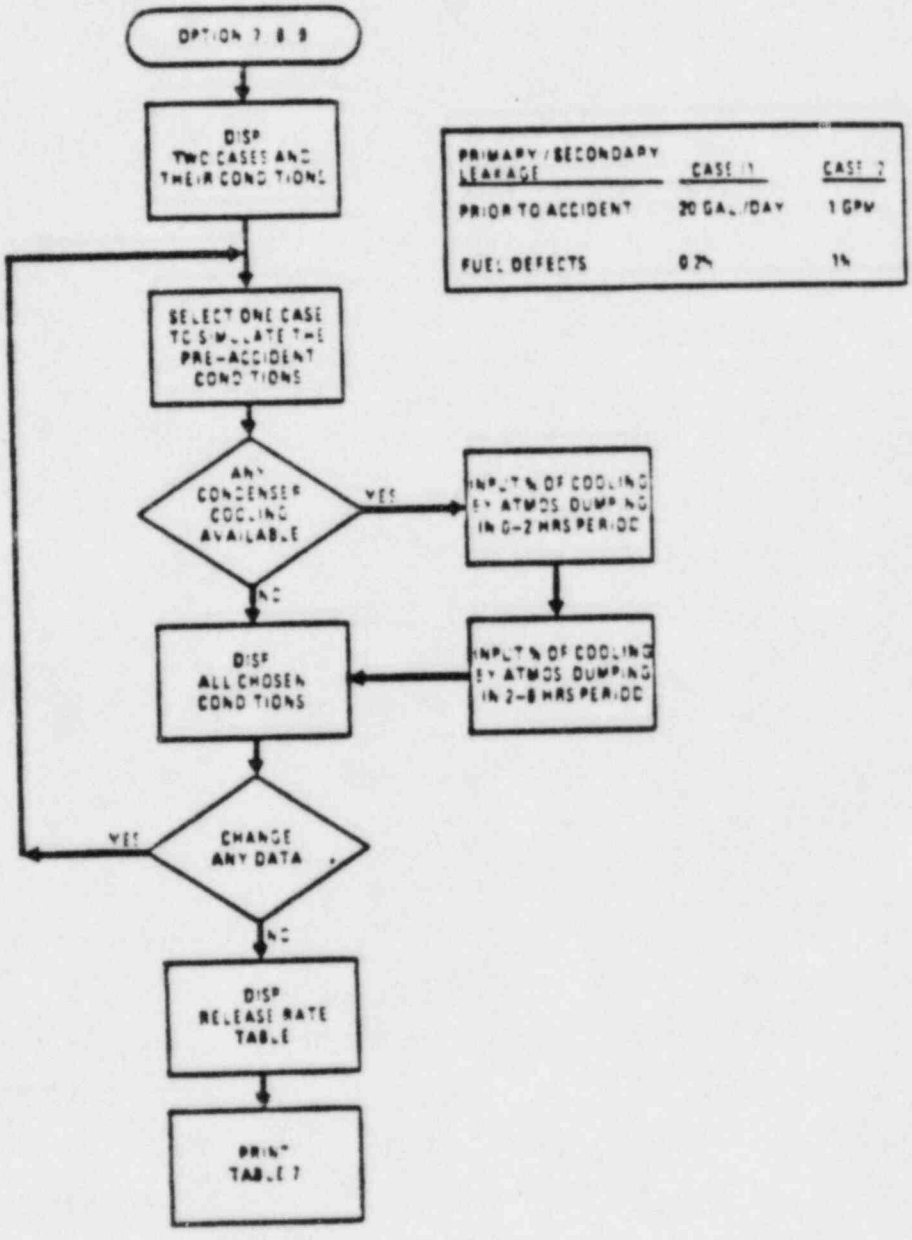


	CASE (1)	CASE (2)
FREE ACTIVITY IN CONTAINMENT		
NOBLE GASES	100% GAP	100% CORE
IODINES	25% GAP	25% CORE
ANTICIPATED CONTAINMENT LEAK RATE:		
FIRST DAY	0.05%/DAY	0.1%/DAY
LATER DAYS	0.025%/DAY	0.05%/DAY

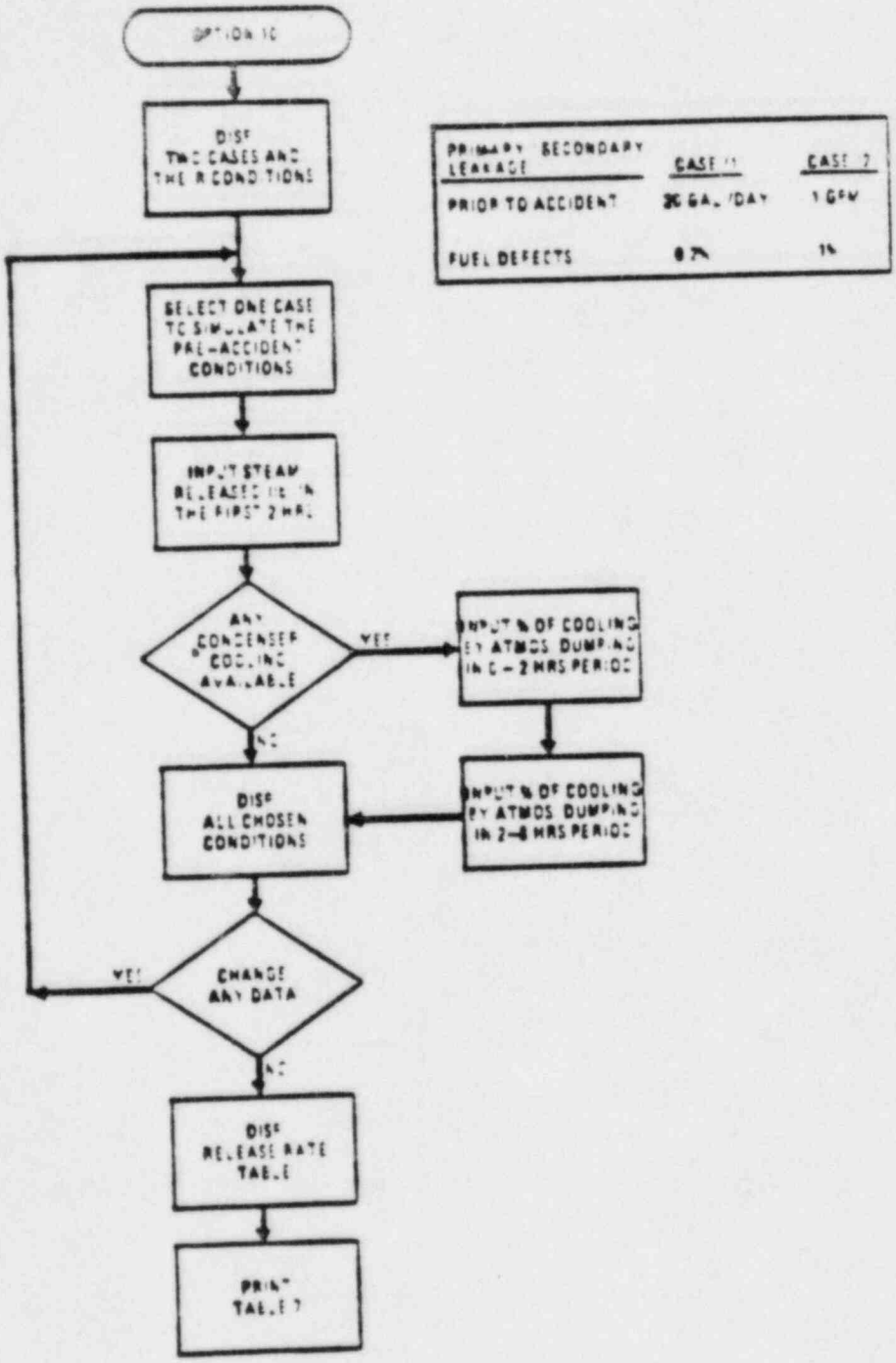
FUEL HANDLING ACCIDENT



CONTROL ROD EJECTION ACCIDENT
LOCKED PUMP ROTOR ACCIDENT
LOSS OF OFFSITE POWER INCIDENT

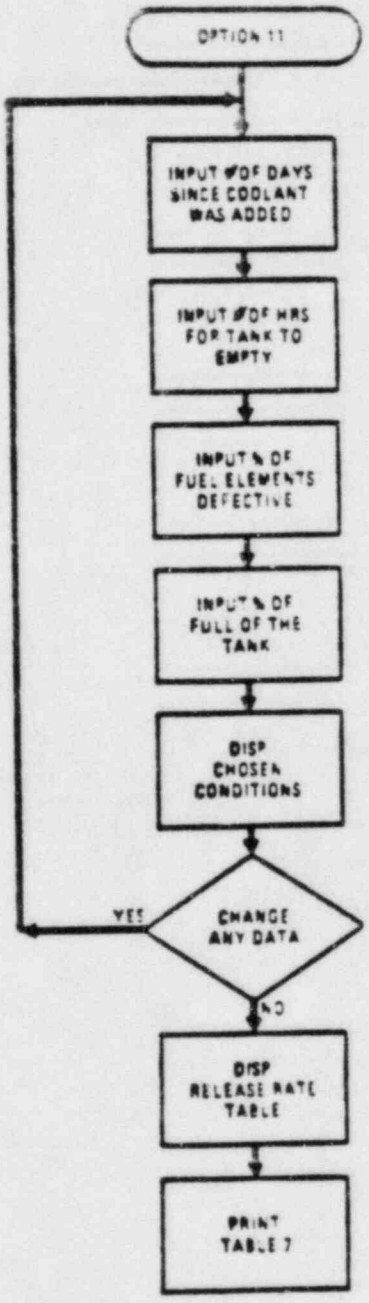


STEAM LINE BREAK ACCIDENT

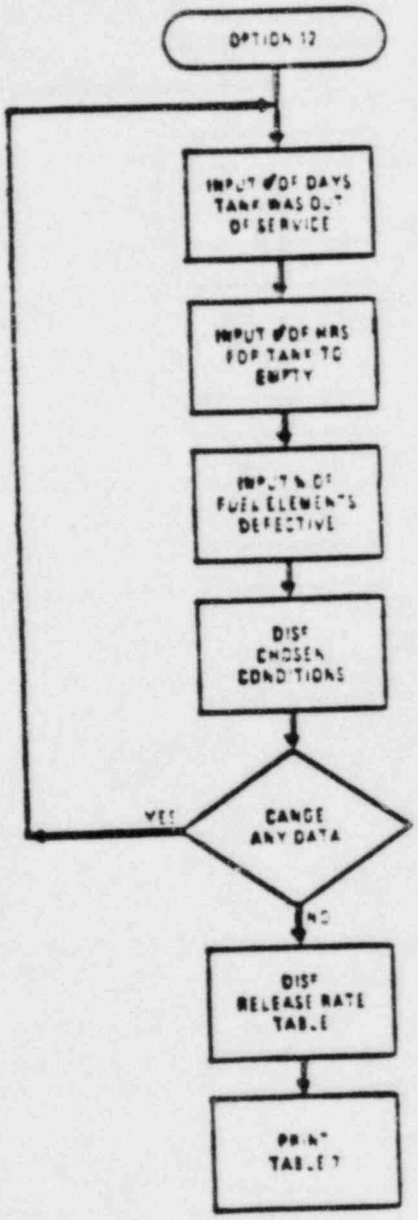


PRIMARY SECONDARY LEAKAGE	CASE 1	CASE 2
PRIOR TO ACCIDENT	35 GAL./DAY	1 GPM
FUEL DEFECTS	0%	1%

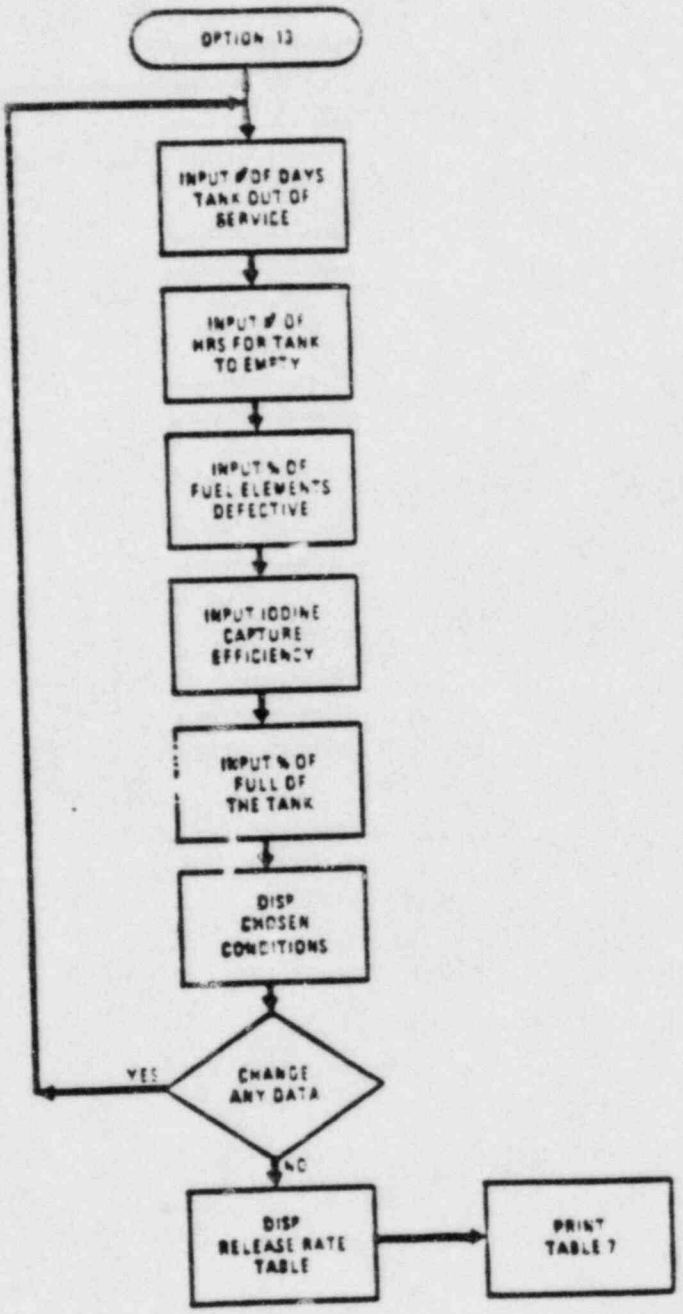
VOLUME CONTROL TANK RUPTURE



WASTE GAS DECAY TANK RUPTURE



LIQUID HOLDUP TANK RUPTURE



6. Terms Common to EARAUT and EARMAN

Meteorological Data Input

Meteorological data from the primary and the backup MET towers are sent to the HP-1000 computer at the TSC. Both STATUS and EARAUT programs can 'poll' the HP-1000 for MET data (averaged, previous or current), including wind direction, wind speed, lapse rate, precipitation, and mixing height (provided the data link between this station and the TSC exists).

During a drill run, MET data is read from the HP-1000 drill database.

If EARMAN program is run, the operator has to enter all MET data manually.

Release Estimate

The DCPP Emergency Procedure RB-9 (Ref. 2) is the technical basis for the EARS release rate calculations. The radionuclide distribution and release rate are determined in the EARS subprograms EARrdc or EARRDC, using one or more of the following techniques:

a. Plant vent monitors and vent flow indication.

b. Containment area monitors and derived release rate based on containment leak rate, etc.

c. Isotopic analyses of selected plant containers and systems performed prior to the accident.

d. Steam line monitors and steam flow rate meters.

e. Final Safety Analysis Report (FSAR)(Ref. 3) accident scenarios:

-Steam Generator Tube Rupture Accident
-Loss of Coolant Accident (LOCA)
-Fuel Handling Accident
-Control Rod Ejection Accident
-Locked Pump Rotor Accident
-Loss of Offsite Power Accident
-Steam Line Break Accident
-Volume Control Tank Rupture Accident
-Waste Gas Decay Tank Rupture Accident
-Liquid Holdup Tank Rupture Accident

When using the FSAR cases, the operator must exercise judgement as to whether the 'expected case' or the 'design basis' estimates are appropriate to adequately describe the accident. The DCPP Emergency Procedure RB-11 (Ref. 4) indicates that unless actual release data is available, the operator should initially choose the 'design basis' (more conservative) values in determining initial accident classification.

f. If none of the FSAR accident types is appropriate, the 'Manually Specified Release Rate' or 'Tank or Building Inventory' permits manual entry of radionuclide release data, either by isotope or as total noble gases and iodines.

P.A.G. Table

The Protective Action Guide (PAG) criteria used in the EARS programs are from Table 5.1 of Reference 5. They apply to the total dose (or dose commitment) up to the time of interest. The criteria are:

a. No action needed if Whole Body dose <0.5 rem* and thyroid dose <5 rem.

b. Sheltering recommended if Whole Body >= 0.5 rem and Whole Body <5 rem, or Thyroid >=5 rem and Thyroid <25 rem.

c. Evacuation recommended if Whole Body >=5 Rem or Thyroid >= 25 rem.

*0.5 rem is the PAG criteria set by the State of California.

Projections and Updates

It is possible to run up to five class A 'dose projections' before the first update and between any two subsequent updates, and forty segmented Gaussian modeled, near 'real-time' dose updates. A 'projection' is a straight line Gaussian modeled dispersion and dose calculation which does NOT deposit activities but does take into account previously accumulated doses from updates. An 'update' is a complete set of segmented Gaussian modeled dispersion and dose calculations which disperses and deposits activities along the travelling direction.

In EARMAN operation, at the end of either projection or update calculations, a set of output tables is automatically printed.

Edge Dose Rate

The edge dose rate is the plume exposure rate at the edge of the plume as displayed for the dose type (thyroid or immersion) selected. This is displayed on the right-side of the CRT graphics area. If the edge dose rate value chosen is greater than the plume center dose rate, message "Edge dose rate > Centerline dose rate" is displayed. When a new edge dose rate is chosen, a plume with this new dose rate will be drawn. This is to prevent confusion regarding the parameters selected and the particular plume displayed.

The edge dose rate is always in mrem/hr. The default value in the EARS is 0.1 mrem/hr. It can be changed by pressing the EDGE DOSE TYPE/RATE soft key and entering a new edge dose rate.

Dose Type

Two different dose types can be selected: thyroid or immersion. Whenever a new dose type is selected and a previous plume is already displayed, the new plume will be redrawn for the new dose type.

Radius and Plume Center

The value displayed as '+Radius' on the right-side of the CRT graphics area is the minimum distance in meters from the plume segment center (denoted by a small white cross on the graphics) to the edge of the plume for a given edge dose rate. This marker is used to indicate the 'centers' of the plume segments, starting from the earliest (generally the outermost segment) to the latest segment (generally the innermost

or closest to the site). The plume center-line dose rate is indicated in mrem/hr under the '+Center Dose Rate' label on the right-side of the CRT graphics area.

Each time the STEP CENTER soft key is pressed, the white cross will move to the next plume segment center and the corresponding center-line dose rate and radius will change accordingly, cycling from the earliest segment to the latest.

Sector Element

The cumulative deposition data are listed for each of 96 'sector elements'.

A sector element is an area bounded by a division of the compass into 16 sectors (from number 1 centered on North to number 16 on NNW) with radial distances as 800 meters to 2 miles, 2 to 5 miles, 5 to 10 miles, 10 to 15 miles, and 15 to 20 miles.

Cumulative Deposition

The cumulative deposition listed as Ci/m**2 of 'Cs-137 equivalents' is the quantity of Cs-137 which would yield a direct radiation exposure rate from ground plane deposition equal to the decay-corrected sum of all deposition which has occurred for that period. Due to uncertainties involved in calculating both wet and dry deposition, this information is meant just to provide guidance to field survey teams as to where deposition is likely to have occurred. The values listed have relatively large uncertainties and should be used together with accurate field survey data in determining appropriate protective actions.

Output Tables

The EARS output is listed in tabular forms as:

Table 1 (EARMAN) or Table 1A (EARAUT or STATUS) - MET data (wind speed, wind direction, sigma theta, lapse rate, precipitation, stability classes, and mix height);

Table 1B (EARAUT or STATUS) - PIC data;

Table 1C (EARAUT or STATUS) - RMS data;

Table 2 - Release rate data in Ci/sec;

Table 3 - Emergency status data (emergency class, projection or update duration, incident and release start times, accident type and any message);

Table 4 (EARMAN) - Plume segment radial intercept (RI) points dose rates and endpoints (EP) dose rates and doses eata; A RI point is the intersection of a plume segment centerline with one of the radial rings: 800 m, 2, 5, 10, 15 or 20 miles.

Table 4A (EARAUT) - Plume segment radial intercept (RI) points dose rates data;

Table 4B (EARMAN or EARAUT) - Plume segment centerline endpoint (EP) dose rates data;

Table 5 (EARMAN or EARAUT) - Dose rates, doses and P.A.G.'s at specific locations;

Table 6 (EARMAN or EARAUT) - Deposition data by sector elements.

Table 7 (EARMAN) - Dose equivalent I-131 and Cs-137 release rates, total noble gas release rate and averaged energy released per disintegration.

7. EARS Support Software

The function of the EARS support programs is to initialize, edit or review the EARS data files. These programs include EAREDT, EARSED, EARSDP, EARKSP, EARKDC and EARDOC, and are all stored on the HP-7906 disc drive at the stations. These programs are not normally used during emergency conditions.

EAREDT - Data File Edit Program

The EAREDT program is used to setup, edit, or print the fixed data files used by the EARS for system parameters, isotope specific parameters, FSAR release rate data, site boundary locations, fixed PIC locations, RMS parameters, etc. This program can also duplicate from one msus to another all of the data files used by the EARS.

The data files accessed by this program are ERDSYS, ERNRMS, ERRTXY, ERDISO, ERBNDY, ERPLOC, ERNMAP, ERDMET, ERNSTN, ERDGRD, ERSTDC, ERSRCE, ERMONI and ERELOC.

EARSED - Data String File Edit Program

The EARSED program allows the operator to access the data base to print, edit or initialize the projection and update string data stored on ERDSTA and ERDSTR, respectively. Rather than decoding the strings, this program edits or prints the ASCII characters of the string for each of the parameters. EARSED can also purge old data on ERDSTA or ERDSTR.

EARSDP - Calculational Parameters Plot Program

The EARSDP program allows the operator to print the immersion dose correction factors and to plot sigma y, sigma z and plume depletion curves used in the EARS calculations. Data files accessed by this program are ERDSIG, ERDDEP and ERDIMR.

EARKSP - Soft Key Functions Defining Program

The EARKSP program is used to create and edit the soft key labels used in EARAUT, EARMAN, and STATUS programs. Labels for the soft keys are stored in a string array that is read from a data file on the program mass sotrage media (7906 disc cartridge).

Data files EARSKY, EARACK, and EARKEY are used in program; STATUS, EARAUT, EARMAN, respectively.

EARKDC - Graphics Documentation Program

The EARKDC program is a documentation program used to describe the CRT screen layout and soft key functions of the EARMAN, EARAUT and STATUS programs.

EARDOC - File Documentation Program

The EARDOC is a documentation program that lists all types of data files in the HP-9845C software. For each data file or type of data file, the file name, size, contents and general purpose can be listed.

8. REFERENCES

1. "EARS User's Operating Manual for CIRC Station", Rev. 3, July, 1984.

2. PGandE: "DCPP Emergency Procedure RB-9 - Determination of Release Rates", Rev. 1, 1983.

3. PGandE: "DCPP Final Safety Analysis Report", Chapter 15.

4. PGandE: "DCPP Emergency Procedure RB-11 - Emergency Offsite Dose Calculations", Rev. 1, 1983.

5. EPA: "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents"; EPA-520/1-75-001, 1975.

APPENDIX A

EARS HARDWARE

The EARS computer hardware at CR, TSC, and EOF EARS stations includes:

MODEL	DESCRIPTION	FUNCTION
HP-9845C	Desktop Computer w/graphics ROM, I/O ROMs, Mass storage ROM, Assembly execution ROM	EARS graphics computer at this station
HP-7906MR	Disc Drive	Mass storage unit
HP-98041A	Disc Interface	Interface the 9845C with the 7906
HP-13037C	Disc Controller	Controls 7906 operation
HP-98036A	Serial Interface (select code 5 at TSC & CR) (select code 4 at EOF)	Interface the 9845C with the modem to the TSC

APPENDIX B

LOADING HP-9845C INTERNAL PRINTING PAPER

Printer paper is loaded by using the following procedure. To perform the following steps, the computer must be switched "ON".

1. Lift or remove the access cover on the top of the printer by pushing down on the raised surface at the rear of the door. The door can be removed by lifting up and pulling it toward you. It is reinstalled by placing it on the hinge pins and pushing until it snaps into place.

2. Remove and discard the paper core of any previous roll. If the remaining roll is small and a new roll is to be used, remove the old roll by:

   a. Unrolling and lifting it upwards until the roll is above the printer, then,

   b. Holding the roll firmly and pulling it upward and forward; the paper guide will tear the paper off.

3. If any paper remains in the printer mechanism, remove it by pressing the PAPER ADVANCE key until the paper stops moving.

4. Remove the first layer of paper from a new roll. Be sure the paper has a cleanly torn or cut edge, as paper with a ragged edge may not load properly. The corners can be folded back to form a point for easier loading.

5. Insert the new roll such that the free end is positioned as shown. Press the PAPER ADVANCE key until paper appears at the front of the printer, then close the access door.

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

NUMBER EP RB-3
REVISION 1
DATE 2/28/85
PAGE 1 OF 4

TITLE EMERGENCY PROCEDURE
STABLE IODINE THYROID BLOCKING

APPROVED R. C. Thornberry PLANT MANAGER 4-11-85 DATE

IMPORTANT TO SAFETY

SCOPE

This procedure addresses administration of Potassium Iodide (KI) under emergency conditions for emergency personnel. Action levels, required authorization, method of distribution and record-keeping are described. This procedure and changes thereto require PSRC review.

ACTION LEVELS

1. Whenever a calculated iodine dose of 10 rem or greater to the thyroid is likely to be received by an individual.

   NOTE: Refer to Figure 1 of this procedure to determine thyroid dose as a function of the airborne I-131 concentration.

2. If possible, prior to undertaking an emergency response operation where high levels of radio-iodine are suspected, or no current air analysis is available.

   NOTE: In all cases where airborne contamination is anticipated, personnel should be fitted with pressure/demand Self Contained Breathing Apparatus (SCBA) as a minimum.

PROCEDURE

1. The Site Emergency Coordinator, acting on advice from the Emergency Radiological Advisor shall designate, for on-site personnel, when and who shall receive KI.

   NOTE: Personnel with sensitivity to Iodine may develop adverse symptoms resulting from ingestion of KI tablets. An allergy to shellfish may indicate Iodine sensitivity. Personnel with a history of Iodine sensitivity may be permitted to take KI tablets only after being verbally warned of the possible effects and having initialed the distribution record, so indicating. (See the Patient Package Insert, Attachment 2).

The Emergency Liason Coordinator will inform all on-site personnel located in the Control Room, Operational Support Center (OSC), Security Building. and all other personnel in their designated assembly areas.

2. The Recovery Manager, acting on advice from the Radiological Emergency Recovery Manager shall designate, for off-site personnel, when and who shall receive KI. These tablets are available in Kits 1, 2 and 3 located in the Mobile Emergency Monitoring Laboratory (MEML) garage. These kits may be obtained by the designated monitoring teams from the PGandE San Luis Obispo Service Center.

3. The Emergency Radiological Advisor, or Radiological Emergency Recover Manager, or their designee shall:

   a. Notify all affected monitoring teams of the decision for personnel potertially exposed to high-level airborne contamination to use the precaution of KI.

   b. Inform each affected supervisor to be responsible for disseminating the directive and appropriate warning and ensuring that all proper preventive precautions have been observed.

   c. Advise supervisors to obtain bottle(s) of 130 mg KI tablets from the TSC, First Aid Room cabinet or Emergency Kits as appropriate and dispense one (1) tablet to each individual that has emergency team assignments and could enter a high-level airborne radioiodine environment.

