



Interoffice Communication

To Lab Analysts

From P. L. Fetzer

Date January 30, 1975

Subject Analysis of Ambient Air Monitoring Samples

Beginning in February, the five-day week evening analyst shall have the responsibility for preparing the charcoal dosimeters for use in the monitoring and also analyzing the ambient air monitoring samples. I realize that it would be advantageous to make this analysis the responsibility of one man so that the data obtained would be more consistent. To assign this responsibility to one man is not possible and still maintain the work force needed in the laboratory.

A sample schedule is attached so that you may know when and how many samples will be in the laboratory. The analytical test for this analysis is attached and a copy will be found in the Vent Gas Analysis Manual. This responsibility includes transferring the integrator counts for the integrated area of each component to the computer calculation sheet for further processing. For the present, you will not be required to complete the analytical summarization of the data. Mr. Hackett and myself will work with you so that this transition will be smooth.

All analysts have the responsibility of preparing the ambient air monitors when extras are needed and completing the Ambient Air Field Report section of the monitoring report for each man. In regards to this last report, please fill it out as completely as possible each time.

If you have any questions regarding this increase in analyst responsibilities, please ask.


P. L. Fetzer

bc

CC: JHM

VVC 000011540

DETERMINATION OF VCM IN AMBIENT AIR
(CHARCOAL METHOD)

SCOPE:

This method is used to determine VCM at the ppm level in ambient air.

OUTLINE OF METHOD

A known volume of ambient air is passed through a charcoal bed which absorbs the VCM. The charcoal is then washed with carbon disulfide. A chromatogram is obtained of the carbon disulfide solution and the VCM is calculated against a known standard.

APPARATUS

1. Bendix type C 115 air sampling pump.
2. Pittsburg Activated Carbon PCB 12430 mesh
3. 75 ML stainless steel sample bomb with $\frac{1}{2}$ " pipe thread openings.
4. Two stainless steel $\frac{1}{4}$ " pipe thread to $\frac{1}{2}$ " tubing valves.
5. 30 quart ice chest.
6. Dry ice.
7. Gas dispersion tube-kimax 12 EC with coarse frit.
8. Scotch brand 33+ vinyl plastic electrical tape.
9. Pyrex brand wool filtering fibre
10. Culture tube - 25 x 150 MM.
11. Tygon tubing - $\frac{1}{4}$ " ID x $\frac{1}{2}$ " OD.
12. Perkin-Elmer 900 gas chromatograph with FID detector
13. Infotronics model CRS-100 integrator.
14. Honeywell 0.05 to 1.05 MV recorder.
15. Syringe - 5 micro liter Service "B" Precision Sampling "Pressure-Lok"
16. Precision Scientific wet test meter.
17. 4 oz. glass bottles.
18. Bottle caps with plastic seals.

REAGENTS

Carbon disulfide - spectroquality
Vinyl Chloride Monomer

COLUMN

Diameter	1/8" stainless steel tubing
Length	20'
Liquid Phase	12% Diethylene Glycol Succinate
Support	Chromosorb P A/W 80/100 Mesh
	Initial Temperature 60° C for 4 minutes
Column Temperature	Program 60° C to 140° C at 4° per minute
Injection Temperature	150° C
Detector Temperature	175° C
Carrier	Helium
Sample size	1 micro liter
Detector	Flame Ionization

PROCEDURE FOR MAKING STANDARD

The standard should contain about 1000 ppm VCM in carbon disulfide. Inject a weighed amount on VCM and carbon disulfide in the stainless steel sample bomb. This standard must be refrigerated. Run a chromatogram on the standard once per day.

CALCULATION

$$\frac{A}{A + B} = \text{weight percent VCM}$$

Where:

A = weight of the VCM

B = weight of the carbon disulfide

PROCEDURE FOR SAMPLING

Assemble the pump as shown in Figure I. Place the pump on the person with the inlet tube positioned in the normal breathing zone area and turn on. After the sampling period, remove the pump and turn off switch. Pour the charcoal in a tared 4 oz. bottle and cap it tightly. Weigh the bottle and charcoal and record the weight. Place the sample in an ice chest containing dry ice for at least thirty minutes. Remove the sample from the ice chest and pour in about 60 ml of carbon disulfide previously chilled to dry ice temperature, and mix thoroughly. Reweight the sample and record this weight. Return the sample to the ice chest for at least thirty minutes. Obtain a chromatogram of the standard and the sample.

CALCULATION: Note 1

$$\frac{\text{Integrator Count of Sample}}{\text{Integrator Count of Standard}} \times \text{weight \% VCM in standard} = \text{weight \% of sample} \times \text{weight } C_2S_2 = g \text{ VCM}$$

$$\frac{g \text{ VCM}}{\text{Mol. Weight}} = \text{Moles of VCM}$$

$$\text{Flow Rate} \times \text{Sample Time} = \frac{\text{Total Volume of air}}{22.4 \text{ L/Mole}} = \text{Moles of Sample}$$

$$\frac{\text{Moles of VCM}}{\text{Moles of Sample}} = \text{Mole PPM of VCM}$$

PUMP CALIBRATION

The Bendix Pump is calibrated to deliver 2.8 liters/minute using a wet test meter. This should be checked every three months.

