Duke Power
A Duke Energy Company

Gary R. Peterson
Vice President

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Catawba Nuclear Station
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December 2, 1999

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Energy Corporation
Catawba Nuclear Station Units 1 and 2
Docket Nos. 50-413 and 50-414
Emergency Plan Implementing Procedures

Please find enclosed for NRC Staff use and review the following Emergency Plan Implementing Procedures:

HP/1/B/1009/017, Post Accident Containment Air Sampling System (Rev. 001)

HP/2/B/1009/017, Post Accident Containment Air Sampling System (Rev. 000)

These revisions are being submitted in accordance with 10CFR 50.54(q) and do not decrease the effectiveness of the Emergency Plan Implementing Procedures or the Emergency Plan. Please replace HP/0/B/1009/017, Post Accident Containment Air Sampling System (Rev. 013) with these two procedures. New tabs have been ordered and will be forwarded to you soon.

This submittal was delayed (greater than 30 days) due to a procedure approval process error that allowed the procedures to be approved and issued without the performance of the 10CFR50.54(q) evaluation and transmittal of the procedures for proper distribution. The procedure approval process is being revised through our corrective action process to prevent future errors of this nature.

Both of these procedures are initial issues, though HP/1/B/1009/017 is revision 001. This procedure number had been used previously in 1984, then deleted so revision 000 was not available for use.

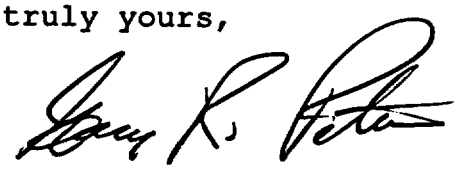
By copy of this letter, two copies of the above documents are being provided to the NRC, Region II.

A045

PDR ADOCK 05000413

If there are any questions, please call Tom Beadle at 803-831-4027.

Very truly yours,



Gary R. Peterson

Attachments

xc (w/attachments):

L. A. Reyes
U.S. Nuclear Regulatory Commission
Regional Administrator, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

(w/o attachments):

P. S. Tam
NRC Senior Project Manager (CNS)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 H12
Washington, DC 20555-0001

D. J. Roberts
Senior Resident Inspector (CNS)
U.S. Nuclear Regulatory Commission
Catawba Nuclear Site

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURES INDEX

VOLUME I

PROCEDURE	TITLE
RP/0/A/5000/001	Classification of Emergency (Rev. 012)
RP/0/A/5000/002	Notification of Unusual Event (Rev. 032)
RP/0/A/5000/003	Alert (Rev. 034)
RP/0/A/5000/004	Site Area Emergency (Rev. 035)
RP/0/A/5000/005	General Emergency (Rev. 036)
RP/0/A/5000/06	Deleted
RP/0/A/5000/006 A	Notifications to States and Counties from the Control Room (Rev. 010)
RP/0/A/5000/006 B	Notifications to States and Counties from the Technical Support Center (Rev. 010)
RP/0/A/5000/006 C	Notifications to States and Counties from the Emergency Operations Facility (Rev. 010)
RP/0/A/5000/007	Natural Disaster and Earthquake (Rev. 016)
RP/0/A/5000/08	Deleted
RP/0/B/5000/008	Spill Response (Rev. 015)
RP/0/A/5000/009	Collision/Explosion (Rev. 005)
RP/0/A/5000/010	Conducting A Site Assembly or Preparing the Site for an Evacuation (Rev. 013)
RP/0/A/5000/11	Deleted
RP/0/B/5000/12	Deleted
RP/0/B/5000/013	NRC Notification Requirements (Rev. 023)
RP/0/B/5000/14	Deleted
RP/0/A/5000/015	Core Damage Assessment (Rev. 004)
RP/0/B/5000/016	Deleted
RP/0/B/5000/17	Deleted

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURES INDEX

VOLUME I

PROCEDURE	TITLE
RP/0/A/5000/018	Emergency Worker Dose Extension (1/15/96)
RP/0/B/5000/019	Deleted
RP/0/A/5000/020	Technical Support Center (TSC) Activation Procedure (Rev. 012)
RP/0/A/5000/021	Deleted
RP/0/B/5000/022	Evacuation Coordinator Procedure (Rev. 003)
RP/0/B/5000/023	Deleted
RP/0/A/5000/024	OSC Activation Procedure (Rev. 006)
RP/0/B/5000/025	Recovery and Reentry Procedure (Rev. 002)
RP/0/B/5000/026	Response to Bomb Threat (5/30/96)
RP/0/B/5000/028	Communications and Community Relations EnergyQuest Emergency Response Plan (Rev. 000)

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURES INDEX

VOLUME II

PROCEDURE	TITLE
HP/0/B/1000/006	Emergency Equipment Functional Check and Inventory (Rev. 52)
HP/0/B/1009/001	Radiation Protection Recovery Plan (Rev. 007)
HP/0/B/1009/003	Radiation Protection Response Following a Primary to Secondary Leak (Rev. 008)
HP/0/B/1009/004	Environmental Monitoring for Emergency Conditions Within the Ten-Mile Radius of CNS (Rev. 0)
HP/0/B/1009/005	Personnel/Vehicle Monitoring for Emergency Conditions (Rev. 016)
HP/0/B/1009/006	Alternative Method for Determining Dose Rate Within the Reactor Building (Rev. 008)
HP/0/B/1009/007	In-Plant Particulate and Iodine Monitoring Under Accident Conditions (Rev. 018)
HP/0/B/1009/008	Contamination Control During Transportation of Contaminated Injured Individuals (Rev. 014)
HP/0/B/1009/009	Guidelines for Accident and Emergency Response (Rev. 038)
HP/0/B/1009/014	Radiation Protection Actions Following an Uncontrolled Release of Radioactive Material (Rev. 008)
HP/0/B/1009/016	Distribution of Potassium Iodide Tablets in the Event of a Radioiodine Release (Rev. 010)
HP/0/B/1009/017	Deleted
HP/1/B/1009/017	Post-Accident Containment Air Sampling System (Rev. 001)
HP/2/B/1009/017	Post-Accident Containment Air Sampling System (Rev. 000)
HP/0/B/1009/018	Deleted
HP/0/B/1009/019	Emergency Radio System Operation, Maintenance and Communication (Rev. 010)
HP/0/B/1009/024	Implementing Procedure for Estimating Food Chain Doses Under Post-Accident Conditions (Rev. 002)

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURES INDEX

VOLUME II

PROCEDURE	TITLE
HP/0/B/1009/025	Deleted
HP/0/B/1009/026	On-Shift Offsite Dose Projections (Rev. 002)
SH/0/B/2005/001	Emergency Response Offsite Dose Projections (Rev. 000)
SH/0/B/2005/002	Protocol for the Field Monitoring Coordinator During Emergency Conditions (Rev. 000)
OP/0/A/6200/021	Operating Procedure for Post Accident Liquid Sampling System II+ (Rev. 031)
SR/0/B/2000/001	Standard Procedure for Public Affairs Response to the Emergency Response Facility (Rev. 001)
SR/0/B/2000/002	Standard Procedure for EOF Commodities and Facilities (Rev. 0)
SR/0/B/2000/003	Activation of the Emergency Operations Facility (Rev. 003)

(R06-97)

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. HP/1/B/1009/017
Revision No. ~~000~~ 001
CWray 11/29/99

PREPARATION

(2) Station Catawba Nuclear

(3) Procedure Title Post Accident Containment Air Sampling System

(4) Prepared By _____ Date 5-24-99

(5) Requires 10CFR50.59 evaluation?