      NOTE 1: Once taken and the I-131 concentration is verified or the calculated dose determined, the tablets should be administered for ten (10) days post-exposure. Dosage is one tablet, once a day. Individuals suspected of inhalation of airborne contaminants should receive thyroid counts on a regular basis throughout the KI treatment period to verify effectiveness of treatment and to estimate dose commitment.

      NOTE 2: If possible, KI should be administered approximately one to one-half hour before exposure for maximum blockage. Final uptake is halved if KI is administered within 3-4 hours after exposure. Little benefit is gained with KI administration 10-12 hours after exposure.

d. Insure that records are maintained for those people who were administered the KI tablets. Use Form No. 69-9395, Record of Potassium Iodide Distribution, or other log. Each person must initial next to his (her) name to indicate that he (she) has been warned about possible side effects.

e. Inform the Materials Department if available, or the Corporate Materials Coordinator at the General Office , that the KI tablets were used so that adequate supplies are maintained.

FIGURES

1. Thyroid Dose Due to Inhalation of I-131

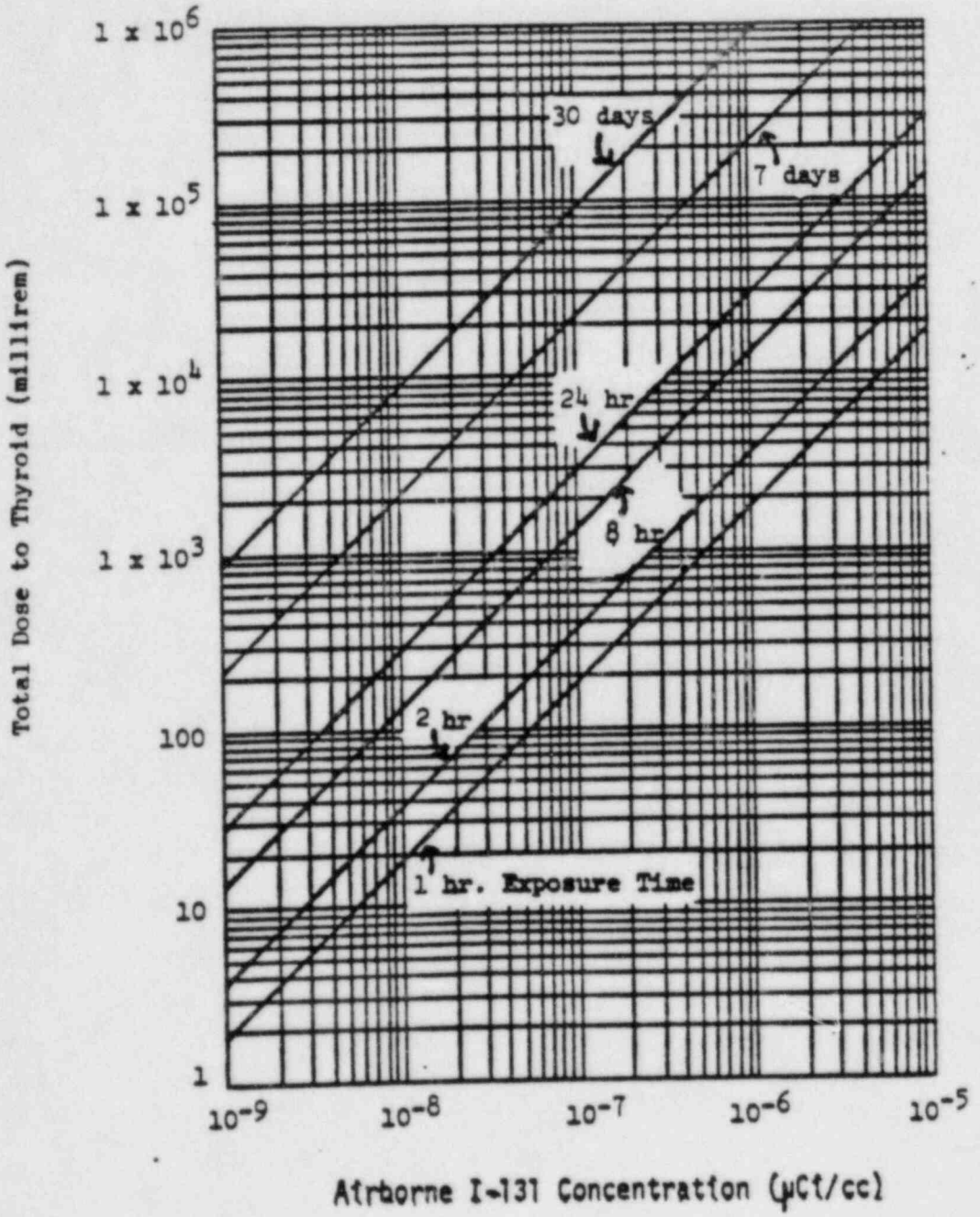
ATTACHMENTS

1. Form 69-9395 "Record of Distribution of Potassium Iodine"

2. Patient Package Insert for THYRO-BLOCK, Wallace Laboratories, Issue 10/79.

FIGURE 1

THYROID DOSE DUE TO INHALATION OF I-131



PACIFIC GAS AND ELECTRIC COMPANY
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT

RECORD OF DISTRIBUTION OF POTASSIUM IODINE

INITIALS SIGNIFY ACKNOWLEDGEMENT THAT ADMINISTRATION OF KI TO INDIVIDUALS WITH HISTORY OF SENSITIVITY TO IODINE (SHELLFISH) MAY RESULT IN AN ADVERSE PHYSICAL REACTION.

DATE	TIME*	DOSAGE	NAME	Initials	S.S. NO.	ORGANIZATION	ADDRESS

* = Time KI is taken.

PACIFIC GAS AND ELECTRIC COMPANY
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

ATTACHMENT 2

Patient Package Insert For

THYRO-BLOCK™

(POTASSIUM IODIDE)
(pronounced poe-TASS-e-um EYE-on-dyed)
(abbreviated KI)
TABLETS and SOLUTION U.S.P.

TAKE POTASSIUM IODIDE ONLY WHEN PUBLIC HEALTH OFFICIALS TELL YOU. IN A RADIATION EMERGENCY, RADIOACTIVE IODINE COULD BE RELEASED INTO THE AIR. POTASSIUM IODIDE (A FORM OF IODINE) CAN HELP PROTECT YOU.

IF YOU ARE TOLD TO TAKE THIS MEDICINE, TAKE IT ONE TIME EVERY 24 HOURS. DO NOT TAKE IT MORE OFTEN. MORE WILL NOT HELP YOU AND MAY INCREASE THE RISK OF SIDE EFFECTS. *DO NOT TAKE THIS DRUG IF YOU KNOW YOU ARE ALLERGIC TO IODIDE* (SEE SIDE EFFECTS BELOW.)

INDICATIONS

THYROID BLOCKING IN A RADIATION EMERGENCY ONLY

DIRECTIONS FOR USE

Use only as directed by State or local public health authorities in the event of a radiation emergency.

DOSE

Tablets	ADULTS AND CHILDREN 1 YEAR OF AGE OR OLDER: One (1) tablet once a day. Crush for small children. BABIES UNDER 1 YEAR OF AGE: One-half (1/2) tablet once a day. Crush first.
Solution	ADULTS AND CHILDREN 1 YEAR OF AGE OR OLDER: Add 6 drops to one-half glass of liquid and drink each day. BABIES UNDER 1 YEAR OF AGE: Add 3 drops to a small amount of liquid once a day.

For all dosage forms: Take for 10 days unless directed otherwise by State or local public health authorities.

Store at controlled room temperature between 15° and 30°C (59° to 86°F). Keep container tightly closed and protect from light. Do not use the solution if it appears brownish in the nozzle of the bottle.

WARNING

Potassium iodide should not be used by people allergic to iodide. Keep out of the reach of children. In case of overdose or allergic reaction, contact a physician or the public health authority.

DESCRIPTION

Each THYRO-BLOCK™ TABLET contains 130 mg of potassium iodide.

Each drop of THYRO-BLOCK™ SOLUTION contains 21 mg of potassium iodide.

HOW POTASSIUM IODIDE WORKS

Certain forms of iodine help your thyroid gland work right. Most people get the iodine they need from foods, like iodized salt or fish. The thyroid can "store" or hold only a certain amount of iodine.

In a radiation emergency, radioactive iodine may be released in the air. This material may be breathed or swallowed. It may enter the thyroid gland and damage it. The damage would probably not show itself for years. Children are most likely to have thyroid damage.

If you take potassium iodide, it will fill-up your thyroid gland. This reduces the chance that harmful radioactive iodine will enter the thyroid gland.

WHO SHOULD NOT TAKE POTASSIUM IODIDE

The only people who should not take potassium iodide are people who know they are allergic to iodide. You may take potassium iodide even if you are taking medicines for a thyroid problem (for example, a thyroid hormone or antithyroid drug). Pregnant and nursing women and babies and children may also take this drug.

HOW AND WHEN TO TAKE POTASSIUM IODIDE

Potassium Iodide should be taken as soon as possible after public health officials tell you. You should take one dose every 24 hours. More will not help you because the thyroid can "hold" only limited amounts of iodine. Larger doses will increase the risk of side effects. You will probably be told not to take the drug for more than 10 days.

SIDE EFFECTS

Usually, side effects of potassium iodide happen when people take higher doses for a long time. You should be careful not to take more than the recommended dose or take it for longer than you are told. Side effects are unlikely because of the low dose and the short time you will be taking the drug.

Possible side effects include skin rashes, swelling of the salivary glands, and "iodism" (metallic taste, burning mouth and throat, sore teeth and gums, symptoms of a head cold, and sometimes stomach upset and diarrhea).

A few people have an allergic reaction with more serious symptoms. These could be fever and joint pains, or swelling of parts of the face and body and at times severe shortness of breath requiring immediate medical attention.

Taking iodide may rarely cause overactivity of the thyroid gland, underactivity of the thyroid gland, or enlargement of the thyroid gland (goiter).

WHAT TO DO IF SIDE EFFECTS OCCUR

If the side effects are severe or if you have an allergic reaction, stop taking potassium iodide. Then, if possible, call a doctor or public health authority for instructions.

HOW SUPPLIED

THYRO-BLOCK™ TABLETS (Potassium Iodide, U.S.P.) bottles of 14 tablets (NDC 0037-0472-20.) Each white, round, scored tablet contains 130 mg potassium iodide.

THYRO-BLOCK™ SOLUTION (Potassium Iodide Solution, U.S.P.) 30 ml (1 fl. oz.) light-resistant, measured-drop dispensing units (NDC 0037-4287-25). Each drop contains 21 mg potassium iodide.

WALLACE LABORATORIES
Division of
CARTER-WALLACE, INC.
Cranbury, New Jersey 08512

CW—107915—10/79 Issue 10/79

DC0017 6111

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

TITLE EMERGENCY PROCEDURE
ACCESS TO AND ESTABLISHMENT OF CONTROLLED AREAS UNDER EMERGENCY CONDITIONS

NUMBER EP RB-4
REVISION 2
DATE 2/11/85
PAGE 1 OF 6

APPROVED R. C. Thornberry 4-11-85
PLANT MANAGER DATE

IMPORTANT TO SAFETY

SCOPE

This procedure provides criteria for expanding the boundaries of the Radiological Controls Area or establishing a new Controlled Area if the need arises under emergency conditions. The administrative controls which are employed to control access to areas for radiation protection purposes under emergency conditions are addressed. This procedure also describes the methods to be employed for the subsequent return of such areas to normal access and use. This procedure and changes there require PSRC approval.

GENERAL

The normal permanent Radiological Controls Area of the plant includes the containment buildings, the fuel handling buildings, the outside tankage areas containing radioactive liquids, the solid radwaste storage area, most of the auxiliary building, and the calibration facility in the Unit 2 turbine building.

Radiological monitoring during and after an unplanned release may indicate the need to establish Temporary Controls Areas. In addition, emergency conditions may necessitate the establishment of Temporary Radiation Areas, Temporary Radioactive Materials Areas, Temporary High Radiation Areas, Temporary Airborne Radioactivity Areas and Loose Contamination Areas.

PROCEDURE

1. Administrative Control

   a. Authorization

      1) All entries into a controlled area affected by the emergency shall be made under the provision of a valid SWP.

NOTE: C&RP personnel should perform the evaluation required for issuance of an SWP, however a clearance request is not required when an emergency has been declared.
If the situation requires immediate action, the SWP portion of form 69-9158 and the SWP form 69-9300 may be completed following the entry, however, the C&RP approval for entry and authorization of The Emergency Radiological Advisor (or Site Emergency Coordinator) shall be obtained verbally.

2) The Emergency Operations Advisor and the Emergency Evaluations and Recovery Coordinator will provide the Site Emergency Coordinator with an evaluation of conditions affecting access to Controlled Areas.

3) The Emergency Radiological Advisor will be notified of all requests to enter the Radiological Controls Area to insure implementation of appropriate methods to minimize personnel exposure.

4) The Chemical and Radiation Protection Coordinator located at the Access Control is responsible for implementation of appropriate radiation protection methods.

5) All entries and exits from the Radiological Controls Areas shall be recorded by the Chemical and Radiation Protection Coordinator or Operational Support Center Supervisor.

6) Information needed for a Special Work Permit (SWP) will use the forms provided in RCP G-1 "Radiation Work Permits."

b. Exposure Control

1) All entrances and exits to the Radiological Controls Areas shall be through Access Control with the following exceptions:

a) If Access Control cannot be used, new entry and egress points will be established.

b) Under emergency conditions and if approved by the Site Emergency Coordinator, the Radiological Controls Area entry point located at the east side of the Control Room may be used.

2) Individuals shall not enter any area where dose rates are unknown or beyond the range of instruments and dosimetry provided.

3) Personnel shall wear dosimeters appropriate for measurement of anticipated exposure levels. Refer to procedures RCP G-2 "Personnel External Exposure Dosimetry and Control" and EP RB-1, "Personnel Dosimetry."

4) Protective clothing and/or respirators should be used as appropriate. In all cases where airborne radioactivity is anticipated, personnel shall be fitted with full face respirators as a minimum. Refer to procedure RCP G-3, "Personnel Internal Exposure Control."

5) Stable iodine (KI) tablets should be administered where high levels of radio-iodine are suspected. Refer to EP RB-3, "Stable Iodine Thyroid Blocking."

6) Administrative methods used during normal operations to minimize personnel exposure (such as ALARA measures) should remain in force to the extent consistent with emergency recovery efforts.

7) If personnel exposures are projected to be greater than established exposure limits in RCS-1 "External Radiation Dose Control," an Emergency Exposure Permit shall be completed per EP RB-2, "Emergency Exposure Guides."

2. Criteria and method(s) used to establish expanded Radiological Controls Areas under emergency conditions.

a. Identify the radiological controls area to be expanded by radiation dose rate and/or contamination survey and/or air analysis using the criteria described in RCS 4 "Control of Access", and RCP G-5 "Control of Access for Radiation Protection Purpose."

b. Establish a new control area entry and exit point if existing entry and exit points cannot be used.

c. Remove any personal food supplies from affected area and/or prohibit their consumption. |

d. Isolate water supply to drinking fountains in effected areas, and/or otherwise prohibit consumption. |

e. Continue to monitor radiological conditions during the emergency for indication of possible change of status to posted Controlled Area boundaries.

3. Criteria for permitting return of areas to normal use.

a. Verify that the emergency has been terminated and plant conditions have been returned to a controlled status. |

b. If the drinking water supply (i.e., reservoir and surrounding watershed), could be potentially contaminated, bottled water will be supplied until analysis of the water can determine that it is safe for consumption.

c. Permanent fixtures (i.e., drinking fountains, equipment, and buildings), will have to be surveyed to identify surfaces that have to be decontaminated.

d. The need for immediate access across contaminated areas within the RCA boundary will have to be evaluated. If time does not permit initial decontamination, lay plastic sheets(s) over pathways to access points to prevent further spread of contamination.

e. Follow decontamination methods described in EP RB-6, "Area and Equipment Decontamination" or appropriate Radiation Control Standards and Procedures.

f. After decontamination work is complete verify by performing final radiation and contamination survey as per RCP G-7 "Radiation and Contamination Surveys" and G-8 "Sampling and Measurement of Airborne Radioactivity." If results are below Radiological Controls Area limits return the controlled area boundary to its original status. | | |

g. If uncontrolled area limits are exceeded, do one or more of the following:

1) Continue decontamination procedure.

2) Cover contaminated area with clean surface (i.e., plastic sheets, paper boards, etc.).

3) Fix loose contamination using strippable paint.

4) Remove contaminated material to radioactive control area.

5) If contamination is isolated, barricade off local area.

6) If none of the above prove sufficient, establish a permanent Radiological Controls Area to include the new affected area as soon as is practical under emergency recovery efforts.

STANDARDS

Radiation Control Standard 1, "External Radiation Dose Control"

Radiation Control Standard 4, "Control of Access"

Radiation Control Standard 6, "Control of Radioactive Materials"

SUPPORTING PROCEDURES

Radiation Control Procedure G-1, "Radiation Work Permits"

Radiation Control Procedure G-2, "Personnel External Exposure Dosimetry and Control"

Radiation Control Procedure G-3, "Personnel Internal Exposure Control"

Radiation Control Procedure G-5, "Control of Access for Radiation Protection Purposes"

Radiation Control Procedure G-7, "Radiation and Contamination Surveys"

Radiation Control Procedure G-8, "Sampling and Measurement of Airborne Radioactivity"

Emergency Procedure RB-1, "Personnel Dosimetry"

Emergency Procedure RB-2, "Emergency Exposure Guides"

Emergency Procedure RB-3, "Stable Iodine Thyroid Blocking"

Emergency Procedure RB-5, "Personnel Decontamination"

Emergency Procedure RB-6, "Area and Equipment Decontamination"

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY OPERATING PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM
TITLE -- INITIAL ACTIONS DURING AN EMERGENCY

NUMBER	EP RB-15:A
REVISION	3
DATE	3/26/85
PAGE	1 OF 27

APPROVED R. C. Thornberg 3/29/85
PLANT MANAGER DATE

PURPOSE

The purpose of this procedure is to define some of the actions taken when a decision is made by the Site Emergency Coordinator to obtain a post accident sample using the Post Accident Sample System (PASS).

This procedure guides, with consideration of plant emergency radiation hazards, the Sentry team to access and make operable the Sentry room. It also guides the team to withdraw from the Sentry room upon sample acquisition. This procedure and changes thereto requires PSRC approval.

DISCUSSION

This procedure ensures sample recovery with a minimum risk to personnel in a limited time frame.

The movable shield in the 85' penetration area will usually block that access route. Therefore ingress and egress may be required across the RCA boundary. Performance of this procedure may require the transfer of radioactive samples to non-RCA's. For these reasons this procedure involves exemptions from certain routine RCA access requirements. Personnel implementing this procedure should be covered by an SWP during an accident, drill, or drill-like training. Routine use of the Sentry room is covered by the C&RP routine sampling RWP.

Particularly hazardous or unexpected conditions may occur in post accident situations. Direction by appropriate supervision may augment or supercede portions of this procedure because every possibility cannot be anticipated.

PREREQUISITES AND PRECAUTIONS

1. The Site Emergency Coordinator should pre-plan post-accident sampling with the Emergency Radiological Advisor and the Site Chemical and Radiation Protection Coordinator prior to ordering a plant entry (i.e., prior to deciding to collect a post-accident sample) when unusually hazardous radiation or contamination levels are known or suspected to exist.

2. A sufficient number of properly qualified personnel to complete the task should be available prior to making the post accident sample decision. This might include:

   a. Two people on the Sentry team; one of whom is a qualified C&RP Technician and the other an Unescorted Radiation Worker.

   b. A sample transporter qualified as a C&RP Technician.

   c. A count room qualified person in the TSC lab.

3. The Work Permit will specify protective equipment. Unless conditions warrant less stringent requirements, it is suggested that full PC's, SCBA's and accident dosimetry be worn.

4. The Sentry team will make a post-accident entry to the plant only when directed by supervision and when possessing a high range portable survey meter to permit surveying into areas of unknown radiological conditions.

5. The Sentry team should be informed of plant status as it pertains to significant hazards, both radiological and non-radiological, along access routes.

6. Exposure hazards, both airborne and direct radiation, in the Sentry room should be monitored remotely for pre-entry status and locally for tracking while sampling.

   a. Use the Eberline Control Terminal(s) in either Access Control or the cold machine shop to remotely address the SPING air monitor in the Sentry room, which can be read locally.

b. Area radiation monitor RE-48, in the Sentry room, can be read in the Control Room or locally.

7. Communications are vital during a plant emergency. Entry teams must be able to communicate with the Control Room and appropriate supervision.

8. C&RP Technicians have the [redacted] required for access to areas and equipment related to this procedure and have security key cards to enter doors [redacted] If the Sentry team does not possess either of these then take the applicable master keys located in the lock box in the [redacted] The key to the 85' elev. post-accident equipment locker is number [redacted] located in the key cabinet in the [redacted]

9. The containment isolation valves FCV-696, 697, 698, 699 and 700 are controlled from the Containment Isolation Valve Panel in the Sentry Room only. These switches require a key to operate. Keys are located in the Sentry room.

10. It is important to conduct operations in an expeditious manner to provide timely vital plant status information.

11. Any information disseminated at briefing or any information recorded or Sentry Status Board may allow changes in procedure to reflect a current, transient condition of the system.

PROCEDURE

1. Access to Sentry Room Area

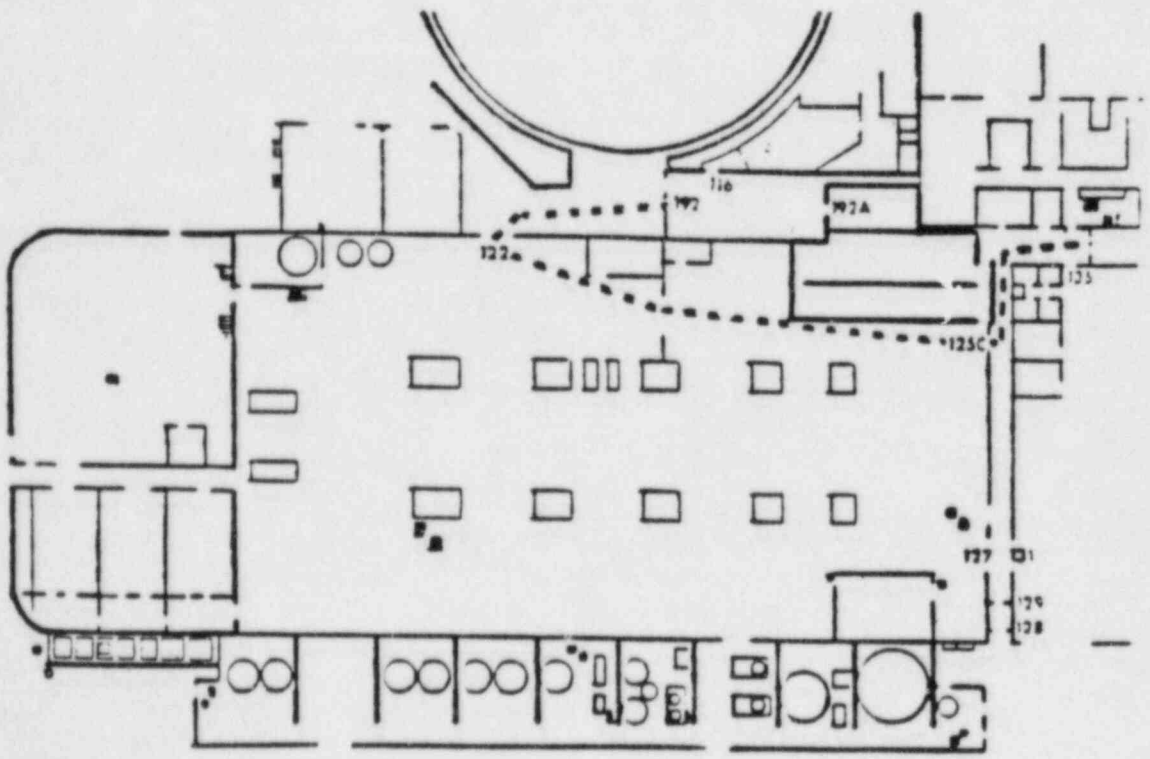
The Diablo Canyon Shielding Review indicates that the following routes might minimize exposures.

a. Via Turbine Building at 85' Elevation

1) Unit I

Starting at the Cold Machine Shop proceed into the hallway to door #125C, proceed north to door #122 and exit building. From here turn south and enter door #192 to the Motor Repair Shop.

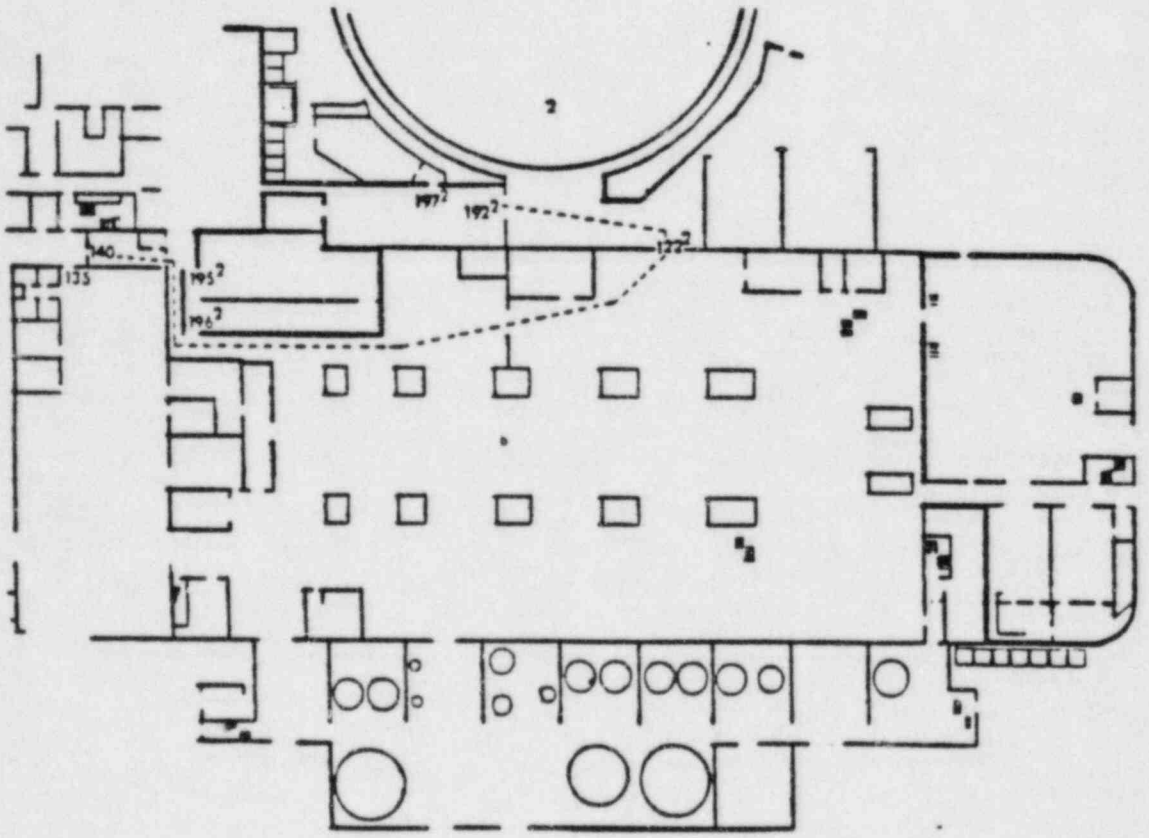
FIGURE 1a



2) Unit II

Starting at the Cold Machine Shop proceed into the hallway to door #140, proceed south to door #122 and exit building. From here turn north and enter #192 to the Motor Repair Shop.