NOTE 1. The weight of carbon disulfide, the pump rate, sampling time, area of components in sample, area and concentration of components in standard are entered in the time shared computer that calculates the time weight average value.

CONTINENTAL VCM PLANT

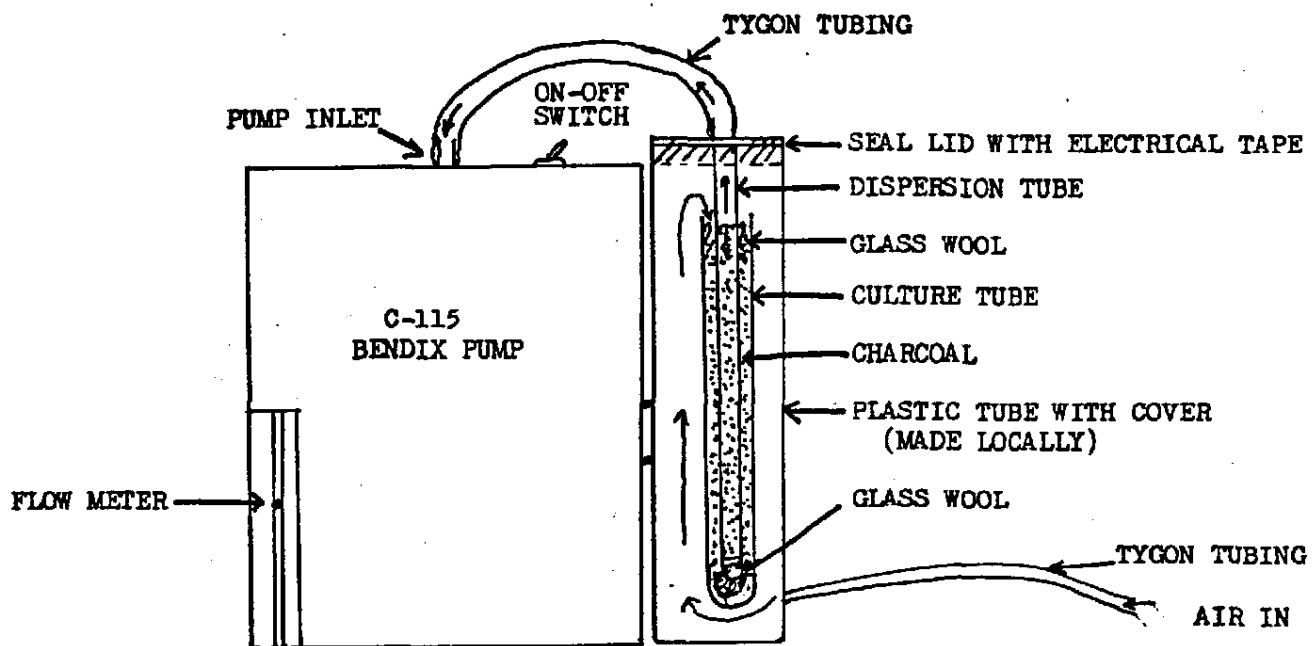


FIGURE I
AIR SAMPLING APPARATUS

DETERMINATION OF VCM IN AMBIENT AIR

SCOPE:

This method describes a means of collecting and determining ppm vinyl chloride in ambient air.

APPARATUS:

Gas chromatograph, varian aerograph series 2700 equipped with flame ionization detectors.

Auto-Lab System IV B chromatography data analyzer or suitable substitute.

Recorder Hewlett Packard Model 7123 A.

Glass collecting tube, 250 ML size with 5 MM I.D. side opening with rubber septum.

Bendix type C-115 air sampling pump.

2 ML pressure-lok glass syringe.

COLUMN:

Diameter	3/16" Aluminum tubing
Length	27'
Support	Chromosorb P A/W 60/80 Mesh
Liquid Phase	Diethylene Glycol Succinate 12% W/W
Column Temperature	90° C
Injection Temperature	140° C
Detector Temperature	180° C
Carrier	Helium
Sample Size	1.0 CC

STANDARD:

10 ppm VCM in nitrogen
(Available from Big Three Industries, Houston, Tex.)

PROCEDURE FOR CATCHING SAMPLE:

Place a rubber septum on side opening of glass collecting tube. Put about 10 inches of Tygon tubing on one end of the tube. Evacuate the glass cylinder by means of a vacuum system. Place the tygon tubing on the inlet of the Bendix Pump. Open both valves on the glass tube and turn on the Bendix drawing ambient air through the tube for about two minutes. Close the valves on the tube and turn off the pump.

PROCEDURE FOR ANALYSIS OF SAMPLE:

Run a chromatogram of the standard gas. This should be obtained for each series of samples and no less than every eight hours. Run a chromatogram of the sample using the glass pressure lok syringe.

