"TEMPORARY CHANGE"

Three Mile Island Nuclear Station Temporary Change Notice (TCN)

* NOTE: Instructions and guidelines in AP1001A must be followed when completing this form.

12. TCN No. 1-83-0235 (From TCN Log Index)

13. Implementation Date 11/15/83

SS/SF Signature J R Powles

1. **Procedure** 1004.4 (No.) 10 (Present Rev. No.) General Emergency (Title)

2. **Change** (Include page numbers, paragraph numbers, and exact wording of change. (Attach additional sheets if necessary and provide the generic nature of the change on this sheet.)
Page 24.0 Attachment 1, Section IV - To be replaced by a new attachment 1, Section IV.

3. **Reason for Change:**
To provide better guidance in PAR decision making.

4. **Duration of TCN** - No longer than ninety days from implementation date of TCN or as in (a) or (b) below whichever occurs first.

(a) TCN will be cancelled by a procedure revision issued as a result of a Procedure Change Request to be submitted by J. Beaver (Individual Submitting TCN) (Submit PCR as soon as possible) ☑

(b) TCN is not valid after _____ (Fill in circumstances which will result in TCN being cancelled) ☐

5. Is procedure "Important to Safety"? ..... yes ☑ no ☐
If "Yes" a safety evaluation is required (side 2).

6. Is procedure "Environmental Impact Related"? ..... yes ☐ no ☑
If "Yes" an environmental impact evaluation is required (side 2).

7. Does the change effect the intent of the original procedure? ..... yes ☐ no ☑

NOTE: If answers to #5, 6 and 7 are "no" the change may be approved by the Shift Supervisor.

NOTE: If answer to #7 is "yes" the change must be reviewed and approved in accordance with Table 2 prior to implementation.

NOTE: If answer to #7 is "no" and answers to #5 or 6 are "yes" change may be either (a) two member reviewed or (b) reviewed and approved in accordance with table 2.

Review Signatures:

8. Change Recommended By: Jerry R Beaver Date 11-14-83

9. * Procedure Owner Concurrence J R Beaver Date 11-14-83

* Responsible Technical Reviewer, Responsible Office Department Head, or his Designee may concur if Procedure Owner is unavailable
* May be by Telecon

10. Tech. Functions Rep. Notified (If reqd.) N/A ORB 11-14-83 Date _____

11. Approval(s):

(a) Two Members of the GPUN Mng. Staff Route

1. _____ Signature Date

2. _____ Signature Date

Within fourteen (14) days: (Approval per AP 1001A must occur)

_____ Signature Date

_____ Signature Date

(b) Normal Route (Per AP1001A):

(ISR) Joe A Brady 11/15/83 Signature Date

X _____ Signature Date

OPS James R Powles

(c) SS Approval Only: (This approval only used if anwers to questions #5, 6 and 7 are all "No".)

_____ SS Signature Date

14. TCN is Cancelled _____ Shift Supervisor & Shift Foreman _____ Date

8-82 A0001132 A

X005 0/1

Three Mile Island Nuclear Station
Safety/Environmental Impact Evaluation

TCN No. 1 - 83 - 0235

1. **Procedure** 1004.4 (No.) General Emergency (Title)

2. **Safety Evaluation**

Does the attached procedure change:

*(a) increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety? ..... yes ☐ no ☑

*(b) create the possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report? ..... yes ☐ no ☑

*(c) reduce the margin of safety as defined in the basis for any technical specification? ..... yes ☐ no ☑

Details of Evaluation (Explain why answers to above questions are "no" Attach additional pages if required.)

This Change involves replacement of Attachment 1 with a PAR Matrix. It does not increase the probability or possibility of an accident nor reduce the margin of safety as defined in the Tech. Specs.

Evaluation By Jerry R Beaver Date 11/14/83

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

3. **Environmental Impact Evaluation**

Does the attached procedure change:

(a) possibly involve a significant environmental impact? ..... yes ☐ no ☐

(if 3(a) is "yes" answer questions (b) and (c) and fill in "Details of Evaluation" below. If no, state why by filing in the "Details of Evaluation" below.)

*(b) have a significant adverse effect on the environment? ..... yes ☐ no ☐

*(c) involve a significant environmental matter or question not previously reviewed and evaluated by the N.R.C. ..... yes ☐ no ☐

Details of Evaluation (Attach additional pages if required)

N/A

Evaluation By _____ Date _____

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

4. (1) Normal Approval(s) (Per AP 1001A)	4. (2) If "Two (2) members of the GPUN management staff route:	Within fourteen (14) Days Approval per AP 1001A
(SR) Joe A Brady 11/15/83 Signature Date	Signature Date	Signature Date
X Signature Date	Signature Date	Signature Date

INFORMATION ONLY

ATTACHMENT I SECTION IV

PROTECTIVE ACTION RECOMMENDATION GUIDELINES

THESE RECOMMENDATIONS MAY BE DELIVERED ONLY BY

THE EMERGENCY DIRECTOR

1. Consideration shall be given to sheltering if:

   a. Release time is expected to be short (Puff release, <2 hours)

   (AND)

   b. Evacuation could not be well underway prior to expected plume arrival due to short warning time, high wind speeds, and/or foul weather.

2. Consideration shall be given to evacuation if:

   a. A release is expected to occur with projected doses approaching or exceeding:

      1 Rem Whole Body and/or

      5 Rem Child Thyroid

      (AND)

   b. Release time is expected to be long (>2 hours)

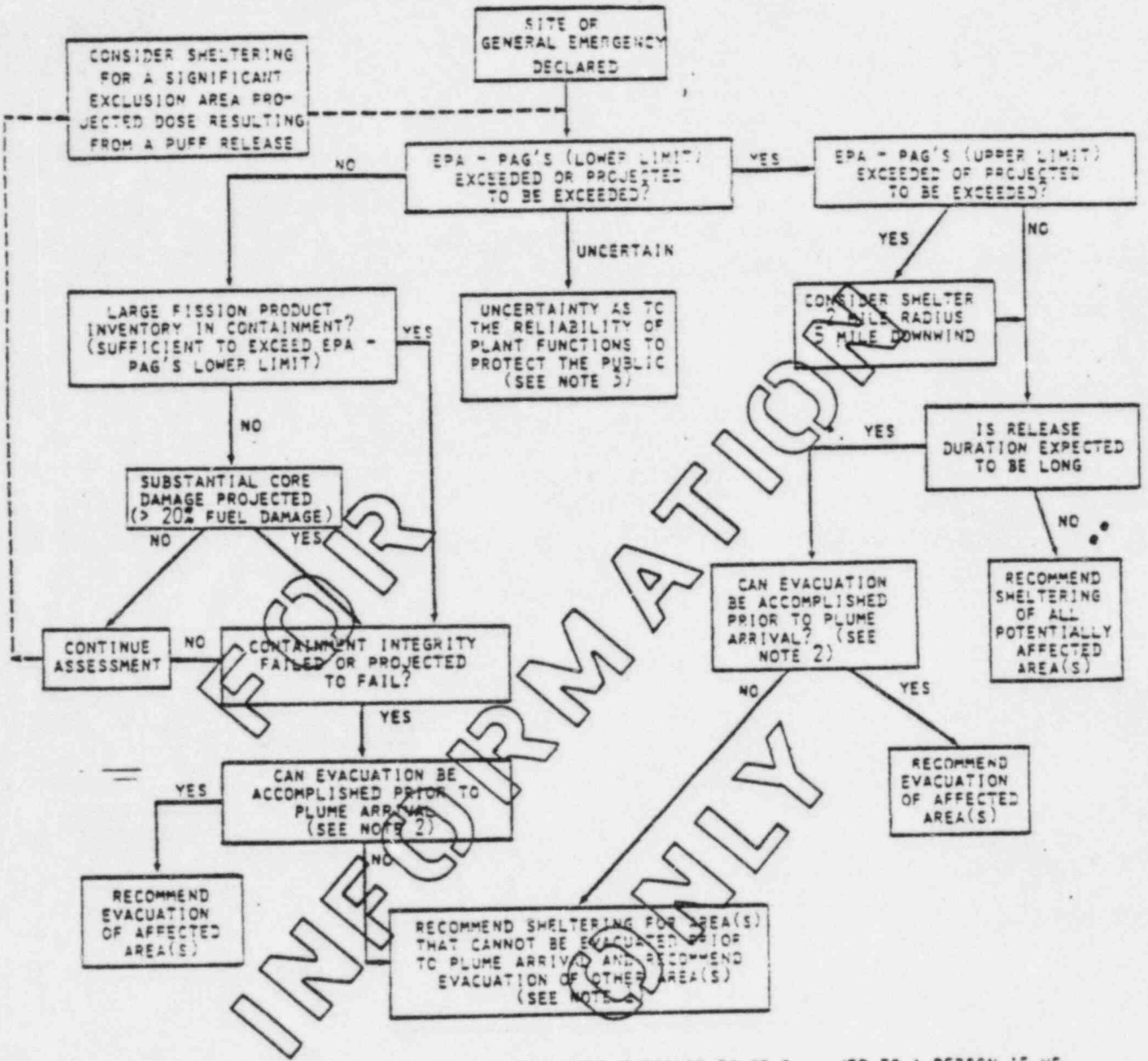
      (AND)

   c. Evacuation can be well underway prior to plume arrival for above release, based upon wind speed and travel conditions.

ATTACHMENT I SECTION IV

LOGIC DIAGRAM

DEVELOPMENT OF PROTECTIVE ACTION RECOMMENDATIONS (PAR



NOTE 1: CONSIDERATION SHOULD BE GIVEN TO THE PROJECTED EXPOSURE TO BE P VED TO A PERSON IF HE SHELTERS VICE EVACUATES. IN SO DOING, YOU MUST FACTOR RELEASE ...TION, RELEASE MAGNITUDE AND ASSUME A PROTECTION FACTOR OF 2 FOR UP TO THE FIRST 2 HOURS OF RELEASE DURATION AND A PF OF 1 FOR > 2 HOURS RELEASE DURATION. THE PATHWAY OF LEAST EXPOSURE SHOULD BE CHOSEN.

