Northern States Power Company

Monticello Nuclear Generating Plant
2807 West Co. Rd. 75
Monticello, Minnesota 55362-9637

April 18, 2000

10 CFR 50, Appendix E
Section V

US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Emergency Plan Implementing Procedures

Furnished with this letter are revisions to the Monticello Nuclear Generating Plant Emergency Plan Implementing Procedures. The following issues are new or revised:

Procedure No.	Procedure Title	Procedure Rev.
A.2-413	Small Volume Liquid Sample Obtained at the Post Accident Sampling System	15
A.2-414	Large Volume Liquid Sample and/or Dissolved Gas Sample Obtained at Post Accident Sampling System	18
A.2-415	Containment Gas Sample Obtained at Post Accident Sampling System	15
A.2-417	Draining the Trap, Sump, and Collector of Post Accident Sampling System	7
A.2-420	Containment Atmosphere Radiochemical Analysis	6

Please post changes in your copy of the Monticello Nuclear Generating Plant Emergency Plan Implementing Procedures. Superseded procedures should be destroyed.

This letter contains no new NRC commitments, nor does it modify any prior commitments.

Please contact Marcus H. Voth, Project Manager - Licensing at (763) 271-5116 if you require further information.

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1060	A.2-413	15	SMALL VOLUME LIQUID SAMPLE OBTAINED AT THE POST
1060	A.2-414	18	LARGE VOLUME LIQUID SAMPLE AND/OR DISSOLVED GAS
1060	A.2-415	15	CONTAINMENT GAS SAMPLE OBTAINED AT POST ACCIDENT
1060	A.2-417	7	DRAINING THE TRAP, SUMP, AND COLLECTOR OF POST
1060	A.2-420	6	CONTAINMENT ATMOSPHERE RADIOCHEMICAL ANALYSIS

EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By:	Reviewed By:	
ALARA Coord Review By:		
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1.0 PURPOSE

The purpose of this procedure is to provide instructions for collection and handling of small volume liquid samples obtained from the Post Accident Sampling System during and following an Emergency.

2.0 APPLICABILITY

2.1 An emergency (Alert or higher classification) has been declared at Monticello Nuclear Generating Plant which involves abnormal or elevated radiological conditions which preclude use of normal sampling methods.

2.2 The REC/CSL has requested analysis of RHR or Jet Pump liquid samples.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Radiological Emergency Coordinator (REC) is responsible for:

3.1.1 Overall coordination of the Radiation Protection and Chemistry Group activities.

3.2 The Chemistry Section Leader (CSL) is responsible for:

3.2.1 Overall direction for PASS sampling and analysis.

3.3 The Chemistry Coordinator is responsible for:

3.3.1 Coordination of Chemistry group activities in the Chemistry Lab.

3.4 The Radiation Protection Specialists (Chem) is responsible for:

3.4.1 Performing post accident sampling using the PASS system.

4.0 DISCUSSION

The primary objective of the Post Accident Sampling System (PASS) is to obtain a representative liquid and gas samples for chemical and radiochemical analysis. The liquid samples taken from this system are considered to be representative of liquids within the reactor vessel and suppression pool areas.

The Post Accident Sampling System is located on the south side of the 951' level of the Turbine Building. The most efficient route to the PASS is through access control and into the Turbine Building. Move to the 951' level via the east stairway.

5.0 PRECAUTIONS

5.1 Exposures of sampling and analysis personnel ***SHALL*** be in accordance with A.2-401 (EMERGENCY EXPOSURE CONTROL).

5.2 Exposures to all personnel due to sampling and analysis operations should be maintained AS LOW AS IS REASONABLY ACHIEVABLE. Techniques such as temporary shielding, remote handling, and sample dilution prior to analysis should be considered to reduce exposure to personnel.

5.3 When actual or potential radiations levels so warrant, high range portable survey instruments, and self-reading dosimeters ***SHALL*** be provided to sampling and analysis personnel. Alarming dosimeters should also be considered.

5.4 Appropriate extremity dosimeters should be provided and worn when handling samples which themselves represent high level radiation sources.

5.5 Two Rad Prot Spec should be used to obtain a post-accident sample.

6.0 INSTRUCTIONS

6.1 Pre-Sample Preparation

6.1.1 Perform the following:

A. Obtain key 55 and PASS cabinet key from the Shift Chemist key ring.

B. Initiate Form 5790-413-01 (SMALL VOLUME LIQUID SAMPLING AND ANALYSIS CHE3CKLIST) FIGURE 7.1.

C. Obtain sample type and number from Chemistry Coordinator per Procedure A.2-408 (SAMPLE COORDINATION DURING EMERGENCIES)

D. Call the Control Room to:

1. Determine whether A or B RHR is operating.

2. Verify RBCCW is operating.

3. Advise Control Room that Jet Pump flow transmitter may be affected. (Computer Point REC136 (REACTOR JET PUMP TOTAL FLOW))

6.2 Obtaining Samples

6.2.1 IF PASS demin water tank level is below the Low Level indicator, THEN fill the tank IAW A.2-418 (POST ACCIDENT SAMPLING STATION DEMIN WATER TANK FILL PROCEDURE).

6.2.2 Open nitrogen supply as follows:

A. OPEN main cylinder valve on one nitrogen cylinder.

B. OPEN corresponding manifold valve either PAS-57-21 (N_2 GAS BOTTLE MANIFOLD SHUTOFF) or PAS-57-11 (N_2 GAS BOTTLE MANIFOLD SHUTOFF).

C. CLOSE regulator outlet isolation valve.

D. Adjust regulator to 100 psi.

E. OPEN regulator outlet isolation valve.

6.2.3 Turn HC-730 (PASS VENTILATION) to start.

6.2.4 IF vacuum is not between 0.10" and 0.05", THEN adjust ventilation damper to obtain proper reading.

6.2.5 Insert PASS key into HC-600 (POWER SOURCE SELECTION SWITCH).

6.2.6 Place HC-600 to position A.

6.2.7 Obtain 20 ml sample vial (with velcro strip), cap, and retainer ring from the cabinet. Cap the vial and remove aluminum ring from the center of the cap.

