IMPORTANT TO SAFETY
NON-ENVIRONMENTAL IMPACT RELATED

THREE MILE ISLAND NUCLEAR STATION
UNIT NO. 1 EMERGENCY PLAN IMPLEMENTING PROCEDURE 1004.31
AIRBORNE RADIOACTIVITY SAMPLING AND ANALYSIS

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THREE MILE ISLAND NUCLEAR STATION
UNIT NO. 1 EMERGENCY IMPLEMENTING PROCEDURE 1004.31
AIRBORNE RADIOACTIVITY SAMPLING AND ANALYSIS

1.0 PURPOSE

The purpose of this procedure is to define the method of air sampling and analysis for Airborne Radioactivity in the areas of 1) in-plant 2) out-of-plant and 3) plant effluent pathways during an emergency. The Radiological Assessment Coordinator is responsible for implementing this procedure.

2.0 ATTACHMENTS

2.1 Attachment I, Airborne Radioactivity Sampling and I-131 Analysis Data Sheet.

2.2 Attachment II, Iodine Air Sample Nomograph.

2.3 Attachment III, Particulate Air Sample Nomograph.

2.4 Attachment IV, Minimum Detectable Radioiodine Nomograph.

2.5 Attachment V, Containment Atmospheric Post Accident Sampling System Schematic.

2.6 Attachment VI, Schematic of Catpass Remote Sample Panel.

2.7 Attachment VII, Catpass Sample Data Sheet.

2.8 Attachment VIII, MAP-5 Sample Panel Schematic.

2.9 Attachment IX, MAP-5 Sample Data Sheet.

3.0 EMERGENCY ACTION LEVELS

3.1 This procedure shall be implemented at any time during any class of declared emergency, when a potential or actual release of radioactivity to the environment exists; or

3.2 As directed by the Emergency Director, Radiological Assessment Coordinator or their designee.

4.0 EMERGENCY ACTIONS

4.1 Emergency Equipment Required to be available for use:

INITIALS

____ 4.1.1 SAM-II/RD19 Detector Probe

____ 4.1.2 Radeco H-809 Air Sampler

____ 4.1.3 Stopwatch

____ 4.1.4 GY-130 Silver Zeolite Cartridge

____ 4.1.5 Particulate Filter

4.2 Sample Collection For Out-Of-Plant Areas

____ 4.2.1 For particulate and radioiodine sampling, insert a radioiodine cartridge (silver zeolite) with the arrow in the direction of air flow and particulate filter in the Air Sampler unit holder with the fibrous glass backing side of the particulate filter facing toward the sampler. The particulate filter must be upstream of the cartridge.

____ 4.2.2 With the filters in place, set the flow selector switch on the air sampler unit to variable and adjust the flow so as not to exceed 2 CFM (~60 liters/min). Run the sampler unit for sufficient time to obtain a minimum of ten (10) cubic feet (~3E5 cc). Record the sample time and volume on the data sheet. Periodically check the air flow indicator while the sampler is running.

NOTE:	A minimum of ten (10) cubic feet (~3E5 cc) is required to obtain an MDA of 1E-8 µCi/cc. The larger the sample, the lower the MDA will be.

4.2.3 To set up the Sam II, perform the following steps.

a. Check settings on the SAM-II unit to comply with the calibration label except that the threshold must be set at 3.60 for both sample and source counts.

b. Set the Scaler display switch to "ON", Count Mode to "2", "XI", "timed".

NOTE:	This will set the SAM-II for a 2 minute count. For high radioiodine sample count rates as indicated on the count rate meter, lower counting times may be used.

c. Connect the detector to the front panel of the SAM-II.

d. Turn the power switch "ON" and the stabilizer "ON", and allow unit to stabilize for approximately five (5) minutes.

NOTE:	Do Not count the source, the background, or a sample while the air sampler is running. While counting the sample or background ensure that the check source is at least five (5) feet from the SAM-II probe.

4.3 Sample Analysis

4.3.1 Prior to counting the first sample, count a background with the SAM-II set-up in the mode defined in step 4.2.3. Count background whenever radiological conditions

have changed or are suspected to have changed at the counting location. Count background after changing locations.

NOTE:	If the SAM-II unit is stable and not located in the plume or a high background area, the background count should be less than 50 counts per minute.

4.3.2 Label a coin envelope with the necessary information, i.e., date, time, volume, location, and person taking sample. Then remove the radioiodine cartridge and particulate filter from the air sampler unit and place the particulate filter disc in the coin envelope for later counting and analysis. Count and analyze the particulate filter in accordance with RCP 1605. Particulate air samples will then be saved for subsequent GeLi analysis at U-1 Rad Con Lab or the EAGF.

NOTE:	A more rapid determination of airborne particulate radioactivity may be made using the AIRBORNE PARTICULATE SAMPLE NOMOGRAPH, ATTACHMENT III.

4.3.3 Place the radioiodine cartridge in the SAM-II shield chamber with the upstream side facing the detector, and count the sample for two (2) minutes. (Or less if the high count rate is indicated for the sample.)

NOTE:	If problems are encountered with the Sam II while counting, check the following: 1. Power supply and connections. 2. Physical damage and proper probe connections. 3. Adjustments and settings per 4.2.3.a. 4. Response to provided source.

4.3.4 Record the serial number of the SAM-II, counter factor (as indicated on the SAM-II), background count rate, and count time on the sample data sheet. (Att. I).

NOTE:	The "Count Factor" posted on the SAM II incorporates counting efficiency, geometry factor and activity conversion factors.

4.3.5 After counting sample, record the iodine sample counts and counting time on the data sheet.

4.3.6 Calculate the radioiodine activity by use of the data sheet or nomograph. If the gross count rate of the sample is low, (less than 2 X background) calculate the Minimum Detectable Count Rate (MDCR). If the MDCR is greater than the sample count rate, use the MDCR for activity calculations and report the measured activity as less than this activity. MDA for radioiodine samples may also be obtained by use of the Minimum Detectable Radioiodine Activity Nomograph (Att. II).

NOTE:	Analysis of all 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 more rapid determination of radioiodine concentration may be made using the AIRBORNE IODINE SAMPLE NOMOGRAPH, ATTACHMENT II.

