40,233

Occidental Chemical Corporation
Environment, Health & Safety

MEMO

To Rich White, Burlington Date April 4, 1986

From R. L. Comboy

Subj ct VCM Graphics

Attached are two graphs depicting VCM levels in Burlington. One depicts an average by month and the second depicts an average by job code.

Why is the average for July so high?

Would any other graphics be of interest?

RLC:blp
6888E-35

Attachment

40.233

Occid ntal Chemical Corporation

MEMO

Environment, Health & Safety

To Gerry Lloyd **Date** January 3, 1983

Fr m Terry Briggs

Subj ct VCM Sampling with 3M Badges

cc: M. R. Zavon
R. J. Schuttler

Based on a review of your VCM sampling and analysis methodology, I am providing specific recommendations to improve quality control. The following VCM sampling and analysis papers by Jack Larkin were reviewed:

1. Personnel Monitoring for VCM Exposure Utilizing the 3M Brand Organic Vapor Monitor (OVM) #3500, December 15, 1980.

2. Use of Higher Capacity Badges for VCM Monitoring, June 4, 1982.

(Each paper is enclosed in Attachment I).

Reviews were provided by R. G. Badger, OCC Central Sciences and Dr. F. W. Snowden, 3M, Occupational Health and Safety Products Division. Their reviews are presented in Attachment II.

The major concerns with Larkin's papers are:

1. Air bags are not an acceptable device for exposure chambers in validating Organic Vapor Monitor performance. A dynamic flow chamber must be employed to provide meaningful results. 3M has conducted validation tests for VCM using a dynamic flow chamber. Thus it is unnecessary to validate the use of 3M OVM badges.

2. The inference of #3500 (one-bed) badge capacity presented in paper 1 is incorrect. As discussed by Snowden, the capacity or linear range in the #3500 badge depends on the exposure history but testing in a bag provides misleading data. Since the linear range for #3500 badges may be quite low for 8 hour samples, I recommend that the #3520 or double wafer badge be used for sampling all Group 1 employees. The weight relationship of VCM on each wafer of the #3520 badge will indicate if a valid sample was collected (i.e., if the weight response is linear). For the #3520 badge, "to assure a valid sample under all sampling conditions, the ratio of the contaminant weight (Ws) on the second adsorbent to the contaminant weight (Wp) on the primary absorbent must meet the following criteria: $Ws/Wp \leq 0.50$"*.

*Anders, L.W., et al, Organic Vapor Monitor with Backup, Section #3520. 3M Company publication. (No date given).

2149E-1

3. The conclusion in paper 2 that, "the double badges do not perform in the manner suggested by the manufacturer's literature", is untrue and appears to follow from a lack of understanding of the operating principle of the #3520 badge and faulty experimental technique. See Snowden's review for a discussion. The #3520 badge and the similar 2-section badge by DuPont are based on sound technical principles and have been lab and field validated.

4. To criticize the recommended analytical procedure when that procedure was not followed (paper 1, section A), indicates faulty experimental design. The 3M analytical method is simply an adaptation of the NIOSH Standard Method for VCM. DMAC is a less efficient solvent than CS_2 which results in less complete desorption of VCM from the badge. The use of either solvent may give accurate and reproducible results however. Since you are using a non-standard method, I recommend that split sampling be conducted periodically and one of the samples sent to an AIHA certified lab for analysis to compare with the Works Lab results. This will provide technical support for the DMAC-Head Space method.

Recommendations

To summarize, my recommendations are:

1. The VCM sampling program should use #3520 badges for Group 1 employees and to retest other employees when sample results show greater than 1 ppm, 8 hour TWA.

2. The analysis of #3520 badges must be performed separately for each wafer and the VCM weight for each wafer added using the following equation:

$$C\ (mg/m^3) = \frac{(Wp + 2.2\ Ws)}{Kp + t}$$

Where: Kp = sampling rate of the contaminant onto the primary adsorbent.

t = length of sampling period.

Wp = corrected weight collected on the primary adsorbent.

Ws = corrected weight collected on the secondary adsorbent.

3. Validation data should be collected on the VCM analytical method by conducting selected split personal sampling and sending one of the samples from each set to an AIHA certified lab for comparison.

ATTACHMENT I

Firestone

INTEROFFICE

RECEIVED
DEC 18 1980
G. D. LLOYD

DATE DECEMBER 15, 1980

TO MR. C. W. ENGBLOM

FROM J. E. LARKIN

REFERENCE

SUBJECT PERSONNEL MONITORING FOR VCM EXPOSURE
UTILIZING THE 3M BRAND ORGANIC VAPOR MONITOR #3500

History: Up to the present, personnel monitoring for vinyl chloride monomer (VCM) exposure, as required by the Occupational Safety and Health Administration (OSHA), has been carried out using ten minute air sampling bags and standard gas chromatographic analysis. In order to convert to use of the 3M Brand Organic Vapor Monitor #3500 and to utilize our automatic headspace gas chromatograph and computing integrator, a study has been initiated to establish operating parameters and validity of data obtained.

