Duke Energy

W. R. McCollum, Jr.
Vice President

Duke Energy Corporation
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672
(864) 885-3107 OFFICE
(864) 885-3564 FAX

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U. S. Nuclear Regulatory Commission
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Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Emergency Plan Implementing Procedures Manual
Volume B, Revision 2000-06

Please find attached for your use and review copies of the revision to the Oconee Nuclear Station Emergency Plan:

Volume B Revision 2000-06 September 2000

This revision is being submitted in accordance with 10 CFR 50-54(q) and does not decrease the effectiveness of the Emergency Plan or the Emergency Plan Implementing Procedures.

Any questions or concerns pertaining to this revision please call Mike Thorne, Emergency Planning Manager
at 864-885-3210.

By copy of this letter, two copies of this revision are being provided to the NRC, Region II, Atlanta, Georgia.

Very truly yours,

W. R. McCollum, Jr.
VP, Oconee Nuclear Site

xc: (w/2 copies of attachments)
Mr. Luis Reyes,
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
61 Forsyth St., SW, Suite 24T23
Atlanta, Georgia 30303

w/copy of attachments
Mr. Steven Baggett
Rockville, Maryland

(w/o Attachments, Oconee Nuclear Station)
NRC Resident Inspector
M. D. Thorne, Manager, Emergency Planning

A045

September 18, 2000

OCONEE NUCLEAR SITE

SUBJECT: Emergency Plan Implementing Procedures
Volume B, Revision 2000-06

Please make the following changes to the Emergency Plan, Volume B by following these instructions.

REMOVE	ADD
Cover Sheet Rev. 2000-05	Cover Sheet Rev. 2000-06
Table of Contents page 1 & 2	Table of Contents page 1 & 2
HP/1/A/1009/017 -(08/30/99)	HP/1/A/1009/017 - 09/13/00
HP/2/A/1009/017 -(08/30/99)	HP/2/A/1009/017 - 09/13/00
HP/3/A/1009/017 -(08/30/99)	HP/3/A/1009/017 - 09/13/00
Chemistry Manual 5.2 - 12/28/99	Chemistry Manual 5.2 - 09/18/00
Maintenance Directive 9.1 -02/28/00	Maintenance Directive 9.1 - 08-21-00
Operations Management Procedure 1-07 - 03/13/00	Operations Management Procedure 1-07 - 08/31/00

DUKE POWER

EMERGENCY PLAN
IMPLEMENTING PROCEDURES
VOLUME B

APPROVED:

W. W. Foster, Manager
Safety Assurance

09/18/00
Date Approved

09/18/00
Effective Date

VOLUME B
REVISION 2000-06
September, 2000

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(R06-97)

INFORMATION ONLY

Duke Power Company

PROCEDURE PROCESS RECORD

(1) ID No HP/1/A/1009/017

Revision No 017

PREPARATION

(2) Station OCONEE NUCLEAR STATION

(3) Procedure Title Operating Procedure For Post-Accident Containment Air Sampling System

(4) Prepared By John E. Adams Date 9/12/00

(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 Rick Bowman (QR) Date 9/12/00

Cross-Disciplinary Review By _____ (QR)NA RB Date 9/12/00

Reactivity Mgmt. Review By _____ (QR)NA RB Date 9/12/00

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

Temporary Approval *(if necessary)*

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By J. A. Twiggs Date 9/13/2000

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 Checklists 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 Oconee Nuclear Station **Operating Procedure For Post-Accident Containment Air Sampling System** **Continuous Use**	Procedure No. HP/1/A/1009/017 Revision No. 017 Electronic Reference No. OX002SDU

Operating Procedure For Post-Accident Containment Air Sampling System

1. Purpose

1.1 This procedure describes the operation of the Post-Accident Containment Air Sampling System that is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA.

1.2 This procedure is used for actual accident or emergency.

1.3 This procedure is also used to perform the semi-annual functional test of the system.

1.4 This procedure is an Emergency Plan Implementing Procedure (EPIP). It must be forwarded to the Emergency Planning Group within three working days of approval by the responsible group. {PIP 4-O-93-0701}

2. References

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

2.2 HP/0/B/1009/015, Procedure For Sampling And Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.3 NSD 700, Independent Verification

2.4 Operations Management Procedure (OMP) 2.16, Unit Turnover Sheet

2.5 OP/0/A/1102/022, Reactor Building Hydrogen Analyzer System

2.6 SH/0/B/2000/004, Taking, Counting And Recording Surveys

2.7 PIP 4-O-93-701, Distribution Of Emergency Plan Procedures

2.8 MNS INPO Finding September 1990, Verification of Flow From Containment During Sampling Process

3. Limits And Precautions

3.1 The sampling cycle will require two (2) qualified technicians approximately one (1) hour per sample, of which about ten (10) minutes will be spent in the sample panel area. One qualified technician will operate the control panel while the other will perform transit duties to and from the panel.

3.2 Personnel communications can be achieved by phone (by column Q-73). Unit 1&2 Control Room - extension 2268.

3.3 Before sampling operations begin, the decision must be made based on radiological conditions in the Reactor Building whether to use a 100 ml gas bomb or a graduated syringe for the gas sample. A syringe should be used when the atmospheric concentration of Xe-133 equivalent is expected to be $\geq$1000 µCi/cc.

3.4 Before system is activated, ensure the dial switches are **NOT** giving a false indication by rotating the switches through all possible positions to ensure the base of the switch has **NOT** rotated.

3.5 The key for the control panel is located in the Post Accident Sampling Toolbox at the sample panel.

3.6 The key to the Post Accident Sampling Toolbox is in the RP Shift Key Box.

3.7 **IF** Reactor Building pressure is greater than 40 psig, the sampling system must **NOT** be used.

3.8 The following items will never be used on the panel:

- TRAP AREA EVACUATION
- FAST SAMPLE DILUTION
- SOLUTION CHANGE OUT

3.9 The Recirc Pump must never be used at any pressure other than 0 inches of mercury.

3.10 Moving the SELECTOR switch from one mode to another stops all current system operations.

3.11 Depressing the ACTIVATE pushbutton starts operation of the newly selected mode.

3.12 Portable survey meter shall be used for determining radiation levels. The radiation monitor display on the control panel will provide an indication of radiation levels at the sample panel.

3.13 **IF** problems with the pressure **AND/OR** temperature gauge are evident, such as going off scale or erratic response, the SELECTOR switch must be turned to the OFF mode and sampling discontinued until the problem is corrected.

3.14 **IF** the sampling system **CANNOT** be operated, then HP/0/B/1009/015 (Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity) will be used as an alternate method for obtaining a containment air sample.

3.15 Operations must complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer to bring containment air to the sampling system and to return the Hydrogen Analyzer to service after sampling is complete by Enclosure 5.5 or 5.6. These enclosures shall be double verified to ensure that containment integrity is maintained. The Operations Unit Supervisor shall designate one "doer" and one "verifier" as required by NSD 700 (Independent Verification).

3.16 The front side of the sample panel is the side that contains the door. The left and right side of the sample panel will be determined by facing the door.

3.17 **IF** radiation levels exceed 16 rad/hr and **CANNOT** be reduced by purging the system, secure operation of the panel, move to a low background area and contact the Radiation Protection Supervisor for further instructions.

3.18 Enclosure 5.7 may be used to provide assistance in determining flow inside the sample panel. It is **NOT** intended to provide verification for valve operation.

3.19 **IF** both hydrogen analyzer trains are inoperative and upon request by the Operations group, this procedure may be used to obtain a hydrogen sample of the containment atmosphere.

3.20 The Chemistry Section will analyze the hydrogen sample in accordance with their procedures. The Chemistry Section should be contacted to obtain sampling syringes and specific instructions on size and number of hydrogen samples to be taken.

3.21 **IF** the acceptance criteria are **NOT** met on Functional Test, promptly notify RP Shift Supervisor.

3.22 Make note of any problems incurred during the functional test and the step at which the problem occurred.

3.23 Sample flow from the containment atmosphere to the post-accident containment air sampling system can be verified by independent sample taken from the Unit's RIA-49. The concentration of Xe-133 in the undiluted sample taken from the Post Accident Sample Panel should be within a factor of 2 of the Xe-133 concentration taken from the RIA. Flow verification is applicable to functional testing only. Example: RIA sample = 1E-4 Xe-133: Boundaries of the Post Accident sample are: 5E-5 to 2E-4 Xe-133. {MNS INPO, September 1990}

3.24 **WHEN** performing Functional Test, Enclosure 5.11 shall be used.

4. Procedure

4.1 Determine application of this procedure:

4.1.1 **IF** performing functional test, perform Enclosure 5.11.

4.1.2 **IF** Post Accident Sampling is needed, contact Control Room SRO and request Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

NOTE: Needed items include portable survey instrument, air sampling equipment (P&C cartridge) and key to Post Accident Sampling Toolbox.

4.2 Obtain needed items and proceed to sampling area.

4.3 Supply nitrogen gas to the panel as follows:

_____ 4.3.1 Turn "T" handle on second stage of nitrogen bottle's regulator counter clockwise to ensure 40 psig is **NOT** exceeded in Step 4.3.2.

_____ 4.3.2 Open valve on nitrogen bottle next to sampling panel:

4.3.2.1 Note pressure on first stage of regulator:

- **IF** pressure is <200 psig replace nitrogen bottle, return to Step 4.3.1.

_____ 4.3.3 Turn "T" handle on nitrogen bottle's regulator clock-wise until 40 psig is indicated on the low pressure gauge.

NOTE: When black valve handles are rotated counter-clockwise one-quarter turn to UPWARD position, inlets valves are opened.

4.4 Open the following inlet valves located on left side of sample panel:

_____ 4.4.1 INSTRUMENT AIR INLET

_____ 4.4.2 N_2 INLET

_____ 4.5 **IF** a hydrogen sample is desired, replace sample inlet line test tee cap (outside upper left side of panel) with a septum:

_____ _____ 4.5.1 Verify test tees on sample inlet and outlet lines are capped.
DV

_____ 4.6 Verify THIOSULFATE valve is CLOSED.

4.7 Set switches listed below as follows:

_____ 4.7.1 SAMPLE VOLUME SELECT - set on SMALL.

_____ 4.7.2 DILUTION VOLUME SELECT - set on LARGE.

_____ 4.7.3 SELECTOR switch - set on OFF.

_____ 4.7.4 SYSTEM PURGE - set on NORMAL.

_____ 4.7.5 REFILL switch - set on OFF (down).

_____ 4.7.6 TC switch - set on POSITION 1 (thermocouple measures sample line temperature).

_____ 4.7.7 SAMPLE LINE SELECT switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of sampling system.

_____ 4.8 Turn KEY LOCK switch to POWER ON and ensure POWER ON light has come on.

_____ 4.9 Turn toggle switch on Radiation Monitor to ON position (Up):

_____ 4.9.1 Turn SELECTOR switch on Radiation Monitor to BATT and ensure needle is in "Red Test Region":

_____ 4.9.1.1 Turn SELECTOR switch to MR/HR or R/HR scale.

4.10 Purge sample panel as follows:

_____ 4.10.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 4.10.2 Move NORMAL - SAMPLE PURGE toggle switch to SAMPLE PURGE.

_____ 4.10.3 Depress ACTIVATE pushbutton.

_____ 4.10.4 Depress EVAC pushbutton (EVAC light ON) and watch pressure gauge slowly drop to - 19" of Hg.

_____ 4.10.5 Depress STOP pushbutton.

_____ 4.10.6 Press down and release GAS PURGE toggle switch and watch pressure gauge swiftly rise to + 10" of Hg.

_____ 4.10.7 Depress STOP pushbutton.

_____ 4.10.8 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 4.10.9 Depress STOP pushbutton.

_____ 4.10.10 Depress PUMP pushbutton and wait for 30 seconds.

_____ 4.10.11 Depress STOP pushbutton.

_____ 2nd purge _____ 3rd purge 4.10.12 Repeat Step 4.10.6 through 4.10.11 twice to purge sample panel two more times.

_____ 4.10.13 Move NORMAL - SAMPLE PURGE toggle switch to NORMAL.

_____ 4.10.14 Turn SELECTOR switch to DILUTION VOLUME EVACUATION.

4.11 Evacuate dilution volume as follows:

_____ 4.11.1 Depress ACTIVATE pushbutton and watch pressure gauge drop to - 19" of Hg.

_____ 4.11.2 Turn SELECTOR switch to SAMPLE RECIRC.

4.12 Recirculate containment air and trap a sample as follows:

_____ 4.12.1 Depress ACTIVATE pushbutton and wait 15 minutes.

_____ 4.12.2 Read and record sample inlet line pressure and temperature on Enclosure 5.2.

4.12.3 Complete Steps 4.12.3.1 and 4.12.3.2 for each hydrogen sample needed:

WARNING: Hydrogen samples taken from the Post-Accident Sampling Panel are **NOT** diluted and therefore may be highly radioactive. To reduce personnel dose, shielding should be immediately available following sampling.

_____ 4.12.3.1 Insert syringe needle into septum on sample inlet line (outside left side of panel), withdraw specified volume of sample and remove needle from septum.

_____ 4.12.3.2 Place syringe in a shielded container as necessary to reduce personnel dose.

_____ 4.12.4 Depress SAMPLE pushbutton and wait 1 minute.

_____ 4.12.5 Depress TRAP pushbutton and wait 30 seconds.

_____ 4.12.6 Turn SELECTOR switch to SAMPLE DILUTION.

4.13 Dilute sample with N_2 and recirculate as follows:

_____ 4.13.1 Depress ACTIVATE pushbutton.

_____ 4.13.2 Depress SLOW pushbutton and watch pressure gauge slowly rise to 0" of Hg.

_____ 4.13.3 Depress STOP pushbutton.

4.14 Prepare for sampling as follows:

_____ 4.14.1 Turn SELECTOR switch to OFF.

_____ 4.14.2 Disconnect gas sampler flexible tubing quick disconnects located on right side of panel near the floor:

_____ 4.14.2.1 **IF** a gas sample will **NOT** be taken with a syringe, install particulate and iodine cartridge holder with sampling media and a 100 cc gas bomb at gas sampler located in Step 4.14.2.

_____ 4.14.2.2 **IF** a gas sample will be taken with a syringe, replace gas line test tee cap with one with a septum and install a particulate and iodine cartridge holder with sampling media at gas sampler location located in Step 4.14.2.

_____ 4.14.3 Turn SELECTOR switch to SAMPLE DILUTION:

_____ 4.14.3.1 Depress ACTIVATE pushbutton.

_____ 4.14.3.2 Depress RECIRC pushbutton and wait 15 minutes.

4.14.3.3 **IF** a syringe will be used for gas sample, complete Steps A thru C:

_____ A. Insert syringe into septum on a 100 cc gas bomb and withdraw 5 cc's of air, remove needle from septum and return syringe plunger to 0 cc's.

_____ B. Insert syringe needle into septum on sample line (right side of the panel at floor), withdraw a 5 cc sample of gas and remove needle from septum.

_____ C. Insert syringe needle into septum on cc gas bomb and inject 5 cc's of gas sample taken from sample inlet, withdraw needle from septum.

_____ 4.14.4 Depress STOP pushbutton.

_____ 4.14.5 Turn SELECTOR switch to SYSTEM PURGE.

4.15 Purge sample panel as follows:

_____ 4.15.1 Depress ACTIVATE pushbutton.

_____ 4.15.2 Depress EVAC pushbutton and watch pressure gauge slowly drop to - 19" of Hg.

_____ 4.15.3 Depress STOP pushbutton.

_____ 4.15.4 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg.

_____ 4.15.5 Depress STOP pushbutton.

_____ 4.15.6 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 4.15.7 Depress STOP pushbutton.

_____ 4.15.8 Depress PUMP pushbutton and wait 30 seconds.

_____ 4.15.9 Depress STOP pushbutton.

_____ 4.15.10 Repeat Steps 4.15.4 through 4.15.9 to purge sample panel one additional time.

4.16 Remove samples from sample panel as follows:

4.16.1 **IF** used, disconnect gas bomb, particulate and iodine sample from sample panel.

4.16.2 Record sample date and time.

4.16.3 Reconnect gas sampler flexible tubing line.

NOTE: If additional samples will be pulled or the radiological conditions do **NOT** allow cleanup Steps 4.16.4, and 4.18 may be N/A.

DV _____ 4.16.4 **IF** a hydrogen sample was taken, replace septum on sample inlet line (located on the left hand side) with a test tee cap.

4.17 Switch Sample System OFF as follows:

4.17.1 Close the following valves:

_____ 4.17.1.1 Nitrogen bottle.

_____ 4.17.1.2 NITROGEN INLET and INSTRUMENT AIR INLET valves.

_____ 4.17.2 Turn SELECTOR switch to OFF.

_____ 4.17.3 Turn toggle switch on Radiation Monitor to OFF position (Down).

_____ 4.17.4 Turn Radiation Monitor knob to OFF position.

_____ 4.17.5 Turn SAMPLE LINE SELECT switch to OFF.

_____ 4.17.6 Turn KEY LOCK switch to OFF.

_____ 4.17.7 Clean area around sample panel.

_____ 4.18 Request Operations to return Hydrogen Analyzer to service per Enclosure 5.5 or 5.6.

_____ 4.19 Calculate sample volumes using data from Enclosure 5.2 and record these volumes on sample labels.

NOTE: Locations of analytical measurement labs are subject to change during either a drill or emergency.

4.20 Transport gas, particulate, and iodine samples to Count Room for gamma spectral analysis and, if taken, hydrogen samples to Primary Chemistry Lab for percent hydrogen analysis:

_____ 4.20.1 **IF** gas sample **CANNOT** be counted because of high activity, contact RP Staff personnel for dilution of gas samples.

_____ 4.20.2 **IF** iodine sample **CANNOT** be counted because of high activity, purge iodine cartridge per SH/0/B/2000/004 (Taking, Counting And Recording Surveys).

_____ 4.20.3 Forward sample analysis results to the Radiation Protection Manager or designee.

_____ 4.21 Verify Post Accident Sampling Toolbox contains all items listed on Enclosure 5.1, secure toolbox.

_____ 4.22 Complete Procedure Process Record and forward the completed procedure to RP Staff personnel.

5. Enclosures

5.1 Sampling Panel Equipment

5.2 Sample Data Sheet

5.3 Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

5.4 Operations Checklist For Bypassing H_2 Analysis Panel Currently In Analyze Mode

5.5 Operations Checklist For Returning H_2 Analysis Panel Back To Service In Standby Mode

5.6 Operations Checklist For Returning H_2 Analysis Panel Back To Service In Analyze Mode

5.7 Valve Checklist For Sample Panel

5.8 Control Panel Diagram

5.9 Flow Diagram

5.10 Sample Train Configuration

5.11 Functional Test Operating Enclosure

Enclosure 5.1

Sampling Panel Equipment

1	Key to the Post Accident Containment Air Sampling Control Panel
1	100 cc gas bombs with quick disconnect fittings
2	Septums for the 100 cc gas bombs
1	Adjustable Wrench
1	9/16" Combination Wrench
1	Stopwatch
1	Graduated syringe

NOTE: Poly tubing stored inside panel door.

	6 feet of ¼" poly tubing with compression fittings to connect to the sample inlet line.
1 ea.	Particulate filter and iodine cartridge
	¼" poly tubing with appropriate fittings to complete sampling train
2	Test tee caps with septums
	Shielded Sample Transport Container
1	Set of O-Rings for filter housing
1	Break-away lock to secure Sampling Toolbox

Enclosure 5.2

Sample Data Sheet

1. Name _____

   Date_____

   Unit_____

2. Sample Line Temperature _____ °F

3. Sample Inlet Line Pressure _____ psig

4. Sample Volume = SV

$$SV = \frac{(5599.23 + 380.9P)}{(3751.77 + 8.167xF)} = \_\_\_\_\_$$

   - °F = Sample Line Temperature in °F
   - P = Sample Line Pressure in psig

5. Diluted Volume = $\frac{SV}{1.05E4}$ x sample size = _____ ml
   - Sample Size = 100cc gas bomb or 5cc gas syringe

6. Record diluted volume as gas sample volume on sample label.

7. Record sample volume (SV) as particulate and iodine sample volume on sample label.

8. Multiply each iodine and particulate concentration by the appropriate factor listed below to correct for deposition in the sample lines:
   - Normal Conditions: 1.70
   - Accident Conditions: 19.23

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

1. Initial Conditions

_____ _____ 1.1 Verify Containment Integrity and record date/time.
DV

Date/Time _____

NOTE: This person may have other responsibilities, but they shall **NOT** be prevented from performing this evolution.

1.2 Designate a Reactor Operator to immediately close containment isolation valves from the Control Room in the event an ES actuation occurs and record date/time:

- Reactor Operator _____
- Control Room SRO _____
- Date/Time _____

_____ 1.3 Record containment isolation valves that will be opened on Enclosures 7.2 of OMP 2-16 (Unit Turnover Sheet) and date/time:

_____ • (1PR-81 and 1PR-84)

_____ • (1PR-90 and 1PR-87)

- Date/Time _____

_____ 1.4 Verify H_2 Analysis Panel in STANDBY mode and record date/time.

Date/Time _____

_____ _____ 1.5 Verify Reactor Building pressure less than 40 psig and record date/time.
DV

Date/Time _____

1.6 Record which Train to be used and date/time:

- (Train A or Train B) _____
- Date/Time _____

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

2. Procedure

2.1 Place Post Accident Sampler in service as follows:

_____ 2.1.1 Verify selected train in STANDBY mode by observing red STANDBY light in gray "Unit 1 Reactor Building Containment Atmosphere Hydrogen Analyzer Train (A or B)" cabinet and record date/time.

Date/Time _____

2.1.2 **IF** using Train A, at Remote Panel, depress the following black ON pushbuttons and record date/time:

_____ • 1PR-83

_____ • 1PR-86

• Date/Time_____

2.1.3 **IF** using Train B, at Remote Panel, depress the following ON pushbuttons and record date/time:

_____ • 1PR-89

_____ • 1PR-92

• Date/Time _____

_____ 2.1.4 **IF** Train A was selected, turn SAMPLE VALVE SELECTOR switch to 1PR-71 and record date/time. (Red light will come on which is labeled Top Containment).

Date/Time _____

_____ 2.1.5 **IF** Train B was selected, turn SAMPLE VALVE SELECTOR switch to 1PR-76 and record date/time. (Red light will come on which is labeled Top Containment).

Date/Time _____

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

CAUTION: If ES actuation occurs, immediately close containment isolation valves.

_____ _____ 2.1.6 DV

IF Train A was selected, OPEN 1PR-81 and 1PR-84 (Containment Isolation Valves) from Control Room and record date/time.

Date/Time _____

_____ _____ 2.1.7 DV

IF Train B was selected, OPEN 1PR-87 and 1PR-90 (Containment Isolation Valves) from Control Room and record date/time.

Date/Time _____

_____ 2.1.8

Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.4

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Analyze Mode

1. Initial Conditions

_____ 1.1 Verify H_2 Analyzer in ANALYZE mode and record date/time.

Date/Time _____

_____ 1.2 Verify Reactor Building pressure is less than 40 psig and record date/time.

Date/Time _____

_____ 1.3 Record which Train to be used and date/time:

- (Train A or Train B) _____
- Date/Time _____

2. Procedure

2.1 Place Post Accident Sampler in service as follows:

_____ 2.1.1 At selected train Remote Panel, position OFF, STANDBY, ANALYZE selector to STANDBY and record date/time.

Date/Time _____

_____ 2.1.2 Verify red STANDBY light in gray "Unit 1 Reactor Building Containment Atmosphere Hydrogen Analyzer Train (A or B)" cabinet is illuminated and record date/time.

Date/Time _____

_____ 2.1.3 At selected train Remote Panel, depress both black ON pushbuttons for BYP TO POST AC and record date/time. Opens (1PR-83, 1PR-86) or (1PR-89, 1PR-92).

Date/Time _____

_____ 2.1.4 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.5

Operations Checklist For Returning H_2 Analysis Panel Back To Service In Standby Mode

1. Procedure

1.1 Return H_2 Analysis train back to service in STANDBY mode as follows:

_____ 1.1.1 Turn SAMPLE VALVE SELECTOR switch to OFF and record date/time. (Red light will go off). Closes 1PR-71 or 1PR-76.

Date/Time _____

_____ 1.1.2 Depress OFF pushbuttons on both BYP TO POST AC switches and record date/time. Closes 1PR-83 and 1PR-86 or 1PR-89 and 1PR-92.

Date/Time _____

NOTE: This will regain containment integrity.

_____ _____ 1.1.3 **IF** Train A is selected, from Control Room, close 1PR-81 and 1PR-84 and record date/time.
DV

Date/Time _____

_____ _____ 1.1.4 **IF** Train B was selected, from Control Room, close 1PR-87 and 1PR-90 and record date/time.
DV

Date/Time _____

_____ 1.1.5 Notify Unit Supervisor the H_2 Analysis Train is back in STANDBY mode and request to remove containment isolation valves from Enclosure 7.2 of OMP2-16 (Unit Turnover Sheet) and record date/time.

