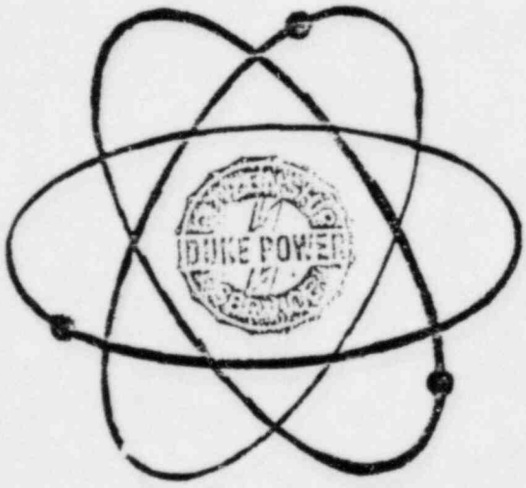
DUKE POWER COMPANY

OCONEE NUCLEAR STATION

IMPLEMENTING PROCEDURES



APPROVED:

J. Ed Smith, Station Manager

6/8/83
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CONTROL COPY

INFORMATION ONLY

Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: HP/1/A/1009/17
Change(s) 2 to
NA Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Operating Procedure for Post-Accident Containment Air Sampling System

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By: _____ Date: _____

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Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR POST-ACCIDENT CONTAINMENT

AIR SAMPLING SYSTEM

1.0 Purpose

This procedure describes the operation of the Post-Accident Containment Air Sampling System which is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA. This procedure is also used to perform the semi-annual functional test of the system.

2.0 References

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

2.2 HP/0/B/1006/07, Procedure for Preparation of Gas Calibration Sources

2.3 CP/1/A/2002/04C, Operating Procedure for the Post Accident Liquid Sampling (PALS) System

2.4 HP/0/B/1009/15, Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.5 EP/0/A/1800/04, Loss of Coolant

3.0 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.

Unit 1 & 2 - Ext. 1268 (by column AX-38)
Unit 3 - Ext. 1396 (by door to RCA)

3.3 The following items will never be used on the panel.

a. Trap Area Evacuation

b. Fast Sample Dilution

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

3.5 Moving the Selector Switch from one mode to another stops all current system operations. Depressing the Activate button starts operation of the newly selected mode.

3.6 The radiation monitor on the control panel will provide levels of radiation at the sample panel. If the radiation monitor is not working properly, then a portable survey instrument will be used to determine radiation levels.

3.7 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.

3.8 If the sampling system cannot be operated, then HP/0/B/1009/15 (Ref. 2.4) will be used as an alternate method for obtaining a containment air sample.

3.9 Enclosure 5.5 will be used to check off the steps as the procedure is completed.

3.10 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 5.6 or 5.7.

3.11 The front side of the sample panel is the side which contains the door. The left and right side of the sample panel will be determined by using this fact.

3.12 If radiation levels exceed 16 R/hr and cannot be reduced by purging the system, secure operation of the panel, move to a low background area, and contact the Station Health Physicist or his designee for further instructions.

3.13 Before sampling operations begin, the decision must be made based on radiological conditions in the reactor building and the sampling area whether to use a 100 ml gas bomb or a calibrated syringe for the gas sample. During emergency conditions, this decision will be made by the Station Health Physicist or his designee.

3.14 Enclosure 5.8, Valve Checklist for Sample Panel, may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

3.15 During accident conditions, the keys needed for sampling will be located in the Shiftman's key cabinet.

3.16 The sampling system must not be used if reactor building pressure is greater than 40 psig.

4.0 Procedure

4.1 Locate the Shift Supervisor for Operations and request that Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

4.2 Obtain equipment necessary to perform sampling, including the thiosulfate solution. Also obtain keys to the control panel and the sixth floor Ventilation Equipment Room.

NOTE: Necessary equipment for sampling is listed on Enclosure 5.1.

4.3 Open the valve on the nitrogen bottle next to the sampling panel to 40 psig.

4.4 Open the

(a) DI Water Inlet

(b) Instrument Air Inlet

(c) N_2 Inlet

located on the left side of the sample panel.

NOTE: Open inlets by rotating the back switches counterclockwise one-quarter turn to the upward position.

4.4.1 Ensure the test tees on the sample inlet and outlet lines are closed.

4.5 Position the thiosulfate funnel directly over the fill port located on top of the sample panel. Attach the hose on the funnel to the fill port and pour the 500 ml of thiosulfate solution into the funnel.

4.6 Set the switches listed below as follows:

(a) Sample Volume Select - set on SMALL

(b) Dilution Volume Select - set on LARGE

(c) Selector Switch - set on OFF

(d) System Purge - set on NORMAL

(e) Refill Switch - set on OFF (down)

(f) TC Switch - set on POSITION 1 (thermocouple measures sample line temperature)

(g) Sample Line Select Switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

4.7 Turn the Key Lock Switch to POWER ON and ensure the power on light has come on.

4.8 Turn the Radiation Monitor toggle switch ON (up).

4.8.1 Turn the selector on the Radiation Monitor to BATT and ensure the needle is in the "red test region." Turn the selector to the MR/HR or R/HR scale.

NOTE: If the Radiation Monitor is not functioning properly, note that is is not working on Enclosure 5.5, Step 9 and use a portable survey instrument to determine radiation levels during sampling.

4.9 Purge the Sample Panel.

4.9.1 Turn Select Switch to SYSTEM PURGE

4.9.2 Move Normal - Sample Purge to SAMPLE PURGE

4.9.3 Depress ACTIVATE button.

4.9.4 Depress EVAC button (Evac light on) and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP.

4.9.5 Press down and release the GAS PURGE toggle switch and watch the pressure gauge swiftly rise to + 10" of Hg. Depress STOP button.

4.9.6 Depress the EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.9.7 Depress the PUMP button and wait for 30 seconds. Depress STOP button.

4.9.8 Repeat Step 4.9.4 through 4.9.7 twice to purge the sample panel two more times.

4.9.9 Move Normal - Sample Purge to NORMAL.

4.9.10 Turn Selector Switch to SOLUTION CHANGE OUT.

4.10 Preparation for Sampling

4.10.1 Set the 500 ml sample bottle in a clear poly bag. Place the portable shielded container on the floor under the Thiosulfate sampler (left side of panel), and place the sample bottle in the shielded container.

4.10.2 Detach the left side of the flexible tubing on the thiosulfate sampler located on the left side of the sample panel near the floor.

4.10.3 Insert the free end of the tubing into the 500 ml sample bottle.

4.10.4. Complete Steps a) and b) below if a 100 ml gas bomb will be used for the gas sample. If the gas sample will be drawn by syringe, go to Step 4.10.5.

a) Detach the side of the flexible tubing farthest away from the sample panel on the gas sampler located on the right side of the sample panel near the floor.

b) Attach a 100 ml gas bomb between the free end of the flexible tubing and the hard piping on the gas sampler.

4.10.5 Record sample line temperature reading for sample volume calculations on Enclosure 5.2.

4.11 Flush Thiosulfate Sampler and fill with Thiosulfate.

4.11.1 Depress ACTIVATE button.

4.11.2 Depress FLUSH button and hold for 30 seconds.

4.11.3 Depress PURGE button and hold for 30 seconds.

4.11.4 Depress EMPTY button and hold for 30 seconds.

4.11.5 Open the TS (thiosulfate) valve located inside the sample panel directly below the fillport. (Open valve in same manner as valves in Step 4.4).

4.11.6 Move Refill toggle switch to ON (up) and wait 2 minutes. Move Refill to OFF (down).

4.11.7 Turn Selector Switch to DILUTION VOLUME EVACUATION.

4.12 Evacuate the Dilution Volume.

4.12.1 Depress ACTIVATE button and watch pressure gauge drop to ~ - 19" of Hg. Turn Selector Switch to SAMPLE RECIRC.

4.13 Recirc Containment Air and Trap a Sample.

4.13.1 Depress ACTIVATE button and wait 10 minutes.

4.13.2 Return to sample panel and note pressure gauge reading on sample inlet line. Record pressure on Enclosure 5.2.

4.13.3 Depress SAMPLE button and wait 1 minute.

4.13.4 Depress TRAP button and wait 10 seconds.

4.13.5 Turn Selector Switch to SAMPLE DILUTION.

4.14 Dilute Sample with N_2 and Recirc.

4.14.1 Depress ACTIVATE button.

4.14.2 Depress SLOW button and watch pressure gauge slowly rise to 0" of Hg. Depress STOP button.

4.14.3 Depress RECIRC button and wait 5 minutes.

4.14.4 Complete step a) if a syringe will be used for the gas sample. If a 100 ml gas bomb is being used for the gas sample, continue on to Step 4.14.5.

a) Insert the calibrated gas syringe into the septum on the gas sampler. Withdraw a 5 cc sample of gas and place the syringe into the portable shielded container.

4.14.5 Depress the STOP button on the control panel.

4.14.6 Turn the Selector Switch to SOLUTION CHANGEOUT.

4.15 Collect Particulate and Iodine Sample.

4.15.1 Depress ACTIVATE button.

4.15.2 Depress TS SAMPLE button.

4.15.3 Depress and hold EMPTY button until thiosulfate solution has drained into 500 ml sample bottle.

4.15.4 Depress TS SAMPLE GRAB button.

4.15.5 Depress PURGE button and hold for 1 minute.

4.15.6 Turn the Selector Switch to SYSTEM PURGE.

4.16 Purge the Sample Panel.

4.16.1 Depress ACTIVATE button.

4.16.2 Depress EVAC button and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP button.

4.16.3 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg. Depress STOP button.

4.16.4 Depress EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.16.5 Depress the PUMP button and wait 30 seconds. Depress STOP button.

4.16.6 Repeat Steps 4.16.2 through 4.16.5 to purge the sample panel one additional time.

4.17 Remove Samples from Sample Panel.

4.17.1 Return to the sample panel and close both valves on the gas bomb (if used.)

4.17.2 Disconnect the gas bomb (if used) from the sample panel. Place gas bomb in portable shielded container.

4.17.3 Tightly cap the 500 ml sample bottle.

4.18 Switching the Sample System Off.

4.18.1 Turn the Selector Switch to OFF.

4.18.2 Turn the Radiation Monitor to OFF.

4.18.3 Turn the Keylock Switch to OFF.

4.18.4 Close the following valves:

a) Nitrogen bottle - next to sample panel

b) TS Valve - inside sample panel

c) DI Water Inlet, Instrument Air Inlet, N_2 Inlet (On left side of sample panel)

4.19 Transport the samples to the Count Room for analysis.

4.20 Calculate the sample volume using the data from Enclosure 5.2. Record this volume on sample data sticker.

NOTE: If sample cannot be counted because of high activity, further dilute the gas samples as per procedure HP/0/B/1006/07.