NOTE 2:

TMI EVACUATION TIME ESTIMATES

	LOWER (HOURS)	UPPER (HOURS)
BEST ESTIMATE (NIGHT)	5.25	9.50
TYPICAL WEEKDAY (NORMAL)	5.00	10.50
ADVERSE WEATHER	5.00	11.50

LOWER = GOOD STATE OF EMERGENCY READINESS (SLOW SCENARIO)
UPPER = LACK OF ADEQUATE PREPARATION TIME (FAST SCENARIO)

NOTE 3: IN EXERCISING THE JUDGMENT AS TO THE NEED FOR PROTECTIVE ACTION RECOMMENDATIONS, ANY UNCERTAINTY CONCERNING THE STATUS OF PLANT FUNCTIONS NEEDED FOR PROTECTION OF THE PUBLIC, THE LENGTH OF TIME THE UNCERTAINTY EXISTS, THE PROSPECTS FOR EARLY RESOLUTION OF AMBIGUITIES, AND THE POTENTIAL DEGRADATION OF THE PLANT FUNCTIONS NEEDED FOR PROTECTION OF PUBLIC SHOULD BE CONSIDERED. I.E., SIGNIFICANT UNCERTAINTY AS TO THE RELIABILITY OF PLANT FUNCTIONS TO PROTECT THE PUBLIC EXTENDING BEYOND A REASONABLE TIME PERIOD IS A SUFFICIENT BASIS FOR MAKING A PROTECTIVE ACTION RECOMMENDATION TO SHELTER WITHIN A 2 MILE RADIUS OF THE PLANT AND 5 MILES DOWNWIND. CONTINUE PLANT ASSESSMENT.

"TEMPORARY CHANGE"

Three Mile Island Nuclear Station Temporary Change Notice (TCN)

NOTE: Instructions and guidelines in AP1001A must be followed when completing this form

12. TCN No. 1-83-0237 (From TCN Log Index)

13. Implementation Date 11/16/83

SS/SF Signature Steven K. Martin

1. Procedure 1004.15 (No.) 3 (Present Rev. No.) Post Accident In-Plant Sampling (Title)

2. Change (Include page numbers, paragraph numbers, and exact wording of change. (Attach additional sheets if necessary and provide the generic nature of the change on this sheet.)

changes are required as shown on attached copies

3. Reason for Change:

this change is intended to increase the efficacy of the procedure and add clarity

4. Duration of TCN - No longer than ninety days from implementation date of TCN or as in (a) or (b) below whichever occurs first.

(a) TCN will be cancelled by a procedure revision issued as a result of a Procedure Change Request to be submitted by Paul J. Kowalczyk (Individual Submitting TCN) (Submit PCR as soon as possible) ☞

(b) TCN is not valid after _____ (Fill in circumstances which will result in TCN being cancelled) ☐

5. Is procedure "Important to Safety"? ..... yes ☞ no ☐

If "Yes" a safety evaluation is required (side 2).

6. Is procedure "Environmental Impact Related"? ..... yes ☐ no ☞

If "Yes" an environmental impact evaluation is required (side 2).

7. Does the change effect the intent of the original procedure? ..... yes ☐ no ☞

NOTE: If answers to #5, 6 and 7 are "no" the change may be approved by the Shift Supervisor.

NOTE: If answer to #7 is "yes" the change must be reviewed and approved in accordance with Table 2 prior to implementation.

NOTE: If answer to #7 is "no" and answers to #5 or 6 are "yes" change may be either (a) two member reviewed or (b) reviewed and approved in accordance with table 2.

Review Signatures:

8. Change Recommended By J. Mergen Date 11/16/83

9. * Procedure Owner Concurrence Paul J. Kowalczyk Date 11/15/83

* Responsible Technical Reviewer, Responsible Office Department Head, or his Designee may concur if Procedure Owner is unavailable

* May be by Telecon

10. Tech. Functions Rep. Notified (If reqd.) Not Required X.M. Thomas Date 11/16/83

11. Approval(s):

(a) Two Members of the GPUN Mng. Staff Route

1 _____ Signature Date

2 _____ Signature Date

Within fourteen (14) days: (Approval per AP 1001A must occur)

_____ Signature Date

_____ Signature Date

(b) Normal Route (Per AP1001A):

C-SG X.M. Thomas 11/16/83 Signature Date

C.C. Tubbs 11-16-83 Signature Date

OPS [illegible] 11/16/83

(c) SS Approval Only: (This approval only used if anwers to questions #5, 6 and 7 are all "No".)

_____ SS Signature Date

14. TCN is Cancelled _____ Shift Supervisor & Shift Foreman _____ Date

8-82 A0001132 A

Three Mile Island Nuclear Station
Safety/Environmental Impact Evaluation

TCN No. 1-93-0237

1. Procedure 1004.15 No. Post Accident In-Plant Sampling Title

2. **Safety Evaluation**

Does the attached procedure change:

*(a) increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety? ..... yes ☐ no ☒

*(b) create the possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report? ..... yes ☐ no ☒

*(c) reduce the margin of safety as defined in the basis for any technical specification? ..... yes ☐ no ☒

Details of Evaluation (Explain why answers to above questions are "no". Attach additional pages if required.)

these changes do not increase the probability of occurrence or create the possibility for an accident or reduce the margin of safety of the plant; this procedure will be performed post-accident.

Evaluation By [signature] Date 11/15/93

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

3. **Environmental Impact Evaluation**

Does the attached procedure change:

(a) possibly involve a significant environmental impact? ..... yes ☐ no ☐

(if 3(a) is "yes" answer questions (b) and (c) and fill in "Details of Evaluation" below. If no, state why by filling in the "Details of Evaluation" below.)

*(b) have a significant adverse effect on the environment? ..... yes ☐ no ☐

*(c) involve a significant environmental matter or question not previously reviewed and evaluated by the N.R.C. ..... yes ☐ no ☐

Details of Evaluation (Attach additional pages if required)

Evaluation By _____ Date _____

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

4. (1) Normal Approval(s) (Per AP 1001A)	4. (2) If "Two (2) members of the GPUN management staff route:	Within fourteen (14) Days Approval per AP 1001A
[signature] 11/16/93 Signature Date	Signature Date	Signature Date
[signature] 11-16-93 Signature Date	Signature Date	Signature Date

THREE MILE ISLAND NUCLEAR STATION
UNIT NO. 1 EMERGENCY PLAN IMPLEMENTING PROCEDURE 1004.15
POST ACCIDENT IN-PLANT SAMPLING

1.0 PURPOSE

This procedure specifies the method of obtaining and analyzing primary coolant samples under accident conditions.

2.0 DISCUSSION

A requirement exists for timely analysis of primary coolant under emergency conditions without overexposure of personnel. Since radiation levels associated with sampling and analysis may be very high, special precautions are required. The Chemistry Coordinator is responsible for implementing this procedure when requested by the Emergency Director/ Radiological Assessment Coordinator and meeting the criteria set forth in Appendix A, or at their discretion. The Radiological Controls Coordinator is responsible to ensure that the sample is obtained without incurring a radiation exposure to any individual in excess of 3 REM to the whole body and 18 3/4 REM to the extremities.

3.0 REFERENCES

3.1 Drawings C 302 673, C 302 671

3.2 Analysis Area Schematic (Attachment 1)

3.3 Post Accident Sample Equipment Inventory (Attachment 2)

3.4 Post Accident Sampling System Valve Schematic (Attachment 3)

4.0 EQUIPMENT

4.1 Protective clothing (as required by Rad Con Coordinator)

4.2 Self-contained breathing apparatus (as required by Rad Con Coordinator)

4.3 Lead-glass shield

Doc ID 0053w

4.4 Remote handling tools

4.5 Locking syringe with 8 1/2" needle

4.6 (2) Sample shields (lead pigs)

4.7 Wheeled cart

4.8 Other radiation detection and protection equipment, as defined in RWP or by Radiological Controls Coordinator.

4.9 Ensure that the chemistry lab exhaust hoods, handling tools and other equipment are set up as per Procedure 1004.33.

4.10 500 ml SAMPLE BOTTLE (TO collect RCS PURGE WATER)

5.0 PROCEDURE

NOTE: Initial steps upon completion.

5.1 Prerequisites

____ 1. Steps 4.0 to 4.6 in EPIP 1004.33 must be completed prior to sampling.

____ 2. The Nuclear Service Closed Cooling System is in operation per Operating Procedure 1104-11.

____ 3. Verify with control room that the control building ventilation system is in emergency recirculation mode with the AH-E-90 and AH-E-91 fans operating (per OP 1004-19) and will not be interrupted.

____ 4. The Reclaimed Water Portion of the Nuclear Chemical Addition System is operational per Operating Procedure 1104-47.

____ 5. Verify with the control room that the Aux. Bldg. Sump has adequate capacity (at least 100 gallons) to receive water from the sample sink.

6. The original sample container shall be pre-labelled to specify date and time of sample, sample location, sample type and the individual obtaining the sample. Subsequent dilution sample containers shall be pre-labelled to include dilution factor and original sample data.

7. Ensure that the following valves are closed (verify with control room or physically check):

   ____CA-V13

   ____CA-V1

   ____CA-V2

   ____CA-V3

8. Verify valve positions per Attachment 4, Prerequisite Post Accident Sampling Valve Positions

NOTE 1: When making adjustments to CA-V-110, do not stand near the drain funnel in which relief valve CA-RV-5 discharges (west side of back of sample hood).

NOTE 2: The Shift Supervisor must be notified prior to sampling. The RM-R6A recorder chart should be marked accordingly.

9. Verify that the Post Accident RCS Sample Argon bottle pressure is greater than 250 psig, and the associated regulator is set at 6 psig.

10. Verify that the Post Accident RCS sample N_2 bottle pressure is greater than 500 psig, AND the associated regulator is set at 15 psig.

11. Bkr. No. 1 through 9 at Dist. Pnl. MG-1A should be checked closed. ~~is closed power to the Post Accident RCS Sampling vacuum pump~~.

12. Close the sample hood.

5.2 Precautions

5.2.1 Ensure that all required sampling equipment is available before initiating sampling. Check off Appendix C, Post Accident Sample Equipment Inventory.

5.2.2 The appropriate number (as determined by Chemistry Coordinator) of technicians will be equipped in accordance with the RWP or instructions provided by the Radiological Controls Coordinator.

5.3 Procedure

NOTE: Personnel performing sampling will leave Sample Room and notify their Supervisor immediately if it appears that their extended exposure limit (as established by Radiological Assessment Coordinator) might be exceeded.