Date/Time _____

_____ 1.1.6 Return completed enclosure to personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.6

Operations Checklist For Returning H_2 Analysis Panel Back To Service In Analyze Mode

1. Initial Conditions

_____ 1.1 Verify H_2 Analysis Panel has been switched to STANDBY mode for post accident sampling and record date/time.

Date/Time _____

_____ 1.2 Return to ANALYZE mode and record date/time.

Date/Time _____

2. Procedure

2.1 Return H_2 Analysis train back to service as follows:

_____ 2.1.1 Depress OFF pushbuttons on both BYP TO POST AC switches and record date/time. Closes 1PR-83 and 1PR-86 or 1PR-89 and 1PR-92 .

Date/Time _____

NOTE: When ANALYZE is selected, the indication will go up scale resulting in a possible High Hydrogen Alarm on both panels and in Control Room. Then return down scale to correct reading in approximately 3 minutes.

_____ 2.1.2 Position OFF, STANDBY, ANALYZE selector to ANALYZE and record date/time.

Date/Time _____

_____ 2.1.3 Push REMOTE SELECTOR pushbutton to ensure control is from Remote Panel and record date/time.

Date/Time _____

_____ 2.1.4 Reset Common Alarm after meter reading stabilizes and record date/time.

Date/Time _____

_____ 2.1.5 Notify Unit Supervisor the H_2 Analysis Train is back in ANALYZE mode and record date/time.

Date/Time _____

_____ 2.1.6 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.7

Valve Checklist For Sample Panel

This checklist may be used to provide assistance in determining flow inside the sample panel. It is **NOT** intended to provide verification for valve operation.

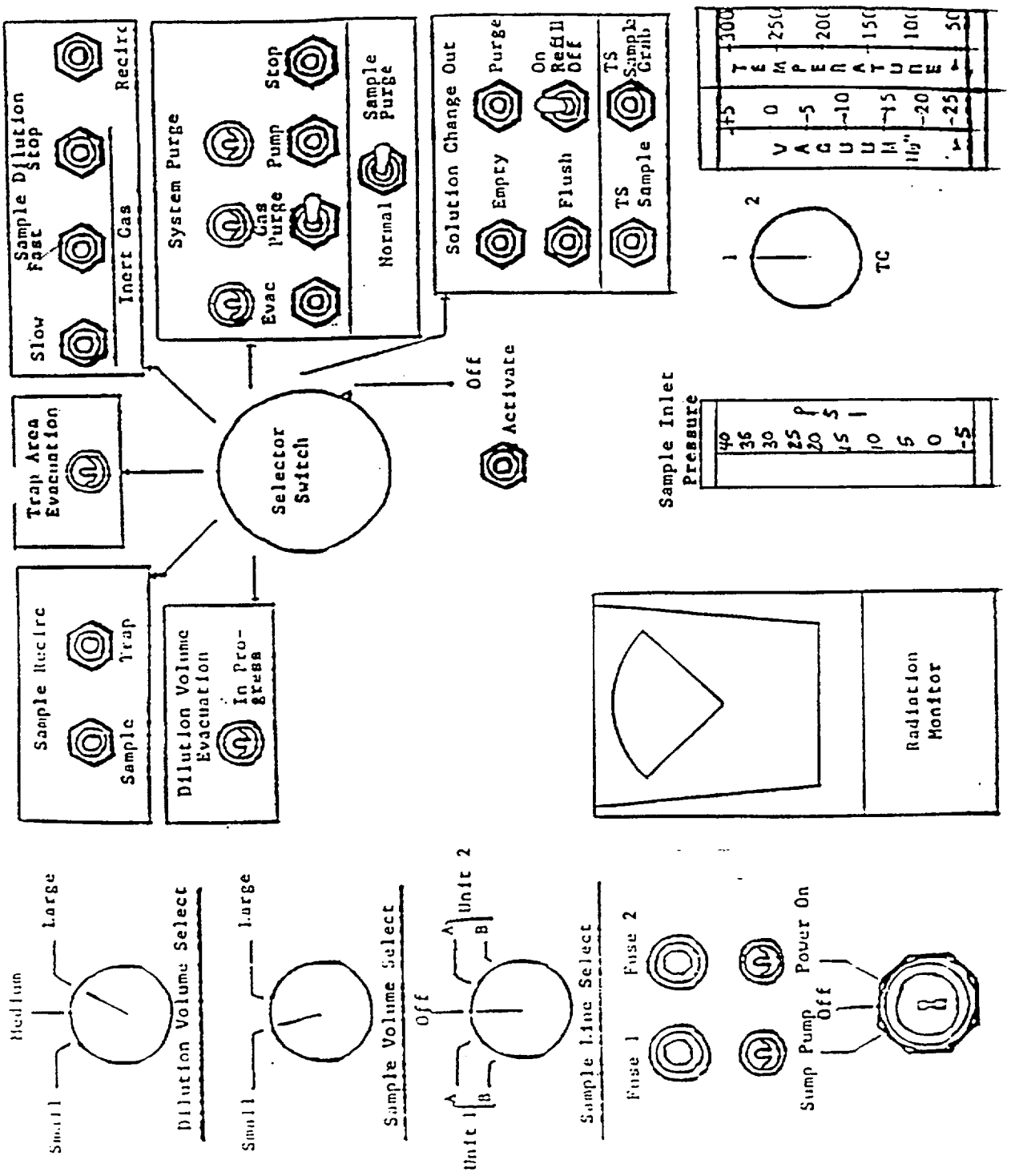
ACTION	RESPONSE
Dilution Volume Evacuation	
Activate	Energize 1, 2, 9, 12, 17,19
Sample Recirculate	
Activate	Energize 1, 2, 5, 6, 27
Sample	De-energize 27
Trap	De-energize 2, 5

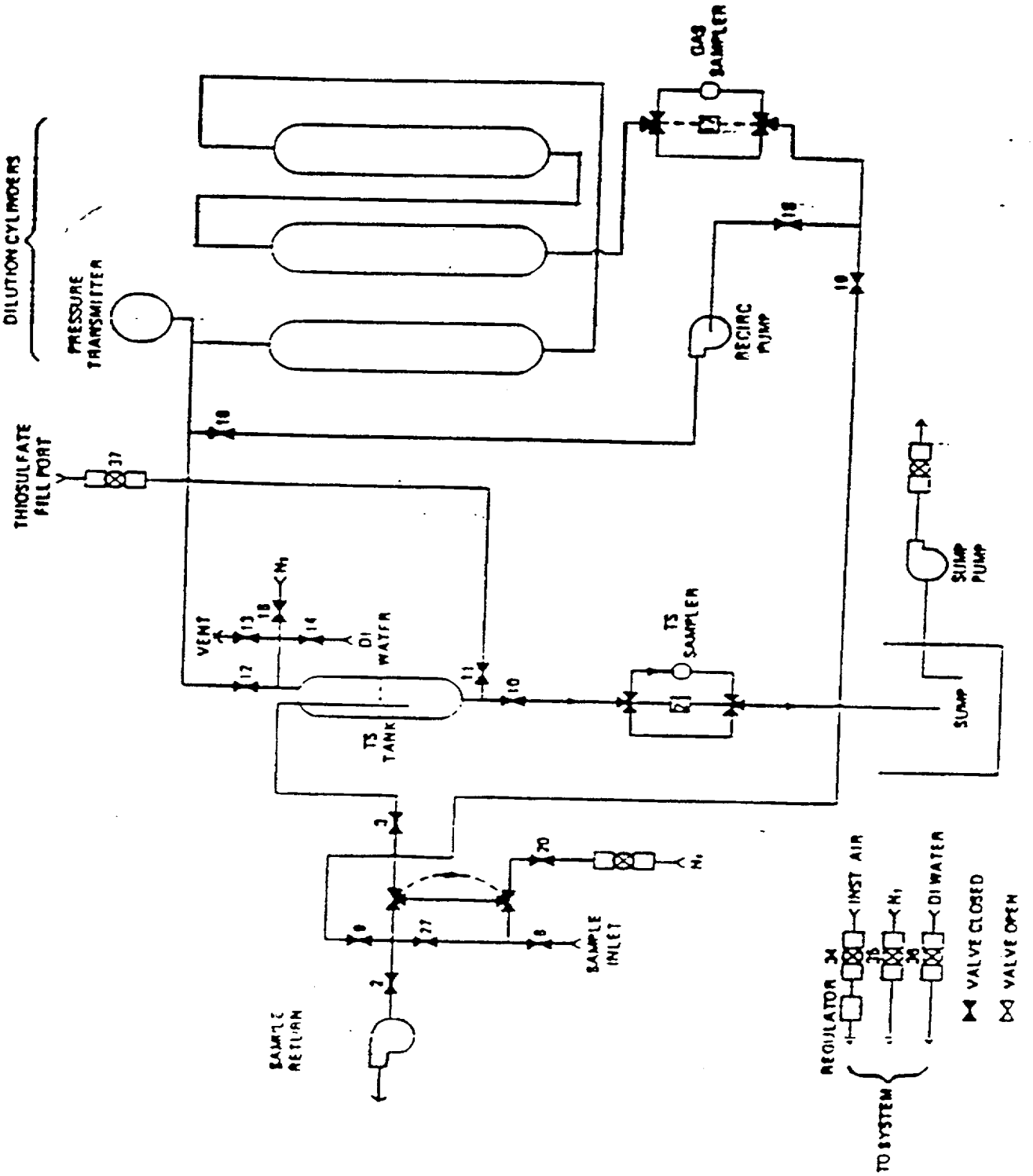
NOTE: When SELECTOR switch is moved to another position, Valve #17 will de-energize.

Sample Dilution	
Activate	Energize 12, 17
Slow	Energize 3, 20
Stop	De-energize 3, 20
Recirc	Energize Recirc Pump 16, 18
System Purge	Energize 9, 12, 19, 27
Activate	Energize 12, 22
Evac	Energize 1, 2
Stop	De-energize 1, 2
Gas Purge (down)	Energize 15, De-energize 1, 2
Stop	De-energize 15
Normal - Sample Purge (Sample Purge)	Energize 17
Pump	Energize Pump 16, 18
	De-energize 15, or 1 and 2
Stop	De-energize Pump 16, 18
Solution Change Out	
Empty	Energize 10, 11, 13
Flush	Energize 14, 10
Purge	Energize 15, 10
Refill	Energize
TS Sample	Energize 21
TS Sample Grab	De-energize 21

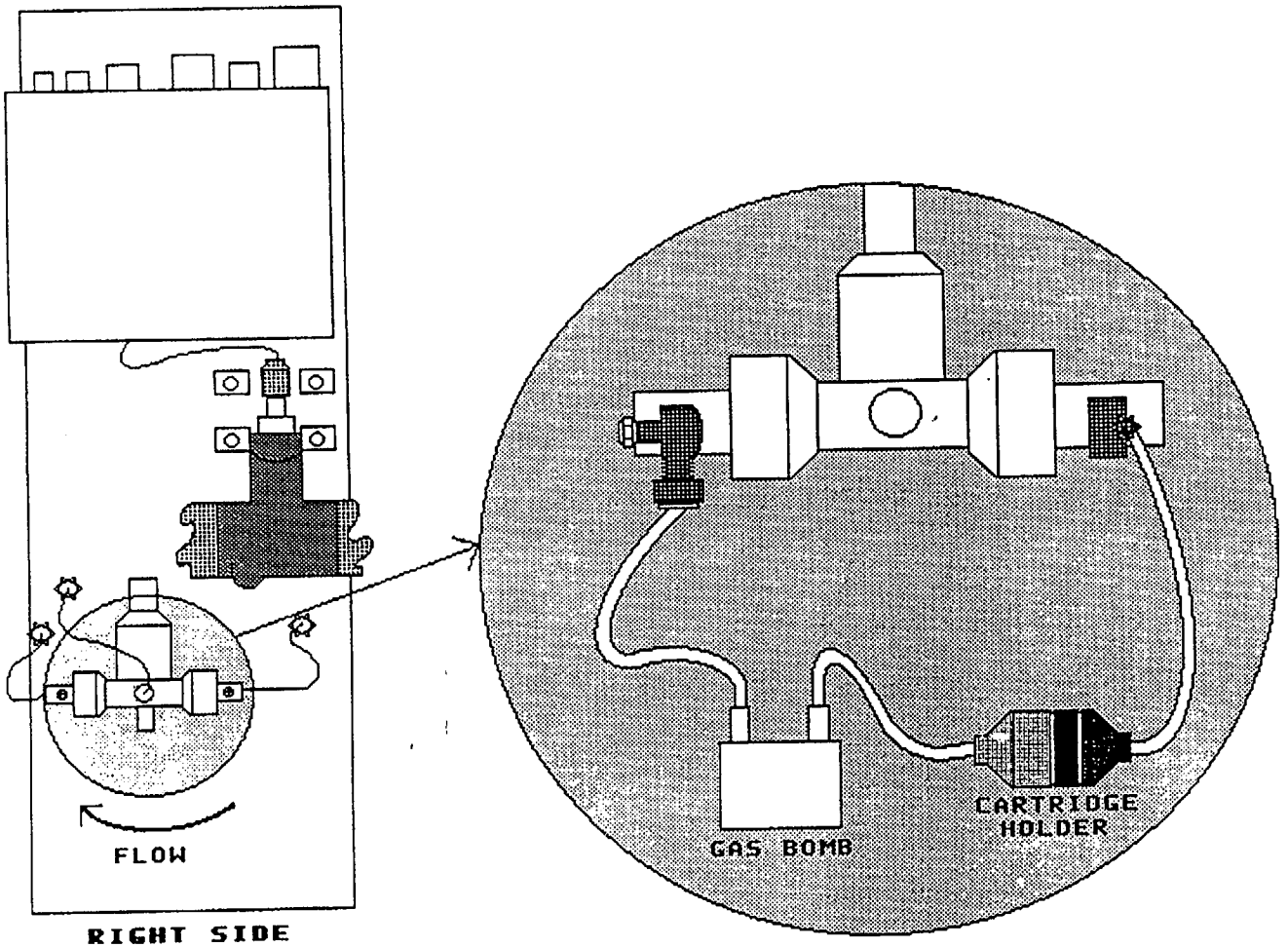
Enclosure 5.8

Control Panel Diagram




GAS SAMPLER
DILUTION CYLINDERS
PRESSURE TRANSMITTER
RECIRC PUMP
THIOSULFATE FILL PORT
VENT
DI WATER
TS SAMPLER
TS TANK
SUMP PUMP
SUMP
SAMPLE RETURN
SAMPLE INLET
REGULATOR 34
INST AIR
DI WATER
VALVE CLOSED
VALVE OPEN
TO SYSTEM

Sample Train Configuration



1. Contact Control Room SRO and request Operations complete Enclosure 5.3 or 5.4 to bypass Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

> **NOTE:** Needed items may include portable survey instrument, air sampling equipment (P&C cartridge and marinelli) and key to Post Accident Sampling Toolbox.

2. Obtain needed items and proceed to sampling area.

3. Supply nitrogen gas to the panel as follows:

   3.1 Turn "T" handle on second stage of nitrogen bottle's regulator counter clockwise to ensure 40 psig is **NOT** exceeded in Step 3.2.

   3.2 Open valve on nitrogen bottle:

      3.2.1 Note pressure on first stage of regulator:

      - **IF** pressure is <200 psig replace nitrogen bottle, return to Step 3.1.
      - **IF** pressure is >200 but <300 psig the functional test may continue and nitrogen bottle should be replaced at conclusion of test.

   3.3 Turn "T" handle on nitrogen bottle's regulator clock-wise until 40 psig is indicated on low pressure gauge.

> **NOTE:** When black valve handles are rotated counter-clockwise one-quarter turn to UPWARD position, inlets valves are opened.

4. Open the following inlet valves located on left side of sample panel:

_____ 4.1 INSTRUMENT AIR INLET

_____ 4.2 N_2 INLET

_____ _____ 4.3 Verify test tee caps on sample inlet and outlet lines are capped.

DV

_____ 5. Verify THIOSULFATE valve is CLOSED.

6. Prepare for sampling as follows:

_____ 6.1 Install a 4600 cc marinelli with quick disconnect fittings using 1/4" polytubing located inside the door of the panel. {MNS INPO Finding September 1990}

_____ 6.2 Install 1/4" tubing at the first compression fitting of the sample inlet line located inside the panel on the upper left side. {MNS INPO Finding September 1990}

7. Set switches listed below as follows:

_____ 7.1 SAMPLE VOLUME SELECT - set on SMALL

_____ 7.2 DILUTION VOLUME SELECT - set on LARGE

_____ 7.3 SELECTOR switch - set on OFF

_____ 7.4 SYSTEM PURGE toggle switch - set on NORMAL

_____ 7.5 REFILL switch - set on OFF (down)

_____ 7.6 TC switch - set on POSITION 1 (thermocouple measures sample line temperature)

_____ 7.7 SAMPLE LINE SELECT switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

_____ 8. Turn KEY LOCK switch to POWER ON and ensure POWER ON light has come on.

_____ 9. Turn toggle switch on Radiation Monitor to ON position (Up):

_____ 9.1 Turn SELECTOR on Radiation Monitor to BATT and ensure needle is in "Red Test Region".

_____ 9.2 Turn SELECTOR to MR/HR.

10. Purge the sample panel as follows:

_____ 10.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 10.2 Move NORMAL - SAMPLE PURGE toggle switch to SAMPLE PURGE.

_____ 10.3 Depress ACTIVATE pushbutton.

_____ 10.4 Depress EVAC pushbutton (EVAC light ON) and watch pressure gauge slowly drop to - 19" of Hg.

_____ 10.5 Depress STOP pushbutton.

_____ 10.6 Press down and release GAS PURGE toggle switch and watch pressure gauge swiftly rise to + 10" of Hg.

_____ 10.7 Depress STOP pushbutton.

_____ 10.8 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 10.9 Depress STOP pushbutton.

_____ 10.10 Depress PUMP pushbutton and wait for 30 seconds.

_____ 10.11 Depress STOP pushbutton.

_____ 10.12 Move NORMAL - SAMPLE PURGE toggle switch to NORMAL.

_____ 10.13 Turn SELECTOR switch to DILUTION VOLUME EVACUATION.

11. Evacuate dilution volume as follows:

_____ 11.1 Depress ACTIVATE pushbutton and watch pressure gauge drop to - 19" of Hg.

_____ 11.2 Turn SELECTOR switch to SAMPLE RECIRC.

12. Recirculate containment air and trap a sample as follows:

_____ 12.1 Depress ACTIVATE pushbutton and wait 15 minutes.

_____ 12.2 Read and record sample inlet line pressure and temperature on Enclosure 5.2.

_____ 12.3 Depress SAMPLE pushbutton and wait 1 minute.

_____ 12.4 Depress TRAP pushbutton and wait 30 seconds.

_____ 12.5 Turn SELECTOR switch to SAMPLE DILUTION.

_____ 12.6 Turn SAMPLE LINE SELECT switch to OFF:

_____ 12.6.1 Disconnect the 4600 cc gas marinelli from poly tubing and the poly tubing from sample line inlet fitting. {MNS INPO Finding September 1990}

_____ _____ 12.6.2 Record sample date and time.
DV

_____ _____ 12.6.3 Reconnect sample inlet line.
DV

_____ 12.7 Turn SAMPLE LINE SELECT switch to Unit and Hydrogen Analyzer (Train A or B) being used for this Functional test.

13. Dilute sample with N_2 and recirculate as follows:

_____ 13.1 Depress ACTIVATE pushbutton.

_____ 13.2 Depress SLOW pushbutton and watch pressure gauge slowly rise to 0" of Hg.

_____ 13.3 Depress STOP pushbutton.

_____ 13.4 Turn SELECTOR switch to OFF:

_____ 13.4.1 Disconnect flexible tubing on gas sampler located on right-hand side of panel.

_____ 13.4.2 Inspect filter housing O-Rings and replace as necessary.

_____ 13.4.3 Connect the quick disconnects to a sampling train containing a particulate filter, CP-100 cartridge and a 100 cc gas bomb.

_____ 13.5 Turn SELECTOR switch to SAMPLE DILUTION:

_____ 13.5.1 Depress ACTIVATE pushbutton.

_____ 13.5.2 Depress RECIRC pushbutton and wait 15 minutes.

_____ 13.5.3 Depress STOP pushbutton.

14. Purge sample panel as follows:

_____ 14.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 14.2 Depress ACTIVATE pushbutton.

_____ 14.3 Depress EVAC pushbutton and watch pressure gauge slowly drop to - 19" of Hg.

_____ 14.4 Depress STOP pushbutton.

_____ 14.5 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg.

_____ 14.6 Depress STOP pushbutton.

_____ 14.7 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 14.8 Depress STOP pushbutton.

_____ 14.9 Depress PUMP pushbutton and wait 30 seconds.

_____ 14.10 Depress STOP pushbutton.

15. Remove samples from sample panel as follows:

_____ 15.1 Disconnect gas bomb (if used), particulate and iodine sample from sample panel.

_____ 15.2 Record sample date and time.

_____ 15.3 Reconnect gas sampler flexible tubing line.

_____ 16. Clean area around sample panel.

17. Switching sample system OFF as follows:

17.1 Close the following valves:

_____ A. Nitrogen bottle.

_____ B. NITROGEN INLET and INSTRUMENT AIR INLET valves.

_____ 17.2 Turn SELECTOR switch to OFF.

_____ 17.3 Turn toggle switch on Radiation Monitor to OFF position (Down).

_____ 17.4 Turn Radiation Monitor knob to OFF position.

_____ 17.5 Turn SAMPLE LINE SELECT switch to OFF position.

_____ 17.6 Turn KEY LOCK switch to OFF position.

_____ 18. Verify Post Accident Sampling Toolbox contains all the items listed on Enclosure 5.1 secure toolbox with a break-away lock:

_____ • **WHEN** semi-annual Functional Test is performed, replace any deteriorated or missing items Post Accident Sampling Toolbox.

_____ 19. Request Operations to return Hydrogen Analyzer to service per Enclosure 5.5 or 5.6.

_____ 20. Transport undiluted gas sample taken from panel and gas sample taken from RIA-49 to the Count Room for analysis.

_____ 21. Compare sample results as per Limits and Precautions 3.23:

• **IF** comparison criteria are **NOT** met for functional test, notify responsible supervisor.

_____ 22. Complete Procedure Process Record and forward completed procedure to Master File.

_____ 23. **IF** sample comparison is within Limits and Precautions 3.23, update information in WMS.

(R06-97)

INFORMATION ONLY

Duke Power Company

PROCEDURE PROCESS RECORD

(1) ID No HP/2/A/1009/017

Revision No 016

PREPARATION

(2) Station OCONEE NUCLEAR STATION

(3) Procedure Title Operating Procedure For Post-Accident Containment Air Sampling System

(4) Prepared By John E. Davis Date 9/12/00

(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 Rick Bowen (QR) Date 9/12/00

Cross-Disciplinary Review By _____ (QR)NA RB Date 9/12/00

Reactivity Mgmt. Review By _____ (QR)NA RB Date 9/12/00

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval *(if necessary)*

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By J. A. Twiggs Date 9/13/2000

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 Checklists 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 Oconee Nuclear Station **Operating Procedure For Post-Accident Containment Air Sampling System** **Continuous Use**	Procedure No. HP/2/A/1009/017 Revision No. 016 Electronic Reference No. OX002SDV

Operating Procedure For Post-Accident Containment Air Sampling System

1. Purpose

1.1 This procedure describes the operation of the Post-Accident Containment Air Sampling System that is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA.

1.2 This procedure is used for actual accident or emergency.

1.3 This procedure is also used to perform the semi-annual functional test of the system.

1.4 This procedure is an Emergency Plan Implementing Procedure (EPIP). It must be forwarded to the Emergency Planning Group within three working days of approval by the responsible group. {PIP 4-O-93-0701}

2. References

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

2.2 HP/0/B/1009/015, Procedure For Sampling And Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.3 NSD 700, Independent Verification

2.4 Operation Management Procedure (OMP) 2.16, Unit Turnover Sheet

2.5 OP/0/A/1102/022, Reactor Building Hydrogen Analyzer System

2.6 SH/0/B/2000/004, Taking, Counting And Recording Surveys

2.7 PIP 4-O-93-701, Distribution Of Emergency Plan Procedures

2.8 MNS INPO Finding September 1990, Verification of Flow From Containment During Sampling Process

3. Limits And Precautions

3.1 The sampling cycle will require two (2) qualified technicians approximately one (1) hour per sample, of which about ten (10) minutes will be spent in the sample panel area. One qualified technician will operate the control panel while the other will perform transit duties to and from the panel.

3.2 Personnel communications can be achieved by phone (by column Q-73). Unit 1&2 Control Room - extension 2268.

3.3 Before sampling operations begin, the decision must be made based on radiological conditions in the Reactor Building whether to use a 100 ml gas bomb or a graduated syringe for the gas sample. A syringe should be used when the atmospheric concentration of Xe-133 equivalent is expected to be $\geq$1000 µCi/cc.

3.4 Before system is activated, ensure the dial switches are **NOT** giving a false indication by rotating the switches through all possible positions to ensure the base of the switch has **NOT** rotated.

3.5 The key for the control panel is located in the Post Accident Sampling Toolbox at the sample panel.

3.6 The key to the Post Accident Toolbox is in the RP Shift Key Box.

3.7 **IF** Reactor Building pressure is greater than 40 psig, the sampling system must **NOT** be used.