4.21 Transmit sample analysis results to the Station Health Physicist or his designee.

4.22 Request Operations to return the Hydrogen Analyzer to service per Enclosure 5.6 or 5.7.

5.0 Enclosures

5.1 Sampling 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 Checklist for Operation of Sample Panel

5.6 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Standby Mode

5.7 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Analyze Mode

5.8 Valve Checklist for Sample Panel

5.9 Control Panel Diagram

5.10 Flow Diagram

ENCLOSURE 5.1

HP/1/A/1009/17

SAMPLING PANEL EQUIPMENT

1	Nalgene 500 ml Thiosulfate sample bottle.
2	Stainless Steel Gas Bombs
1	9/16" Combination Wrench
1	Stainless Steel Portable Shielded Container
1	Stopwatch
1 bottle	Thiosulfate Solution (500 ml)
2	10" x 12" Clear Poly Bags
1	Calibrated Gas Syringe
1	Bucket

ENCLOSURE 5.2

HP/1/A/1009/17

SAMPLE DATA SHEET

1) NAME _____

DATE _____

UNIT _____

2) Sample Line Temperature _____ _____

3) Sample Inlet Line Pressure _____

4) Gas Sample Volume = SV

$$SV = \frac{4307.1\ (STV)}{(275.224 + .555\ [°F])\ (14.7 + P)} = \_\_\_\_\_ ml$$

where:

°F = Sample Line Temperature

P = Sample Inlet Line Pressure

STV = Sample Trap Volume

Unit 1 = 1.3 ml

5) Diluted Volume = $\frac{SV}{1E4}$ = _____ml

6) Record Diluted Volume as Gas Sample Volume on Sample Label.

7) Record Iodine and Particulate Sample Volume as 1.3 ml of sample in 500 ml of thiosulfate solution on sample label.

Checked Control Copy _____

Date _____

ENCLOSURE 5.3

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN STANDBY MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0 Initial Conditions		
1.1 Containment Integrity is required.	_____	_____
1.2 Designate a Licensed Operator assigned to immediately close containment isolation valves from the Control Room if an ES actuation occurs. This person may have other responsibilities, but they shall not prevent him from performing this evolution.	_____	
License Operator _____		
Unit Supervisor _____		
1.3 Record that the containment isolation valves that will be opened on Enclosures 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover). (1PR-81 and 1PR-84 or 1PR-90 and 1PR-87).	_____	
1.4 H_2 Analysis Panel is in Standby Mode.	_____	
1.5 Reactor building pressure is less than 40 psig.	_____	
2.0 Procedure		
2.1 Place Post Accident Sampler in service as follows:		
2.1.1 Select which train to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2 Ensure train is in standby mode by observing red light in gray cabinet.	_____	

NOTE: Use other train if not in standby.

ENCLOSURE 5.3

HP/1/A/1009/17

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
2.1.3	At the selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (1PR-83, 1PR-86) or (1PR-89, (1PR-92).	_____	
2.1.4	Turn sample valve selector switch to 'Top Cont'. Opens 1PR-71 or 1PR-76. (Red light will come on).	_____	_____
2.1.5	From the Control Room, open 1PR-81 and 1PR-84 (Containment Isolation Valves) if train "A" was selected.	_____	_____
	OR		
	Open 1PR-87 and 1PR-90 (Containment Isolation Valves) if train "B" was selected.	_____	_____

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

2.1.6	Notify Unit Supervisor which train is selected.	_____	_____
	Unit Supervisor _____		
2.1.7	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

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ENCLOSURE 5.4

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING H_2 ANALYSIS PANEL CURRENTLY IN ANALYZE MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	H_2 Analyzer is in Analyze Mode.	_____	
1.2	Reactor building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train is to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2	At the "Remote" Panel (blue cabinet), position the "Off Standby, Analyze" selector to "Standby" and observe red light in grey cabinet.	_____	
2.1.3	At selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (1PR-83, 1PR-86) or (1PR-89, 1PR-92).	_____	
2.1.4	Notify Unit Supervisor which train is selected.	_____	
	Unit Supervisor _____		
2.1.5	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

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Date _____

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

NOTE: Complete steps in order listed. Initial steps as completed.

A) Switching System On

_____1) Operations Bypass H_2 Analyzer by Enclosure 5.3 or 5.4.

_____2) Obtain Sampling Equipment and Keys.

_____3) Open Nitrogen bottle to 40 psig.

_____4) Open:

a) DI Water Inlet
b) Instrument Air Inlet
c) N_2 Inlet

_____5) Ensure test tees on sample inlet and outlet lines are closed.

_____6) a) Position thiosulfate funnel
b) Attach hose to fill port
c) Pour 500 ml of thiosulfate into funnel.

_____7) Set switches on control panel:

a) Sample Volume Select - set on SMALL.

b) Dilution Volume Select - set on LARGE.

c) Selector Switch - set on OFF.

d) System Purge - set on NORMAL.

e) Refill Switch - set on OFF (down).

f) TC Switch - set on POSITION 1 (measures sample line temperature).

g) Sample Line Select Switch - Unit and Hydrogen Analyzer Train A or B

_____8) Key Lock Switch - POWER ON

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

____9) a) Radiation Monitor - ON (up)

b) Radiation Monitor Selector - BATT (red test region)

c) Radiation Monitor Selector - MR/HR or R/HR

B) Purge the Sample Panel

____10) Selector Switch - SYSTEM PURGE

____11) Normal - Sample Purge - SAMPLE PURGE

☐ ☐ ☐ 12) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ∿ - 19" of Hg.

d) STOP

☐ ☐ ☐ 13) a) GAS PURGE - press down and release.

b) Pressure swiftly rises to + 10" of Hg.

c) STOP

☐ ☐ ☐ 14) a) EVAC

b) Pressure drops to 0" of Hg.

c) STOP

☐ ☐ ☐ 15) a) PUMP - wait 30 seconds

b) STOP

☐ ☐ ☐ 16) a) Purge sample panel two (2) more times by completing Steps 12 through 15 two (2) more times.

____17) Normal - Sample Purge - NORMAL

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

___18) Selector Switch - SOLUTION CHANGEOUT

C) Preparation for Sampling

___19) Attach 500 ml sample bottle to TS Sampler.

___20) Attach gas bomb to gas sampler (N.A step if syringe will be used instead of gas bomb).

___21) Record sample line temperature on Enclosure 5.2.

D) Flush Thiosulfate Sampler and fill with Thiosulfate

___22) a) ACTIVATE

b) FLUSH - hold 30 seconds

c) PURGE - hold 30 seconds

d) EMPTY - hold 30 seconds

e) Open TS (thiosulfate) valve

f) Refill - ON - wait 2 minutes

g) Refill - OFF

___23) Selector Switch - DILUTION VOLUME EVACUATION

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

E) Evacuate the Dilution Volume

___24) a) Activate

b) Pressure slowly drops to ~ - 19" of Hg.

c) Selector Switch - SAMPLE RECIRC

F) Recirc Containment Air and Trap a Sample

___25) ACTIVATE - wait 10 minutes

___26) Return to sample panel - note and record sample inlet line pressure on Enclosure 5.2.

___27) a) SAMPLE - wait 1 minute

b) TRAP - wait 20 seconds

c) Selector Switch - SAMPLE DILUTION

G) Dilute Sample with N_2 and Recirc.

___28) a) ACTIVATE

b) SLOW

c) Pressure slowly rises to 0" of Hg.

d) STOP

___29) RECIRC - wait 5 minutes

___30) Complete a) if syringe will be used for gas sample. If gas bomb is being used, N/A this step and continue on to Step 31.

a) Withdraw a 5 cc gas sample from the septum of the gas sampler using calibrated syringe. Place syringe in portable shielded container.

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

___31) a) STOP

b) Selector Switch - SOLUTION CHANGEOUT

H) Collect Particulate and Iodine Sample

___32) a) ACTIVATE

b) TS SAMPLE

c) EMPTY - hold button until thiosulfate solution has drained into sample bottle.

d) TS SAMPLE GRAB

e) PURGE - hold button 1 minute

___33) Selector Switch - SYSTEM PURGE

I) Purge the Sample Panel.

□ □ 34) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ∿ - 19" of Hg.

d) STOP

□ □ 35) a) GAS PURGE - press down and release

b) Pressure swiftly rise to + 10" of Hg.

c) STOP

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

□ □ 36) a) EVAC

b) Pressure drop to 0" of Hg.

c) STOP

□ □ 37 a) PUMP - wait 30 seconds

b) STOP

□ □ 38) Repeat Steps 34 through 37 one additional time.

J) Remove Samples from Sample Panel

____39) Return to sample panel and close both valves on the gas bomb. (N/A step if gas bomb not used).

____40) Disconnect gas bomb from sample panel. Place gas bomb in portable shielded container. (N/A step if gas bomb not used).

____41) Tightly cap sample bottle.

K) Switching System Off

____42) Selector Switch - OFF

____43) Turn the Radiation Monitor - OFF

____44) Key Lock Switch - OFF

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

45) Close:

a) Nitrogen bottle

b) TS Valve - inside sample panel

c) DI Water Inlet

d) Instrument Air Inlet

e) N_2 Inlet

____46) Transport samples to Count Room for analysis.

____47) Calculate sample volume using data from Enclosure 5.2. (Dilute gas samples per HP/0/B/1006/07 if needed).

____48) Transmit sample analysis results to Station Health Physicist or his designee.

____49) Request Operations to return the Hydrogen Analyzer to service per Enclosures 5.6 or 5.7.

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Date _____

ENCLOSURE 5.6

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING H_2 ANALYSIS PANEL BACK TO SERVICE IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Procedure		
1.1	Return the H_2 Analysis train back to service as follows:		
1.1.1	Turn Sample Valve Selector switch to OFF. (Red light will go off). Closes 1PR-71 or 1PR-76.	_____	_____
1.1.2	Depress the OFF buttons on both 'BYP TO POST AC' switches. Closes (1PR-83, 1PR-86) or (1PR-89, 1PR-92).	_____	
1.1.3	From the Control Room, Close 1PR-81 and 1PR-84 if train "A" is selected.	_____	_____
	OR		
	Close 1PR-87 and 1PR-90 if train "B" was selected.	_____	_____

NOTE: This will regain containment integrity. Remove the containment isolation valves from Enclosure 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover).