FIGURE 1b

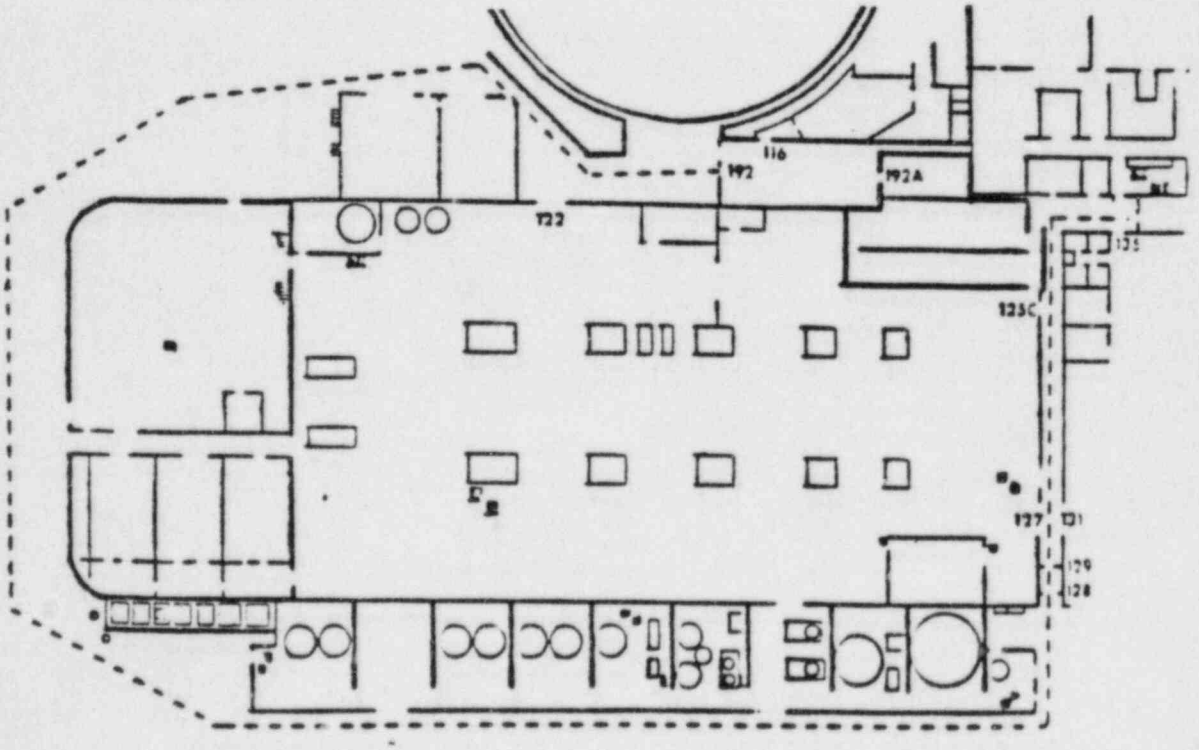


b. Around Turbine Building at 85' Elevation

1) Unit I

Starting at the Cold Machine Shop proceed west to the outside via door #129, turn right and continue north around the Unit 1 Turbine Building looping around the transformers at the north end of the plant. Continue south to door #192 between containment and the Turbine Building. Enter the Motor Repair Shop via door #192.

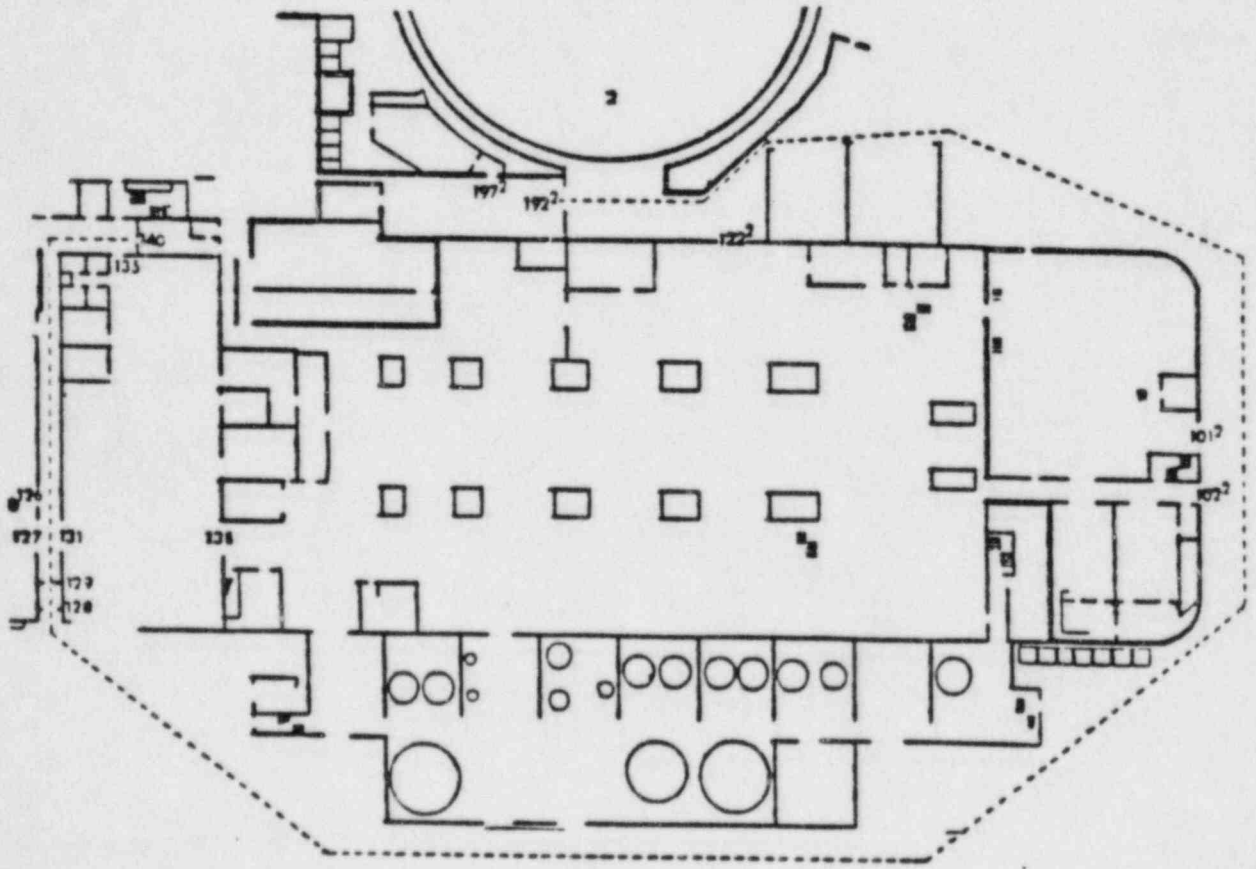
FIGURE 2a



2) Unit II

Starting at the Cold Machine Shop proceed to the outside via door #129, turn left and continue south around the Unit II Turbine Building looping around the transformers at the south end of the plant. Continue north to door #192 between containment and the Turbine Building. Enter the Motor Repair Shop via door #192.

FIGURE 2b



c. Other Access Routes

The Figure 1a or 1b pathway is preferred. However an access route other than those above may be suggested by actual post accident conditions (e.g., fire, high energy line break, etc.) The final route selected should be directed by appropriate supervisory personnel.

2. Initial Set-up of Sentry Room Equipment

a. Gas Supply Cylinders Check

The gas supply cylinders for Sentry Room equipment are located along the east wall of the Motor Repair Shop. Proceed to the gas storage rack and verify the following:

1) The cylinder valves are fully open for all three cylinders.

2) The manifold valves are fully open for all three cylinders.

3) The argon regulator shows tank pressure of approximately 1000 psig and the regulator is set to 100 psig.

NOTE: If argon tank pressure is much less than 1000 psig, then the cylinder has to be changed with the spare cylinder located at the storage rack.

4) The 2000 ppm and 10% H_2 span gas cylinders should have at least 100 psig and both regulators should be set at 10 psig.

b. Emergency Ventilation System Line-up. (Optional: If proper ventilation is lined up proceed to step 2.c., Steel Shield Door Closure.)

1) Climb the ladder to the cat walk and cross to enter the ventilation room. [redacted]

NOTE: Minimize the time that the vent room doors are open.

2) Proceed to breaker panel PPHRS, 52-12J-35 and check all breakers ON.

3) Proceed to the motor controllers for fans and heaters located to the left of the breaker panel and push the STOP and RESET pushbutton on each one.

4) EMER LEAD (IS-150) is the preferred system.

a) Open its supply and exhaust dampers and the supply and exhaust vent dampers (a total of 4 dampers) and close all other dampers.

b) Push the START pushbuttons on the motor controllers for the EMER LEAD supply fan, exhaust fan, and heater 29A, in that order.

5) EMER REDUN (IS-151) is to be used as a backup if EMER LEAL is inoperable.

a) Open its supply and exhaust dampers and the supply and exhaust vent dampers and close all other dampers.

b) Push the START pushbutton on the motor controllers for the EMER REDUN supply fan, exhaust fan and heater 29B, in that order.

6) Return to the Motor Repair Shop.

c. Steel Shield Door Closure. (Optional. If the shield door is closed proceed to step 2.d., Radiological Assessment.)

1) Proceed through door #192-A^1 south of the Unit I Motor Repair Shop, or door #192-A^2 north of the Unit II Motor Repair Shop, and visually check the shield door's winch cable. If the marked portion of the cable indicates the shield is closed return to the Motor Repair Shop and proceed with step d., Radiological Assessment below.

2) Operate the winch until the marked portion of the cable visibly indicates the shield door is closed.

3) Return to the Motor Repair Shop.

d. Radiological Assessment of Sentry Room

1) Enter the Sentry room via the RCA boundary (door #116 or #197[2] and the watertight door. [redacted]

2) Perform a general area radiation survey

a) Note high levels such as might exist at the auxiliary building end of the room due to ECCS piping.

b) Note low level areas for sample screen surveying later.

3) Note the reading of RE-48 on the Process Control Panel (PCP). Recheck it intermittently.

4) Monitor airborne radioactivity using the SPING. If airborne levels permit the respirator, if worn, may be removed at this time. It should be done anytime there is a potential for airborne contamination to be introduced into the room.

e. Proceed to the Ventilation Control Panel.

1) Check the alarms.

a) Press TEST and note the red alarm indicators flash while the audible alarm sounds.

b) Press SILENCE to stop the audible alarm.

c) Press ACK and note the flashing alarm indicators glow steadily.

d) Press RESET and note the red alarm indicators go out.

2) If the NORMAL VENT switch is on, turn it off.

3) If the EMER LEAD ventilation system is desired and is not operating depress in order the SUPPLY, EXHAUST, and HEATER pushbuttons.

4) Observe the appropriate indicating lights for proper operation of the desired ventilation line-up.

5) If necessary, return to step 2.b., Emergency Ventilation Line-up.

f. Containment Atmosphere Sample Line Heating

1) Proceed to the CCP and position the FUNCTION SELECT from OFF to SFI-3/GGD.

2) Observe the following:

a) The POWER ON indicator lights.

b) The flow monitor 20% and 100% flow lights turn on for approximately 25 seconds.

3) Press the PILOT LIGHT TEST pushbutton and note which lights are not functional.

4) Turn the HEAT TRACE POWER SWITCH to the ON position.

5) Place the temperature select switches for EHT 196 and EHT 197 to the down position marked 260°.

g. Rear Panel Access Rolling Shield Closure.

If the panel rolling shield is closed proceed to step 3., Electrical Line-up.

1) Perform this valve line-up check in the rear of the shielded panels:

CAP-V-13 CLOSED (above the G.C.) [ ]

CAP-V-31 OPEN (adjacent to the G.C.) [ ]

CAP-V-32 OPEN (adjacent to the G.C.) [ ]

CASP-V-1 OPEN (overhead on cont. atmos. supply line) [ ]

CASP-V-2 OPEN (lower part of CASP) [ ]

CASP-V-3 OPEN (mid part of CASP) [ ]

2) Get the come-a-long from the cabinet and attach one end to the pad eye on the east wall and the other to the pad eye on the door.

3) Operate the come-a-long until the rolling shield is blocking the doorway.

3. Electrical Line-up

Proceed to the breaker panel PYNM, located next to the Vent Control Panel, and check positions of breakers as follows:

BKR #1 - ON	[ ]	BKR #2 - ON	[ ]
BKR #3 - ON	[ ]	BKR #4 - ON	[ ]
BKR #5 - ON	[ ]	BKR #6 - ON	[ ]
BKR #7 - ON	[ ]	BKR #8 - ON	[ ]
BKR #9 - ON	[ ]	BKR #10 - ON	[ ]
BKR #11 - ON	[ ]	BKR #12 - ON	[ ]
		MAIN BKR - ON	[ ]

4. The Containment Atmosphere Hydrogen Analyzers

If hydrogen in containment air is to be analyzed by G.C. proceed to step 5. CMP/CAP power up.

The two redundant analyzer systems' remote panels are between the PCP and the CMP. Beneath each panel are the switches for controlling the three sample line containment isolation valves. The reagent gas tank (oxygen) is against the auxiliary building wall of the Sentry Room.

a. Initial Conditions of an Analyzer System

1) Main power switch at remote panel in STANDBY. [ ]

NOTE: If the power switch is OFF, then turn it to STANDBY and give the system six hours to warm up. If both systems have not been in STANDBY for at least six hours, or are otherwise inoperable, use the gas chromatograph, step 5, below. Record the time of switching from OFF to STANDBY _____ .

2) Solenoid operated sample line containment isolation valve switches CLOSED. (FCV-235, 236, 237, 238, 239, 240) [ ]

3) Oxygen gas tank connected and isolation valve closed. (Tank should be changed at 100 psig.) [ ]

b. H_2 Analyzer System(s) Operation.

	CEL: 82	83
1) Turn the three sample line switches to the OPEN position. Observe the position indicating lights.	[ ]	[ ]
2) Open the oxygen tank isolation valve and adjust regulator to 27 ± 2 psig.	[ ]	[ ]
3) Turn the main power switch from STANDBY to ANALYZE.	[ ]	[ ]
4) Push the REMOTE SELECTOR pushbutton to gain control at this panel and reset COMMON ALARM, if necessary.	[ ]	[ ]
5) Turn the dual range switch to the 0-10% range.	[ ]	[ ]

CEL: 82 83

6) Adjust the ZERO and SPAN potentiometers until they agree with their respective values indicated on calibration stickers located under each potentiometer. [ ] [ ]

7) Turn the function selector switch to SAMPLE. [ ] [ ]
TIME(82) _____ (83) _____

8) If both CEL 82 and 83 are to be used, repeat steps 4.b.1) to 7) for the second system while waiting for the first system to stabilize, which takes approximately 6 minutes. [ ] [ ]

9) Proceed with step 6., Initial Valve Line Up, while waiting for stabilization. When 6 minutes have elapsed since switching to SAMPLE, continue with step 10) below. [ ] [ ]

10) Record the analyzer meter reading, the time read, and the scale used. [ ] [ ]

Meter Reading (%) _____
Time _____
Scale Used _____

NOTE: If the meter reads greater than 9%, the 0-20% scale should be used.

11) Inform the Control Room of which scale and CEL is used and ask the Control Room if the analyzer(s) are to remain in ANALYZE or be returned to STANDBY. [ ] [ ]

NOTE: Advise the Control Room of the reagent gas depletion and the limited lifetime of the sample pumps, which are located in the 100' El. penetration area.

12) If directed to leave the analyzer(s) in ANALYZE proceed with step 5, CMP/CAP Power Up... [ ] [ ]

CEL: 82 83

c. Standby

1) Turn the function selector to ZERO and purge the analyzer for 6 minutes. [ ] [ ]

2) Turn the main power switch to STANDBY. [ ] [ ]

3) Close the reagent tank isolation valve. [ ] [ ]

4) Turn the three sample line isolation valve switches to the CLOSED position. [ ] [ ]

5) Push Common Alarm to Reset [ ] [ ]

5. CMP/CAP Power Up/Gas Chromatograph Startup

a. At the CAP align V-6 and V-5 to DEMIN WATER. [ ]

b. Open V-8, V-11 and V-2. [ ]

c. Check the three green root valve handles next to the CAP down in the vertical position to allow Argon and the Spar gases to the CAP. [ ]

d. Open or check open CAP-V-10 and adjust instrument air pressure to 80 ± 2 psig. [ ]

e. Open or check open CAP-V-14 and adjust argon pressure to 25 ± 1 psig. [ ]

f. At the CMP, turn the POWER switch to ON. [ ]

1) Ensure red power light is on. [ ]
2) The red colon at the G.C. display is on. [ ]
3) Full flow lights for conductivity loop and IC loop are lit. [ ]
4) Check that the TCD at the back of the panel is turned ON. [ ]

g. On the G.C. front panel

1) Select attenuation factor of 250 (25 x 10). Place all function switches in the OFF (out) position. [ ]

2) Depress MAN and CLEAR switches. [ ]

3) Enter "CO" initiating G.C. warmup.

Time on _____

6. Initial Valve Lineup

a. Unlock the cabinet door and the drawer lock bar under the counter, if locked. [ ]

1) Locate a loaded filter assembly for the containment air sample. [ ]

2) Locate wrenches, labels, and bags. [ ]

b. Valve HCV-21, which is located next to the chemical sink, should be positioned to the TO CONTAINMENT position, except during Training or Drill when it should be positioned to the POST LOCA COLL TANK position. [ ]

c. Sample cooler water valve should be turned until indicator shows OPEN [ ]

d. At the CASP [ ]

1) Install a loaded filter assembly into the containment air dilution system. [ ]

The tubing end with the blue dab of paint on it should be on the bottom. Tighten but do not damage the fittings. Retighten if leakage is noted later.

2) CASP cart/cask connection for pressure indication.

a) Engage and lock a cart/cask on its quick-disconnects. [ ]

b) OPEN the INLET and OUTLET valves and CLOSE the BYPASS valve on the engaged cart/cask. [ ]

c) Connect PI-1109 (an MBIS pressure monitor) to the engaged cart/cask. Plug it in and turn the selector switch to the proper cart/cask. Cart/Cask _____ [ ]

3) Check that PI-1116 is plugged in and turn it on. [ ]

4) Close or check closed CASP-V-17. [ ]

5) Align CASP-V-16 to the CASP-DV-1 position. [ ]

6) Align CASP-DV-1 to CASP-SF-5 position. [ ]

7) Install a new septum on CASP-SF-5. [ ]

e. At the CCP:

1) Adjust N_2 pressure regulator to 100 psig as indicated on CCP-G1. [ ]

NOTE: This pressure will drop to 80 psig when the eductor is on and Low N_2 PRESS alarm will sound.

2) All 11 of the CCP 3 position valve switches should be CLOSED:

AV-1	[ ]	SV-4.1	[ ]
SV-1.2	[ ]	SV-4.2	[ ]
SV-2.1	[ ]	SV-5	[ ]
SV-2.2	[ ]	AV-2	[ ]
SV-3.1	[ ]	SV-10	[ ]
SV-3.2	[ ]		

3) The EXERCISE STOP button should be in the IN position. Verify red light in knob is on. [ ]

4) Annunciator Test

a) Push and hold the TEST button and verify:

(1) the alarm sounds. [ ]

(2) all labeled windows flash except ISOLATE SAMPLE FLASK window which glows steady. [ ]

b) Release the TEST button and verify that the ISOLATE SAMPLE FLASK window goes off. [ ]

c) Push the ACK button and verify:

(1) the alarm is silenced. [ ]

(2) the 3 upper windows glow steady. [ ]

d) Push the RESET button and verify that all windows are off. [ ]

f. At the POST LOCA CNT ISOLATION PANEL all five key operated valve switches should be CLOSED. [ ]

g. At the CAP, valves should be positioned as follows:

CAP-V-12 (open)		[ ]
Adjust nitrogen regulator until nitrogen pressure gauge is 60 ± 2 psig.		[ ]
CAP-V-7 (REXNORD OXYGEN ANAL)		[ ]
CAP-V-8 (open)		[ ]
CAP-V-6 (DEMIN WATER)		[ ]
CAP-V-5 (CLOSED)		[ ]
CAP-V-2 (open)		[ ]
CAP-V-1 (open)		[ ]
CAP-V-29 (12 o'clock)	Top of CAL TANKS	[ ]
CAP-V-28 (12 o'clock)	Top of CAL TANKS	[ ]
CAP-V-27 (12 o'clock)	Top of CAL TANKS	[ ]
CAP-V-15 (closed)	Bottom of CAL TANKS	[ ]
CAP-V-16 (closed)	Bottom of CAL TANKS	[ ]
CAP-V-26 (closed)	Bottom of CAL TANKS	[ ]
CAP-V-30 (9 o'clock)	CAL TANK 1/2 Selector	[ ]
CAP-V-25 (closed)	Bottom of CAL TANKS	[ ]
CAP-V-20 (closed)	Bottom of CAL TANKS	[ ]
CAP-V-19 (closed)	Bottom of CAL TANKS	[ ]
CAP-V-11 (open)		[ ]
CAP-V-24 (closed)		[ ]
CAP-V-17 (closed)		[ ]
CAP-V-9 (closed)		[ ]
CAP-V-18 (closed)		[ ]

h. At the Demin Module of the LSP, valves should be positioned as follows:

DM-V-1.1	(closed)	[ ]
DM-V-1.2	(closed)	[ ]
DM-V-1.3	(closed)	[ ]
DM-V-3	(closed)	[ ]
DM-VREL-1.1	(closed)	[ ]
DM-VREL-1.2	(closed)	[ ]
DM-VREL-1.3	(closed)	[ ]

i. At the Open Grab Sample panel of the LSP, valves should be positioned as follows:

RW-V-6	(closed)	[ ]
DM-V-2.1	(closed)	[ ]
DM-V-2.2	(closed)	[ ]
DM-V-2.3	(closed)	[ ]
RC-V-17	(closed)	[ ]
RC-V-6.1	(closed)	[ ]
RC-V-6.2	(closed)	[ ]
RC-V-5.1	(closed)	[ ]
RC-V-5.2	(closed)	[ ]

j. At the RC Module of the LSP, valves should be positioned as follows:

RC-V-12	(12 o'clock)	[ ]
RC-V-15	(CLOSED)	[ ]
RC-V-14	(closed)	[ ]
RC-V-13	(9 o'clock)	[ ]
RC-V-10	(9 o'clock)	[ ]
RC-V-11	(CLOSED)	[ ]
RC-DV-2	(9 o'clock)	[ ]
RC-VREL-1	(closed)	[ ]

RC-VREL-2	(closed)	[ ]
RC-V-3	(closed)	[ ]
RC-V-7	(9 o'clock)	[ ]
RC-V-2	(closed)	[ ]
RC-V-1.1	(closed)	[ ]
RC-V-1.2	(closed)	[ ]
RC-V-1.3	(closed)	[ ]
RC-V-1.4	(closed)	[ ]
RC-V-1.5	(closed)	[ ]
RC-V-4	(closed)	[ ]
RC-V-8.1	(closed)	[ ]
RC-V-8.2	(closed)	[ ]
RC-V-16	(closed)	[ ]
RC-V-9	(CLOSED)	[ ]
RC-V-18	(6 o'clock)	[ ]
RC-V-19	(BYPASS)	[ ]
RC-V-20	(closed)	[ ]
RC-V-21	(closed)	[ ]
RC-DV-1	(BYPASS)	[ ]
RC-V-22	(TO WASTE)	[ ]

k. At the RW Module of the LSP, valves should be positioned as follows:

RW-V-9	(closed)	[ ]
RW-V-10	(closed)	[ ]
RW-DV-1	(BYPASS)	[ ]
RW-V-8	(BYPASS)	[ ]
RW-V-7	(BYPASS)	[ ]
RW-V-5	(6 o'clock)	[ ]
RW-V-4	(closed)	[ ]
RW-V-3	(closed)	[ ]

RW-V-1.1 through RW-V-1.10 (12 o'clock) [ ]

RW-V-2.1 through RW-2.10 (6 o'clock) [ ]

1. At the PROCESS CONTROL PANEL (PCP)

NOTE: Notify the Control Room when any valve alignments are changed.

1) Position or check the position of the following switches for valves:

FCV-9351A (CLOSE) [ ]

FCV-9351B (CLOSE) [ ]

FCV-9350B (CLOSE) [ ]

FCV-9350A (CLOSE) [ ]

FCV-9353A (CLOSE) [ ]

FCV-9353B (CLOSE) [ ]

During Drill or Training the above valves should be left in REMOTE.

FCV-692 (CLOSE) [ ]

FCV-693 (CLOSE) [ ]

FCV-694 (CLOSE) [ ]

FCV-1413 (CLOSE) [ ]

FCV-1416 (CLOSE) [ ]

FCV-1417 (CLOSE) [ ]

FCV-1418 (CLOSE) [ ]

FCV-1419 (CLOSE) [ ]

FCV-1412 (CLOSE) [ ]

FCV-1410 (CLOSE) [ ]

FCV-1411 (CLOSE) [ ]

FCV-1414 (CLOSE) [ ]

FCV-1415 (CLOSE) [ ]

FCV-1420 (CLOSE) [ ]

FCV-1421 (CLOSE) [ ]

FCV-1422 (CLOSE) [ ]

FCV-1423 (CLOSE) [ ]

FCV-1424 (CLOSE) [ ]

FCV-1425 (CLOSE) [ ]

FCV-624 (CLOSE) [ ]

FCV-1428 (POST LOCA SAMPLING) - During Drill or Training this valve should be left in the RE 11/12 position. [ ]

2) Position switches for POST LOCA COLLECTION TANK TRANSFER PUMPS 1 and 2 to the STOP position. [ ]

3) At the PCP

a) Push the TEST button and verify:

(1) the alarm sounds [ ]

(2) all labeled windows flash [ ]

b) Push the ACK button and verify:

(1) the alarm is silenced [ ]

(2) all labeled windows glow steady [ ]

c) Push the RESET button and verify that all windows are off. [ ]

7. Monitor Startup and O_2 Calibration Tank Recirculation (CAP)

a. Dissolved O_2 Calibration Tank Recirculation

1) If calibration has been performed within one week, proceed to step b. [ ]

2) Observe that the level in the oxygen calibration tank CAP-CAL-4 is about 1" below top of sightglass. If water must be added to the tank, check closed CAP-V-18, open CAP-V-11 and CAP-V-24 and fill the tank. Close CAP-V-24. [ ]

3) Open fully CAP-V-17. [ ]

4) Turn the O_2 CALIB. SYSTEM pump to ON position. Indicator lights for the pump should light on both the CAP and CMP. [ ]

5) Recirculate the water for at least 1 hour. [ ]

Time on _____

6) Continue to recirculate until the actual calibration is performed. [ ]

b. pH Monitor (CMP)

1) Place internal S-1 toggle switch to ON (up) position. [ ]

2) Switch S-3 to the OFF position. [ ]

3) With a small screwdriver, adjust R-3 standardize control for full downward and upward deflection and then reset to a reading of 7.0. [ ]

4) Switch S-3 to the ON position. [ ]

5) Close door. [ ]

c. Conductivity Monitor (CMP)

1) Observe that the meter reading is on zero when the selector switch is on ZERO. [ ]

2) Turn the selector switch to CHECK. The meter indicator should move to CHECK on the meter scale. [ ]

NOTE: If it does not move to CHECK, consult the Site Emergency Coordinator for directions.

3) Switch the selector switch to MEASURE. The monitor is now ready for operation. [ ]

4) Energize for 30 minutes.

Time on _____

d. YSI Dissolved Oxygen Analyzer (CMP)

If the YSI is not to be used proceed to step e., Rexnord Analyzer.

1) If calibration has been performed within one week, proceed to step e. [ ]

2) Turn POWER switch to ON. [ ]

3) Turn O_2 FILTER to OFF. [ ]

4) Turn O_2 RANGE to 0-20 ppm. [ ]

5) Turn PEN INPUT to ZERO. [ ]

6) Turn CHART SPEED to RAPID. [ ]

7) Adjust the PEN ZERO control until the pen traces a line on the 0-20 chart scale at 0. [ ]

8) Turn CHART SPEED to 10. [ ]

9) Turn PEN INPUT to $-O_2$. [ ]

10) Energize for 30 minutes.

Time on _____

e. Rexnord Analyzer

Implement this section only if Rexnord Analyzer is to be used.

1) Adjust mechanical zero with power switch to unit OFF. [ ]

2) With power switch ON, and function selector switch on ZERO, adjust ZERO ADJ. to get zero reading on the instrument. [ ]

3) Turn function selection switch to 20 mg/l. [ ]

f. Ion Chromatograph Startup

NOTE: Proceed with this section only if chloride analyses is to be done at this time.