4.3.7 For dose calculations due to off-site radioactive releases, refer to EPIP 1004.7.

NOTE:	If during sample analysis, the sample activity exceeds the ability of the instrument being used, (i.e., high count rate), one or all of the following alternatives may be used as directed by the RAC: a. Reduce the sample volume b. Utilize different counting geometries c. Utilize counting instrumentation with lower efficiency/sensitivity

4.3.8 Place all samples in separate plastic bags and label the samples with sample date, time, location and calculated activity and return all samples taken to the OSC and give to the Rad Con Coordinator.

4.4 In-Plant air sampling for Radioactive Gas shall be performed in accordance with RCP 1607 with care to problems expressed in the note below 4.3.7.

4.5 In-Plant air sampling for Radioactive Iodine shall be performed in accordance with RCP 1606 with care to problems expressed in the note below 4.3.7.

NOTE:	A more rapid determination of radioiodine concentration may be made using the AIRBORNE IODINE SAMPLE NOMOGRAPH, ATTACHMENT II.

4.6 In-Plant air sampling for Radioactive Particulates shall be performed in accordance with RCP 1605 with care to problems expressed in 4.3.7.

NOTE:	A more rapid determination of airborne particulate radioactivity may be made using the AIRBORNE PARTICULATE SAMPLE NOMOGRAPH, ATTACHMENT III.

4.7 All air samples shall be handled in accordance with RCP 1605.1.

4.8 Post accident sampling of Reactor Containment air, if needed, shall be performed as outlined below.

CAUTION:	Obtaining a Reactor Containment atmospheric sample after an accident may involve high levels of gaseous and particulate activity. Special precautions as outlined in EPIP 1004.9 should be observed.

NOTE:	Personnel performing this portion of the procedure are required to initial each step upon completion and prior to performing the next step.

4.8.1 Containment Atmospheric Post Accident Sampling System (CATPASS).

NOTE:	Do not use this system if Reactor Building pressure exceeds 30 PSIG.

4.8.1.1 Before proceeding to the sampling station, request that the Control Room isolate RM-A2 by shutting valves CM-V-1, V2, V3, and V4 if not already shut due to ESFAS actuation. Also request whether instrument air is available in the Intermediate Building for sampling operations.

NOTE:	If instrument air is not available in the Intermediate Building, bottled air must be connected at the sample station area to the fitting at reducing valve CM-V-32.

NOTE:	Habitability of the sampling area must be determined prior to sampling by: 1. Setting up a continuous air monitor in the vicinity of the sample station and 2. Taking dose rate readings in the sampling area.

NOTE:	If a sampling system line ruptures, close valves CM-V-12 and CM-V-13 and switch valve CM-V-10 to the recirc. mode at the remote sample panel. Notify the RAC to have the Control Room close valves CM-V-1, V2, V3, and V4. A rupture may be indicated by an abnormal or unexpected change in flow or pressure.

4.8.1.2 The Radiological Controls Coordinator shall conduct a briefing with those personnel directly involved in the sampling evolution. Attachments V and VI should be used to familiarize sampling personnel with the sampling system and sample panel. Heat insulating gloves will be needed for handling the sample flask after sampling.

4.8.1.3 Switch heat tracing "ON" at the remote sample panel.

4.8.1.4 Install the sample flask at the fittings between valves CM-V-12 and CM-V-13 at the sample station if not already in place. Ensure that the 2 isolation valves attached to the sample flask are open and that the septum valve is shut.

NOTE:	Valves CM-V-11 and CM-V-14 are quarter turn ball valves. These valves are open when the handle on the valve is aligned with the system tubing and shut when the handle is at a 90° angle to the system tubing.

4.8.1.5 If not already closed, close the following valves: CM-V-11 and CM-V-14 (at the sample station), CM-V-16, CM-V-17, and CM-V-18 (at the instrument/bottled air station), and CM-V-12 and CM-V-13 (at the remote sample panel).

____ 4.8.1.6 Place valves CM-V-7, V8, and V10 in the sample mode at the remote sample panel.

____ 4.8.1.7 Switch valve CM-V-9 to "COOL SMPL" position at the remote sample panel.

____ 4.8.1.8 If bottled air is used, open the valve on the supply bottle and adjust the reducer (CM-V-32) to achieve 90-100 psig on the regulator outlet guage, then open CM-V-16.

____ 4.8.1.9 "Crack" open valve CM-V-17 to obtain a reading of 25 to 30 psig on PI-997 at the sample station, then immediately shut CM-V-17. Then crack open valve CM-V-18 to obtain a reading of 25 to 30 psig on PI-996 at the sample station, then immediately shut CM-V-18.

____ 4.8.1.10 Record all pressure gauge indications at the sample station. PI-995, ____, PI-996 ____, PI-997 ____.

____ 4.8.1.11 Wait 2 minutes and again record pressure gauge indications. PI-995, ____, PI-996, ____, PI-997, ____.

____ 4.8.1.12 If there is no decrease in pressure indications, the pressure integrity is acceptable. If pressure integrity is unacceptable, notify the RAC.

NOTE:	Approximately 3 hours will elapse before heat tracing has warmed the system to operating temperature (~200°F).

____ 4.8.1.13 When the heat tracing indicator light on the remote sample panel goes off, ensure that valves CM-V-7, V8, and V10 are in the sample mode.

NOTE:	CM-V-9 may be placed in either "COOL SMPL" or "ISOK SMPL" position dependent on whether the RAC desires a sample from the RM-A2 Isokinetic Probe or the Cooler Discharge. Note the position used on sample data sheet.

____ 4.8.1.14 Request, through the RAC, to have the Control Room override the ESFAS function of valves CM-V-1, V2, V3 and V4 (if ESFAS is actuated) and open valves CM-V-1, V2 V3, and V4.

____ 4.8.1.15 Fully open valve CM-V-17. If bottled air is used, also open CM-V-16.

____ 4.8.1.16 Open valves CM-V-11 and CM-V-14 at the sample station.

____ 4.8.1.17 Switch valves CM-V-12 and CM-V-13 to "OPEN" at the remote sample panel.

NOTE:	Valves CM-V-12 and CM-V-13 have three positions: "Close", "Open", and "Open Bypass". The "Open Bypass" mode bypasses the protective pressure switches that normally shut CM-V-12 and CM-V-13 on an over pressure situation. Do not use this position unless directed to do so by this procedure.