1.1.4	Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
1.1.5	Return completed enclosure to personnel operating Post Accident Sample Panel.	_____	

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Date _____

ENCLOSURE 5.7

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING UNIT 1 H_2 ANALYSIS

PANEL BACK TO SERVICE IN ANALYZE MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./Time
1.0 Initial Conditions		
1.1 H_2 Analysis Panel has been switched to Standby Mode for Post Accident sampling and is to be returned to Analyze Mode.	_____	
2.0 Procedure		
2.1 Return the H_2 Analysis train back to service as follows:		
2.1.1 Depress the OFF buttons on both "BYP to Post AC" switches. Closes (1PR-83, 1PR-86) or (1PR-89, 1PR-92).	_____	
2.1.2 Position the "Off, Standby, Analyze" Selector to Analyze.	_____	
NOTE: When Analyze is 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.		
2.1.3 Push the Remote Selector button to ensure control is from Remote Panel.	_____	
2.1.4 Reset the Common Alarm after the meter reading stabilizes.	_____	
2.1.5 Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
2.1.6 Return completed enclosure to Health Physics Personnel Operating Post Accident Sample Panel.	_____	

ENCLOSURE 5.8

HP/1/A/1009/17

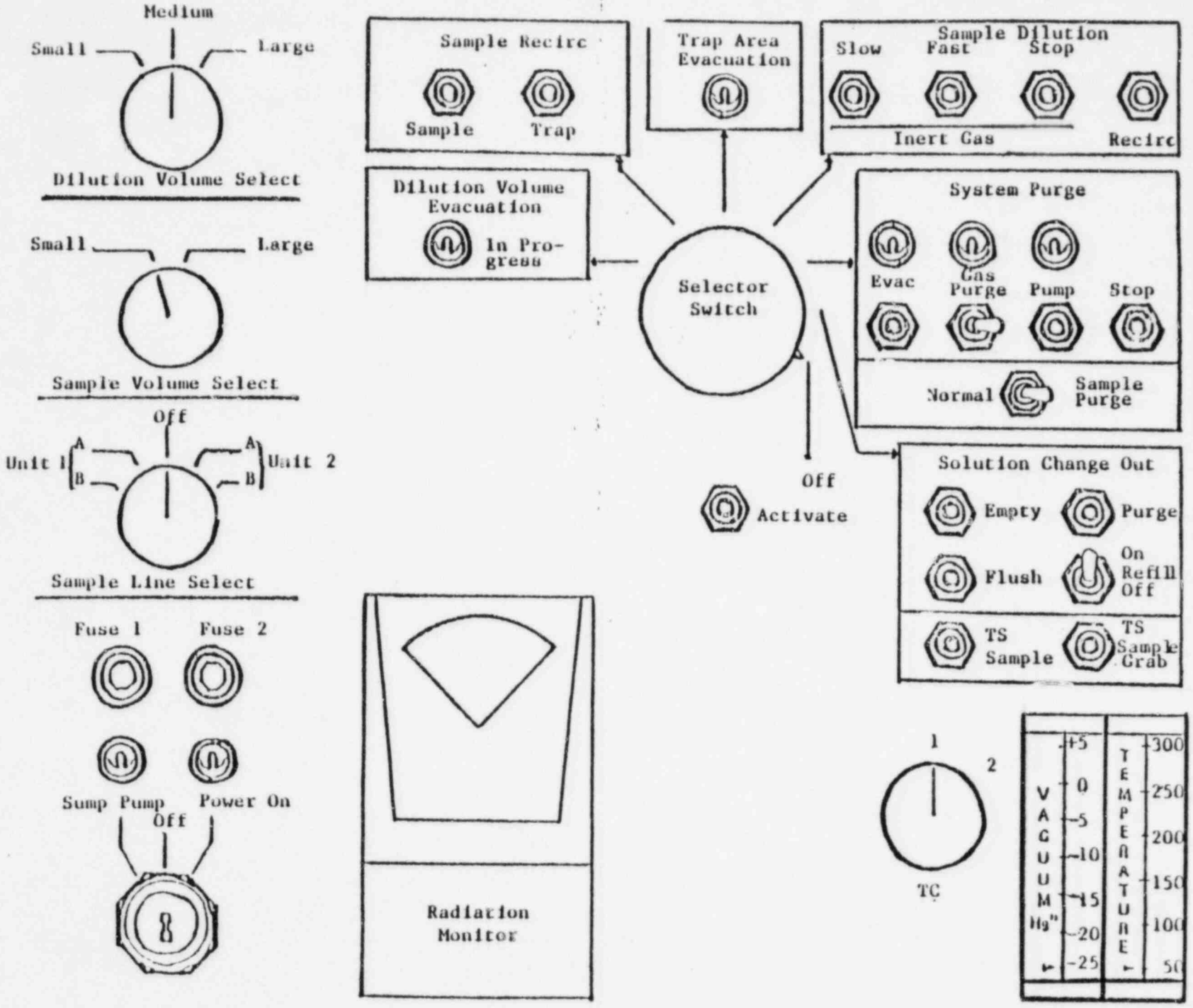
VALVE CHECKLIST FOR SAMPLE PANEL

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

ACTION	RESPONSE
Dilution Volume Evacuation	
- Activate	Energize 1, 2, 9, 12, 19, 17
Sample Recirculate	
- Activate	Energize 1, 2, 5, 6, 27
- Sample	De-energize 27
- Trap	De-energize 2, 5
Sample Dilution	
- Activate	Energize 12, 17
- Slow	Energize 3, 20
- Stop	De-energize 3, 20
- Recirc	Energize Recirc Pump 16, 18

NOTE: Valve #17 will de-energize when selector switch is moved to another position.

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 11, 13
- TS Sample	Energize 21
- TS Sample Grab	De-energize 21



Enclosure 5.9

Control Panel Diagram

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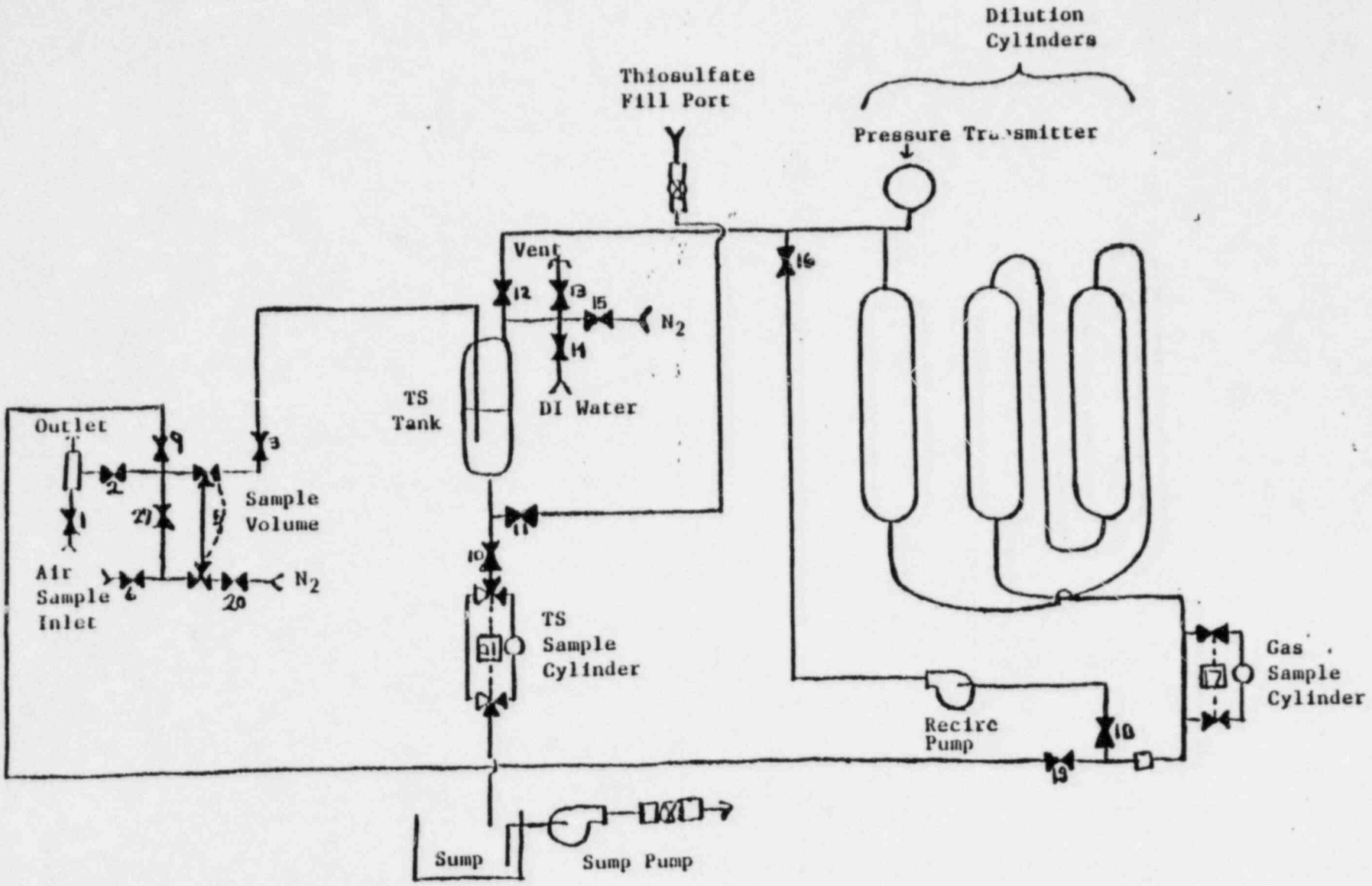
HP/1/A/1009/17



Enclosure 5.10

Flow Diagram

HP/1/A/100C/17

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INFORMATION ONLY

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Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: HP/2/A/1009/17
Change(s) NA to
_____ Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Operating Procedure for Post-Accident Containment Air Sampling System

(4) PREPARED BY: Sarah Cox DATE: 5-6-83

(5) REVIEWED BY: Charlie Young DATE: 5-16-83

Cross-Disciplinary Review By: John R. Kendrick, Jr. N/R: _____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: Tony B. Owen Date: 5/17/83

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR POST-ACCIDENT CONTAINMENT AIR SAMPLING SYSTEM

1.0 Purpose

This procedure describes the operation of the Post-Accident Containment Air Sampling System which is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA. This procedure is also used to perform the semi-annual functional test of the system.

2.0 References

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

2.2 HP/0/B/1006/07, Procedure for Preparation of Gas Calibration Sources

2.3 CP/1/A/2002/04C, Operating Procedure for the Post Accident Liquid Sampling (PALS) System

2.4 HP/0/B/1009/15, Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.5 EP/0/A/1800/04, Loss of Coolant

3.0 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.

Unit 1 & 2 - Ext. 1268 (by column AX-38)
Unit 3 - Ext. 1396 (by door to RCA)

3.3 The following items will never be used on the panel.

a. Trap Area Evacuation

b. Fast Sample Dilution

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

3.5 Moving the Selector Switch from one mode to another stops all current system operations. Depressing the Activate button starts operation of the newly selected mode.

3.6 The radiation monitor on the control panel will provide levels of radiation at the sample panel. If the radiation monitor is not working properly, then a portable survey instrument will be used to determine radiation levels.

3.7 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.

3.8 If the sampling system cannot be operated, then HP/0/B/1009/15 (Ref. 2.4) will be used as an alternate method for obtaining a containment air sample.

3.9 Enclosure 5.5 will be used to check off the steps as the procedure is completed.

3.10 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 5.6 or 5.7.

3.11 The front side of the sample panel is the side which contains the door. The left and right side of the sample panel will be determined by using this fact.

3.12 If radiation levels exceed 16 R/hr and cannot be reduced by purging the system, secure operation of the panel, move to a low background area, and contact the Station Health Physicist or his designee for further instructions.

3.13 Before sampling operations begin, the decision must be made based on radiological conditions in the reactor building and the sampling area whether to use a 100 ml gas bomb or a calibrated syringe for the gas sample. During emergency conditions, this decision will be made by the Station Health Physicist or his designee.

3.14 Enclosure 5.8, Valve Checklist for Sample Panel, may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

3.15 During accident conditions, the keys needed for sampling will be located in the Shiftman's key cabinet.

3.16 The sampling system must not be used if reactor building pressure is greater than 40 psig.

4.0 Procedure

4.1 Locate the Shift Supervisor for Operations and request that Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

4.2 Obtain equipment necessary to perform sampling, including the thiosulfate solution. Also obtain keys to the control panel and the sixth floor Ventilation Equipment Room.

NOTE: Necessary equipment for sampling is listed on Enclosure 5.1.

4.3 Open the valve on the nitrogen bottle next to the sampling panel to 40 psig.

4.4 Open the

(a) DI Water Inlet

(b) Instrument Air Inlet

(c) N_2 Inlet

located on the left side of the sample panel.

NOTE: Open inlets by rotating the back switches counterclockwise one-quarter turn to the upward position.