NOTE: Personnel performing sampling will verify timed procedure steps with the communicator outside of the sampling area.

NOTE: * Denotes valve extension.

5.3.1 Rad Con and Chemistry Technicians will proceed as follows:

NOTE: Radiation levels will be dependent on the status of normal RCS sampling valves. Contact control room to find out position of CAV 1, 2, 3, 13. If open, radiation levels could be high; if not, levels are expected to be relatively low until sampling begins. Chem. Techs. will enter room after discussing radiation hazards with Rad Con Technician performing survey.

CHEMISTRY TECHNICIANS

___ 5.3.1.1 Radiological Controls (Rad Con) Technician will enter Sampling Room carrying Teletektor with probe extended and perform rapid survey of radiation levels. The Rad Con Technician shall leave the room and then discuss radiation levels and other hazards with chemistry personnel assigned to enter the sample room. Stay times shall be established by the Radiological Controls Coordinator. These actions shall be performed in a timely manner to accommodate the three hour time limitation.

___ 5.3.1.2 Place leaded glass shield in front of CA-V-16.

___ 5.3.1.3 Place wheeled cart with two sample shields (one for liquid sample and one for gas sample) in front of the nuclear sampling sink.

___ 5.3.1.4 Open hood and place polyethylene sample bottle (F) with cap removed into hood with remote handling tool.

___ 5.3.1.5 Open or verify open valve *CA-V330 and start vacuum pump.

___ 5.3.1.6 Open or verify open the following valves:

____CA-V317 (on Argon Bottle)

____*CA-V322

___ 5.3.1.7 Open *CA-V321 to purge argon line to drain for 15 seconds then close *CA-V321.

___ 5.3.1.8 Open or verify open the following valves:

____CA-V304 (on Nitrogen Bottle)

____CA-V309 (on Nitrogen line)

____*CA-V314

____*CA-V315

____*CA-V323

____*CA-V322

____ 5.3.1.9 ~~[illegible]~~ Purge nitrogen to drain for 15 seconds then close the following valves:

____CA-V309 (on Nitrogen line)

____*CA-V314

____*CA-V315

____*CA-V323

____*CA-V322

____ 5.3.1.10 Verify that the pressure at PI 1104 has reached approximately 28.8 inches Hg vacuum and record. (If not, verify that CA-V-330 is open, CA-V-329 and CA-V-326 are closed and that the vacuum pump is running. Recheck that PI 1104 read approximately 28.8 inches Hg vacuum.)

____ 5.3.1.11 Close *CA-V330, and stop the vacuum pump.

____ 5.3.1.12 Close or verify closed the following valves:

____CA-V26A

____*CA-V26B

____CA-V26C

____CA-V25C

____ 5.3.1.13 Open or verify open the following valves:

____CA-V25A

____CA-V25B

____ 5.3.1.14 Open *CA-V-35.

___ 5.3.1.15 Open the following valves:

____*CA-V325

____*CA-V324

___ 5.3.1.16 Notify the control room to open the following valves and ensure that they remain open (these valves may shut automatically due to high radiation interlocks). Check ~~line~~ PANEL after acknowledgement has been received:

____CA-V13

____CA-V2

___ 5.3.1.17 Slowly open *CA-V-110 (flow restriction device) to obtain pressure of 40-60 PSIG on CA6 PI.

: CAUTION: Adjust *CA-V-110 carefully since pressure of 125 PSIG downstream will cause CA-RV-5 to lift. :

___ 5.3.1.18 Check temperature indicator TI 1023 for increase in temperature.

___ 5.3.1.19 Check pressure indicator PI 1103 for increase in pressure.

: NOTE: Lack of increase in temperature or pressure indicates NO FLOW -- possible plugging in sample lines. If this occurs, go directly to step 5.4 and proceed with purging lines. :

___ 5.3.1.20 Chemistry Technician should return to step-off pad, check dosimeter and inform Rad Con Technician of exposure received. Allow the sample to recirculate through the 40 ml cylinder at least five minutes before proceeding.

___ 5.3.1.21 Rad Con Technician will enter sample room with Teletektor extended, quickly check radioactivity levels, leave sample room, and record and report results to Rad Con

Coordinator and Chemistry Coordinator. The Rad Con Technician shall discuss radiation levels and other hazards with chemistry personnel assigned to enter the sample room. Stay times shall be assigned by the Rad Con Coordinator. These actions shall be performed in a timely manner to accommodate the three hour time limitation.

5.3.2 Chemistry Technician will proceed as follows:

5.3.2.1 Verify that temperature of 150° or less is indicated on CA4 TI (in sample sink area corner). If temperature exceeds 150°F, stop this procedure and notify the Chemistry Coordinator.

5.3.2.2 Raise hood door, place waste sample bottle under sample point to collect 15 second sample purge, then open the following valves:

CA-V107 (demineralized water)

CA-V16

5.3.2.3 Lower hood to 100LFPM line.

: NOTE: Allow time to purge for approximately 15 seconds. :

5.3.2.4 Close CA-V-16.

5.3.2.5 Obtain grab sample by placing sample bottle (F) under drain line (hold sample bottle with remote handling tool), open valve CA-V-16 and fill sample bottle to premarked fill line level (approximately 20 - 30 ml).

____ 5.3.2.6 Close CA-V-16, leaving CA-V107 (demineralized water) open to flush sink.

____ 5.3.2.7 Move sample bottle to lead pig (C^1)on cart, AND PUSH CART TO TENT BARRIER.

____ 5.3.2.8 Completely close hood.

____ 5.3.2.9 Return to step-off pad and inform Rad Con Technician of exposure received.

____ 5.3.2.12 Rad Con Technician will enter sample room with Teletektor extended, quickly check radioactivity levels, leave sample room and record and report results to Rad Con Coordinator and Chemistry Coordiantor. The Rad Con Technician shall discuss radiation levels and other hazards with chemistry personnel assigned to enter the sample room. Stay times shall be established by the Rad Con Coordiantor. These actions shall be performed in a timely manner to accommodate the three hour time limitation.

5.3.3 Chemistry Technician will proceed as follows:

____ 5.3.3.1 Check that steady state temperature has been reached in 40 ml cylinder, via TI 1023. (If not, return to step-off pad, allow system to recirculate and remotely monitor temperature).

____ 5.3.3.2 Close or verify closed the following valves:

_____*CA-V324

_____*CA-V325

_____*CA-V110

_____CA-V33

_____CA-V34

____ 5.3.3.3 Close the following valves and notify the control rrom that they are closed:

____CA-V-13

____CA-V-2

____ 5.3.3.4 Record pressure on PI 1103 and temperature (°F) on TI 1023 on data sheet (Appendix B).

____a. If temperature on TI 1023 is greater than 150°F, open valve CA-V313 to allow demineralized water into cooling bath. (If not, go to step 5.3.3.5).

____b. Leave panel and monitor from remote location.

____c. When temperature on TI 1023 drops below 150°F, return to panel and close valve CA-V313.

____ 5.3.3.5 Open or verify open the following valves:

____*CA-V315

____*CA-V326

____ 5.3.3.6 Record pressure at PI 1104 on data sheet (Appendix B).

____ 5.3.3.7 Open *CA-V-321.

____ 5.3.3.8 Open valve *CA-V-323 as required to bubble argon through 40 ml sample cylinder.

____ 5.3.3.9 Close valve *CA-V326 when pressure at PI 1104 reaches 2 psig.

____ 5.3.3.10 Record exact pressure at PI 1104 on data sheet (Appendix B).

____ 5.3.3.11 Withdraw gas sample from 300 ml expansion cylinder via the septum guide tube using the locking syringe with 8 1/2 inch needle.

____ 5.3.3.12 Remove syringe from septum, and place syringe in lead pig (c^2) on cart.

____ 5.3.3.13 Open hood door and close valve CA-V107.

____ 5.3.3.14 Take samples on cart to laboratory for analysis.

____ 5.3.3.15 Upon returning from laboratory, check dosimeter and inform Rad Con Technician of exposure received.

NOTE:	The next procedure section, cleanup of gas sampling train, should be performed within 48 hours after gas sample has been taken, or prior to taking the next sample, whichever occurs first.

Rad Con Technician will first enter sample room with Teletektor extended, quickly check radiation levels, leave room, and record and report results to Rad Con Coordinator and Chemistry Coordinator. The Rad Con Technician shall discuss radiation levels and other hazards with chemistry personnel assigned to enter the sample room. Stay times shall be established by the Rad Con Coordinator. These actions shall be performed in a timely manner to accommodate the three hour time limitation.

5.3.4 Chemistry Technician shall proceed as follows:

____ 5.3.4.1 Close or verify closed the following valves:

_____*CA-V321

_____*CA-V315

____ 5.3.4.2 Start vacuum pump.

____ 5.3.4.3 Open the following valves:

_____*CA-V330

_____*CA-V326

____ 5.3.4.4 When pressure indicator PI 1104 reads approximately 28.8 inches Hg Vac, close valve CA-V330 and stop vacuum pump.

____ 5.3.4.5 Open or verify open the following valves for approximately 30 seconds to drain water out of the gas sampling system:

____*CA-V329

____*CA-V315

____*CA-V322

____ 5.3.4.6 Close *CA-V326.

____ 5.3.4.7 Open the following valves and flush lower system for 2 minutes (return to step off pad while waiting):

____CA-V312

____*CA-V314

____ 5.3.4.8 Open *CA-V326.

____ 5.3.4.9 Close *CA-V315, and flush upper system for 2 minutes (return to step off pad while waiting).

____ 5.3.4.10 Close valve CA-V312.

____ 5.3.4.11 Open valve *CA-V315, and let system drain for 1 minutes (return to step off pad while waiting).

____ 5.3.4.12 Open CA-V309 (on nitrogen line).

____ 5.3.4.13 Purge for 30 seconds with nitrogen to remove remaining moisture.

____ 5.3.4.14 Close or verify closed the following valves:

____CA-V304 (on Nitrogen bottle)

____CA-V309 (on Nitrogen line)

____*CA-V314

_____*CA-V326

_____*CA-V329

_____*CA-V315

_____*CA-V323

____ 5.3.4.15 Open *CA-V321 for 3 seconds to purge argon line.

____ 5.3.4.16 Close or verify closed the following valves to decommission the system:

_____CA-V317 (on Argon bottle)

_____CA-V319

_____*CA-V321

_____*CA-V322

____ 5.3.4.17 Technician should return to step off pad, check dosimeter, and inform Rad Con technician of exposure received.