3.8 The following items will never be used on the panel:

- TRAP AREA EVACUATION
- FAST SAMPLE DILUTION
- SOLUTION CHANGE OUT

3.9 The Recirc Pump must never be used at any pressure other than 0 inches of mercury.

3.10 Moving the SELECTOR switch from one mode to another stops all current system operations.

3.11 Depressing the ACTIVATE pushbutton starts operation of the newly selected mode.

3.12 Portable survey meter shall be used for determining radiation levels. The radiation monitor display on the control panel will provide an indication of radiation levels at the sample panel.

3.13 **IF** problems with the pressure **AND/OR** temperature gauge are evident, such as going off scale or erratic response, the SELECTOR switch must be turned to the OFF mode and sampling discontinued until the problem is corrected.

3.14 **IF** the sampling system **CANNOT** be operated, then HP/0/B/1009/015 (Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity) will be used as an alternate method for obtaining a containment air sample.

3.15 Operations must complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer to bring containment air to the sampling system and to return the Hydrogen Analyzer to service after sampling is complete by Enclosure 5.5 or 5.6. These enclosures shall be double verified to ensure that containment integrity is maintained. The Operations Unit Supervisor shall designate one "doer" and one "verifier" as required by NSD 700 (Independent Verification).

3.16 The front side of the sample panel is the side that contains the door. The left and right side of the sample panel will be determined by facing the door.

3.17 **IF** radiation levels exceed 16 rad/hr and **CANNOT** be reduced by purging the system, secure operation of the panel, move to a low background area and contact the Radiation Protection Supervisor for further instructions.

3.18 Enclosure 5.7 may be used to provide assistance in determining flow inside the sample panel. It is **NOT** intended to provide verification for valve operation.

3.19 **IF** both hydrogen analyzer trains are inoperative and upon request by the Operations group, this procedure may be used to obtain a hydrogen sample of the containment atmosphere.

3.20 The Chemistry Section will analyze the hydrogen sample in accordance with their procedures. The Chemistry Section should be contacted to obtain sampling syringes and specific instructions on size and number of hydrogen samples to be taken.

3.21 **IF** the acceptance criteria are **NOT** met on Functional Test, promptly notify RP Shift Supervisor.

3.22 Make note of any problems incurred during the functional test and the step at which the problem occurred.

3.23 Sample flow from the containment atmosphere to the post-accident containment air sampling system can be verified by independent sample taken from the Unit's RIA-49. The concentration of Xe-133 in the undiluted sample taken from the Post Accident Sample Panel should be within a factor of 2 of the Xe-133 concentration taken from the RIA. Flow verification is applicable to functional testing only. Example: RIA sample = 1E-4 Xe-133: Boundaries of the Post Accident Sample Panel sample are: 5E-5 to 2E-4 Xe-133.{MNS INPO, September 1990}

3.24 **WHEN** performing functional test, Enclosure 5.11 shall be used.

4. Procedure.

4.1 Determine application of this procedure:

4.1.1 **IF** performing functional test, perform Enclosure 5.11

4.1.2 **IF** Post Accident Sampling is needed contact Control Room SRO and request Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

NOTE: Needed items include portable survey instrument, air sampling equipment (P&C cartridge) and key to Post Accident Sampling Toolbox.

4.2 Obtain needed items and proceed to sampling area.

4.3 Supply nitrogen gas to the panel as follows:

_____ 4.3.1 Turn "T" handle on second stage of nitrogen bottle's regulator counter clockwise to ensure 40 psig is **NOT** exceeded in the next step.

_____ 4.3.2 Open valve on nitrogen bottle next to sampling panel:

4.3.2.1 Note pressure on first stage of regulators:

- **IF** pressure is <200 psig replace nitrogen bottle, return to Step 4.3.1.

_____ 4.3.3 Turn "T" handle on nitrogen bottle's regulator clock-wise until 40 psig is indicated on the low pressure gauge.

NOTE: When black valve handles are rotated counter-clockwise one-quarter turn to UPWARD position, inlets valves are opened.

4.4 Open the following inlet valves located on left side of sample panel:

_____ 4.4.1 INSTRUMENT AIR INLET

_____ 4.4.2 N_2 INLET

_____ 4.5 **IF** a hydrogen sample is desired, replace sample inlet line test tee cap (outside upper left side of panel) with a septum:

_____ _____ 4.5.1 Verify test tees on sample inlet and outlet lines are capped.
DV

_____ 4.6 Verify THIOSULFATE valve is CLOSED.

4.7 Set switches listed below as follows:

_____ 4.7.1 SAMPLE VOLUME SELECT - set on SMALL.

_____ 4.7.2 DILUTION VOLUME SELECT - set on LARGE.

_____ 4.7.3 SELECTOR switch - set on OFF.

_____ 4.7.4 SYSTEM PURGE - set on NORMAL.

_____ 4.7.5 REFILL switch - set on OFF (down).

_____ 4.7.6 TC switch - set on POSITION 1 (thermocouple measures sample line temperature).

_____ 4.7.7 SAMPLE LINE SELECT switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of sampling system.

_____ 4.8 Turn KEY LOCK switch to POWER ON and ensure POWER ON light has come on.

_____ 4.9 Turn toggle switch on Radiation Monitor to ON position (Up):

_____ 4.9.1 Turn SELECTOR switch on Radiation Monitor to BATT and ensure needle is in "Red Test Region":

_____ 4.9.1.1 Turn SELECTOR switch to MR/hr or R/HR scale.

4.10 Purge sample panel as follows:

_____ 4.10.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 4.10.2 Move NORMAL - SAMPLE PURGE toggle switch to SAMPLE PURGE.

_____ 4.10.3 Depress ACTIVATE pushbutton.

_____ 4.10.4 Depress EVAC pushbutton (EVAC light ON) and watch pressure gauge slowly drop to - 19" of Hg.

_____ 4.10.5 Depress STOP pushbutton.

_____ 4.10.6 Press down and release GAS PURGE toggle switch and watch pressure gauge swiftly rise to + 10" of Hg.

_____ 4.10.7 Depress STOP pushbutton.

_____ 4.10.8 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 4.10.9 Depress STOP pushbutton.

_____ 4.10.10 Depress PUMP pushbutton and wait for 30 seconds.

_____ 4.10.11 Depress STOP pushbutton.

_____ _____ 4.10.12 Repeat Step 4.10.6 through 4.10.11 twice to purge sample panel two more times.
2nd purge 3rd purge

_____ 4.10.13 Move NORMAL - SAMPLE PURGE toggle switch to NORMAL.

_____ 4.10.14 Turn SELECTOR switch to DILUTION VOLUME EVACUATION.

4.11 Evacuate dilution volume as follows:

_____ 4.11.1 Depress ACTIVATE pushbutton and watch pressure gauge drop to - 19" of Hg.

_____ 4.11.2 Turn SELECTOR switch to SAMPLE RECIRC.

4.12 Recirculate containment air and trap a sample as follows:

_____ 4.12.1 Depress ACTIVATE pushbutton and wait 15 minutes.

_____ 4.12.2 Read and record sample inlet line pressure and temperature on Enclosure 5.2.

4.12.3 Complete Steps 4.12.3.1 and 4.12.3.2 for each hydrogen sample needed:

WARNING: Hydrogen samples taken from the Post Accident Sample Panel are **NOT** diluted and therefore may be highly radioactive. To reduce personnel dose, shielding should be immediately available following sampling.

_____ 4.12.3.1 Insert syringe needle into septum on sample inlet line (outside left side of panel) withdraw specified volume of sample and remove needle from septum.

_____ 4.12.3.2 Place syringe in a shielded container as necessary to reduce personnel dose.

_____ 4.12.4 Depress SAMPLE pushbutton and wait 1 minute.

_____ 4.12.5 Depress TRAP pushbutton and wait 30 seconds.

_____ 4.12.6 Turn SELECTOR switch to SAMPLE DILUTION.

4.13 Dilute sample with N_2 and recirculate as follows:

_____ 4.13.1 Depress ACTIVATE pushbutton.

_____ 4.13.2 Depress SLOW pushbutton and watch pressure gauge slowly rise to 0" of Hg.

_____ 4.13.3 Depress STOP pushbutton.

4.14 Prepare for sampling as follows:

_____ 4.14.1 Turn SELECTOR switch to OFF.

_____ 4.14.2 Disconnect gas sampler flexible tubing quick disconnects located on right side of panel near the floor:

_____ 4.14.2.1 **IF** a gas sample will **NOT** be taken with a syringe, install particulate and iodine cartridge holder with sampling media and a 100 cc gas bomb at gas sampler located in Step 4.14.2.

_____ 4.14.2.2 **IF** a gas sample will be taken with a syringe, replace gas line test tee cap with one with a septum and install a particulate and iodine cartridge holder with sampling media at gas sampler location located in Step 4.14.2.

_____ 4.14.3 Turn SELECTOR switch to SAMPLE DILUTION:

_____ 4.14.3.1 Depress ACTIVATE pushbutton.

_____ 4.14.3.2 Depress RECIRC pushbutton and wait 15 minutes.

4.14.3.3 **IF** a syringe will be used for gas sample, complete Steps A thru C:

_____ A. Insert syringe into septum on a 100 cc gas bomb and withdraw 5 cc's of air, remove needle from septum and return syringe plunger to 0 cc's.

_____ B. Insert syringe needle into septum on sample line (right side of the panel at floor), withdraw a 5 cc sample of gas and remove needle from septum.

_____ C. Insert syringe needle into septum on cc gas bomb and inject 5 cc's of gas sample taken from sample inlet, withdraw needle from septum.

_____ 4.14.4 Depress STOP pushbutton.

_____ 4.14.5 Turn SELECTOR switch to SYSTEM PURGE.

4.15 Purge sample panel as follows:

_____ 4.15.1 Depress ACTIVATE pushbutton.

_____ 4.15.2 Depress EVAC pushbutton and watch pressure gauge slowly drop to - 19" of Hg.

_____ 4.15.3 Depress STOP pushbutton.

_____ 4.15.4 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg.

_____ 4.15.5 Depress STOP pushbutton.

_____ 4.15.6 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 4.15.7 Depress STOP pushbutton.

_____ 4.15.8 Depress PUMP pushbutton and wait 30 seconds.

_____ 4.15.9 Depress STOP pushbutton.

_____ 4.15.10 Repeat Steps 4.15.4 through 4.15.9 to purge sample panel one additional time.

4.16 Remove samples from sample panel as follows:

4.16.1 **IF** used, disconnect gas bomb, particulate and iodine sample from sample panel.

4.16.2 Record sample date and time.

4.16.3 Reconnect gas sampler flexible tubing line.

NOTE: If additional samples will be pulled or the radiological conditions do **NOT** allow cleanup steps 4.16.4, and 4.18 may be N/A.

DV _____ 4.16.4 **IF** a hydrogen sample was taken, replace septum on sample inlet line (located on the left hand side) with a test tee cap.

4.17 Switch Sample System OFF as follows:

4.17.1 Close the following valves:

_____ 4.17.1.1 Nitrogen bottle.

_____ 4.17.1.2 NITROGEN INLET and INSTRUMENT AIR INLET valves.

_____ 4.17.2 Turn SELECTOR switch to OFF.

_____ 4.17.3 Turn toggle switch on Radiation Monitor to OFF position (Down).

_____ 4.17.4 Turn Radiation Monitor knob to OFF position.

_____ 4.17.5 Turn SAMPLE LINE SELECT switch to OFF.

_____ 4.17.6 Turn KEY LOCK switch to OFF.

_____ 4.17.7 Clean area around sample panel.

_____ 4.18 Request Operations to return Hydrogen Analyzer to service per Enclosure 5.5 or 5.6.

_____ 4.19 Calculate sample volumes using data from Enclosure 5.2 and record these volumes on sample labels.

NOTE: Locations of analytical measurement labs are subject to change during either a drill or emergency.

4.20 Transport gas, particulate, and iodine samples to Count Room for gamma spectral analysis and, if taken, hydrogen samples to Primary Chemistry Lab for percent hydrogen analysis:

_____ 4.20.1 **IF** gas sample **CANNOT** be counted because of high activity, contact RP Staff personnel for dilution of gas samples.

_____ 4.20.2 **IF** iodine **CANNOT** be counted because of high activity, purge iodine cartridge per SH/0/B/2000/004 (Taking, Counting And Recording Surveys).

_____ 4.20.3 Forward sample analysis results to the Radiation Protection Manager or designee.

_____ 4.21 Verify Post Accident Sampling Toolbox contains all items listed on Enclosure 5.1, secure toolbox.

_____ 4.22 Complete Procedure Process Record and forward the completed procedure to RP Staff personnel.

5. Enclosures

5.1 Sampling Panel Equipment

5.2 Sample Data Sheet

5.3 Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

5.4 Operations Checklist For Bypassing H_2 Analysis Panel Currently In Analyze Mode

5.5 Operations Checklist For Returning H_2 Analysis Panel Back To Service In Standby Mode

5.6 Operations Checklist For Returning H_2 Analysis Panel Back To Service In Analyze Mode

5.7 Valve Checklist For Sample Panel

5.8 Control Panel Diagram

5.9 Flow Diagram

5.10 Sample Train Configuration

5.11 Functional Test Operating Enclosure

Enclosure 5.1

Sampling Panel Equipment

1	Key to the Post Accident Containment Air Sampling Control Panel
1	100 cc gas bombs with quick disconnect fittings
2	Septums for the 100 cc gas bombs
1	Adjustable Wrench
1	9/16" Combination Wrench
1	Stopwatch
1	Graduated syringe

NOTE: Poly tubing stored inside panel door.

	6 feet of ¼" poly tubing with compression fittings to connect to the sample inlet line.
1 ea.	Particulate filter and iodine cartridge
	¼" poly tubing with appropriate fittings to complete sampling train
2	Test tee caps with septums
	Shielded Sample Transport Container
1	Set of O-Rings for filter housing
1	Break-away lock to secure Sampling Toolbox

Enclosure 5.2

Sample Data Sheet

1. Name _____

   Date_____

   Unit_____

2. Sample Line Temperature _____°F

3. Sample Inlet Line Pressure _____psig

4. Sample Volume = SV

$$SV = \frac{(5599.23 + 380.9P)}{(3751.77 + 8.167xF)} = \_\_\_\_\_$$

   - °F = Sample Line Temperature in °F
   - P = Sample Line Pressure in psig

5. Diluted Volume = $\frac{SV}{1.05E4}$ x sample size = _____ml

   - Sample Size = 100cc gas bomb or 5cc gas syringe

6. Record diluted volume as gas sample volume on sample label.

7. Record sample volume (SV) as particulate and iodine sample volume on sample label.

8. Multiply each iodine and particulate concentration by the appropriate factor listed below to correct for deposition in the sample lines:

   - Normal Conditions: 1.70
   - Accident Conditions: 19.23

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

1. Initial Conditions

_____ _____ 1.1 Verify Containment Integrity and record date/time.
DV

Date/Time _____

NOTE: This person may have other responsibilities, but they shall **NOT** prevent him from performing this evolution.

_____ 1.2 Designate a Reactor Operator to immediately close containment isolation valves from the Control Room in the event an ES actuation occurs and record date/time:

- Reactor Operator _____
- Control Room SRO _____
- Date/Time _____

_____ 1.3 Record containment isolation valves that will be opened on Enclosures 7.2 of OMP 2-16 (Unit Turnover Sheet) and date/time:

_____ • 2PR-81 and 2PR-84

_____ • 2PR-90 and 2PR-87

- Date/Time _____

_____ 1.4 Verify H_2 Analysis Panel in STANDBY mode and record date/time.

Date/Time _____

_____ _____ 1.5 Verify Reactor Building pressure is less than 40 psig and record date/time.
DV

Date/Time _____

_____ 1.6 Record which Train to be used and date/time:

- (Train A or Train B) _____
- Date/Time _____

2. Procedure

2.1 Place Post Accident Sampler in service as follows:

_____ 2.1.1 Verify selected train in STANDBY mode by observing red STANDBY light in gray "Unit 2 Reactor Building Containment Atmosphere Hydrogen Analyzer Train (A or B)" cabinet and record date/time.

Date/Time _____

2.1.2 **IF** using Train A, at Remote Panel, depress the following black ON pushbuttons and record date/time:

_____ • 2PR-83

_____ • 2PR-86

_____ • Date/Time_____

2.1.3 **IF** using Train B, at Remote Panel, depress the following black ON pushbuttons and record date/time:

_____ • 2PR-89

_____ • 2PR-92

_____ • Date/Time _____

_____ 2.1.4 **IF** Train A was selected, turn SAMPLE VALVE SELECTOR switch to 2PR-71 and record date/time. (Red light will come on which is labeled Top Containment).

Date/Time _____

_____ 2.1.5 **IF** Train B was selected, turn SAMPLE VALVE SELECTOR switch to 2PR-76 and record date/time. (Red light will come on which is labeled Top Containment).

Date/Time _____

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

CAUTION: If ES actuation occurs, immediately close containment isolation valves.

_____ _____ 2.1.6 **IF** Train A was selected, OPEN 2PR-81 and 2PR-84 (Containment Isolation Valves) from Control Room and record date/time.
DV

Date/Time _____

_____ _____ 2.1.7 **IF** Train B was selected, OPEN 2PR-87 and 2PR-90 (Containment Isolation Valves) from Control Room and record date/time.
DV

Date/Time _____

_____ 2.1.8 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.4

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Analyze Mode

1. Initial Conditions

_____ 1.1 Verify H_2 Analyzer in ANALYZE mode and record date/time.

Date/Time _____

_____ 1.2 Verify Reactor Building pressure is less than 40 psig and record date/time.

Date/Time _____

_____ 1.3 Record which Train to be used and date/time:

- (Train A or Train B) _____
- Date/Time _____

2. Procedure

2.1 Place Post Accident Sampler in service as follows:

_____ 2.1.1 At selected train Remote Panel, position OFF, STANDBY, ANALYZE selector to STANDBY and record date/time.

Date/Time _____

_____ 2.1.2 Verify red STANDBY light in gray "Unit 2 Reactor Building Containment Atmosphere Hydrogen Analyzer Train (A or B)" cabinet is illuminated and record date/time.

Date/Time _____

_____ 2.1.3 At selected train Remote Panel, depress <u>both</u> black ON pushbuttons for BYP TO POST AC and record date/time. Opens 2PR-83 and 2PR-86 or 2PR-89 and 2PR-92.

Date/Time _____

_____ 2.1.4 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.5

Operations Checklist For Returning H_2 Analysis Panel Back To Service In Standby Mode

1. Procedure

1.1 Return H_2 Analysis train back to service in STANDBY mode as follows:

_____ 1.1.1 Turn SAMPLE VALVE SELECTOR switch to OFF and record date/time. (Red light will go off). Closes 2PR-71 or 2PR-76.

Date/Time _____

_____ 1.1.2 Depress OFF pushbuttons on both BYP TO POST AC switches and record date/time. Closes 2PR-83 and 2PR-86 or 2PR-89 and 2PR-92.

Date/Time _____

NOTE: This will regain containment integrity.

_____ DV _____ 1.1.3 **IF** Train A is selected, from Control Room, close 2PR-81 and 2PR-84 and record date/time.

Date/Time _____

_____ DV _____ 1.1.4 **IF** Train B was selected, from Control Room, close 2PR-87 and 2PR-90 and record date/time.

Date/Time _____

_____ DV _____ 1.1.5 Notify Unit Supervisor the H_2 Analysis Train back in STANDBY mode and request to remove the containment isolation valves from Enclosure 7.2, OMP2-16 (Unit Turnover Sheet) and record date/time.

Date/Time _____

_____ 1.1.6 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.6

Operations Checklist For Returning H_2 Analysis Panel Back To Service In Analyze Mode

1. Initial Conditions

_____ 1.1 Verify H_2 Analysis Panel has been switched to STANDBY mode for Post Accident sampling and record date/time.

Date/Time _____

_____ 1.2 Return to ANALYZE mode and record date/time.

Date/Time _____

2. Procedure

2.1 Return H_2 Analysis train back to service as follows:

_____ 2.1.1 Depress OFF pushbuttons on both BYP TO POST AC switches and record date/time. Closes 2PR-83 and 2PR-86 or 2PR-89 and 2PR-92.

Date/Time _____

NOTE: When ANALYZE is selected, the indication will go up scale resulting in a possible High Hydrogen Alarm on both panels and in Control Room. Then return down scale to the correct reading in approximately 3 minutes.

_____ 2.1.2 Position OFF, STANDBY, ANALYZE selector to ANALYZE and record date/time.

Date/Time _____

_____ 2.1.3 Push REMOTE SELECTOR pushbutton to ensure control is from Remote Panel and record date/time.

Date/Time _____

_____ 2.1.4 Reset Common Alarm after meter reading stabilizes and record date/time.

Date/Time _____

_____ 2.1.5 Notify Unit Supervisor the H_2 Analysis Train is back in ANALYZE mode and record date/time.

Date/Time _____

_____ 2.1.6 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

This checklist may be used to provide assistance in determining flow inside the sample panel. It is **NOT** intended to provide verification for valve operation.

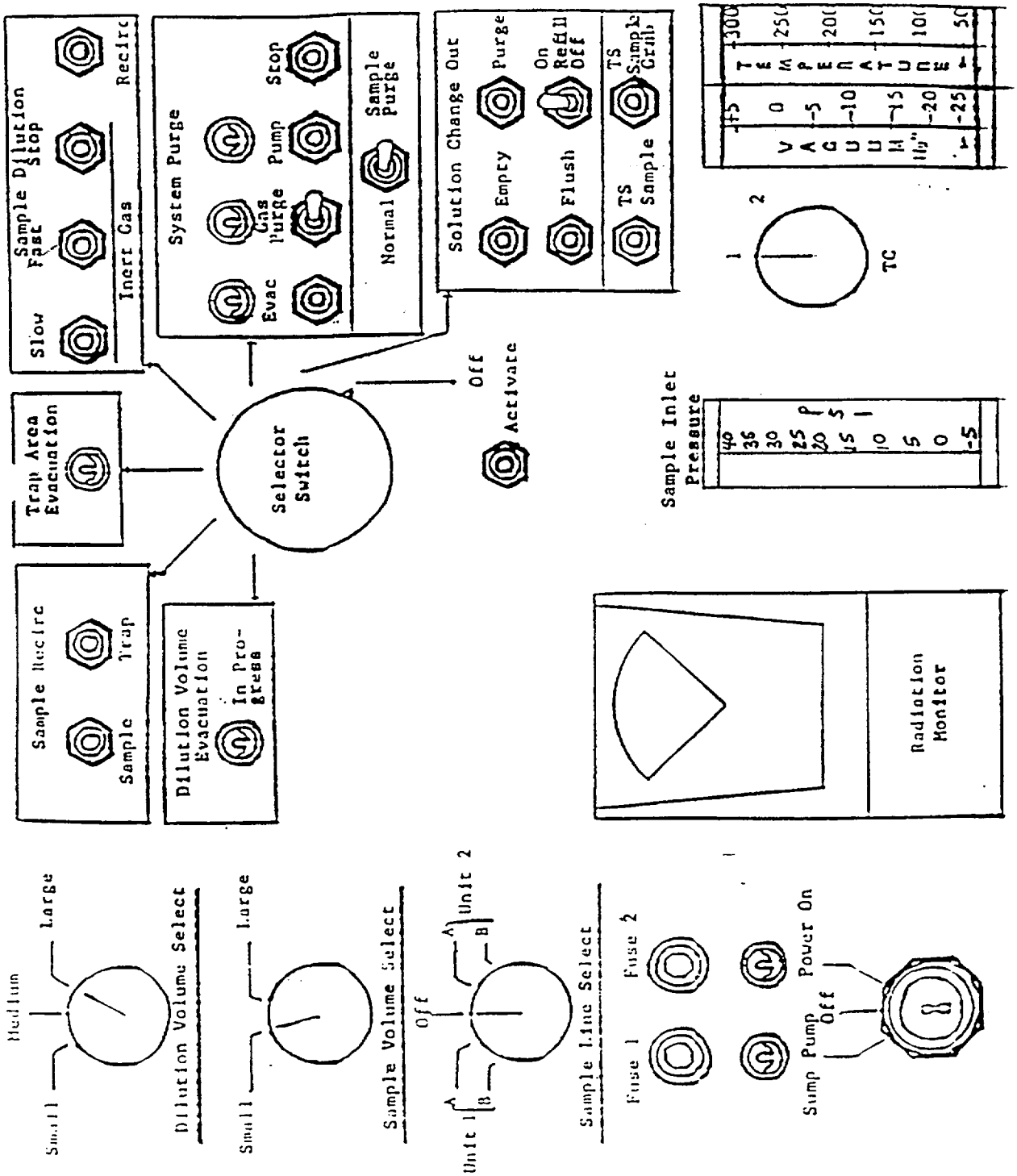
ACTION	RESPONSE
Dilution Volume Evacuation	
Activate	Energize 1, 2, 9, 12, 17,19
Sample Recirculate	
Activate	Energize 1, 2, 5, 6, 27
Sample	De-energize 27
Trap	De-energize 2, 5

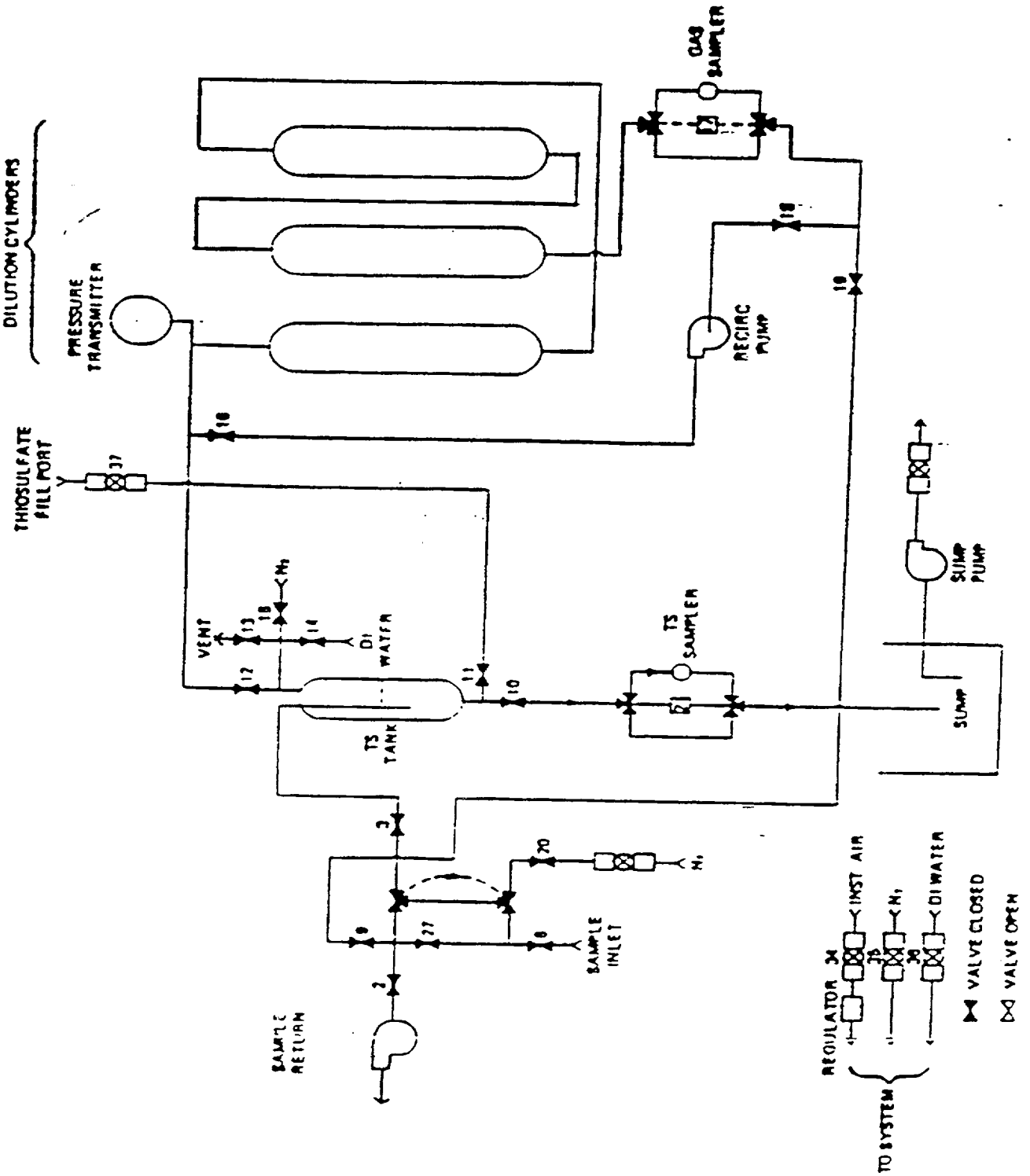
NOTE: When SELECTOR switch is moved to another position, Valve #17 will de-energize.