PPM VCM equals : $\frac{A \times B}{C}$

WHERE:

A - Peak area of sample
B - ppm VCM in standard
C - Peak area of standard

VVC 000011544

**CONTINENTAL VCM PLANT
FIELD AND LAB DATA SHEET REPORT**

Employee Name _____ Sampling Date _____
Occupation _____ Supervisor _____
Shift _____

FIELD REPORT

- | | |
|---|---|
| <p>1. Pump Serial No: _____</p> <p>3. Employee Trained in Proper Use & Care of Monitor
YES _____ NO _____</p> <p>5. Time Sampling Begin: _____</p> <p>7. Routine Job: YES _____ NO _____</p> <p>9. Was Respiratory Equipment Used: YES _____ NO _____</p> <p>11. Describe Work Performed During Testing Time: _____</p> | <p>2. Tube & Filter Operable YES _____ NO _____</p> <p>4. Personnel Monitor Installed & Fitter Properly YES _____ NO _____</p> <p>6. Time Sampling Ended: _____</p> <p>8. Special Job: YES _____ NO _____</p> <p>10. Estimated Percent of Time Respiratory Equipment Used _____</p> |
|---|---|
12. Percent of Time Spent: Indoors _____ Outdoors _____
13. No. of Employees Involved in Job: _____
14. Weather Conditions: Temperature _____ °F Wind Speed _____
(Call 478-4810)
Direction Wind From _____ Humidity _____
Circle One: Clear Cloudy Partly Cloudy Rain
15. Report Filed By: _____ Date _____

LAB REPORT

- | | | | | | | | | | | | | | | | |
|--|-----------------------------|--------------------|-----------------------------|---------------------|-------------------------------|---------------------|--------------------------------|----------------------|--------------------------------|----------------------|----------------------------------|----------------------|--|----------------------|--|
| <p>1. Date of Analysis _____</p> <p>3. Sample Duration _____</p> <p>5. Weight of Empty Bottle _____</p> <p>7. Weight of Bottle, Charcoal and Carbon Disulfide _____</p> <p>9. Weight of Charcoal _____ gm</p> <p>10. Gas Chromatography Model: _____</p> <p>11. Analysis of Sample:</p> <table border="0" style="width: 100%;"> <tr> <td>1. Vinyl Chloride _____ ppm</td> <td>7. 1,1,2 _____ ppm</td> </tr> <tr> <td>2. Ethyl Chloride _____ ppm</td> <td>8. UNK #1 _____ ppm</td> </tr> <tr> <td>3. CCl₄ _____ ppm</td> <td>9. UNK #2 _____ ppm</td> </tr> <tr> <td>4. Trichloroethylene _____ ppm</td> <td>10. UNK #3 _____ ppm</td> </tr> <tr> <td>5. CHCl₃ _____ ppm</td> <td>11. UNK #4 _____ ppm</td> </tr> <tr> <td>6. Ethylene Dichloride _____ ppm</td> <td>12. UNK #5 _____ ppm</td> </tr> <tr> <td></td> <td>13. UNK #6 _____ ppm</td> </tr> </table> | 1. Vinyl Chloride _____ ppm | 7. 1,1,2 _____ ppm | 2. Ethyl Chloride _____ ppm | 8. UNK #1 _____ ppm | 3. CCl ₄ _____ ppm | 9. UNK #2 _____ ppm | 4. Trichloroethylene _____ ppm | 10. UNK #3 _____ ppm | 5. CHCl ₃ _____ ppm | 11. UNK #4 _____ ppm | 6. Ethylene Dichloride _____ ppm | 12. UNK #5 _____ ppm | | 13. UNK #6 _____ ppm | <p>2. Pump Calibration Date _____</p> <p>4. Air Sampling Rate _____</p> <p>6. Weight of Bottle with Charcoal _____</p> <p>8. Quantity of Carbon Disulfide Used for Analysis: _____ grams</p> |
| 1. Vinyl Chloride _____ ppm | 7. 1,1,2 _____ ppm | | | | | | | | | | | | | | |
| 2. Ethyl Chloride _____ ppm | 8. UNK #1 _____ ppm | | | | | | | | | | | | | | |
| 3. CCl ₄ _____ ppm | 9. UNK #2 _____ ppm | | | | | | | | | | | | | | |
| 4. Trichloroethylene _____ ppm | 10. UNK #3 _____ ppm | | | | | | | | | | | | | | |
| 5. CHCl ₃ _____ ppm | 11. UNK #4 _____ ppm | | | | | | | | | | | | | | |
| 6. Ethylene Dichloride _____ ppm | 12. UNK #5 _____ ppm | | | | | | | | | | | | | | |
| | 13. UNK #6 _____ ppm | | | | | | | | | | | | | | |
14. UNK #7 _____ ppm
15. UNK #8 _____ ppm
16. UNK #9 _____ ppm
17. UNK #10 _____ ppm
18. UNK #11 _____ ppm
19. UNK #12 _____ ppm
- TOTAL _____ ppm
12. Recovery Efficiency _____ percent
13. Date Recovery Efficiency Test Conducted _____
14. Report Filed By _____

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CONTINENTAL VCM PLANT

FULL WEEKS OF EACH MONTH

[illegible]