1) Note the level of chloride calibration standard (2000 ppm B as boric acid and 1 ppm chloride) in CAL-3. _____% [ ]

2) Verify that air bubbles are not visible in the sight glass or in tygon capillary tubing. [ ]

NOTE: If air bubbles are present, check the pumps for prime and vent; venting is required when eluent containers are filled. Refer to Procedure CAP G-3.

3) Verify that the following reagents are available:

E1/E2 Eluent: 2.0 mM NaOH/2.4 mM Na_2CO_3 [ ]

1N Sulfuric Acid (H_2SO_4) [ ]

Deionized Water Rinse [ ]

4) If any of the reagents listed in step 3 is not available or has not been prepared within the last 30 days, refer to Appendix 1 for details of reagent preparation. [ ]

5) At the CMP place the POWER and AIR switches to ON position. [ ]

6) Place LOAD/INJECT switch in the LOAD position. [ ]

7) Place the E-2 switch in the UP position. [ ]

8) Place the SEPARATOR switch in the SEP-1 position. [ ]

9) Place the SUPPRESSOR switch in the SUP-1/RGN-2 position. [ ]

10) At the CAP set MODE switch to ZERO and verify needle points to 0. [ ]

NOTE: If not at ZERO, adjust to ZERO with the screw below the meter face.

11) Set MODE switch to CAL and verify needle swings full scale. [ ]

NOTE: If adjustment is necessary, adjust using the screw at the top of the circuit board (the one labeled METER).

12) Set MODE switch to zero. [ ]

13) Set the µMHO FULL SCALE switch to 30. [ ]

14) Check if eluent pump setting is 40 percent. [ ]

15) At the CMP turn the eluent pump switch to ON position. [ ]

16) Turn GAUGE switch to ON position. If reading on ELUENT PUMP DISCHARGE PRESSURE is very low, check capillary lines for air (CAP G-3). [ ]

17) Allow system to warm up and stabilize for 30 minutes.

Time on _____

8. Sampling may now commence using specific sampling procedures.

APPENDICES

1. Reagent Preparation

APPENDIX 1

REAGENT PREPARATION

NOTE: Reagents must be made using demin water with a conductance of less than 1 μmho.

1. E1/E2 Eluent - 2mM NaOH/2.4mM Na_2CO_3

   Add 0.32g NaOH and 1.00g Na_2CO_3 (anhydrous) to 4.0 liters of demineralized water, dissolve and mix.

2. 1N H_2SO_4

   Add with stirring 120 ml of concentrated sulfuric acid to 4 liters of demin water and cool. Transfer the solution of a 4 liter collapsible container, remove excess air, and label container with initials and date. Connect it to the line REGEN SYSTEM-1. Open the container valve and vent pump inlet lires.

3. Demineralized Water Rinse

   Fill a four (4) liter collapsible container with demin water. Remove excess air from the bottle and label. Connect it to the water line in the reagent storage facility. Open the container valve and vent pump inlet lines.

4. Chloride Standard

   Add 2ml of 1000ppm chloride standard and 22.9 ± 0.1g H_3BO_3 to two separate 2 liter volumetric flasks. Dilute each flask to the mark, with demin water. The cal tank holds 3.5 liters.

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

EMERGENCY PROCEDURE

TITLE SENTRY POST-ACCIDENT SAMPLING SYSTEM REACTOR COOLANT SAMPLING (STRIPPED-GAS AND DILUTED RCS)

APPROVED R. C. Thornberry 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of this procedure is to detail the steps required to sample liquid and to strip gas from the reactor coolant. This procedure will further detail the steps required to prepare a sample for H_2 analysis. This procedure requires operations at the LSP, CAP, and CMP panels. A complete flush of the modules will be done after the sample has been processed and system will be returned to initial lineup status.

PREREQUISITES

1. System was initially lined up as described in Procedure EP RB-15:A.

2. Verify that the following annunciator windows are off on the PCP:

   a. REACTOR COOLANT SAMPLE COOLING WATER LOW FLOW

   b. REACTOR COOLANT SAMPLE COOLING WATER LOW PRESS

   c. REACTOR COOLANT SAMPLE COOLING WATER HIGH TEMP

   d. REACTOR COOLANT PURGE HIGH TEMP

   e. REACTOR COOLANT SAMPLE WATER HIGH TEMP

   f. LIQUID SAMPLE PANEL HIGH PLENUM PRESS

   g. CHEM ANALYSIS PANEL HIGH PLENUM PRESS

3. The following equipment must be available and operational:

   a. Meter-long reach rod

   b. Hand operated vacuum pump

c. Gas bottle griptong

d. Sample cart/cask

e. A pre-labeled 60 ml sample bottle with a new septum and 14 cc gas sample bottle

NOTE: The labels should have the sample source, date, estimated time of the sample, and the initials of the person taking the sample. (From this point estimate 20 minutes.)

4. The gas chromatograph must be in a standby mode with a valid calibration.

Assign one LSP operator to EP RB-15:D to prepare the G.C.

PRECAUTIONS

1. See EP RB-15:A for details.

2. This sampling involves processing of water that will be highly radioactive. Precautions should be taken to prevent skin contact or ingestion.

3. Time in a radiation field should be limited to that necessary to perform the required operations. During purge and flush period, it may not be necessary to stand near the panels and consideration should be given to moving to a low dose area.

4. A dose rate instrument should be on and periodic monitoring is suggested during purge and sampling exercises.

5. The LSP operator must verify that the gas chromatograph is ready to receive a gas sample before opening valve RC-V-15. Valve RC-V-15 must be closed after filling all G.C. sample loops and prior to performing diluted gas sampling and final flushing operations.

PROCEDURE

1. Verify RC-DV-1 is turned to BYPASS. Fill reservoir RC-R-1 with demin water: [ ]

   a. Open RC-V-20 and RC-V-21. [ ]

   b. Adjust reservoir RC-R-1 until the water level in graduated cylinder RC-C-1 is over 100 mls. [ ]

   c. Close RC-V-21 and RC-V-20. [ ]

2. Verify that the following valves are closed:

   RC-V-1.1 through 1.5 [ ]
   RC-V-4 [ ]

3. Insert the needle of the hand operated vacuum pump into the septum of the prelabeled 60 ml sample bottle: [ ]

   a. Evacuate to the maximum vacuum achievable with the hand pump. The vacuum must be at least 15" of Hg. [ ]

   b. Keep the pump connected to the bottle for 3 minutes to assure that the bottle retains the vacuum. [ ]

4. Turn on the switch to light the diluted bottle fill station. [ ]

5. Remove the bottle from the vacuum pump and place bottle on the cart/cask assembly cavity piston. [ ]

   a. Turn the direction valve for the hydraulic piston to the down position and lower the bottle into the cask cavity. [ ]

   b. Close and open the cask to verify that the cover is working properly. [ ]

   c. Position the cart/cask under the diluted reactor coolant fill station needle and set the brake. [ ]

d. Turn the direction valve for the hydraulic piston to the up position and raise the bottle onto the needle. [ ]

6. At the PCP verify that the sample cooler water flow, temperature, and pressure annunciator lights are off. [ ]

7. Open the following valves:

RC-V-9 [ ]
RC-V-8.2 [ ]
RC-V-10 [ ]

8. Drying Expansion Vessel

CAUTION: Adhere to directions for clockwise and counterclockwise movement of valves.

---

a. Turn RC-V-11 clockwise to 3 o'clock position. [ ]

b. Pull open RC-VREL-2. When there is a sharp increase in pressure indicated on RC-G-3, release RC-VREL-2. [ ]

c. Adjust RC-VREL-2 until RC-G-3 indicates approximately 20 psig. Dry RC-EV-1 with argon for 1 minute. [ ]

d. Turn RC-V-11 counterclockwise to the 9 o'clock position to permit RC-EV-1 to vent, then close RC-V-9. [ ]

9. Gas Extraction and Line Evacuation

a. Install the prelabeled, diluted gas sample bottle on the front panel needle. [ ]

b. Open RC-V-13 and then open RC-V-12 and evacuate until RC-G-2.1 and RC-G-2.2 indicate a minimum of 22" of Hg. [ ]

c. Turn RC-DV-2 to the 6 o'clock position and continue the evacuation until RC-G-2.2 indicates the same reading as RC-G-2.1 or a minimum of 22" of Hg. [ ]

d. Close in order:

RC-V-13 [ ]
RC-V-10 [ ]
RC-V-12 [ ]

Wait for a minimum 2 minutes to verify vacuum is holding. [ ]

Record the vacuum on RC-G-2.1 _____" of Hg. [ ]

e. Turn RC-V-11 clockwise to the CLOSED position. [ ]

f. Turn RC-DV-2 to the 9 o'clock position. [ ]

g. Open RC-V-14 and verify the pressure on RC-G-2.2 is approximately 1 psig. [ ]

h. Close RC-VREL-2. [ ]

10. Reactor Coolant Sample Line Purge

a. Open RC-V-8.1. [ ]

b. Determine which sample source isolation valves will have to be opened from the list below:

SAMPLE SOURCE	CONTAINMENT ISOLATION VALVES
Hot Legs Loops 1 and 4	FCV-9356A and FCV-9356B
Pressurizer Steam Space	FCV-9354A and FCV-9354B
Pressurizer Liquid Space	FCV-9355A and FCV-9355B
RHR Pumps Discharge	N/A
Volume Control Tank	N/A

c. Call the Control Room and have operations block open the appropriate containment isolation valves. [ ]

d. Open the corresponding remote plant isolation valve (RPIV) and remote source isolation valve (RSIV) at the PCP (see Appendix 1 for proper valve). [ ]

e. Close the remote flush isolation valve (RFIV). [ ]

NOTE 1: The sample source valves are labeled RC-V-1.1 through RC-V-1.5. Throughout this procedure, the form RC-V-1.X will be used to indicate the source valve to be operated. The sample source used for sampling will have been given at a briefing by the Site Chem and Rad Protection Coordinator.

NOTE 2: Upon implementation of the next step, sample will be flowing into the back of the LSP. The meter-long reach rod should be used to operate valves and a dose rate survey should be done to monitor radiation levels.

f. Open the sample source valve RC-V-1.X (see Appendix 1 for proper valve). [ ]

g. Open RC-V-3. [ ]

h. Slowly open RC-VREL-1 until RC-FI-1 indicates 100% flow or 1900 cc/min. Purge for 9 minutes. [ ]

i. Slowly close RC-VREL-1 until RC-FI-1 indicates 36% or 700 cc/min. Continue the purge for 1 minute. [ ]

j. Close RC-V-3. [ ]

11. Reactor Coolant Sampling

a. Align RC-V-22 to CHEM PANEL. [ ]

b. At CAP align V-6 and V-5 to LIQUID SAMPLE. [ ]

c. Open RC-V-2. [ ]

d. Adjust RC-VREL-2 until RC-FI-2 indicates 100% flow or 200 cc/min. Purge for 3 minutes. [ ]

e. Close RC-V-8.2 and record time _____. [ ]

f. Close RC-V-8.1 [ ]

g. Open RC-V-7 and continue purge to CAP. [ ]

h. Turn RC-DV-1 to SAMPLE. [ ]

12. CAP Analyses

    a. One operator can now analyze pH/Conductivity/DO according to EP RB-15:H Step 3. Sample Analyses. Subsequently chloride can be determined according to EP RB-15:G.

    b. One operator can continue with the liquid sampling procedure.

13. Liquid Sample Dilution

    a. Read initial ml on buret _____. [ ]

    b. Crack open RC-V-21, and add 23 mls of water from the graduated cylinder RC-C-1 to the sample bottle, then close RC-V-21. [ ]

       Read final ml _____.

       Determine total ml added _____.

    c. Turn the RC-DV-1 to BYPASS. [ ]

    d. Place the direction valve for the hydraulic piston in the down position and lower the sample into the cask. [ ]

    e. Close the cask. [ ]

14. Sample Cask/Cart Removal

    a. Release brake and remove the cart/cask from the sample station and place in temporary hold area. [ ]

    b. Perform a radiation and contamination survey on the cart/cask assembly. [ ]

    c. Turn off the diluted fill station light. [ ]

15. Gas Stripping Operation

a. Open RC-V-9, wait approximately 5 seconds, and close RC-V-9. [ ]

b. Open RC-V-16. [ ]

c. Snap open RC-V-9 and wait for 1 minute. [ ]

d. Close RC-V-16 and then close RC-V-9. [ ]

e. Turn RC-V-11 counterclockwise to the 9 o'clock position. The pressure reading is normally between 5 and 10 psig. Record the reading on RC-G-2.1. [ ]

RC-G-2.1 _____ psig

16. Diluted Gas Sampling

a. Turn RC-DV-2 to the 6 o'clock position and wait until the pressure on RC-G-2.2 returns to 1 psig. [ ]

b. Turn RC-DV-2 to the 9 o'clock position. [ ]

c. Close RC-V-14. [ ]

d. Remove the griptong containing the diluted gas sample and store. Inform PASS Supervisor that the diluted offgas sample is available for transfer. [ ]

NOTE 1: The sample is now ready for analysis in the Gas Chromatograph.

NOTE 2: The G.C. operator should be at Step 4.f. of EP RB-15:D.

17. Stop here and analyze the sample according to EP RB-15:D. Direct the G.C. operator to align RC-V-15 to "LSP to GAS CHROMAT". [ ]

18. Do not proceed to the next step until the offgas sample is complete.

19. Call the control room and have operations close the containment isolation valves opened earlier if needed. [ ]

20. Final Flushing

    a. Verify RC-V-15 is in the CLOSED position. [ ]

    b. Turn RC-V-11 counterclockwise to the 6 o'clock position. [ ]

    c. Open the following valves:

    RC-V-9 [ ]
    RC-V-7 [ ]
    RC-V-8.1 [ ]

    d. Adjust RC-VREL-2 until RC-FI-2 indicates 100% flow or 200 cc/min. Flush with demin water for 1 minute. [ ]

    e. Open RC-V-8.2. [ ]

    f. Close RC-V-9 and RC-V-7. [ ]

    g. Adjust RC-VREL-2 until RC-FI-2 indicates 100% flow or 200 cc/min. Flush with demin water for 3 minutes. [ ]

    h. Close RC-V-8.1. [ ]

i. Turn RC-V-11 counterclockwise to the 3 o'clock position. [ ]

j. Open RC-V-9. [ ]

k. Pull open RC-VREL-2. [ ]

1) When there is a sharp increase in pressure indicated on RC-G-3, release RC-VREL-2. [ ]

2) Adjust RC-VREL-2 until RC-G-3 indicates 20 psig. [ ]

3) Flush with argon for 3 minutes. [ ]

l. Close RC-V-9. [ ]

m. Open RC-V-10. [ ]

n. Turn RC-V-11 counterclockwise to the 9 o'clock position and allow RC-EV-1 to vent. [ ]

o. Close RC-V-10. [ ]

p. Turn RC-V-11 clockwise to CLOSED. [ ]

q. Open RC-V-8.1. [ ]

r. Adjust RC-VREL-2 until RC-FI-2 indicates 100% flow or 200 cc/min. [ ]

Flush with demin water for 1 minute. [ ]

s. Close RC-V-2. [ ]

t. Open RC-V-1.X and flush with demin water for 5 minutes. [ ]

u. Close RC-V-1.X. [ ]

v. Terminate flushing by closing the following valves. [ ]

RC-V-8.1 [ ]
RC-V-8.2 [ ]
RC-VREL-1 [ ]
RC-VREL-2 [ ]
RC-V-4 [ ]

21. At the PCP, close the remote flush isolation valve. [ ]

22. Close sample cooler water. [ ]

23. Turn off any fill station lights. [ ]

24. Turn off emergency ventilation. [ ]

25. Sample transfer. [ ]

a. Transfer the diluted off-gas sample to the TSC. [ ]

b. Using Procedure EP RB-15:E, aliquot and analyze the diluted liquid sample for boron. [ ]

26. Process the data according to Procedure EP RB-15:F. [ ]

27. Check with OSC for any changes in conditions then exit Post Loca Room with the same precautions as access. [ ]

28. When exiting through Motor Repair Shop close the bottle Isolation Valves for the Sentry gas supplies. [ ]

29. If this procedure has been used for a drill or training the following steps should also be included:

a. Reopen LSP shield door by attaching come-a-long and strap to other end and open. [ ]

b. Release brake on wench next to motor repair shop. [ ]

c. Take come-a-long and strap to penetration shield door, attach to door and eye ball in floor and open door. Return come-a-long to Sentry Room. [ ]

d. Restock Emergency Locker on 85' Elevation with any clothing, dosimetry or respirator/facemasks used during the drill. [ ]

e. Return keys to Rad Foreman's office. [ ]

REFERENCES

1. Sentry Equipment Corp. High Radiation Sampling System Operating and Maintenance Manual.

APPENDICES

1. Valves for Obtaining Samples from Reactor Coolant.

APPENDIX 1

VALVES FOR OBTAINING SAMPLES FROM REACTOR COOLANT

SAMPLE SOURCE	REMOTE PLANT ISOLATION VALVE (RPIV)	REMOTE SOURCE ISOLATION VALVE (RSIV)	REMOVE FLUSH ISOLATION VALVE (RFIV)	LSP SAMPLE SOURCE VALVE (SSV)
RC Hot Leg 1	FCV-9351 A	FCV-692	FCV-1416	RC-V-1.1
RC Hot Leg 4	FCV-9351 B	FCV-692	FCV-1416	RC-V-1.1
PZR Liquid	FCV-9350 B	FCV-693	FCV-1417	RC-V-1.2
PZR Steam	FCV-9350 A	FCV-694	FCV-1418	RC-V-1.3
RHR Pump 1-1 Discharge	FCV-9353 A	FCV-1413	FCV-1419	RC-V-1.4
RHR Pump 1-2 Discharge	FCV-9353 B	FCV-1413	FCV-1419	RC-V-1.4
VCT Liquid	N/A	FCV-1412	FCV-1420	RC-V-1.5

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM

TITLE CONTAINMENT AIR SAMPLING

APPROVED R. C. Thornberry 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of this procedure is to detail the steps required to make containment air available for gas chromatography and to dilute a containment air sample for isotopic analysis of noble gases, particulates, and radionuclides. This procedure will also detail the steps for a complete system flush and return to the initial valve line up.

After purging containment air through the G.C. and loading the diluter valve, this procedure will direct sampling personnel to EP RB-15:D, for gas analysis and to procedure EP RB-15:E, for preparation of the diluted containment air sample for isotopic analysis.

The containment isolation valves FCV-698, FCV-699 and FCV-700 are controlled from the Containment Isolation Valve Panel in the Sentry Room only. These switches require redundant keys to operate. Copies of the keys are located in the Control Room and in the Sentry Room.

PREREQUISITES

1. System was initially lined up as described in procedure EP RB-15:A.

2. Verify that the following annunciator windows are off on the PCP:

   a. LIQUID SAMPLE PANEL HIGH PLENUM PRESS

   b. CHEMICAL ANALYSIS PANEL HIGH PLENUM PRESS

   c. CONTAINMENT AIR SAMPLE PANEL HIGH PLENUM PRESS

3. The following equipment must be available and operational:

   a. Meter-long reach rod

   b. A gas tight 5cc locking syringe

   c. A 14cc gas vial with a new septum installed

   d. Bags, tape, and labels

   e. Four channel MBIS Pressure Monitor (CASP-PI-1109)

   f. Two crescent wrenches

   g. Spare filter assemblies

4. Prior to initiating this analyses procedure the G.C. must be prepared according to EP RB-15:D, and needed Calibration Verifications must be completed.

PRECAUTIONS

1. This sampling involves processing of containment air that may be highly radioactive. Precautions should be taken to prevent releases to the sampling environment.

2. Time in a radiation field should be limited to that necessary to perform the required operations. During purge and flush periods, it may not be necessary to stand near the panels and consideration should be given to moving to a low dose rate area.

3. A dose rate instrument should be on and periodic monitoring is suggested during purge and sampling exercises.

PROCEDURE

1. Sample Flask Evacuation

   NOTE: Ensure that a loaded filter assembly is installed.

   a. Close outlet valve of the engaged cart/cask. [ ]

   b. Verify that any unused CASP ports located at the base of the CASP have been capped. [ ]

c. At the CCP, place the switch for CCP-AV-1 to OPEN. [ ]

NOTE: This allows containment pressure to be monitored on CASP-PI-1109.

d. Change the positions of the following valves:

CASP-DV-1 to Containment Supply [ ]

CASP-V-16 to CASP-SF-5 [ ]

e. Contact the Control Room and request permission to open FCV-700, the sample return containment isolation valve. In succeeding steps FCV-698 and 699 and will be operated also. Inquire whether the Control Room wants to be notified every time each valve is operated or only when sampling is completed and containment isolation valves are closed. Also obtain and record containment temperature and pressure from the Control Room.

_____ °F

_____ psig

f. Evacuate CASP-SF-5 by opening the following valves:

FCV-700 (key operated - keys located in top drawer by sink) [ ]

CASP-V-17 [ ]

CCP-AV-2 [ ]

CCP-SV-10 [ ]

g. When CASP-SF-5 pressure is as low as apparently achievable as indicated on CASP-PI-1116, align CASP-V-16 to CASP-DV-1. If vacuum is not held, replace the filter assembly or septum and repeat Steps c. through f. [ ]

2. Sample Purge

a. Open containment isolation valves FCV-699 and FCV-698 at the Containment Isolation Valve Panel and notify the Control Room, if requested. [ ]

b. Containment air is now being purged through the sample panel back to containment. Purge for 5 minutes. [ ]

c. At the CCP, close CCP-SV-10 and record containment air pressure as indicated on CASP-PI-1109 and sample time.

CASP-PI-1109 _____ psig

Sample Time _____

d. Record the temperature indicated on THT 196.

_____ °C

e. The G.C. should be ready to accept a sample at point EP RB-15:D Section 4.F.

f. Continue with Sample Analyses using EP RB-15:D.

3. Sample Dilution

a. Align CASP-DV-1 to CASP-SF-5. N_2 will flush the sample aliquot into CASP-SF-5 through the removable filter assembly. [ ]

b. When the pressure in CASP-SF-5 as indicated on CASP-PI-1116 is 14.70 psia, or as high as achievable, whichever is first, close CASP-V-17. [ ]

4. Initial Flushing

a. If the G.C. was used for containment H_2 analysis then perform the following steps, otherwise skip to Step b.

1) At the LSP, align RC-V-15 to CASP TO GAS CHROMAT position. [ ]

2) At the G.C. control panel, enter "13" to start argon flush of sample line back to CASP. Flush for 2 minutes. [ ]

3) Terminate argon flush by entering "14" at the G.C. control panel. [ ]

4) At the LSP, align RC-V-15 to CLOSED position. [ ]

b. Align CASP-V-16 to CASP-SF-5. [ ]

c. Open CCP-SV-10 and flush removable filter assembly for 1 minute. [ ]

d. Close containment isolation valve FCV-699. [ ]

e. Open CCP SV-5. [ ]

f. Change the positions of the following valves:

Align CASP-DV-1 to Containment Supply [ ]

Align CASP-V-16 to CASP-DV-1 [ ]

g. At the CCP, close CCP-AV-2 and CCP-SV-5.

h. Open containment isolation valve FCV-699 and flush line with nitrogen for 2 minutes. Notify the Control Room that this valve was opened, if requested to earlier. [ ]

i. Close CCP-SV-10 and CCP-AV-1. [ ]

5. Sample Handling

a. Survey the removable filter assembly and CASP-SF-5 to determine contact dose rates. [ ]

NOTE: Under worst case conditions, the contact dose rate of the filter, using a teletector, will be about 165 mR/hr. The contact dose rate at centerline of CASP-SF-5 will be about 44 mR/hr.

b. Position the exhaust duct as close as possible to the removable filter assembly. [ ]

c. Using the crescent wrenches, disconnect the filter assembly from the system, then separate the assembly into two halves and place the two halves in a bag, seal, and survey. [ ]

1) Place a prewritten label on the bag. The label should have the name of the sample, dose rate, time, containment air pressure, and the initials of the sampler. [ ]

2) Store the sample to minimize exposure from it. [ ]

3) Inform PASS Supervisor that CA sample is ready for transport. [ ]

d. Install a new filter assembly into the system making sure the connections are tight. [ ]

e. Partially evacuate a septum sealed 14cc gas vial by withdrawing 2cc from it using a syringe. [ ]

f. Flush a 5 ml gas tight syringe by inserting its needle into the septum of CASP-SF-5, withdrawing 1cc and injecting it again. [ ]

g. Using the flushed syringe withdraw a 2cc sample aliquot from CASP-SF-5. [ ]

h. Inject the syringe contents into the evacuated 14cc gas vial. [ ]

i. Place the gas vial into a bag, seal and survey it. [ ]

j. Place a prewritten label on the bag. The label shall have the name of the sample, dose rate, time, cont. air pressure, volume of 1 ml and the initials of the sampler. [ ]

k. Store the sample to minimize exposure from it. [ ]

6. Final Flushing

a. Align CASP-V-16 to CASP-SF-5. [ ]

b. Open the following valves:

CCP-AV-2 [ ]

CCP-SV-10 [ ]

CASP-V-17 [ ]

c. Evacuate CASP-SF-5 until vacuum is as low as achievable as indicated on CASP-PI-1116 [ ]

d. Close CCP-AV-2 and allow N_2 to fill CASP-SF-5. [ ]

e. Repeat Steps 6.b. through d. above once more. [ ]

f. Close CCP-SV-10. [ ]

g. Open the OUTLET valve on the engaged cart/cask. [ ]

h. Open CCP-SV-10. [ ]

i. Open CCP-SV-1.2 and allow N_2 to flush the line for 2 minutes. [ ]

7. Terminate flushing by closing the following valves:

CCP-SV-10 [ ]

CCP-SV-1.2 [ ]

8. Change the positions of the following valves:

CASP-V-16 to CASP-DV-1 [ ]

CASP-DV-1 to CASP-SF-5 [ ]

9. Turn OFF and disconnect the CASP-PI-1109, MBIS Pressure Monitor connected to the cart/cask. [ ]

10. At the Containment Isolation Valve Panel CLOSE the following valves and notify the Control Room that they are closed:

FCV-698 [ ]

FCV-699 [ ]

FCV-700 [ ]

11. At the CCP turn the FUNCTION SELECT switch to OFF and deenergize the heat tracing. [ ]

12. If all CAP analyses are finished: at the CMP turn the power switch to OFF. [ ]

13. Process the data according to procedure EP RB-15:F. [ ]

REFERENCES

1. NUREG 0737

2. Diablo Canyon Shielding Review.

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY OPERATING PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM
TITLE -- GAS CHROMATOGRAPHIC ANALYSIS

NUMBER	EP RB-15:D
REVISION	2
DATE	2/25/85
PAGE	1 OF 10

APPROVED R. C. Thornberry 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of this procedure is to detail the steps required to determine the dissolved hydrogen concentration in reactor coolant, the percent hydrogen concentration and oxygen concentration in containment air by gas chromatography. This procedure will detail gas analysis from RC-V-15 on the LSP to the Gas Chromatograph. The sample gas for analysis should be prepared according to any of the following procedures:

EP RB-15:B
EP RB-15:C

PREREQUISITES

1. The Gas Chromatograph (G.C.) should be in the ON or STANDBY condition for a minimum of 30 minutes before sample analysis.

2. Carrier gas (Ar) should be available with cylinder outlet pressure 1000 psig.

PRECAUTIONS

1. Monitoring with a dose rate instrument should be done during the transfer of sample to the G.C.

   If the carrier gas cylinder empties while the G.C. is in use, the thermal conductivity detector (TCD) protection device will turn off the current to the TCD.

PROCEDURE

1. Analysis Program

   a. Release all pushbuttons and depress the CLEAR button. [ ]

   b. Check that the following program is in memory by entering the two digit STEP number and verify that the TIME and CODE numbers are as shown below. Do this for each STEP. If the memory is correct, proceed to Step 2, Platen Stabilization. [ ]

STEP	TIME	CODE
01	00:01	03
02	00:02	25
03	00:10	01
04	03:00	00

   c. If the program is not correct, enter the program as follows:

      1) Depress ENTER and CLEAR [ ]

      2) Enter the above program into memory, by entering the two digit pairs in the sequence shown above, for one line. [ ]

         NOTE: If an entry error is made, depress CLEAR to blank display and re-enter the entire line.