6.2.8 Apply the sample label, from STEP 6.1.1, on the vial.

6.2.9 Insert the capped vial into the sample station as follows:

A. Using flashlight and inspection mirror, check condition of needles. Ensure they are not bent.

B. Place the cylinder into the sample cask.

C. Engage the cable into the sample vial by gently pushing the cable in and turning clockwise.

D. Remove the cylinder cask shield plug from the cask.

E. Raise the sample vial holder and insert capped vial.

E. Raise the sample vial holder and insert capped vial.

F. Lower the sample vial into cask using the cable.

G. Place the shim on the LEFT SIDE of the cask.

H. Close the hydraulic valve and jack up the cask.

I. Gently roll the cask under the right side of the sample station.

J. Using the cable, raise sample vial into position.

K. Maintain sample vial in elevated position and jack up the cask until it is flush with the bottom of the station.

CAUTION

Do not allow the demin water pressure to exceed 110 psi.

6.2.10 Adjust demin water pressure regulator to 100 psi.

6.2.11 Place HC-700 (LIQUID/GAS SELECTOR) to LIQD.

6.2.12 Place HC-626 (LIQUID SAMPLE SOURCE SELECTOR) to position 2 (Jet Pump) or position 4 (RHR) as required.

6.2.13 IF bottle position status light is not green,
THEN adjust the bottle holder.

6.2.14 Place HC-626 to position 1 (Jet Pump Bypass) or position 5 (RHR Bypass).

6.2.15 Place HC-500 (SAMPLE SOURCE SELECTOR SWITCH) to required sample position.

6.2.16 Place Liquid Return Selector switch to operating RHR loop.
IF neither RHR loop is operating,
THEN place the Selector switch to A.

6.2.17 IF pressure on PI-661 (LIQUID PRESSURE - PSIG) does not increase to near target system pressure within 10 min,
THEN cycle HC-500 between 'A' and 'B' sample points.

6.2.18 Slowly turn PCV-627 (FLOW CONTROL VALVE) clockwise to get a flow of at least 0.8 gpm for jet pump sample or at least 0.4 gpm for RHR (as indicated on FI-664 (SAMPLE RETURN FLOW)).

6.2.19 Flush for 10 minutes.

6.2.20 Record the flow and flush time on Form 5790-413-01.

6.2.21 Place HC-626 to position 2 (Jet Pump) or position 4 (RHR) for the required sample.

6.2.22 Adjust PCV-627 to 0.3 +/-0.05 gpm.

6.2.23 Flush for 5 minutes.

6.2.24 Record the following on Form 5790-413-01:

A. Flow per FI-664.

B. Pressure per PI-661.

C. Temperature per TI-660.

D. Conductivity per CI-663.

E. Radiation per RI-665.

6.2.25 Place HC-616-1 (SMALL VOL SAMPLE SWITCH) to position 1 (Take Sample).

6.2.26 After CV-616 light is energized, verify flow per FI-664 is zero.

6.2.27 Record sample time on Form 5790-413-01.

6.2.28 IF pH is being determined,
THEN fill the 10 ml syringe with AIR,
ELSE fill with water.

6.2.29 Connect the syringe to the top-right side of the sample station.

6.2.30 Open the two block valves and PAS-63.

6.2.31 Inject the 10 mls of water (air) into the line.

6.2.32 Close PAS-63.

6.2.33 Remove the syringe and fill it with air.

6.2.34 Reattach the syringe.

6.2.35 Open PAS-63.

6.2.36 Inject the air.

6.2.37 Close PAS-63 and the two block valves.

6.2.38 Remove the syringe.

6.2.39 Place HC-616-1 to OFF.

6.2.40 IF pH is being determined,
THEN adjust PCV-627 to 0.3 +/- .05 gpm,
AND repeat sections 6.2.25 through 6.2.39.

6.2.41 Place HC-500 to OFF.

6.2.42 Place HC-616-1 to position 3 (Flush Loop).

6.2.43 Adjust PCV-627 for maximum flow.

6.2.44 Flush for 2 minutes or until RI-665 reaches a minimum.

6.2.45 Place HC-626 to OFF.

6.2.46 Place HC-616-1 to OFF.

6.2.47 Turn PCV-627 fully counterclockwise.

6.2.48 IF no additional sampling is required,
THEN perform Procedure A.2-417 (DRAINING THE TRAP, SUMP, AND COLLECTOR OF POST ACCIDENT SAMPLING SYSTEM).

6.2.49 Notify Control Room that sampling is completed.

6.3 Removing Vial From Sample Station

CAUTION

Observe appropriate radiological precautions when handling vial, as potentially high dose rates may exist.

NOTE: Do not twist the cable. This would bend the needles.

6.3.1 Remove the sample vial from the sample station as follows:

A. Pull up on the cable.

B. Open the hydraulic valve.

C. Roll the cask from under the sample station.

D. Install shield plug in cask top.

E. Disengage the cable from the sample vial by turning the cable counterclockwise and pulling gently outward.

F. Lift the cylinder out of the cask.

6.3.2 Turn HC-730 to stop.

6.3.3 Complete Form 5790-413-01.

7.0 FIGURES

FIGURE

7.1 Forms Utilized in this Procedure

1. 5790-413-01 (SMALL VOLUME LIQUID SAMPLING AND ANALYSIS CHECKLIST)

MONTICELLO NUCLEAR GENERATING PLANT		A.2-414
TITLE:	LARGE VOLUME LIQUID SAMPLE AND/OR DISSOLVED GAS SAMPLE OBTAINED AT POST ACCIDENT SAMPLING SYSTEM	Revision 18
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EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

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ALARA Coord Review By:		
OC Review Req'd: YES	OC Meeting Number: 2214	Date: 3/30/00
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1.0 PURPOSE

The purpose of this procedure is to provide instructions and precautions for collection, handling, and analysis of large volume liquid and dissolved gas samples during and following an emergency.

2.0 APPLICABILITY

2.1 The REC/CC/CSL has requested a dissolved gas analysis of RHR or jet pump liquid samples, or a large volume liquid sample for off-site analysis or on-site if coolant activity is low enough that a large volume sample can be handled without undue exposure to technicians.

2.2 Actual or potential radiological conditions are such that special methods and/or precautions are necessary in order to collect and analyze samples under conditions which may present a much greater than normal radiation hazard to individuals performing the sampling and analyses, or the normal sample points are not available.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Radiological Emergency Coordinator (REC) is responsible for:

3.1.1 Overall direction of the Radiation Protection and Chemistry Group activities.

3.2 The Chemistry Section Leader (CSL) is responsible for:

3.2.1 Overall direction of PASS sampling and analysis.

3.2.2 Overall coordination of Chemistry Group activities.

3.3 The Chemistry Coordinator is responsible for:

3.3.1 Coordination of Chemistry Group activities in the Chemistry Lab.

3.3.2 Coordination of sample logging, identification and documentation.

3.4 The Radiation Protection Specialists (Chem) are responsible for:

3.4.1 Implementation of this procedure.

4.0 DISCUSSION

4.1 The Post Accident Sampling Station is located on the south side of the 951' level of the Turbine Building. The most efficient route to the PASS is through Access Control and into the Turbine Building. Move to the 951' level via the east stairway.