____ 4.8.1.18 Verify that the temperature on TI-992 at the remote sample panel indicates at least 215°F and that FI-838 at

the remote sample panel indicates that flow exists in the sample system.

NOTE:	The sample flask and other exposed metal portions of the sample system will be HOT! Heat insulating gloves should be used to handle any exposed metal portion of this system.

____ 4.8.1.19 After 5 minutes, samples may be drawn from the system by opening the septum valve and inserting the tip of a syringe through the septum and withdrawing a small volume of Containment atmosphere into the syringe. Remove the syringe, then close the septum valve and record the sample time on the sample data sheet. This step may be repeated as necessary, to obtain further samples while the system continues circulation.

____ 4.8.1.20 Upon completion of syringe sampling or if syringe sampling is not desired, place CM-V-10 in the recirculation mode at the remote sample panel.

____ 4.8.1.21 Switch valves CM-V-12 and CM-V-13 to "close" at the remote sample panel.

____ 4.8.1.22 If it is desired to remove the sample flask for analysis, verify that dose rates at the sample station are within acceptable limits, then close the valves on the sample flask. Remove the sample flask from the sample station for further analysis. Record the time removed as sample time on the sample data sheet.

4.8.1.23 If removed, replace the sample flask with the spare flask. Ensure that the septum valve is closed and that the 2 isolation valves attached to the sample flask are open on the newly installed flask.

4.8.1.24 To purge the sample piping of Containment air, switch valve CM-V-10 to "SAMPLE" and switch valves CM-V-12 and CM-V-13 to the "Open Bypass" mode. Switch valve CM-V-9 to "COOL SMPL".

4.8.1.25 Slowly open valve CM-V-18 to flush all lines with instrument/bottled air.

NOTE: Keep valves CM-V-7 and CM-V-8 in the sample mode until their respective sample lines are depressurized to Reactor Building pressure as indicated on PI-995 and PI-997.

4.8.1.26 At the completion of a 2 minute purge time, close valve CM-V-18 then switch valve CM-V-12 to "Close" at the remote sample panel.

4.8.1.27 Request that the Control Room close valves CM-V-3 and CM-V-4. When these valves are shut, switch valve CM-V-8 to "RM-A2" position at the remote sample panel.

4.8.1.28 At the completion of an additional 2 minute purge, close valve CM-V-17. If bottled air was used, also close valve CM-V-16 and the valve on the bottled air source. Switch valve CM-V-13 to "close" at the remote sample panel.

4.8.1.29 Request that the Control Room close valves CM-V-1 and CM-V-2. When these valves are shut, switch valve CM-V-7 to "RM-A2" position at the remote sample panel.

____ 4.8.1.30 Turn off heat tracing at the remote sample panel.

____ 4.8.1.31 Shut valves CM-V-11 and CM-V-14 at the sample station.

____ 4.8.1.32 The sample(s) should now be analyzed per the applicable 1990 Chemistry Procedure.

____ 4.8.1.33 Relay the results of the gamma analysis to the Radiological Assessment Coordinator to be used in EPIP 1004.7.

4.9 Post Accident Sampling of Condenser Vacuum Exhaust, Reactor Building Purge or Auxiliary and Fuel Handling Building Exhaust using the NRC MAP-5 Sampling Stations. (NRC MAP-5 Sample Panels)

4.9.1 When requested by the Radiological Assessment Coordinator, obtain samples from the appropriate sample panel as follows. (Refer to Attachment VIII)

NOTE: Radiological conditions may warrant consideration of the need for shielding, stay times, respiratory protection, dosimetry and protective clothing. The RM-A8 and RM-A9 sample panel room vent fan should be running during sampling (switch is on the right, just inside the door) to remove any noble gases which may leak the monitors. Dose rates at the door to the sample station should be monitored and relayed to the Radiological Assessment Coordinator.

4.9.2 Perform a lamp test upon arriving at the sample station by pressing the lamp test button. If lamp test is unsat, inform the RAC.

____ 4.9.3 Record flow rate(s) on desired channel(s) on the sample data sheet (Att. IX). (Flow rate during sampling should be approximately 3000 cc/min).

4.9.4 Depress the "OFF" button on the desired channel(s). The "OFF" light should go on, the "AUTO" light should go off.

NOTE:	Channel 2 and 3 will complete a purge cycle before turning off.

4.9.5 Depress "PURGE" button on desired channel to remove any noble gases which may have been present in the ambient air. The "sample" light should go off and the "purge" light should go on. The elapsed purge time indicator for channel No. 1 should start to increment.

4.9.6 Depress "OFF" button on desired channel after at least one (1) minute.

4.9.7 Record elapsed time (in minutes), flow rate (in cc/min), for the appropriate channel number on sample data sheet (Att. IX).

4.9.8 Open the panel and survey the cartridge holder. Enter contact dose rate for each cartridge holder on the sample data sheet (Att. VIII). Notify the Radiological Assessment Coordinator of the survey results before proceeding.

4.9.9 Remove cartridge holder(s) by releasing quick disconnect fittings on sample line.

NOTE:	Cartridge holder in channel 1 is enclosed inside on 80 lb. lead sheild. Shield and cartridge holder must be removed as one unit.

NOTE:	Radiological conditions will dictate how filters and cartridges are to be handled during transport and analysis.

____ 4.9.10 If additional sampling is necessary, insert new silver zeolite cartridge (with the arrow pointed toward the blue half of the filter holder) and particulate filter into the filter holder.

____ 4.9.11 Insert cartridge holder into place while ensuring sample flow is through the particulate filter first (blue end of the filter holder should be on top).

____ 4.9.12 Ensure quick disconnect fittings are securely attached and close panel.

____ 4.9.13 After cartridge holder(s) are installed, verify sample flow rate by depressing sample and purge pump, "ON" button, then depress the channel "SAMPLE" button. Verify 3000 cc/min flow rate on the applicable flow meter for approximately 5 seconds. Then depress Sample and Purge Pump "OFF" button.

____ 4.9.14 Wait until all three channels have stopped cycling then depress Sample and Purge Pump "AUTO" button.

____ 4.9.15 Depress "AUTO" button for all three channels, and then depress "RESET" button for all three channels. The "AUTO" button light should be on and the LED readouts should read zero. This now places the MAP-5 sampling station back in automatic standby to permit response to RM-A5, 8, or 9 low channel alarm.