4.4.1 Ensure the test tees on the sample inlet and outlet lines are closed.

4.5 Position the thiosulfate funnel directly over the fill port located on top of the sample panel. Attach the hose on the funnel to the fill port and pour the 500 ml of thiosulfate solution into the funnel.

4.6 Set the switches listed below as follows:

(a) Sample Volume Select - set on SMALL

(b) Dilution Volume Select - set on LARGE

(c) Selector Switch - set on OFF

(d) System Purge - set on NORMAL

(e) Refill Switch - set on OFF (down)

(f) TC Switch - set on POSITION 1 (thermocouple measures sample line temperature)

(g) Sample Line Select Switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

4.7 Turn the Key Lock Switch to POWER ON and ensure the power on light has come on.

4.8 Turn the Radiation Monitor toggle switch ON (up).

4.8.1 Turn the selector on the Radiation Monitor to BATT and ensure the needle is in the "red test region." Turn the selector to the MR/HR or R/HR scale.

NOTE: If the Radiation Monitor is not functioning properly, note that is is not working on Enclosure 5.5, Step 9 and use a portable survey instrument to determine radiation levels during sampling.

4.9 Purge the Sample Panel.

4.9.1 Turn Select Switch to SYSTEM PURGE

4.9.2 Move Normal - Sample Purge to SAMPLE PURGE

4.9.3 Depress ACTIVATE button.

4.9.4 Depress EVAC button (Evac light on) and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP.

4.9.5 Press down and release the GAS PURGE toggle switch and watch the pressure gauge swiftly rise to + 10" of Hg. Depress STOP button.

4.9.6 Depress the EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.9.7 Depress the PUMP button and wait for 30 seconds. Depress STOP button.

4.9.8 Repeat Step 4.9.4 through 4.9.7 twice to purge the sample panel two more times.

4.9.9 Move Normal - Sample Purge to NORMAL.

4.9.10 Turn Selector Switch to SOLUTION CHANGE OUT.

4.10 Preparation for Sampling

4.10.1 Set the 500 ml sample bottle in a clear poly bag. Place the portable shielded container on the floor under the Thiosulfate sampler (left side of panel), and place the sample bottle in the shielded container.

4.10.2 Detach the left side of the flexible tubing on the thiosulfate sampler located on the left side of the sample panel near the floor.

4.10.3 Insert the free end of the tubing into the 500 ml sample bottle.

4.10.4. Complete Steps a) and b) below if a 100 ml gas bomb will be used for the gas sample. If the gas sample will be drawn by syringe, go to Step 4.10.5.

a) Detach the side of the flexible tubing farthest away from the sample panel on the gas sampler located on the right side of the sample panel near the floor.

b) Attach a 100 ml gas bomb between the free end of the flexible tubing and the hard piping on the gas sampler.

4.10.5 Record sample line temperature reading for sample volume calculations on Enclosure 5.2.

4.11 Flush Thiosulfate Sampler and fill with Thiosulfate.

4.11.1 Depress ACTIVATE button.

4.11.2 Depress FLUSH button and hold for 30 seconds.

4.11.3 Depress PURGE button and hold for 30 seconds.

4.11.4 Depress EMPTY button and hold for 30 seconds.

4.11.5 Open the TS (thiosulfate) valve located inside the sample panel directly below the fillport. (Open valve in same manner as valves in Step 4.4).

4.11.6 Move Refill toggle switch to ON (up) and wait 2 minutes. Move Refill to OFF (down).

4.11.7 Turn Selector Switch to DILUTION VOLUME EVACUATION.

4.12 Evacuate the Dilution Volume.

4.12.1 Depress ACTIVATE button and watch pressure gauge drop to ~ - 19" of Hg. Turn Selector Switch to SAMPLE RECIRC.

4.13 Recirc Containment Air and Trap a Sample.

4.13.1 Depress ACTIVATE button and wait 10 minutes.

4.13.2 Return to sample panel and note pressure gauge reading on sample inlet line. Record pressure on Enclosure 5.2.

4.13.3 Depress SAMPLE button and wait 1 minute.

4.13.4 Depress TRAP button and wait 10 seconds.

4.13.5 Turn Selector Switch to SAMPLE DILUTION.

4.14 Dilute Sample with N_2 and Recirc.

4.14.1 Depress ACTIVATE button.

4.14.2 Depress SLOW button and watch pressure gauge slowly rise to 0" of Hg. Depress STOP button.

4.14.3 Depress RECIRC button and wait 5 minutes.

4.14.4 Complete step a) if a syringe will be used for the gas sample. If a 100 ml gas bomb is being used for the gas sample, continue on to Step 4.14.5.

a) Insert the calibrated gas syringe into the septum on the gas sampler. Withdraw a 5 cc sample of gas and place the syringe into the portable shielded container.

4.14.5 Depress the STOP button on the control panel.

4.14.6 Turn the Selector Switch to SOLUTION CHANGEOUT.

4.15 Collect Particulate and Iodine Sample.

4.15.1 Depress ACTIVATE button.

4.15.2 Depress TS SAMPLE button.

4.15.3 Depress and hold EMPTY button until thiosulfate solution has drained into 500 ml sample bottle.

4.15.4 Depress TS SAMPLE GRAB button.

4.15.5 Depress PURGE button and hold for 1 minute.

4.15.6 Turn the Selector Switch to SYSTEM PURGE.

4.16 Purge the Sample Panel.

4.16.1 Depress ACTIVATE button.

4.16.2 Depress EVAC button and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP button.

4.16.3 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg. Depress STOP button.

4.16.4 Depress EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.16.5 Depress the PUMP button and wait 30 seconds. Depress STOP button.

4.16.6 Repeat Steps 4.16.2 through 4.16.5 to purge the sample panel one additional time.

4.17 Remove Samples from Sample Panel.

4.17.1 Return to the sample panel and close both valves on the gas bomb (if used.)

4.17.2 Disconnect the gas bomb (if used) from the sample panel. Place gas bomb in portable shielded container.

4.17.3 Tightly cap the 500 ml sample bottle.

4.18 Switching the Sample System Off.

4.18.1 Turn the Selector Switch to OFF.

4.18.2 Turn the Radiation Monitor to OFF.

4.18.3 Turn the Keylock Switch to OFF.

4.18.4 Close the following valves:

a) Nitrogen bottle - next to sample panel

b) TS Valve - inside sample panel

c) DI Water Inlet, Instrument Air Inlet, N_2 Inlet (On left side of sample panel)

4.19 Transport the samples to the Count Room for analysis.

4.20 Calculate the sample volume using the data from Enclosure 5.2. Record this volume on sample data sticker.

NOTE: If sample cannot be counted because of high activity, further dilute the gas samples as per procedure HP/0/B/1006/07.

4.21 Transmit sample analysis results to the Station Health Physicist or his designee.

4.22 Request Operations to return the Hydrogen Analyzer to service per Enclosure 5.6 or 5.7.

5.0 Enclosures

5.1 Sampling 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 Checklist for Operation of Sample Panel

5.6 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Standby Mode

5.7 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Analyze Mode

5.8 Valve Checklist for Sample Panel

5.9 Control Panel Diagram

5.10 Flow Diagram

ENCLOSURE 5.1

HP/2/A/1009/17

SAMPLING PANEL EQUIPMENT

1	Nalgene 500 ml Thiosulfate sample bottle.
2	Stainless Steel Gas Bombs
1	9/16" Combination Wrench
1	Stainless Steel Portable Shielded Container
1	Stopwatch
1 bottle	Thiosulfate Solution (500 ml)
2	10" x 12" Clear Poly Bags
1	Calibrated Gas Syringe
1	Bucket

ENCLOSURE 5.2

HP/2/A/1009/17

SAMPLE DATA SHEET

1) NAME _____

DATE _____

UNIT _____

2) Sample Line Temperature _____

3) Sample Inlet Line Pressure _____

4) Gas Sample Volume = SV

$$SV = \frac{4307.1\ (STV)}{(275.224 + .555\ [°F])\ (14.7 + P)} = \_\_\_\_\_ ml$$

where:

°F = Sample Line Temperature

P = Sample Inlet Line Pressure

STV = Sample Trap Volume

Unit 2 = 1.3 ml

5) Diluted Volume = $\frac{SV}{1E4}$ = _____ml

6) Record Diluted Volume as Gas Sample Volume on Sample Label.

7) Record Iodine and Particulate Sample Volume as 1.3 ml of sample in 500 ml of thiosulfate solution on sample label.

Checked Control Copy _____

Date _____

ENCLOSURE 5.3

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	Containment Integrity is required.	_____	_____
1.2	Designate a Licensed Operator assigned to immediately close containment isolation valves from the Control Room if an ES actuation occurs. This person may have other responsibilities, but they shall not prevent him from performing this evolution.	_____	
	License Operator _____		
	Unit Supervisor _____		
1.3	Record that the containment isolation valves that will be opened on Enclosures 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover). (2PR-81 and 2PR-84 or 2PR-90 and 2PR-87)	_____	
1.4	H_2 Analysis Panel is in Standby Mode.	_____	
1.5	Reactor building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2	Ensure train is in standby mode by observing red light in gray cabinet.	_____	

NOTE: Use other train if not in standby.

ENCLOSURE 5.3

HP/2/A/1009/17

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
2.1.3	At the selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
2.1.4	Turn sample valve selector switch to 'Top Cont'. Opens 2PR-71 or 2PR-76. (Red light will come on).	_____	_____
2.1.5	From the Control Room, open 2PR-81 and 2PR-84 (Containment Isolation Valves) if train "A" was selected. OR Open 2PR-87 and 2PR-90 (Containment Isolation Valves) if train "B" was selected.	_____ _____	_____ _____

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

2.1.6	Notify Unit Supervisor which train is selected. Unit Supervisor _____	_____	_____
2.1.7	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.4

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING H_2 ANALYSIS PANEL CURRENTLY IN ANALYZE MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	H_2Analyzer is in Analyze Mode.	_____	
1.2	Reactor building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train is to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2	At the "Remote" Panel (blue cabinet), position the "Off Standby, Analyze" selector to "Standby" and observe red light in grey cabinet.	_____	
2.1.3	At selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
2.1.4	Notify Unit Supervisor which train is selected.	_____	
	Unit Supervisor _____		
2.1.5	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

NOTE: Complete steps in order listed. Initial steps as completed.

A) Switching System On

____1) Operations Bypass H_2 Analyzer by Enclosure 5.3 or 5.4.

____2) Obtain Sampling Equipment and Keys.

____3) Open Nitrogen bottle to 40 psig.

____4) Open:

a) DI Water Inlet
b) Instrument Air Inlet
c) N_2 Inlet

____5) Ensure test tees on sample inlet and outlet lines are closed.

____6) a) Position thiosulfate funnel
b) Attach hose to fill port
c) Pour 500 ml of thiosulfate into funnel.

____7) Set switches on control panel:

a) Sample Volume Select - set on SMALL.

b) Dilution Volume Select - set on LARGE.

c) Selector Switch - set on OFF.

d) System Purge - set on NORMAL.

e) Refill Switch - set on OFF (down).

f) TC Switch - set on POSITION 1 (measures sample line temperature).

g) Sample Line Select Switch - Unit and Hydrogen Analyzer Train A or B

____8) Key Lock Switch - POWER ON

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

____9) a) Radiation Monitor - ON (up)

b) Radiation Monitor Selector - BATT (red test region)

c) Radiation Monitor Selector - MR/HR or R/HR

B) Purge the Sample Panel

____10) Selector Switch - SYSTEM PURGE

____11) Normal - Sample Purge - SAMPLE PURGE

☐ ☐ ☐ 12) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ∿ - 19" of Hg.

d) STOP

☐ ☐ ☐ 13) a) GAS PURGE - press down and release.

b) Pressure swiftly rises to + 10" of Hg.

c) STOP

☐ ☐ ☐ 14) a) EVAC

b) Pressure drops to 0" of Hg.

c) STOP

☐ ☐ ☐ 15) a) PUMP - wait 30 seconds

b) STOP

☐ ☐ ☐ 16) a) Purge sample panel two (2) more times by completing Steps 12 through 15 two (2) more times.