5.0 PRECAUTIONS

5.1 Exposures of sampling and analysis personnel ***SHALL*** be in accordance with A.2-401 (EMERGENCY EXPOSURE CONTROL).

5.2 Exposures to all personnel due to sampling and analysis operations should be maintained as low as is reasonably achievable. Techniques such as temporary shielding, remote handling, and sample dilution prior to analysis should be considered to reduce exposure to personnel.

5.3 When actual or potential radiation levels so warrant, high range portable survey instruments, and self-reading dosimeters should be provided to sampling and analysis personnel. Alarming dosimeters should also be considered.

5.4 Appropriate extremity dosimeters should be provided and worn when handling samples which themselves represent high level radiation sources.

5.5 Two Rad Prot Specs should be used to obtain a post-accident sample when applicable and possible.

6.0 INSTRUCTIONS

6.1 Preparation for Sampling

6.1.1 Obtain key 55 and the PASS cabinet key from the Shift Chemist key ring.

6.1.2 Initiate a Form 5790-414-01 (DISSOLVED GAS SAMPLING AND ANALYSIS CHECKLIST).

6.1.3 Obtain sample type and number from Chemistry coordinator (see FIGURE 7.7 in A.2-408).

6.1.4 Call the Control Room to:

A. Determine whether A or B RHR is operating.

B. Verify RBCCW is operating.

C. Advise the Control Room that jet pump flow transmitter may be affected. (Computer Point REC136 (REACTOR JET PUMP TOTAL FLOW)).

6.2 Obtaining Samples

6.2.1 IF PASS demin water tank level is below the Low Level indicator, THEN fill the tank IAW A.2-418 (POST ACCIDENT SAMPLING STATION DEMIN WATER TANK FILL PROCEDURE).

6.2.2 Open nitrogen supply as follows:

A. OPEN main cylinder valve on one nitrogen cylinder.

B. OPEN corresponding manifold valve either PAS-57-21 (N_2 GAS BOTTLE MANIFOLD SHUTOFF) or PAS-57-11 (N_2 GAS BOTTLE MANIFOLD SHUTOFF).

C. CLOSE regulator outlet isolation valve.

D. Adjust regulator to 100 psi.

E. OPEN regulator outlet Isolation valve.

6.2.3 Turn HC-730 (PASS VENTILATION) to start.

6.2.4 IF vacuum is not between 0.10″ and 0.05″, THEN adjust ventilation damper to obtain proper reading.

6.2.5 Insert PASS key into HC-600 (POWER SOURCE SELECTOR SWITCH).

6.2.6 Place HC-600 to position A.

6.2.7 Obtain 20 ml sample vial (with velcro strip), cap, and retainer ring from cabinet. Cap the vial and remove the aluminum ring from the center of the cap.

6.2.8 Label the vial with the sample number obtained in STEP 6.1.3.

6.2.9 Insert the capped vial into the sample station as follows:

A. Using a flashlight and inspection mirror, check the condition of the needles. Ensure that they are not bent.

B. Place the cylinder into the cask.

C. Engage the cable in the sample vial by gently pushing the cable in and turning clockwise.

D. Remove the cylinder cask shield plug from the cask.

E. Raise the sample vial holder and insert the capped vial.

E. Raise the sample vial holder and insert the capped vial.

F. Lower the sample vial into the cask using the cable.

G. Place the shim on the RIGHT SIDE of the cask.

H. Close the hydraulic valve and jack up the cask.

I. Gently roll the cask under the left side of the station.

J. Using the cable, raise the sample vial into position.

K. Maintain sample vial in elevated position and jack up the cask until lit is flush with the bottom of the station.

CAUTION

Do not allow the demin water pressure to exceed 110 psi.

6.2.10 Adjust demin water pressure regulator to 100 psi.

6.2.11 Place HC-700 to LIQD.

6.2.12 Place HC-626 (LIQUID SAMPLE SOURCE SELECTOR) to position 2 (JET PUMP) or position 4 (RHR) as required.

6.2.13 IF bottle position status light is not green,
THEN adjust the bottle holder.

6.2.14 Place HC-626 to position 1 (JET PUMP BYPASS) or position 5 (RHR BYPASS).

6.2.15 Place HC-500 (SAMPLE SOURCE SELECTOR SWITCH) to required sample position.

6.2.16 Place LIQUID RETURN SELECTOR switch to the operating RHR loop.
IF neither RHR loop is operating,
THEN place the selector switch to A.

6.2.17 IF pressure on PI-661 (LIQUID PRESSURE - PSIG) does not increase to near target system pressure within 10 minutes,
THEN cycle HC-500 between 'A' and 'B' sample points.

6.2.18 Slowly turn PCV-627 (FLOW CONTROL VALVE) clockwise to get a flow of at least 0.8 gpm for jet pump sample or at least 0.4 gpm for RHR (as indicated on FI-664 (SAMPLE RETURN FLOW)).

6.2.19 Flush for 10 minutes.

6.2.20 Record flow and flush time on Form 5790-414-01.

6.2.21 Place HC-626 to position 2 (JET PUMP) or position 4 (RHR) for the required sample.

6.2.22 Adjust PCV-627 to 0.3 +/-0.05 gpm.

6.2.23 Flush for 5 minutes.

6.2.24 Record the following on Form 5790-414-01:

A. Flow per FI-664.

B. Pressure per PI-661.

C. Temperature per TI-660.

D. Conductivity per CI-663.

E. Radiation per RI-665.

6.2.25 IF only a large volume liquid sample is to be taken, THEN go to 6.2.51.

6.2.26 Place HC-601 (DISSOLVED GAS AND LIQUID SAMPLE) to position 1 (START P-702 AND INSERT NEEDLE).

6.2.27 WHEN PI-662 (DISSOLVED GAS PRES - PSIA) is stable, THEN turn HC-601 to OFF.

6.2.28 Confirm PI-662's indicated pressure change is less than or equal to 0.05 psia/min.

6.2.29 IF PI-662 increases by more than 0.05 psia/min, THEN tighten or replace the needle guide septum. Repeat 6.2.26 and 6.2.28.