NOTE: The following steps are to be taken only in the event of a line blockage in the sample lines.

5.4 In the event of blockage in sample lines, proceed as follows:

____ 5.4.1 Open or verify open the following valves:

_____CA-V309 (on Nitrogen line)

_____*CA-V314

____ 5.4.2 Record as found position on data sheet (Appendix B) and open or verify open valve *CA-V325.

____ 5.4.3 Record as found position on data sheet (Appendix B) and close or verify closed valve *CA-V324.

____ 5.4.4 Open or verify open valve *CA-V315.

____ 5.4.5 Record as found position on data sheet (Appendix B) and close or verify closed CA-V306 (on Nitrogen line).

____ 5.4.6 Open valve CA-V308 (on Nitrogen line) and purge sample lines for 30 seconds.

____ 5.4.7 Close the following valves:

____ *CA-V315

____ *CA-V314

____ CA-V308 (on Nitrogen line)

____ 5.4.8 Return the following valves tc the as found positions recorded on data sheet (Appendix B)

____ *CA-V325

____ *CA-V324

____ CA-V306 (on Nitrogen line)

____ 5.4.9 Return to step 5.3.1.17 and proceed.

APPENDIX A

Post Accident Sample Procedure Initiation Setpoints*

RMS Parameter	Setpoint
RM-L1 High Channel	8.5E3 cpm
Low Channel	4.5E5 cpm
RM-G8	10 mr/hr
RMA-2 Gaseous Channel	1.0E4 cpm
RMA-9 Gaseous Channel	7.1E3 cpm
RMA-5 Gaseous Channel	4.0E3 cpm

* The setpoints are provided to the RAC for guidance in determining the necessity of procurement of a RCS sample in accordance with this procedure and analyzed in accordance with 1004.33. Any RCS samples taken below these setpoints during an emergency requires that the RAC consider whether any additional radiological precautions are necessary.

APPENDIX B

Data Sheet for Post Accident Sampling System

1 Record pressure on PI 1104 from Step 5.3.1.10 _____

2 Record pressure on PI 1103 from Step 5.3.3.4 _____

3 Record temperature on TI 1023 from Step 5.3.3.4 _____

4 Record pressure at PI 1104 from Step 5.3.3.6 _____

5 Record pressure at PI 1104 from Step 5.3.3.10 _____

If Step 5.4 (Removing Line Blockage) is performed, Record the following:

Step 5.4.2 As found position for *CA-V325 _____

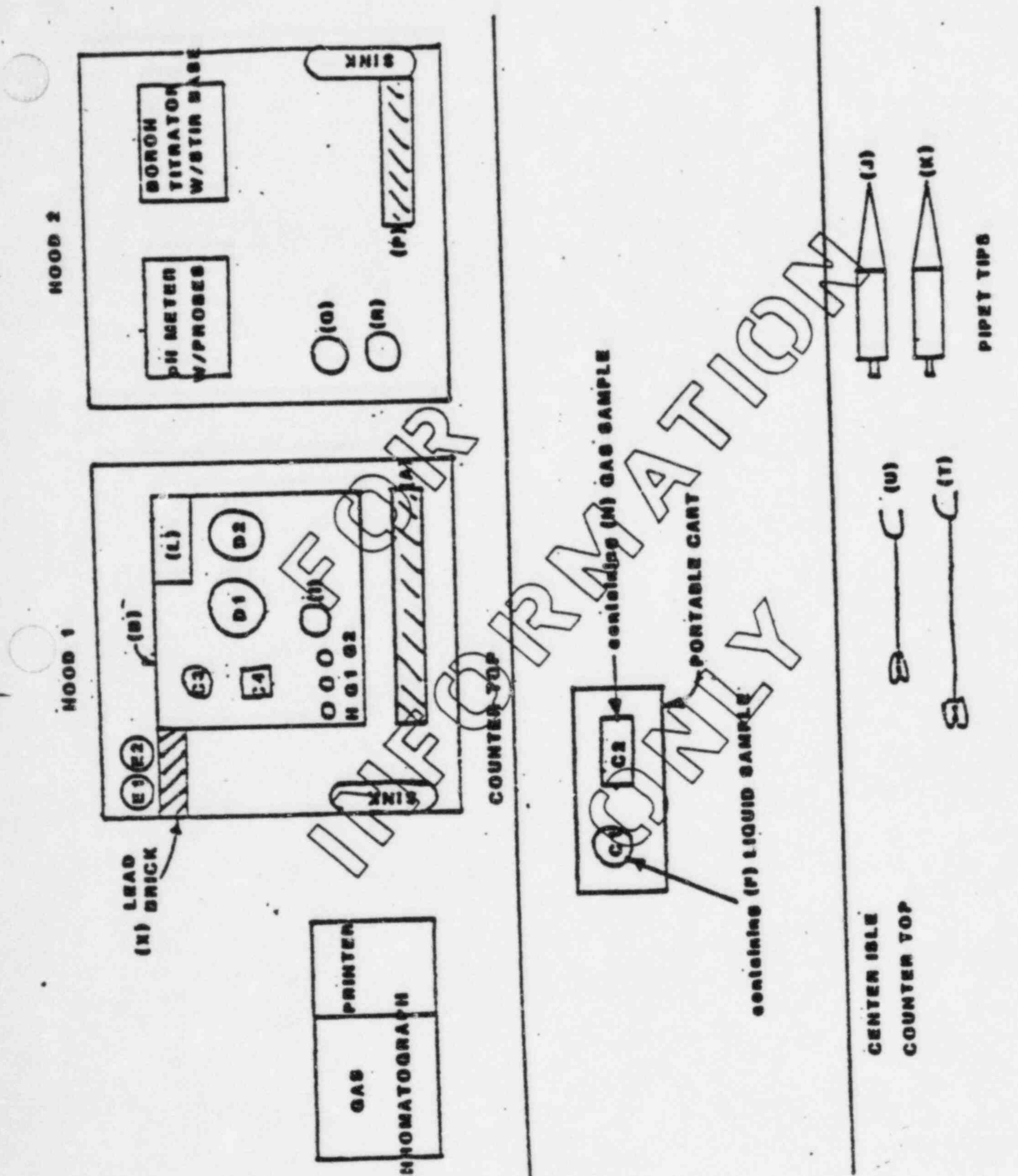
Step 5.4.3 As found position for *CA-V324 _____

Step 5.4.5 As found position for CA-V306 (on Nitrogen line) _____

ATTACHMENT 1

Analysis Area Schematic

DRAFT



ATTACHMENT 2

INVENTORY CHECKED BY _____ DATE _____

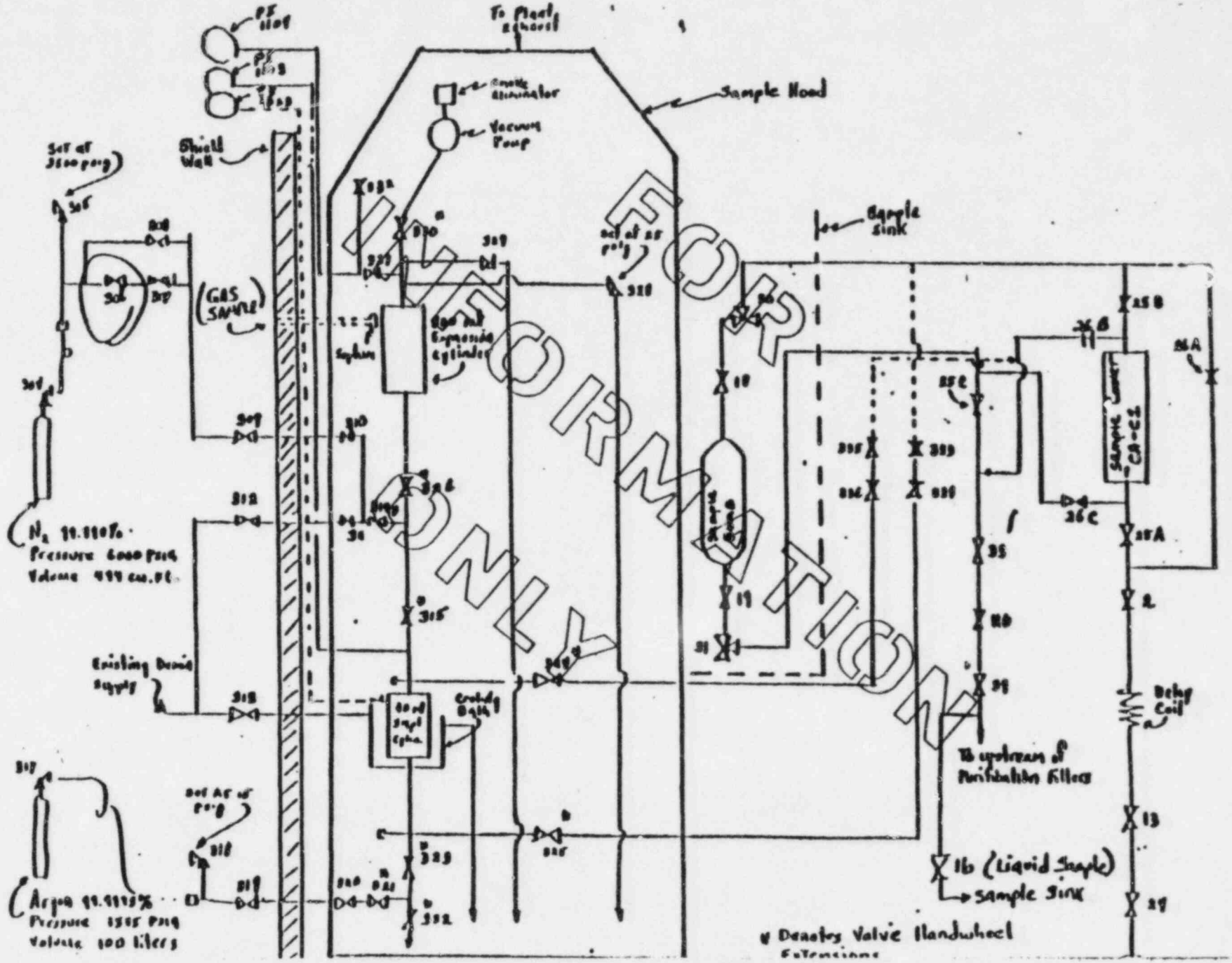
POST ACCIDENT SAMPLE EQUIPMENT INVENTORY

DESIGNATION	EQUIPMENT	AMT. REQ.	AMT. IN LOCKER
A	4" Thick x 24" long x 12" high laminated glass shield	1	
B	Spill catch pan 24" x 24" x 2" deep	1	
C^1	Lead pig for liquid sample bottle	1	
C^2	Lead pig for gas (syringe) sample	1	
C^4	Lead pig for Head No. 1	1	
D^1	Magnetic stir base	1	
D^2	Magnetic stir base	1	
E^1	1 liter poly bottle containing 1000 ml DI water and stir bar	1	
E^2	1 liter poly bottle containing 1000 ml DI water and stir bar	1	
F	125 ml sample bottle containing sample (on portable cart)	1	
G^1	10 ml counting vial containing 9 ml of DI water	1	
G^2	10 ml counting vial containing 9 ml of DI water	1	
H	SCINTILLATION VIAL	1	
I	250 ml beaker containing 99 ml DI water and stir bar	1	