Sample Dilution	
Activate	Energize 12, 17
Slow	Energize 3, 20
Stop	De-energize 3, 20
Recirc	Energize Recirc Pump 16, 18
System Purge	Energize 9, 12, 19, 27
Activate	Energize 12, 22
Evac	Energize 1, 2
Stop	De-energize 1, 2
Gas Purge (down)	Energize 15, De-energize 1, 2
Stop	De-energize 15
Normal - Sample Purge (Sample Purge)	Energize 17
Pump	Energize Pump 16, 18
	De-energize 15, or 1 and 2
Stop	De-energize Pump 16, 18
Solution Change Out	
Empty	Energize 10, 11, 13
Flush	Energize 14, 10
Purge	Energize 15, 10
Refill	Energize
TS Sample	Energize 21
TS Sample Grab	De-energize 21

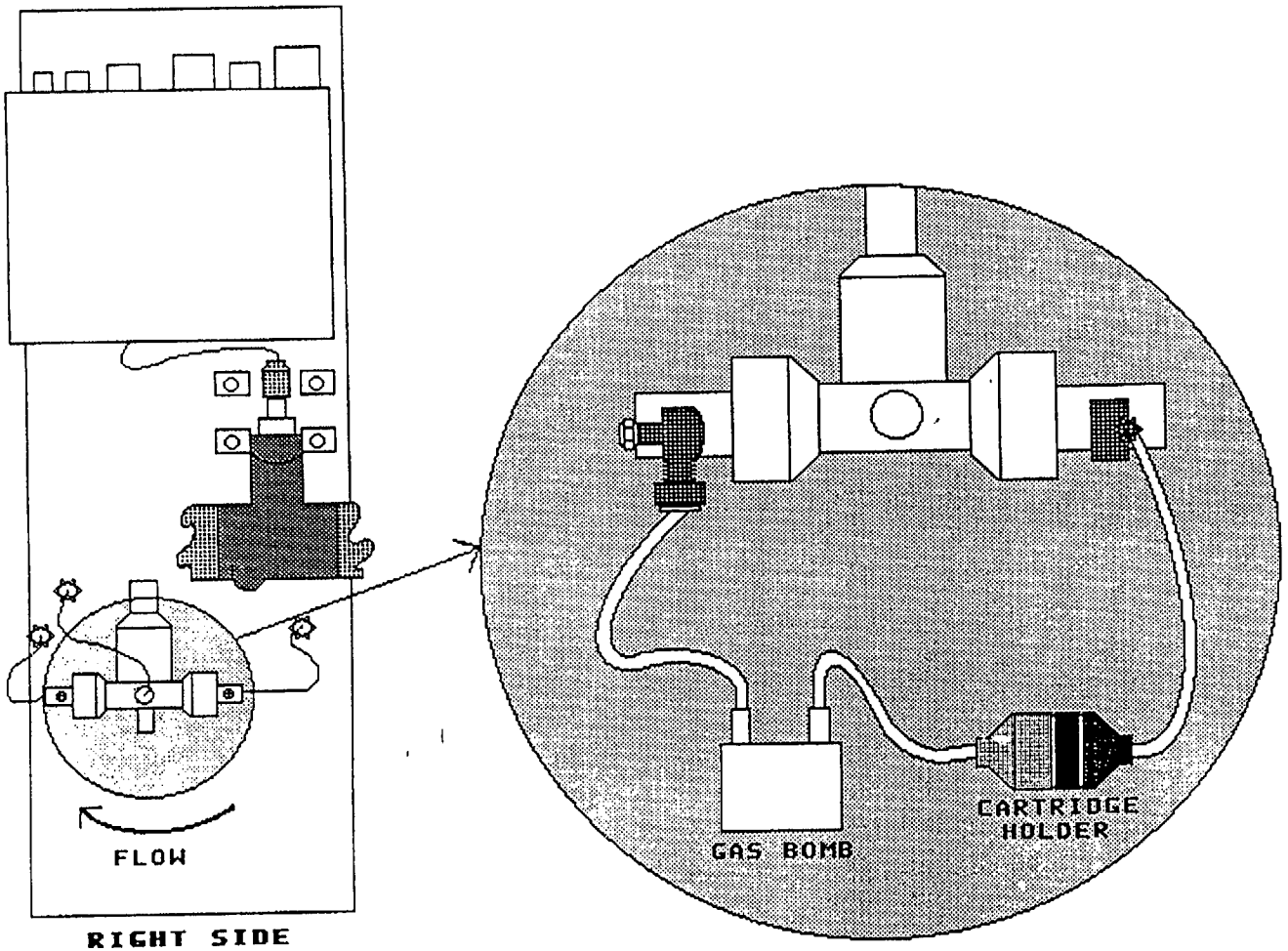
Enclosure 5.8

Control Panel Diagram




GAS SAMPLER
DILUTION CYLINDERS
PRESSURE TRANSMITTER
RECIRC PUMP
THIOSULFATE FILL PORT
SUMP PUMP
VENT
DI WATER
TS SAMPLER
TS TANK
SUMP
SAMPLE RETURN
SAMPLE INLET
REGULATOR
INST AIR
DI WATER
TO SYSTEM
VALVE CLOSED
VALVE OPEN

Sample Train Configuration



1. Contact Control Room SRO and request Operations complete Enclosure 5.3 or 5.4 to bypass Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

> **NOTE:** Needed items may include portable survey instrument, air sampling equipment (P&C cartridge and marinelli) and key to Post Accident Sampling Toolbox.

2. Obtain needed items and proceed to sampling area.

3. Supply nitrogen gas to the panel as follows:

   3.1 Turn "T" handle on second stage of nitrogen bottle's regulator counter clockwise to ensure 40 psig is **NOT** exceeded in Step 3.2.

   3.2 Open valve on nitrogen bottle:

      3.2.1 Note pressure on first stage of regulator:

      - **IF** pressure is <200 psig replace nitrogen bottle, return to Step 3.1.
      - **IF** pressure is >200 but <300 psig the functional test may continue and nitrogen bottle should be replaced at conclusion of test.

   3.3 Turn "T" handle on nitrogen bottle's regulator clock-wise until 40 psig is indicated on low pressure gauge.

> **NOTE:** When black valve handles are rotated counter-clockwise one-quarter turn to UPWARD position, inlets valves are opened.

4. Open the following inlet valves located on left side of sample panel:

_____ 4.1 INSTRUMENT AIR INLET

_____ 4.2 N_2 INLET

_____ _____ 4.3 Verify test tee caps on sample inlet and outlet lines are capped.

DV

_____ 5. Verify THIOSULFATE valve is CLOSED.

6. Prepare for sampling as follows:

_____ 6.1 Install a 4600 cc marinelli with quick disconnect fittings using 1/4" polytubing located inside the door of the panel. {MNS INPO Finding September 1990}

_____ 6.2 Install 1/4" tubing at the first compression fitting of the sample inlet line located inside the panel on the upper left side. {MNS INPO Finding September 1990}

7. Set switches listed below as follows:

_____ 7.1 SAMPLE VOLUME SELECT - set on SMALL

_____ 7.2 DILUTION VOLUME SELECT - set on LARGE

_____ 7.3 SELECTOR switch - set on OFF

_____ 7.4 SYSTEM PURGE toggle switch - set on NORMAL

_____ 7.5 REFILL switch - set on OFF (down)

_____ 7.6 TC switch - set on POSITION 1 (thermocouple measures sample line temperature)

_____ 7.7 SAMPLE LINE SELECT switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

_____ 8. Turn KEY LOCK switch to POWER ON and ensure POWER ON light has come on.

_____ 9. Turn toggle switch on Radiation Monitor to ON position (Up):

_____ 9.1 Turn SELECTOR on Radiation Monitor to BATT and ensure needle is in "Red Test Region".

_____ 9.2 Turn SELECTOR to MR/HR.

10. Purge the sample panel as follows:

_____ 10.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 10.2 Move NORMAL - SAMPLE PURGE toggle switch to SAMPLE PURGE.

_____ 10.3 Depress ACTIVATE pushbutton.

_____ 10.4 Depress EVAC pushbutton (EVAC light ON) and watch pressure gauge slowly drop to - 19" of Hg.

_____ 10.5 Depress STOP pushbutton.

_____ 10.6 Press down and release GAS PURGE toggle switch and watch pressure gauge swiftly rise to + 10" of Hg.

_____ 10.7 Depress STOP pushbutton.

_____ 10.8 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 10.9 Depress STOP pushbutton.

_____ 10.10 Depress PUMP pushbutton and wait for 30 seconds.

_____ 10.11 Depress STOP pushbutton.

_____ 10.12 Move NORMAL - SAMPLE PURGE toggle switch to NORMAL.

_____ 10.13 Turn SELECTOR switch to DILUTION VOLUME EVACUATION.

11. Evacuate dilution volume as follows:

_____ 11.1 Depress ACTIVATE pushbutton and watch pressure gauge drop to - 19" of Hg.

_____ 11.2 Turn SELECTOR switch to SAMPLE RECIRC.

12. Recirculate containment air and trap a sample as follows:

_____ 12.1 Depress ACTIVATE pushbutton and wait 15 minutes.

_____ 12.2 Read and record sample inlet line pressure and temperature on Enclosure 5.2.

_____ 12.3 Depress SAMPLE pushbutton and wait 1 minute.

_____ 12.4 Depress TRAP pushbutton and wait 30 seconds.

_____ 12.5 Turn SELECTOR switch to SAMPLE DILUTION.

_____ 12.6 Turn SAMPLE LINE SELECT switch to OFF:

_____ 12.6.1 Disconnect the 4600 cc gas marinelli from poly tubing and the poly tubing from sample line inlet fitting. {MNS INPO Finding September 1990}

_____ 12.6.2 Record sample date and time.

_____ _____ 12.6.3 Reconnect sample inlet line.
DV

_____ 12.7 Turn SAMPLE LINE SELECT switch to Unit and Hydrogen Analyzer (Train A or B) being used for this Functional test.

13. Dilute sample with N_2 and recirculate as follows:

_____ 13.1 Depress ACTIVATE pushbutton.

_____ 13.2 Depress SLOW pushbutton and watch pressure gauge slowly rise to 0" of Hg.

_____ 13.3 Depress STOP pushbutton.

_____ 13.4 Turn SELECTOR switch to OFF:

_____ 13.4.1 Disconnect flexible tubing on gas sampler located on right-hand side of panel.

_____ 13.4.2 Inspect filter housing O-Rings and replace as necessary.

_____ 13.4.3 Connect the quick disconnects to a sampling train containing a particulate filter, CP-100 cartridge and a 100 cc gas bomb.

_____ 13.5 Turn SELECTOR switch to SAMPLE DILUTION:

_____ 13.5.1 Depress ACTIVATE pushbutton.

_____ 13.5.2 Depress RECIRC pushbutton and wait 15 minutes.

_____ 13.5.3 Depress STOP pushbutton.

14. Purge sample panel as follows:

_____ 14.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 14.2 Depress ACTIVATE pushbutton.

_____ 14.3 Depress EVAC pushbutton and watch pressure gauge slowly drop to - 19" of Hg.

_____ 14.4 Depress STOP pushbutton.

_____ 14.5 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg.

_____ 14.6 Depress STOP pushbutton.

_____ 14.7 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 14.8 Depress STOP pushbutton.

_____ 14.9 Depress PUMP pushbutton and wait 30 seconds.

_____ 14.10 Depress STOP pushbutton.

15. Remove samples from sample panel as follows:

_____ 15.1 Disconnect gas bomb (if used), particulate and iodine sample from sample panel.

_____ 15.2 Record sample date and time.

_____ 15.3 Reconnect gas sampler flexible tubing line.

_____ 16. Clean area around sample panel.

17. Switching sample system OFF as follows:

17.1 Close the following valves:

_____ A. Nitrogen bottle.

_____ B. NITROGEN INLET and INSTRUMENT AIR INLET valves.

_____ 17.2 Turn SELECTOR switch to OFF.

_____ 17.3 Turn toggle switch on Radiation Monitor to OFF position (Down).

_____ 17.4 Turn Radiation Monitor knob to OFF position.

_____ 17.5 Turn SAMPLE LINE SELECT switch to OFF position.

_____ 17.6 Turn KEY LOCK switch to OFF position.

_____ 18. Verify Post Accident Sampling Toolbox contains all items listed on Enclosure 5.1, secure toolbox with a break-away lock:

_____ • **WHEN** the semi-annual Functional Test is performed, replace any deteriorated or missing items in the Post Accident Sampling Toolbox.

_____ 19. Request Operations to return Hydrogen Analyzer to service per Enclosure 5.5 or 5.6.

_____ 20. Transport undiluted gas sample taken from panel and gas sample taken from RIA-49 to the Count Room for analysis.

_____ 21. Compare sample results as per Limits and Precautions 3.23:

• **IF** comparison criteria are **NOT** met for functional test, notify responsible supervisor.

_____ 22. Complete Procedure Process Record and forward completed procedure to Master File.

_____ 23. **IF** sample comparison is within Limits and Precautions 3.23, update information in WMS.

(R06-97)

INFORMATION ONLY

Duke Power Company

PROCEDURE PROCESS RECORD

(1) ID No HP/3A/1009/017

Revision No 017

PREPARATION

(2) Station OCONEE NUCLEAR STATION

(3) Procedure Title Operating Procedure For Post-Accident Containment Air Sampling System

(4) Prepared By John E. Adams Date 9/12/00

(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 Rick Bowser (QR) Date 9/12/00

Cross-Disciplinary Review By (QR)NA RB Date 9/12/00

Reactivity Mgmt. Review By (QR)NA RB Date 9/12/00

(7) Additional Reviews

Reviewed By Date

Reviewed By Date

) Temporary Approval *(if necessary)*

By (SRO/QR) Date

By (QR) Date

(9) Approved By D. A. Tuttle Date 9/18/2000

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 Checklists 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 Oconee Nuclear Station **Operating Procedure For Post-Accident Containment Air Sampling System** **Continuous Use**	Procedure No. HP/3/A/1009/017 Revision No. 017 Electronic Reference No. OX002SDW

Operating Procedure For Post-Accident Containment Air Sampling System

1. Purpose

1.1 This procedure describes the operation of the Post-Accident Containment Air Sampling System that is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA.

1.2 This procedure is used for actual accident or emergency.

1.3 This procedure is also used to perform the semi-annual functional test of the system.

1.4 This procedure is an Emergency Plan Implementing Procedure (EPIP). It must be forwarded to the Emergency Planning Group within three working days of approval by the responsible group. {PIP 4-O-93-0701}

2. References

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

2.2 HP/0/B/1009/015, Procedure For Sampling And Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.3 NSD 700, Independent Verification

2.4 Operations Management Procedure (OMP) 2.16, Unit Turnover Sheet

2.5 OP/0/A/1102/022, Reactor Building Hydrogen Analyzer System

2.6 SH/0/B/2000/004, Taking, Counting And Recording Surveys

2.7 PIP 4-O-93-701, Distribution Of Emergency Plan Procedures

2.8 MNS INPO Finding September 1990, Verification of Flow From Containment During Sampling Process

3. Limits And Precautions

3.1 The sampling cycle will require two (2) qualified technicians approximately one (1) hour per sample, of which about ten (10) minutes will be spent in the sample panel area. One qualified technician will operate the control panel while the other will perform transit duties to and from the panel.

3.2 Personnel communications can be achieved by phone (by column S-89). Unit 3 Control Room – extension 2396.

3.3 Before sampling operations begin, the decision must be made based on radiological conditions in the Reactor Building whether to use a 100 ml gas bomb or a graduated syringe for the gas sample. A syringe should be used when the atmospheric concentration of Xe-133 equivalent is expected to be ≥1000 µCi/cc.

3.4 Before system is activated, ensure the dial switches are **NOT** giving a false indication by rotating the switches through all possible positions to ensure the base of the switch has **NOT** rotated.

3.5 The key for the control panel is located in the Post Accident Sampling Toolbox at the sample panel.

3.6 The key to the Post Accident Sampling Toolbox is in the RP Shift Key Box.

3.7 **IF** Reactor Building pressure is greater than 40 psig, the sampling system must **NOT** be used.

3.8 The following items will never be used on the panel:

- TRAP AREA EVACUATION
- FAST SAMPLE DILUTION
- SOLUTION CHANGE OUT

3.9 The Recirc Pump must never be used at any pressure other than 0 inches of mercury.

3.10 Moving the SELECTOR switch from one mode to another stops all current system operations.

3.11 Depressing the ACTIVATE pushbutton starts operation of the newly selected mode.

3.12 Portable survey meter shall be used for determining radiation levels. The radiation monitor display on the control panel will provide an indication of radiation levels at the sample panel.

3.13 **IF** problems with the pressure **AND/OR** temperature gauge are evident, such as going off scale or erratic response, the SELECTOR switch must be turned to the OFF mode and sampling discontinued until the problem is corrected.

3.14 **IF** the sampling system **CANNOT** be operated, then HP/0/B/1009/015 (Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity) will be used as an alternate method for obtaining a containment air sample.

3.15 Operations must complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer to bring containment air to the sampling system and to return the Hydrogen Analyzer to service after sampling is complete by Enclosure 5.5 or 5.6. These enclosures shall be double verified to ensure that containment integrity is maintained. The Operations Unit Supervisor shall designate one "doer" and one "verifier" as required by NSD 700 (Independent Verification).

3.16 The front side of the sample panel is the side that contains the door. The left and right side of the sample panel will be determined by facing the door.

3.17 **IF** radiation levels exceed 16 rad/hr and **CANNOT** be reduced by purging the system, secure operation of the panel, move to a low background area and contact the Radiation Protection Supervisor for further instructions.

3.18 Enclosure 5.7 may be used to provide assistance in determining flow inside the sample panel. It is **NOT** intended to provide verification for valve operation.

3.19 **IF** both hydrogen analyzer trains are inoperative and upon request by the Operations group, this procedure may be used to obtain a hydrogen sample of the containment atmosphere.

3.20 The Chemistry Section will analyze the hydrogen sample in accordance with their procedures. The Chemistry Section should be contacted to obtain sampling syringes and specific instructions on size and number of hydrogen samples to be taken.

3.21 **IF** the acceptance criteria are **NOT** met on Functional Test, promptly notify RP Shift Supervisor.

3.22 Make note of any problems incurred during the functional test and the step at which the problem occurred.

3.23 Sample flow from the containment atmosphere to the post-accident containment air sampling system can be verified by independent sample taken from the Unit's RIA-49. The concentration of Xe-133 in the undiluted sample taken from the Post Accident Sample Panel should be within a factor of 2 of the Xe-133 concentration taken from the RIA. Flow verification is applicable to functional testing only. Example: RIA sample = 1E-4 Xe-133: Boundaries of the Post Accident Sample Panel sample are: 5E-5 to 2E-4 Xe-133.{MNS INPO, September 1990}

3.24 **WHEN** performing functional test, Enclosure 5.11 shall be used.

4. Procedure

4.1 Determine application of this procedure:

4.1.1 **IF** performing functional test, perform Enclosure 5.11.

4.1.2 IF Post Accident Sampling is needed, contact Control Room SRO and request Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

NOTE: Needed items include portable survey instrument, air sampling equipment (P&C cartridge) and key to Post Accident Sampling Toolbox.

4.2 Obtain needed items and proceed to sampling area.

4.3 Supply nitrogen gas to the panel as follows:

_____ 4.3.1 Turn "T" handle on second stage of nitrogen bottle's regulator counter clockwise to ensure 40 psig is **NOT** exceeded in Step 4.3.2.

_____ 4.3.2 Open valve on nitrogen bottle next to sampling panel:

4.3.2.1 Note pressure on first stage of regulator:

- IF pressure is <200 psig replace nitrogen bottle, return to Step 4.3.1.

_____ 4.3.3 Turn "T" handle on nitrogen bottle's regulator clock-wise until 40 psig is indicated on the low pressure gauge.

NOTE: When black valve handles are rotated counter-clockwise one-quarter turn to UPWARD position, inlets valves are opened.

4.4 Open the following inlet valves located on left side of sample panel:

_____ 4.4.1 INSTRUMENT AIR INLET

_____ 4.4.2 N_2 INLET

_____ 4.5 IF a hydrogen sample is desired, replace sample inlet line test tee cap (outside upper left side of panel) with a septum:

_____ _____ 4.5.1 Verify test tees on sample inlet and outlet lines are capped.
DV

_____ 4.6 Verify THIOSULFATE valve is CLOSED.

4.7 Set switches listed below as follows:

_____ 4.7.1 SAMPLE VOLUME SELECT - set on SMALL.

_____ 4.7.2 DILUTION VOLUME SELECT - set on LARGE.

_____ 4.7.3 SELECTOR switch - set on OFF.

_____ 4.7.4 SYSTEM PURGE - set on NORMAL.

_____ 4.7.5 REFILL switch - set on OFF (down).

_____ 4.7.6 TC switch - set on POSITION 1 (thermocouple measures sample line temperature).

_____ 4.7.7 SAMPLE LINE SELECT switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of sampling system.

_____ 4.8 Turn KEY LOCK switch to POWER ON and ensure POWER ON light has come on.

_____ 4.9 Turn toggle switch on Radiation Monitor to ON position (Up):

_____ 4.9.1 Turn SELECTOR switch on Radiation Monitor to BATT and ensure needle is in "Red Test Region":

_____ 4.9.1.1 Turn SELECTOR switch to MR/HR or R/HR scale.

4.10 Purge sample panel as follows:

_____ 4.10.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 4.10.2 Move NORMAL - SAMPLE PURGE toggle switch to SAMPLE PURGE.