____17) Normal - Sample Purge - NORMAL

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

___18) Selector Switch - SOLUTION CHANGEOUT

C) Preparation for Sampling

___19) Attach 500 ml sample bottle to TS Sampler.

___20) Attach gas bomb to gas sampler (N/A step if syringe will be used instead of gas bomb).

___21) Record sample line temperature on Enclosure 5.2.

D) Flush Thiosulfate Sampler and fill with Thiosulfate

___22) a) ACTIVATE

b) FLUSH - hold 30 seconds

c) PURGE - hold 30 seconds

d) EMPTY - hold 30 seconds

e) Open TS (thiosulfate) valve

f) Refill - ON - wait 2 minutes

g) Refill - OFF

___23) Selector Switch - DILUTION VOLUME EVACUATION

E) Evacuate the Dilution Volume

___24) a) Activate

b) Pressure slowly drops to ~ - 19" of Hg.

c) Selector Switch - SAMPLE RECIRC

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

F) Recirc Containment Air and Trap a Sample

____25) ACTIVATE - wait 10 minutes

____26) Return to sample panel - note and record sample inlet line pressure on Enclosure 5.2.

____27) a) SAMPLE - wait 1 minute

b) TRAP - wait 20 seconds

c) Selector Switch - SAMPLE DILUTION

G) Dilute Sample with N_2 and Recirc.

____28) a) ACTIVATE

b) SLOW

c) Pressure slowly rises to 0" of Hg.

d) STOP

____29) RECIRC - wait 5 minutes

____30) Complete a) if syringe will be used for gas sample. If gas bomb is being used, N/A this step and continue on to Step 31.

a) Withdraw a 5 cc gas sample from the septum of the gas sampler using calibrated syringe. Place syringe in portable shielded container.

____31) a) STOP

b) Selector Switch - SOLUTION CHANGEOUT

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

H) Collect Particulate and Iodine Sample

____32) a) ACTIVATE

b) TS SAMPLE

c) EMPTY - hold button until thiosulfate solution has drained into sample bottle.

d) TS SAMPLE GRAB

e) PURGE - hold button 1 minute

_____33) Selector Switch - SYSTEM PURGE

I) Purge the Sample Panel.

☐ ☐ 34) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

☐ ☐ 35) a) GAS PURGE - press down and release

b) Pressure swiftly rise to + 10" of Hg.

c) STOP

☐ ☐ 36) a) EVAC

b) Pressure drop to 0" of Hg.

c) STOP

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

☐ ☐ 37 a) PUMP - wait 30 seconds

b) STOP

☐ ☐ 38) Repeat Steps 34 through 37 one additional time.

J) Remove Samples from Sample Panel

____39) Return to sample panel and close both valves on the gas bomb. (N/A step if gas bomb not used).

____40) Disconnect gas bomb from sample panel. Place gas bomb in portable shielded container. (N/A step if gas bomb not used).

____41) Tightly cap sample bottle.

K) Switching System Off

____42) Selector Switch - OFF

____43) Turn the Radiation Monitor - OFF

____44) Key Lock Switch - OFF

45) Close:

a) Nitrogen bottle

b) TS Valve - inside sample panel

c) DI Water Inlet

d) Instrument Air Inlet

e) N_2 Inlet

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

_____46) Transport samples to Count Room for analysis.

_____47) Calculate sample volume using data from Enclosure 5.2. (Dilute gas samples per HP/0/B/1006/07 if needed).

_____48) Transmit sample analysis results to Station Health Physicist or his designee.

_____49) Request Operations to return the Hydrogen Analyzer to service per Enclosures 5.6 or 5.7.

Checked Control Copy _____

Date _____

ENCLOSURE 5.6

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING H_2 ANALYSIS PANEL BACK TO SERVICE IN STANDBY MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0 Procedure		
1.1 Return the H_2 Analysis train back to service as follows:		
1.1.1 Turn Sample Valve Selector switch to OFF. (Red light will go off). Closes 2PR-71 or 2PR-76.	_____	_____
1.1.2 Depress the OFF buttons on both 'BYP TO POST AC' switches. Closes (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
1.1.3 From the Control Room, Close 2PR-81 and 2PR-84 if train "A" is selected.	_____	_____
OR		
Close 2PR-87 and 2PR-90 if train "B" was selected.	_____	_____

NOTE: This will regain containment integrity. Remove the containment isolation valves from Enclosure 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover).

1.1.4 Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
1.1.5 Return completed enclosure to personnel operating Post Accident Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.7

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING UNIT 2 H_2 ANALYSIS PANEL BACK TO SERVICE IN ANALYZE MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./Time
1.0 Initial Conditions		
1.1 H_2 Analysis Panel has been switched to Standby Mode for Post Accident sampling and is to be returned to Analyze Mode.	_____	
2.0 Procedure		
2.1 Return the H_2 Analysis train back to service as follows:		
2.1.1 Depress the OFF buttons on both "BYP to Post AC" switches. Closes (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
2.1.2 Position the "Off, Standby, Analyze" Selector to Analyze.	_____	
NOTE: When Analyze is 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.		
2.1.3 Push the Remote Selector button to ensure control is from Remote Panel.	_____	
2.1.4 Reset the Common Alarm after the meter reading stabilizes.	_____	
2.1.5 Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
2.1.6 Return completed enclosure to Health Physics Personnel Operating Post Accident Sample Panel.	_____	