ATTACHMENT 2 (Cont'd)
POST ACCIDENT SAMPLE EQUIPMENT INVENTORY

DESIGNATION	EQUIPMENT	AMT. REQ.	AMT. IN LOCKER
J	0.1 ml eppendorf pipet w/tip on center isle counter top	1	
K	1.0 ml eppendorf pipet w/tip on center isle counter top	1	
L	Lead pig for used pipet tips and syringe	1	
N	1 ml locking syringe w/8 1/2" needle	1	
O	Piston buret w/stir base (for boron titration)	1	
P	Laminated glass shield 12" x 12" x 4" thick	1	
Q	Mannitol "D" w/scoop	1	
R	Dilute HCl for pH adjustment	1	
T	3' long handled tongs	1	
U	Short handled tongs	1	
V	Poly bags	1	
W	Roll of tape	1	
X	Lead brick	1	

ATTACHMENT 3: POST ACCIDENT SAMPLING SYSTEM VALVE SCHEMATIC



20.0

1004.15
DRAFT

ATTACHMENT 4
PREREQUISITE POST ACCIDENT SAMPLING VALVE POSITIONS

VALVE NO.	VALVE DESCRIPTION	POSITION
CA-V-16	RC letdown sample valve	Closed
CA-V-29	Isolation to upstream of MU-F-1A/C	Open
CA-V-110	RC Sample Pressure Control	Closed
CA-V-333	To RC Gas Sample Cylinder	Open
CA-V-334	To RC Gas Sample Cylinder	Open
CA-V-335	From RC Gas Sample Cylinder	Open
CA-V-336	From RC Gas Sample Cylinder	Open
CA-V-324	From RC Gas Sample Cylinder	Closed
CA-V-325	To RC Gas Sample Cylinder	Closed
CA-V-323	40 ml Cylinder Drain	Closed
CA-V-315	40 ml Cylinder to 300 ml Cylinder	Closed
CA-V-326	300 ml Cylinder Inlet	Closed
CA-V-327	PI 1104 Root Valve	Open
CA-V-332	PI 1104 Pressure Test	Closed
CA-V-329	300 ml Cylinder to Vacuum Pump Drain	Closed
CA-V-330	Vacuum Pump Inlet	Open
CA-V-314	N_2 + Demin. Water Inlet	Closed
CA-V-312	Demin. Water Flush Inlet	Closed
CA-V-309	N_2 Purge Needle Valve	Closed
CA-V-308	N_2 Pressure Regulator Bypass	Closed
CA-V-306	N_2 Pressure Regulator Inlet	Open
CA-V-304	N_2 Bottle Outlet	Closed
CA-V-313	Demin. Water to 40 ml Cylinder Cooling Bath	Closed
CA-V-321	Argon Purge Inlet	Closed

ATTACHMENT 4

PREREQUISITE POST ACCIDENT SAMPLING VALVE POSITIONS

VALVE NO.	VALVE DESCRIPTION	POSITION
CA-V-319	Argon Purge Needle Valve	Open
CA-V-317	Argon Bottle Outlet	Closed
CA-V-322	40 ml Cylinder Drain	Closed
CA-V-30	RC Bomb Isolation	Closed
CA-V-31	RC Bomb Isolation	Closed
CA-V-25C	RC Cold Sample Sel. Valve	Closed
CA-V-337	DI Water Inlet	Open
CA-V-33	Capillary Tube Isolation Valve, RC Sample	Open
CA-V-34	Capillary Tube Isolation Valve, RC Sample	Open
CA-V-2	RC Sample Cont. Isolation	Closed
CA-V-13	RC Letdown Sample Isolation	Closed

"TEMPORARY CHANGE"

Three Mile Island Nuclear Station Temporary Change Notice (TCN)

NOTE: Instructions and guidelines in AP1001A must be followed when completing this form.

12. TCN No. 1-83-0238 (From TCN Log Index)

13. Implementation Date 11/16/83

SS/SF Signature Steven K. Martin

1. **Procedure** 1004.33 (No) 4 (Present Rev. No) Handling High Activity Reactor Coolant Samples - Boron, Chloride, Gas and Gamma Spectrum Analysis (Title)

2. **Change** (include page numbers, paragraph numbers, and exact wording of change. Attach additional sheets if necessary and provide the generic nature of the change on this sheet.)
changes as required as shown on attached pages

3. **Reason for Change:** these changes reflect in house chloride analysis and add provision for estimation of core damage

4. **Duration of TCN** - No longer than ninety days from implementation date of TCN or as in (a) or (b) below whichever occurs first.
   (a) TCN will be cancelled by a procedure revision issued as a result of a Procedure Change Request to be submitted by Paul J. Kowal (Individual Submitting TCN) (Submit PCR as soon as possible) ☑
   (b) TCN is not valid after _____ (Fill in circumstances which will result in TCN being cancelled) ☐

5. Is procedure "Important to Safety"? ..... yes ☑ no ☐
   If "Yes" a safety evaluation is required (side 2).

6. Is procedure "Environmental Impact Related"? ..... yes ☐ no ☑
   If "Yes" an environmental impact evaluation is required (side 2).

7. Does the change effect the intent of the original procedure? ..... yes ☐ no ☑

   NOTE: If answers to #5, 6 and 7 are "no" the change may be approved by the Shift Supervisor.

   NOTE: If answer to #7 is "yes" the change must be reviewed and approved in accordance with Table 2 prior to implementation.

   NOTE: If answer to #7 is "no" and answers to #5 or 6 are "yes" change may be either (a) two member reviewed or (b) reviewed and approved in accordance with table 2.

Review Signatures:

8. Change Recommended By A Mergen Date 11/16/83

9. * Procedure Owner Concurrence Paul J. Kowal Date 11/15/83

   * Responsible Technical Reviewer, Responsible Office Department Head, or his Designee may concur if Procedure Owner is unavailable
   * May be by Telecon

10. Tech. Functions Rep. Notified (If reqd.) (not required) (616) X _____ Date _____

11. Approval(s):

(a) Two Members of the GPUN Mng. Staff Route

1 _____ Signature Date

2 _____ Signature Date

Within fourteen (14) days: (Approval per AP 1001A must occur)

_____ Signature Date

_____ Signature Date

(b) Normal Route (Per AP1001A):

(616) _____ Signature Date

(release) K C Fisher 11-16-83 Signature Date

(51) _____ 11/16/83

(c) SS Approval Only: (This approval only used if anwers to questions #5, 6 and 7 are all "No".)

_____ SS Signature Date

14. **TCN is Cancelled** _____ Shift Supervisor & Shift Foreman _____ Date

8-82 A0001132 A

Three Mile Island Nuclear Station
Safety/Environmental Impact Evaluation

TCN No. 1-83-0238

1. Procedure 1004.33 No. Handling Rad Activity Reactor Coolant Samples - Boron, Chloride, Gas, and Gamma Spectrum Title Analysis

2. **Safety Evaluation**

Does the attached procedure change:

*(a) increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety? ..... yes ☐ no ☒

*(b) create the possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report? ..... yes ☐ no ☒

*(c) reduce the margin of safety as defined in the basis for any technical specification? ..... yes ☐ no ☒

Details of Evaluation (Explain why answers to above questions are "no". Attach additional pages if required.)

These changes do not increase the probability of occurrence or create the possibility for an accident or reduce the margin of safety of the plant; this procedure will be performed post-accident.

Evaluation By Emily J. Kowal Date 11/15/83

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

3. **Environmental Impact Evaluation**

Does the attached procedure change:

(a) possibly involve a significant environmental impact? ..... yes ☐ no ☐

(if 3(a) is "yes" answer questions (b) and (c) and fill in "Details of Evaluation" below. If no, state why by filing in the "Details of Evaluation" below.)

*(b) have a significant adverse effect on the environment? ..... yes ☐ no ☐

*(c) involve a significant environmental matter or question not previously reviewed and evaluated by the N.R.C. ..... yes ☐ no ☐

Details of Evaluation (Attach additional pages if required)

Evaluation By _____ Date _____

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

4. (1) Normal Approval(s) (Per AP 1001A)	4. (2) If "Two (2) members of the GPUN management staff route:	Within fourteen (14) Days Approval per AP 1001A
(GSC) K.K. Tang 11/23 Signature Date	Signature Date	Signature Date
(Future) E.J. Kuhns 11-16-83 Signature Date	Signature Date	Signature Date

8-82 A00011328

THREE MILE ISLAND NUCLEAR STATION
UNIT NO. 1 EMERGENCY PLANNING IMPLEMENTING PROCEDURE 1004.33
HANDLING HIGH ACTIVITY REACTOR COOLANT
SAMPLES - BORON, CHLORIDE, GAS, AND GAMMA
SPECTRUM ANALYSIS - ACCIDENT CONDITIONS

1.0 PURPOSE

The purpose of this procedure is to provide guidance to technicians involved in the handling and preparation of post accident reactor coolant samples for boron analysis, chloride analysis, gamma isotopic analysis and gas analysis, as described in NUREG 0737. It is designed to provide prompt analytical results for the above mentioned parameters while minimizing technician exposures per the requirements of NUREG 0737. Specifically, these requirements include:

1. Boron analysis completed within 3 hours or less from the time a decision is made to obtain a sample.
2. Gamma isotopic analysis for evaluation of degree of core damage completed within 3 hours or less from the time a decision is made to obtain a sample.
3. Chloride analysis completed within 1 shift (assume 8 hours), if done in-house.
4. Dissolved Hydrogen Gas analysis completed within 3 hours or less from the time a decision is made to obtain a sample.
5. The above sampling and analysis completed without incurring a radiation exposure to any individual in excess of 3 Rem to the whole body or 18 3/4 Rem to the extremities.
6. If the chloride level of the liquid sample taken exceeds 0.15 ppm and either, (1) the hydrogen level cannot be maintained or returned to greater then 10 cc/kg, or (2) 30 days have elapsed, then a sample will also be analyzed for dissolved oxygen.