_____ 4.10.3 Depress ACTIVATE pushbutton.

_____ 4.10.4 Depress EVAC pushbutton (EVAC light ON) and watch pressure gauge slowly drop to - 19" of Hg.

_____ 4.10.5 Depress STOP pushbutton.

_____ 4.10.6 Press down and release GAS PURGE toggle switch and watch pressure gauge swiftly rise to + 10" of Hg.

_____ 4.10.7 Depress STOP pushbutton.

_____ 4.10.8 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 4.10.9 Depress STOP pushbutton.

_____ 4.10.10 Depress PUMP pushbutton and wait for 30 seconds.

_____ 4.10.11 Depress STOP pushbutton.

_____ 2nd purge _____ 3rd purge 4.10.12 Repeat Step 4.10.6 through 4.10.11 twice to purge sample panel two more times.

_____ 4.10.13 Move NORMAL - SAMPLE PURGE toggle switch to NORMAL.

_____ 4.10.14 Turn SELECTOR switch to DILUTION VOLUME EVACUATION.

4.11 Evacuate dilution volume as follows:

_____ 4.11.1 Depress ACTIVATE pushbutton and watch pressure gauge drop to - 19" of Hg.

_____ 4.11.2 Turn SELECTOR switch to SAMPLE RECIRC.

4.12 Recirculate containment air and trap a sample as follows:

_____ 4.12.1 Depress ACTIVATE pushbutton and wait 15 minutes.

_____ 4.12.2 Read and record sample inlet line pressure and temperature on Enclosure 5.2.

4.12.3 Complete Steps 4.12.3.1 and 4.12.3.2 for each hydrogen sample needed:

WARNING: Hydrogen samples taken from the Post-Accident Sampling Panel are **NOT** diluted and therefore may be highly radioactive. To reduce personnel dose, shielding should be immediately available following sampling.

_____ 4.12.3.1 Insert syringe needle into septum on sample inlet line (outside left side of panel), withdraw specified volume of sample and remove needle from septum.

_____ 4.12.3.2 Place syringe in a shielded container as necessary to reduce personnel dose.

_____ 4.12.4 Depress SAMPLE pushbutton and wait 1 minute.

_____ 4.12.5 Depress TRAP pushbutton and wait 30 seconds.

_____ 4.12.6 Turn SELECTOR switch to SAMPLE DILUTION.

4.13 Dilute sample with N_2 and recirculate as follows:

_____ 4.13.1 Depress ACTIVATE pushbutton.

_____ 4.13.2 Depress SLOW pushbutton and watch pressure gauge slowly rise to 0" of Hg.

_____ 4.13.3 Depress STOP pushbutton.

4.14 Prepare for sampling as follows:

_____ 4.14.1 Turn SELECTOR switch to OFF.

_____ 4.14.2 Disconnect gas sampler flexible tubing quick disconnects located on right side of panel near the floor:

_____ 4.14.2.1 **IF** gas sample will **NOT** be taken with a syringe, install particulate and iodine cartridge holder with sampling media and a 100 cc gas bomb at gas sampler located in Step 4.14.2.

_____ 4.14.2.2 **IF** gas sample will be taken with a syringe, replace gas line test tee cap with one with a septum and install a particulate and iodine cartridge holder with sampling media at gas sampler location located in Step 4.14.2.

_____ 4.14.3 Turn SELECTOR switch to SAMPLE DILUTION:

_____ 4.14.3.1 Depress ACTIVATE pushbutton.

_____ 4.14.3.2 Depress RECIRC pushbutton and wait 15 minutes.

4.14.3.3 **IF** syringe will be used for gas sample, complete Steps A thru C:

_____ A. Insert syringe into septum on a 100 cc gas bomb and withdraw 5 cc's of air, remove needle from septum and return syringe plunger to 0 cc's.

_____ B. Insert syringe needle into septum on sample line (right side of the panel at floor), withdraw a 5 cc sample of gas and remove needle from septum.

_____ C. Insert syringe needle into septum on cc gas bomb and inject 5 cc's of gas sample taken from sample inlet, withdraw needle from septum.

_____ 4.14.4 Depress STOP pushbutton.

_____ 4.14.5 Turn SELECTOR switch to SYSTEM PURGE.

4.15 Purge sample panel as follows:

_____ 4.15.1 Depress ACTIVATE pushbutton.

_____ 4.15.2 Depress EVAC pushbutton and watch pressure gauge slowly drop to - 19" of Hg.

_____ 4.15.3 Depress STOP pushbutton.

_____ 4.15.4 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg.

_____ 4.15.5 Depress STOP pushbutton.

_____ 4.15.6 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 4.15.7 Depress STOP pushbutton.

_____ 4.15.8 Depress PUMP pushbutton and wait 30 seconds.

_____ 4.15.9 Depress STOP pushbutton.

_____ 4.15.10 Repeat Steps 4.15.4 through 4.15.9 to purge sample panel one additional time.

4.16 Remove samples from sample panel as follows:

_____ 4.16.1 **IF** used, disconnect gas bomb, particulate and iodine sample from sample panel.

_____ 4.16.2 Record sample date and time.

_____ 4.16.3 Reconnect gas sampler flexible tubing line.

NOTE: If additional samples will be pulled or the radiological conditions do **NOT** allow cleanup steps 4.16.4, and 4.18 may be N/A.

_____ _____ 4.16.4 **IF** a hydrogen sample was taken, replace septum on sample inlet line (located on the left hand side) with a test tee cap.
DV

4.17 Switch Sample System OFF as follows:

4.17.1 Close the following valves:

_____ 4.17.1.1 Nitrogen bottle.

_____ 4.17.1.2 NITROGEN INLET and INSTRUMENT AIR INLET valves.

_____ 4.17.2 Turn SELECTOR switch to OFF.

_____ 4.17.3 Turn toggle switch on Radiation Monitor to OFF position (Down).

_____ 4.17.4 Turn Radiation Monitor knob to OFF position.

_____ 4.17.5 Turn SAMPLE LINE SELECT switch to OFF.

_____ 4.17.6 Turn KEY LOCK switch to OFF.

_____ 4.17.7 Clean area around sample panel.

_____ 4.18 Request Operations to return Hydrogen Analyzer to service per Enclosure 5.5 or 5.6.

_____ 4.19 Calculate sample volumes using data from Enclosure 5.2 and record these volumes on sample labels.

NOTE: Locations of analytical measurement labs are subject to change during either a drill or emergency.

4.20 Transport gas, particulate, and iodine samples to Count Room for gamma spectral analysis and, if taken, hydrogen samples to Primary Chemistry Lab for percent hydrogen analysis:

_____ 4.20.1 **IF** gas sample **CANNOT** be counted because of high activity, contact RP Staff personnel for dilution of gas samples.

_____ 4.20.2 **IF** iodine **CANNOT** be counted because of high activity, purge iodine cartridge per SH/0/B/2000/004 (Taking, Counting And Recording Surveys).

_____ 4.20.3 Forward sample analysis results to the Radiation Protection Manager or designee.

_____ 4.21 Verify Post Accident Sampling Toolbox contains all items listed on Enclosure 5.1, secure toolbox.

_____ 4.22 Complete Procedure Process Record and forward the completed procedure to RP Staff personnel.

5. Enclosures

5.1 Sampling Panel Equipment

5.2 Sample Data Sheet

5.3 Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

5.4 Operations Checklist For Bypassing H_2 Analysis Panel Currently In Analyze Mode

5.5 Operations Checklist For Returning H_2 Analysis Panel Back To Service In Standby Mode

5.6 Operations Checklist For Returning H_2 Analysis Panel Back To Service In Analyze Mode

5.7 Valve Checklist For Sample Panel

5.8 Control Panel Diagram

5.9 Flow Diagram

5.10 Sample Train Configuration

5.11 Functional Test Operating Enclosure

Enclosure 5.1

Sampling Panel Equipment

1	Key to the Post Accident Containment Air Sampling Control Panel
1	100 cc gas bombs with quick disconnect fittings
2	Septums for the 100 cc gas bombs
1	Adjustable Wrench
1	9/16" Combination Wrench
1	Stopwatch
1	Graduated syringe

NOTE: Poly tubing stored inside panel door.

	6 feet of ¼" poly tubing with compression fittings to connect to the sample inlet line
1 ea.	Particulate filter and iodine cartridge
	¼" poly tubing with appropriate fittings to complete sampling train
2	Test tee caps with septums
	Shielded Sample Transport Container
1	Set of O-Rings for filter housing
1	Break-away lock to secure Sampling Toolbox

Enclosure 5.2

Sample Data Sheet

1. Name

   Date_____

   Unit_____

2. Sample Line Temperature _____°F

3. Sample Inlet Line Pressure _____psig

4. Sample Volume = SV

$$SV = \frac{(5599.23 + 380.9P)}{(3751.77 + 8.167xF)} = \_\_\_\_\_$$

   - °F = Sample Line Temperature in °F
   - P = Sample Line Pressure in psig

5. Diluted Volume = $\frac{SV}{8.6E3}$ x sample size = _____ml

   - Sample Size = 100cc gas bomb or 5cc gas syringe

6. Record diluted volume as gas sample volume on sample label.

7. Record sample volume (SV) as particulate and iodine sample volume on sample label.

8. Multiply each iodine and particulate concentration by the appropriate factor listed below to correct for deposition in the sample lines:

   - Normal Conditions: 1.70
   - Accident Conditions: 19.23

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

1. Initial Conditions

_____ _____ 1.1 Verify Containment Integrity and record date/time.
DV

Date/Time _____

NOTE: This person may have other responsibilities, but they shall **NOT** be prevented from performing this evolution.

_____ 1.2 Designate a Reactor Operator to immediately close containment isolation valves from the Control Room in the event an ES actuation occurs and record date/time:

- Reactor Operator _____
- Control Room SRO _____
- Date/Time _____

_____ 1.3 Record containment isolation valves that will be opened on Enclosure 7.2 of OMP 2-16 (Unit Turnover Sheet) and date/time:

_____ • 3PR-81 and 3PR-84

_____ • 3PR-90 and 3PR-87

- Date/Time _____

_____ 1.4 Verify H_2 Analysis Panel in STANDBY mode and record date/time.

Date/Time _____

_____ _____ 1.5 Verify Reactor Building pressure less than 40 psig and record date/time.
DV

Date/Time _____

_____ 1.6 Record which Train to be used and date/time:

- (Train A or Train B) _____
- Date/Time _____

2. Procedure

2.1 Place Post Accident Sampler in service as follows:

_____ 2.1.1 Verify selected train in STANDBY mode by observing red STANDBY light in gray "Unit 3 Reactor Building Containment Atmosphere Hydrogen Analyzer Train (A or B)" cabinet and record date/time.

Date/Time _____

2.1.2 **IF** using Train A, at Remote Panel depress the following black ON pushbuttons and record date/time:

_____ • 3PR-83

_____ • 3PR-86

• Date/Time _____

2.1.3 **IF** using Train B, at Remote Panel depress the following black ON pushbuttons and record date/time:

_____ • 3PR-89

_____ • 3PR-92

• Date/Time _____

_____ 2.1.4 **IF** Train A was selected, turn SAMPLE VALVE SELECTOR switch to 3PR-71 and record date/time. (Red light will come on which is labeled Top Containment):

Date/Time _____

_____ 2.1.5 **IF** Train B was selected, turn SAMPLE VALVE SELECTOR switch to 3PR-76 and record date/time. (Red light will come on which is labeled Top Containment):

Date/Time _____

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Standby Mode

CAUTION: If ES actuation occurs, immediately close containment isolation valves.

_____ _____ 2.1.6 **IF** Train A was selected, OPEN 3PR-81 and 3PR-84 (Containment Isolation Valves) from Control Room and record date/time.
DV

Date/Time _____

_____ _____ 2.1.7 **IF** Train B was selected, OPEN 3PR-87 and 3PR-90 (Containment Isolation Valves) from Control Room and record date/time.
DV

Date/Time _____

_____ 2.1.8 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.4

Operations Checklist For Bypassing H_2 Analysis Panel Currently In Analyze Mode

1. Initial Conditions

_____ 1.1 Verify H_2 Analyzer in ANALYZE mode and record date/time.

Date/Time _____

_____ 1.2 Verify Reactor Building pressure is less than 40 psig and record date/time.

Date/Time _____

_____ 1.3 Record which Train to be used record date/time:

- (Train A or Train B) _____
- Date/Time _____

2. Procedure

2.1 Place Post Accident Sampler in service as follows:

_____ 2.1.1 At selected train Remote Panel, position OFF, STANDBY, ANALYZE selector to STANDBY and record date/time:

Date/Time _____

_____ 2.1.2 Verify red STANDBY light in gray "Unit 3 Reactor Building Containment Atmosphere Hydrogen Analyzer Train (A or B)" cabinet is and record date/time:

Date/Time _____

_____ 2.1.3 At selected train Remote Panel, depress both black ON pushbuttons for BYP TO POST AC and record date/time. Opens (3PR-83, 3PR-86) or (3PR-89, 3PR-92).

Date/Time _____

_____ 2.1.4 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time:

Date/Time _____

Enclosure 5.5

Operations Checklist For Returning H_2 Analysis Panel Back To Service In Standby Mode

1. Procedure

1.1 Return H_2 Analysis train back to service in STANDBY mode as follows:

_____ 1.1.1 Turn SAMPLE VALVE SELECTOR switch to OFF and record date/time. (Red light will go off). Closes 3PR-71 or 3PR-76.

Date/Time _____

_____ 1.1.2 Depress OFF pushbuttons on both BYP TO POST AC switches and record date/time. Closes 3PR-83, 3PR-86 or 3PR-89, 3PR-92.

Date/Time _____

NOTE: This will regain containment integrity.

_____ _____ 1.1.3 **IF** Train A is selected, from Control Room, close 3PR-81 and 3PR-84 and record date/time.
DV

Date/Time _____

_____ _____ 1.1.4 **IF** Train B was selected, from Control Room, close 3PR-87 and 3PR-90 and record date/time.
DV

Date/Time _____

_____ 1.1.5 Notify Unit Supervisor the H_2 Analysis Train back in STANDBY mode and request to remove the containment isolation valves from Enclosure 7.2, OMP 2-16 (Unit Turnover Sheet) and record date/time.

Date/Time _____

_____ 1.1.6 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.6

Operations Checklist For Returning H_2 Analysis Panel Back To Service In Analyze Mode

1. Initial Conditions

_____ 1.1 Verify H_2 Analysis Panel has been switched to STANDBY mode for post accident sampling and record date/time.

Date/Time _____

_____ 1.2 Return to ANALYZE mode and record date/time.

Date/Time _____

2. Procedure

2.1 Return H_2 Analysis train back to service as follows:

_____ 2.1.1 Depress OFF pushbuttons on both BYP TO POST AC switches and record date/time. Closes 3PR-83, 3PR-86 or 3PR-89, 3PR-92.

Date/Time _____

NOTE: When ANALYZE selected, the indication will go up scale resulting in a possible High Hydrogen Alarm on both panels and in the Control Room. Then return down scale to the correct reading in approximately 3 minutes.

_____ 2.1.2 Position OFF, STANDBY, ANALYZE selector to ANALYZE and record date/time.

Date/Time _____

_____ 2.1.3 Push REMOTE SELECTOR pushbutton to ensure control is from Remote Panel and record date/time.

Date/Time _____

_____ 2.1.4 Reset Common Alarm after meter reading stabilizes and record date/time.

Date/Time _____

_____ 2.1.5 Notify Unit Supervisor the H_2 Analysis Train is back in ANALYZE mode and record date/time.

Date/Time _____

_____ 2.1.6 Return completed enclosure to Radiation Protection personnel operating Post Accident Sample Panel and record date/time.

Date/Time _____

Enclosure 5.7

Valve Checklist For Sample Panel

This checklist may be used to provide assistance in determining flow inside the sample panel. It is **NOT** intended to provide verification for valve operation.

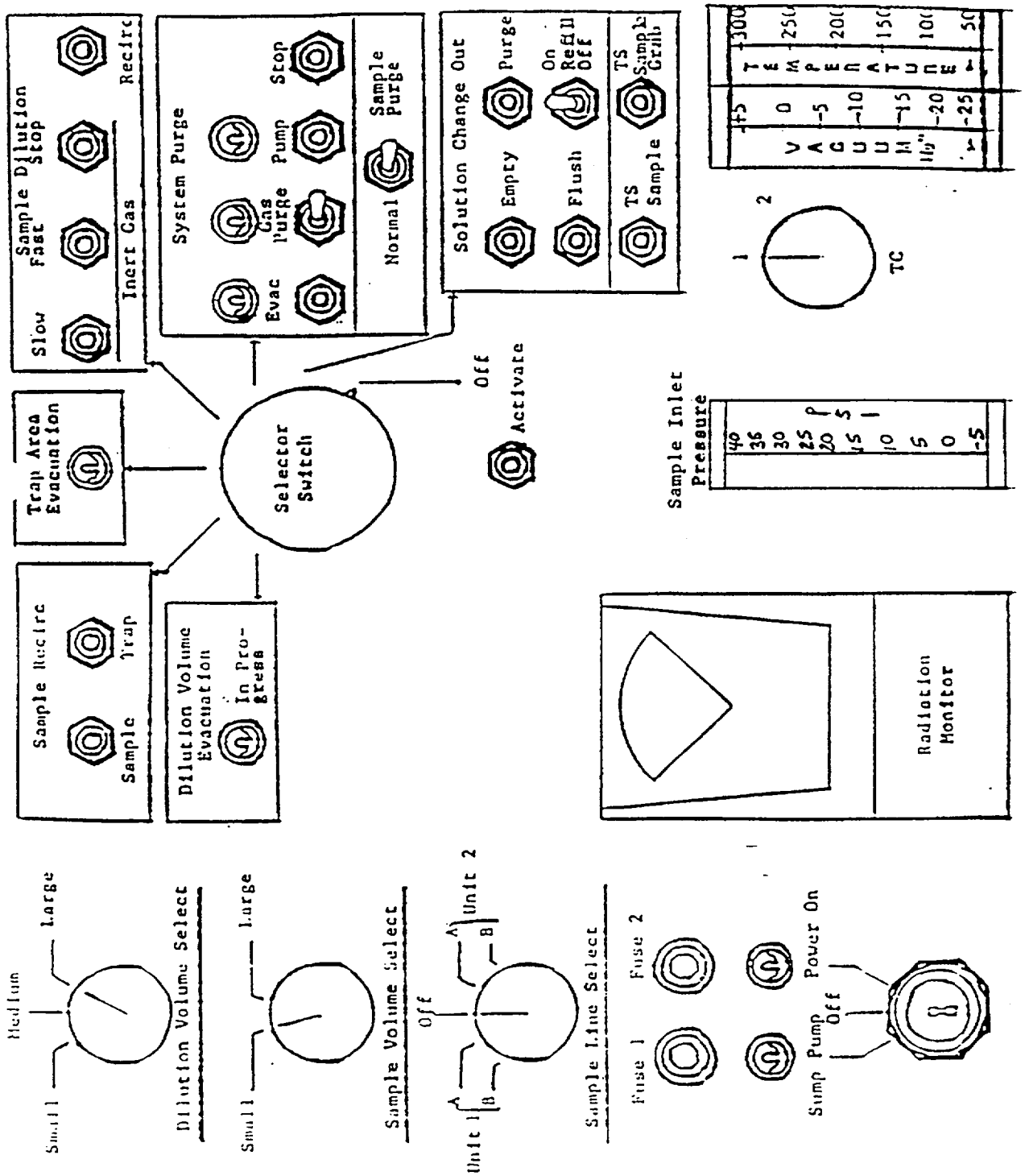
ACTION	RESPONSE
Dilution Volume Evacuation	
Activate	Energize 1, 2, 9, 12, 17,19
Sample Recirculate	
Activate	Energize 1, 2, 5, 6, 27
Sample	De-energize 27
Trap	De-energize 2, 5

NOTE: When SELECTOR switch is moved to another position, Valve #17 will de-energize.

Sample Dilution	
Activate	Energize 12, 17
Slow	Energize 3, 20
Stop	De-energize 3, 20
Recirc	Energize Recirc Pump 16, 18
System Purge	Energize 9, 12, 19, 27
Activate	Energize 12, 22
Evac	Energize 1, 2
Stop	De-energize 1, 2
Gas Purge (down)	Energize 15, De-energize 1, 2
Stop	De-energize 15
Normal - Sample Purge (Sample Purge)	Energize 17
Pump	Energize Pump 16, 18
	De-energize 15, or 1 and 2
Stop	De-energize Pump 16, 18
Solution Change Out	
Empty	Energize 10, 11, 13
Flush	Energize 14, 10
Purge	Energize 15, 10
Refill	Energize
TS Sample	Energize 21
TS Sample Grab	De-energize 21

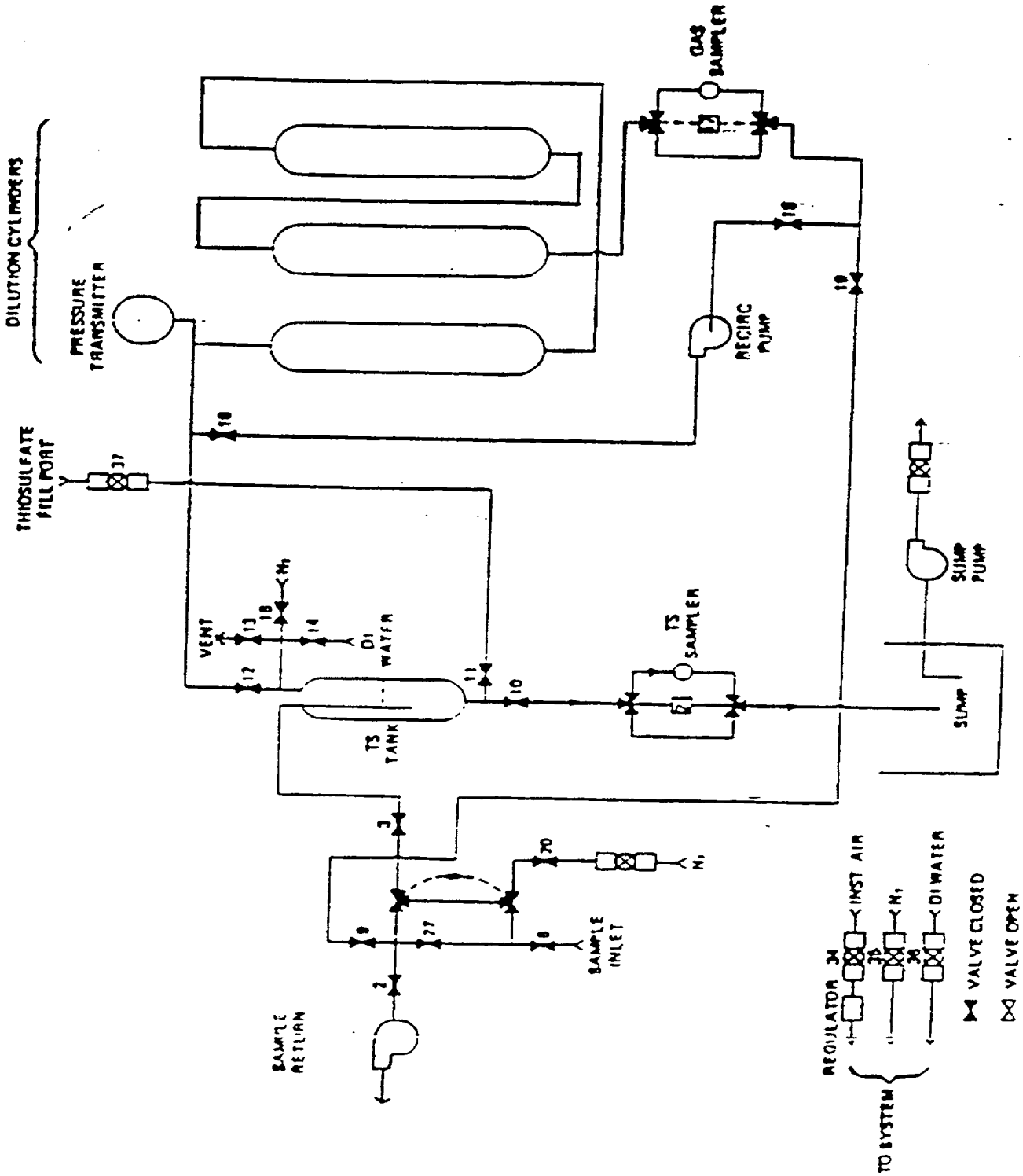
Enclosure 5.8

Control Panel Diagram

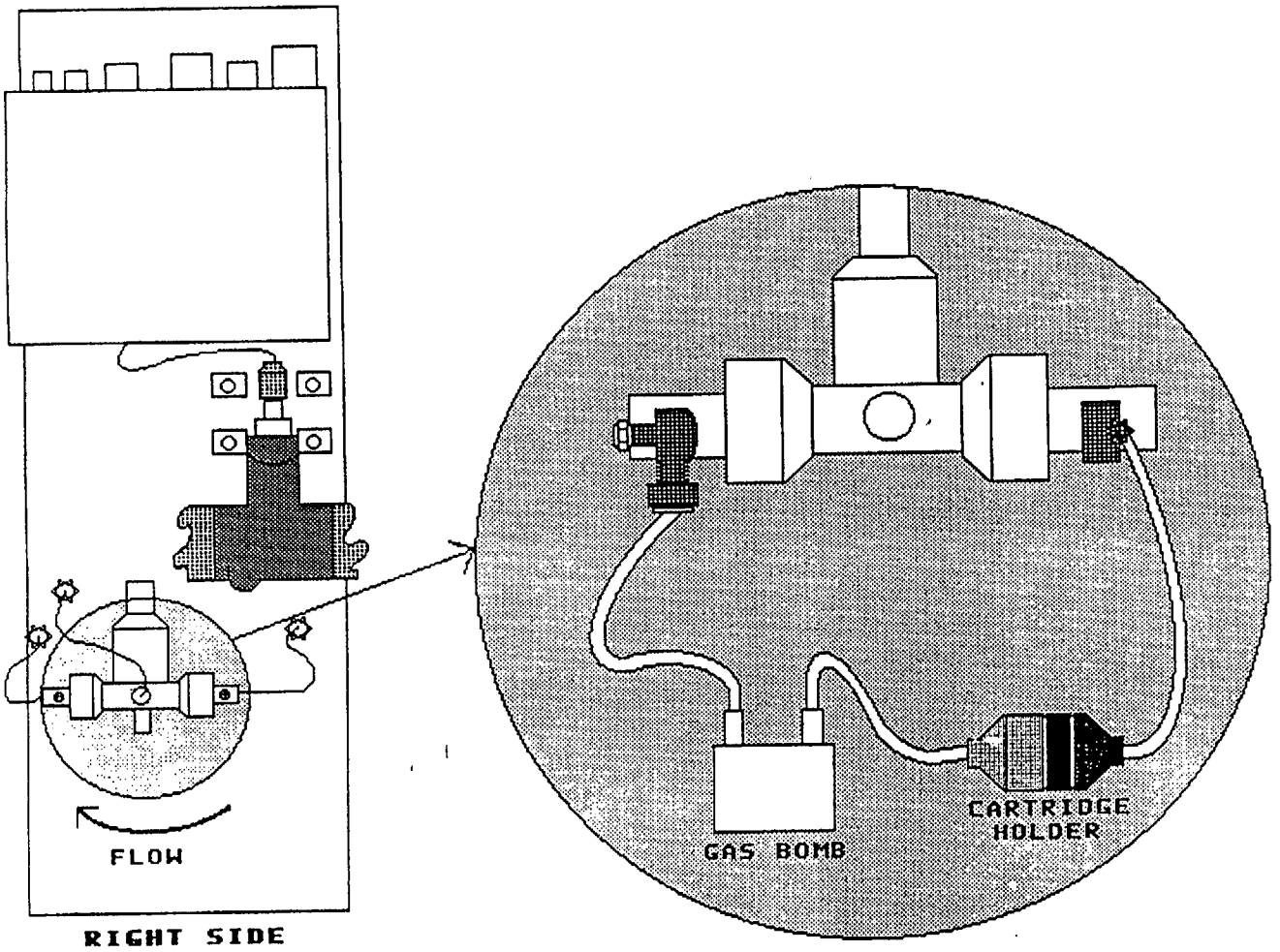


Enclosure 5.9

Flow Diagram



Sample Train Configuration



1. Contact Control Room SRO and request Operations complete Enclosure 5.3 or 5.4 to bypass Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

> **NOTE:** Needed items may include portable survey instrument, air sampling equipment (P&C cartridge and marinelli) and key to Post Accident Sampling Toolbox.