____ 4.9.16 Ensure that the sample and purge times have not been disturbed (Normal settings are: Channel 2, sample - 4 sec., purge - 36 sec.; Channel 3, sample - 4 sec., purge - 396 sec.).

4.10 Under certain conditions manual operation of the sample station may be warranted.

4.10.1 When requested by the Radiological Assessment Coordinator obtain samples by manual operation as follows: (Refer to Attachment VII).

____ 4.10.2 If sample panel is currently operating replace the present filter media with new filter media per 4.9.2 through 4.9.12 above, for all channels then proceed to 4.10.3.

____ 4.10.3 Depress "RESET" on all three channels to clear display.

____ 4.10.4 Depress "ON" button for pump. Pump "OFF" light should go off. Pump "AUTO" light should be off. Pump "ON" light should go on.

____ 4.10.5 Depress channel "SAMPLE" button on the desired channel control. "SAMPLE" light should go on. Elapsed time indicator should begin count for that channel. Record the flow rate for the appropriate channel(s) on the sample data sheet (Att. IX).

____ 4.10.6 When desired sample time is reached, depress the "PURGE" button, the purge light should go on. If using Channel 1, elapsed time display should begin incrementing in seconds. Purge all channels for at least one (1) minute.

____ 4.10.7 To stop sample operation, depress "OFF" button for the desired channel. "PURGE" light should go out. "OFF" light should go on.

____ 4.10.8 When sampling is completed, depress pump "OFF" button. Pump "ON" light should go off. Pump "OFF" light should go on.

____ 4.10.9 Record elapsed sample time (in minutes) on the sample data sheet (Att IX). Open the panel and survey the cartridge holders. Record the contact dose rate for each cartridge holder on the sample data sheet (Att. IX). Notify the Radiological Assessment Coordinator of the survey results before proceeding.

____ 4.10.10 Remove cartridge holder(s) by releasing quick disconnect fittings on sample line.

____ 4.10.11 If additional sampling is necessary, insert new silver zeolite cartridge (with the arrow pointed toward the blue half of the cartridge holder) and particulate filter into the cartridge holder.

____ 4.10.12 Insert cartridge holder into place while ensuring sample flow is through the particulate filter first (blue end of the cartridge holder should be on top).

____ 4.10.13 Ensure quick disconnect fittings are securely attached and close panel.

____ 4.10.14 Depress "RESET" button on desired channels to clear accumulated time. All displays should read zero.

4.10.15 Ensure that the sample and purge times have not been disturbed. (Normal settings are: Channel 2, sample - 4 sec., purge - 36 sec.; Channel 3, sample - 4 sec., purge - 396 sec.).

4.10.16 For additional manual sampling proceed back to Step 4.10.4.

4.10.17 Follow steps 4.9.12 through 4.9.15 to place sampling station back in automatic mode after manual sampling.

4.10.18 Sample analyses will be performed in accordance with the applicable 1990 Chemistry procedures.

4.10.19 Relay the results of the gamma analysis to the Radiological Assessment Coordinator to be used in EPIP 1004.7.

5.0 FINAL CONDITIONS

5.1 All samples taken after release has been terminated.

5.2 All monitoring teams ordered to return to base.

5.3 All samples given to Radiological Controls for analysis.

5.4 Post accident sampling of the Containment atmosphere and MAP-5 processor stations complete and analysis results reported to the RAC.

ATTACHMENT I

AIRBORNE RADIOACTIVITY SAMPLING AND IODINE - 131 ANALYSIS DATA SHEET

Sample Collection

1) Time on _____, Time off _____
Run Time _____ min. (1)

2) Sample Flow _____ (2a) CFM, _____ (2b) LPM

3) Volume = _____ (1) min x _____ (2a) CFM

x 2.832 x E 4 cc/ft3 = _____ (3) cc

Volume = _____ (1) min x _____ (2b) LPM

x 1000 cc/l = _____ (3) cc

4) Location: _____

5) Date: _____

6) Time: _____

7) Sampler Type: _____
Serial No.: _____

8) Collected by: _____

Iodine Sample Counting

1) Serial No. of SAM-II _____

2) Counter Factor _____

3) Background counts _____

4) Background count time _____ min

5) Background count rate-

_____ (3) ÷ _____ (4) min = _____ cpm

6) Sample Counts _____

7) Sample Count Time _____ min.