      3) Release ENTER, depress CLEAR and repeat Step 1.b. [ ]

      4) Repeat Steps 1) through 3) for remainder of lines as necessary. [ ]

   d. If technician deems it necessary to change programming times to accommodate peaks, they may be varied with identification on trace as to actual program used.

2. Platen Stabilization

   a. Depress MAN and CLEAR [ ]

b. Check to see if the G.C. has stabilized by doing the following:

1) Select attenuation factor of 250 (25 x 10) [ ]

2) Enter "01" and then "35" to display set point of platen temp and record for a minimum of 30 seconds. [ ]

3) Enter "45" to display actual platen temperature and record for a minimum of 30 seconds. [ ]

NOTE: Stabilization is complete when platen set-point and actual temperature are within 1/2 grid marking of each other as indicated on the G.C. chart recorder only.

4) Enter "00" and mark chart recorder on the G.C. with date. time, and initials. [ ]

3. Calibration Verification

If G.C. Calibration Verifications have been done within the last 7 days, proceed to Step 4. Sample Analyses.

a. Hydrogen Verification - only verification needed when analyzing offgas

1) Select loop No. 1. [ ]

2) Enter "23" to evacuate the G.C. until the red HI VACUUM light is on. [ ]

a) Cycle loop selector through loops 2, 3, and 4, pausing at each loop and evacuating until the HI VACUUM light is on. [ ]

b) Cycle a minimum of 3 times through loops 1, 2, 3, and 4, pausing at each loop. [ ]

c) Select loop No. 1. [ ]

3) Enter "24" to terminate evacuation of the G.C. [ ]

4) Select attenuation factor of 500 (5 x 100) for the 10% H_2 source or 5 (5 x 10) for the 2000 ppm H_2 source. [ ]

5) Depress CAL-1 switch for 10% H_2 source, or CAL-2 switch for 2000 ppm H_2 source, and wait 10 seconds after amber LOW VACUUM light is on. Cycle through loops three times. [ ]

6) Release CAL-1 or CAL-2 switch and wait 10 seconds. [ ]

7) Start the L&N recorder. [ ]

8) Depress AUTO switch to on (in) and press CLEAR. Wait until the G.C. display clock has timed to a minimum of 3 minutes. During this time interval, identify the L&N recorder trace with the date/time, gas used, loop number, attenuation factor and operator initials. [ ]

9) Release AUTO switch to off (out) position. Press CLEAR and enter "00". [ ]

10) Repeat Steps 8) and 9) for subsequent loops. [ ]

11) Stop the L&N recorder. [ ]

12) Calculate the hydrogen peak height as follows:

$$\text{peak height} = \frac{(\text{Trace peak height} - \text{baseline}) \times \text{attenuation}}{100}$$

peak height = ____

13) Compare the peak height calculated against the value shown on the concentration versus peak height curve for the same attenuation factor and calibration gas. The values should be within ± 10 percent of each other. [ ]

b. Oxygen Verification

1) Ensure that a loaded filter assembly is installed. [ ]

2) Change the positions of the following valves:

CASP-DV-1 to Containment Supply [ ]

CASP-V-16 to CASP-SF-5 [ ]

3) Contact the Control Room and request permission to open FCV-700, the sample return containment isolation valve. [ ]

4) Evacuate CASP-SF-5 by opening the following valves:

FCV-700 (key operated) [ ]

CASP-V-17 [ ]

CCP-AV-2 [ ]

CCP-SV-10 [ ]

5) Evacuate CASP-SF-5 until pressure is as low as apparently achievable as indicated on CASP-PI-1116. [ ]

6) Remove fitting and septum from the end of SF-5 to allow ambient air to purge through sample panel and into containment. Purge for 2 minutes. [ ]

7) Close CCP-SV-10 and FCV-700 and replace septum and fitting on SF-5. [ ]

8) Depress SAMP switch and verify red sample light is on. [ ]

9) Select loop No. 1. [ ]

10) Enter "23" to evacuate the G.C. until the read HI VACUUM light is on. [ ]

a) Cycle loop selector through loops 2, 3, and 4, pausing at each loop and evacuating until the HI VACUUM light is on. [ ]

b) Cycle a minimum of 3 times through loops 1, 2, 3, and 4, pausing at each loop. [ ]

c) Select loop No. 1. [ ]

11) Enter "24" to terminate evacuation. [ ]

12) Select attenuation factor of 100 (1 x 100). [ ]

13) Align RC-V-15 to CASP to GAS CHROMAT.

14) Cycle loop selector through loops 1, 2, 3, and 4, pausing at each loop. Cycle 3 times. [ ]

a) Select loop No. 1. [ ]

15) Align RC-V-15 to the CLOSED position and release SAMP switch. [ ]

16) Start the L&N recorder, wait 5 seconds. [ ]

17) Depress AUTO to on (in) position and press CLEAR. [ ]

a) Wait until the G.C. display clock has timed to a minimum of 3 minutes. During this time interval identify the recorder trace with sample name, date/time, loop number, attenuation factor and operator initials. [ ]

18) Release AUTO switch to off (out) position. Press CLEAR and enter "00". [ ]

19) Stop the L&N recorder. [ ]

20) Calculate the net peak height and determine the oxygen concentration from the appropriate calibration curve. [ ]

peak height = _____ mm

21) Record the net peak height on the recorder trace. Repeat the analysis and select the next loop and appropriate attenuation factor (5 x 1, 25 x 1, 1 x 100, or 5 x 100). Repeat Steps 16 through 21 for loop 2, 3 and 4. [ ]

c. Null Verification

1) Depress SAMP switch and enter "23" to evacuate the G.C. until the red HI VACUUM light is on. [ ]

2) Cycle through each loop and evacuate until the red HI VACUUM light is on. [ ]

3) Enter "13" to initiate argon purge. [ ]

4) Cycle loop selector through loops 1, 2, 3, and 4, pausing at each loop. Cycle 3 times. Select loop No. 1. [ ]

5) Enter "14" to terminate the purge. [ ]

6) Enter "24" to terminate the evacuation. [ ]

7) Enter "00". [ ]

8) Depress AUTO to on (in) position and press CLEAR. [ ]

a) Wait until the G.C. display clock has timed to a minimum of 3 minutes. During this time interval identify the recorder trace with sample time name, date/time, loop number, attenuation factor and operator initials. [ ]

9) Release AUTO switch to off (out) position. Press CLEAR and enter "00". [ ]

10) Repeat the analysis and select the next loop and appropriate attenuation factor (5 x 1, 1 x 100, or 5 x 100). Repeat Steps 8) through 10) for loop No. 2. [ ]

11) If greater than 10% of sampled air oxygen concentration is recorded on trace, the system is not thoroughly purged. Repeat Steps 1) through 10) one time. [ ]

12) If greater than 10% of sampled air oxygen is still present contact C&RP supervision while continuing with analyses. [ ]

13) Release SAMP switch to off position. [ ]

14) Stop the L&N recorder. [ ]

4. Sample Analysis

a. Depress SAMP switch and verify red sample light is on. [ ]

b. Select loop No. 1. [ ]

c. Enter "23" to evacuate the G.C. until the red HI VACUUM light is on. [ ]

1) Cycle loop selector through loops 2, 3, and 4, pausing at each loop and evacuating until the HI VACUUM light is on. [ ]

2) Cycle a minimum of 3 times through loops 1, 2, 3, and 4, pausing at each loop. [ ]

3) Select loop No. 1. [ ]

d. Enter "24" to terminate evacuation. [ ]

e. Select attenuation factor of 500 (5 x 100). [ ]

NOTE: Before proceeding consult with the LSP operator to assure that a gas sample is available at RC-V-15.

f. When the appropriate gas sample is available at RC-V-15 align RC-V-15 to one of the following positions:

1) LSP TO GAS CHROMAT. for reactor coolant off-gas sample. [ ]

2) CASP TO GAS CHROMAT. for containment air sample. [ ]

g. Cycle loop selector through loops 1, 2, 3, and 4, pausing at each loop. Cycle 3 times. [ ]

1) Select loop No. 1. [ ]

h. Release SAMP switch and align RC-V-15 to the CLOSED position. [ ]

NOTE: If the analysis applies to containment air, proceed to Step "j".

i. Record the pressure on RC-G-2.1 on the data sheet, EP R5-15:F.
Reading: _____psig

NOTE 1: The pressure is normally between 5 and 10 psig.

NOTE 2: Notify the main LSP operator when RC-V-15 is closed.

j. Start the L&N recorder, wait 5 seconds. [ ]

k. Depress AUTO to on (in) position and press CLEAR. [ ]

1) Wait until the G.C. display clock has timed to a minimum of 3 minutes. During this time interval identify the recorder trace with sample name, date/time, loop number, attenuation factor and operator initials. [ ]

l. Release AUTO switch to off (out) position. Press CLEAR and enter "00". [ ]

m. Stop the L&N recorder. [ ]

n. Calculate the net peak height and determine the hydrogen concentration from the appropriate calibration curve. [ ]

peak height = _____mm

o. Record the net peak height on the recorder trace. Repeat the analysis and select the next loop and appropriate attenuation factor (5 x 1, 25 x 1, 1 x 100, or 5 x 100). Repeat Steps j. through o. for loop No. 2 and any subsequent loops as needed. Run one loop on same attenuation as oxygen calibration. [ ]

p. Purge the G.C. residual gas as follows:

1) Depress SAMP and enter "23" and evacuate the G.C. until the red HI VACUUM light is on. [ ]

2) Cycle through each loop and evacuate until the red HI VACUUM light is on. [ ]

3) Enter "13" to initiate argon purge. [ ]

4) Cycle loop selector through loops 1, 2, 3, and 4, pausing at each loop. Cycle 3 times. [ ]

5) Enter "14" to terminate the purge. [ ]

6) Enter "24" to terminate the evacuation. [ ]

7) Enter "00". [ ]

8) Release SAMP switch to off position. [ ]

q. After final use of G.C.

1) Shutdown the instrument by turning off the power to the TCD. [ ]

2) Secure the gas supplies for the G.C.

a) CLOSE the 3 root valves next to the CAP. [ ]

b) CLOSE CAP-V-10. [ ]

c) CLOSE CAP-V-14. [ ]

r. Return to the referencing procedure.

NOTE: For stripped-gas, this is EP RB-15:B, Step 15.f.
For Containment Air, this is EP RB-15:C, Step 3.

s. Record the net peak height from Step n. on the appropriate data sheet and attach traces used.

REFERENCES

1. Sentry Equipment Corp. High Radiation Sampling System Operating and Maintenance Manual.

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

EMERGENCY PROCEDURE

SENTRY POST-ACCIDENT SAMPLING SYSTEM

TITLE RCS LIQUID AND GAS SAMPLE HANDLING

NUMBER	EP RB-15:E
REVISION	2
DATE	3/21/85
PAGE	1 OF 12

APPROVED R. C. Thomas 3/29/85
PLANT MANAGER DATE

SCOPE

This procedure provides guidance for safely handling post accident liquid samples obtained from the Reactor Coolant System (RCS) using the SENTRY PASS. The diluted liquid sample from the RCS is aliquotted. The aliquot may be used for boron or for γ-assay. Further dilutions for γ-assay are done in the hot cell. Likewise, steps for preparation of diluted containment air samples for counting are also detailed. This procedure and changes thereto require PSRC review.

DISCUSSION

Based on worst-case post accident assumptions regarding sample radioactivity content, special precautions may be required for handling RCS and containment air sample acquired using the Sentry PASS. Sample aliquots are transferred by precision pipets to a dilution vial for radiological counting or an appropriate reaction flask for chemical analysis. These flasks may be kept inside the hot cell throughout the procedure to minimize personnel exposures and also to contain the airborne radioactivity generated within the hot cell area. Control of airborne activity is accomplished by use of an overhead ventilation duct which creates a slightly negative pressure inside the enclosure. After all sample manipulations are completed, the radioactive waste solutions may be flushed down the Sentry Room sink via the receiver funnel drain valve and, if necessary, the inside surfaces of the hot cell may be sprayed down to reduce the contamination levels within the sample handling area.

PREREQUISITES AND PRECAUTIONS

1. Personnel assigned to conduct this procedure should be familiar with the considerations of handling highly radioactive liquid and gas samples and shall be experienced with the analytical chemistry techniques employed in this procedure. Also, any individual performing this procedure should be capable of:

a. Making does rate measurements with portable survey instruments.

b. Assessing response and basic trends of continuous air monitoring equipment.

c. Taking actions based on items 1.a and 1.b.

2. Unless conditions are known to warrant less stringent precautions, complete protective clothing and accident dosimetry (including high range and extremity dosimeters) will be required. Lapel air samplers are also recommended. Full respiratory protection equipment (SCBA) may also be necessary.

3. To minimize time spent in hot sample handling, ensure availability of the required equipment for performing applicable portions of this procedure. This includes sample vessels, pipets, handling tools, reagents, etc. A comprehensive listing of these supplies is provided in a check list format in Appendix 1 to this procedure to facilitate the review.

4. When the liquid sample is handled, there is a possibility that local radiation levels and airborne radioactivity could increase. Since the sample is to be contained within the hot cell, the increases should not be too high; however, as precautionary measure, all individuals within the Sentry Room should have functioning respirators. Monitoring should be performed using survey instruments (for dose rates) and any available CAM system (for airborne) for early identification of potential problems.

5. This procedure is designed to permit all sample handling to be performed by the use of tongs or other remote handling devices. Unless the samples are surveyed and known not to present a significant source of exposure to the fingers, hands or other extremities, no sample manipulations involving direct hand contact should be attempted.

PROCEDURE

1. Preparation of Sample Enclosure and Sink Area

This section covers the preliminary steps required before performing actual liquid sample manipulations. It is important that all required handling equipment and reagents to be employed are available prior to handling the liquid sample in order to minimize time spent working around hot samples within the hot cell.

a. Initial Survey of Sample Enclosure and Sink Area

1) Perform a radiation survey of the hot cell area to verify that no highly radioactive sample material remains inside or around the enclosure from a previous use. If an indication of radioactive sample materials is found, these materials should be promptly disposed of as set forth below under "Clean-Up" in Section 6 of this procedure.

2) Visually inspect the inside of the hot cell for unwanted material and for cleanliness. If material remains, remove and store or discard it, whichever is appropriate.

b. Acquisition of Required Supplies

Assemble the necessary supplies, equipment, etc. to perform the required steps. A listing of these supplies is presented in Appendix 1 to this procedure for the following preparation and analysis categories.

1) General Equipment Requirements (Sections 1, 2, and 6)

2) Dilution of Liquid Sample for Radiological Counting (Section 3)

3) Chemical Analysis for Boron Levels (Section 4)

4) Dilution of Off-gas for Isotopic Analysis (Section 5)

5) Containment Air Fractionation Supplies

c. Preparation of Hot Cell Area for Use

1) Open the access door to the hot cell.

2) Carefully position shielded sample holder brick for use in conjunction with pipet operations.

3) If a liquid sample for radiological analysis is to be diluted pursuant to Section 3 of this procedure, install an uncapped, clean 20 cc liquid scintillation vial into its appropriate sample port within the sample holder brick. Leave the cap and sealing tape outside the hot cell for later use.

4) If a Boron analysis is to be performed (pursuant to Section 4), install two 50 ml Erlenmeyer flasks into their appropriate sample ports within the sample holder brick. Leave rubber stopper caps (one for each 50 ml flask) outside the hot cell for later use.

5) If a Boron analysis is to be performed, install two clean, uncapped, prewiped 1 cm path length photocell into the appropriate sample port within the sample holder brick. Keep the cap plugs available outside the hot cell for later use.

NOTE: Be careful not to scratch the transmission surfaces nor to depcsit extraneous material (e.g. - powder or lint) especially from gloves.

6) Check that a RO-7-BM probe, or appropriate range probe, is installed in the mount above the receiving funnel. The probe should be 5 inches above the base of the hot cell. The attached cable should run through the vent chimney and fit in the slot provided for it. Connect the cable to the RO-7 and turn the detector on.

7) Verify air flow (a piece of paper is suggested) into the elephant trunk vent shroud.

8) Connect ventilation shroud to the chimney on top of cover switch.

9) Prepare remaining equipment, materials, reagents, etc. required for the planned sample manipulations and analyses.

10) Turn on the spectrophotometer and allow it to warm up. Absorbance should be read 45 to 60 minutes after carminic acid is added. Note the time _____.

2. Obtaining a Liquid Sample from the cart/cask

   a. Place an RO-2A over the hot cell and determine the ambient background response of the RO-2A. Note the reading and then remove the RO-2A.

      RO-2A Reading:_____mR/hr (ambient background)

   b. Move the cart/cask to the sink area and set the brake.

   c. Uncover the sample vial by rolling the radiation shield away from the sample cavity.

      1) Transfer the bottle containing the diluted reactor coolant to the hot cell and remove the lid.

      2) Close the cask and move it away.

      3) Close the access door to the hot cell.

   d. Measure the radiation level with the RO-7 and record the reading.

      _____mR/hr (ambient background plus sample)

   e. Calculate the net sample reading by subtacting the value of step 2.c. from the value of step 2.e.

      _____mR/hr (step 2.e.)

      _____mR/hr (step 2.c.)

      _____mR/hr (net sample reading)

3. Dilution and Preparation of Liquid Sample for Radioassay

   This step involves selection and dilution of a sample aliquot to obtain a counting geometry of 10 mls liquid in a 20 ml vial. The sample volume is based on the exposure rate recorded in Step 2.f.

a. Select the appropriate pipet tip size and pipet volume as follows:

Pipet	Approx. Step 2.g. Reading	Check
5 ml	< 1.6 mR/hr	[ ]
1 ml	> 1.6 mR/hr but ≤ 16 mR/hr	[ ]
100 µl	> 16 mR/hr but ≤ 160 mR/hr	[ ]
10 µl	> 160 mR/hr	[ ]

b. Open the access door on top of shielded sample enclosure.

c. Using the pipet volume setting chosen in Step 3.a. above, obtain this volume of RCS liquid sample from the sample bottle, keeping hands as far away as possible from tne "hot" sample liquid.

d. Slowly discharge the aliquot into the empty 20 cc liquid scintillation vial previously placed within the shield brick. Discard the pipet tip.

NOTE: Dispose of materials that have contacted highly contaminated mediums separately from those that have not.

e. Using the appropriate pipette and tip, add sufficient demin water to the 20 cc vial to bring the total liquid volume to 10 ml. Add 10 mls to the 10µl or 100µl aliquot.

f. Remove the diluted sample from the hot cell with tongs.

g. Cap the vial. Wipe it and seal it with tape.

h. Screen survey the vial to verify countability (≤ 5 mR/hr contact).

i. Label and bag the vial noting the dilution, the aliquot volume used, and the radiation level measured.

j. Set the sample aside and inform PASS Supervisor sample is ready for transport to the TSC or counting room.

k. If a chemical analysis for Boron is to be performed, proceed below to Section 4. If no chemical analysis is to be performed, proceed below to Section 6 to clean up and secure the hot cell for later use.

4. Analysis of Liquid Sample for Boron

This section is a version of CAP C-17 "BORON COLORMETRIC", modified to permit the application to highly radioactive samples. Sample manipulations are performed primarily within the hot cell.

a. Pipet 2 ml each of the 2 and 10 ppm boron standard solution into a 50 ml Erlenmeyer flask. Pipet 2 ml of demin water into a second 50 ml Erlenmeyer flask. (Both these flasks should be outside the hot cell.)

b. Open the access door on top of the hot cell.

c. Pipet a 2 ml aliquot of the RCS liquid sample solution from the sample bottle into each of the 50 ml Erlenmeyer flasks within the hot cell.

NOTE: Open hot cell access lid whenever something is added to a flask. Close it immediately afterwards.

d. Pipet 10 µl of concentrated HCl to each flask stopper and swirl. Allow flasks to cool (~ 2 minutes).

e. Add 10.0 ml of concentrated H_2SO_4 into each flask, stopper and swirl. Allow flasks to cool to room temperature (~ 15 minutes).

f. Add 10.0 ml of carminic acid solution into each flask.

g. Stopper again and, using tongs, swirl to mix well.

h. Being careful to avoid direct hand contact with the cuvettes, between approximately 40 and 55 minutes after the carminic add, transfer solutions to clean, prewiped 1 cm cuvettes and carefully cap them. This may be accomplished using a 5 ml pipet set for 4 ml, and, in the case of the "hot" sample the capping and cuvette transfer must be performed using tongs.

i. Set the spectrophotometer to a wavelength of 585 nm and adjust the blank for 0% absorbance.

j. Read the boron standard to verify agreement with calibration graph within ±5%. If this agreement is not obtained continue the analysis but inform supervision immediately.

k. Read the absorbance of the sample(s). Record results and return the samples to the hot cell.

_____(Absorbance RCS)

Calibration Graph (Standard Curve)

ppm Boron RCS (diluted) = _____ppm

Record this on the data sheet in EP RB-15:F.

l. Notify the PASS Supervisor of results of sample analysis.

m. Turn the spectrophotometer off and proceed to Section 5 below.

5. Dilution and Preparation of Off-gas for Isotopic Analysis

NOTE: Perform steps below only if sample vial dose rate is >5 mR/hr.

a. Obtain a clean 14 cc gas sample vial with a septum installed and using a 5 ml gas tight syringe, withdraw 1 cc of air from the vial and discharge the air from the syringe.

b. Insert the syringe into the off-gas sample vial and remove 1cc. Shut the valve on the syringe before removing the vial.

c. Insert the syringe into the counting vial; open the valve on the syringe and inject the contents into the vial.

d. Survey the newly prepared vial; if the dose rate is >5 mR/hr, repeat steps a. through e. above, diluting into new clean 14 cc gas sample vials until the sample vial is less than 5 mR/hr, keeping track of the number of dilutions.

e. Place a label on the counting vial repeating the information as found on the original vial. Calculate the new dilution factor by multiplying all dilutions together. Each dilution 15:1. Record this information on the data sheet.

f. Inquire from supervision whether the original sample vials should be discarded or stored for future use and perform as directed.

6. Cleaning and Securing the Hot Cell

a. Cleaning

1) Disposal of Radioactive Sample Residues

During these actions, the radiation levels in the sink area and airborne concentrations within the Sentry Room may become higher since the sample materials are being discharged via the sink.

a) Turn on sink drain faucet to provide a slow, steady stream.

b) Open the access port on top of the hot cell. Remove sample caps using tongs and, using the remote handling device, empty out the contents of the flasks remaining in the enclosure down the sink drain.

c) Flush out the sample flasks and wash off all contaminated handling tools with demin water, caustic or acid wash solutions (as appropriate), followed by a demin water rinse.

d) Perform a general washdown of the hot cell to remove contamination. Close the access port when finished inside the hot cell.

e) Store sample flasks, vessels, etc. as "dirty" materials -- not to be used again unless thoroughly cleaned and inspected.

2) Disposal or Storage of Chemicals, etc.

a) Dispose of waste chemicals, materials, etc. in a similar fashion as above for the radioactive vessels. (Of course the precautions regarding radioactivity should not apply).

b) Chemicals, reagents and other supplies not consumed or compromised during the sample analyses may be stored for later use. These may be stored in the cabinet space adjacent to the sink area.

b. Securing Equipment

1) Valves

a) Verify that the sink water flow is secured off.

2) Ventilation

If the hot cell and all survey/access ports are secured, the ventilation flow via the overhead duct may be turned off, provided there is no other requirement for this system.

3) When ready to do so, transfer samples to the TSC or counting room for counting.

4) Turn all ventilation OFF when leaving the Sentry Room unless the Sentry Room will be used in the near future.

5) When exiting through the Motor Repair Shop, note the pressures of the gas supply bottles.

Argon _____psig

Cal Gas 1 _____psig

Cal Gas 2 _____psig

6) Close the bottle isolation valves for the Sentry supply gasses.

APPENDIX 1

CHECKLIST OF REQUIRED EQUIPMENT AND SUPPLIES

GENERAL SAMPLE HANDLING AND MANIPULATIONS (Sections 1, 2, and 6)	CHECK
Fully operable hot cell (located in Sentry Room)	[ ]
Sample shield brick (with pre-bored holes)	[ ]
Long extension tongs: 14-16" in length, (2 pairs)	[ ]
RO-7 w/RO-7-BM probe and 5' cable	[ ]
Acid cleaning solution (1 gallon)	[ ]
Caustic clearing solution (1 gallon)	[ ]
Demin water jug (5 gallons)	[ ]
Suction bulb	[ ]
Rubber hose (5' long with trigger spray nozzle and tap hook-up)	[ ]
30 ml beakers (3)	[ ]
Paper towels or equivalent (1 box)	[ ]
Alcohol (1 liter)	[ ]

RADIOACTIVE SAMPLE DILUTION SUPPLIES (SECTION 3)	CHECK
20 ml liquid scintillation vial w/cap (1)	[ ]
Sealing tape for 20 ml liquid scintillation vial (1 roll)	[ ]
Labels for 20 ml liquid scintillation vial (1 box)	[ ]
Small plastic bags; sealable (1 dozen)	[ ]
10 µl pipet w/tip	[ ]
1 ml pipet w/tip	[ ]
Adjustable 0-5 ml pipet w/tip	[ ]
Shielded syringe (calibrated for 5 cc volume)	[ ]
Spare syringe cylinder	[ ]

APPENDIX 1 (Continued)

BORON SAMPLE ANALYSIS SUPPLIES (SECTION 4)	CHECK
50 ml Erlenmeyer flasks w/rubber stoppers (4 sets)	[ ]
1 cm path length spectrophotometer cells w/caps (3 sets)	[ ]
Dri-wipes for spectrophotometer cells (1 box)	[ ]
Rinse/soak bath for 1 cm path length spectrophotometer cells	[ ]
100 ml volumetric flask	[ ]
Adjustable 0-5 ml pipets w/tips	[ ]
10 µl pipet w/tips (3)	[ ]
Spectrophotometer unit	[ ]
Dilute nitric acid, HNO_3	[ ]
Carminic acid solution, Stability: 1 week (30 ml/analysis)	[ ]
Hydrochloric acid, HCl, concentrated (30 ml/analysis)	[ ]
Sulfuric acid, H_2SO_4, concentrated (30 ml/analysis)	[ ]
Standard boric acid, two of the following standards: 10 ppm, 6 ppm, 4 ppm, 2 ppm, 1 ppm	[ ]

DILUTION OF OFF-GAS FOR ISOTOPIC ANALYSIS (SECTION 5)	
14 cc gas sample vials w/septums installed (2)	[ ]
5 cc gas tight syringe/needle	[ ]
Labels for 14 cc gas vials	[ ]
Small plastic bags; sealable	[ ]
Sealing tape	[ ]

CONTAINMENT AIR FRACTIONATION SUPPLIES	
Spare U-tube filter assembly	[ ]

[1]Reagents must be stored in boron free containers; use plastic

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DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

NUMBER EP RB-15:F
REVISION 1
DATE 3/22/85
PAGE 1 OF 1

TITLE EMERGENCY PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM
-- DATA ANALYSIS

APPROVED R. E. Thornberry 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of this procedure is to provide a means to assemble the data generated from the various EP RB-15 sub-procedures into a concise form. Each section has a worksheet where data generated throughout the procedure is recorded. The back side records calculations and analyses results. The data summary sheet gathers all analysis results onto one sheet.