6.2.30 Insert an open end 10 inch needle (without syringe) through the septum.

6.2.31 Place HC-601 to position 2 (START P-601).

6.2.32 Flush for 10 minutes.

6.2.33 Place HC-601 to position 3 (CIRC AND SEPARATE GAS) and wait for 30 seconds.

6.2.34 IF only a liquid sample is desired,
THEN go to 6.2.51.

6.2.35 Place HC-601 to position 4 (REMOVE NEEDLE) and remove the 10 inch needle.

6.2.36 AFTER PI-662 is stable,
PLACE HC-601 to position 5 (CIRC AND SEPARATE GAS).

6.2.37 When PI-662 is stable, record value as P_1 on Form 5790-414-01.

6.2.38 Place HC-601 to position 6 (COLLECT DISSOLVED GAS) and wait 5 seconds.

6.2.39 Place HC-601 to position 7 (CIRCULATE AGAIN) and wait 10 seconds.

6.2.40 Place HC-601 to position 8 (COLLECT DISSOLVED GAS AGAIN) and wait 5 seconds.

6.2.41 Repeat 6.2.39 through 6.2.40 until the change in pressure readings from PI-662 is < 0.15 psia.

6.2.42 Place HC-601 to position 9 (RELIEVE PRESSURE/TAKE GAS SAMPLE).

6.2.43 Record final pressure of PI-662 as P_2 on Form 5790-414-01.

6.2.44 Record water temperature, TI-660 as T_L on Form 5790-414-01.

6.2.45 IF only a dissolved gas calculation will be made and a dissolved gas grab sample is not required,
THEN go to 6.2.50.

CAUTION

Use appropriate radiological precautions when handling the syringe, as high dose may be present.

6.2.46 Insert 10 inch needle with syringe into gas collection chamber via needle guide.

6.2.47 Draw 2 cc's of gas and lock the syringe closed. DO NOT REMOVE SYRINGE AND NEEDLE.

6.2.48 Place HC-652 counterclockwise to LOWER PRESSURE position and hold until pressure is relieved, as indicated on PI-662.

6.2.49 Remove needle and syringe.

6.2.50 IF a large volume liquid sample is not required, THEN go to 6.2.55.

6.2.51 Place or verify HC-601 to position 9 (RELIEVE PRESS/TAKE GAS SAMPLE).

6.2.52 Turn HC-652 counterclockwise to LOWER PRESSURE position and hold until pressure is relieved, as indicated on PI-662.

6.2.53 Place HC-601 to position 10 (TAKE LIQUID SAMPLE).

6.2.54 Press and hold in pushbutton HC-629-1 for 10 seconds.

6.2.55 Place HC-601 to OFF.

6.2.56 Inform Control Room sampling is completed.

CAUTION

Do not position body at any time directly over cask, as potentially high dose rates may exist.

6.2.57 Lower the sample into the large volume cask by pulling up on the cable. DO NOT twist the plunger.

6.2.58 Lower the cask.

6.2.59 Roll the cask out from under the station.

6.2.60 Install the shield plug in the cask.

6.2.61 Disengage the cable from the sample vial by turning the cable counterclockwise and pulling gently outward.

6.2.62 Place or verify HC-601 to OFF.

6.2.63 Place HC-500 to OFF.

6.2.64 Place HC-628-1 (FLUSH SYSTEM) to position 2 (START FLUSH), AND adjust PCV-627 for MAXIMUM flow per FI-664.

6.2.65 After RI-665 shows radiation has decreased significantly, place HC-628-1 to position 3 (FLUSH V-610 LOOP).

6.2.66 WHEN the radiation no longer decreases, place HC-628-1 to position 4 (FLUSH P-601 LOOP).

6.2.67 WHEN the radiation no longer decreases, place switch HC-628-1 to position 5 (FLUSH P-601 LOOP).

6.2.68 WHEN the radiation no longer decreases, place switch HC-628-1 to position 6 (FLUSH PIPING STATION).

6.2.69 Flush for 3 minutes.

6.2.70 Place HC-628-1 to position 7 (FLUSH CV-622 LOOP).

6.2.71 IF any abnormal radiation levels are indicated on RI-665, THEN repeat 6.2.65 through 6.2.70.

6.2.72 Place HC-626 to OFF.

6.2.73 Place HC-628-1 to OFF.

6.2.74 Turn PCV-627 fully counterclockwise.

6.2.75 IF no additional sampling is required, THEN perform A.2-417 (DRAIN OF TRAP, SUMP, AND COLLECTOR).

6.2.76 Turn HC-730 to stop.

6.3 Sample Transport and Analysis

6.3.1 Transport the large volume liquid sample or dissolved gas sample in a shielded container for high activity samples or use a remote carrying device for low activity samples.

6.3.2 Perform analysis requested by REC/CC/CSL IAW Chemistry Manual Procedures.

6.3.3 IF a large volume sample is to be sent off-site for analysis, THEN notify the REC for instructions.

6.3.4 Complete Form 5790-414-01. Run computer program PASGAS to obtain C_T, C_0 ppm, C_H scc/kg. Backup equations, conditions and constants are identified in FIGURES 7.1 through 7.7 of this procedure.

7.0 FIGURES

FIGURE

7.1 Symbols, Assumptions, and Accuracy of Dissolved Gas Analyses Symbols

The following section identifies the symbols used in the calculations.

C_T = Concentration of total dissolved gas in the reactor coolant, scc/kg water

C_0 = Concentration of dissolved oxygen in the reactor coolant, ppm or scc/kg water

C_H = Concentration of dissolved hydrogen in the reactor coolant, scc/kg water

P_1 = Initial pressure in the gas collection chamber after evacuation, psia

P_2 = Final pressure in the gas collection chamber after expansion, psia

P_V = Water vapor pressure at water temperature, psia

T_L = Water temperature, °F

S_H = Solubility of hydrogen in water, scc/kg H_2O - Atm

S_O = Solubility of oxygen in water, scc/kg H_2O - Atm

V_S = Volume of dissolved gas sample in a syringe, cc (2 cc's by procedure)

N_O = Moles of dissolved oxygen at standard condition STP in a sample, scc

N_H = Moles of dissolved hydrogen at standard condition STP in a sample, scc

V_O = % Volume of oxygen in gas vial, as determined by gas chromatography

V_H = % Volume of hydrogen in gas vial, as determined by gas chromatography

V_G = Experimentally determined volume of V-662, (8.72 cc's)

V_L = Experimentally determined volume of V-610, (138.70 cc's)

FIGURE

7.1 Symbols, Assumptions, and Accuracy of Dissolved Gas Analyses (cont'd)

Assumptions for Total Dissolved Gas Calculation Method

The following assumptions are used in this sampling procedure and calculation.