8) Sample Count Rate =
_____ (6) ÷ _____ (7) min = _____ cpm

9) Sample Net Count Rate (Net CPM)
_____ Sample(8) - _____ Bkgd(5) = _____ cpm

10) Date and Time of Counting: _____

11) Counted by: _____

Iodine Activity = Net CPM / (Vol) (Counter Factor) = _____ µCi/cc

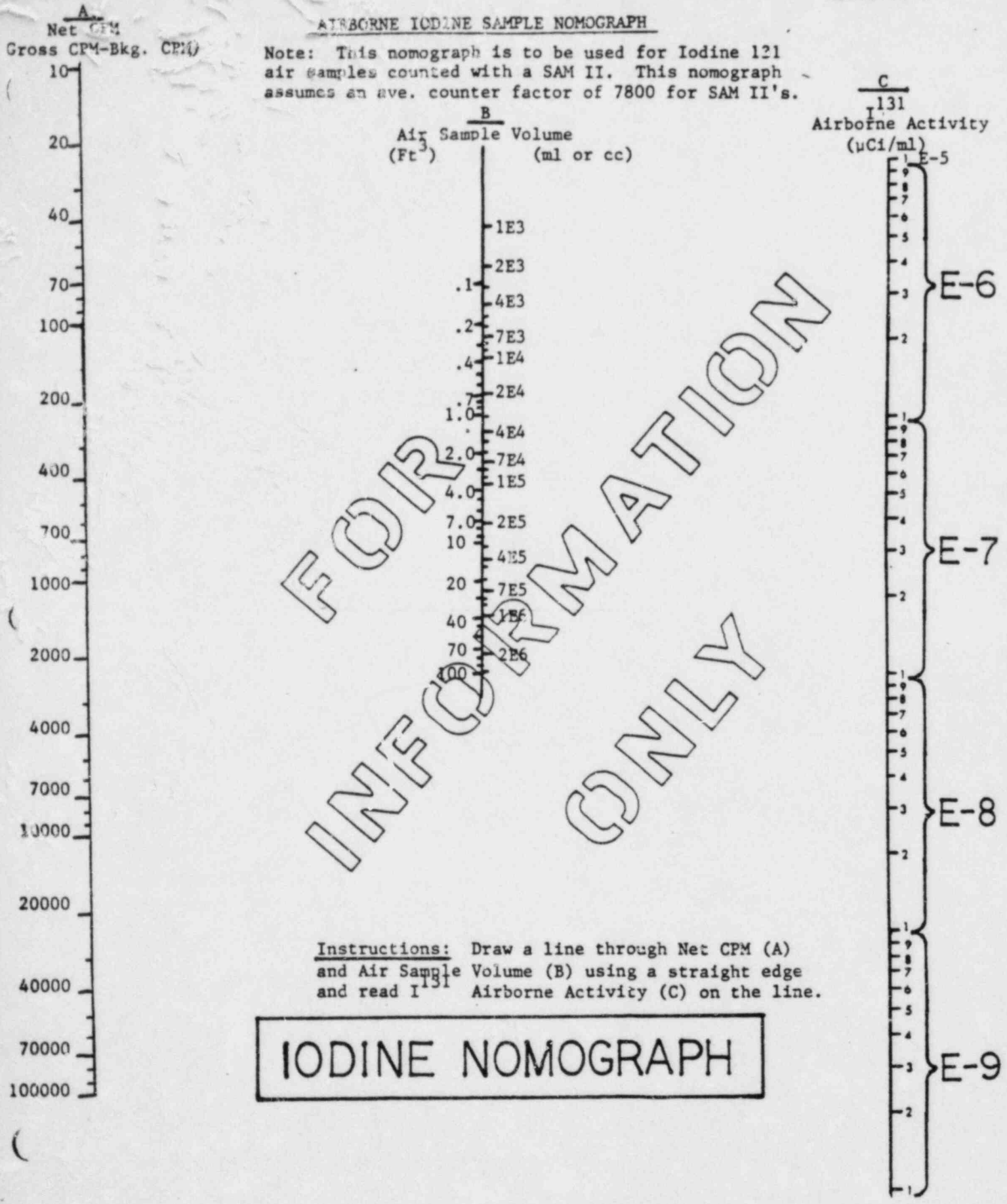
= CPM / (cc) ( ) = _____ µCi/cc

MDCR = 3.3 x √Bkgd. Count Rate (NOTE: This is for 95 percent Confidence Level and is valid only if Bkgd Count Time and Sample Count Time both equal 2 minutes).

= 3.3 x √ CPM = _____ CPM

AIRBORNE IODINE SAMPLE NOMOGRAPH

Note: This nomograph is to be used for Iodine 121 air samples counted with a SAM II. This nomograph assumes an ave. counter factor of 7800 for SAM II's.



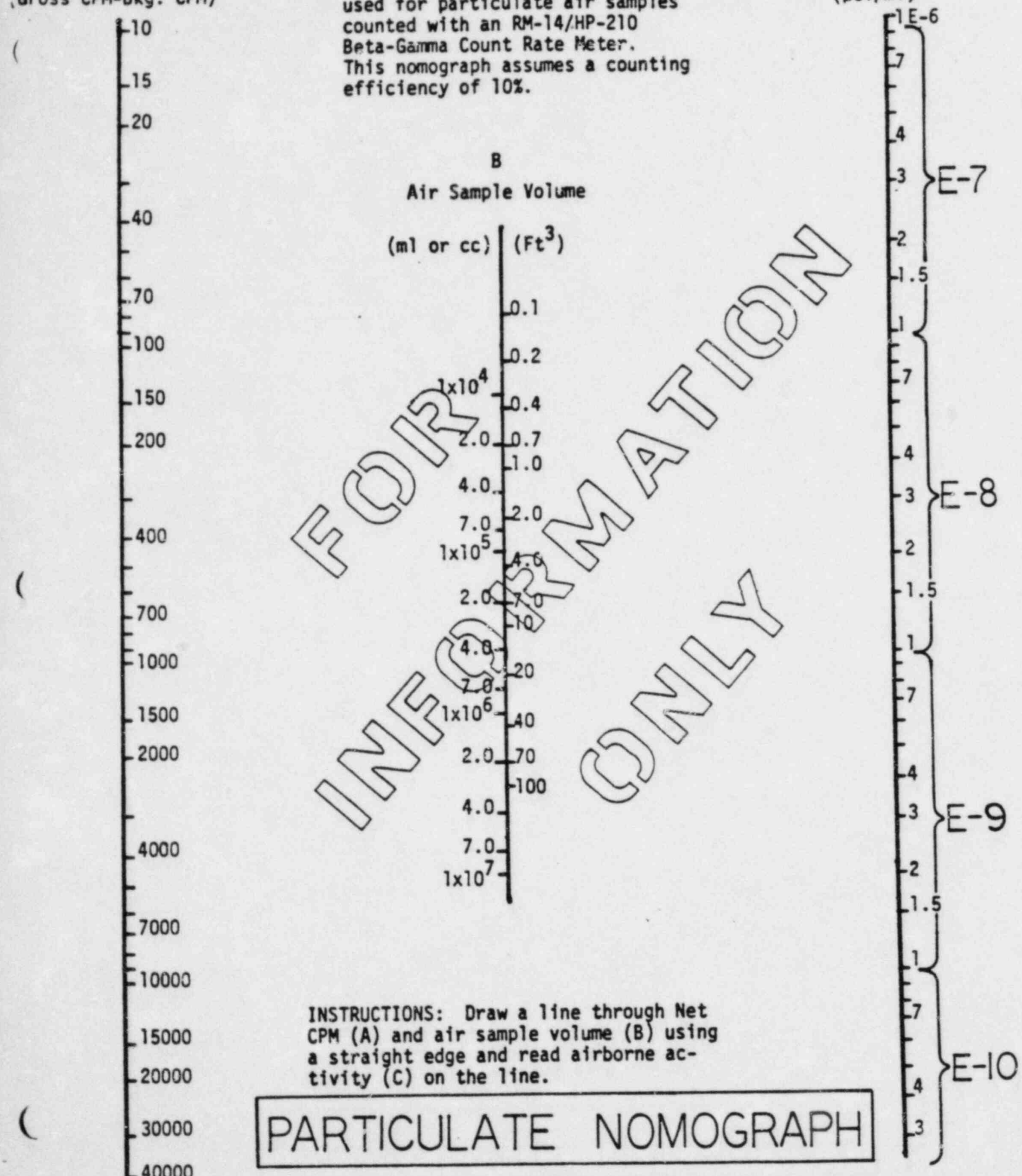
Instructions: Draw a line through Net CPM (A) and Air Sample Volume (B) using a straight edge and read I^{131} Airborne Activity (C) on the line.