All of the above requirements assume a highly radioactive initial sample with a source term as specified in Regulatory Guide 1.4. The Chemistry Coordinator is responsible for implementing this procedure in coordination with procurement of a post-accident sample in accordance with 1004.15.

2.0 ATTACHMENTS

2.1 Attachment 1 - Analysis Area Schematic

2.2 Attachment 2 - Post Accident Sample Equipment Inventory

2.3 Attachment 3 - Calculations to estimate Core Damage

2.4 Attachment 4 - Post Accident Reactor Coolant Sample Summary

3.0 EMERGENCY ACTION LEVELS

3.1 An emergency condition has been declared, and a request has been made for a gamma spectrum analysis, boron analysis and chloride analysis of high activity reactor coolant liquid sample, and a gas analysis of a high activity reactor coolant gas sample (both samples are obtained per procedure 1004.15).

4.0 PROCEDURE

NOTE:	Initial steps upon completion.

NOTE:	Steps 4.0 to 4.6 shall be completed prior to taking a sample in accordance with 1004.15.

____ 4.1 Verify Radiological Control personnel are available to assist Chemistry technicians by providing complete radiological coverage; (i.e., prescribe proper protective clothing, dosimetry requirements, Scott Air Pac or supplied breathing air requirements,

perform initial and continual dose rate survey while chemistry technician works with sample, monitor Chemistry Technicians exposure throughout the procedure.)

NOTE:	The Radiological Controls Coordinator shall ensure that chemistry personnel conform to the exposure Limits specified in procedure 1004.9 (Radiological Controls During Emergencies).

NOTE:	If necessary, transport the sample to the dilution station. Reduce radiation levels to minimize interference on the operation of the counting facility.

____4.2 Ensure that the shift supervisor has been notified that work on the sample is to commence and provides verification that the control building ventillation system is in the emergency recirculation mode of operation with the AH-E-90 and AH-E-91 fans operating and will not be interrupted.

____4.3 Ensure that the appropriate number of Chemistry Technicians (as determined by the Chemistry Coordinator) are dressed and prepared to perform sample preparation and analysis.

____4.4 Ensure that all personnel involved with handling and analyzing sample are thoroughly familiar with this and other referenced procedures.

____4.5 Prior to handling liquid sample, establish equipment in chemistry laboratory exhaust hoods per Attachment 1. All dilution water must be added to the containers and the containers prelabelled prior to handling sample. Label sample bottle F and corresponding lead pig with labels stating SAMPLE BOTTLE F and time, date and name of

Chemistry Technician. Label Vial H and corresponding lead pig with labels stating VIAL H and time, date and name of Chemistry Technician. Start stirrers D^1 and D^2, run KAP for Boron.

____4.6 Prior to handling gas sample, prepare gas chromatograph (GOW-MAC 69-570) and Strip Chart Recorder (GOW-MAC 70-700) and calibrate with Standards, in accordance with Procedure N1956, N1957. Check that chromatograph is stable.

NOTE:	The remainder of this procedure will be performed after a liquid and a gas sample have been taken and samples have been brought to the laboratory in lead pigs, and the above steps (4.0 - 4.6) have been completed.

____4.7 Gas Analysis

____ 4.7.1 Remove syringe containing gas sample from lead pig on cart.

____ 4.7.2 Inject sample into gas chromatograph and discard syringe into lead receptacle (L).

____ 4.7.3 Measure the height of the hydrogen peak from base line.

____ 4.7.4 When sample has been completed, shut down the recorder by turning the recorder to "Off" and lift the pen.

____4.8 Boron, Chloride and Gamma Scan Sample Preparation

NOTE:	All dilutions shall be done with (E^1) and (E^2) on stir plates to ensure proper mixing.

____ 4.8.1 Utilizing long handled tongs, the Chemistry Technician shall remove sample (F) from transport pig and place in pig (C^4) (refer to Attachment 1).

4.8.2 Quickly and carefully pipet 0.1 ml of sample, using Eppendorf pipet (J), from sample bottle (F) to the 1 liter poly bottle (E^1).

4.8.3 Discard tip from pipet (J) into lead receptacle (L).

4.8.4 Transfer 1 ml from SAMPLE BOTTLE (F) to beaker (I) using pipet (K). Discard tip from pipet (K) into lead receptacle (L).

4.8.5 Place new tip on pipet (K) and transfer 2 ml from sample bottle (F) to vial (H). Close lid on vial (H). Put vial (H) in lead transfer pig (C^3) and place pig on cart. Discard tip from pipet (K) into lead receptacle and place new tip on pipet (K).

4.8.6 Using short handled tongs, replace cap on SAMPLE BOTTLE (F). Place SAMPLE BOTTLE (F) back into transfer pig [previously used for transporting bottle (F)], place on cart and move cart to far side of the lab.

4.8.7 Using pipet (K), transfer 1.0 ml from 1 liter poly bottle (E^1) to 1 liter poly bottle (E^2) and 1 ml to vial (G^1). Cap vial (G^1) and cap (E^1) and place (E^1) in the back left hand corner of hood 1 behind the lead brick.

4.8.8 Discard tip from pipet (K) into lead receptacle (L), and place new tip on pipet (K).

4.8.9 Using short handled tongs, transfer beaker (I) from hood 1 to hood 2 (place on boron titrator magnetic stir base.

4.8.10 With new tip on pipet (K), transfer 1 ml from bottle (E^2) to vial (G^2), Cap (G^2). Cap (E^2) and discard tip from pipet (K) into lead receptacle (L). Close cover on receptacle (L). Place (E^2) in back left hand corner of hood 1 behind the lead brick.

4.8.11 Place vials (G^1) and (G^2) into individual poly bags and tape bags shut. Survey (G^1) and (G^2) with a dose rate instrument.

NOTE: It may be necessary to remove the sample from the primary laboratory to conduct an accurate dose rate due to a high background radiation level in the laboratory.

NOTE: For guidance, samples reading > 1 mr/hr will be too active for counting on the Geli detector/MCA system. i.e., greater than 15 percent dead time. If both samples read > 1 mr/hr, further dilution of the contents of bottle (E^2) is required. Note all subsequent dilutions of (E^2) so that correct volume calculations can be performed.

NOTE: If background noble gas levels result in interference with Geli analysis (high deadtime on MCA) insure shield cover on Geli cave is closed and initiate compressed air purge of cave.

NOTE: If background levels do not allow the use of the TMI-I Geli/MCA system, analysis may be performed by transporting samples to TMI-2 or to the mobile lab of the Environmental Assessment Group.

NOTE: If counting vial (G^1), volume for use is 1×10^{-4} ml. If counting vial (G^2), volume is 1×10^{-7} ml.

4.9 Gamma Scan

4.9.1 Transport appropriate sample(s) (those reading <1 mr/hr) to count room and count on Geli detector/MCA system per 1990.1.

NOTE:	For a Post Accident Sample, after placing the sample on the detector, check the dead time by starting a count using the MCA keyboard control. The dead time should be <15 percent.

NOTE:	Log onto the VT-100 terminal by typing HELLO POST ACCIDENT/SAMPLE. Start the sample count by answering the computer prompts. At the end of the count, SPECTRAN-F will print a report. Record results in Attachment 3.

4.10 Boron Analysis

___ 4.10.1 Perform boron analysis on the contents of the beaker (I) per Chemistry Procedure CPN 1904 observing the following cautions and exceptions:

a. In the calculations given in section 6.0 of Chemistry Procedure CPN 1904, sample volume, "S", is 1 ml.

b. Use of 1 KAP standard for NaOH standardization may be used vice 3 as specified in CP N1904.

c. No spiked sample will be run.

___ 4.10.2 Following titration, pour the contents of beaker (I) down hood sink and flush sink for approximately 2 minutes with demin water.

___ 4.10.3 Perform chloride analysis on the contents of the vial (H).

5.0 FINAL CONDITIONS

The remainder of this procedure can be done at a later time, to allow the radioactivity level to decay:

5.1 Lead pig(s) containing sample bottle (F) must be placed in a locked High Radiation Cubicle (for example, precoat filter room) as directed by the Radiological Controls Coordinator. The exact location must be specified in the space below.