1. Any measurable total dissolved gas concentration will be all hydrogen.
2. Equilibrium between the gas phase and liquid phase has been reached.
3. Residual gas in the gas collection chamber does not diffuse into the liquid.
4. Any gas bubbles coming out of solution prior to expansion stays with its associated liquid.
5. Gases obey Henry's and Ideal Gas Law.
6. Volume of the gas and liquid space is known.
7. Temperature of the gas collection area is assumed to be 90°F before expansion and 120°F after expansion.
8. Water density is assumed to be constant at 62.00 lb_m per cubic foot.

Assumptions for Dissolved Gas Grab Sample Calculation Method

1. Equilibrium between the gas phase and liquid phase has been reached.
2. Any gas bubbles coming out of solution prior to expansion stays with its associated liquid.
3. Gases obey Henry's and Ideal Gas Law.
4. Volume of the gas and liquid space is known.
5. Temperature of the gas collection area is assumed to be 90°F before expansion and 120°F after expansion.
6. Water density is assumed to be constant at 10^{-3} Kg/cc.
7. Dissolved gas evolved from the liquid phase is assumed to be well mixed with the air in the gas collection area.
8. Volume of the needle is negligible.

Accuracy

The accuracy of the total dissolved gas measurement for the GE PASS has been determined by GE to be at least $\pm$ 50% for dissolved gas concentrations between 25 cc/kg and 50 cc/kg and at least $\pm$ 30% for concentrations greater than 50 cc/kg.

FIGURE

7.2 Hydrogen Solubility in Water

The following solubility data is a function of liquid sample temperature and is used in the calculation method.

T_L (°F)	S_H (scc/kg-Atm)	T_L (°F)	S_H (scc/kg-Atm)
60	18.56	110	16.56
62	18.34	112	16.45
64	18.22	114	16.45
66	18.11	116	16.45
68	18.00	118	16.45
70	17.89	120	16.45
72	17.67	122	16.45
74	17.56	124	16.45
76	17.56	126	16.45
78	17.45	128	16.45
80	17.34	130	16.45
82	17.22	132	16.45
84	17.11	134	16.45
86	17.11	136	16.56
88	17.00	138	16.56
90	16.89	140	16.56
92	16.89	142	16.56
94	16.78	144	16.56
96	16.78	146	16.67
98	16.67	148	16.67
100	16.67	150	16.67
102	16.67		
104	16.56		
106	16.56		
108	16.56		

FIGURE

7.3 Oxygen Solubility in Water

The following solubility data is a function of liquid sample temperature and is used in the calculation method.

T_L (°F)	S_O (scc/kg-Atm)	T_L (°F)	S_O (scc/kg-Atm)
60	37.04	110	24.56
62	36.27	112	24.26
64	35.50	114	24.02
66	34.80	116	23.79
68	34.11	118	23.49
70	33.42	120	23.25
72	32.80	122	23.02
74	32.19	124	22.79
76	31.57	126	22.64
78	31.03	128	22.41
80	30.49	130	22.25
82	29.95	132	22.02
84	29.45	134	21.87
86	28.95	136	21.71
88	28.49	138	21.56
90	28.11	140	21.41
92	27.64	142	21.25
94	27.26	144	21.10
96	26.87	146	20.94
98	26.49	148	20.84
100	26.18	150	20.71
102	25.80		
104	25.49		
106	25.18		
108	24.87		

FIGURE

7.4 Water Vapor Pressure

The following water vapor data is a function of liquid sample temperature and is used in the calculation method.

T_L (°F)	P_V (psia)	T_L (°F)	P_V (psia)
60	.2561	110	1.275
62	.2749	112	1.351
64	.2950	114	1.430
66	.3163	116	1.513
68	.3389	118	1.601
70	.3629	120	1.693
72	.3884	122	1.789
74	.4155	124	1.890
76	.4442	126	1.996
78	.4746	128	2.107
80	.5068	130	2.223
82	.5239	131	2.284
84	.5409	132	2.345
86	.5770	134	2.472
88	.6152	136	2.605
90	.6555	138	2.744
92	.6981	140	2.889
94	.7432	142	3.041
96	.7906	144	3.200
98	.8936	146	3.365
100	.9492	148	3.538
102	1.008	150	3.718
104	1.070		
106	1.135		
108	1.203		
Source: ASME Steam Tables, 1967			

FIGURE

7.5 Total Dissolved Gas Calculation Method

1. Input Parameters

   The following values must be obtained to calculate total dissolved gas concentrations:

   a. Temperature of liquid sample, T_L, °F

   b. Final pressure of gas, P_2, psia

   c. Initial pressure of gas, P_1, psia

   d. Solubility of hydrogen at temperature of liquid sample, S_H, scc/kg-Atm (from FIGURE 7.2)

   e. Pressure of water vapor at temperature of liquid sample, P_V, psia (from FIGURE 7.4)

2. Equation

   Total Dissolved Gas Concentration in scc/kg

$$C_T = \frac{1}{138.70} (9.432\ S_H + 501.1)\ (P_2 - P_V - (1.05\ P_1))$$

NOTE: Record result C_T on Form 5790-414-01.

FIGURE

7.6 Recommended Conditions for Taking Dissolved Gas Grab Sample

1. IF total gas concentration (C_T) > 40 scc/kg,
   THEN dissolved oxygen is < 0.1 ppm, record this result on Form 5790-414-01,
   ELSE determine the dissolved oxygen concentration in accordance with Chem Manual I.1.36, Gaseous H_2, O_2 and N_2 concentrations, and record result on Form 5790-414-01.

BASES

The 40 scc/kg takes into account other potential gases and the accuracy of the measurement. GE assumes a 50% measurement error on the C_T determination.