IODINE NOMOGRAPH

ATTACHMENT III

AIRBORNE PARTICULATE SAMPLE NOMOGRAPH

Note: This nomograph is to be used for particulate air samples counted with an RM-14/HP-210 Beta-Gamma Count Rate Meter. This nomograph assumes a counting efficiency of 10%.

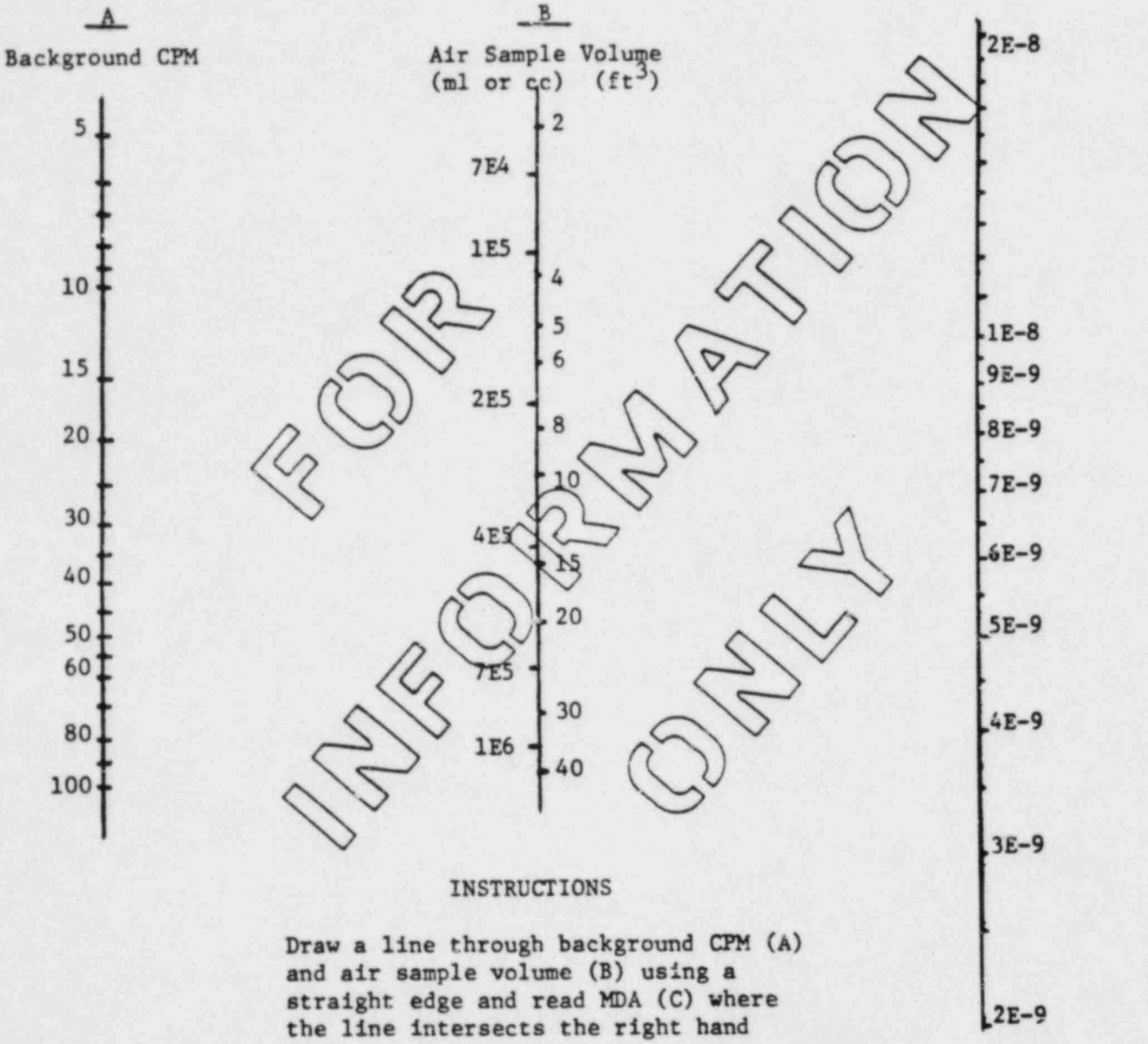


INSTRUCTIONS: Draw a line through Net CPM (A) and air sample volume (B) using a straight edge and read airborne activity (C) on the line.

PARTICULATE NOMOGRAPH

MINIMUM DETECTABLE RADIOIODINE ACTIVITY NOMOGRAPH

Note: This nomograph is to be used for determining the minimum detectable activity of airborne iodine samples counted with the SAM II. This nomograph assumes an ave. efficiency of 0.35% for SAM II's.