☒ Yes (New procedure or revision with major changes)

☐ No (Revision with minor changes)

☐ No (To incorporate previously approved changes)

(6) Reviewed By John S Rhodes (QR) Date 6-1-99

Cross-Disciplinary Review By Buford A Johnson (QR) NA 95 Date 6-2-99

Reactivity Mgmt. Review By _____ (QR) NA SBR Date 6-1-99

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval (*if necessary*)

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By for MJ Boyle Date 8 June 99

PERFORMANCE (Compare with Control Copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?

☐ Yes ☐ NA Listed enclosures attached?

☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?

☐ Yes ☐ NA Charts, graphs, etc. attached, dated, identified, and marked?

☐ Yes ☐ NA Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks (*Attach additional pages, if necessary.*)

Duke Power Company Catawba Nuclear Station **Post Accident Containment Air Sampling System** **Continuous Use**	Procedure No. HP/1/B/1009/017 Revision No. 001 Electronic Reference No. CN005CVU

Post Accident Containment Air Sampling System

1. Purpose

To describe a method for obtaining a containment air sample following a nuclear reactor accident using the Post Accident Containment Air Sampling System (PACS).

2. References

2.1 HP/0/B/1009/009 – Guidelines for Accident and Emergency Response

2.2 OP/1/A/6450/010 – Containment Hydrogen Control Systems

2.3 Duke Power Company Nuclear Station Post Accident Containment Air Sampling System Manual

3. Limits and Precautions

3.1 The combined time allotted for sampling **AND** analysis should be three hours or less from the time the decision is made to collect a sample.

3.2 The exposure to any individual while obtaining and analyzing a sample will not be in excess of federal limits.

3.3 Dose rates at PACS Sample Panel could exceed **15 R/hr.**

4. Procedure

4.1 Use of Procedure

_____ 4.1.1 Obtain a Working Copy of this procedure.

_____ 4.1.2 Initial all steps as completed by:

- RP Qualified Technicians **OR**
- RP Supervision

Initials	Printed Name	Initials	Initials

4.2 Preparation

_____ 4.2.1 Select at least two qualified RP technicians based on completed PACS Training Qualifications and Lifetime TEDE, following direction via HP/0/B/1009/009 (Guidelines for Accident and Emergency Response).
RP Supv.

_____ 4.2.2 Consider at least the following prior to proceeding to Aux.Bldg., NM Lab:
RP Supv.

- VB System operability
- MSA "Black Box" (with acceptable calibration date)
- SCBAs
- Throat microphones
- Portable survey instruments: Teletector, high range ion chamber
- Dosimetry: ED and extremity
- Route to and from NM Lab
- 1EMF2 area monitor reading
- Flashlight
- Radios
- Control points

_____ 4.2.3 Request any additional assistance from Technical Support Center (TSC) or Operations Support Center (OSC).
RP Supv.

_____ 4.2.4 Perform a Pre-Job Brief with selected personnel.
RP Supv.

4.3 Sampling

NOTE: Numbers within parenthesis (ex. #9) are locations on Post Accident Containment Air Sampling Control Panel Diagram and on Control Panel.

_____ 4.3.1 Contact Operations Shift Manager (OSM) or designee that PACS sampling is to be performed **AND** one Hydrogen Analyzer will be inoperable during sampling.

_____ _____/_____
Person Contacted Date Time

_____ 4.3.2 Request OPS complete Setup Section for Post Accident Containment Air Sampling of OP/1/A/6450/010 (Containment Hydrogen Control Systems).

_____ 4.3.3 Obtain PACS Equipment and Kit from cabinet on AB-543, HH-56.

_____ 4.3.4 Proceed to PACS nitrogen gas cylinder at door to Room 238, AB-543.

_____ 4.3.5 Verify nitrogen gas pressure on PACS cylinder is $\geq$ 100 psi.

_____ 4.3.6 IF pressure is < 100 psi, contact RP OSC Supervisor to request cylinder replacement IMMEDIATELY.

_____ 4.3.7 Proceed to PACS Control Panel inside Room 238.

_____ 4.3.8 Ensure Selector switch (#9) is in **OFF** position.

_____ 4.3.9 Move System Purge toggle switch (#20) to **NORMAL** position.

_____ 4.3.10 Move Gas Purge toggle switch (#16) to **CENTER** position.

_____ 4.3.11 Move Refill toggle switch (#24) to **OFF** (down) position.

_____ 4.3.12 Place PACS Control Panel Key into Key Lock switch (#48).

_____ 4.3.13 Turn Key Lock switch (#48) to **POWER ON**. [Power light should illuminate].

_____ 4.3.14 Turn Radiation Monitor (#3) **ON** by moving toggle switch (below meter) to **UP** position.

_____ 4.3.15 Turn Radiation Monitor (#3) selector to **BATT**.

_____ 4.3.16 Verify needle is in "Red Test Region" on right end of scale.

- IF Radiation Monitor needle is **BELOW** test region, use RP survey results to determine access to PACS Sample Panel.

_____ 4.3.17 Select appropriate rate by turning selector knob to higher scale (R/hr) or lower scale (mr/hr).

_____ 4.3.18 Record Radiation Monitor (#3) reading: _____ R/hr

_____ 4.3.19 IF Radiation Monitor (#3) readings are > 5 R/hr **OR** other problems are evident with the Monitor, notify OSC.

- Use RP Survey information to determine access requirements to PACS Sample Panel.