2. Obtain needed items and proceed to sampling area.

3. Supply nitrogen gas to the panel as follows:

   3.1 Turn "T" handle on second stage of nitrogen bottle's regulator counter clockwise to ensure 40 psig is **NOT** exceeded in Step 3.2.

   3.2 Open valve on nitrogen bottle:

      3.2.1 Note pressure on first stage of regulator:

      - **IF** pressure is <200 psig replace nitrogen bottle, return to Step 3.1.
      - **IF** pressure is >200 but <300 psig the functional test may continue and nitrogen bottle should be replaced at conclusion of test.

   3.3 Turn "T" handle on nitrogen bottle's regulator clock-wise until 40 psig is indicated on low pressure gauge.

> **NOTE:** When black valve handles are rotated counter-clockwise one-quarter turn to UPWARD position, inlets valves are opened.

4. Open the following inlet valves located on left side of sample panel: -

_____ 4.1 INSTRUMENT AIR INLET

_____ 4.2 N_2 INLET

_____ _____ 4.3 Verify test tee caps on sample inlet and outlet lines are capped.

DV

_____ 5. Verify THIOSULFATE valve is CLOSED.

6. Prepare for sampling as follows:

_____ 6.1 Install a 4600 cc marinelli with quick disconnect fittings using 1/4" polytubing located inside the door of the panel. {MNS INPO Finding September 1990}

_____ 6.2 Install 1/4" tubing at the first compression fitting of the sample inlet line located inside the panel on the upper left side. {MNS INPO Finding September 1990}

7. Set switches listed below as follows:

_____ 7.1 SAMPLE VOLUME SELECT - set on SMALL

_____ 7.2 DILUTION VOLUME SELECT - set on LARGE

_____ 7.3 SELECTOR switch - set on OFF

_____ 7.4 SYSTEM PURGE toggle switch - set on NORMAL

_____ 7.5 REFILL switch - set on OFF (down)

_____ 7.6 TC switch - set on POSITION 1 (thermocouple measures sample line temperature)

_____ 7.7 SAMPLE LINE SELECT switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

_____ 8. Turn KEY LOCK switch to POWER ON and ensure POWER ON light has come on.

_____ 9. Turn toggle switch on Radiation Monitor to ON position (Up):

_____ 9.1 Turn SELECTOR on Radiation Monitor to BATT and ensure needle is in "Red Test Region".

_____ 9.2 Turn SELECTOR to MR/HR.

10. Purge the sample panel as follows:

_____ 10.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 10.2 Move NORMAL - SAMPLE PURGE toggle switch to SAMPLE PURGE.

_____ 10.3 Depress ACTIVATE pushbutton.

_____ 10.4 Depress EVAC pushbutton (EVAC light ON) and watch pressure gauge slowly drop to - 19" of Hg.

_____ 10.5 Depress STOP pushbutton.

_____ 10.6 Press down and release GAS PURGE toggle switch and watch pressure gauge swiftly rise to + 10" of Hg.

_____ 10.7 Depress STOP pushbutton.

_____ 10.8 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 10.9 Depress STOP pushbutton.

_____ 10.10 Depress PUMP pushbutton and wait for 30 seconds.

_____ 10.11 Depress STOP pushbutton.

_____ 10.12 Move NORMAL - SAMPLE PURGE toggle switch to NORMAL.

_____ 10.13 Turn SELECTOR switch to DILUTION VOLUME EVACUATION.

11. Evacuate dilution volume as follows:

_____ 11.1 Depress ACTIVATE pushbutton and watch pressure gauge drop to - 19" of Hg.

_____ 11.2 Turn SELECTOR switch to SAMPLE RECIRC.

12. Recirculate containment air and trap a sample as follows:

_____ 12.1 Depress ACTIVATE pushbutton and wait 15 minutes.

_____ 12.2 Read sample inlet line pressure and temperature and record on Enclosure 5.2.

_____ 12.3 Depress SAMPLE pushbutton and wait 1 minute.

_____ 12.4 Depress TRAP pushbutton and wait 30 seconds.

_____ 12.5 Turn SELECTOR switch to SAMPLE DILUTION.

_____ 12.6 Turn SAMPLE LINE SELECT switch to OFF:

_____ 12.6.1 Disconnect the 4600 cc gas marinelli from poly tubing and the poly tubing from sample line inlet fitting. {MNS INPO Finding September 1990}

_____ _____ 12.6.2 Record sample date and time.
DV

_____ _____ 12.6.3 Reconnect sample inlet line.
DV

_____ 12.7 Turn SAMPLE LINE SELECT switch to Unit and Hydrogen Analyzer (Train A or B) being used for this Functional test.

13. Dilute sample with N_2 and recirculate as follows:

_____ 13.1 Depress ACTIVATE pushbutton.

_____ 13.2 Depress SLOW pushbutton and watch pressure gauge slowly rise to 0" of Hg.

_____ 13.3 Depress STOP pushbutton.

_____ 13.4 Turn SELECTOR switch to OFF:

_____ 13.4.1 Disconnect flexible tubing on gas sampler located on right-hand side of panel.

_____ 13.4.2 Inspect filter housing O-Rings and replace as necessary.

_____ 13.4.3 Connect the quick disconnects to a sampling train containing a particulate filter, CP-100 cartridge and a 100 cc gas bomb.

_____ 13.5 Turn SELECTOR switch to SAMPLE DILUTION:

_____ 13.5.1 Depress ACTIVATE pushbutton.

_____ 13.5.2 Depress RECIRC pushbutton and wait 15 minutes.

_____ 13.5.3 Depress STOP pushbutton.

14. Purge sample panel as follows:

_____ 14.1 Turn SELECTOR switch to SYSTEM PURGE.

_____ 14.2 Depress ACTIVATE pushbutton.

_____ 14.3 Depress EVAC pushbutton and watch pressure gauge slowly drop to - 19" of Hg.

_____ 14.4 Depress STOP pushbutton.

_____ 14.5 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg.

_____ 14.6 Depress STOP pushbutton.

_____ 14.7 Depress EVAC pushbutton and watch pressure gauge drop to 0" of Hg.

_____ 14.8 Depress STOP pushbutton.

_____ 14.9 Depress PUMP pushbutton and wait 30 seconds.

_____ 14.10 Depress STOP pushbutton.

15. Remove samples from sample panel as follows:

_____ 15.1 Disconnect gas bomb (if used), particulate and iodine sample from sample panel.

_____ 15.2 Record sample date and time.

_____ 15.3 Reconnect gas sampler flexible tubing line.

_____ 16. Clean area around sample panel.

17. Switching sample system OFF as follows:

17.1 Close the following valves:

_____ A. Nitrogen bottle.

_____ B. NITROGEN INLET and INSTRUMENT AIR INLET valves.

_____ 17.2 Turn SELECTOR switch to OFF.

_____ 17.3 Turn toggle switch on Radiation Monitor to OFF position (Down).

_____ 17.4 Turn Radiation Monitor knob to OFF position.

_____ 17.5 Turn SAMPLE LINE SELECT switch to OFF position.

_____ 17.6 Turn KEY LOCK switch to OFF position.

_____ 18. Verify Post Accident Sampling Toolbox contains all the items listed on Enclosure 5.1 secure toolbox with a break-away lock:

_____ • **WHEN** the semi-annual Functional Test is performed, replace any deteriorated or missing items in the Post Accident Sampling Toolbox.

_____ 19. Request Operations to return Hydrogen Analyzer to service per Enclosure 5.5 or 5.6.

_____ 20. Transport undiluted gas sample taken from panel and gas sample taken from RIA-49 to the Count Room for analysis.

_____ 21. Compare sample results as per Limits and Precautions 3.23:

• **IF** comparison criteria are **NOT** met for functional test, notify responsible supervisor.

_____ 22. Complete Procedure Process Record and forward completed procedure to Master File.

___ 23. **IF** sample comparison is within Limits and Precautions 3.23, update information in WMS.

CHEMISTRY MANUAL 5.2
POST ACCIDENT PROCEDURE USE GUIDELINES

REVISION NUMBER	ISSUE DATE
Original	07/15/82
1	10/25/95
2	01/20/97
3	04/07/97
4	11/20/97
5	08/17/98
6	03/16/99
7	12/28/99
8	9/18/00

INFORMATION ONLY

Prepared by: Dean Cantrell Date: 9/12/00

10CFR50.59 required: Yes ✓ No ____

Approval: Bryan L. Davis Date: 9/18/00

Control Copies delivered to Emergency Planning: Pam Mettler

Date: 9/18/00

DUKE POWER COMPANY OCONEE CHEMISTRY MANUAL

Post Accident Procedure Use Guidelines

1. Purpose

NOTE: 1. A 50.59 screening is required to make major changes to this section. Minor changes per NSD 703 can be made without a 50:59.

2. Seven Control copies and one Information Only copy of this CSM shall be routed to the Emergency Preparedness Team within three (3) working days following any approved changes/modifications.

This section provides guidelines on the administration and use of chemistry post accident procedures and the precautions that should be observed during the use of these procedures. Special attention is given to limits and precautions associated with the execution of a procedure during a projected accident. Personnel requirements and procedure work locations will be given for personnel exposure consideration. Also, a listing of RIAs of interest to Chemistry for planning and assessment activities is included in Enclosures 6.1 and 6.2. This information is intended only as guidelines with the knowledge that an actual accident situation may deviate greatly from a projected scenario.

2. Guidelines

2.1 Limits and Precautions

NOTE: These Limits and Precautions do not apply to the task for Addition of Caustic to the LPI (RCS) System. This task is a "time critical task" and therefore is not subject to the below Limits and Precautions.

2.1.1 Valve alignments should **NOT** be made and samples should **NOT** be taken without prior authorization from the TSC/OSC.

2.1.2 Do **NOT** attempt any phase of sampling or analysis without Radiation Protection coverage.

2.1.3 ALL personnel will need prior authorization from the OSC to exceed any exposure limit.

2.1.4 Radiation levels of the sampling and analysis area should be measured continuously during all phases of sampling, sample preparation, and analysis.

2.1.4.1 Air activity should be determined by use of installed air monitors or through the use of portable air sampling equipment.

2.1.4.2 Area dose rates should be established by the use of installed radiation monitors or by portable radiation survey instruments.

2.1.4.3 Portable shielding, remote handling equipment, video equipment, etc., should be used where practical during sample preparation and sample analysis.

2.1.4.4 All personnel working in the lab area and transporting samples shall monitor their personal dosimetry frequently to avoid exceeding maximum dose limits.

2.1.5 The post accident analysis should be done in a fume hood and/or other precautions should be taken to avoid the release of gaseous activity.

2.1.6 Radiation exposure to an individual during all phases of sampling should be limited so as not to exceed an annual accumulative exposure of 2 rem whole body; 50 rem skin of whole body; 50 rem extremities; or 15 rem eye respectively. All personnel will need prior authorization from the TSC/OSC to knowingly exceed any exposure limit. The exposure received may require an occupational exposure penalty and/or a medical decision as to whether an individual can continue in radiation work.

2.2 Waste Disposal

2.2.1 Determine by detailed planning meeting, the exact course of action to be taken. Under no condition should liquid or solid wastes be disposed of without prior specific RP directions.

2.2.2 Designate a sealable carboy as the "Post Accident Lab Waste" container. This container should be shielded and used as an interim liquid waste disposal container for all liquid analytical waste.

2.2.3 Request RP to designate an area where the "RCS Flush" bottle(s), "RCS Sample" bottle(s) and "Post Accident Lab Waste" container may be stored until final disposal.

2.2.4 In the event an area is grossly contaminated and cannot be decontaminated, evaluate the need for shielding or protective covering to prevent the spread of airborne activity.

2.3 Procedures

2.3.1 CP/1,2,3/A/2002/001 - Unit One, Two, or Three Primary Sampling System

Description - Defines the steps necessary to sample tanks, systems, etc., associated with the primary system to determine various chemical concentrations and radioactive isotopes.

Personnel - One (1) Chemistry technician - to sample
One (1) RP technician

Precautions - Personnel should expect high dose rates and possible airborne activity. Use applicable RIA's listed in Enc. 6.1 and 6.2. Some sample points will be at system pressure.

CAUTION: If the hydrogen purge unit is in service on Unit 2 or 3 the ventilation flow path for the Primary and waste sample hoods has been isolated. The hydrogen purge unit will typically not be placed into service for about 7 days after a LOCA and then only if the hydrogen recombiner is out of service. The hydrogen purge unit must be secured prior to sampling.

Use - This procedure should be used to obtain reactor coolant samples when possible. Other primary systems and tanks such as LPI, BWST, SFP, etc. can be sampled using these procedures.

Location - Third floor Aux building - Primary sample hoods; First floor Aux building - Waste sample hoods

2.3.2 CP/1,2,3/A/2002/004 C - Operating Procedure for the Post Accident Liquid Sampling System (PALSS)

Description - Outlines method to sample primary coolant using the remotely operated PALSS sampling system. System can sample from RCS "J-Leg", LPI Pump Discharge, and HPI Letdown.

Personnel - One (1) Chemistry technician - panel operation
One (1) person to communicate with control room for LP-65 (if required)
One (1) Radiation Protection technician.

Precautions - Because of location of sample panels, personnel may be in high radiation area with airborne activity. Evaluate shuttle of personnel to and from lower dose areas. Use the readings from applicable RIAs listed in Enc. 6.1 and 6.2 to plan sampling activities.

Use - This procedure should be used to sample primary coolant when significant fuel damage is expected. System is designed to limit personnel exposure during sampling. Sample point for RCS "J-Leg" needs flow through that loop to ensure representative sample. If significant loss of coolant has occurred, need to also sample LPI Pump Discharge.

Location - First floor auxiliary building Near 1 & 2 Waste Disposal Hood - Units 1 & 2; Near 3 Waste Disposal Hood - Unit 3

2.3.3 CP/0/A/2002/004E - Reactor Coolant Sampling During an Appendix "R" Accident

Description - This procedure provides instruction on sampling the RCS via an ice cooled sampler installed on the discharge side of valve 1, 2, 3 RC-179 of the affected unit during an Appendix "R" accident situation.

Personnel - Two (2) Chemistry Technicians
One (1) Radiation Protection Technician
Two (2) I&E Technicians

Precautions - Personnel should expect normal dose rates and a high probability of airborne activity due to fission gas release during sample flush to floor drain. Sample temperature & pressure will be very high & if not cooled properly will flash to steam.

Use - This procedure should only be used during an Appendix "R" fire when all power is lost. It should be considered the last alternative for Reactor coolant sampling.

Location - Unit 1, 2, 3 LPI Pump rooms

2.3.4 CP/1&2,3/A/2002/005 - Post Accident Caustic Injection Into the Low Pressure Injection System

NOTE: This is a "time critical task" and must be initiated immediately when recirculation mode off the RBES has been established.

Description - Outlines the method used to raise the pH of the primary coolant to ≈ 7.0 - 8.0 following a LOCA. Caustic additions will improve the iodine liquid partition factor and inhibit hydrogen gas formation. Use Enc. 6.3 to calculate quantity of caustic required for addition.

Personnel - Two (2) Chemistry technicians (desirable, but not required)
One (1) Radiation Protection tech (desirable, but not required)
Two (2) additional OSC personnel to move Caustic (desirable, but not required)

Precautions - High radiation areas and airborne activity may be a concern. Use readings from applicable RIAs listed in Enc. 6.1 and 6.2 to plan addition. Establish Low Dose Waiting Areas as needed. Heat Stress conditions may also be a concern.

Use - This procedure should be used when a significant loss of coolant to the Reactor Building has occurred and there is concern about an Iodine release and/or hydrogen gas formation. The LPI System MUST be in service and taking suction from the emergency sump.

Location - Units 1&2 - 2nd floor of the Aux. Bldg, Chemical Addition Area
Unit 3 - 1st floor of the Aux Bldg, Chemical Addition Area

2.3.5 LM-O-P003C - Determination of Boron by Manual Colorimetric Titration Using Phenolphthaline Indicator

Description - Outlines the use of manual potentiometric titrations to determine boron concentration. The range for this analysis is between 100 and 2500 ppm. Samples with concentrations greater than 1000 ppm must be diluted for dose and time considerations.

Personnel - One (1) Chemistry technician
One (1) Radiation Protection technician

Precautions - Personnel should expect high dose rates and possible airborne activity. Use the readings from applicable RIAs listed in Enc. 6.1 and 6.2 to determine if the Primary Lab is available for use.

Use - This procedure should be used to analyze for boron whenever conditions have resulted in the loss of the normal analytical instrumentation, such as an Appendix "R" Accident.

Location - Rooms 329 and 330.

2.3.6 LM-O-P919 - Boron Analysis By Mettler DL-58 Titration

Description - This method covers the precise determination of boron concentration in the 0.2 – 10,000 ppm range in high purity water (RCS) using the Mettler DL-58 Titration System.

Personnel - One (1) Chemistry technician
One (1) Radiation Protection technician

Precautions - Personnel should expect high dose rates and possible airborne activity. Use the readings from applicable RIAs listed in Enc. 6.1 and 6.2 to determine if the Primary Lab is available for use.

Use - This procedure should be used as the primary method for determining boron concentration.

Location - Rooms 329 and 330.

2.3.7 LM-O-P914 - Ion Analysis - DX-500 IC

Description - Outlines the use of ion chromatograph in determination of chloride concentration in primary coolant when fuel failure is expected.

Personnel - One (1) Chemistry technician
One (1) Radiation Protection technician

Precautions - Personnel should expect high dose rates and possible airborne activity. If too much dilution is required based on dose consideration, then this procedure could not be utilized. Use the readings from applicable RIAs listed in Enc. 6.1 and 6.2 to determine if the Dionex Lab is available for use.

Use - This procedure should be used when dose consideration allows a reasonable expectancy of being able to detect chloride at the dilution required.

Location - Room 330.

2.3.8 LM-O-P008 - The Determination of Hydrogen in Gas Samples Using the Carle or SRI Gas Chromatographs

Description - This procedure covers the use of the Carle Series and the SRI Series Analytical Gas Chromatographs to determine the concentration of hydrogen in gas samples.

Personnel - One (1) Chemistry technician
One (1) Radiation Protection technician

Precautions - Personnel should expect high dose rates and possible airborne activity. Use the readings from applicable RIAs listed in Enc. 6.1 and 6.2 to determine if the Primary Lab is available for use.

Use - This procedure should be used in an accident situation to analyze for hydrogen concentration.

Location - Rooms 329 and 330.

2.3.9 LM-O-G004 - Determination of Gamma Isotopic Activity

Description - Outline of method used to prepare sample for gamma isotopic analysis.

Personnel - One (1) Chemistry technician
One (1) Radiation Protection technician

Precautions - Personnel should expect high dose rates and possible airborne activity. Utilize remote handling when possible. Use the readings from applicable RIAs listed in Enc. 6.1 and 6.2 to determine if the Primary Lab and Count Room are available for use.

Use - This procedure should be used when a gamma isotopic analysis is required.

Location - Rooms 329 and 330.

3. Additional Information

3.1 Tank volumes:

Quench Tank	5,834 gallons
BWST	388,000 gallons
CBAST	22,440 gallons
BAMT	2,500 gallons
BHUT	82,000 gallons
LDST	4,488 gallons (31.26 gal/in)
CFT	10,470 gallons
SFP (1&2)	546,000 gallons
SFP (3)	374,000 gallons
LiOH	30 gallons
NaOH	100 gallons
MWT	20,200 gallons
HAWT	2,000 gallons
LAWT	3,000 gallons
CTP 1	1,300,000 gallons
CTP 2	1,100,000 gallons
CTP 3	3,000,000 gallons
CTP 3 (weir down)	4,900,000 gallons

3.2 System Volumes:

RCS (cold/hot)	88,000/60,000 gallons
Reactor Building	1,910,000 ft^3 free volume
CST	30,000 gallons
Waste Gas	23,800 ft^3
Hotwell	150,000 gallons
OTSG (Secondary Side)	28,000 gallons

3.3 Cooler Supplies:

Quench Tank	-	CC
Decay Heat	-	LPSW
Letdown	-	CC
Seal Return	-	RCW
RBCU	-	LPSW
CC	-	LPSW
RCW	-	CCW
Pri Sample	-	RCW
PALSS	-	RCW

4. Suggested Actions

4.1 Normal Operating Conditions:

Observation: Loose part or mechanical failure has caused suspected loss of some fuel integrity.

Actions:

- Do not over react, close coordination with OPS and RP will be necessary to understand where and how to sample coolant.
- First find out exact status of unit (subcritical, pressure, temperature, # of RCP on, letdown flow rate, area monitor readings?)
- If the unit is shutdown, then remember that samples will show normal coolant fission product spiking - must compare to earlier unit trip results.
- Have RP survey letdown piping (if in service) and compare to normal values before deciding which method to use in sampling.

- For truly mechanical damage, gap activity isotope should increase (Xenons, Kryptons, iodines) with much smaller increases in (Strontium, Barium, Cesium, less mobile isotopes).

- With gap activity release, degassing of coolant fission gases will be much more pronounced. Appropriate respiratory protection should be considered while sampling.

4.2 Overheat Condition Without Fuel Melt

Observation: RB pressure and temperature increase. Suspect loss of coolant to Reactor Building.

Actions:

- If ES actuation occurs, then letdown will be automatically secured thus rendering normal sample point useless (Ops may manually override)

- Make immediate plans to move necessary equipment to RW facility or Environmental lab for chemical analysis of boron and pH. Dose rates may render Primary lab useless.

- Before deciding which sample location to use, a careful evaluation of all data should be performed.

  1. Boron concentration can be calculated based on injection volumes and known concentrations.

  2. RIA readings from RIA 57, 58 can closely estimate failed fuel percentage without need for sampling.

  3. If recirculation of water through vessel is not available, the PALS J-leg sample will not be representative.

  4. Core exit thermocouple readings and mapping can aid in estimating area and extent of core damage.

- If electrical system load shed has occurred, then many of the normal power supplies to the Chemistry group may be unavailable without Operations assistance.

4.3 Fuel Melt

Actions:

- All of Section 4.2 action items are applicable.
- Expect higher levels of Barium, Strontium and Praesyodimium from fuel matrix loss.
- Expect high suspended solids in any sampling attempted.
- Both hydrogen percentage and RIA 57, 58 readings can and should be used in lieu of sampling, at least until dose levels have significantly dropped.
- Boron as a criticality concern should be minimal - weighing the small benefit of a sample versus the extreme risk to an individual(s) should be considered.