FIGURE

7.7 Dissolved Gas Grab Sample Calculation Method

Criteria

1. Input Parameters

   The following values must be obtained prior to calculating dissolved gas concentrations:

   a. Temperature of liquid sample, T_L, °F (use to determine S_O and S_H values)

   b. Final pressure of gas, P_2, psia

   c. Initial pressure of gas, P_1, psia

   d. Volume of dissolved gas sample in a syringe, V_S, cc (2 cc's by procedure)

   e. % volume of oxygen in gas vial, as determined by gas chromatography, V_O.

   f. Moles of dissolved oxygen at STP in a sample, as determined by gas chromatograph, N_O, scc.

   g. % volume of hydrogen in gas vial, as determined by gas chromatography, V_H.

   h. Moles of dissolved hydrogen at STP in a sample, as determined by gas chromatograph, N_H, scc.

   i. Solubility of hydrogen at temperature of liquid sample, S_H, scc/kg-Atm (from FIGURE 7.2)

   j. Solubility of oxygen at temperature of liquid sample, S_O, scc/kg-Atm (from FIGURE 7.3)

2. Equation

   To Calculate Moles of Oxygen from Gas Chromatography Results:

   $$N_O = 2.575E\text{-}8 * V_S * P_2 * V_O$$

   For Dissolved Oxygen Concentration in scc/kg (Grab Sample):

   $$C_O = 38.64\ N_O + 0.7254\ S_O\ N_O - 0.8003\ P_1$$

   For Dissolved Oxygen Concentration in ppm (Grab Sample):

   $$C_0 = \frac{C_0}{0.77}$$

   To Calculate Moles of Hydrogen from Gas Chromatography Results:

   $$N_H = 2.574E\text{-}8 * V_S * P_2 * V_H$$

For Dissolved Hydrogen Concentration in scc/kg (Grab Sample):

$$C_H = 0.7254\ N_H\ S_H + 38.6\ N_H$$

NOTE: Record results on Form 5790-414-01.

FIGURE

7.8 Forms Utilized in the Procedure

1. 5790-414-01 Dissolved Gas Sampling and Analysis Checklist

EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By:	Reviewed By:	
ALARA Coord Review By:		
OC Review Req'd: YES	OC Meeting Number: 2214	Date: 3/30/00
Approved By:		Date: 4/3/00

FOR ADMINISTRATIVE USE ONLY

3087 (DOCUMENT CHANGE, HOLD, AND COMMENT FORM) incorporated: 99-3836

Resp Supv: GTRNG	Assoc Ref: A.2		SR: N	Freq: 1 yrs
ARMS: A.2-415	Doc Type: 1060	Admin Initials:		Date: 4/7/00

l/skb

1.0 PURPOSE

The purpose of this procedure is to provide instructions and precautions for collection and handling of containment gas samples during and following an emergency.

2.0 APPLICABILITY

2.1 An emergency (Alert or higher classification) has been declared at Monticello Nuclear Generating Plant which involves abnormal or elevated radiological conditions which preclude use of normal sampling methods.

2.2 The REC/CSL has requested analysis of containment gas samples.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Radiological Emergency Coordinator (REC) is responsible for:

3.1.1 Overall direction of the Radiation Protection and Chemistry Group activities.

3.2 The Chemistry Section Leader (CSL) is responsible for:

3.2.1 Overall coordination for PASS sampling and analysis.

3.2.2 Overall coordination of Chemistry Group activities.

3.3 The Chemistry Coordinator is responsible for:

3.3.1 Coordination of Chemistry Group activities in the Chemistry Lab.

3.4 The Radiation Protection Specialists (Chem) are responsible for:

3.4.1 Implementation of this procedure.

3.4.2 Performing post-accident sampling using the PASS system.

4.0 DISCUSSION

The primary objective of the Post-Accident Sampling System (PASS) is to obtain representative liquid and gas samples for chemical and radiochemical analysis in the event of a LOSS-OF-COOLANT ACCIDENT (LOCA). The gas samples taken from this system are considered to be representative of the atmosphere within the primary and secondary containment.

The Post-Accident Sampling System (PASS) is located on the south side of the 951' level of the Turbine Building. The most efficient route to the PASS is through access control and into the Turbine Building. Move to the 951' level via the east stairway.

5.0 PRECAUTIONS

5.1 Exposures of sampling and analysis personnel ***SHALL*** be in accordance with EPIP A.2-401 (EMERGENCY EXPOSURE CONTROL).

5.2 Exposures to all personnel due to sampling and analysis operations should be maintained AS LOW AS REASONABLY ACHIEVABLE. Techniques such as temporary shielding, remote handling and sample dilution prior to analysis should be considered to reduce exposure to personnel.

5.3 When actual or potential radiation levels so warrant, high range portable survey instruments, and self-reading dosimeters ***SHALL*** be provided to sampling and analysis personnel. Alarming dosimeters should also be considered.

5.4 Appropriate extremity dosimeters should be provided and worn when handling samples which themselves represent high level radiation sources.

5.5 Two-man teams should be used to obtain a post-accident sample, when possible.

6.0 INSTRUCTIONS

6.1 Pre-Sample Preparations

6.1.1 Notify the Control Room of impending sample.

6.1.2 Obtain PASS key 55 and the PASS cabinet key from the Shift Chemist key ring. I

6.1.3 Obtain the desired sample location from the Chemistry Coordinator and determine which primary containment isolation valves need to be opened using the following table:

HC-500 Position	PASS Sample Valve	Associated Primary Containment Valves
1. DW High	SV-4010	SV-4001A/SV-4005A and SV-4020A/SV-4004A
2. DW Med	SV-4011	SV-4081 and SV-4082 and SV-4005A and SV-4004A
3. Torus 1	SV-4012A	SV-4003A/SV-4005A and SV-4002A/SV-4004A
4. Torus 2	SV-4012B	SV-4003B/SV-4005B and SV-4002B/SV-4004B and SV-4005A and SV-4004A
5. Sec Cont	SV-4017A	None

6.1.4 Initiate Form 5790-415-1 (CONTAINMENT GAS SAMPLING AND ANALYSIS CHECKLIST) (FIGURE 7.1) and prepare a label for the sample.

6.1.5 IF sampling secondary containment air,
THEN go to Section 6.1.6.,
ELSE proceed to the Control Room with Form 5790-415-1 and have an Operator open the applicable primary containment valves for the desired sample as follows:

A. IF a Group II isolation signal exists,
THEN perform the following:

1. Place the ISOL/BYPASS switch in BYPASS on Panel C-259 and C-260.

2. IF SV-4081 and SV-4082 need to be opened,
THEN perform the following:

a. Place the handswitches at Panel C-26 for the following valves to close:

SV-3307	CV-3311	CV-3313	SV-4081
SV-3308	CV-3312	CV-3314	SV-4082

b. At Panel C-26, lift and tape the external wires at the following terminals:

Q530/1

Q528/1

c. At Panel C-26, jumper the following terminals:

Q530/x1 - Q530/1

Q528/x1 - Q528/1

NOTE: **The sample return valves SV-4004A and SV-4005A OPEN when a Div I H_2 O_2 Analyzer sample inlet line's isolation valves are opened.**

B. OPEN the primary containment valves indicated on Form 5790-415-1.

6.1.6 Proceed to the PASS Sample Station.

6.1.7 IF the PASS Demin Water Tank level is below the Low Level indicator on the sightglass,
THEN fill the tank IAW A.2-418 (PASS DEMIN WATER TANK FILL PROCEDURE).