ENCLOSURE 5.8

HP/2/A/1009/17

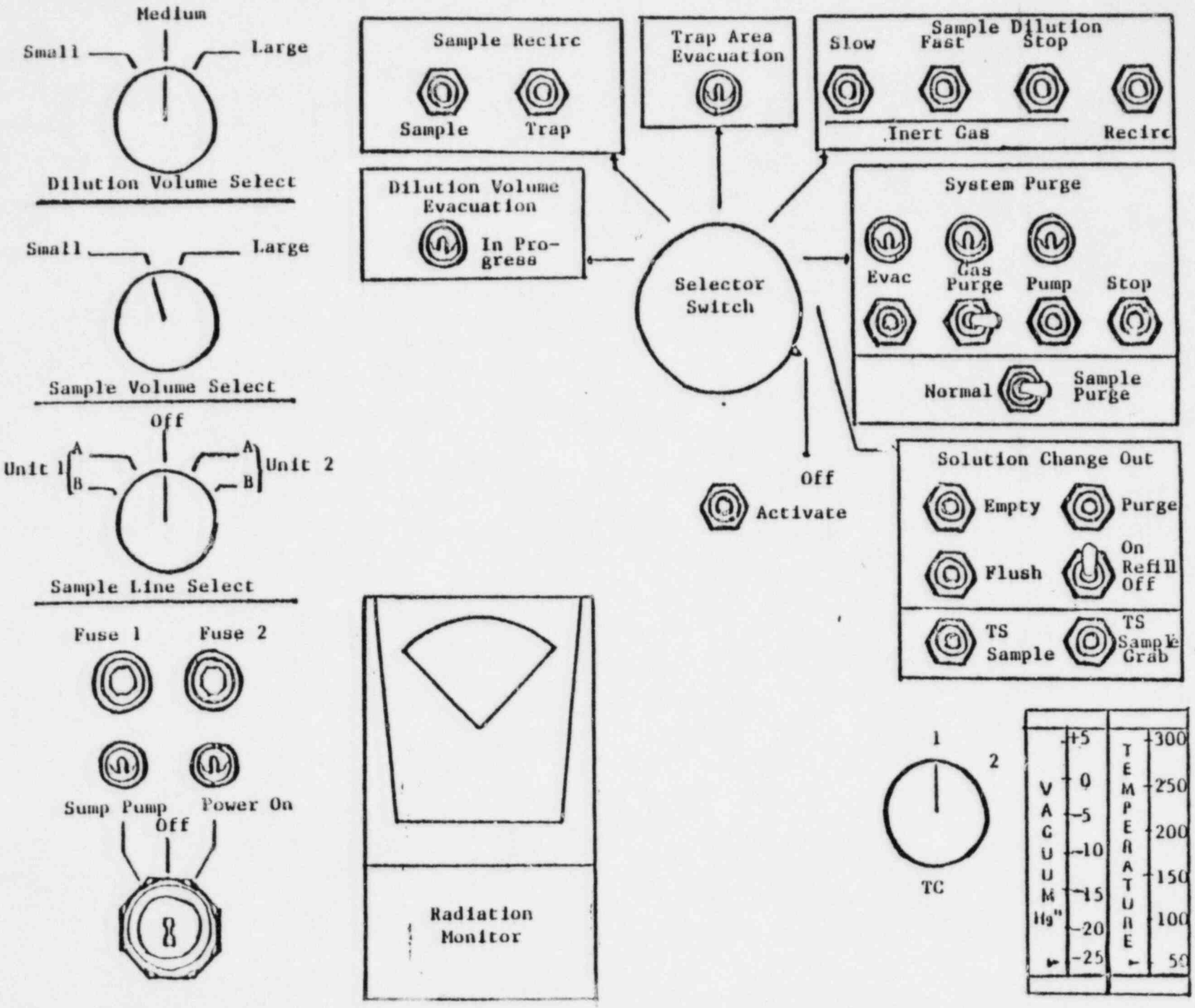
VALVE CHECKLIST FOR SAMPLE PANEL

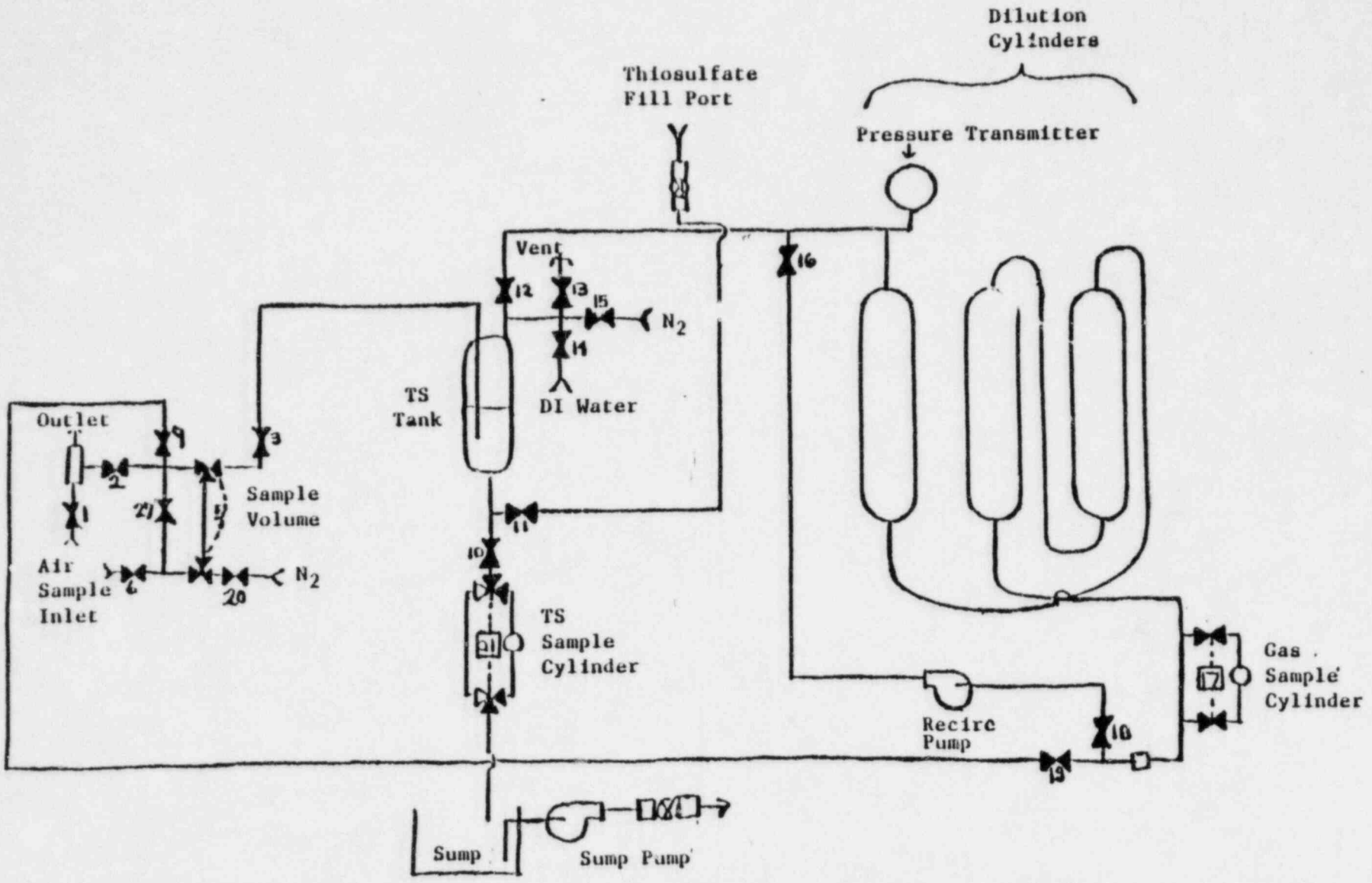
NOTE: This checklist may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

ACTION	RESPONSE
Dilution Volume Evacuation	
- Activate	Energize 1, 2, 9, 12, 19, 17
Sample Recirculate	
- Activate	Energize 1, 2, 5, 6, 27
- Sample	De-energize 27
- Trap	De-energize 2, 5
Sample Dilution	
- Activate	Energize 12, 17
- Slow	Energize 3, 20
- Stop	De-energize 3, 20
- Recirc	Energize Recirc Pump 16, 18

NOTE: Valve #17 will de-energize when selector switch is moved to another position.

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 11, 13
- TS Sample	Energize 21
- TS Sample Grab	De-energize 21


Medium
Small
Large
Dilution Volume Select
Small
Large
Sample Volume Select
Off
Unit 1
A
B
A
B
Unit 2
Sample Line Select
Fuse 1
Fuse 2
Sump Pump
Power On
Off
Sample Recirc
Sample
Trap
Trap Area Evacuation
Sample Dilution
Slow
Fast
Stop
Inert Gas
Recirc
Dilution Volume Evacuation
In Progress
Selector Switch
System Purge
Evac
Gas Purge
Pump
Stop
Normal
Sample Purge
Off
Activate
Solution Change Out
Empty
Purge
Flush
On
Refill
Off
TS Sample
TS Sample Grab
Radiation Monitor
1
2
TC
VACUUM "Hg
+5
0
-5
-10
-15
-20
-25
TEMPERATURE
300
250
200
150
100
50



Enclosure 5.10

Flow Diagram

HP/2/A/1009/17

INFORMATION ONLY

CONTROL COPY

Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: HP/3/A/1009/17
Change(s) NA to
____ Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Operating Procedure for Post-Accident Containment Air Sampling Syste

(4) PREPARED BY: Sarah Coy DATE: 5-6-83

(5) REVIEWED BY: Charlie Yongue DATE: 5-16-83

Cross-Disciplinary Review By: RL Sweigart 5-9-83 N/R: ____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: ____ (SRO) Date: ____

By: ____ Date: ____

(7) APPROVED BY: Billy B Owen Date: 5/17/83

(8) MISCELLANEOUS:

Reviewed/Approved By: ____ Date: ____

Reviewed/Approved By: ____ Date: ____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR POST-ACCIDENT CONTAINMENT AIR SAMPLING SYSTEM

1.0 Purpose

This procedure describes the operation of the Post-Accident Containment Air Sampling System which is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA. This procedure is also used to perform the semi-annual functional test of the system.

2.0 References

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

2.2 HP/0/B/1006/07, Procedure for Preparation of Gas Calibration Sources

2.3 CP/1/A/2002/04C, Operating Procedure for the Post Accident Liquid Sampling (PALS) System

2.4 HP/0/B/1009/15, Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.5 EP/0/A/1800/04, Loss of Coolant

3.0 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.

Unit 1 & 2 - Ext. 1268 (by column AX-38)
Unit 3 - Ext. 1396 (by door to RCA)

3.3 The following items will never be used on the panel.

a. Trap Area Evacuation

b. Fast Sample Dilution

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

3.5 Moving the Selector Switch from one mode to another stops all current system operations. Depressing the Activate button starts operation of the newly selected mode.

3.6 The radiation monitor on the control panel will provide levels of radiation at the sample panel. If the radiation monitor is not working properly, then a portable survey instrument will be used to determine radiation levels.

3.7 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.

3.8 If the sampling system cannot be operated, then HP/0/B/1009/15 (Ref. 2.4) will be used as an alternate method for obtaining a containment air sample.

3.9 Enclosure 5.5 will be used to check off the steps as the procedure is completed.

3.10 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 5.6 or 5.7.

3.11 The front side of the sample panel is the side which contains the door. The left and right side of the sample panel will be determined by using this fact.

3.12 If radiation levels exceed 16 R/hr and cannot be reduced by purging the system, secure operation of the panel, move to a low background area, and contact the Station Health Physicist or his designee for further instructions.

3.13 Before sampling operations begin, the decision must be made based on radiological conditions in the reactor building and the sampling area whether to use a 100 ml gas bomb or a calibrated syringe for the gas sample. During emergency conditions, this decision will be made by the Station Health Physicist or his designee.

3.14 Enclosure 5.8, Valve Checklist for Sample Panel, may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

3.15 During accident conditions, the keys needed for sampling will be located in the Shiftman's key cabinet.

3.16 The sampling system must not be used if reactor building pressure is greater than 40 psig.

4.0 Procedure

4.1 Locate the Shift Supervisor for Operations and request that Operation complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

4.2 Obtain equipment necessary to perform sampling, including the thiosulfate solution. Also obtain keys to the control panel and the sixth floor Ventilation Equipment Room.

NOTE: Necessary equipment for sampling is listed on Enclosure 5.1.

4.3 Open the valve on the nitrogen bottle next to the sampling panel to 40 psig.

4.4 Open the

(a) DI Water Inlet

(b) Instrument Air Inlet

(c) N_2 Inlet

located on the left side of the sample panel.

NOTE: Open inlets by rotating the back switches counterclockwise one-quarter turn to the upward position.

4.4.1 Ensure the test tees on the sample inlet and outlet lines are closed.

4.5 Position the thiosulfate funnel directly over the fill port located on top of the sample panel. Attach the hose on the funnel to the fill port and pour the 500 ml of thiosulfate solution into the funnel.

4.6 Set the switches listed below as follows:

(a) Sample Volume Select - set on SMALL

(b) Dilution Volume Select - set on LARGE

(c) Selector Switch - set on OFF

(d) System Purge - set on NORMAL

(e) Refill Switch - set on OFF (down)

(f) TC Switch - set on POSITION 1 (thermocouple measures sample line temperature)

(g) Sample Line Select Switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

4.7 Turn the Key Lock Switch to POWER ON and ensure the power on light has come on.

4.8 Turn the Radiation Monitor toggle switch ON (up).

4.8.1 Turn the selector on the Radiation Monitor to BATT and ensure the needle is in the "red test region." Turn the selector to the MR/HR or R/HR scale.

NOTE: If the Radiation Monitor is not functioning properly, note that is is not working on Enclosure 5.5, Step 9 and use a portable survey instrument to determine radiation levels during sampling.

4.9 Purge the Sample Panel.

4.9.1 Turn Select Switch to SYSTEM PURGE

4.9.2 Move Normal - Sample Purge to SAMPLE PURGE

4.9.3 Depress ACTIVATE button.

4.9.4 Depress EVAC button (Evac light on) and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP.

4.9.5 Press down and release the GAS PURGE toggle switch and watch the pressure gauge swiftly rise to + 10" of Hg. Depress STOP button.

4.9.6 Depress the EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.9.7 Depress the PUMP button and wait for 30 seconds. Depress STOP button.

4.9.8 Repeat Step 4.9.4 through 4.9.7 twice to purge the sample panel two more times.

4.9.9 Move Normal - Sample Purge to NORMAL.

4.9.10 Turn Selector Switch to SOLUTION CHANGE OUT.

4.10 Preparation for Sampling

4.10.1 Set the 500 ml sample bottle in a clear poly bag. Place the portable shielded container on the floor under the Thiosulfate sampler (left side of panel), and place the sample bottle in the shielded container.

4.10.2 Detach the left side of the flexible tubing on the thiosulfate sampler located on the left side of the sample panel near the floor.

4.10.3 Insert the free end of the tubing into the 500 ml sample bottle.

4.10.4. Complete Steps a) and b) below if a 100 ml gas bomb will be used for the gas sample. If the gas sample will be drawn by syringe, go to Step 4.10.5.

a) Detach the side of the flexible tubing farthest away from the sample panel on the gas sampler located on the right side of the sample panel near the floor.

b) Attach a 100 ml gas bomb between the free end of the flexible tubing and the hard piping on the gas sampler.

4.10.5 Record sample line temperature reading for sample volume calculations on Enclosure 5.2.

4.11 Flush Thiosulfate Sampler and fill with Thiosulfate.

4.11.1 Depress ACTIVATE button.

4.11.2 Depress FLUSH button and hold for 30 seconds.

4.11.3 Depress PURGE button and hold for 30 seconds.

4.11.4 Depress EMPTY button and hold for 30 seconds.

4.11.5 Open the TS (thiosulfate) valve located inside the sample panel directly below the fillport. (Open valve in same manner as valves in Step 4.4).