PROCEDURE

1. Process data on appropriate sections of form 69-9393.

2. Attach all pertinent chemistry and radiochemistry data to this form.

3. Deliver the completed form to the Chemistry and Radiation Protection Supervisor for approval and disposition.

PACIFIC GAS AND ELECTRIC COMPANY
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION A: WORKSHEET - INITIAL ACTIONS DATE _____

REMOTE CONTAINMENT HYDROGEN MONITORS

		CEL-82	CEL-83
Time switched from OFF to STANDBY (N/A if in STANDBY prior to this step)		_____	_____
Scale used (Step 10)	10%	[ ]	[ ]
	20%	[ ]	[ ]
Meter Reading - % (Step 10)		_____	_____
Time (Step 10)		_____	_____
Analyst's Initials		_____	_____

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION B: WORKSHEET - STRIPPED GAS AND DILUTED RCS DATE_____

ANALYST_____

Sample Source: Hot Legs [ ]

Pzr Steam [ ]

Pzr Liquid [ ]

RHR Pump [ ]

VCT [ ]

Step 9.d Vacuum on RC-G-2.1 _____" of Hg

Step 11.c Sample Time _____

Step 13.e Initial ml _____

Final ml _____

Total ml added _____

Step 15.3 Pressure on RC-G-2.1_____ psig

SECTION E: RCS GAS SAMPLE HANDLING

5. Use only if sample vial dose rate mR/hr

Dilutions:

1	15:1	[ ]
2	225:1	[ ]
3	3375:1	[ ]
4	50,625:1	[ ]
5	76,000:1	[ ]

Final Dilution = _____:1

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION B: DATA SHEET

The volume of original sample in the 14 ml serum vial is calculated in the same manner as gases within steel sampling bombs, Procedure CAP D-12, equation (4)

V_{14} = Volume of original sample in the 14 ml serum vial, ml

V_b = Volume of expansion vessel (EV-1) = 300 ml

V_g = Volume of lines from EV-1 to RCV-15 = 60 ml

$P_a = P_f$ = Pressure after expansion

$$= \left(\_\_\_\_\_ \text{psig} + 14.7\right)\left(\frac{30 \text{ in Hg}}{14.7 \text{ psi}}\right) = \_\_\_\_\_ \text{ inches of Hg}$$

P_v = Pressure evacuated system = _____ inches of Hg

V_s = Volume of the gas aliquot transferred by diluter value (DV-2)

= 0.024 ml

$$V_{14} = \frac{(V_s)(V_b)(P_f - P_v)(V_g)}{(V_b + V_g)(P_f)(V_g + V_s)}$$

The volume of the original sample in the 14 ml serum vial, V_{14}, is to be used in the radionuclide analysis programs.

Transfer results from counting printout to specific Activity Determination in Reactor Coolant Analysis Data Sheet prior to Data Summary Sheet.

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RD-15:F)

SECTION C: WORKSHEET - CONTAINMENT AIR SAMPLING DATE_____

ANALYST_____

Step 1.e

Containment temperature = (_____°F +460) x 5/9 = _____°K = T_c

Containment pressure = _____ psig

Step 2.c

Sample Pressure: containment air pressure CASP-PI-1109 _____ psig

Sample Time_____

Step 2.d

THT 196 = _____°C + 273 = _____°K = T_s

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION C: DATA SHEET - CONTAINMENT AIR ISOTOPIC ANALYSIS

Sampling Technician _____

Containment Noble Gas

Fractional Yield = $T_c/(43,400 \times T_s)$ = _____ Y_{NG}

Noble Gas Activity = _____ µCi/cc

Counted By _____

Containment Air Iodine and Particulates

Fractional Yield = T_c/T_s = _____ Y_{IP}

Iodine and Particulate Activity = _____ µCi/cc

Counted By _____

Where: Y_{IP} and Y_{NG} are fractional yields entered into the analysis program.

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION D: WORKSHEET - G.C. ANALYSIS DATE_____

ANALYST_____

3. Calibration Verification

a. Hydrogen - source calibration gas: Cal 1-10% [ ]
Cal 2-0.2% [ ]

12) Loop 1

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

Loop 2

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

Loop 3

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

Loop 4

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

b. Oxygen

20) Loop 1

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

Loop 2

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

Loop 3

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

Loop 4

(trace peak height ____ - baseline ____) x attenuation ____/100

peak height = _____ hydrogen concentration_____

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION D: WORKSHEET - G.C. ANALYSIS (CONT'D)

3. Null Verification

ii) (trace peak height ____ - baseline ____) x attenuation _____/100

peak height = _____ oxygen concentration _____

Less than 10% value calculated Step 20) ____ Yes

____ No

4. Sample Analysis

i. Off gas sample pressure RC-G-2.1 _____ psig

ii. Loop 1

(trace peak height _____ - baseline _____) x attenuation ____/100

peak height = _____

Hydrogen [ ]

Oxygen [ ]

Loop 2

(trace peak height _____ - baseline _____) x attenuation ____/100

peak height = _____

Hydrogen [ ]

Oxygen [ ]

Loop 3

(trace peak height _____ - baseline _____) x attenuation ____/100

peak height = _____

Hydrogen [ ]

Oxygen [ ]

Loop 4

(trace peak height _____ - baseline _____) x attenuation ____/100

peak height = _____

Hydrogen [ ]

Oxygen [ ]

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION D: DATA SHEET - HYDROGEN CONCENTRATION BY G.C.

DATE_____

ANALYST'S INITIALS_____

Peak height-CP (at calibration pressure) = Peak height-SP (from trace) x (Calibration Pressure: recorded on cal. graph) / (Sampling Pressure)*

*Sampling Pressure - for CA: from EP RB:C = _____psig + 14.7 = _____ psia

- for offgas: from EP RB:D = _____psig + 14.7 = _____ psia

Loop _____:

Peak height-CP = _____mm x (_____psia) / (_____psia) = _____ mm

% H_2 (from calibration curve) = _____ % H_2

Loop _____:

Peak height-CP = _____mm x (_____psia) / (_____psia) = _____ mm

% H_2 (from calibration curve) = _____ % H_2

Loop _____:

Peak height-CP = _____mm x (_____psia) / (_____psia) = _____ mm

% H_2 (from calibration curve) = _____ % H_2

Loop _____:

Peak height-CP = _____mm x (_____psia) / (_____psia) = _____ mm

% H_2 (from calibration curve) = _____ % H_2

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION D: DATA SHEET - OXYGEN CONCENTRATION BY G.C.

DATE _____

ANALYST'S INITIALS _____

Peak height-CP (at calibration pressure) = Peak height-SP (from trace) x (Calibration Pressure: recorded on cal. graph) / (Sampling Pressure)*

*Sampling Pressure - for CA: from EP RB:C = _____ psig + 14.7 = _____ psia

Loop _____:

Peak height-CP = _____ mm x (_____ psia) / (_____ psia) = _____ mm

% O_2 (from calibration curve) = _____ %

Loop _____:

Peak height-CP = _____ mm x (_____ psia) / (_____ psia) = _____ mm

% O_2 (from calibration curve) = _____ %

Loop _____:

Peak height-CP = _____ mm x (_____ psia) / (_____ psia) = _____ mm

% O_2 (from calibration curve) = _____ %

Loop _____:

Peak height-CP = _____ mm x (_____ psia) / (_____ psia) = _____ mm

% O_2 (from calibration curve) = _____ %

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP R6-15:F)

SECTION E: WORKSHEET - RCS LIQUID SAMPLE HANDLING

DATE_____

ANALYST_____

2.a. RO-2A ambient background - hot cell _____ mR/hr

e. RO-7 sample plus background _____ mR/hr

f. net reading sample _____ mR/hr

3.a. Volume RCS pipetted for isotopic analysis

5 ml [ ]
1 ml [ ]
100 µl [ ]
10 µl [ ]

4. Boron Analysis

	Standard		Sample	
	_____ppm	____ppm	1	2
absorbance				
Calculated ppm B				

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION E: DATA SHEET

$$\frac{\text{total ml water added to sample } \_\_\_\_\_}{\text{sample size } \quad 0.024 \text{ ml}} = \_\_\_\_\_ \text{ dilution factor}$$

Boron Analyses

[B] in RCS = [B] in sample x dilution factor

Sample 1 [B] in RCS = _____ x _____ = _____ ppm Boron

Sample 2 [B] in RCS = _____ x _____ = _____ ppm Boron

Isotopic Analysis

$$\text{Fractional Yield} = \frac{1}{\text{dilution factor}} = \frac{1}{\_\_\_\_\_} = \_\_\_\_\_$$

Volume Sample Pipetted. _____

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

SECTION G: WORKSHEET - ION CHROMATOGRAPHIC CHLORIDE ANALYSES

DATE _____

ANALYST _____

2. Chloride Standard Check

m. (trace peak height _____ - baseline _____) x attenuation _____/100

peak height _____ Chloride concentration _____ (A)

n. $\frac{(A)-1.0}{1.0} \times 100$ _____ % Difference (B)

Is B less than 10%? YES - Proceed

NO - Proceed, but contact C&RP Supervisor

4. Sample Analysis

i. (trace peak height _____ - baseline _____) x attenuation _____/100

peak height = _____ mm

ppm Chloride _____

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RR-15:F)

SECTION H: WORKSHEET - pH/CONDUCTIVITY/DISSOLVED OXYGEN

DATE_____

ANALYST_____

1. Monitor Calibration

a. pH Calibration

5)a) pH: temperature of buffer solution _____°C

7) pH 7 buffer value _____ from table

15) temperature of buffer solution _____°C

16) pH 4 buffer value _____ reading

b. Dissolved Oxygen Analyzer Calibration

5) temperature water _____°C

6) Solubility oxygen _____ ppm from table

3. Sample Analysis

b. conductivity sample stream from CMP _____umho

temperature sample stream from CMP _____°C

e. oxygen concentration reading _____ppm O_2

f. pH reading _____

temperature _____°C

TITLE: POST ACCIDENT RCS AND CONTAINMENT AIR SAMPLE DATA SHEET (EP RB-15:F)

DATA SUMMARY SHEET

UNIT NO. 1 [ ]
2 [ ]

PARAMETER		PASS READING	COMMENTS	DATE	INITIAL
RCS LIQUID	BORON diluted	ppm			
	CONDUCTIVITY	µmhos/cm			
	CHLORIDE	ppm			
	DO_2	ppm			
	pH				
	ACTIVITY	µCi/ml			
OFFGAS	HYDROGEN	cc/kg			
	ACTIVITY	µCi/ml			
CONTAINMENT ATMOSPHERE	OXYGEN	%			
	HYDROGEN	%			
	NOBLE GAS ACTIVITY	µCi/ml			
	RADIOIODINES & PARTICULATES	µCi/ml			

REVIEWED BY _____
C&RF Supervisor

PACIFIC GAS AND ELECTRIC COMPANY
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

TITLE: SPECIFIC ACTIVITY DETERMINATION IN REACTOR COOLANT ANALYSIS DATA SHEET

...mple location: ______________ Performed by: ______________

Sample Collection Date/Time: ______ / ______

H-3: ______________ µCi/ml Sr/Y-90: ______________ µCi...

Sr-89: ______________ µCi/ml

Gaseous Activity Results

Sample Analysis Date/Time: ______ / ______

Nuclide		Activity Concentration		Nuclide		Activity Concentration	
______	:	______	µCi/ml	______	:	______	µCi/m
______	:	______	µCi/ml	______	:	______	µCi/m
______	:	______	µCi/ml	______	:	______	µCi/m
______	:	______	µCi/ml	______	:	______	µCi/m
______	:	______	µCi/ml	______	:	______	µCi/m

Degassed Liquid Activity Results

Sample Analysis Date/Time: ______ / ______

Nuclide		Activity Concentration		Nuclide		Activity Concentration	
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/
______	:	______	µCi/ml	______	:	______	µCi/

Combined Activity = total of all above analysis = ______________ µCi/r

$\bar{E}$ = ____ MeV/dis Determined on ______________ $100/\bar{E}$ = ______________ µCi/ml

Is combined activity greater than $100/\bar{E}$ limit? [ ] YES [ ] NO

...answer is yes, Shift Foreman notified DATE/TIME ______ / ______ By ______________

...RP Supervisor (name) ______________ notified DATE/Time ______ / ______ By ______________

NPPR initiated DATE/TIME ______________ By ______________

Reviewed by ______________ DATE/TIME ______________
C&RP Supervisor

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY OPERATING PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM
TITLE --ION CHROMATOGRAPHIC CHLORIDE ANALYSIS

APPROVED R. C. Thornton 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of this procedure is to detail the steps required to measure chloride concentrations of reactor coolant. Included are steps to complete flushing of both the LSP reactor coolant module and CAP lines. This procedure requires operator actions at the LSP, CAP, and CMF.

PREREQUISITES

1. The Ion Chromatograph (IC) was turned on according to Procedure EP RB-15:A and has warmed up for 30 minutes.

2. CAP, CMP, and LSP systems lined up as detailed in Procedure EP RB-15:A.

3. Verify that the following annunciator windows are off on the PCP:

   a. REACTOR COOLANT SAMPLE COOLING WATER LOW FLOW

   b. REACTOR COOLANT SAMPLE COOLING WATER LOW PRESS

   c. REACTOR COOLANT SAMPLE COOLING WATER HIGH TEMP

   d. REACTOR COOLANT PURGE HIGH TEMP

   e. REACTOR COOLANT SAMPLE HIGH TEMP

   f. LIQUID SAMPLE PANEL HIGH PLENUM PRESS

   g. CHEM ANALYSIS PANEL HIGH PLENUM PRESS

4. The following equipment should be available:

   a. Meter-long reach rod

PRECAUTIONS

1. This sampling involves processing of water that may be highly radioactive. Precautions should be taken to prevent skin contact or ingestion.

2. Time in a radiation field should be limited to that necessary to perform the required operations. During purge and flush periods, it may not be necessary to stand near the panels and consideration should be given to moving to a low dose area.

3. A dose rate instrument should be on and periodic monitoring is suggested during purge and sampling exercises.

4. For the Ion Chromatograph (IC):

   a. The calibration curve should be checked once every 4 samples by analyzing a chloride standard.

   b. Calibration should be checked when first using a new eluent.

   c. Regeneration is required about once every 6-8 hours of continuous operation. Refer to the troubleshooting and surveillance and maintenance procedure.

   d. During continuous operation, the separator column must be cleaned on a daily basis or every other regeneration by pumping eluent through the column for a minimum of 10 minutes, followed by a 20 minute demineralized water rinse. This may be coincident with regeneration of the suppressor column. Refer to the troubleshooting and surveillance and maintenance procedure CAP G-3.

PROCEDURE

1. Instrument Calibration

   a. Set the OFFSET range switch to left. [ ]

   b. Set MODE to LIN. [ ]

   c. Adjust the COARSE vernier switch to zero the meter. It may be necessary to adjust the FINE pot to zero the meter. [ ]

d. Operate the system until the baseline is stabilized with the umho FULL SCALE switch in the 1 position adjusting the FINE pot as necessary to zero the meter. [ ]

2. Chloride Standard Check

a. If Standard Check has been performed within the last week proceed to step 3. [ ]

b. Close or check closed CAP-V-15. [ ]

c. Verify CAP-CAL-3 is at least half full. (CAP G-3, directs filling). [ ]

d. Align CAP-V-5 to CHLORIDE CALIB. SOL'N. [ ]

e. Open CAP-V-15. [ ]

f. Turn on the L&N recorder. [ ]

g. After 1 minute, place the LOAD/INJECT switch at the CMP to INJECT and mark the recorder trace with date, time, injection point, analyst's initials, sample type, and conductivity meter setting. [ ]

h. After 1 minute, place the LOAD/INJECT switch in LOAD position. [ ]

NOTE: The Cl^- peak will elute about 5 min. after injection.

i. Close CAP-V-15. [ ]

j. Align CAP-V-5 Counterclockwise to CLOSED. [ ]

k. Align CAP-V-29 to vent (6 o'clock) [ ]

l. After the Cl^- peak has eluted, wait 5 minutes then shut off the L&N recorder. [ ]

m. Align CAP-V-5 to RCS sample (9 o'clock). [ ]

n. Determine the peak height:

$$\text{Peak height} = \frac{(\text{Trace Peak Height} - \text{Baseline}) \times \text{Attenuation}}{100}$$

Peak Height = _____mm

Corresponding ppm Cl^- from CAL. Curve _____ppm (A)

o. Compare the Cl^- standard peak with the calibration curve. For the same umho setting, the values should be within ±10%.

$$\frac{(A) - 1.0}{1.0} \times 100 = \text{_____\% Difference (B)}$$

Is (B) within ±10%?_____ (YES/NO)

3. LSP and CAP Purging

If LSP has been previously purged during Reactor Coolant Liquid/offgas sampling then proceed to step c.

a. Determine which sample source isolation valves will have to be opened from the list below:

SAMPLE SOURCE	CONTAINMENT ISOLATION VALVES
Hot Legs Loops 1 and 4	FCV-9356A and FCV-9356B
Pressurizer Steam Space	FCV-9354A and FCV-9354B
Pressurizer Liquid Space	FCV-9355A and FCV-9355B
RHR Pumps Discharge	N/A
Volume Control Tank	N/A

b. Call the Control Room and have operations block open the appropriate containment isolation valves.

c. Open the corresponding remote plant isolation valve (RPIV) and remote source isolation valve (RSIV) at the PCP (see Appendix 1 for proper valve).

d. Close remote flush isolation valve (RFIV). [ ]

NOTE 1: The sample source valves are labeled RC-V-1.1 through RC-V-1.5. Throughout this procedure, the form RC-V-1.X will be used to indicate the source valve to be operated. The sample source used for sampling will have been given at a briefing by the Site Chem and Rad Protection Coordinator.

NOTE 2: Upon implementation of the next step, sample will be flowing into the back of the LSP. The meter-long reach rod should be used to operate valves and a dose rate survey should be done to monitor radiation levels.

e. Open the sample source valve RC-V-1.X (see Appendix 1 for proper valve). [ ]

f. Open RC-V-3. [ ]

g. If LSP has been previously purged proceed to step h. Slowly open RC-VREL-1 until RC-FI-1 indicates 100% flow or 1900 cc/min. Purge for 9 minutes. [ ]

h. Slowly close RC-VREL-1 until RC-FI-1 indicates 36% or 700 cc/min. Continue the purge for 1 minute. [ ]

i. Close RC-V-3. [ ]

j. Open the following valves:

RC-V-7 [ ]
RC-V-2 [ ]

k. Position RC-V-22 to the TO CHEM PANEL position. [ ]

l. Adjust RC-VREL-2 until RC-FI-2 indicates 100% full flow or 200 cc/min. [ ]

m. Verify that the red FULL FLOW lights are lit for the ION CHROMAT loop at the CMP and CAP panels. Adjust RC-VREL-2 if necessary to obtain proper flow rate. [ ]

n. Continue the purge for 5 minutes. [ ]

4. Sample Analysis

a. At the CMP, activate the L&N recorder. [ ]

b. Place the IC LOAD/INJECT switch in the INJECT position and mark the inject position on the chart paper. [ ]

c. On the chart paper, record the date/time, sample source used, μ ing, chart speed, and analyst's initials. [ ]

d. After approximately 1 minute from sample injection, place the LOAD/INJECT switch in the LOAD position. [ ]

NOTE: The chloride peak will appear approximately 5 minutes after injection at the same retention time observed for the standard.

e. Turn CAP-V-5 to the DEMIN WATER position. [ ]

f. Flush with demin water for 2 minutes. [ ]

g. Examine the L&N recorder. If the chloride peak goes off-scale, a reanalysis must be completed using a larger μmho set , 3 μmho) and following the steps below, otherwise skip to step "h". [ ]

1) Select appropriate attenuation. [ ]

2) Align CAP-V-5 to LIQUID SAMPLE. [ ]

3) Continue the purge for 1 minute. [ ]

4) Place LOAD/INJECT switch in the INJECT position and mark the inject position on the chart paper. [ ]

5) On the chart paper, record the date/time, sample source used, μmho setting, chart speed, and analyst's initials. [ ]

6) After approximately 1 minute, place the LOAD/INJECT switch in the LOAD position. [ ]

NOTE: The chloride peak will appear at approximately 5 minutes after injection.

7) Turn CAP-V-5 to the DEMIN WATER position. [ ]

8) Flush with demin water for 2 minutes. [ ]

9) Examine the L&N recorder for the chloride peak. [ ]

NOTE: If the chloride peak is off scale, change the umho setting and repeat step g. until the chloride peak is on scale.

h. After the Cl^- peak has eluted, wait 5 minutes then turn off the L&N recorder. [ ]

i. Determine the peak height

$$\text{Peak height} = \frac{(\text{Trace peak height} - \text{baseline}) \times \text{Attenuation}}{100}$$

Peak height = _____ mm

j. Determine the ppm chloride from the calibration curve and record on the data sheet (EP RB-15:F).

_____ppm Cl^-

k. If pH/conductivity/DO are to be analyzed proceed to EP RB-15:H. [ ]

5. Flushing

a. At the PCP, perform the following:

1) Close the remote plant and source isolation valves. (See Appendix 1). [ ]

2) Open the remote flush isolation valve (see Appendix 1 for proper valve). [ ]

b. At the LSP, close RC-V-1.X. [ ]

c. At the CAP, align CAP-V-5 to LIQUID SAMPLE. [ ]

d. At the LSP, open RC-V-4. [ ]

e. Open RC-VREL-2 until RC-FI-2 indicates 100% of full flow or 200 cc/min. Flush with demin water for 3 minutes. [ ]

f. Close RC-V-7. [ ]

g. Open RC-V-3. [ ]

h. Adjust RC-VREL-1 until RC-FI-1 indicates 100% of full flow or 1900 cc/min. Flush with demin water for 1 minute. [ ]

i. Close RC-V-3. [ ]

j. Open RC-V-1.X and flush with demin water for 5 minutes. [ ]

k. Close RC-V-1.X. [ ]

l. Open RC-V-7. [ ]

m. Adjust RC-VREL-2 until RC-FI-2 indicates 100% of full flow or 200 cc/min. Flush with demin water for 3 minutes. [ ]

n. At the CMP, cycle the LOAD/INJECT switch at least 3 times. Return it to the LOAD position. [ ]

o. At the CAP, align CAP-V-5 to CLOSED. [ ]

p. Turn CAP-V-6 to LIQUID SAMPLE (9 o'clock) and flush with demin water for 2 minutes. [ ]

q. Turn CAP-V-6 to OXYGEN CALIB SOLUTION. [ ]

r. Close CAP-V-11. [ ]

s. Terminate flushing by closing the following valves:

RC-V-7 [ ]
RC-V-2 [ ]
RC-V-4 [ ]
RC-VREL-1 [ ]
RC-VREL-2 [ ]

t. Align RC-V-22 to WASTE. [ ]

u. At the PCP, close the remote flush isolation valve. (Appendix 1) [ ]

v. Call the control room and have operations close the containment isolation valves opened earlier. [ ]

6. Flushing the Separator and Suppressor Columns

If the IC is not needed for further sampling in an 8 hour period then the following steps should be performed before system shutdown can be started.

a. Perform the following IC valve alignments to wash the iodine and other cations from the suppressor column:

NOTE: Direction from the Site Emergency Coordinator may preclude this section, if radiological conditions warrant.

1) Check that the conductivity meter mode switch is set to ZERO. [ ]

2) In the eluent/pump enclosure of the CAP, check the following:

a) Check the levels of eluent, water, and regenerants are at least half full. [ ]

b) Check that the I.C. pumps and vent if air is visible in the sightglass or tubing. [ ]

c) Check that the pump stroke settings are set at 40% for both pumps. [ ]

3) At the CMP, check the following:

a) Check that the regeneration time thumbwheels are set at 15 min for REG and 45 min for RIN. [ ]

b) Align the following air toggle switches to the indicated positions:

SWITCH	POSITION	
E_1/Water	E_1	[ ]
E_2	DOWN	[ ]
SEP-1/SEP-2	SEP-1	[ ]
SUP-1/RGN-2	SUP-2/RGN-1	[ ]
INJECT/LOAD	LOAD	[ ]

4) Depress regeneration START button and the suppressor column will automatically be regenerated. [ ]

5) Flush the separator column for 20 min. After 20 min., turn the E, switch to DOWN and rinse the separator column with demin. water for 10 min. [ ]

7. System Shutdown

a. After completion of column regeneration, perform the following:

1) Turn IC POWER switch to OFF. [ ]

2) Turn AIR switch to OFF. [ ]

3) Turn GAUGE switch to OFF. [ ]

4) Turn ELUENT pump switch to OFF. [ ]

5) Turn conductivity meter MODE switch to ZERO. [ ]

b. If pH/conductivity/DO are to be done, proceed to section H. [ ]

c. If finished with all CMP analyses, turn CMP power off. [ ]

8. Data Analysis

a. Proceed to EP RB-15:F for data analysis. [ ]

9. If finished with all sampling/analysis go to 15:H Step 6, system shutdown. [ ]

REFERENCES

Sentry Equipment Corp. High Radiation Sampling System Operating and Maintenance Manual.

APPENDIX

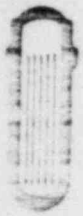
1. Valves for Obtaining Samples from Reactor Coolant

APPENDIX 1

VALVES FOR OBTAINING SAMPLES FROM REACTOR COOLANT

SAMPLE SOURCE	REMOTE PLANT ISOLATION VALVE (RPIV)	REMOTE SOURCE ISOLATION VALVE (RSIV)	REMOVE FLUSH ISOLATION VALVE (RFIV)	LSP SAMPLE SOURCE VALVE (SSV)
RC Hot Leg 1	FCV-9351 A	FCV-692	FCV-1416	RC-V-1.1
RC Hot Leg 4	FCV-9351 B	FCV-692	FCV-1416	RC-V-1.1
PZR Liquid	FCV-9350 B	FCV-693	FCV-1417	RC-V-1.2
PZR Steam	FCV-9350 A	FCV-694	FCV-1418	RC-V-1.3
RHR Pump 1-1 Discharge	FCV-9353 A	FCV-1413	FCV-1419	RC-V-1.4
RHR Pump 1-2 Discharge	FCV-9353 B	FCV-1413	FCV-1419	RC-V-1.4
VCT Liquid	N/A	FCV-1412	FCV-1420	RC-V-1.5
Rx Cavity Sump	FCV-696 FCV-697	N/A	FCV-1423	RW-V-2.1
Floor Drn Recvr	N/A	FCV-1415	FCV-1425	RW-V-2.2
Equip Drn Recvr	N/A	FCV-1414	FCV-1424	RW-V-2.3

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



DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

EMERGENCY OPERATING PROCEDURE

SENTRY POST-ACCIDENT SAMPLING SYSTEM

TITLE -- PH/CONDUCTIVITY/DISSOLVED OXYGEN

NUMBER	EP RB-15:H
REVISION	1
DATE	3/26/85
PAGE	1 OF 12

APPROVED R. C. Thomas 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of this procedure is to detail the steps required to measure pH, conductivity, and dissolved oxygen concentrations of reactor coolant. Included are steps to complete flushing of both the LSP reactor coolant module an CAP lines. This procedure requires operator actions at the LSP, CAP, and CMP.

PREREQUISITES

1. Monitors are turned on according to procedure EP RB-15:A:

   a. and have warmed up for 1 hour if oxygen analyzer has not been calibrated within 1 week;

   b. or, have warmed up for 30 minutes if oxygen analyzer does not need calibration.

2. CAP, CMP, and LSP systems lined up as detailed in procedure EP RB-15:A.

3. Verify that the following annunciator windows are off on the PCP:

   a. REACTOR COOLANT SAMPLE COOLING WATER LOW FLOW

   b. REACTOR COOLANT SAMPLE COOLING WATER LOW PRESS

   c. REACTOR COOLANT SAMPLE COOLING WATER HIGH TEMP

   d. REACTOR COOLANT PURGE HIGH TEMP

   e. REACTOR COOLANT SAMPLE HIGH TEMP

   f. LIQUID SAMPLE PANEL HIGH PLENUM PRESS

   g. CHEM ANALYSIS PANEL HIGH PLENUM PRESS

4. The following equipment must be available:

   a. Meter-long reach rod

   b. Small screwdriver

5. The conductivity meter should have been calibrated within the last 3 months.

PRECAUTIONS

1. This sampling involves processing of water that will be highly radioactive. Precautions should be taken to prevent skin contact or ingestion.

2. Time in a radiation field should be limited to that necessary to perform the required operations. During purge and flush periods, it may not be necessary to stand near the panels and consideration should be given to moving to a low dose area.