CAUTION

Do not allow the demin water pressure to exceed 110 psi.

NOTE: It will take several minutes to bring the system to 100 psi.

6.1.8 Open the nitrogen supply as follows:

A. OPEN main cylinder valve on one nitrogen cylinder.

B. OPEN corresponding manifold valve either PAS-57-21 (N_2 GAS BOTTLE MANIFOLD SHUT0FF)or PAS-57-11 (N_2 GAS BOTTLE MANIFOLD SHUTOFF).

C. CLOSE regulator outlet isolation valve.

D. Adjust regulator to 100 psi.

E. OPEN regulator outlet isolation valve.

6.2 Obtaining Sample

6.2.1 Turn HC-730 (PASS VENTILATION) to start.

6.2.2 IF vacuum is not between 0.10" and 0.05",
THEN adjust ventilation damper to obtain proper reading.

6.2.3 Insert PASS key into HC-600 (CONTROL PANEL POWER SELECTOR SWITCH).

6.2.4 Place switch HC-600 to position A.

6.2.5 Verify HC 715-1 (SUMP DRAIN SYSTEM SWITCH) is in OFF.

6.2.6 Switch HC-700 (LIQUID/GAS SELECTOR) to "Gas" position.

6.2.7 Label a standard 15 milliliter off-gas vial.

6.2.8 Perform the following:

A. Place the off-gas vial with Rubber Septum into the gas vial holder.

B. With the bottle plunger fully out, slideholder fully into gas port at the sample station.

C. Push bottle plunger in until vial status light changes from red to green.

6.2.9 Turn HC-723 (GAS SAMPLE SELECTOR SWITCH) to the desired sample location.

6.2.10 Verify primary containment isolation valves are open by checking Form 5790-415-1 (CONTAINMENT GAS SAMPLING AND ANALYSIS CHECKLIST) is complete through part 3.

CAUTION

Part 3 of Form 5790-415-1 must be completed or the CAMS analyzers performance may be affected.

6.2.11 Place switch HC-500 (SAMPLE SOURCE SELECTOR SWITCH) in the position corresponding to the desired sample.

6.2.12 Turn HC-705 (10 ML GAS SAMPLE SWITCH) to position 2 (CIRCULATE GAS).

6.2.13 Circulate gas for 5 minutes.

6.2.14 Record the flow as indicated on Rotameter FI-725 and flush duration on Form 5790-415-1.

6.2.15 IF obtaining a primary containment sample,
THEN call Control Room to obtain primary containment pressure and temperature. Unless directed otherwise by the REC, use the bulk drywell or torus temp (depending on sample point) shown on SPOTMOS. Log both on Form 5790-415-1,
ELSE go to Section 6.2.16.

6.2.16 Turn HC-705 to position 3 (EVACUATE BOTTLE).

6.2.17 Record stabilized pressure (P_1) from PI-708 (SAMPLE GAS PRESSURE-PSIA) on Form 5790-415-1.

6.2.18 Turn HC-705 to position 4 (TAKE SAMPLE).

6.2.19 IF pressure on PI-708 changes,
THEN there is a leak in the system. Notify the CSL.

6.2.20 Press button HC-720 (PRESS FOR SAMPLE) until a steady pressure is received on PI-708.

6.2.21 Record the final pressure of the sample from PI-708 (P_2), sample temperature from TI-724 and sample time on Form 5790-415-1.

6.2.22 Turn HC-705 to position 5 (FLUSH SYSTEM).

6.2.23 Flush for approximately one minute or until the area radiation monitor located on the sample station reaches a minimum.

6.2.24 Turn HC-705 through position 6 (OFF), 7 (OFF), and 8 (OFF) and then to OFF.

CAUTION

Potentially high dose rates may exist, use appropriate radiological precautions when handling sample.

6.2.25 Withdraw the gas vial positioner. Keep the vial at a maximum distance and quickly insert the sample bottle into the gas vial cask.

6.2.26 Perform Procedure A.2-417 (DRAINING THE TRAP, SUMP, AND COLLECTOR OF POST-ACCIDENT SAMPLING SYSTEM).

6.2.27 Turn HC-730 to the STOP.

6.2.28 Transport the sample to the Hot Lab for analysis per Procedure A.2-420 (CONTAINMENT ATMOSPHERE RADIOCHEMICAL ANALYSIS) or for hydrogen, oxygen and nitrogen analysis per Chemistry Procedure I.01.36 (GASEOUS H2, O2 & N2 CONCENTRATIONS).

6.2.29 IF valves were opened in section 6.1.5,
THEN proceed to the Control Room and request that an Operator close the valves that were opened in 6.1.5.

6.2.30 Complete analysis and log results per Form 5790-415-1.

7.0 FIGURES

FIGURE

7.1 Forms Utilized in the Procedure

1. 5790-415-1 (CONTAINMENT GAS SAMPLING AND ANALYSIS CHECKLIST).

EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By:	Reviewed By:	
OC Review Req'd: YES	OC Meeting Number: 2214	Date: 3/30/00
Approved By:		Date: 4/3/00

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Resp Supv: GTRNG	Assoc Ref: A.2		SR: N	Freq: 1 yrs
ARMS: A.2-417	Doc Type: 1060	Admin Initials:		Date: 4/7/00

l/skb

1.0 PURPOSE

The purpose of this procedure is to provide instructions and precautions for draining the trap, sump, and collector of the PASS.