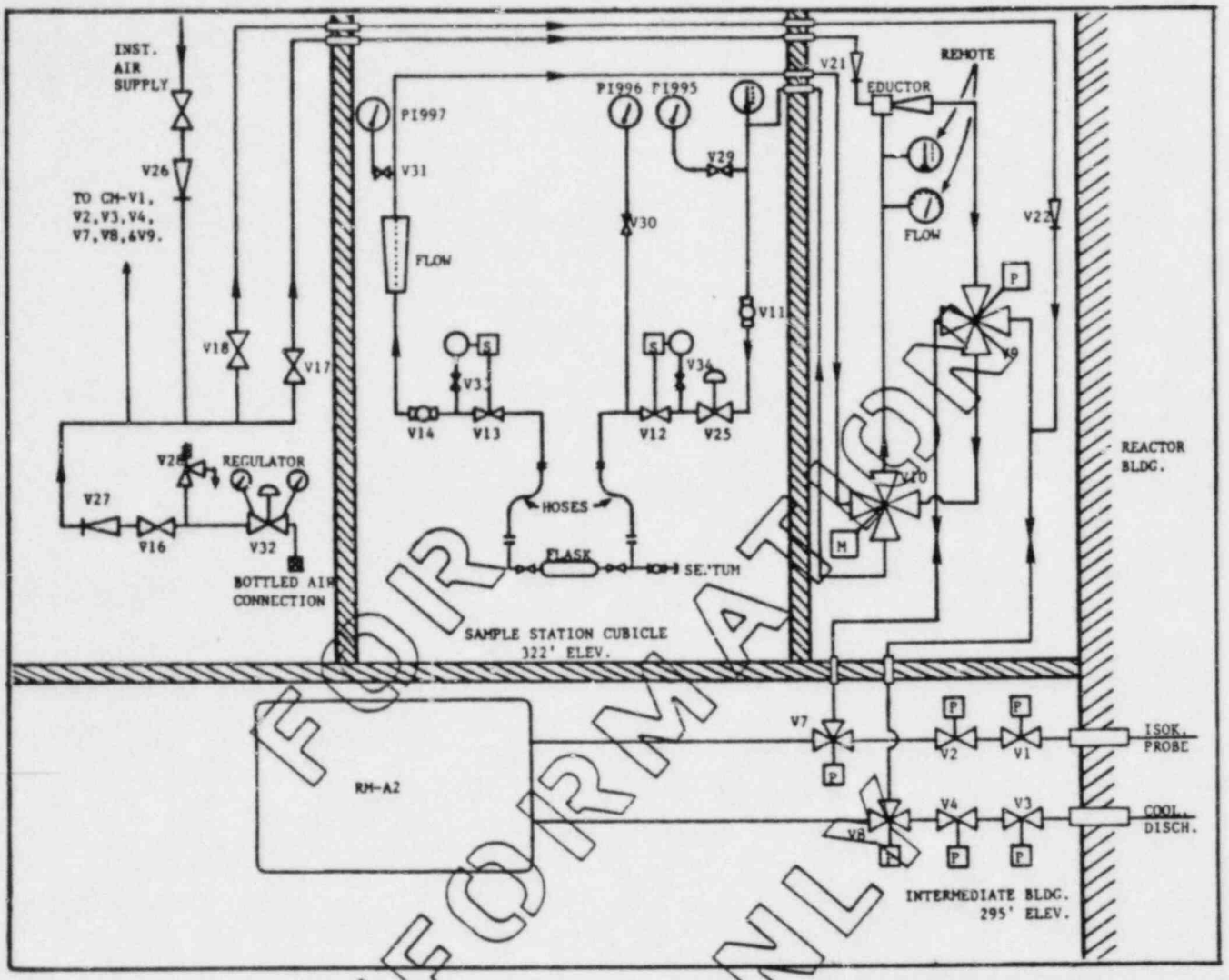


INSTRUCTIONS

Draw a line through background CPM (A) and air sample volume (B) using a straight edge and read MDA (C) where the line intersects the right hand scale.

MDA NOMOGRAPH

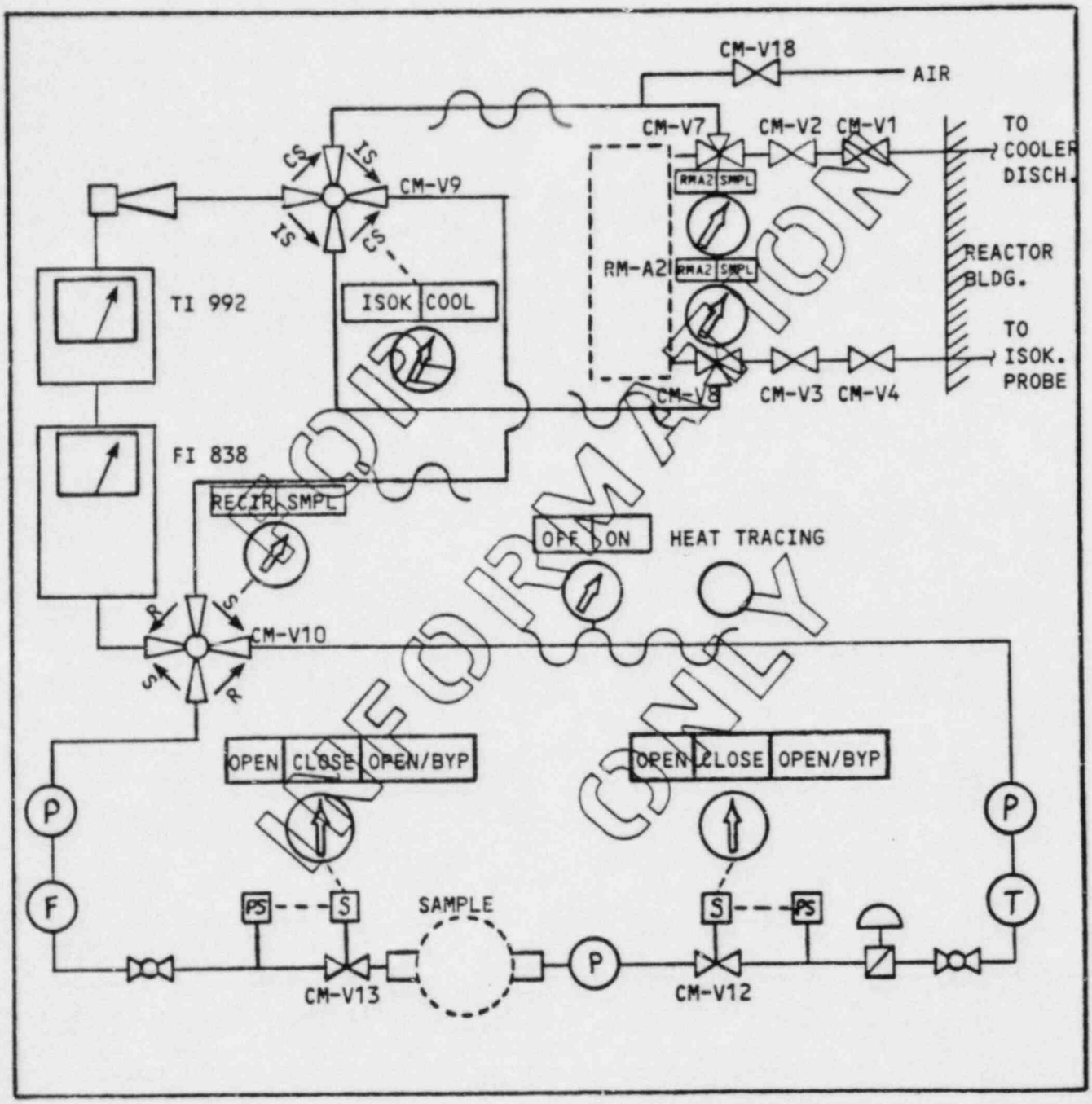
ATTACHMENT V
Containment ATmospheric Post Accident
Sampling System (CATPASS)