5. References

5.1 ONS Post Accident Procedures

5.2 ONS OFD Drawings

5.3 ONS UFSAR

5.4 ONS ITS

6. Enclosures

6.1 RIAs of Interest to Chemistry

6.2 Location of Sample Points for Multipoint RIAs

6.3 Caustic Addition Calculations

6.4 E, A and R Values for 1% Failed Fuel and DBA

6.5 Technical Basis for Caustic Addition Calculations

6.6 Quarterly Inspection of Post Accident Equipment

Enclosure 6.1
RIAs of Interest to Chemistry

RIA #	RANGE	LOCATION	INFORMATION USED FOR
1RIA-4 2RIA-4 3RIA-4	0.1 - 10e7 mR/hr	Reactor Building Entrance/ Personnel Hatch	Indicates a LOCA with moderate to severe fuel damage; 2RIA-4 is located near the Primary Lab and Count Room - Readings used to assess the need to prepare alternate labs
RIA-8	0.1 - 10e7 mR/hr	Primary Chemistry Lab	Used to assess the need to prepare the alternate Primary Lab and/or Count Room
1RIA-10 2RIA-10 3RIA-10	0.1 - 10e7 mR/hr	Unit 1 Primary Sample Hood Unit 2 Primary Sample Hood Unit 3 Primary Sample Hood	Used for planning sampling. Readings will be high once sampling is started if significant fuel damage has occurred
1RIA-12 3RIA-12	0.1 - 10e7 mR/hr	Unit 1&2 Boric Acid Mix Tank Unit 3 Boric Acid Mix Tank	Readings used for planning chemical additions (ie: Caustic Additions)
1RIA-13 3RIA-13	0.1 - 10e7 mR/hr	Unit 1&2 Waste Sample Hood Unit 3 Waste Sample Hood	Used for planning sampling activities from the PALS. Readings may be high if significant fuel damage has occurred
1RIA-15 3RIA-15	0.1 - 10e7 mR/hr	Unit 1&2 HPI Pump Room Unit 3 HPI Pump Room	Provide preliminary indications of significant fuel damage
1RIA-16,17 2RIA-16,17 3RIA-16,17	0.01 - 10e3 mR/hr	Unit 1 'A & B' Main Steam Lines Unit 2 'A & B' Main Steam Lines Unit 3 'A & B' Main Steam Lines	Readings > background from these RIAs are indications of primary/secondary steam generator tube leaks
3RIA-19	0.1 - 10e7 mR/hr	Laundry and Hot Shower Tank Room	Used for planning Unit 3 caustic; readings may be high if significant fuel damage has occurred due to being near LDST
1RIA-31 3RIA-31	10 - 10e6 CPM	Behind air compressors in Turbine Building Basement, west of Unit 2 Powdex North of sewage ejectors at Unit 3, west wall of Turbine Building	Multipoint RIA that monitors LPSW effluents from LPI Cooler, and CC Cooler. Readings > background indicate a primary coolant leak into the LPSW System. See Enc. 6.2 for sample point locations.
1RIA-32 3RIA-32	10 - 10e6 CPM	Monitor on first floor of Aux Building; sample points are located in various room/areas throughout the Aux Building	Multipoint RIA that measures airborne activity levels in various locations (up to 24) through the Aux Building. Used to plan sampling and chemical addition activities. See Enc. 6.2 for sample point locations.

Enclosure 6.1
RIAs of Interest to Chemistry

RIA #	RANGE	LOCATION	INFORMATION USED FOR
1RIA-35 2RIA-35 3RIA-35	10 - 10e6 CPM	Behind air compressors in Turbine Building Basement, west of Unit 2 Powdex Same location as 3RIA-31	Monitors LPSW discharge from the Building. Readings > background are indicators of primary coolant leak into the LPSW System; RIA-31 readings will increase also.
1RIA-40 2RIA-40 3RIA-40	10 - 10e6 CPM	Unit 1 CSAE Off Gas Discharge Unit 2 CSAE Off Gas Discharge Unit 3 CSAE Off Gas Discharge	Monitors CSAE Off Gas effluent to each unit vent. Indicates steam generator tube leaks.
1,2,3 RIA-57&58	1 - 10e7 R/hr	Unit 1 Reactor Building Unit 2 Reactor Building Unit 3 Reactor Building	Measures activity in the Rx building during a LOCA. Readings from these RIAs can be related to % failed fuel.

Enclosure 6.2
Location of Sample Points
for Multipoint RIAs

1RIA-31 SAMPLE POINTS

1RIA-31-1	LPI/Decay Heat Cooler 1A Outlet
1RIA-31-2	LPI/Decay Heat Cooler 1B Outlet
1RIA-31-3	RB Component Cooler 1A Outlet
1RIA-31-4	RB Ventilation (Cooling) Unit 1A Outlet
1RIA-31-5	RB Ventilation (Cooling) Unit 1B Outlet
1RIA-31-6	RB Ventilation (Cooling) Unit 1C Outlet
1RIA-31-7	LPI/Decay Heat Cooler 2A Outlet
1RIA-31-8	LPI/Decay Heat Cooler 2B Outlet
1RIA-31-9	RB Component Cooler 2B Outlet
1RIA-31-10	RB Ventilation (Cooling) Unit 2A Outlet
1RIA-31-11	RB Ventilation (Cooling) Unit 2B Outlet
1RIA-31-12	RB Ventilation (Cooling) Unit 2C Outlet

3RIA-31 SAMPLE POINTS

3RIA-31-1	LPI/Decay Heat Cooler 3A Outlet
3RIA-31-2	LPI/Decay Heat Cooler 3B Outlet
3RIA-31-3	RB Component Cooler 3B Outlet
3RIA-31-4	RB Ventilation (Cooling) Unit 3B Outlet
3RIA-31-5	RB Ventilation (Cooling) Unit 3A Outlet
3RIA-31-6	RB Ventilation (Cooling) Unit 3C Outlet

1RIA-32 SAMPLE POINTS

1RIA-32-1	Unit 1 Pipe Rooms; Elevation 758 and 771
1RIA-32-2	Unit 2 Pipe Rooms; Elevation 758 and 771
1RIA-32-3	Spent Resin Storage Tanks, Condensate Test Tanks, Unit 1 Letdown Storage Tank, Boric Acid Mix Tank
1RIA-32-4	RC Bleed Evaporator Room, Unit 1&2 Miscellaneous Waste Holdup Tank, Unit 2 Letdown Storage Tank
1RIA-32-5	Waste Drumming Area
1RIA-32-6	Miscellaneous Waste Evaporator Room
1RIA-32-7	Unit 1 RC Bleed Transfer Pump, Unit 1 RC Bleed Holdup Tanks, Unit 1 Concentrated Boric Acid Storage Tank
1RIA-32-8	Unit 2 RC Bleed Transfer Pump, Unit 2 RC Bleed Holdup Tanks, Unit 2 Concentrated Boric Acid Storage Tank
1RIA-32-10	Waste Gas Compressor, RC Bleed Evaporator Feed Tank
1RIA-32-11	Unit 1 Pipe Rooms; Elevations 783-796
1RIA-32-12	Unit 2 Pipe Rooms; Elevations 783-796

3RIA-32 SAMPLE POINTS

3RIA-32-1	Unit 3 Pipe Rooms; Elevation 758 and 771
3RIA-32-2	Unit 3 Pipe Rooms; Elevations 783-796
3RIA-32-3	RB Component Coolers, Letdown Filters, Hatches, Waste Gas Compressor Room, Waste Gas Decay Tanks
3RIA-32-4	Unit 3 RC Bleed Holdup Tanks, Unit 3 Concentrated Boric Acid Storage Tank, Unit 3 Miscellaneous Waste Holdup Tank Area
3RIA-32-5	High Activity Spent Resin Storage Tank, Boric Acid Mix Tank and Pumps, Spent Resin Storage Tank Area

1. Initial Conditions for Injection

1.1 An emergency is in effect due to a LOCA.

1.2 The Low Pressure Injection (LPI) system is in operation with the LPI pumps taking suction from the BWST.

1.3 The Reactor Building Emergency Spray system may or may not be in operation from the BWST through the spray headers.

1.4 The addition of caustic SHALL begin WITHIN thirty (30) minutes AFTER switchover to the recirculation mode of core cooling. The recirculation mode is in effect whenever the suction for the LPI pumps' is aligned to the Reactor Bldg. Emergency Sump.

1.5 The addition of caustic will be made upon authorization of the TSC/OSC, or upon notification by Operations when the TSC/OSC has not yet been activated.

2. Bases for Caustic Addition Calculations

2.1 Calculations for the amount of caustic required for neutralization of the borated water are dependent on:

2.1.1 An accurate estimation of the volume of borated water being used as the core flooding coolant;

2.1.2 The boron concentration of the core flooding coolant;

2.1.3 One (1) pound of caustic neutralizing seventeen (17) pounds of H_3BO_3 to a pH of 7.5.

2.2 If the total volumes of the CFTs and BWST are used, then the maximum amount of caustic required for neutralization of the borated water to a pH of 7.5 is 700 gallons. The amount of 700 gallons has been calculated with the following considerations:

2.2.1 Both CFTs and the BWST have a total volume of 403,000 gallons with a boron concentration of 2300 ppm;

2.2.2 The RCS has a volume of 88,000 gallons with a boron concentration of 1000 ppm.

2.3 Boric Acid for the purposes of these calculations behaves as a simple monoprotic acid.

3. Calculations of the Amount of Caustic required for Neutralization to a pH of 7.5 Based on Core Flooding Coolant Boron Content.

NOTE: Calculate the quantity of caustic as outlined below or use the computer program by opening DAE, Department Applications, Nuclear Generation, Oconee Desktop; Oconee Information Library; Chemistry Information Library; CUG-S-19-Caustic.

Date _____ Time _____ Unit _____ By _____

CFT 'A' Boron _____ CFT 'B' Boron _____ RCS Boron _____

BWST Boron _____ BWST Vol. dumped to RCS _____

3.1 The 2 CFT's have a total volume of 15,000 gal. Average the most recent boron results for the A&B CFT's and enter the average into the equation below. Calculate the (lbs of) H_3BO_3 in the CFT's:

$$\text{Lbs. CFT } H_3BO_3 = \frac{(\_\_\_\_\text{ ppm})\ (15{,}000 \text{ gal})\ (8.34 \text{ lbs/gal})}{(1 \times 10^6)\ (0.175)} = \_\_\_\_\_$$

3.2 The RCS has a volume of 88,000 gal. Calculate the lbs. H_3BO_3 in the RCS:

$$\text{Lbs. RCS } H_3BO_3 = \frac{(\_\_\_\_\text{ ppm})\ (88{,}000 \text{ gal})\ (8.34 \text{ lbs/gal})}{(1 \times 10^6)\ (0.175)} = \_\_\_\_\_$$

3.3 The BWST has a total volume of 388,000 gal. Obtain from Operations an estimate of the volume of borated water that has been dropped from the BWST: _____ gal. Calculate the lbs. H_3BO_3 added to the core from the BWST:

$$\text{Lbs. BWST } H_3BO_3 = \frac{(\_\_\_\_\text{ ppm})\ (\_\_\_\_\text{ gal})\ (8.34 \text{ lbs/gal})}{(1 \times 10^6)\ (0.175)} = \_\_\_\_\_$$

3.4 Calculate the Gal. NaOH required to adjust the borated water of the CFT's and the RCS to 7.5.

$$\text{Gal. 35\% NaOH required} = \frac{(1 \text{ lb NaOH})\ (\text{lbs CFT } H_3BO_3 + \text{lbs RCS } H_3BO_3 + \text{lbs BWST } H_3BO_3)\ (1 \text{ Gal. 35\% NaOH})}{(17 \text{ lbs } H_3BO_3)\ (4 \text{ lbs NaOH})}$$

= _____ Gallons

3.5 For the initial caustic addition, it is recommended that only half of the calculated amount should be added. Note that if using the computer program to calculate the initial addition, the results have already been halved. This is clearly stated by the computer program. Record the actual amount to be added below.

Amount of 35% NaOH to add _____ gallons.

4. Calculation of the amount of 35% caustic required for neutralization of a pH between 7.0 and 8.0 based on core flooding coolant actual pH.

NOTE: Calculate as outlined below or use the computer program by opening DAE, Department Applications, Nuclear Generation, Oconee Desktop; Oconee Information Library; Chemistry Information Library; CUG-S-19-Caustic.

Date _____ Time _____ Unit _____ By _____

4.1 Core Coolant pH _____.

4.2 Core Coolant Boron Concentration (approximately) in ppm is _____.

4.3 Core Coolant Volume (RCS, BWST vol. dumped, CFTs) in gallons is _____.

4.4 Calculate the volume of 35% NaOH required to adjust the core coolant water to a pH between 7.0 and 8.0.

35% NaOH to Add $= ((4.7 \times 10^{-6} - 1.6 \times 10^{-13}/10^{-pH})ppm\ B - 10^{-pH} + 10^{pH-14}) * V * 0.0829$

Where,

Gallons	=	Volume in gallons of 35% NaOH to add to the Reactor Coolant
B	=	Reactor Coolant boron concentration in ppm
V	=	Volume of reactor cooling water (including BWST, CFT, etc.) in gallons
8.29×10^{-2}	=	Conversion Factor
pH	=	Actual measured pH of reactor coolant water.
Gals 35% NaOH	=	_____ Gallons

NOTE :

1. This volume does not account for the associated piping volume between the caustic injection tank and the suction of the low pressure injection pump.
2. If reactor coolant pH is between 7.0 and 8.0, this formula "MAY" produce a negative number which means that no caustic addition is necessary.

Enclosure 6.4
E, A and R Values for
1% Failed Fuel and DBA

1% Failed Fuel:

$\bar{E}$ ~ 0.34 MeV/dis.

A ~ 0.293 mCi/ml

R = 0.18 mR/hr-mCi at lm for $\bar{E}$ ~ 0.34 MeV

100% Failed Fuel or Design Basis Accident (DBA):

$\bar{E}$ ~ 1.14 MeV/dis.

A ~ 1.324×10^5 uCi/mL

R = 0.58 R/hr-Ci at lm for $\bar{E}$ ~ 1.14 MeV

A direct proportion should exist between $\bar{E}$ and R for any failed fuel value > 1% and < 100%.

Enclosure 6.5
Technical Basis for
Caustic Addition Calculations

Initial Addition Based on Pounds of Boric Acid:

The initial addition is based on the ability of one pound of caustic to neutralize 17 pounds of boric acid. This value was calculated using the methodology described in the Babcock & Wilcox Water Chemistry Manual (BAW-1385), Section 8 (1990 revision) and was confirmed by benchtop titration studies. Please reference Memo to File, dated 1-24-96, "Results of Caustic Titration Study", File #OS-715.00 for further details.

Subsequent Additions Based on Measured pH:

The basic assumption is that boric acid (H_3BO_3) behaves as a simple monoprotic acid versus the complex monoprotic acid that it is. Thus, it was assumed that when boric acid is placed in water only the H_2BO_3 borate ion is produced. Typically, boric acid in water will produce 3 to 4 different borate ions (Ref.: B&W or Westinghouse literature on boric acid). The equation will therefore read as follows:

$$H_3BO_3 \text{ <--> } H^+ + H_2BO_3^-$$

where the acid dissociation constant (K_a) equation would be

$$K_a = \frac{\{H_2BO_3^-\}\{H^+\}}{\{H_3BO_3\}} \qquad \text{(Eqn. 1)}$$

The pH equations for the hydrogen and hydroxyl ion are as follows:

$$pH = -\text{Log}\{H^+\} \qquad \text{(Eqn. 2)}$$

$$10^{-14} = \{H^+\}\{OH^-\} \qquad \text{(Eqn. 3)}$$

For calculation simplification purposes, it is assumed that the only species contributing to the neutralization equation listed below are NaOH, H_3BO_3, and H_2O:

$$\{Na^+\} + \{H^+\} - \{OH^-\} - \{H_2BO_3^-\} = 0 \qquad \text{(Eqn. 4)}$$

By substituting Equations 1, 2, and 3 above into equation 4 and solving for the sodium ion concentration, the amount of caustic added to the reactor coolant water can be determined given the system pH. The equation would be:

$$\{Na^+\} = K_a\{H_3BO_3\}/(10^{-pH}) + 10^{14-pH} - 10^{-pH} \qquad \text{(Eqn. 5)}$$

Since it is desired to adjust the system pH to a point between 7.0 and 8.0, then the desired amount of sodium necessary to achieve a system pH of 7.5 can be determined by solving equation 5 above for a pH equal to 7.5. Therefore, subtracting the sodium concentration calculated at the actual system pH from the sodium concentration at the desired pH of 7.5 yields the amount of sodium necessary for pH adjustment.

At a pH of 7.0, the terms 10^{-pH} and 10^{14-pH} cancel each other. This leaves the following equation:

$$\{Na^+\} = (K_a'\{H_3BO_3\}/(10^{-pH'})) - (K_a\{H_3BO_3\}/(10^{-pH}) + 10^{pH-14} - 10^{-pH}) \quad \text{(Eqn. 6)}$$

where " ' " represents the terms for when pH is 7.0.

Substituting A for the term $K_a'/(10^{-pH'})$ and B for K_a the above equation becomes,

$$\{Na^+\} = (A - B/(10^{-pH}))\{H_3BO_3\} - 10^{pH-14} + 10^{-pH} \quad \text{(Eqn. 7)}$$

Next, using conversion factors and solving for sodium in terms of gallons of 35% NaOH to add, the equation becomes,

$$\text{35\% NaOH to Add (Gallons)} = ((A-B/(10^{-pH}))\text{ppm B} - 10^{pH-14} + 10^{-pH}) * V * 0.0829 \quad \text{(Eqn. 8)}$$

where,
- ppm B = boron concentration of reactor cooling water
- V = volume of reactor cooling water to pH adjust, gallons
- pH = pH of reactor cooling water after making initial caustic add
- 0.0829 = conversion factor
- A & B = coefficients for boric acid dissociation constants at 25° C.

The 0.0829 conversion factor came from the conversion of Na ion concentration to gallons of 35% NaOH. The number was reached by the following equations:

Gallons 35% NaOH = (moles Na / liters soln.) * (gals soln.) * (1 mole NaOH / 1 mole Na) 35% * (3.785 liters soln. / 1 gal soln.) * (40.01 gms NaOH / 1 mole NaOH) * (100 gms soln. / 35 gms NaOH) * (1 cubic centimeter / 1.38 gms) * (1 liter 35% naOH / 1000 cubic centimeters 35% NaOH) * (1 gal 35% NaOH / 3.785 liters 35% NaOH)

Gallons 35% NaOH = (moles Na / liters soln.) * (gals soln.) * 0.0829
(liter soln. * gal 35% NaOH) / (gal soln. * moles Na)

The initial guesses for the A and B coefficients were calculated from apparent monoprotic dissociation constants using a pH - specific conductivity computer program. The initial coefficients were $A = 9 \times 10^{-6}$ and $B = 3.09 \times 10^{-13}$. Laboratory data was then utilized to fine tune the coefficients. Titrations of various boron concentrations resulted in coefficients $A = 4.7 \times 10^{-6}$ and $B = 1.6 \times 10^{-13}$. Thus, the formula for calculating the quantity of caustic to add based on pH as shown in Enc. 6.3 is:

$$\text{35\% NaOH to Add} = \left((4.7 \times 10^{-6} - 1.6 \times 10^{-13}/10^{-pH})\text{ppm B} \right) / \left(-10^{-pH} + 10^{pH-14}\right) * V * 0.0829 \qquad \text{(Eqn. 9)}$$

Reference: Memo to File, dated 5/29/89, "pH Adjustment of Reactor Coolant During a LOCA Using Sodium Hydroxide", File #OS-715.00.

Enclosure 6.6
Quarterly Inspection of
Post Accident Equipment

1. Caustic addition equipment stored in the brown cabinet in AB, 2nd floor ~10 ft North of 1 & 2 Chemical Addition Area:

Goggles	Face shield	Bung Wrench
Corrosive suit	Gloves	Flashlight
Boots	Stainless steel flex hose	
Tank to valve adapter	Tape measure	

2. Appendix 'R' sampling apparatus stationed in each units respective LPI room:

	UNITS		
	1 (RM-61)	**2 (RM-63)**	**3 (RM-82)**
Sample cooler	_____	_____	_____
Ice container (30 gal. drum)	_____	_____	_____
Glass thermometer	_____	_____	_____
Plastic liter bottles (3)	_____	_____	_____
Tygon tubing for cooler	_____	_____	_____
Plastic sleeving for drum drain	_____	_____	_____

INFORMATION ONLY

Oconee Nuclear Station

Maintenance Directive 9.1

Approved _____

Original Date 4/24/84

Revised Date 8/21/00

Prepared By Alan Greene

EP Review M. Q. Thom

EP Review Date 8-21-00

EMERGENCY PREPAREDNESS PLAN ACTIVATION

1.0 Purpose

The purpose of this directive is to provide maintenance coordination and interface with the Oconee Nuclear Site (ONS) Emergency Plan, and should be reviewed by Emergency Planning prior to approval by the responsible group.

2.0 Responsibility

Responsibilities of Maintenance personnel are described in the body of this directive.

UPON REVISION AND APPROVAL, A COPY OF THIS DIRECTIVE MUST BE FORWARDED TO EMERGENCY PLANNING WITHIN 3 WORKING DAYS.

3.0 Implementation

This directive explains the duties of various Maintenance personnel whenever the Emergency Plan is activated.

NOTE: Following are the primary and alternate locations of the Operational Support Center (OSC) and Technical Support Center (TSC).

OSC: Primary - OSC Room behind Unit 3 Control Room
Alternate- Room 316A, Oconee Office Building

TSC: Primary - TSC Room behind Unit 1 and 2 Control Room
Alternate- Room 316 in the Oconee Office Building

3.1 Normal Working Hours

3.1.1 Upon site assembly alarm, all Maintenance Group personnel will:

a. Maintenance SPOC Personnel report immediately to the Operational Support Center. Supervisors and team swipe badges and report accountability to their Maintenance Manager.

b. All other Maintenance Personnel shall swipe badges and report immediately to their assembly area for accountability. Personnel should remain in their assembly areas until notified to set up TSC/OSC or secure from site assembly.

Maintenance personnel inside the protected area and not physically close to their reporting work area will go to the nearest telephone and call their supervisor immediately for accountability and swipe badges within 30 minutes. These individuals should either return to their assembly area or remain close to a phone or as instructed by their supervision. If outside the protected area call only as there are no card readers outside the protected area.

c. Maintenance Supervisors will account for their on site personnel, whether accounted for or missing, and give accountability report to their Manager within eight (8) minutes after the site assembly alarm.

d. Maintenance Managers will give their accountability reports to the Maintenance Superintendent's Administrative Specialist within twelve (12) minutes after site assembly begins.

e. The Superintendent's Administrative Specialist will give accountability reports to the Security Shift Lieutenant within twenty (20) minutes after the site assembly alarm.

3.1.2 Activation of the Maintenance Emergency Response Organization:

NOTE: Site assembly will not always precede the activation of the OSC/TSC. Also, the OSC/TSC is not always activated after site assembly.

Upon announcement over the P.A. system to set up the Technical Support Center (TSC) and the Operational Support Center (OSC) the following Maintenance Personnel should respond as indicated below:

MAINTENANCE MANAGER

a. Reports to the OSC.

b. Keeps the OSC Coordinator up-to-date as to the activities of the Maintenance Group.

c. Maintenance Manager in the OSC will secure additional manager support from I&E/Mechanical if conditions warrant.

MAINTENANCE SHIFT (12 hour) PERSONNEL

a. SPOC Team Supervisor

1. Reports with team to the OSC.
(Use RP/0/B/1000/25 to establish OSC)

2. Swipe badges and report accountability to appropriate Manager.

3. Sets up and checks out communication equipment (if announcement is made to set up TSC/OSC).

4. Follows instructions for response from the Maintenance Manager.

b. Mechanical Maintenance SPOC Team

1. Reports to the OSC.

2. Mechanical Maintenance SPOC team swipe badges report accountability to appropriate Manager.

3. Follows instructions for response from the Maintenance Manager.

3.1.3 Evacuation of Maintenance Personnel

Reference: N.S.D. 114 - Site Assembly/Site Evacuation

NOTE: Site Assembly will always precede a Station Evacuation.

3.1.3.1 The Offsite Communicator will initiate an evacuation with a PA announcement identifying (a) the applicable evacuation plan in effect see (NSD 114), (b) the Decontamination Center/Post Evacuation Assembly Location to be utilized, (c) and the use of PROFS (if applicable).

3.1.3.2 Personnel being evacuated should follow evacuation instructions and report to the identified locations. Further instructions will be provided by maintenance management.

3.1.3.3 Once the announcement to evacuate has been made, the Maintenance Manager(s) will determine the essential Maintenance personnel to retain on site. **Non-essential personnel who are retained to assist in the recovery must receive approval from the Station Manager or his designee.**

NOTE: All personnel designated as "essential" must appear on the Emergency Response Organization (ERO) List. Classifications/Definitions for E-1, 2, 3 denoted on site evacuation plans.