2.0 APPLICABILITY

2.1 An emergency (Alert or higher classification) has been declared at Monticello Nuclear Generating Plant which involves abnormal or elevated radiological conditions which preclude use of normal sampling methods, and

2.2 The REC/CSL has requested sampling and analysis of containment gas samples, and

2.3 A sample has been obtained at the PASS.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Radiological Emergency Coordinator (REC) is responsible for:

3.1.1 Overall direction of the Radiation Protection and Chemistry Group activities.

3.2 The Chemistry Section Leader (CSL) is responsible for:

3.2.1 Overall direction for PASS sampling and analysis.

3.2.2 Overall coordination of Chemistry Group activities.

3.3 The Chemistry Coordinator is responsible for:

3.3.1 Coordination of Chemistry Group activities in the Chemistry Lab.

3.3.2 Coordination of sample logging, identification and documentation.

3.4 The Radiation Protection Specialists (Chem) are responsible for:

3.4.1 Implementation of this procedure.

4.0 DISCUSSION

There is no automatic drain or blow down, but there is an alarm light to indicate that the level in the trap T-717 is high and that the trap needs to be drained. This trap removes water from the gas sample lines. If the liquid level becomes too high, water will be sucked into the air pump of the PASS and mechanical damage may result.

The Post Accident Sampling System is located on the south side of the 951' level of the Turbine Building. The most efficient route to the PASS is through Access Control and into the Turbine Building. Move to the 951' level via the east stairway.

5.0 PRECAUTIONS

5.1 Exposures of sampling personnel ***SHALL*** be in accordance with A.2-401 (EMERGENCY EXPOSURE CONTROL).

5.2 Exposures to all personnel due to sampling operations should be maintained as low as is reasonably achievable.

5.3 When actual or potential radiation levels so warrant, high range portable survey instruments, and self-reading dosimeters should be provided to sampling personnel. Alarming dosimeters should also be considered.

6.0 INSTRUCTIONS

6.1 Draining the Trap, Sump, and Collector

6.1.1 Verify that the nitrogen pressure is set at 100 psig.

6.1.2 IF the PASS Demin Water Tank level is below the low indicator on the sightglass,
THEN fill the tank IAW A.2-418 (POST ACCIDENT SAMPLING STATION DEMIN WATER TANK FILL PROCEDURE).

6.1.3 Turn all control panel switches to the arrow UP and OFF position.

6.1.4 Turn HC-730 (PASS VENTILATION) to START.

6.1.5 Insert PASS key in HC-600 (CONTROL PANEL POWER SELECTOR SWITCH).

6.1.6 Place HC-600 to position "A".

6.1.7 Turn HC-700 (LIQUID GAS SELECTOR SWITCH) to LIQD.

6.1.8 Turn HC-626 (LIQUID SAMPLE SOURCE SELECTOR SWITCH) to position 2 (JET PUMP).

CAUTION

Minimize the time spent with HC-500 in positions 1 through 4 and the associated primary containment isolation valves closed.

6.1.9 Turn switch HC-500 (SAMPLE SELECTOR SWITCH) counter-clockwise to position 9 (RHR).

6.1.10 Set Liquid Return Selection Switch to Operating RHR Loop,
IF neither RHR Loop is operating,
THEN place selector switch to "A".

6.1.11 Rotate the HC-628-1 (FLUSH SYSTEM SWITCH) counterclockwise to position 6 (FLUSH PIPING STATION).

6.1.12 Adjust PCV-627 (FLOW CONTROL VALVE) to obtain a flow of at least 0.4 gpm on FI-664 (SAMPLE RETURN FLOW).

6.1.13 Rotate HC-715-1 (DRAIN SYSTEM SWITCH) positions 2 through 7, pausing about 5 seconds at each position.

6.1.14 Turn HC-626 to OFF position.

6.1.15 Turn HC-628-1 to OFF position.

6.1.16 Turn HC-715-1 to OFF position.

6.1.17 Turn HC-700 to OFF position.

6.1.18 Place HC-600 to OFF position.

6.1.19 Turn PCV-627 fully counterclockwise.

6.1.20 Place all switches to the up and OFF position.

6.1.21 Close the nitrogen supply (cylinder valve).

6.1.22 Close the applicable nitrogen supply valve PAS-57-21 OR PAS-57-11.

6.1.23 Return to the original procedure.

7.0 FIGURES

None

EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By:	Reviewed By:	
ALARA Coord Review By:		
OC Review Req'd: YES	OC Meeting Number: 2214	Date: 3/20/00
Approved By:		Date: 4/3/00

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ARMS: A.2-420	Doc Type: 1060	Admin Initials:		Date: 4/17/00

l/skb

1.0 PURPOSE

The purpose of this procedure is to provide instructions and precautions for analysis of containment atmosphere samples during and following an emergency.

2.0 APPLICABILITY

Analysis of a gas sample obtained at the PASS is requested by the Emergency Director/REC/CSL.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Radiological Emergency Coordinator (REC)/Chemistry Section Leader (CSL) are responsible for:

3.1.1 Assigning sample priority and frequency.

3.1.2 Results review.

3.2 The Radiation Protection Specialists (Rad Prot Spec Chem) are responsible for:

3.2.1 Implementation of this procedure.

3.2.2 Sample analysis and results reporting.

4.0 DISCUSSION

This procedure provides instructions for the analysis of primary containment atmosphere samples obtained using the PASS System.

5.0 PRECAUTIONS

5.1 Exposures of analysis personnel ***SHALL*** be in accordance with A.2-401 (EMERGENCY EXPOSURE CONTROL).

5.2 Exposures to all personnel due to analysis operations should be maintained as low as is reasonably achievable. Techniques such as temporary shielding, remote handling and sample dilution prior to analysis should be considered to reduce exposure to personnel.

5.3 When actual or potential radiation levels so warrant, high range portable survey instruments, and self-reading dosimeters should be provided to sampling and analysis personnel. Alarming dosimeters should also be considered.

5.4 Appropriate extremity dosimeters should be provided and worn when handling samples which themselves represent high level radiation sources.

6.0 INSTRUCTIONS

6.1 Sample Analysis

6.1.1 Verify the sample is correctly labeled IAW A.2-408 (SAMPLE COORDINATION DURING EMERGENCIES).

6.1.2 Place vial in a poly bag and count IAW Chemistry Procedure I.03.39 (MCA OPERATION/GAMMA ISOTOPIC ANALYSIS).

6.1.3 IF dilution is necessary (due to high dead time), THEN complete the following:

A. Evacuate another 15 cc gas vial.

B. Remove 1 cc of gas from sample vial.

C. Inject gas into vial from section 6.1.3.A.

D. Label the new vial IAW A.2-408 (SAMPLE COORDINATION DURING EMERGENCIES).

E. Repeat section 6.1.2.

6.1.4 Record the result on 5790-415-1 (CONTAINMENT GAS SAMPLING AND ANALYSIS CHECLIST) page 2, line 2.

6.1.5 Forward the sample results to the Chemistry Coordinator or Chemistry Section Leader for review.

7.0 FIGURES

None