High Radiation Cubicle location: _____

_____

_____

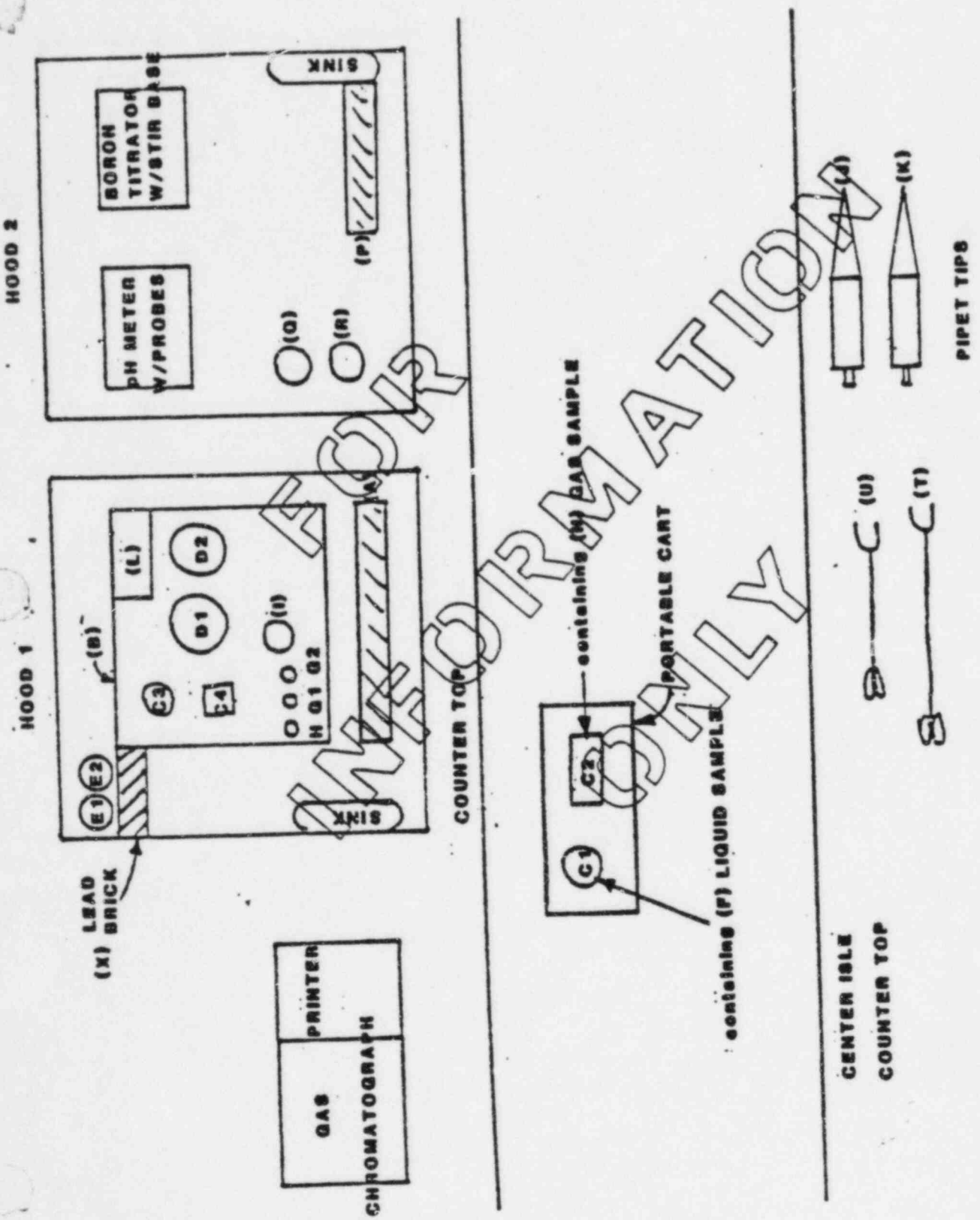
5.2 Poly bottles E1 and E2 must be emptied into the sink and the sink flushed for 5 minutes with demineralized water.

5.3 Complete Attachment 4, Post Accident Reactor Coolant Sample Summary.

5.4 Notify the Shift Supervisor that sampling and analysis of the Post Accident Sample have been completed.

ATTACHMENT I
Analysis Area Schematic

1004.33
DRAFT



ATTACHMENT 2

POST ACCIDENT SAMPLE EQUIPMENT INVENTORY

DESIGNATION	EQUIPMENT	AMT. REQ.	AMT. IN LOCKER
A	4" Thick x 24" long x 12" high laminated glass shield	1	
B	Spill catch pan 24" x 24" x 2" deep	1	
C^1	Lead pig for liquid sample bottle	1	
C^2	Lead pig for gas (syringe) sample	1	
C^3	Lead pig for chloride sample	1	
C^4	Lead pig for hood No. 1	1	
D^1	Magnetic stir base	1	
D^2	Magnetic stir base	1	
E^1	1 liter poly bottle containing 1000 ml DI water and stir bar	1	
E^2	1 liter poly bottle containing 1000 ml DI water and stir bar	1	
F	125 ml sample bottle containing sample (on portable cart)	1	
G^1	10 ml counting vial containing 9 ml of DI water	1	
G^2	10 ml counting vial containing 9 ml of DI water	1	
H	10 ml scintillation vial for chloride analysis	1	
I	250 ml beaker containing 99 ml DI water and stir bar	1	

ATTACHMENT 2 (Cont'd)

POST ACCIDENT SAMPLE EQUIPMENT INVENTORY

DESIGNATION	EQUIPMENT	AMT. REQ.	AMT. IN LOCKER
J	0.1 ml eppendorf pipet w/tip on center isle counter top	1	
K	1.0 ml eppendorf pipet w/tip on center isle counter top	1	
L	Lead pig for used pipet tips and syringe	1	
N	1 ml locking syringe w/8 1/2" needle	1	
O	Piston buret w/spir base (for boron titration)	1	
P	Laminated glass shield 12" x 12" x 4" thick	1	
Q	Mannitol "D" w/scoop	1	
R	Dilute HCl for pH adjustment	1	
T	3' long handled tongs	1	
U	Short handled tongs	1	
V	Poly bags	1	
W	Roll of tape	1	
X	Lead brick	1	

Inventory Check By_____

Date_____

ATTACHMENT 3

1.0 PURPOSE

The purpose of this calculation is to provide an initial gross estimate to the extent of core damage by gamma spectrum analysis following accident conditions.

2.0 REFERENCES

2.1 TDR-431, Rev. 0, Method for Estimating Extent of Core Damage Under Severe Accident Conditions.

3.0 PROCEDURE

3.1 Basis For Estimating Core Damage

3.1.1 The following NRC matrix shall be used in reporting the estimated degree of core damage utilizing specific radionuclide data and other plant parameters.

	Degree of Degradation	Minor (< 10%)	Intermediate (10% - 50%)	Major (> 50%)
	No Fuel Damage	←	1	→ 1
G	Cladding Failure	2	3	4
F	Fuel Overheat	5	6	7
M	Fuel Melt	8	9	10

The matrix consists of four general classes of damage and three degrees of damage within each of the classes except for the "NO FUEL DAMAGE" class.

3.2 Calculations

3.2.1 Gamma Scan Results

I-131 = _____ µCi/ml
I-133 = _____ µCi/ml
Ba-140 = _____ µCi/ml
Cs-134 = _____ µCi/ml
Cs-137 = _____ µCi/ml
Ru-103 = _____ µCi/ml
Te-129M = _____ µCi/ml

ATTACHMENT 3 (Cont'd)

3.2.2 Plant Parameters

RCS Tave = _____ °F at estimated time of failure.

K = _____ Density Correction Factor from TABLE 1 assume sample at 90°F.

V_2 = V Sump _____ gal. *

V_1 = V RCS _____ gal. *

(V_{RCS} at 523°F is approximately 70,000 gal.)

Power level at Failure _____ %

* Corrected to operating T_{ave}

NOTE: If power level changed by more than 10% in last 22 days, record the following:

Old Power Level _____ %

Time to make Change (T_c) _____ hr ÷ 2 = _____ hr (median time to make the change)

Time since completion of change to when core damage is expected to have occurred (f)

(f) _____ hr

$$t = \frac{T_c}{2} + f + 24$$

t = median time to make power change plus the time after the power change until damage is expected to have occurred, in days.

3.2.3 Activity Correction

$$Ae_{I-133} = \left(\frac{A_{I-133}V_1 + A_{I-133}V_2 + \ldots + A_{I-133}V_1}{V_{RCS}}\right) K = \_\_\_\_\_ \mu Ci/ml$$

$$Ae_{I-131} = \left(\frac{A_{I-131}V_1 + A_{I-131}V_2 + \ldots + A_{I-131}V_1}{V_{RCS}}\right) K = \_\_\_\_\_ \mu Ci/ml$$

$$Ae_{Ba-140} = \left(\frac{A_{Ba-140}V_1 + A_{Ba-140}V_2 + \ldots + A_{Ba-140}V_1}{V_{RCS}}\right) K = \_\_\_\_\_ \mu Ci/ml$$

ATTACHMENT 3 (Cont'd)

A_e = Equivalent Nuclide Activity

A_i = Activity of Each Sample corrected for density

V_i = Volume (Gal) of each Component Sampled corrected at operating temperature

K = Volume Correction Factor

3.2.4 Inventory Correction

a. If Steady State Power Level is less than 100 percent

$$X = \frac{100}{\% \text{ Power}} = X_{I-133} = X_{I-131} = X_{Sr-140}$$

b. If transient condition > 10% existed in the past 22 days calculate X for each nuclide.

$$X_{I-132} = \frac{100}{P_1 e^{-0.796t} + P_2 e^{-0.796t}} = \_\_\_\_\_$$

$$X_{I-132} = \frac{100}{P_1 e^{-0.0864t} + P_2 e^{-0.0864t}} = \_\_\_\_\_$$

$$X_{Ba-140} = \frac{100}{P_1 e^{-0.0542t} + P_2 e^{-0.0542t}} = \_\_\_\_\_$$

X = Correcting Factor

3.2.5 Calculate Damage to Core

a. Gap Activity

G = Percent of Rods with Ruptured Cladding Releasing Gap Activity

$$G = [(1.863 \times 10^{-2})(Ae_{I-131})(X_{I-131})] - [(8.31 \times 10^{-3})(Ae_{I-133})(X_{I-133})]$$

G = _____

ATTACHMENT 3 (Cont'd)

b. Fuel Failure

F = Percent of Rods Overheated with Fuel Releasing Activity

$$F = [(1.684 \times 10^{-4})(Ae_{I-133})(X_{I-133})] - [(3.64 \times 10^{-5})(Ae_{I-131})(X_{I-131})]$$

F = _____

c. Fuel Melting

$$M = (0.002)(Ae_{Ba-140})(X_{Ba-140})$$

M = Percent of Rods with Molten Fuel

M = _____

NOTE:	The absence of Ruthenium and Tellurium activity in the RCS and/or normal operating Cesium activity levels indicate that no fuel melting has occurred.

ATTACHMENT 3 (Cont'd)

TABLE 1

DENSITY CORRECTION FACTORS FOR RCS
EQUIVALENT VOLUME CALCULATION
DENSITY CORRECTION FACTOR, K

Reactor Coolant System Temperature at Time of Accident °F	RCS SAMPLE TEMPERATURE, °F		
	80	90	100
100	.996	.998	1
150	.983	.985	.987
200	.966	.968	.970
250	.945	.947	.949
300	.921	.923	.924
350	.894	.895	.897
400	.862	.863	.865
450	.827	.828	.830
500	.787	.788	.790
550	.739	.740	.741
560	.728	.729	.731
570	.717	.718	.719
580	.706	.708	.709
590	.693	.694	.695
600	.680	.681	.683
	DENSITY CORRECTION FACTOR, K		

NOTE: Normal RCS System sample temperature is approximately 90°F. Use this temperture if no other information is avaiable.