LEGEND

- Globe valve (manual)
- Three way valve (pneumatic)
- Four way valve (motor)
- Check valve
- Solenoid valve
- Regulator
- Relief valve
- Ball valve (¼ turn)
- Pressure gauge
- Temperature gauge
- Disconnect fitting

ATTACHMENT VI
SCHEMATIC OF CATPASS REMOTE SAMPLE PANEL



ATTACHMENT VII

CATPASS Sample Data Sheet

Sample Time:_____ Date:_____

Type Sample:

50 cc Sample Flask/____cc Syringe
(circle one)

CM-V9 Position: ISOK. SMPL./COOL. SMPL.
(circle one)

Tech _____

Remarks: _____

_____

_____

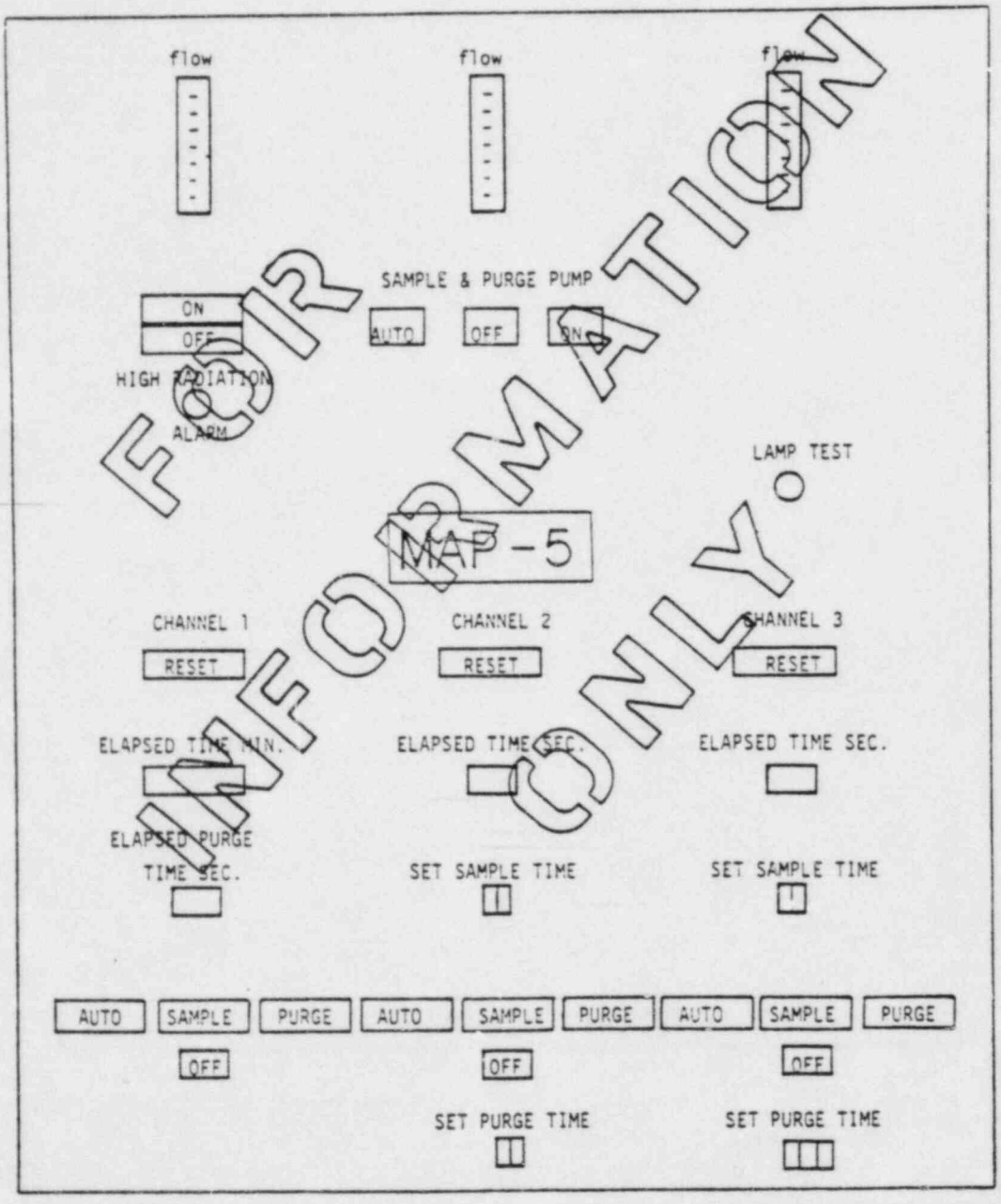
Results:

Contact dose rate_____mR/Hr.

NUCLIDE	ACTIVITY (μci)	CONC. (μci/cc)
TOTAL		

ATTACHMENT VIII

MAP 5 SAMPLE PANEL SCHEMATIC



ATTACHMENT IX

MAP-5 Sample Data Sheet
RM-A5, RM-A8, RM-A9
(circle one)

Sample Time: _____ Date: _____

Technician: _____

Sample Data	Sample Results		
	Nuclide	Activity (µci)	Concentration (µci/cc)
Channel No. 1			
1. Sample Flow Rate (cc/min) =			
2. Elapsed Sample Time (min) =			
3. Sample Volume (cc) (1 x 2) =			
4. Contact Dose Rate (mR/hr) =	Total		
Channel No. 2			
1. Sample Flow Rate (cc/min) =			
2. Elapsed Sample Time (min) =			
3. Sample Volume (cc) (1 x 2) =			
4. Contact Dose Rate (mR/hr) =	Total		
Channel No. 3			
1. Sample Flow Rate (cc/min) =			
2. Elapsed Sample Time (min) =			
3. Sample Volume (cc) (1 x 2) =			
4. Contact Dose Rate (mR/hr) =	Total		