_____ 4.3.20 Proceed to PACS nitrogen gas cylinder outside of Room 238 door.

_____ 4.3.21 Ensure connections to cylinder are intact.

_____ 4.3.22 Ensure black knob attached to regulator on cylinder is **CLOSED** (clockwise).

_____ 4.3.23 Adjust "T" handle on regulator is **BACKED OUT** (counterclockwise) approximately three turns.

_____ 4.3.24 **OPEN** gate valve on top of PACS nitrogen gas cylinder (counterclockwise).

_____ 4.3.25 Adjust "T" handle on regulator CLOCKWISE until low pressure gauge is set at 60 psi.

_____ 4.3.26 **OPEN** (counterclockwise) black knob attached to regulator on cylinder.

_____ 4.3.27 Obtain 100 cc gas bomb and P&C with filter media from Kit.

_____ 4.3.28 Proceed to PACS Sample Panel.

_____ 4.3.29 Ensure PACS Sample Panel door is **OPEN.**

WARNING: Wear heat protective gloves while operating valves inside panel. Heat traced inlet lines may exceed 200°F.

_____ 4.3.30 Ensure valves are positioned as follows:

_____ 1NM838 System Bypass Valve is **CLOSED.**

_____ 1NM839 Inlet Isolation Valve is **OPEN.**

_____ 1NM840 Outlet Isolation Valve is **OPEN.**

_____ 4.3.31 **OPEN** the following service valves located on outer left side of Panel:

_____ VI – Turn one-quarter turn counterclockwise

_____ N_2 – Turn one-quarter turn counterclockwise

_____ 4.3.32 Disconnect quick-connect on lower right side of Panel by pulling connector toward RED side.

_____ 4.3.33 Connect P&C sample head to inlet side of Panel.

_____ 4.3.34 Proceed to PACS Control Panel.

_____ 4.3.35 Turn Selector switch (#9) to **SYSTEM PURGE.**

_____ 4.3.36 Depress and release Activate pushbutton (#10).

_____ 4.3.37 Depress and release Evac pushbutton (#17). [Evac light should illuminate]

_____ 4.3.38 Observe Vacuum Gauge (#6) drop to **–20"** Hg.

_____ 4.3.39 **WHEN** Vacuum Gauge (#6) reaches **–20"** Hg, depress and release STOP pushbutton (#19).[Evac light should go off]

CAUTION: Pressing down Gas Purge toggle switch causes vacuum gauge needle to move VERY fast.

_____ 4.3.40 Press **DOWN** Gas Purge toggle switch (#16).

_____ 4.3.41 Observe vacuum gauge needle (#6) swiftly rise to **+5"** Hg.

_____ 4.3.42 **WHEN** vacuum gauge needle (#6) reaches **+5"** Hg, return toggle switch (#16) to **CENTER** position.

_____ 4.3.43 Depress and release Evac pushbutton (#17).

_____ 4.3.44 Observe vacuum gauge (#6) needle drop to **0"** Hg.

_____ 4.3.45 **WHEN** vacuum gauge needle reaches **0"** Hg, depress and release Stop pushbutton (#19).

_____ 4.3.46 Depress and release Pump pushbutton (#18).[Light should illuminate]

_____ 4.3.47 Wait 30 seconds.

_____ 4.3.48 Depress and release Stop pushbutton (#19).[Light should go off]

_____ 4.3.49 Press **UP** Gas Purge toggle switch (#16).[Light should illuminate]

_____ 4.3.50 Wait 3 minutes.

_____ 4.3.51 Return Gas Purge toggle switch (#16) to **CENTER** position.[Light should go off]

_____ 4.3.52 Turn Selector switch (#9) to **DILUTION VOLUME EVACUATION.**

_____ 4.3.53 Depress and release Activate pushbutton (#10).

_____ 4.3.54 Observe vacuum gauge (#6) needle drop to **–20"** Hg.

_____ 4.3.55 **WHEN** vacuum gauge (#6) needle reaches **–20"** Hg, turn Selector switch (#9) to SAMPLE RECIRC.

_____ 4.3.56 Depress and release Activate pushbutton (#10).

_____ 4.3.57 Wait 5 minutes.

_____ 4.3.58 Record sample line temperature (#4): _____ °C

_____ 4.3.59 Record sample inlet line pressure (psig) (#5): _____ psig

_____ 4.3.60 Turn Selector switch (#9) to **SAMPLE DILUTION**.

_____ 4.3.61 Depress and release Activate pushbutton (#10).

_____ 4.3.62 Depress and release Slow pushbutton (#13).

_____ 4.3.63 Observe vacuum gauge (#6) needle rise to **0"** Hg.

_____ 4.3.64 **WHEN** vacuum gauge (#6) needle reaches 0" Hg, depress and release Stop pushbutton (#14).

CAUTION: **DO NOT** use Recirc Pump at any pressure other than **0"** Hg.

_____ 4.3.65 Depress and release Recirc pushbutton (#15).

_____ 4.3.66 Proceed to lower dose rate area.

_____ 4.3.67 Wait 10 minutes.

_____ 4.3.68 Return to PACS Control Panel.

_____ 4.3.69 Turn Selector switch (#9) to **SYSTEM PURGE**.

_____ 4.3.70 Ensure dose rate on Radiation Monitor (#3) decreases **OR** stabilizes before continuing.

- **IF** dose rate has not decreased or stabilized, notify OSC/RP Supervisor.

_____ 4.3.71 Depress and release Activate pushbutton (#10).

_____ 4.3.72 Record Radiation Monitor (#3) reading: _____ R/hr

_____ 4.3.73 Turn Key Lock switch (#48) to power **OFF**.

_____ 4.3.74 Proceed to PACS Sample Panel.

_____ 4.3.75 Disconnect 100 cc gas bomb and P&C sample head.

_____ 4.3.76 Replace quick-connect.

_____ 4.3.77 **CLOSE** VI and N_2 valves by turning one-quarter turn CLOCKWISE.

_____ 4.3.78 Ensure valves are positioned as follows:

_____ _____ 1NM838 System Bypass Valve **OPEN**
DV

_____ _____ 1NM839 Inlet Isolation Valve **CLOSED**
DV

_____ _____ 1NM840 Outlet Isolation Valve **CLOSED**
DV

_____ 4.3.79 Ensure all sample media and equipment is retrieved.

_____ 4.3.80 Proceed to low dose waiting area.

_____ 4.3.81 Obtain contact dose rates on 100 gas bomb and P&C sample head.

_____ 4.3.82 Record dose rate of 100 gas bomb: _____

_____ 4.3.83 Record dose rate of P&C sample head: _____

4.4 Shutdown of Sample Panel

_____ 4.4.1 Proceed to PACS Control Panel.

_____ 4.4.2 Turn Selector switch (#9) to **OFF**.

_____ 4.4.3 Turn Radiation Monitor (#3) **OFF**.

_____ 4.4.4 Proceed to PACS nitrogen gas cylinder.

_____ 4.4.5 **CLOSE** gate valve on top of cylinder by turning CLOCKWISE.

_____ 4.4.6 **CLOSE** black knob attached to regulator by turning CLOCKWISE.

_____ 4.4.7 **BACK OUT** "T" handle on regulator by turning COUNTERCLOCKWISE approximately three turns.

4.5 Notifications of Completion of Sampling

_____ 4.5.1 Request Operations personnel to complete Shutdown Section for Post Accident Containment Air Sampling of OP/1/A/6450/010 (Containment Hydrogen Control Systems).