NOTE: All personnel designated as essential must meet respiratory requirements if an airborne condition exists. It will be the responsibility of Maintenance Management to ensure that the requirement is met.

3.1.3.4 When the determination of essential personnel is complete it will be provided to the Evacuation Coordinator for the Maintenance group. The Evacuation Coordinator is assigned as follows (reference Attachment #2):

a. Maintenance Team- One individual from Attachment #2.

3.1.3.5 The Evacuation Coordinator for each group will ensure that assigned personnel are informed of their designation as being either essential or non-essential. All personnel designated as essential will remain on site in the event of a Station Evacuation. All personnel designated as non-essential will be directed to follow all evacuation instructions if a Station Evacuation is announced.

3.1.3.6 The Maintenance Evacuation Coordinator will communicate specific work schedule instructions as required.

3.1.3.7 After receiving the information detailed in 3.1.3.2 all on-site non-essential Maintenance personnel will evacuate the site following the given evacuation instructions.

3.1.3.8 All on-site essential Maintenance personnel will be directed by the OSC in any further activities after receiving the information detailed in 3.1.3.2.

3.1.3.9 All off-site Maintenance personnel will be contacted by Maintenance Supervision with specific work schedule instructions.

3.2 Backshift, Holidays, Weekends

3.2.1 MAINTENANCE SHIFT PERSONNEL

a. SPOC Team Supervisor

1. Reports with team to the OSC at Site Assembly Alarm or when announcement is made to set up OSC/TSC.
(Use RP/0/B/1000/25 to establish OSC)

2. SPOC Supervisor and team swipes badges and reports accountability to phone extension 5050.

3. Sets up and checks out communication equipment. (If announcement is made to set up TSC/OSC).

4. SPOC Supervisor contacts Operations Shift Supervisor to make him aware when the OSC is established (I&E, MM, Chemistry, RP).

5. Determines from the Operations Shift Supervisor the emergency situation and responds as directed by Operations Shift Supervisor.

6. Serves as OSC Coordinator until relieved by Work Control.

b. Mechanical Maintenance SPOC Team

1. Reports to the OSC at Site Assembly Alarm or when announcement is made to set up OSC/TSC.

2. Lead spoc technician acts as OSC Coordinator if SPOC Supervisoris not available and serves as OSC Coordinator until relieved by Work Control.

(Use RP/0/B/1000/25 to establish the OSC)

3. Swipe badges and reports accountability of Maintenance Technicians and Materials personnel to phone extension 5050.

4. Follows instructions for response from the OSC Coordinator.

c. Maintenance Manager

1. Maintenance Manager will report to the OSC within 75 minutes of acknowledging call from the Community Alert Network. Maintenance Manager will take turnover from the SPOC supervisors and direct maintenance activities.

2. Maintenance Manager will callout additional manager support from Maintenance personell if conditions warrant.

3.2.2 Evacuation of Maintenance Personnel

3.2.2.1 Maintenance personnel on site will be identified essential or non-essential and evacuated per instructions from the OSC/TSC. The Maintenance Manager and/or SPOC supervisors will identify maintenance personnel as being essential or non-essential.

4.0 Attachments

Attachment #1 - ESS and Tech Support/ Site Sponsor Contact list

Attachment #2 - Maintenance Evacuation Coordinator List

Attachment #3 - Fitness For Duty Information

ATTACHMENT #1

ESS ELECTRICAL CONTACT LIST
Breakers, Bus, Switchyards, Switchgear, Transformers, Generators, Excitation Systems and Doble Teams

Resources

ESS Duty Pager 382-1125

Victor Sheets 382-3157 M-Thurs. Beeper 778-5976

Technical Support and Site Sponsors

Alan Greene ext. 3099 M-Thurs. Beeper 778-6173**

Gary "Radar" Edens ext. 3022 M-Thurs. Beeper 778-4341 **

Ron Beaver ext. 3486 M-Thurs. Beeper 778-4334

** Contact Switchboard after normal hours.

ATTACHMENT #2

MAINTENANCE EVACUATION COORDINATOR LIST

Evacuation Coordinators:	Phone Extension	Beeper Number
PRIMARY: - Bill McAlister	Ext. 3100	778-8176
1st Alternate - Terry Smith	Ext. 3672	778-6560
2nd Alternate - Phillip Culbertson	Ext. 4025	778-2103

ATTACHMENT #3
FITNESS FOR DUTY INFORMATION

PERSONS AUTHORIZED TO CALL EMPLOYEES OUT MUST ASK THE FOLLOWING QUESTIONS:

1. Have you consumed alcohol in the last five (5) hours?*
2. What did you have?
3. How much did you have?
4. Can you perform your job unimpaired?
5. Can you drive?

* **Employees who acknowledge consumption of alcohol within five (5) hours must be evaluated by supervision upon reporting to work. Evaluation may be by observation or breathalyzer.**

If the answer to the first questions is "no", the other questions should not be asked.

These questions apply to ANYONE being called out to work in the protected area of a nuclear station regardless of position or whether his/her name appears on the "duty list".

Documentation of the phone call is not required per the Fitness-for-Duty "rule". However, if the call-out results in a questionable situation, you may want this information documented.

INFORMATION ONLY

Duke Power Company Oconee Nuclear Station	Procedure No. OMP 1-07
Operations Emergency Response Organization	Revision No. 021
Information Use	Electronic Reference No. OP0095P5

Reviewed by Eric Lampe 8/29/00

Emergency Planning Review by Ray Waterman

Approved by

Date 8/31/00

Major Revision # 21

OCONEE NUCLEAR STATION

OPERATIONS MANAGEMENT PROCEDURE 1-07

OPERATIONS EMERGENCY RESPONSE ORGANIZATION

1. Purpose

This procedure establishes the expectations and requirements for the Operations Emergency Response Organization (ERO) roles and responsibilities and augments NSD 117, *Emergency Response Organization, Training, and Responsibilities*.

Note:
A copy of changes to this procedure must be forwarded to the Emergency Planning group within 3 working days of approval to comply with 10 CFR 50, Appendix E, Section V, *Implementing Procedures*. [1]

2. References/Commitment Documents

2.1 References

10 CFR 50, Appendix E, Section V, Implementing Procedures
10 CFR 26, Fitness for duty
NUREG 1022, Revision 1, Event Reporting Guidelines: 10 CFR 50.72 and 50.73
SLC 16.13.1, Minimum Station Staffing Requirements
Emergency Plan, Section B, Figure B-8, Minimum Staffing Levels
NSD 117, Emergency Response Organization, Training, and Responsibilities
OMP 1-03, Operations Duty Positions
OMP 1-14, Notifications
OMP 1-18, Implementation Standard During Abnormal and Emergency Events
OMP 2-01, Duties and Responsibilities of On-Shift Operations Personnel
RP/0/B/1000/001, Emergency Classification
RP/0/A/1000/002, Control Room Emergency Coordinator Procedure
RP/0/B/1000/025, Operational Support Center Coordinator Procedure
RP/0/B/1000/015A, Offsite Communications From the Control Room
PT/0/B/2000/002, Periodic Test of Emergency Response Communications Equipment
ERTG – 001, Emergency Response Matrix

2.2 Commitment Documents

1. PIP 99-2901 CA# 1

3. Definitions

None

4. Responsibilities

4.1 TSC Operations Superintendent

1. The on-call ERO position qualified per ERTG – 001, *Emergency Response Matrix*, that performs the TSC Operations Superintendent duties.
2. An individual who is currently or formerly SRO licensed at Oconee.
3. Monitor the emergency situation and maintain oversight, the "Big Picture," of Operations activities.
   - Refer to the Emergency Operating Procedure (EOP)
   - Refer to RP/0/B/1000/001, *Emergency Classification*
4. Make recommendations to the TSC Station Manager/Emergency Coordinator and Operations Shift Manager (OSM) to stabilize and recover from the emergency situation.
   - Provide mitigation strategies to the OSM.
   - Provide mitigation strategies to the TSC Station Manager/Emergency Coordinator.
   - Review upcoming EOP actions and provide guidance to the OSM including potential barriers and success strategies.
   - If deviation from the EOP is required, inform the engineering manager to contact the GO Accident Assessment group.
   - Recommend implementation of 10 CFR 50.54(x) prior to Technical Specification deviation.
   - Ensure TSC personnel notify the NRC of any EOP or Technical Specification deviations.
   - Ensure tasks to accomplish mitigation strategies are being developed.
   - Review task priority for OSC assignment.
5. Classify the emergency event using RP/0/B/1000/001, *Emergency Classification*, and immediately provide the decision/justification to the Emergency Coordinator.
   - Continuously review conditions that impact emergency classification.
   - Provide information the TSC Offsite Communicator for the emergency offsite notification form.
6. Relieve the OSM as Emergency Coordinator in the event the TSC Station Manager/Emergency Coordinator is unavailable.
7. Assist the TSC Station Manager/Emergency Coordinator during severe accident management situations to determine whether to implement candidate high level actions recommended by the SAMG Evaluators.

4.2 TSC Assistant to TSC Operations Superintendent

1. The on-call ERO position qualified per ERTG – 001, *Emergency Response Matrix*, that performs the TSC Assistant to the TSC Operations Superintendent duties.
2. An individual currently or formerly RO or SRO licensed or SRO certified at Oconee and has current knowledge and experience with the Emergency Operating Procedure (EOP).
3. Assist the TSC Operations Superintendent in the performance of all duties.
4. Fulfill the role of Severe Accident Mitigation Guide (SAMG) evaluator when implementing the Oconee Severe Accident Guideline (OSAG) if required by plant conditions.
5. Prior to quarterly or annual emergency plan drills, the duty person shall verify the backup communications systems are working properly between the OSC and TSC.

4.3 OSC Operations Liaison

1. The on-call ERO position qualified per ERTG – 001, *Emergency Response Matrix*, that performs OSC Operations Liaison duties.
2. The Operations Work Coordination Support Duty person who is currently or formerly RO or SRO licensed at Oconee fills the role of OSC Operations Coordinator.
3. Participate as a member of the Operations Support Center (OSC) response team and follow the guidance in RP/0/B/1000/25, *Operational Support Center Coordinator Procedure*.
4. Ensure response activities are performed as needed to stabilize the plant by clarifying priorities to all OSC personnel based upon input from the TSC and OSM.
5. Direct the activities of Non-Licensed Operators (NLOs) as required by the OSM or TSC. This includes ensuring that NLOs fully understand the method of feedback prior to being dispatched on a task and that adequate communication with the Control Room (e.g., radio, telephone) is established prior to performing any tasks that directly affect plant operations. If available, an on-duty shift supervisor may assist in coordinating NLO activities.
6. Ensure adequate expertise is available to help manage the emergency by assigning extra/available Operations personnel as the OSM Liaison and Assistant to the OSC Operations Liaison as needed.

7. Notify Keowee Hydro Unit personnel as required.
   - Update Keowee personnel on Oconee plant status, including existing or potential radiological or safety concerns.
   - Ensure evacuation of non-essential Keowee personnel during site evacuation while maintaining a minimum of one Keowee operator.
   - Relocate essential Keowee personnel to the OSC if required by radiological or safety concerns.
8. As needed, assign Operations personnel to the Unit 3 radio base station to communicate with field teams.
9. Prior to quarterly or annual emergency plan drills, the duty person shall verify the backup communications systems are working properly between the OSC and TSC.

4.4 Assistant to the OSC Operations Liaison

1. An individual who is currently or formerly RO or SRO licensed at Oconee. This is an additional role that is manned if Operations personnel are available and is not an on-call or on-shift position.
2. This role is assigned by the OSC Operations Liaison.
3. Report to the OSC to assist the OSC Operations Liaison as needed.

4.5 Operations Shift Manager/Emergency Coordinator

1. The on-shift ERO position qualified per ERTG – 001, *Emergency Response Matrix*, that performs Emergency Coordinator duties.
2. Function as the site Emergency Coordinator during emergency conditions per NSD 117, *Emergency Response Organization, Training, and Responsibilities.*
3. Implement RP/0/A/1000/02, *Control Room Emergency Coordinator Procedure,* until relieved.
4. Implement all necessary Emergency Plan procedures.
5. Oversee Control Room activities on the affected unit per OMP 1-18, *Implementation Standard During Abnormal and Emergency Events*, and OMP 2-01, *Duties and Responsibilities of On-Shift Operations Personnel.*
6. If available, use the OSM Liaison to communicate with the TSC and OSC to coordinate plant response activities.

4.6 The OSM Liaison

1. An individual who is currently or formerly RO or SRO licensed at Oconee. This is an additional role that is manned if Operations personnel are available and is not an on-call or on-shift position.
2. This role is assigned by the OSC Operations Liaison
3. Report to the affected unit control room to assist the OSM with communications from the TSC and OSC.
4. Provide technical support to the OSM as needed.

4.7 Control Room Off-Site Communicator

1. The on-shift ERO position qualified per ERTG – 001, *Emergency Response Matrix,* that performs Off-Site Communicator duties.
2. Perform off-site communicator duties per RP/0/B/1000/015A, *Offsite Communications From the Control Room.*
3. Assist Emergency Planning as needed to test the off-site communications equipment per PT/0/B/2000/002, *Periodic Test of Emergency Response Communications Equipment.*

4.8 NRC Communicator

1. The on-shift ERO position qualified per ERTG – 001, *Emergency Response Matrix,* that performs NRC Communicator duties.
2. The NRC Communicator is required to be knowledgeable about plant operations and emergency plan implementation to enable timely, accurate, and reliable reporting of operating events without interfering with plant operations.
3. Establish constant communications with the NRC via the Emergency Notification System (ENS).
4. Complete the NRC Event Notification Worksheet and fax it to the NRC Operations Center per OMP 1-14, *Notifications.*
5. Provide plant status and response actions to the NRC on a continuous basis if requested.
6. Implement RP/0/B/1000/03A, *ERDS Operation,* as required by the Emergency Coordinator.

4.9 Non-Licensed Operators

1. The on-shift positions that upon activation of the OSC and TSC, and when released by the OSM, all available Non-Licensed Operators (NLOs) shall report to the OSC. NLOs engaged in fire brigade response or tasks essential to mitigation of the event shall remain under the direction of the OSM and Shift Supervisors until released from these tasks.
2. The NLOs in the OSC shall perform tasks as directed by the OSC Operations Liaison or on-duty shift supervisors.
   - Inform the OSC Operations Liaison if the NLO is not qualified to perform an assigned task. The OSC Operations Liaison determines if the NLO may perform the task.
   - Establish adequate communications with the Control Room prior to performing any tasks that will directly affect plant operations.
   - Immediately report the completion of tasks to the Control Room and OSC Operations Liaison.

4.10 Operations Evacuation Coordinator

1. One or more Operations staff members responsible for coordinating the evacuation and relocation of non-essential Operations personnel per RP/0/B/1000/10, *Procedure for Emergency Evacuation/Relocation of Site Personnel*, during normal working hours.

4.11 All Operations ERO Responders

1. Comply with the requirements of NSD 117, *Emergency Response Organization, Training, and Responsibilities*.
2. If normal telephone communications fail between the TSC and OSC, use backup communications methods per Attachment B, *TSC/OSC Operations Backup Communications Systems*.

5. Operations Emergency Response Organization

5.1 ERO Positions and Locations

5.1.1 The following on-call ERO positions respond to emergency events 24-hours a day when the TSC and OSC are activated:

Staff ERO Positions	Emergency Location	Drill Location
TSC Operations Superintendent	TSC	TSC
TSC Assistant to TSC Operations Superintendent	TSC	TSC
OSC Operations Liaison	OSC	OSC

5.1.2 The following on-shift ERO positions are staffed 24-hours a day and respond immediately to emergency events when required:

Shift ERO Positions	Emergency Location	Drill Location
OSM/Emergency Coordinator	Control Room	Simulator /TSC
Control Room Off-Site Communicator	TSC	Simulator/ TSC
NRC Communicator	TSC	Simulator/ TSC

5.1.3 The following ERO roles are manned during normal working hours or when extra Operations personnel are available:

Extra Roles	Emergency Location	Drill Location
Assistant to the OSC Operations Liaison	OSC	OSC
OSM Liaison	Control Room	Simulator
Operations Evacuation Coordinator	Operations Offices	Operations Offices

5.2 Operations ERO Communications Protocol

5.2.1 Refer to Attachment A, *Operations ERO Communications Protocol*, for a description of the expected lines of communications during an emergency event.

5.2.2 When the OSC is fully staffed, the OSM shall be kept informed of all activities initiated by the TSC or OSC and the status of NLO resources from the OSC Operations Liaison.

5.2.3 Prior to evacuation of the Oconee Nuclear Station, the OSC Operations Liaison shall arrange for 24-hour staffing of the Operations ERO positions.

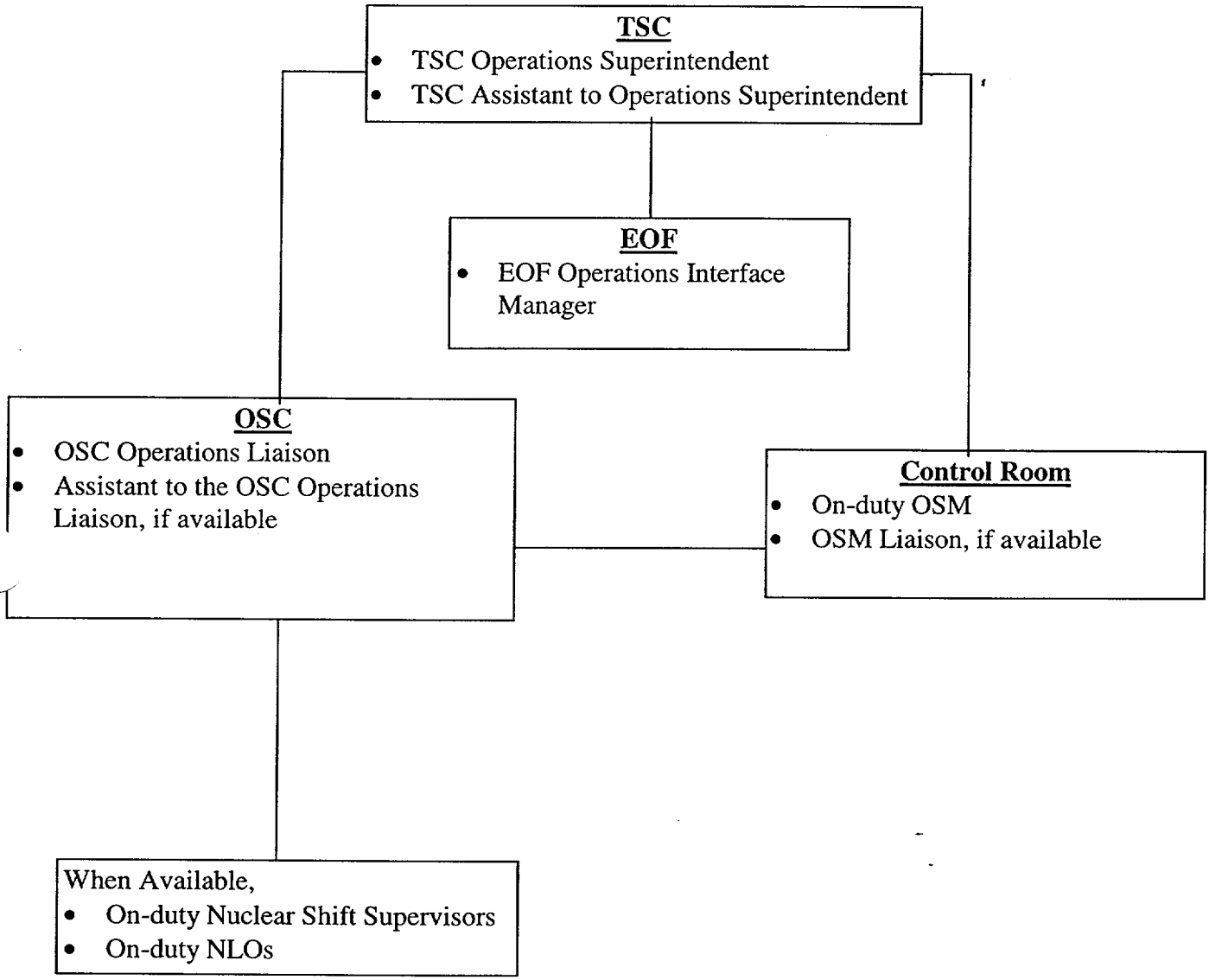
6. Records

None

7. Attachments

Attachment A	Operations ERO Communications Protocol
Attachment B	TSC/OSC Operations Backup Communications Systems

OMP 1-07
Operations Emergency Response Organization
Attachment A
Operations ERO Communications Protocol



OMP 1-07
Operations Emergency Response Organization
Attachment B
TSC/OSC Operations Backup Communications Systems

TSC-OSC Operations Bridge Network System Operation

TSC System Location: On top of and inside the ERDS Cabinet
OSC System Location: On the table along the southwest wall

The TSC-OSC Operations Bridge Network System utilizes the plant telephone system and consists of two Operations Bridge Base Units, two Telephones, a Telephone Bridge, and Belt Pack Headsets. The systems are turned "On" and connected to the Operations Bridge Network by dialing extension 4908. The Belt Pack Headsets are turned "On" to allow for two-way communications between the Belt Pack Headsets and the Bridge Network via the Base Unit. The OSC and TSC can communicate with each other and with anyone else who dials into the Bridge Network using extension 4908 from any telephone.

1. Belt Pack Headsets (TSC/OSC)
   - Obtain the Belt Pack Headsets (R-1, R-2, R-3).
   - The R-4 Belt Pack Headset is only used with the wireless intercom system because the bridge network can only be configured to transmit on three channels.
   - Replace the batteries as needed.
   - Turn the Belt Pack Headset "On."

2. Operations Bridge Base Unit (TSC/OSC)
   - Turn the Operations Bridge Network "On" by placing the Operations Bridge Base Unit power toggle switch in the "Up" position (red light on).
   - Activate the communication channels (1, 2, 3) for the respective Belt Pack Headsets (R-1, R-2, R-3) by placing the respective toggle switch in the "Up" position. Only three channels can be activated on the system.
   - Remove the headset from the telephone attached to the Operations Bridge Base Unit and leave it off while in use.
   - Dial extension 4908 to connect to the bridge network.
   - Depress the button on the Belt Pack Headsets in the Push-to-Talk (PTT) or Continuous Talk position as needed to communicate.

3. Shutdown
   - Replace the handset on the telephone.
   - Turn the Operations Bridge Network "Off" by placing the Operations Bridge Base Unit power toggle switch in the "down" position (red light off).
   - Turn the communication channels (1, 2, 3) off by placing the toggle switch in the "Down" position.
   - Turn the Belt Pack Headsets off.

OMP 1-07
Operations Emergency Response Organization
Attachment B
TSC/OSC Operations Backup Communications Systems

TSC-OSC Wireless Intercom System (Cetec-Vega) Operation

The TSC-OSC Wireless Intercom System is a backup for the TSC-OSC Operations Bridge Network System. This system does not use the plant telephone system. The TSC-OSC Wireless Intercom System consists of two Cetec-Vega QX-6 Wireless Intercom Master Stations (TSC, OSC), the Clear-Com Intercom Main Station (TSC), and the Belt Pack Headsets. The system allows radio transmissions between the Belt Pack Headsets and the base stations, and are connected by hard wire through the Clear-Com Intercom Base Station in the TSC. The Cetec-Vega Base Stations must be turned "On" since it allows the hard wire connection between the TSC and OSC for system operation. The Clear-Com Intercom Main Station must also have the "Ch B (OSC)" button depressed. Each Belt Pack Headset must be turned "On" as needed and its corresponding radio channel button (R-1, R-2, R-3, R-4) depressed on the Cetec-Vega Base Station at its location (TSC, OSC). Operation of this system enables communications between Operations personnel in the TSC, OSC, and other locations whenever the TSC-OSC Operations Bridge Network is not available.

1. Belt Pack Headsets (TSC/OSC)
   - Obtain the Belt Pack Headsets (R-1, R-2, R-3, R-4).
   - Replace the batteries as needed.
   - Turn the Belt Pack Headset "On."

2. Clear-Com Main Station (TSC ERDS Cabinet)
   - Turn on the power by depressing the "Red" power switch.
   - Verify the "Ch B (OSC)" button is depressed.

3. Cetec-Vega QX-6 Wireless Intercom Master Station (TSC/OSC ERDS Cabinet):
   - Turn on power by depressing the "AC PWR" button.
   - Verify the "I/C" button is depressed (green backlight)
   - Check the Simulator On/Off switch on the back of the master station in "Off." During drills, turn the switch to "On." (TSC ERDS Cabinet only)
   - Depress the "Enable" buttons (green backlight) as needed to activate the Belt Pack Headsets in use (R-1, R-2, R-3). If a Belt Pack Headset is not being used, ensure it is not "enabled" to minimize any static on the system.
   - Depress the button on the Belt Pack Headsets in the Push-to-Talk (PTT) or Continuous Talk position as needed to communicate.

4. Shutdown
   - Depress the "Enable" buttons to turn the off each channel used (black indication).
   - Turn off the power to the Clear-Com Main Station and the Cetec-Vega QX-6 Wireless Intercom Master Stations.
   - Verify the Simulator On/Off switch on the back of the Cetec-Vega QX-6 Wireless Intercom Master Station in "Off."
   - Turn the Belt Pack Headsets off.