ATTACHMENT 4

POST ACCIDENT REACTOR COOLANT SAMPLE SUMMARY

Date_____

Time_____

Chemistry Coordinator_____

A. CHEMISTRY ANALYSIS RESULTS

1. Boron (KAP)_____

2. Gas Analysis (hydrogen peak)_____

_____

3. Gamma Scan_____

_____

4. Chloride Analysis_____

_____

B. RADIOLOGICAL DATA

1. Dosage

a. Chem Tech _____ / _____ Others: _____
Name Date

b. Chem Tech _____ / _____ _____
Name Date

c. Chem Tech _____ / _____ _____
Name Date

d. Rad Con _____ / _____ _____
Name Date

2. Exposure Levels

a. Sampling Room (after sampling)_____ mr/hr at_____

b. Analysis Room (after sampling)_____ mr/hr at_____

c. Sample Bottle (F)(unshielded) _____ mr/hr at_____

d. Sample Bottle (F)(pig) _____ mr/hr at_____

e. Vial H (unshielded) _____ mr/hr at_____

f. Vial H (pig) _____ mr/hr at_____

ATTACHMENT 4 (Cont'd)

POST ACCIDENT REACTOR COOLANT SAMPLE SUMMARY

3. Sample Storage

a. Locked high radiation cubicle location _____

_____

b. Exact sample location _____

_____

Completed By _____
Name Title

_____
Date

"TEMPORARY CHANGE"

Three Mile Island Nuclear Station Temporary Change Notice (TCN)

NOTE: Instructions and guidelines in AP1001A must be followed when completing this form.

12. TCN No 1-83-0237 (From TCN Log Index)

13. Implementation Date 11/16/83

SS/SF Signature J R Powles

1. Procedure 1004.31 (No) 8 (Present Rev. No) Airborne Radioactivity Sampling and Analysis (Title)

2. **Change** (Include page numbers, paragraph numbers, and exact wording of change. (Attach additional sheets if necessary and provide the generic nature of the change on this sheet.)

See attached copies of pages 3.0 and 5.0.

3. **Reason for Change:**

Add minor corrections and clarifications.

4. **Duration of TCN** - No longer than ninety days from implementation date of TCN or as in (a) or (b) below whichever occurs first.

(a) TCN will be cancelled by a procedure revision issued as a result of a Procedure Change Request to be submitted by J. Whitcomb (Individual Submitting TCN) (Submit PCR as soon as possible) ☒

(b) TCN is not valid after _____ (Fill in circumstances which will result in TCN being cancelled) ☐

5. Is procedure "Important to Safety"? ..... yes ☒ no ☐

If "Yes" a safety evaluation is required (side 2).

6. Is procedure "Environmental Impact Related"? ..... yes ☐ no ☒

If "Yes" an environmental impact evaluation is required (side 2).

7. Does the change effect the intent of the original procedure? ..... yes ☐ no ☒

NOTE: If answers to #5, 6 and 7 are "no" the change may be approved by the Shift Supervisor.

NOTE: If answer to #7 is "yes" the change must be reviewed and approved in accordance with Table 2 prior to implementation.

NOTE: If answer to #7 is "no" and answers to #5 or 6 are "yes" change may be either (a) two member reviewed or (b) reviewed and approved in accordance with table 2.

Review Signatures:

8. Change Recommended By: J. L. Whitcomb Date 11/16/83

9. * Procedure Owner Concurrence [signature] Date 11/16/83

* Responsible Technical Reviewer, Responsible Office Department Head, or his Designee may concur if Procedure Owner is unavailable

* May be by Telecon

10. Tech. Functions Rep. Notified (If req'd.) [signature] Date 11/16/83

11. Approval(s):

(a) Two Members of the GPUN Mng. Staff Route

1. _____ Signature Date

2. _____ Signature Date

Within fourteen (14) days: (Approval per AP 1001A must occur)

_____ Signature Date

_____ Signature Date

(b) Normal Route (Per AP1001A):

[signature] 11/16/83 Signature Date

ESR x RP Eng. [signature] 11/16/83 Signature Date

(OPS) [signature] 11/16/83

(c) SS Approval Only: (This approval only used if anwers to questions #5, 6 and 7 are all "No".)

_____ SS Signature Date

14. **TCN is Cancelled** _____ Shift Supervisor & Shift Foreman _____ Date

8-82 A0C01132.A

"EVALUATION" Side 2

Three Mile Island Nuclear Station
Safety/Environmental Impact Evaluation

TCN No. 1-83-02137

1. Procedure 1004.31 (No.) Airborne Radioactivity Sampling and Analysis (Title)

2. Safety Evaluation

Does the attached procedure change:

*(a) increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety? ..... yes ☐ no ☒

*(b) create the possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report? ..... yes ☐ no ☒

*(c) reduce the margin of safety as defined in the basis for any technical specification? ..... yes ☐ no ☒

Details of Evaluation (Explain why answers to above questions are "no". Attach additional pages if required.)

This change provides improved guidance and has no detrimental impact on safety

Evaluation By [signature] Date 11/16/83

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

3. Environmental Impact Evaluation

Does the attached procedure change:

(a) possibly involve a significant environmental impact? ..... yes ☐ no ☐

(if 3(a) is "yes", answer questions (b) and (c) and fill in "Details of Evaluation" below. If no, state why by filing in the "Details of Evaluation" below.)

*(b) have a significant adverse effect on the environment? ..... yes ☐ no ☐

*(c) involve a significant environmental matter or question not previously reviewed and evaluated by the N.R.C. ..... yes ☐ no ☐

Details of Evaluation (Attach additional pages if required)

N/A

Evaluation By _____ Date _____

*If any of these questions are answered "YES" the change must be reviewed and approved by the NRC prior to implementation.

4. (1) Normal Approval(s) (Per AP 1001A)	4. (2) If "Two (2) members of the GPUN management staff route:	Within fourteen (14) Days Approval per AP 1001A
[signature] 11/16/83 Signature Date	Signature Date	Signature Date
RF Elec. 11/16/83 Signature Date	Signature Date	Signature Date

8-82 A00011329

4.1.2.3 Mount the filter-absorber canister over the central suction hole and stretch the rubber retainer over the outer end of the canister. Ensure that the rubber retainer passes between the two "wings" on the wing nut located on the end of the canister.

4.1.2.4 Start air sample by turning the timer to the 6 minute mark and adjust to 5CFM as indicated on the flowrate meter using the flow adjust knob. Log "START" time, and sample location on the storage can label and on Attachment I.

4.1.2.5 The air sampler will automatically stop when the timer reaches "OFF". Log the "STOP" time on Attachment I and on the storage can label.

4.1.2.6 Remove the filter-absorber canister from the sampler and put it in the labeled storage can. Reseal the can by pressing the lid on firmly with the palm of the hand. Do not hammer the lid on.

NOTE:	The canister may be warm or hot to the touch. This is due to the absorption of moisture from the air and NOT radioactivity. Use surgeon's gloves to handle used filter-absorber canisters, as particulate activity may now be deposited on the filter, to prevent personnel contamination.

4.1.3 Counting EAS-1 Filter-Absorber with E-140/GM-1 Probe

4.1.3.1 Background Countrate

4.1.3.1.1 Perform general area survey with the meter held at waist level. If background countrate is greater than ~~50~~ 150 cpm, move to an area where background is less than ~~50~~ 150 cpm.

4.1.3.2.6 Allow the meter reading to stabilize and record the reading as the Absorber countrate (Acpm) on the storage can label and on Attachment I. Record the date and time of the measurement on the storage can label and on Attachment I.

4.1.3.2.7 Return the absorber canister to the storage can, containing the glass-fiber filter and reseal the storage can.

4.1.3.2.8 Transmit the following information to the RAC/EACC as appropriate:

1. Start time of sample
2. Location of sample
3. Time of sample countrate measurement
4. Background countrate for location at which sample is measured (Bcpm)
5. Filter-Absorber countrate (FAcpm)
6. Absorber countrate (Acpm)

4.1.3.2.9 Save the sample filter and absorber for further evaluation.

NOTE:	Analysis of field samples may be performed by use of the TMI Unit 1 GeLi/MCA system in accordance with SCP 1958.3, the TMI-Unit 2 GeLi/MCA unit, or the GeLi/MCA unit operated by the Environmental Assessment Section.

Note: A very rough (order of magnitude) determination of airborne activity can be made in the field by subtracting "Bcpm" from "FAcpm" and multiplying the result by 2E-10 to obtain uCi/cc. Activities determined by this method should only be used by the field team to get a rough idea of the airborne levels they are encountering and not for dose projection purposes.

4.1.2.3 Mount the filter-absorber canister over the central suction hole and stretch the rubber retainer over the outer end of the canister. Ensure that the rubber retainer passes between the two "wings" on the wing nut located on the end of the canister.

4.1.2.4 Start air sample by turning the timer to the 5 minute mark and adjust to 5CFM as indicated on the flowrate meter using the flow adjust knob. Log "START" time, and sample location on the storage can label and on Attachment I.

4.1.2.5 The air sampler will automatically stop when the timer reaches "OFF". Log the "STOP" time on Attachment I and on the storage can label.

4.1.2.6 Remove the filter-absorber canister from the sampler and put it in the labeled storage can. Reseal the can by pressing the lid on firmly with the palm of the hand. Do not hammer the lid on.

NOTE:	The canister may be warm or hot to the touch. This is due to the absorption of moisture from the air and NOT radioactivity. Use surgeon's gloves to handle used filter-absorber canisters, as particulate activity may now be deposited on the filter, to prevent personnel contamination.

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4. Background countrate for location at which sample is measured (Bcpm)
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Note: A very rough (order of magnitude) determination of airborne activity can be made in the field by subtracting "Bcpm" from "FAcpm" and multiplying the result by 2E-10 to obtain μCi/cc. Activities determined by this method should only be used by the field team to get a rough idea of the airborne levels they are encountering and not for dose projection purposes.

INFO ONLY