_____ _____/_____
Person Contacted Date Time

_____ 4.5.2 Notify OPS Shift Manager or designee of PACS sampling completion **AND** that Hydrogen Analyzer used during sampling is no longer required.

_____ _____/_____
Person Contacted Date Time

_____ 4.5.3 Notify Count Room personnel that samples are to be delivered for IMMEDIATE analysis.

- Specify dose rates of samples as measured in step 4.3.81.

4.6 Calculations and Final Documentation

_____ 4.6.1 Complete Post Accident Containment Air Sample Data Sheet (Enclosure 5.3).

_____ 4.6.2 Submit completed Working Copy to RPM.

4.7 Record Retention

4.7.1 File and retain completed Working Copy in RP Satellite Master File.

4.7.2 Deliver completed Working Copy to Document Management as space dictates.

5. Enclosures

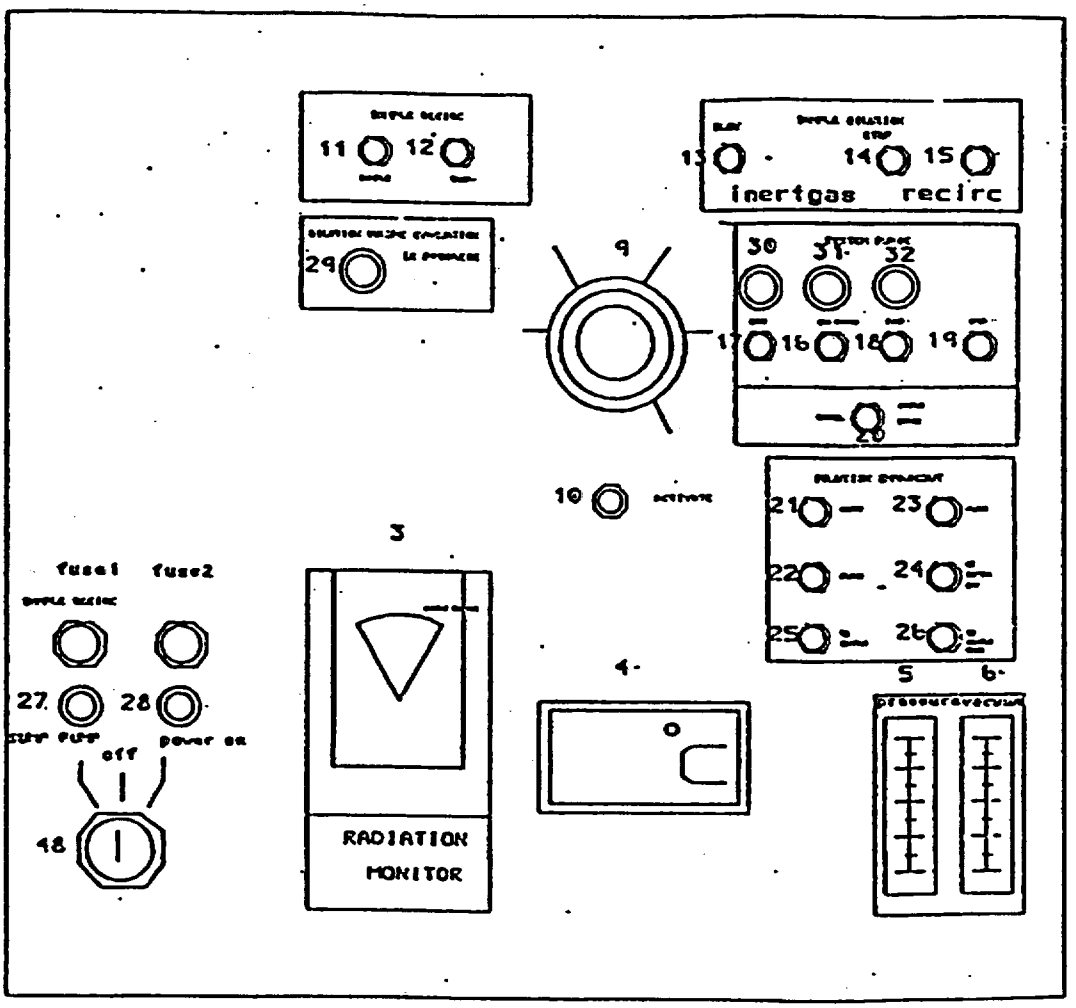
5.1 Post Accident Containment Air Sampling Control Panel Diagram