3. A dose rate instrument should be on and periodic monitoring is suggested during purge and sampling exercises.

PROCEDURE

1. Monitor Calibration

   If the CAP Monitors have been calibrated within the last 7 days proceed to step 2, LSP and CAP Purging.

   a. pH Calibration

      1) Make sure the pH buffer tanks are over half full with pH 7 and pH 4 or 10 buffers at the CAP. [ ]

         NOTE: To fill, vent tank pressure, remove pipe cap on top of sight glass and fill with appropriate buffer. Be sure to install pipe cap and then repressurize tank.

      2) Align CAP-V-6 to pH CALIB SOLUTION [ ]

      3) Adjust CAP-V-26 until sufficient flow is indicated by red flow indicator light. Flow for 2 minutes. Cycle CAP-V-7 to Rexnord and then back to the YSI Oxygen Analyzer. [ ]

4) Turn CAP-V-6 counterclockwise to OXYGEN CALIB. SOLUTION to terminate flow, then align CAP-V-27 to vent position. [ ]

5) Observe and record the temperature of the buffer solution as indicated on the CMP.

Temp. _____°C

a) Correct the buffer pH value for the recorded temp. from the pH Temperature Correction Table (Appendix 1). [ ]

6) Adjust the pH monitor R-3 until the meter indicates the temperature corrected pH value. [ ]

7) Observe the pH monitor reading for 2 minutes and adjust if drift exceeds ±0.1 pH units.

pH _____

8) Align CAP-V-6 to DEMIN WATER and flush for 2 minutes. Cycle V-7 from YSI to Rexnord to flush DO deadleg. [ ]

9) Align CAP-V-30 to pH calibration tank CAL-2. [ ]

10) Align CAP-V-28 to the nitrogen supply line. [ ]

11) Align CAP-V-6 to the pH CALIB SOLUTION. [ ]

12) Open CAP-V-16 until the red flow indicator is lit. Flow for 2 minutes. Cycle CAP-V-7 to Rexnord and then back to YSI Oxygen Analyzer. [ ]

13) Turn CAP-V-6 counterclockwise to the OXYGEN CALIB SOLUTION to terminate flow. [ ]

14) Align CAP-V-28 to vent position. [ ]

15) Observe and record the temperature of the buffer solution as indicated on the CMP.

Temp. _____°C

a) Correct the buffer pH value for the recorded temp. from the pH Temperature Correction Table (Appendix 1). [ ]

16) After the meter reading has stabilized, record the reading and compare to the temperature corrected pH value. The reading should be within ±0.5 pH units of the temperature corrected value.

pH _____

17) Align CAP-V-6 to DEMIN WATER and flush for 2 minutes. Cycle V-7 from YSI to Rexnord. [ ]

b. Dissolved Oxygen Analyzer Calibration

NOTE: If calibration has been performed within 1 week proceed to step 2. LSP and CAP Purging.

1) Align V-7 to YSI or Rexnord depending on directions given by supervision. [ ]

2) Open CAP-V-9. [ ]

3) Align CAP-V-6 to OXYGEN CALIB SOLUTION. [ ]

4) Close CAP-V-17 until the red flow indicator is lit. [ ]

5) Purge for 5 minutes (YSI) or 15 minutes (Rexnord) then read and record the temperature of the water in CAL-4 at the CMP.

Temp. _____°C

6) Determine the dissolved oxygen concentration from the Solubility of Oxygen in Air Saturated Water table (Appendix 2) and record the value.

_____ ppm dissolved oxygen

7) Adjustment

a) YSI:

While flowing, adjust the O_2 calibration knob until the pen traces to the dissolved oxygen concentration in ppm recorded in step 6). [ ]

b) Rexnord:

While flowing, adjust the CAL ADJ to indicate the dissolved oxygen concentration in ppm previously recorded in step 1.b.6). (This may involve changing the scale switch position). [ ]

8) Turn the oxygen calibration pump to OFF. [ ]

9) Close CAP-V-9. [ ]

10) Align CAP-V-6 to LIQUID SAMPLE. (9 o'clock) [ ]

2. LSP and CAP Purging

If LSP has been previously purged during Reactor Coolant Liquid/offgas sampling then proceed to step c.

a. Determine which sample source isolation valves will have to be opened from the list below:

SAMPLE SOURCE	CONTAINMENT ISOLATION VALVES
Hot Legs Loops 1 and 4	FCV-9356A and FCV-9356B
Pressurizer Steam Space	FCV-9354A and FCV-9354B
Pressurizer Liquid Space	FCV-9355A and FCV-9355B
RHR Pumps Discharge	N/A
Volume Control Tank	N/A

b. Call the Control Room and have operations block open the appropriate containment isolation valves. [ ]

c. Open the corresponding remote plant isolation valve (RPIV), remote source isolation valve (RSIV), at the PCP (see Appendix 1 for proper valve). [ ]

d. Close remote flush isolation valve (RFIV). [ ]

NOTE 1: The sample source valves are labeled RC-V-1.1 through RC-V-1.5. Throughout this procedure, the form RC-V-1.X will be used to indicate the source valve to be operated. The sample source used for sampling will have been given at a briefing by the Site Chem and Rad Protection Coordinator.

NOTE 2: Upon implementation of the next step, sample will be flowing into the back of the LSP. The meter-long reach rod should be used to operate valves and a dose rate survey should be done to monitor radiation levels.

e. Open the sample source valve RC-V-1.X (see Appendix 1 for proper valve). [ ]

f. Open RC-V-3. [ ]

g. If LSP has been previously purged proceed to step h. Slowly open RC-VREL-1 until RC-FI-1 indicates 100% flow or 1900 cc/min. Purge for 9 minutes. [ ]

h. Slowly close RC-VREL 1 until RC-FI-1 indicates 36% or 700 cc/min. Continue the purge for 1 minute. [ ]

i. Close RC-V-3. [ ]

j. Open the following valves:

RC-V-7 [ ]
RC-V-2 [ ]

k. Position RC-V-22 to the TO CHEM PANEL position. [ ]

l. Adjust RC-VREL-2 until RC-FI-2 indicates 100% or 200 cc/min. [ ]

m. Verify that the red FULL FLOW lights are lit for the pH, O_2, and COND loop at the CMP and CAP panels. Adjust RC-VREL-2 if necessary to obtain proper flow rate. [ ]

n. At the CMP, turn YSI CHART SPEED to RAPID and verify PEN INPUT is set to $-O_2$. [ ]

3. Sample Analysis

a. Flow for 5 minutes or until meter reading stabilizes. Cycle CAP-V-7 to YSI for 30 seconds and back to Rexnord. [ ]

b. Observe and record conductivity meter reading and temperature of the sample stream from the CMP.

Cond._____µmho
Temp._____°C

c. 1) YSI:

Turn YSI CHART SPEED to 1 and mark the chart paper with the date/time, O_2 range, sample source, sample temperature, and operator's initials. [ ]

2) Rexnord:

Observe the Rexnord dissolved oxygen meter reading and turn to a lower scale position as the meter reading decreases. Purge 15 minutes. [ ]

d. Read the O_2 concentration. _____ppmO_2

e. Turn CAP-V-6 counterclockwise to OXYGEN CALIB SOLUTION to terminate sample flow and permit pH reading to stabilize. [ ]

f. Observe the pH meter for 1 minute to ensure the reading has stabilized. Record the pH reading.

pH_____
Temp._____°C

g. If I.C. analyses is to be performed proceed to EP RB-15:G. [ ]

4. Flushing

a. At the PCP, perform the following:

1) Close the remote source isolation valve. [ ]

2) Open the remote flush isolation valve (see Appendix 3 for proper valve). [ ]

b. At the LSP, close RC-V-1.X. [ ]

c. At the CAP, align CAP-V-6 to LIQUID SAMPLE. (9 o'clock) [ ]

d. At the LSP, open RC-V-4. [ ]

e. Open RC-VREL-2 until RC-FI-2 indicates 100% flow or 200 cc/min. Flush with demin water for 1 minute. [ ]

f. Close RC-V-7. [ ]

g. Open RC-V-3. [ ]

h. Adjust RC-VREL-1 until RC-FI-1 indicates 100% flow or 1900 cc/min. Flush with demin water for 1 minute. [ ]

i. Close RC-V-3. [ ]

j. Open RC-V-1.X and flush with demin water for 5 minutes. [ ]

k. Close RC-V-1.X. [ ]

l. Open RC-V-7. [ ]

m. Adjust RC-VREL-2 until RC-FI-2 indicates 100% flow or 200 cc/min. Flush with demin water for 3 minutes. [ ]

n. At the CAP, align CAP-V-6 to OXYGEN CALIB SOLUTION. [ ]

o. Terminate flushing by closing the following valves:

RC-V-7 [ ]
RC-V-2 [ ]
RC-V-4 [ ]
RC-VREL-1 [ ]
RC-VREL-2 [ ]

p. Align RC-V-22 to WASTE. [ ]

q. At the PCF, close the remote flush isolation valve. [ ]

r. Call the control room and have operations close the containment isolation valves opened earlier. [ ]

5. Sample Calculations.

a. Correct the recorded sample pH for temperature from the pH Temperature Correction Table (Appendix 1). [ ]

b. Transfer all data to data sheets EP RB-15:F. [ ]

c. If further analyses/sampling is to be done proceed to appropriate procedure. [ ]

6. System Shutdown

a. CMP Shutdown

1) pH Monitor - Turn switches S-3 and S-1 to the OFF position. [ ]

2) Conductivity Monitor - Turn function select switch to ZERO position. [ ]

3) YSI Monitor - Turn YSI POWER switch to OFF position. [ ]

b. If finished with all CMP analysis, turn CMP POWER OFF and turn gas supplies off by lifting to horizontal position green root valves next to CAP. [ ]

REFERENCES

1. Sentry Equipment Corp. High Radiation Sampling System Operating and Maintenance Manual.

APPENDICES

1. pH Temperature Correction Table
2. Solubility of Oxygen in Air Saturated Water
3. Valves for Obtaining Samples from Reactor Coolant

APPENDIX 1

pH TEMPERATURE CORRECTION TABLES

SAMPLE pH TEMPERATURE CORRECTION TABLE

TEMP°C	CORR	TEMP°C	CORR
16	-.31	31	+.20
17	-.27	32	+.24
18	-.24	33	+.26
19	-.20	34	+.29
20	-.16	35	+.32
21	-.13	36	+.36
22	-.10	37	+.40
23	-.07	38	+.43
24	-.03	39	+.46
25	.00	40	+.50
26	+.04	41	+.53
27	+.07	42	+.56
28	+.10	43	+.59
29	+.14	44	+.63
30	+.17	45	+.66

BUFFER pH TEMPERATURE CORRECTION TABLE

TEMP	RED pH4	GREEN pH7	BLUE pH10
10°C	4.00	7.06	10.18
15°C	--	--	10.12
20°C	4.00	7.02	10.06
25°C	4.00	7.00	10.01
30°C	4.01	6.99	9.97
35°C	--	--	9.93
40°C	4.03	6.98	9.89
45°C	--	--	9.86
50°C	4.06	6.97	9.83
60°C	4.09	6.98	--
70°C	4.12	6.99	--
80°C	4.16	7.00	--
90°C	4.19	7.02	--
95°C	4.21	7.03	--

*TAKEN FROM LABELS ON BECKMAN BUFFERS

APPENDIX 2

SOLUBILITY OF OXYGEN IN AIR SATURATED WATER
(For Oxygen in Air at 1 atm.)

TEMP °C	PPM DISSOLVED OXYGEN	TEMP °C	PPM DISSOLVED OXYGEN
16	9.9	31	7.5
17	9.7	32	7.4
18	9.5	33	7.3
19	9.3	34	7.2
20	9.2	35	7.1
21	9.0	36	7.0
22	8.8	37	6.8
23	8.7	38	6.7
24	8.5	39	6.6
25	8.4	40	6.5
26	8.2	41	6.4
27	8.1	42	6.3
28	7.9	43	6.2
29	7.8	44	6.1
30	7.7	5	6.0

APPENDIX 3

VALVES FOR OBTAINING SAMPLES FROM REACTOR COOLANT

SAMPLE SOURCE	REMOTE PLANT ISOLATION VALVE (RPIV)	REMOTE SOURCE ISOLATION VALVE (RSIV)	REMOTE FLUSH ISOLATION VALVE (RFIV)	LSP SAMPLE SOURCE VALVE (SSV)
RC Hot Leg 1	9351 A	FCV-692	FCV-1416	RC-V-1.1
RC Hot Leg 4	9351 B	FCV-692	FCV-1416	RC-V-1.1
PZR Liquid	9350 B	FCV-693	FCV-1417	RC-V-1.2
PZR Steam	9350 A	FCV-694	FCV-1418	RC-V-1.3
RHR Pump 1-1 Discharge	9353 A	FCV-1413	FCV-1419	RC-V-1.4
RHR Pump 1-2 Discharge	9353 B	FCV-1413	FCV-1419	RC-V-1.4
VCT Liquid	N/A	FCV-1412	FCV-1420	RC-V-1.5
Rx Cavity Sump	FCV-696 FCV-697	N/A	FCV-1423	RW-V-2.1
Floor Drn Recvr	N/A	FCV-1415	FCV-1425	RW-V-2.2
Equipm Drn Recvr	N/A	FCV-1414	FCV-1424	RW-V-2.3

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

NUMBER EP RB-16:A
REVISION 2
DATE 1/21/85
PAGE 1 OF 16

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

TITLE EMERGENCY OPERATING PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM
-- INITIAL ACTIONS DURING AN EMERGENCY

APPROVED R. C. Thomas 3/29/85
PLANT MANAGER DATE

PURPOSE

The purpose of this procedure is to define some of the actions taken when a decision is made by the Site Emergency Coordinator to obtain a post accident sample using the Post Accident Sample System (PASS).

This procedure guides, with consideration of plant emergency radiation hazards, the Sentry team to access and make operable the Sentry room. It also guides the team to withdraw from the Sentry room upon sample acquisition. This procedure is a guideline to emergency conditions. Actual system usage will be described in CAP G-4 for liquid sampling or G-5 for off gas. This procedure and changes thereto requires PSRC approval.

DISCUSSION

This procedure ensures sample recovery with a minimum risk to personnel in a limited time frame.

The movable shield in the 85' penetration area will usually block that access route. Therefore ingress and egress may be required across the RCA boundary. Performance of this procedure may require the transfer of radioactive samples to non-RCA's. For these reasons this procedure involves exemptions from certain routine RCA access requirements. Personnel implementing this procedure should be covered by an SWP during an accident, drill, or drill-like training. Routine use of the Sentry room is covered by the C&RP routine sampling RWP.

Particularly hazardous or unexpected conditions may occur in post accident situations. Direction by appropriate supervision may augment or supercede portions of this procedure because every possibility cannot be anticipated.

PREREQUISITES AND PRECAUTIONS

1. The Site Emergency Coordinator should pre-plan post-accident sampling with the Emergency Radiological Advisor and the Site Chemical and Radiation Protection Coordinator prior to ordering a plant entry (i.e., prior to deciding to collect a post-accident sample) when unusually hazardous radiation or contamination levels are known or suspected to exist.

2. A sufficient number of properly qualified personnel to complete the task should be available prior to making the post accident sample decision. This might include:

   a. Two people on the Sentry team; one of whom is a qualified C&RP Technician and the other an Unescorted Radiation Worker.

   b. A sample transporter qualified as a C&RP Technician.

   c. A count room qualified person in the TSC lab.

3. The Work Permit will specify protective equipment. Unless conditions warrant less stringent requirements, it is suggested that full PC's, SCBA's and accident dosimetry be worn.

4. The Sentry team will make a post-accident entry to the plant only when directed by supervision and when possessing a high range portable survey meter to permit surveying into areas of unknown radiological conditions.

5. The Sentry team should be informed of plant status as it pertains to significant hazards, both radiological and non-radiological, along access routes.

6. Exposure hazards, both airborne and direct radiation, in the Sentry room should be monitored remotely for pre-entry status and locally for tracking while sampling.

   a. Use the Eberline Control Terminal(s) in either Access Control or the cold machine shop to remotely address the SPING air monitor in the Sentry room, which can be read locally.

b. Area radiation monitor RE-48, in the Sentry room, can be read in the Control Room or locally.

7. Communications are vital during a plant emergency. Entry teams must be able to communicate with the Control Room and appropriate supervision.

8. C&RP Technicians have the [redacted] key required for access to areas and equipment related to this procedure and have security key cards to enter door #116 or #197. If the Sentry team does not possess either of these then take the applicable master keys located in the [redacted] The key to the 85' elev. post-accident equipment locker is [redacted] located in the [redacted]

9. The containment isolation valves FCV-696, 697, 698, 699 and 700 are controlled from the Containment Isolation Valve Panel in the Sentry Room only. These switches require a key to operate. Keys are located [redacted]

10. It is important to conduct operations in an expeditious manner to provide timely vital plant status information.

PROCEDURE

1. Access to Sentry Room Area

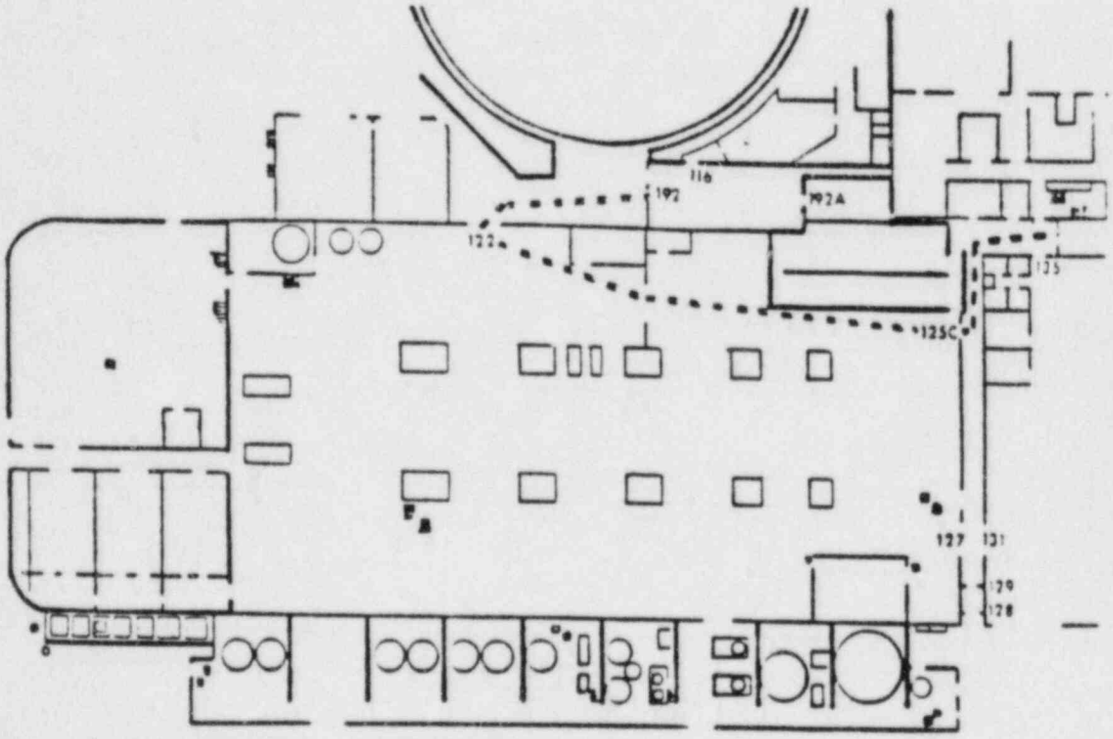
The Diablo Canyon Shielding Review indicates that the following routes might minimize exposures.

a. Via Turbine Building at 85' Elevation

1) Unit 1

Starting at the Cold Machine Shop proceed into the hallway to door #125C, proceed north to door #122 and exit building. From here turn south and enter door #192 to the Motor Repair Shop.

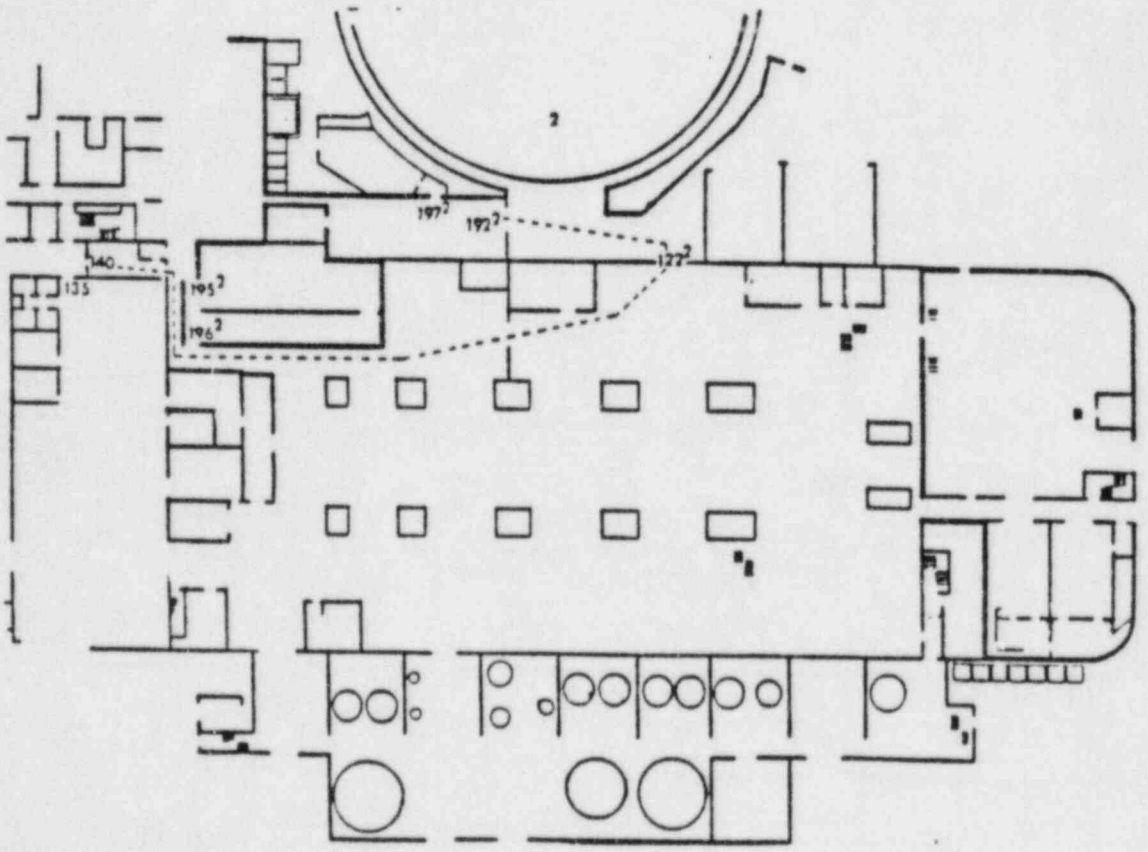
FIGURE 1a



2) Unit II

Starting at the Cold Machine Shop proceed into the hallway to door #140, proceed south to door #122 and exit building. From here turn north and enter #192 to the Motor Repair Shop.

FIGURE 1b

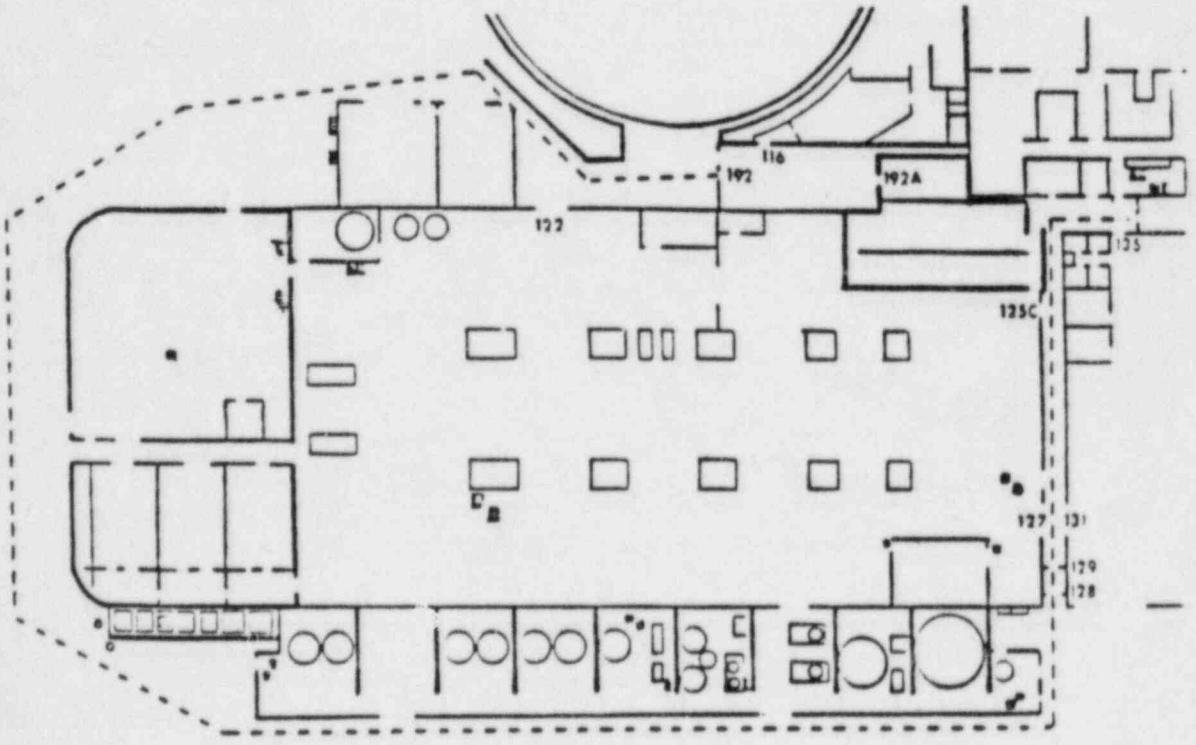


b. Around Turbine Building at 85' Elevation

1) Unit I

Starting at the Cold Machine Shop proceed west to the outside via door #129, turn right and continue north around the Unit 1 Turbine Building looping around the transformers at the north end of the plant. Continue south to door #192 between containment and the Turbine Building. Enter the Motor Repair Shop via door #192.

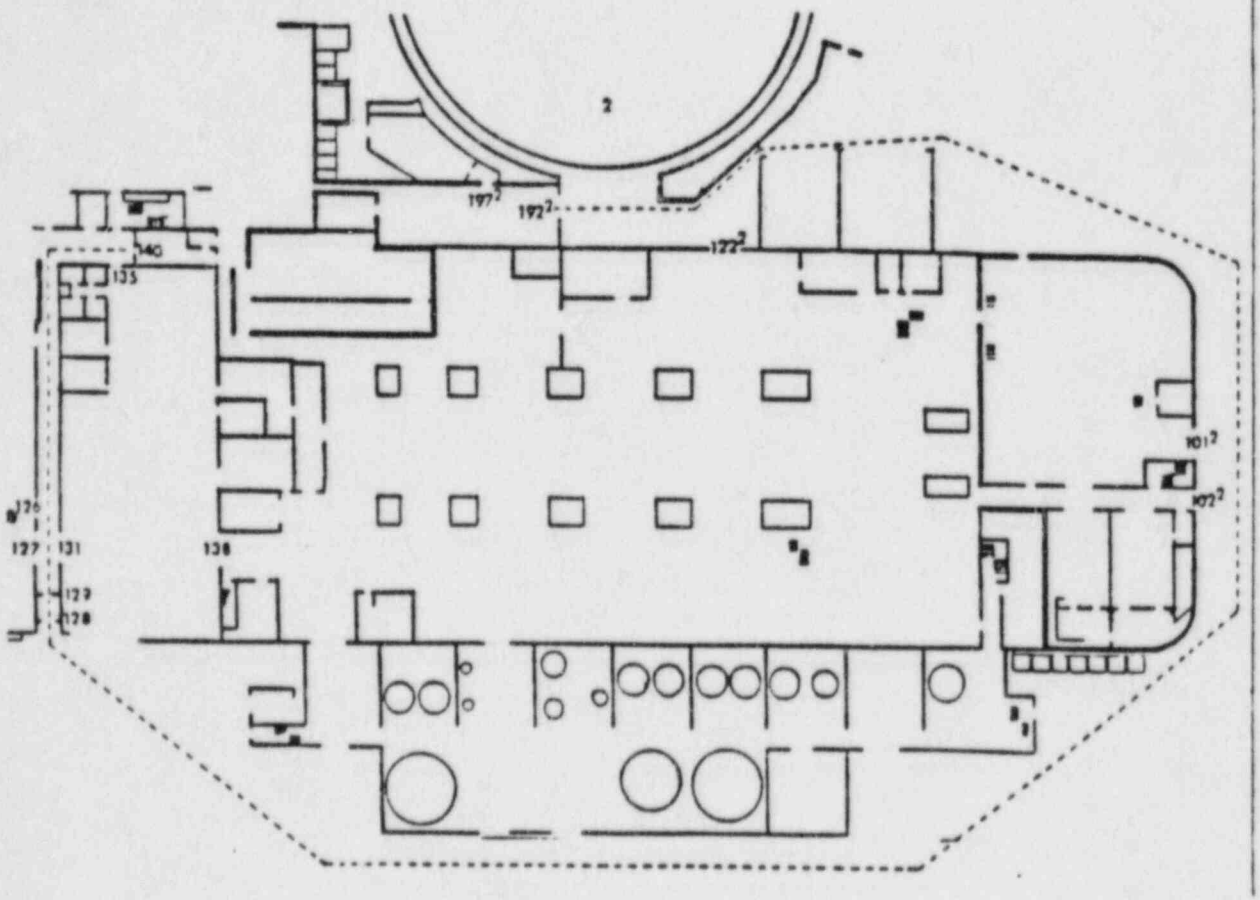
FIGURE 2a



2) Unit II

Starting at the Cold Machine Shop proceed to the outside via door #129, turn left and continue south around the Unit II Turbine Building looping around the transformers at the south end of the plant. Continue north to door #192 between containment and the Turbine Building. Enter the Motor Repair Shop via door #192.