4.11.6 Move Refill toggle switch to ON (up) and wait 2 minutes. Move Refill to OFF (down).

4.11.7 Turn Selector Switch to DILUTION VOLUME EVACUATION.

4.12 Evacuate the Dilution Volume.

4.12.1 Depress ACTIVATE button and watch pressure gauge drop to ~ - 19" of Hg. Turn Selector Switch to SAMPLE RECIRC.

4.13 Recirc Containment Air and Trap a Sample.

4.13.1 Depress ACTIVATE button and wait 10 minutes.

4.13.2 Return to sample panel and note pressure gauge reading on sample inlet line. Record pressure on Enclosure 5.2.

4.13.3 Depress SAMPLE button and wait 1 minute.

4.13.4 Depress TRAP button and wait 10 seconds.

4.13.5 Turn Selector Switch to SAMPLE DILUTION.

4.14 Dilute Sample with N_2 and Recirc.

4.14.1 Depress ACTIVATE button.

4.14.2 Depress SLOW button and watch pressure gauge slowly rise to 0" of Hg. Depress STOP button.

4.14.3 Depress RECIRC button and wait 5 minutes.

4.14.4 Complete step a) if a syringe will be used for the gas sample. If a 100 ml gas bomb is being used for the gas sample, continue on to Step 4.14.5.

a) Insert the calibrated gas syringe into the septum on the gas sampler. Withdraw a 5 cc sample of gas and place the syringe into the portable shielded container.

4.14.5 Depress the STOP button on the control panel.

4.14.6 Turn the Selector Switch to SOLUTION CHANGEOUT.

4.15 Collect Particulate and Iodine Sample.

4.15.1 Depress ACTIVATE button.

4.15.2 Depress TS SAMPLE button.

4.15.3 Depress and hold EMPTY button until thiosulfate solution has drained into 500 ml sample bottle.

4.15.4 Depress TS SAMPLE GRAB button.

4.15.5 Depress PURGE button and hold for 1 minute.

4.15.6 Turn the Selector Switch to SYSTEM PURGE.

4.16 Purge the Sample Panel.

4.16.1 Depress ACTIVATE button.

4.16.2 Depress EVAC button and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP button.

4.16.3 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg. Depress STOP button.

4.16.4 Depress EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.16.5 Depress the PUMP button and wait 30 seconds. Depress STOP button.

4.16.6 Repeat Steps 4.16.2 through 4.16.5 to purge the sample panel one additional time.

4.17 Remove Samples from Sample Panel.

4.17.1 Return to the sample panel and close both valves on the gas bomb (if used.)

4.17.2 Disconnect the gas bomb (if used) from the sample panel. Place gas bomb in portable shielded container.

4.17.3 Tightly cap the 500 ml sample bottle.

4.18 Switching the Sample System Off.

4.18.1 Turn the Selector Switch to OFF.

4.18.2 Turn the Radiation Monitor to OFF.

4.18.3 Turn the Keylock Switch to OFF.

4.18.4 Close the following valves:

a) Nitrogen bottle - next to sample panel

b) TS Valve - inside sample panel

c) DI Water Inlet, Instrument Air Inlet, N_2 Inlet (On left side of sample panel)

4.19 Transport the samples to the Count Room for analysis.

4.20 Calculate the sample volume using the data from Enclosure 5.2. Record this volume on sample data sticker.

NOTE: If sample cannot be counted because of high activity, further dilute the gas samples as per procedure HP/0/B/1006/07.

4.21 Transmit sample analysis results to the Station Health Physicist or his designee.

4.22 Request Operations to return the Hydrogen Analyzer to service per Enclosure 5.6 or 5.7.

5.0 Enclosures

5.1 Sampling 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 Checklist for Operation of Sample Panel

5.6 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Standby Mode

5.7 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Analyze Mode

5.8 Valve Checklist for Sample Panel

5.9 Control Panel Diagram

5.10 Flow Diagram

ENCLOSURE 5.1

HP/3/A/1009/17

SAMPLING PANEL EQUIPMENT

1	Nalgene 500 ml Thiosulfate sample bottle.
2	Stainless Steel Gas Bombs
1	9/16" Combination Wrench
1	Stainless Steel Portable Shielded Container
1	Stopwatch
1 bottle	Thiosulfate Solution (500 ml)
2	10" x 12" Clear Poly Bags
1	Calibrated Gas Syringe
1	Bucket

ENCLOSURE 5.2

HP/3/A/1009/17

SAMPLE DATA SHEET

1) NAME _____

DATE _____

UNIT _____

2) Sample Line Temperature _____

3) Sample Inlet Line Pressure _____

4) Gas Sample Volume = SV

$$SV = \frac{4307.1\ (STV)}{(275.224 + .555\ [°F])\ (14.7 + P)} = \_\_\_\_\_ ml$$

where:

°F = Sample Line Temperature

P = Sample Inlet Line Pressure

STV = Sample Trap Volume

Unit 3 = 1.2 ml

5) Diluted Volume = $\frac{SV}{1E4}$ = _____ml

6) Record Diluted Volume as Gas Sample Volume on Sample Label.

7) Record Iodine and Particulate Sample Volume as 1.2 ml of sample in 500 ml of thiosulfate solution on sample label.

Checked Control Copy _____

Date _____

ENCLOSURE 5.3

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN STANDBY MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0 Initial Conditions		
1.1 Containment Integrity is required.	_____	_____
1.2 Designate a Licensed Operator assigned to immediately close containment isolation valves from the Control Room if an ES actuation occurs. This person may have other responsibilities, but they shall not prevent him from performing this evolution.	_____	
License Operator _____		
Unit Supervisor _____		
1.3 Record the containment isolation valves that will be opened on Enclosures 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover). (3PR-81 and 3PR-84 or 3PR-90 and 3PR-87)	_____	
1.4 H_2 Analysis Panel is in standby mode.		
1.5 Reactor Building pressure is less than 40 psig.	_____	
2.0 Procedure		
2.1 Place Post Accident Sampler in service as follows:		
2.1.1 Select which train to be used. Circle one: Trn. "A" or Trn. "B".	_____	

ENCLOSURE 5.3

HP/3/A/1009/17

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
2.1.2	Ensure train is in standby mode by observing red light in gray cabinet.	_____	

NOTE: Use other train if not in standby.

2.1.3	At the selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	
2.1.4	Turn sample valve selector switch to 'Top Cont'. Opens 3PR-71 or 3PR-76. (Red light will come on).	_____	_____
2.1.5	From the Control Room, open 3PR-81 and 3PR-84 (Containment Isolation Valves) if train "A" was selected. OR Open 3PR-87 and 3PR-90 (Containment Isolation Valves) if train "B" was selected.	_____ _____	_____ _____

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

2.1.6	Notify Unit Supervisor which train is selected.	_____	_____
	Unit Supervisor _____		
2.1.7	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.4

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN ANALYZE MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	H_2 Analyzer is in Analyze Mode.	_____	
1.2	Reactor Building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train is to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2	At the "Remote" Panel (blue cabinet) position the "Off, Standby, Analyze" selector to "Standby" and observe red light in grey cabinet.	_____	
2.1.3	At selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	
2.1.4	Notify Unit Supervisor which train is selected.	_____	
	Unit Supervisor _____		
2.1.5	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

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Date _____

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

NOTE: Complete steps in order listed. Initial steps as completed.

A) Switching System On

_____1) Operations Bypass H_2 Analyzer by Enclosure 5.3 or 5.4.

_____2) Obtain Sampling Equipment and Keys.

_____3) Open Nitrogen bottle to 40 psig.

_____4) Open:

a) DI Water Inlet
b) Instrument Air Inlet
c) N_2 Inlet

_____5) Ensure test tees on sample inlet and outlet lines are closed.

_____6) a) Position thiosulfate funnel
b) Attach hose to fill port
c) Pour 500 ml of thiosulfate into funnel

_____7) Set switches on control panel:

a) Sample Volume Select - set on SMALL.

b) Dilution Volume Select - set on LARGE.

c) Selector Switch - set on OFF.

d) System Purge - set on NORMAL.

e) Refill Switch - set on OFF (down).

f) TC Switch - set on POSITION 1 (measures sample line temperature).

g) Sample Line Select Switch - Unit and Hydrogen Analyzer Train A or B

_____8) Key Lock Switch - POWER ON

_____9) a) Radiation Monitor - ON (up)

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

b) Radiation Monitor Selector - BATT (red test region)

c) Radiation Monitor Selector - MR/HR or R/HR

B) Purge the Sample Panel

____10) Selector Switch - SYSTEM PURGE

____11) Normal - Sample Purge - SAMPLE PURGE

☐ ☐ ☐ 12) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

☐ ☐ ☐ 13) a) GAS PURGE - press down and release.

b) Pressure swiftly rises to + 10" of Hg.

c) STOP

☐ ☐ ☐ 14) a) EVAC

b) Pressure drops to 0" of Hg.

c) STOP

☐ ☐ ☐ 15) a) PUMP - wait 30 seconds

b) STOP

☐ ☐ ☐ 16) a) Purge sample panel two (2) more times by completing Steps 12 through 15 two (2) more times.

____17) Normal - Sample Purge - NORMAL

____18) Selector Switch - SOLUTION CHANGEOUT

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

C) Preparation for Sampling

____19) Attach 500 ml sample bottle to TS Sampler.

____20) Attach gas bomb to gas sampler (N/A step if syringe will be used instead of gas bomb).

____21) Record sample line temperature on Enclosure 5.2.

D) Flush Thiosulfate Sampler and fill with Thiosulfate

____22) a) ACTIVATE

b) FLUSH - hold 30 seconds

c) PURGE - hold 30 seconds

d) EMPTY - hold 30 seconds

e) Open TS (thiosulfate) valve

f) Refill - ON - wait 2 minutes

g) Refill - OFF

____23) Selector Switch - DILUTION VOLUME EVACUATION

E) Evacuate the Dilution Volume

____24) a) Activate

b) Pressure slowly drops to ~ - 19" of Hg.

c) Selector Switch - SAMPLE RECIRC

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

F) Recirc Containment Air and Trap a Sample

____25) ACTIVATE - wait 10 minutes

____26) Return to sample panel - note and record sample inlet line pressure on Enclosure 5.2.

____27) a) SAMPLE - wait 1 minute

b) TRAP - wait 20 seconds

c) Selector Switch - SAMPLE DILUTION

G) Dilute Sample with N_2 and Recirc.

____28) a) ACTIVATE

b) SLOW

c) Pressure slowly rises to 0" of Hg.

d) STOP

____29) RECIRC - wait 5 minutes

____30) Complete a) if syringe will be used for gas sample. If gas bomb is being used, N/A this step and continue on to Step 31.

a) Withdraw a 5 cc gas sample from the septum of the gas sampler using calibrated syringe. Place syringe in portable shielded container.

____31) a) STOP

b) Selector Switch - SOLUTION CHANGEOUT

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

H) Collect Particulate and Iodine Sample

____32) a) ACTIVATE

b) TS SAMPLE

c) EMPTY - hold button until thiosulfate solution has drained into sample bottle.

d) TS SAMPLE GRAB

e) PURGE - hold button 1 minute

_____33) Selector Switch - SYSTEM PURGE

I) Purge the Sample Panel.

☐ ☐ 34) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

☐ ☐ 35) a) GAS PURGE - press down and release

b) Pressure swiftly rise to + 10" of Hg.

c) STOP

☐ ☐ 36) a) EVAC

b) Pressure drop to 0" of Hg.

c) STOP

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

□ □ 37 a) PUMP - wait 30 seconds

b) STOP

□ □ 38) Repeat Steps 34 through 37 one additional time.

J) Remove Samples from Sample Panel

____39) Return to sample panel and close both valves on the gas bomb. (N/A step if gas bomb not used).

____40) Disconnect gas bomb from sample panel. Place gas bomb in portable shielded container. (N/A step if gas bomb not used).