5.2 Post Accident Containment Air Sampling Sample Panel Diagram

5.3 Post Accident Containment Air Sample Data Sheet

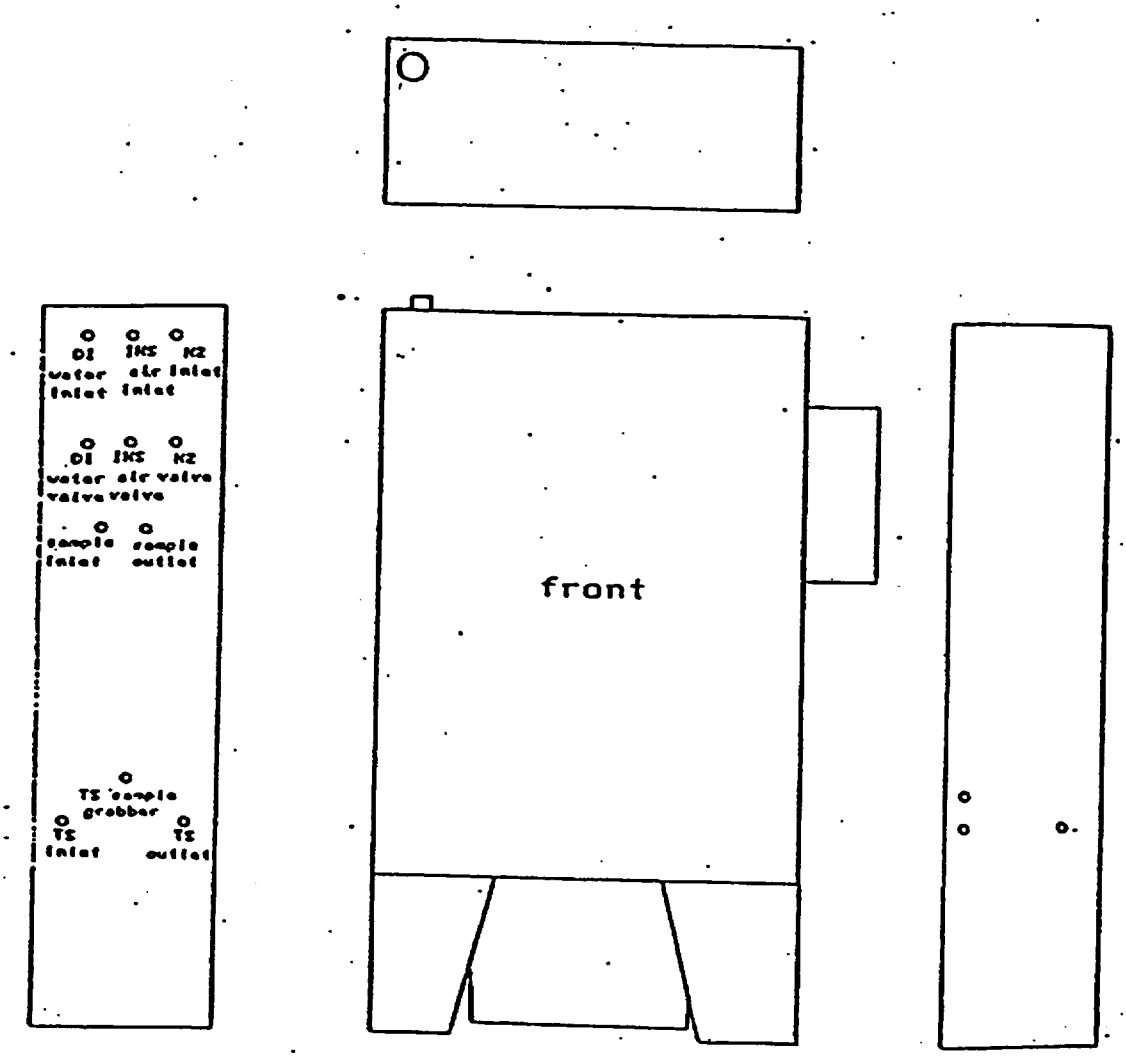
Enclosure 5.1

Post Accident Containment Air Sampling Control Panel Diagram



Enclosure 5.2

Post Accident Containment Air Sampling Sample Panel Diagram



Enclosure 5.3

Post Accident Containment Air Sample Data Sheet

UNIT 1

Date/Time: _____/_____

Prepared By: _____ (Circle One): **Emergency** Drill

		Step#	
1.	Radiation Monitor Reading	**(4.3.18)**	_____ R/hr
2.	Sample Line Temperature	**(4.3.58)**	_____ °C
3.	Sample Inlet Line Pressure	**(4.3.59)**	_____ psig
4.	Radiation Monitor Reading	**(4.3.72)**	_____ R/hr
5.	Contact Reading on Gas Bomb	**(4.3.82)**	_____ R/hr
6.	Sample Volume for P&C to Count Room		7.0E+04 ml

Containment Sample Volume (CSV) Calculation:

$$CSV = 1.4\ ml * \frac{293°K}{(273°C + _____°C)\ °K} * \frac{(14.7\ psig + _____\ psig)}{14.7\ psig}$$

7. CSV = _____ml (standard temperature and pressure)

Section volume of CSV trapped in gas bomb (SVG):

8. SVG = CSV _____ml * 0.009 = _____ml

(Where: 0.009 = 100 ml gas bomb ÷ 11194 ml volume of dilution)

_____ _____/_____

Radiation Protection Manager Date Time

(H06-97)

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. HP/2/B/1009/017
Revision No. 000

PREPARATION

(2) Station Catawba Nuclear

(3) Procedure Title Post Accident Containment Air Sampling System

(4) Prepared By _____ Date 5-24-99

(5) Requires 10CFR50.59 evaluation?

☒ Yes (New procedure or revision with major changes)

☐ No (Revision with minor changes)

☐ No (To incorporate previously approved changes)

(6) Reviewed By John D Rhodes (QR) Date 6-1-99

Cross-Disciplinary Review By Richard A Jackson (QR) NA OPS Date 6-2-99

Reactivity Mgmt. Review By _____ (QR) NA SSR Date 6-1-99

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval (*if necessary*)

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

)) Approved By WJ Boyle by JP WD Jordan Date 8 Jun 99

PERFORMANCE (Compare with Control Copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

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(12) Procedure Completion Verification

☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?

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☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?

☐ Yes ☐ NA Charts, graphs, etc. attached, dated, identified, and marked?

☐ Yes ☐ NA Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

14) Remarks (*Attach additional pages, if necessary.*)

Duke Power Company Catawba Nuclear Station **Post Accident Containment Air Sampling System** **Continuous Use**	Procedure No. HP/2/B/1009/017 Revision No. 000 Electronic Reference No. CP0094PR

Post Accident Containment Air Sampling System

1. Purpose

To describe a method for obtaining a containment air sample following a nuclear reactor accident using the Post Accident Containment Air Sampling System (PACS).

2. References

2.1 HP/0/B/1009/009 – Guidelines for Accident and Emergency Response

2.2 OP/2/A/6450/010 – Containment Hydrogen Control Systems

2.3 Duke Power Company Nuclear Station Post Accident Containment Air Sampling System Manual

3. Limits and Precautions

3.1 The combined time allotted for sampling **AND** analysis should be three hours or less from the time the decision is made to collect a sample.

3.2 The exposure to any individual while obtaining and analyzing a sample will not be in excess of federal limits.

3.3 Dose rates at PACS Sample Panel could exceed **15 R/hr.**

4. Procedure

4.1 Use of Procedure

_____ 4.1.1 Obtain a Working Copy of this procedure.

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- RP Supervision

Initials	Printed Name	Initials	Initials

4.2 Preparation

_____ 4.2.1 RP Supv. Select at least two qualified RP technicians based on completed PACS Training Qualifications and Lifetime TEDE, following direction via HP/0/B/1009/009 (Guidelines for Accident and Emergency Response).

_____ 4.2.2 RP Supv. Consider at least the following prior to proceeding to Aux.Bldg., NM Lab:

- VB System operability
- MSA "Black Box" (with acceptable calibration date)
- SCBAs
- Throat microphones
- Portable survey instruments: Teletector, high range ion chamber
- Dosimetry: ED and extremity
- Route to and from NM Lab
- 2EMF1 area monitor reading
- Flashlight
- Radios
- Control points

_____ 4.2.3 RP Supv. Request any additional assistance from Technical Support Center (TSC) or Operations Support Center (OSC).