FIGURE 2b



c. Other Access Routes

The Figure 1a or 1b pathway is preferred. However an access route other than those above may be suggested by actual post accident conditions (e.g., fire, high energy line break, etc.). The final route selected should be directed by appropriate supervisory personnel.

2. Initial Set-up of Sentry Room Equipment

a. Gas Supply Cylinders Check

The gas supply cylinders for Sentry Room equipment are located along the east wall of the Motor Repair Shop. Proceed to the gas storage rack and verify the following:

1) The cylinder valves are fully open for all three cylinders.

2) The manifold valves are fully open for all three cylinders.

3) The argon regulator shows tank pressure of approximately 1000 psig and the regulator is set to 100 psig.

NOTE: If argon tank pressure is much less than 1000 psig, then the cylinder has to be changed with the spare cylinder located at the storage rack.

4) The 2000 ppm and 10% H_2 span gas cylinders should have at least 100 psig and both regulators should be set at 10 psig.

b. Emergency Ventilation System Line-up. (Optional. If proper ventilation is lined up proceed to step 2.c., Steel Shield Door Closure).

1) Climb the ladder to the cat walk and cross to enter the ventilation room. [redacted]

NOTE: Minimize the time that the vent room doors are oper.

2) Proceed to breaker panel PPHRS, 52-12J-35 and check all breakers ON.

3) Proceed to the motor controllers for fans and heaters located to the left of the breaker panel and push the STOP and RESET pushbutton on each one.

4) EMER LEAD (IS-150) is the preferred system.

a) Open its supply and exhaust dampers and the supply and exhaust vent dampers (a total of 4 dampers) and close all other dampers.

b) Push the START pushbuttons on the motor controllers for the EMER LEAD supply fan, exhaust fan, and heater 29A, in that order.

5) EMER REDUN (IS-151) is to be used as a backup if EMER LEAD is inoperable.

a) Open its supply and exhaust dampers and the supply and exhaust vent dampers and close all other dampers.

b) Push the START pushbutton on the motor controllers for the EMER REDUN supply fan, exhaust fan and heater 29B, in that order.

6) Return to the Motor Repair Shop.

c. Steel Shield Door Closure. (Optional. If the shield door is closed proceed to step 2.d., Radiological Assessment.)

1) Proceed through door #192-A[1] south of the Unit I Motor Repair Shop or door #192-A[2] north of the Unit II Motor Repair Shop, and visually check the shield door's winch cable. If the marked portion of the cable indicates the shield is closed return to the Motor Repair Shop and proceed with step d., Radiological Assessment below.

2) Operate the winch until the marked portion of the cable visibly indicates the shield door is closed.

3) Return to the Motor Repair Shop.

d. Radiological Assessment of Sentry Room

1) Enter the Sentry room via the boundary (door #116 or #197) and the watertight door. [redacted]

2) Perform a general area radiation survey

a) Note high levels such as might exist at the auxiliary building end of the room due to ECCS piping.

b) Note low level areas for sample screen surveying later.

3) Note the reading of RE-48 on the Process Control Panel (PCP). Recheck it intermittently.

4) Monitor airborne radioactivity using the SPING. If airborne levels permit the respirator, if worn, may be removed at this time. It should be donned anytime there is a potential for airborne contamination to be introduced into the room.

e. Proceed to the Ventilation Control Panel.

1) Check the alarms.

a) Press TEST and note the red alarm indicators flash while the audible alarm sounds.

b) Press SILENCE to stop the audible alarm.

c) Press ACK and note the flashing alarm indicators glow steadily.

d) Press RESET and note the red alarm indicators go out.

2) If the NORMAL VENT switch is on, turn it off.

3) If the EMER LEAD ventilation system is desired and is not operating depress in order the SUPPLY, EXHAUST, and HEATER pushbuttons.

4) Observe the appropriate indicating lights for proper operation of the desired ventilation line-up.

5) If necessary, return to step 2.b., Emergency Ventilation Line-up.

f. Containment Atmosphere Sample Line Heating

1) Proceed to the CCP and position the FUNCTION SELECT from OFF to SF1-3/GGD.

2) Observe the following:

a) The POWER ON indicator lights.

b) The flow monitor 20% and 100% flow lights turn on for approximately 25 seconds.

3) Press the PILOT LIGHT TEST pushbutton and note which lights are not functional.

4) Turn the HEAT TRACE POWER SWITCH to the ON position.

5) Place the temperature select switches for EHT 196 and EHT 197 to the down position marked 260°.

g. Rear Panel Access Rolling Shield Closure.

If the panel rolling shield is closed proceed to step 3., Electrical Line-up.

1) Perform this valve line-up check in the rear of the shielded panels:

CAP-V-13 CLOSED (above the GC) [ ]

CAP-V-31 OPEN (adjacent to the GC) [ ]

CAP-V-32 OPEN (adjacent to the GC) [ ]

CASP-V-1 OPEN (overhead on cont. atmos. supply line) [ ]

CASP-V-2 OPEN (lower part of CASP) [ ]

CASP-V-3 OPEN (mid part of CASP) [ ]

2) Get the come-a-long from the cabinet and attach one end to the pad eye on the east wall and the other to the pad eye on the door.

3) Operate the come-a-long until the rolling shield is blocking the doorway.

3. Electrical Line-up

Proceed to the breaker panel PYNM , located next to the Vent Control Panel, and check positions of breakers as follows:

BKR #1 - ON	[ ]	BKR #2 - ON	[ ]
BKR #3 - ON	[ ]	BKR #4 - ON	[ ]
BKR #5 - ON	[ ]	BKR #6 - ON	[ ]
BKR #7 - ON	[ ]	BKR #8 - ON	[ ]
BKR #9 - ON	[ ]	BKR #10 - ON	[ ]
BKR #11 - ON	[ ]	BKR #12 - ON	[ ]
		MAIN BKR - ON	[ ]

4. The Containment Atmosphere Hydrogen Analyzers

The two redundant analyzer systems' remote panels are between the PCP and the CMP. Beneath each panel are the switches for controlling the three sample line containment isolation valves. The reagent gas tank (oxygen) is against the auxiliary building wall of the Sentry Room.

a. Initial Conditions of an Analyzer System

1) Main power switch at remote panel in STANDBY. [ ]

NOTE: If the power switch is OFF, then turn it to STANDBY and give the system six hours to warm up. If both systems have not been in STANDBY for at least six hours, or are otherwise inoperable, use the gas chromatograph, step 5, below. Record the time of switching from OFF to STANDBY _____ .

2) Solenoid operated sample line containment isolation valve switches CLOSED. (FCV-235, 236, 237, 238, 239, 240) [ ]

3) Oxygen gas tank connected and isolation valve closed. (Tank should be changed at 100 psig) [ ]

b. H_2 Analyzer System(s) Operation.

	CEL: 82	83
1) Turn the three sample line switches to the OPEN position. Observe the position indicating lights.	[ ]	[ ]
2) Open the oxygen tank isolation valve and adjust regulator to 27 ± 2 psig.	[ ]	[ ]
3) Turn the main power switch from STANDBY to ANALYZE.	[ ]	[ ]
4) Push the REMOTE SELECTOR pushbutton to gain control at this panel and reset COMMON ALARM, if necessary.	[ ]	[ ]
5) Turn the dual range switch to the 0-10% range.	[ ]	[ ]

		CEL: 82	83
6)	Adjust the ZERO and SPAN potentiometers until they agree with their respective values indicated on calibration stickers located under each potentiometer.	[ ]	[ ]
7)	Turn the function selector switch to SAMPLE. TIME(82) _____ (83) _____	[ ]	[ ]
8)	If both CEL 82 and 83 are to be used, repeat steps 4.b.1) to 7) for the second system while waiting for the first system to stabilize, which takes approximately 6 minutes.	[ ]	[ ]
9)	Proceed with step 6., Initial Valve Line Up, while waiting for stabilization. When 6 minutes have elapsed since switching to SAMPLE, continue with step 10) below.	[ ]	[ ]
10)	Record the analyzer meter reading, the time read, and the scale used. Meter Reading (%) _____ Time _____ Scale Used _____	[ ]	[ ]
	NOTE: If the meter reads greater than 9%, the 0-20% scale should be used.		
11)	Inform the Control Room of which scale and CEL is used and ask the Control Room if the analyzer(s) are to remain in ANALYZE or be returned to STANDBY.	[ ]	[ ]
	NOTE: Advise the Control Room of the reagent gas depletion and the limited lifetime of the sample pumps, which are located in the 100' El. penetration area.		
12)	If directed to leave the analyzer(s) in ANALYZE proceed with step 5, CMP/CAP Power Up...	[ ]	[ ]

CEL: 82 83

c. Standby

1) Turn the function selector to ZERO and purge the analyzer for 6 minutes. [ ] [ ]

2) Turn the main power switch to STANDBY. [ ] [ ]

3) Close the reagent tank isolation valve. [ ] [ ]

4) Turn the three sample line isolation valve switches to the CLOSED position. [ ] [ ]

5) Push Common Alarm to Reset [ ] [ ]

5. Proceed with INITIAL ACTIONS using CAP G-4:A step 1.d if taking a liquid sample or CAP G-5 step 1.d for containment air.

REFERENCES

1. Sentry Equipment Corp. High Radiation Sampling Systems Operations and Maintenance Manual.

APPENDICES

1. Reagent Preparation

ATTACHMENT 1

REAGENT PREPARATION

NOTE: Reagents must have a shelf life of 30 days. Reagents must be made using demin water with a conductance of less than 1 μmho.

1. E1/E2 Eluent - 2mM NaOH/2.4mM Na_2CO_3

   Add 0.32g NaOH and 1.00g Na_2CO_3 (anhydrous) to 4.0 liters of demineralized water, dissolve and mix.

2. 1N H_2SO_4

   Add with stirring 120 ml of concentrated sulfuric acid to 4 liters of demin water and cool. Transfer the solution of a 4 liter collapsable container, remove excess air, and label container with initials and date. Connect it to the line REGEN SYSTEM-1. Open the container valve and vent pump inlet lines.

3. Demineralized Water Rinse

   Fill a four (4) liter collapsable container with demin water. Remove excess air from the bottle and label. Connect it to the water line in the reagent storage facility. Open the container valve and vent pump inlet lines.

4. Chloride Standard

   Add 2ml of 1000ppm chloride standard and 22.9 ± 0.1g H_3BO_3 to two separate 2 liter volumetric flasks. Dilute each flask to the mark, with demin water. The cal tank holds 3.5 liters.

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

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

TITLE EMERGENCY OPERATING PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM
-- DILUTED LIQUID SAMPLING FROM RADWASTE

NUMBER	EP RB-16:B4
REVISION	2
DATE	3/7/85
PAGE	1 OF 7

APPROVED R. E. Thornton 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of this procedure is to detail the steps required to obtain a diluted liquid sample from the radwaste module during accident conditions and complete module flushing.

Sample sources addressed are Reactor Cavity Sump, Equipment Drain Receiver, Floor Drain Receiver and RHR Pump Room sump.

The containment isolation valves FCV-696 and FCV-697 are controlled from the Containment Isolation Valve Panel in the Sentry Room only. These switches require a key to operate. [redacted] These valves are to be opened only during an emergency or for testing.

PREREQUISITES

1. System was initially lined up as described in procedure EP RB-16:A.

2. Verify that the following annunciator windows are off on the PCP:

   a. RADWASTE SAMPLE COOLING WATER LOW FLOW

   b. RADWASTE SAMPLE COOLING WATER LOW PRESS

   c. RADWASTE SAMPLE COOLING WATER HIGH TEMP

   d. RADWASTE HIGH TEMP

   e. LIQUID SAMPLE PANEL HIGH PLENUM PRESS

3. The following equipment must be available and operational:

   a. Meter-long reach rod

b. Hand operated vacuum pump

c. Sample cart/cask with 60 ml lift rod assembly

d. A prelabeled 60 ml sample bottle with a new septum

1) The label should have the sample source, date, estimated time of sample, and the initials of the person taking the sample (from this point estimate 21 minutes).

PRECAUTIONS

1. This sampling involves processing of water that will be highly radioactive. Precaution should be taken to prevent skin contact or ingestion.

2. Time in a radiation field should be limited to that necessary to perform the required operations. During purge and flush periods, it may not be necessary to stand near the panels and consideration should be given to moving to a low dose rate area.

3. A dose rate instrument should be on and periodic monitoring is suggested during purge and sampling exercises.

PROCEDURE

1. Verify RW-DV-1 is turned to BYPASS. Fill reservoir RW-R-1 with demin water. [ ]

a. Open RW-V-10 and RW-V-9. [ ]

b. Adjust reservoir RW-R-1 until the water level in graduated cylinder RW-C-1 is at least 100 ml. [ ]

c. Close RW-V-9 and RW-V-10. [ ]

2. Insert the needle of the hand operated vacuum pump into the septum of the prelabeled 60 ml sample bottle: [ ]

a. Evacuate to the maximum vacuum achievable with the pump. The vacuum must be at least 15" of Hg. [ ]

b. Keep the pump connected to the bottle for 1 minute to assure that the bottle retains the vacuum. [ ]

3. Turn on the switch to light the diluted bottle fill station. [ ]

4. Remove the bottle from the vacuum pump and place the bottle on the cart/cask assembly cavity piston. [ ]

   a. Turn the direction valve for the hydraulic piston to one down position and lower the bottle into the cask cavity. [ ]

   b. Close and open the cask to verify that the cover is working properly. [ ]

   c. Position the cart/cask under the diluted radwaste fill station needle and set the brake. [ ]

   d. Turn the direction valve for the hydraulic piston to the up position and raise the bottle onto the needle. [ ]

5. Align RW-V-8 to the 9 o'clock position. [ ]

   Align RW-V-4 to the SAMPLE position. [ ]

6. Sample Purging

   Reactor Cavity Sump:

   Coordinate with Operations to turn on the reactor cavity sump pumps, then open containment isolation valves FCV 500 and 501 for one minute and then close. Open valves FCV 696 and 697. Containment isolation valves FCV 696 and 697 are key operated valve switches controlled in the Sentry Room at the POST LOCA CNT ISOLATION PANEL.

   Equipment Drain Receiver or Floor Drain Receiver:

   Coordinate with Operations to have EDR or FDR placed on recirculation for Post Loca Sampling.

   RHR Room Sump:

   Verify with control room that RHR room high level is indicated. Coordinate with Operations to transfer the entire contents of a FDR to another holding tank or overboard. Manually pump down RHR room sump to the empty FDR and place FDR on recirc for Post Loca Sampling.

a. Open the corresponding remote plant isolation valve (RPIV), remote source isolation valve (RSIV), at the PCP (see Appendix 1 for proper valve). [ ]

b. Close the remote flush isolation valve at the PCP. [ ]

NOTE: The sample source valves are labeled RW-V-2.1 thru RW-V-2.3. Throughout this procedure, the form RW-V-2.X will be used to indicate the source valve to be operated. The sample source used for sampling will have been given at the briefing by the Site Chem and Rad Protection Coordinator.

c. Slowly open Sample source valve RW-V-2.X (see Appendix 1 for proper valve) until RW-FI-1 indicates 100% flow or 200 cc/min. Purge to waste for 7 minutes. [ ]

7. Sampling

a. Turn RW-V-8 to BYPASS. [ ]

b. Close RW-V-2.X. [ ]

c. Close FCV-696 and FCV-697 if opened earlier and notify the control room when closed. [ ]

8. Initial Flushing

a. At the PCP, close the remote source isolation valve if applicable. [ ]

b. Slowly open RW-V-3 until RW-FI-1 indicates 30% flow or 60 cc/min. Flush with demin water for 2 minutes. [ ]

c. Slowly open RW-V-2.X until RW-FI-1 indicates 30% flow or 60 cc/min. Flush with demin water for 3 minutes. [ ]

d. Close RW-V-2.X and RW-V-3. [ ]

e. At the PCP, open the remote flush isolation valve (see Appendix 1 for proper valve). Flush with demin water for 6 minutes. [ ]

f. Close the remote flush isolation valve at the PCP. [ ]

9. Sample Dilution

   a. Turn RW-DV-1 to SAMPLE. [ ]

   b. At RW-C-1, read initial ml _____.

      Crack open RW-V-9 and add 23 mls of water from RW-C-1 to the sample bottle, then close RW-V-9.

      Read final ml _____

      Record the volume added. _____mls

   c. Turn RW-DV-1 to BYPASS. [ ]

   d. Place the direction valve for the hydraulic piston in the down position and slowly lower the bottle into the cask. [ ]

   e. Close the cask. [ ]

10. Sample Cask/Cart Removal

   a. Release the brake and remove the cart/cask from the sample station. [ ]

   b. Perform a radiation and contamination survey on the cart/cask assembly and transfer the sample according to the appropriate EP RB-16 Subprocedure. [ ]

11. Turn off the diluted fill station light. [ ]

12. If sample is to be analyzed at CAP:

   a. Turn RW-V-4 to CHEM PANEL. [ ]

   b. Proceed to EP RB-16 Section G for I.C. Analysis and/or Section H for pH/conductivity/DO. [ ]

   c. After analyses return to this section.

13. Final Flushing

   a. Turn RW-V-8 to the 9 o'clock position. [ ]

b. Slowly open RW-V-3 until RW-FI-1 indicates 100% flow or 200 cc/min. Flush with demin water for 2 minutes. [ ]

c. Turn RW-V-8 to BYPASS. [ ]

d. Terminate flushing by closing the following valves:

RW-V-3 [ ]

14. Close Sample Cooler Water. [ ]

15. Using procedure EP RB-16:E, aliquot and analyze the diluted liquid sample for boron and specific activity. [ ]

16. Process the data according to EP RB-16:F. [ ]

REFERENCES

1. Sentry Equipment Corp. High Radiation Sampling System Operating and Maintenance Manual.

APPENDICES

1. Valves for Obtaining Samples from Radwaste.

APPENDIX 1

VALVES FOR OBTAINING SAMPLES FROM RADWASTE

SAMPLE SOURCE	CONTAINMENT ISOLATION VALVES	REMOTE SOURCE ISOLATION VALVE	REMOTE FLUSH ISOLATION VALVE	LSP SAMPLE SOURCE VALVE
Rx Cavity Sump	FCV-696 FCV-697	Not Applicable	FCV-1423	RW-V-2.1
Floor Drn Recvr	Not Applicable	FCV-1415	FCV-1425	RW-V-2.2
Equip Drn Recvr	Not Applicable	FCV-1414	FCV-1424	RW-V-2.3

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

DEPARTMENT OF NUCLEAR PLANT OPERATIONS

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2
EMERGENCY OPERATING PROCEDURE
SENTRY POST-ACCIDENT SAMPLING SYSTEM
TITLE -- UNDILUTED LIQUID SAMPLING FROM RADWASTE

NUMBER	EP RB-16:B5
REVISION	2
DATE	3/7/85
PAGE	1 OF 7

APPROVED R. C. Thomas 3/29/85
PLANT MANAGER DATE

DISCUSSION

The purpose of the procedure is to detail the steps required to obtain an undiluted radwaste liquid sample during accident conditions and complete module flushing. Sample sources addressed are Reactor Cavity Sump, Equipment Drain Receiver, Floor Drain Receiver and RHR Pump Room Sump.

PREREQUISITES

1. System was initially lined up as described in procedure EP RB-16:A.

2. Verify that the following annunciator windows are off on the PCP:

   a. RADWASTE SAMPLE COOLING WATER LOW FLOW

   b. RADWASTE SAMPLE COOLING WATER LOW PRESS

   c. RADWASTE SAMPLE COOLING WATER HIGH TEMP

   d. RADWASTE HIGH TEMP

   e. LIQUID SAMPLE PANEL HIGH PLENUM PRESS

3. The following equipment must be available and operational:

   a. Meter-long reach rod

   b. Needle flush tool with demin water in a 15 ml sample bottle and a new septum.

   c. Sample cart/cask with the 15 ml lift rod assembly.

   d. A prelabeled 15 ml sample source, date, estimated time of sample, and the initials of the person taking the sample (from this point estimate 16 minutes).

PRECAUTIONS

1. This sampling involves processing of water that will be highly radioactive. Precautions should be taken to prevent skin contact or ingestion.

2. Time in a radiation field should be limited to that necessary to perform the required operations. During purge and flush periods, it may not be necessary to stand near the panels and consideration should be given to moving to a low dose rate area.

3. A dose rate instrument should be on and periodic monitoring is suggested during purge and sampling exercises.

PROCEDURE

1. Turn on the switch to light the undiluted fill station. [ ]

2. Place the bottle on the cart/cask assembly cavity piston. [ ]

   a. Turn the direction valve for the hydraulic piston in the down position and lower the bottle into the cask cavity. [ ]

   b. Close and open the cask to verify that the cover is working properly. [ ]

   c. Position the cart/cask under the undiluted radwaste fill stations needles and set the brake. [ ]

   d. Turn the direction valve for the hydraulic piston to the up position and raise the bottle onto the needles. [ ]

3. Sample purging

   Reactor Cavity Sump:

   Coordinate with Operations to turn on the reactor cavity sump pumps, then open containment isolation valves FCV 500 and 501 for one minute. Close isolation valves FCV 500 and 501 and open valves FCV 696 and 697. Containment isolation valves FCV 696 and 697 are key operated valve switches controlled in the Sentry Room at the POST LOCA CNT ISOLATION PANEL.

Equipment Drain Receiver or Floor Drain Receiver:

Coordinate with Operations to have EDR or FDR placed on recirculation for Post Loca Sampling.

RHR Room Sump:

Verify with control room that RHR room high level is indicated. Coordinate with Operations to transfer the entire contents of FDR to another holding tank or overboard. Manually pump down RHR room sump to FDR and place FDR on recirc for Post Loca Sampling.

a. Align RW-V-4 to the SAMPLE position. [ ]

b. Open the corresponding remote plant isolation valve (RPIV), remote source isolation valve (RSIV), the PCP (see Appendix 1 for proper valve). [ ]

c. Close the remote flush isolation valve at the PCP (see Appendix 1 for proper valve). [ ]

NOTE: The sample source valves are labeled RW-V-2.1 thru RW-V-2.3. Throughout this procedure, the form RW-V-2.X will be used to indicate the source valve to be operated. The sample source used for sampling will have been given at the briefing by the site Chem and Rad Protection Coordinator.

d. Slowly open the sample source valve RW-V-2.X (see Appendix 1 for proper valve) until RW-FI-1 indicates 100% flow or 200 cc/min. Purge to waste for 7 minutes. [ ]

4. Sampling

a. Adjust RW-V-2.X until RW-G-1 indicates 20 psig or less. [ ]

CAUTION: Do not exceed 20 psig on RW-G-1in these steps.

b. Turn RW-V-7 to SAMPLE. [ ]

c. Adjust RW-V-2.X until RW-G-1 indicates 20 psig or RW-FI-1 indicates 40% flow or 80 cc/min. Purge for 1 minute. [ ]

d. Close RW-V-2.X. [ ]

e. Let RW-G-1 return to 0 psig and wait 30 seconds to allow bottle to depressurize. [ ]

f. Turn RW-V-7 to BYPASS. [ ]

g. Close FCV-696 and FCV-697 if opened earlier and notify control room when closed. [ ]

5. Sample Cart/Cask Removal

a. Turn the direction valve for the cart cask hydraulic piston to the down position and slowly lower the bottle into the cask. [ ]

b. Close the cask. Release the brake and remove the cart/cask from the sampling station and away from the LSP. [ ]

c. Install and secure the auxiliary shield. [ ]

d. Install and secure the needle flush tool containing a 15 ml sample bottle onto the undiluted radwaste fill station needles. [ ]

6. Initial flushing

a. At the PCP, close the sample source isolation valve. (See Appendix 1) [ ]

b. Slowly open RW-V-3 until RW-FI-1 indicates 30% flow or 60 cc/min. Flush with demin water for 3 minutes. [ ]

c. Slowly open RW-V-2.X until RW-FI-1 indicates 30% flow or 60 cc/min. Flush with demin water for 3 minutes. [ ]

d. Close RW-V-2.X and RW-V-3. [ ]

e. At the PCP, open the remote flush isolation valve (see Appendix 1 for proper valve). Flush with demin water for 6 minutes. [ ]

f. Close the remote flush isolation valve at the PCP. [ ]

7. If sample is to be analyzed at CAP:

a. Turn RW-V-4 to CHEM PANEL. [ ]

b. Proceed to EP RB-16 Section G for I.C. Analysis and/or Section H for pH/conductivity/DO. [ ]

c. After analyses return to this section. [ ]

8. Final Flushing

a. Turn RW-V-7 to SAMPLE [ ]

CAUTION: Do not exceed 20 psig on RW-G-1 in this step.

b. Slowly open RW-V-3 until RW-G-1 indicates 20 psig or RW-FI-1 indicates 30% flow or 60 cc/min. Purge for 2 minutes. [ ]

c. Close RW-V-3 and let RW-G-1 return to 0 psig. Wait 30 seconds to allow the bottle to depressurize. [ ]

d. Turn RW-V-7 to BYPASS. [ ]

9. Turn off the undiluted fill station light. [ ]

10. Remove the needle flush tool and survey bottle for disposal. [ ]

11. Perform a radiation and contamination survey on the cart/cask assembly and move the sample according to the appropriate EP RB-16 Subprocedure. [ ]

12. Close Sample Cooler Water. [ ]

13. Using Procedure EP RB-16:E, aliquot and analyze the diluted liquid sample for boron and specific activity. [ ]

14. Process the data according to EP RB-16:F.

REFERENCES

1. Sentry Equipment Corp. High Radiation Sampling System Operating and Maintenance Manual.

APPENDICES

1. Valves for Obtaining Samples from Radwaste.

APPENDIX 1

VALVES FOR OBTAINING SAMPLES FROM RADWASTE

SAMPLE SOURCE	CONTAINMENT ISOLATION VALVES	REMOTE SOURCE ISOLATION VALVE	REMOTE FLUSH ISOLATION VALVE	LSP SAMPLE SOURCE VALVE
Rx Cavity Sump	FCV-696 FCV-697	Not Applicable	FCV-1423	RW-V-2.1
Floor Drn Recvr	Not Applicable	FCV-1415	FCV-1425	RW-V-2.2
Equip Drn Recvr	Not Applicable	FCV-1414	FCV-1424	RW-V-2.3