____41) Tightly cap sample bottle.

K) Switching System Off

____42) Selector Switch - OFF

____43) Turn the Radiation Monitor - OFF

____44) Key Lock Switch - OFF

45) Close:

a) Nitrogen bottle

b) TS Valve - inside sample panel

c) DI Water Inlet

d) Instrument Air Inlet

e) N_2 Inlet

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

_____46) Transport samples to Count Room for analysis.

_____47) Calculate sample volume using data from Enclosure 5.2. (Dilute gas samples per HP/0/B/1006/07 if needed).

_____48) Transmit sample analysis results to Station Health Physicist or his designee.

_____49) Request Operations to return the Hydrogen Analyzer to service per Enclosures 5.6 or 5.7.

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Date _____

ENCLOSURE 5.6

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING H_2 ANALYSIS PANEL

BACK TO SERVICE IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Procedure		
1.1	Return the H_2 Analysis train back to service as follows:		
1.1.1	Turn Sample Valve Selector switch to OFF. (Red light will go off). Closes 3PR-71 or 3PR-76.	_____	_____
1.1.2	Depress the OFF buttons on both 'BYP TO POST AC' switches. Closes (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	_____
1.1.3	From the Control Room, Close 3PR-81 and 3PR-84 if train "A" is selected. OR Close 3PR-87 and 3PR-90 if train "B" was selected.	_____	_____
NOTE:	This will regain containment integrity. Remove the containment isolation valves from Enclosure 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover).		
1.1.4	Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
1.1.5	Return completed enclosure to personnel operating Post Accident Sample Panel.	_____	

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Date _____

ENCLOSURE 5.7

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING UNIT 3 H_2 ANALYSIS PANEL BACK TO SERVICE IN ANALYZE MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./Time
1.0 Initial Conditions		
1.1 H_2 Analysis Panel has been switched to Standby Mode for Post Accident sampling and is to be returned to Analyze Mode.	_____	
2.0 Procedure		
2.1 Return the H_2 Analysis train back to service as follows:		
2.1.1 Depress the OFF buttons on both "BYP to Post AC" switches. Closes (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	
2.1.2 Position the "Off, Standby, Analyze" Selector to Analyze.	_____	
NOTE: When Analyze is 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.		
2.1.3 Push the Remote Selector button to ensure control is from Remote Panel.	_____	
2.1.4 Reset the Common Alarm after the meter reading stabilizes.	_____	
2.1.5 Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
2.1.6 Return completed enclosure to Health Physics Personnel Operating Post Accident Sample Panel.	_____	

ENCLOSURE 5.8

HP/3/A/1009/17

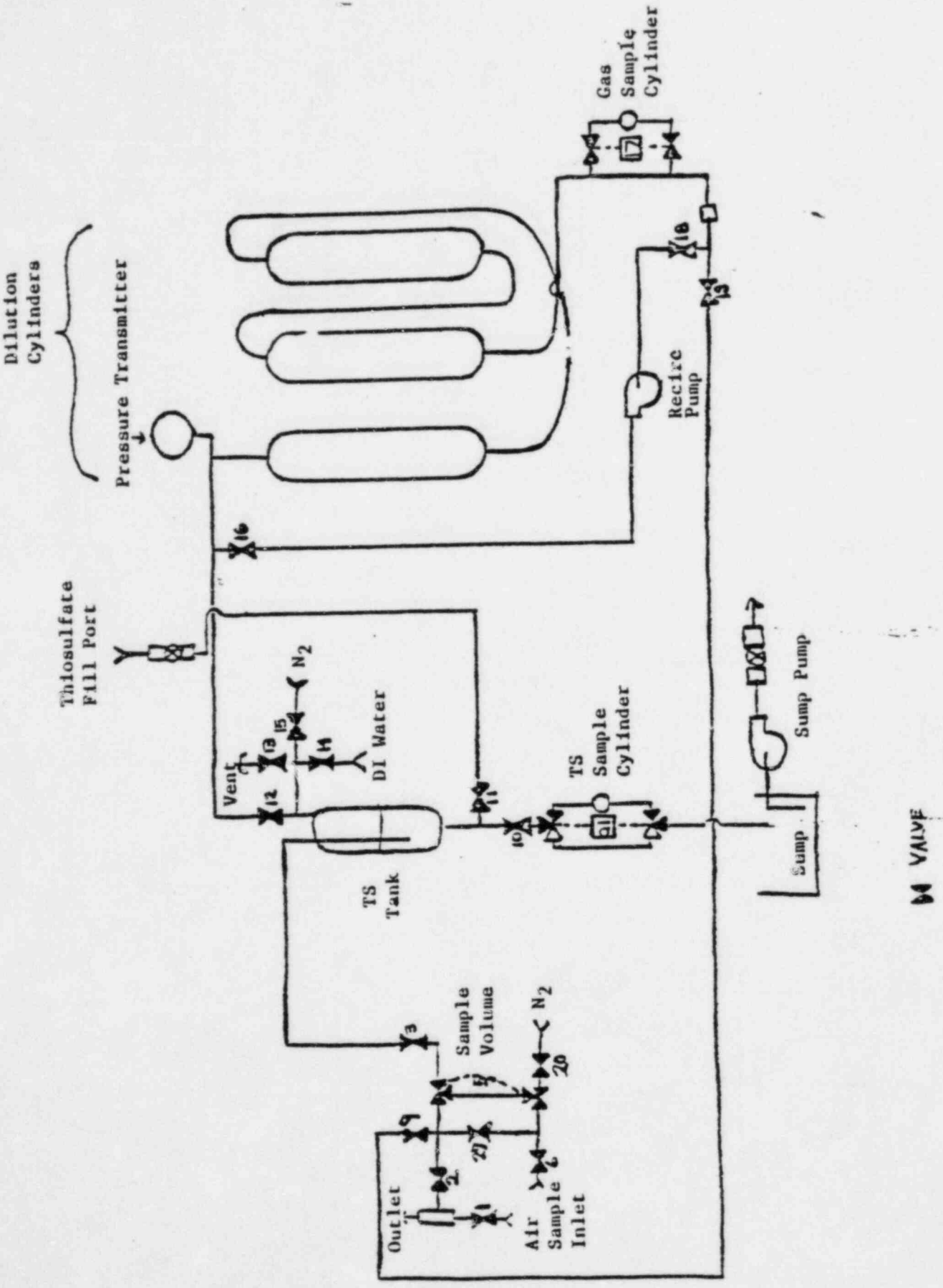
VALVE CHECKLIST FOR SAMPLE PANEL

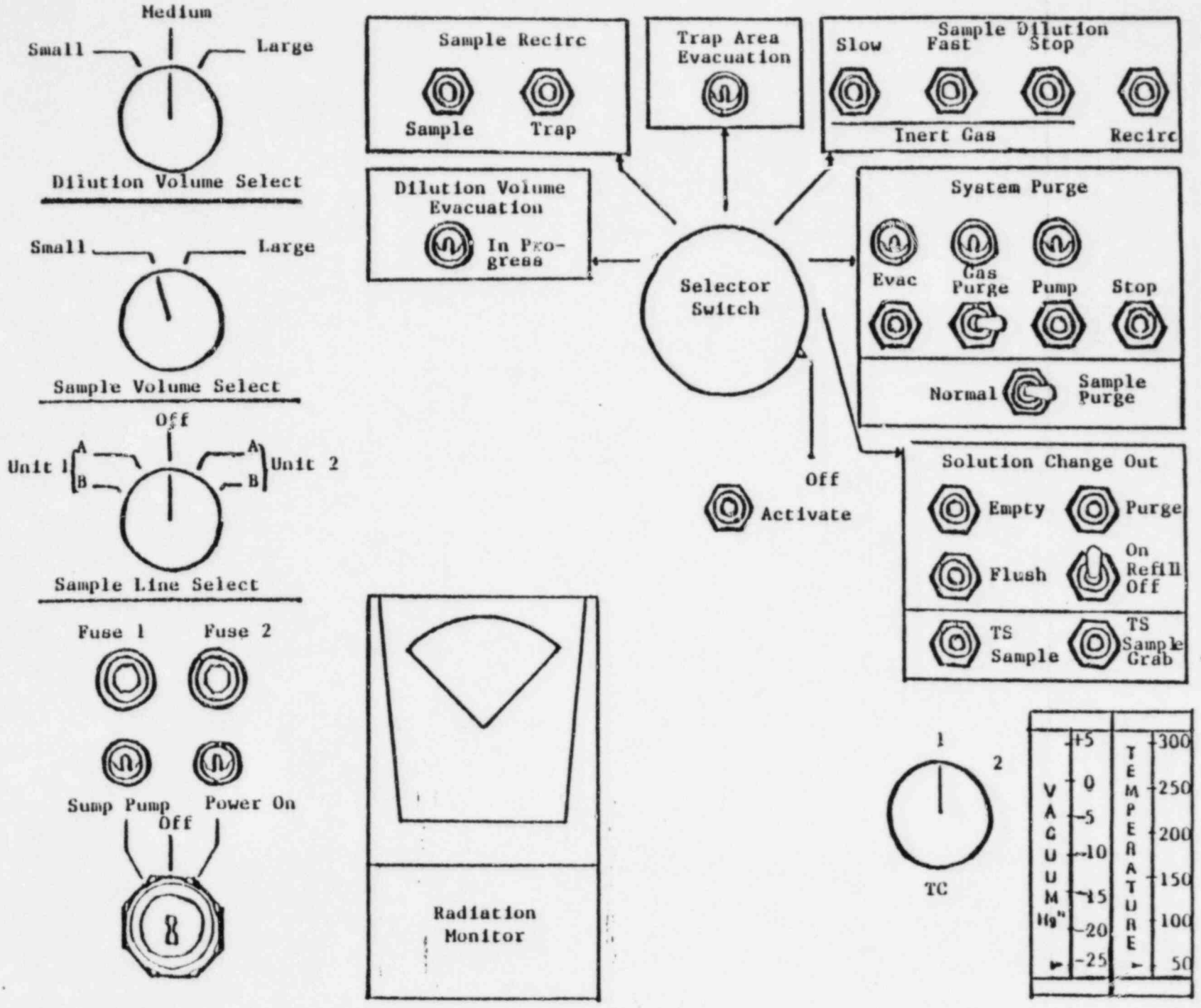
NOTE: This checklist may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

ACTION	RESPONSE
Dilution Volume Evacuation	
- Activate	Energize 1, 2, 9, [illegible], 19, 17
Sample Recirculate	
- Activate	Energize 1, 2, 5, 6, 27
- Sample	De-energize 27
- Trap	De-energize 2, 5
Sample Dilution	
- Activate	Energize 12, 17
- Slow	Energize 3, 20
- Stop	De-energize 3, 20
- Recirc	Energize Recirc Pump 16, 18

NOTE: Valve #17 will de-energize when selector switch is moved to another position.

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 11, 13
- TS Sample	Energize 21
- TS Sample Grab	De-energize 21


Gas Sample Cylinder
Dilution Cylinders
Pressure Transmitter
Recirc Pump
Thiosulfate Fill Port
Vent
DI Water
TS Sample Cylinder
Sump Pump
TS Tank
Sample Volume
Outlet
Air Sample Inlet
VALVE



Enclosure 5.9

Control Panel Diagram

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