_____ 4.2.4 RP Supv. Perform a Pre-Job Brief with selected personnel.

4.3 Sampling

NOTE: Numbers within parenthesis (ex. #9) are locations on Post Accident Containment Air Sampling Control Panel Diagram (Enclosure 5.1) and on Control Panel.

_____ 4.3.1 Contact Operations Shift Manager (OSM) or designee that PACS sampling is to be performed **AND** one Hydrogen Analyzer will be inoperable during sampling.

_____ _____/_____
Person Contacted Date Time

_____ 4.3.2 Request OPS complete Setup Section for Post Accident Containment Air Sampling of OP/2/A/6450/010 (Containment Hydrogen Control Systems).

_____ 4.3.3 Obtain PACS Equipment and Kit from cabinet on AB-543, HH-56.

_____ 4.3.4 Proceed to PACS nitrogen gas cylinder at door to Room 248, AB-543.

_____ 4.3.5 Verify nitrogen gas pressure on PACS cylinder is ≥ 100 psi.

_____ 4.3.6 IF pressure is < 100 psi, contact RP OSC Supervisor to request cylinder replacement IMMEDIATELY.

_____ 4.3.7 Proceed to PACS Control Panel inside Room 248.

_____ 4.3.8 Ensure Selector switch (#9) is in **OFF** position.

_____ 4.3.9 Move System Purge toggle switch (#20) to **NORMAL** position.

_____ 4.3.10 Move Gas Purge toggle switch (#16) to **CENTER** position.

_____ 4.3.11 Move Refill toggle switch (#24) to **OFF** (down) position.

_____ 4.3.12 Place PACS Control Panel Key into Key Lock switch (#48).

_____ 4.3.13 Turn Key Lock switch (#48) to **POWER ON**. [Power light should illuminate].

_____ 4.3.14 Turn Radiation Monitor (#3) **ON** by moving toggle switch (below meter) to **UP** position.

_____ 4.3.15 Turn Radiation Monitor (#3) selector to **BATT**.

_____ 4.3.16 Verify needle is in "Red Test Region" on right end of scale.

- IF Radiation Monitor needle is **BELOW** test region, use RP survey results to determine access to PACS Sample Panel.

_____ 4.3.17 Select appropriate rate by turning selector knob to higher scale (R/hr) or lower scale (mr/hr).

_____ 4.3.18 Record Radiation Monitor (#3) reading: _____ R/hr

_____ 4.3.19 IF Radiation Monitor (#3) readings are > 5 R/hr **OR** other problems are evident with the Monitor, notify OSC.

- Use RP Survey information to determine access requirements to PACS Sample Panel.

_____ 4.3.20 Proceed to PACS nitrogen gas cylinder adjacent to NM sample hood.

_____ 4.3.21 Ensure connections to cylinder are intact.

_____ 4.3.22 Ensure black knob attached to regulator on cylinder is **CLOSED** (clockwise).

_____ 4.3.23 Ensure "T" handle on regulator is **BACKED OUT** (counterclockwise) approximately three turns.

_____ 4.3.24 **OPEN** gate valve on top of PACS nitrogen gas cylinder (counterclockwise).

_____ 4.3.25 Adjust "T" handle on regulator CLOCKWISE until low pressure gauge is set at 60 psi.

_____ 4.3.26 **OPEN** (counterclockwise) black knob attached to regulator on cylinder.

_____ 4.3.27 Obtain 100 cc gas bomb and P&C with filter media from Kit.

_____ 4.3.28 Proceed to PACS Sample Panel.

_____ 4.3.29 Ensure PACS Sample Panel door is **OPEN.**

WARNING: Wear heat protective gloves while operating valves inside panel. Heat traced inlet lines may exceed 200°F.

_____ 4.3.30 Ensure valves are positioned as follows:

_____ 2NM838 System Bypass Valve is **CLOSED.**

_____ 2NM839 Inlet Isolation Valve is **OPEN.**

_____ 2NM840 Outlet Isolation Valve is **OPEN.**

_____ 4.3.31 **OPEN** the following service valves located on outer left side of Panel:

_____ VI – Turn one-quarter turn counterclockwise

_____ N_2 – Turn one-quarter turn counterclockwise

_____ 4.3.32 Disconnect quick-connect on lower right side of Panel by pulling connector toward RED side.

_____ 4.3.33 Connect P&C sample head to inlet side of Panel.

_____ 4.3.34 Proceed to PACS Control Panel.

_____ 4.3.35 Turn Selector switch (#9) to **SYSTEM PURGE.**

_____ 4.3.36 Depress and release Activate push button (#10).

_____ 4.3.37 Depress and release Evac push button (#17). [Evac light should illuminate]

_____ 4.3.38 Observe Vacuum Gauge (#6) drop to **–20"** Hg.

_____ 4.3.39 **WHEN** Vacuum Gauge (#6) reaches **–20"** Hg, depress and release STOP push button (#19).[Evac light should go off]

CAUTION: Pressing down Gas Purge toggle switch causes vacuum gauge needle to move VERY fast.

_____ 4.3.40 Press **DOWN** Gas Purge toggle switch (#16).

_____ 4.3.41 Observe vacuum gauge needle (#6) move upward to **+5"** Hg.

_____ 4.3.42 **WHEN** vacuum gauge needle (#6) reaches **+5"** Hg, return toggle switch (#16) to **CENTER** position.

_____ 4.3.43 Depress and release Evac push button (#17).

_____ 4.3.44 Observe vacuum gauge (#6) needle drop to **0"** Hg.

_____ 4.3.45 **WHEN** vacuum gauge needle reaches **0"** Hg, depress and release Stop push button (#19).

_____ 4.3.46 Depress and release Pump push button (#18).[Light should illuminate]

_____ 4.3.47 Wait 30 seconds.

_____ 4.3.48 Depress and release Stop push button (#19).[Light should go off]

_____ 4.3.49 Press **UP** Gas Purge toggle switch (#16).[Light should illuminate]

_____ 4.3.50 Wait 3 minutes.

_____ 4.3.51 Return Gas Purge toggle switch (#16) to **CENTER** position.[Light should go off]

_____ 4.3.52 Turn Selector switch (#9) to **DILUTION VOLUME EVACUATION.**

_____ 4.3.53 Depress and release Activate push button (#10).

_____ 4.3.54 Observe vacuum gauge (#6) needle drop to **–20"** Hg.

_____ 4.3.55 **WHEN** vacuum gauge (#6) needle reaches **–20"** Hg, turn Selector switch (#9) to SAMPLE RECIRC.

_____ 4.3.56 Depress and release Activate push button (#10).

_____ 4.3.57 Wait 5 minutes.

_____ 4.3.58 Record sample line temperature (#4): _____ °C

_____ 4.3.59 Record sample inlet line pressure (psig) (#5): _____ psig

_____ 4.3.60 Turn Selector switch (#9) to **SAMPLE DILUTION.**

_____ 4.3.61 Depress and release Activate push button (#10).

_____ 4.3.62 Depress and release Slow push button (#13).

_____ 4.3.63 Observe vacuum gauge (#6) needle move upward to **0"** Hg.

_____ 4.3.64 **WHEN** vacuum gauge (#6) needle reaches 0" Hg, depress and release Stop push button (#14).

CAUTION: **DO NOT** use Recirc Pump at any pressure other than **0"** Hg.

_____ 4.3.65 Depress and release Recirc push button (#15).

_____ 4.3.66 Proceed to lower dose rate area.

_____ 4.3.67 Wait 10 minutes.

_____ 4.3.68 Return to PACS Control Panel.

_____ 4.3.69 Turn Selector switch (#9) to **SYSTEM PURGE.**

_____ 4.3.70 Ensure dose rate on Radiation Monitor (#3) decreases **OR** stabilizes before continuing.

- **IF** dose rate has not decreased or stabilized, notify OSC/RP Supervisor.

_____ 4.3.71 Depress and release Activate push button (#10).

_____ 4.3.72 Record Radiation Monitor (#3) reading: _____ R/hr

_____ 4.3.73 Turn Key Lock switch (#48) to power **OFF.**

_____ 4.3.74 Proceed to PACS Sample Panel.

_____ 4.3.75 Disconnect 100 cc gas bomb and P&C sample head.

_____ 4.3.76 Replace quick-connect.

_____ 4.3.77 **CLOSE** VI and N_2 valves by turning one-quarter turn CLOCKWISE.

_____ 4.3.78 Ensure valves are positioned as follows:

_____ _____ 2NM838 System Bypass Valve **OPEN**
DV

_____ _____ 2NM839 Inlet Isolation Valve **CLOSED**
DV

_____ _____ 2NM840 Outlet Isolation Valve **CLOSED**
DV

_____ 4.3.79 Ensure all sample media and equipment is retrieved.

_____ 4.3.80 Proceed to low dose waiting area.

_____ 4.3.81 Obtain contact dose rates on 100 gas bomb and P&C sample head.

_____ 4.3.82 Record dose rate of 100 gas bomb: _____

_____ 4.3.83 Record dose rate of P&C sample head: _____

4.4 Shutdown of Sample Panel

_____ 4.4.1 Proceed to PACS Control Panel.

_____ 4.4.2 Turn Selector switch (#9) to **OFF**.

_____ 4.4.3 Turn Radiation Monitor (#3) **OFF**.

_____ 4.4.4 Proceed to PACS nitrogen gas cylinder.

_____ 4.4.5 **CLOSE** gate valve on top of cylinder by turning CLOCKWISE.

_____ 4.4.6 **CLOSE** black knob attached to regulator by turning CLOCKWISE.

_____ 4.4.7 **BACK OUT** "T" handle on regulator by turning COUNTERCLOCKWISE approximately three turns.

4.5 Notifications of Completion of Sampling

_____ 4.5.1 Request Operations personnel to complete Shutdown Section for Post Accident Containment Air Sampling of OP/2/A/6450/010 (Containment Hydrogen Control Systems).

_____ _____/_____
Person Contacted Date Time

_____ 4.5.2 Notify OPS Shift Manager or designee of PACS sampling completion and that Hydrogen Analyzer used during sampling is no longer required.

_____ _____/_____
Person Contacted Date Time

_____ 4.5.3 Notify Count Room personnel that samples are to be delivered for IMMEDIATE analysis.

- Specify dose rates of samples as measured in step 4.3.81.

4.6 Calculations and Final Documentation

_____ 4.6.1 Complete Post Accident Containment Air Sample Data Sheet (Enclosure 5.3).

_____ 4.6.2 Submit completed Working Copy to RPM.

4.7 Record Retention

4.7.1 File and retain completed Working Copy in RP Satellite Master File.

4.7.2 Deliver completed Working Copy to Document Management as space dictates.

5. Enclosures

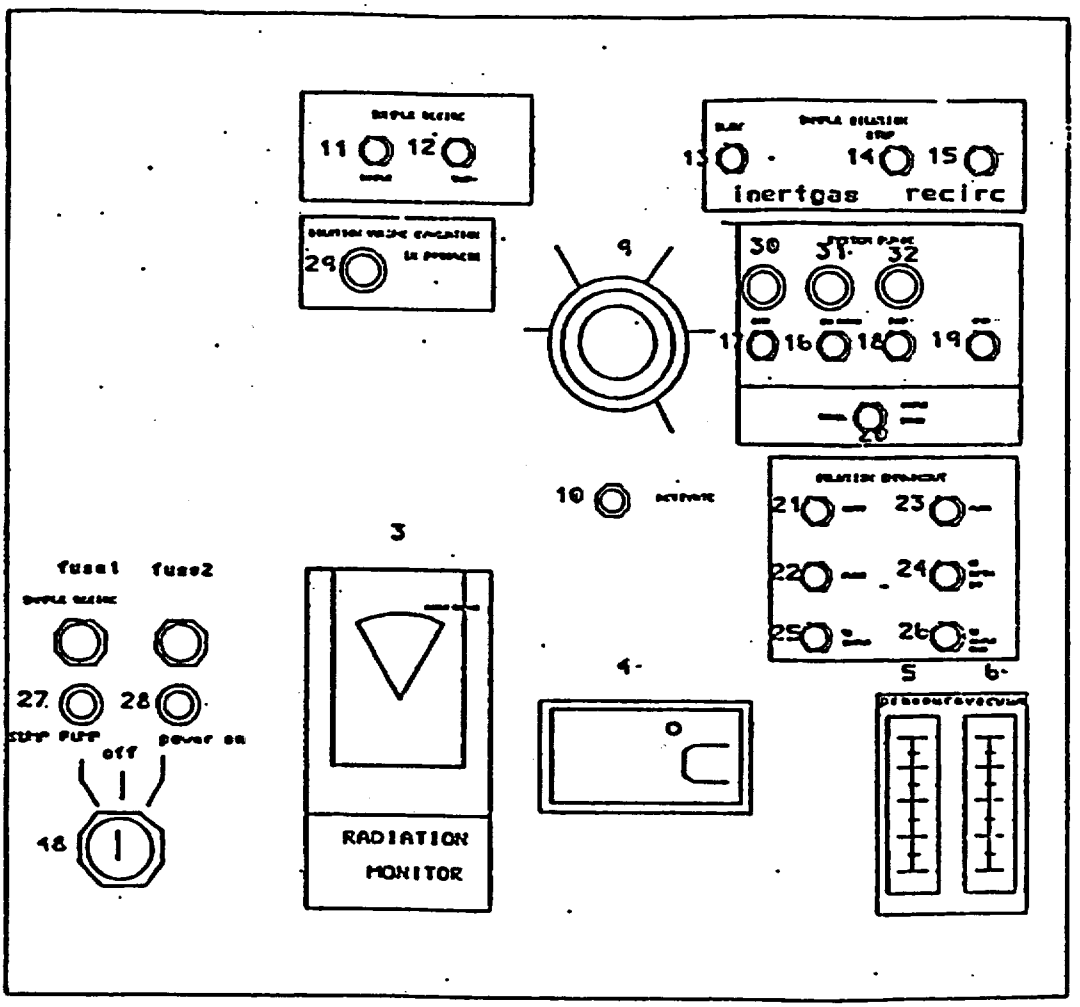
5.1 Post Accident Containment Air Sampling Control Panel Diagram

5.2 Post Accident Containment Air Sampling Sample Panel Diagram

5.3 Post Accident Containment Air Sample Data Sheet

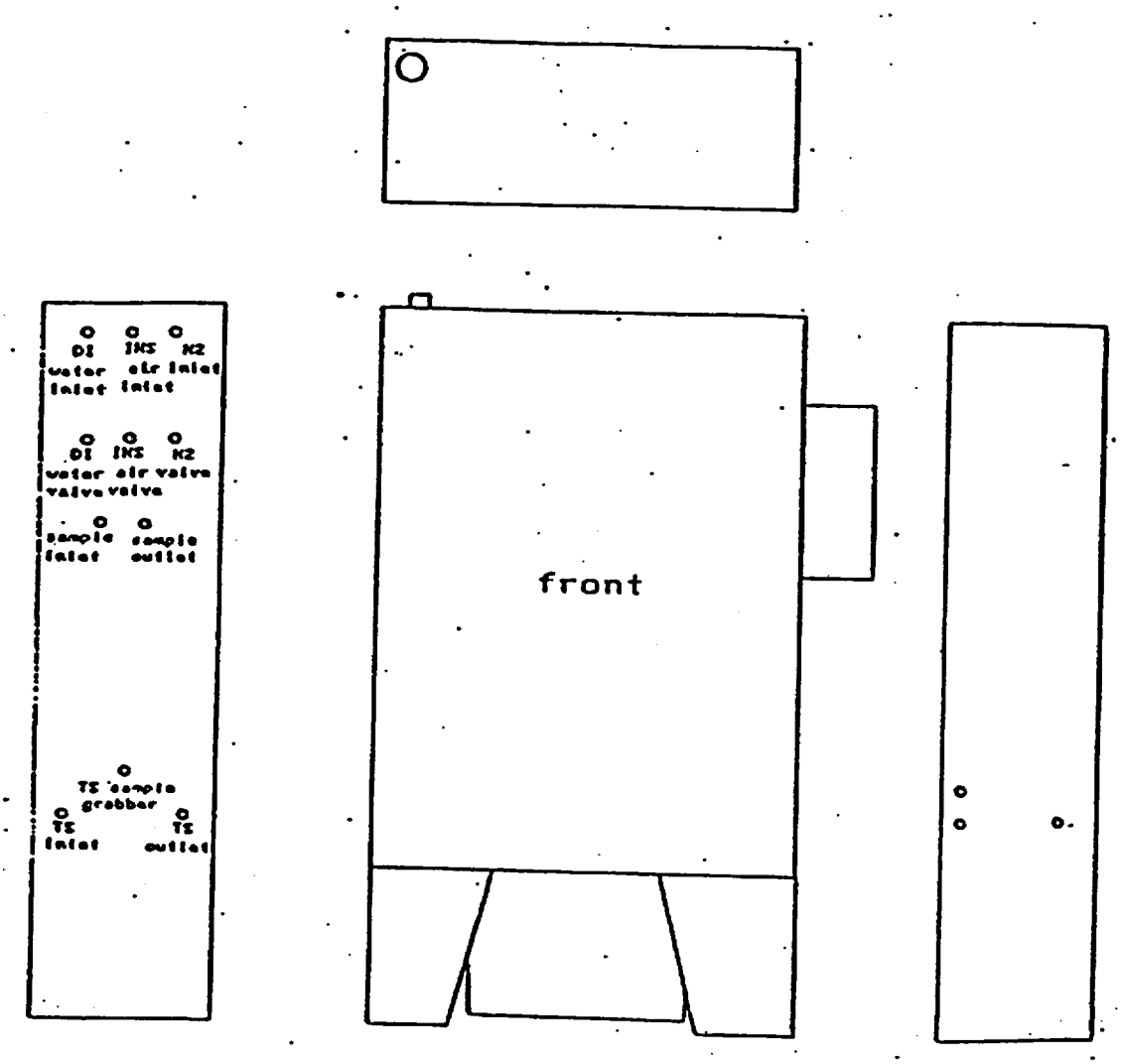
Enclosure 5.1

Post Accident Containment Air Sampling Control Panel Diagram



Enclosure 5.2

Post Accident Containment Air Sampling Sample Panel Diagram



Enclosure 5.3

Post Accident Containment Air Sample Data Sheet

HP/2/B/1009/017
Page 1 of 1

UNIT 2

Date/Time: _____/_____

Prepared By: _____ (Circle One): **Emergency** Drill

		Step#	
1.	Radiation Monitor Reading	**(4.3.18)**	_____ R/hr
2.	Sample Line Temperature	**(4.3.58)**	_____ °C
3.	Sample Inlet Line Pressure	**(4.3.59)**	_____ psig
4.	Radiation Monitor Reading	**(4.3.72)**	_____ R/hr
5.	Contact Reading on Gas Bomb	**(4.3.82)**	_____ R/hr
6.	Sample Volume for P&C to Count Room		7.0E+04 ml

Containment Sample Volume (CSV) Calculation:

$$CSV = 1.4\ ml * \frac{293°K}{(273°C + ____°C)\ °K} * \frac{(14.7\ psig + ____\ psig)}{14.7\ psig}$$

7. CSV = _____ml (standard temperature and pressure)

Section volume of CSV trapped in gas bomb (SVG):

8. SVG = CSV _____ml * 0.009 = _____ml

(Where: 0.009 = 100 ml gas bomb ÷ 11194 ml volume of dilution)

_____ _____/_____

Radiation Protection Manager Date Time