Summary of Results:

1. To avoid handling the volatile and highly toxic solvent carbon disulfide, dimethyl acetamide was used as the desorbing medium in this investigation.
2. The desorbing technique suggested by 3M literature was found to yield incomplete recovery thus producing inaccurate results.
3. A technique was developed wherein the charcoal disc of the 3M badge was transferred to a test vial of the F40 headspace gas chromatograph and desorbent added directly to the sealed vial via hypodermic injection.
4. A response factor for standard VCM concentration was derived as part of the programming of the Model I computing integrator.
5. A VCM concentration value was determined using standard 1.01 ppm VCM in air, also necessary for programming the Model I.
6. It was determined that the Model I may be programmed to print out ppm VCM exposure directly as 8 Hour Time Weighted Average.
7. Numerous analyses were run on badges placed on different plant personnel for 8 hour periods which produced data consistent with that expected.
8. Additional analyses using higher standard samples, 10.1 ppm and 20.0 ppm VCM, indicate linearity of results up to the saturation level of the discs.

Conclusion:

The method of analysis developed in this investigation offers an accurate, and relatively simple and rapid, determination of 8 Hour Time Weighted Average VCM exposure utilizing the 3M Brand Organic Vapor Monitor #3500.

J. E. Larkin

J. E. LARKIN

kth

CC: Mr. F. L. Edris, Mr. C. J. Kleinert, Mr. G. D. Lloyd ✓
Mr. D. M. Connor (Perryville), Mr. M. Handler (Baton Rouge)

OCC 8169

EXPERIMENTAL PROCEDURE

A. The procedure proposed by Perkin-Elmer Corp. to utilize their F40 headspace gas chromatograph with Model I computing integrator to determine levels of VCM adsorbed by activated charcoal suggests several desorbents other than carbon disulfide (CS_2). To minimize volatility and avoid working with the highly toxic CS_2, dimethylacetamide (DMAC) seemed to be the most promising alternative and was thus used in this investigation.

3M Brand Organic Vapor Monitor #3500 is a plastic badge containing activated charcoal impressed in an inert matrix in the form of a disc about 1/2 mm thick by 30 mm in diameter inset in the badge and covered by a permeable membrane. The disc is exposed to sample atmosphere and VCM is adsorbed by the charcoal by diffusion of sample atmosphere across the face of the membrane. The suggested handling procedure is that at conclusion of exposure time the badge be resealed and desorbent be introduced for a period of time (1 ml DMAC for 1/2 hour with periodic agitation). After desorbtion, the DMAC is analyzed by gas chromatography to determine VCM content. Data obtained is incorporated in calculations to determine Time Weighted Average VCM exposure. This procedure was applied to a 3M badge exposed for 8 hours to an atmosphere containing 10.5 ppm VCM and the entire 1 ml portion of DMAC was transferred to a headspace vial, sealed, equilibrated for 1/2 hour at 90°C and analyzed using the F40 and Model I. The Model I was programmed to convert the VCM peak signal data to ppm VCM contained in the vapor space of the vial. Transfer of the DMAC to the vial is somewhat arbitrary as one cannot transfer all the DMAC initially introduced to the badge. In this analysis, a value of 138 ppm VCM was obtained. To determine totality of desorbtion, a second 1 ml portion of DMAC was added to the previously desorbed badge and the process of analysis repeated. The second run yielded an additional 143 ppm VCM. A third DMAC addition was made and an additional 78 ppm VCM obtained. Finally, the disc which had been desorbed three times was removed from the badge, cut into small pieces, placed in a headspace vial and 1 ml DMAC added. The result, an additional 236 ppm VCM. Obviously, the desorbtion using the 3M technique is neither complete nor accurate.

B. On the basis of the data obtained in A, it was decided to remove the charcoal disc from the badge upon completion of exposure, cut the disc into pieces and place the entire disc in a vial for desorbtion. Numerous standard samples were prepared as follows: An opened badge was placed in a 15 liter air bag through a slit in the bag, the bag was then resealed and filled with 1.01 ppm standard VCM in air. After 8 hours, the badge was taken from the bag, the disc removed, cut into pieces and the pieces sealed in a headspace vial. 1 ml DMAC was injected into the vial, the vial was equilibrated 1 hour @ 90°C in the F40 and analyzed using the F40 and the Model I.

In order to obtain integrated data directly in ppm, it was first necessary to establish a response factor (RF) for VCM standard sample. This was done according to Quantitative Method 3 of the Model I operations manual. Over a period of weeks, three vials were filled each day with standard 10.5 ppm VCM in air, sealed and 1 ml DMAC added. Each vial was analyzed using the F40 and Model I and an RF obtained. Statistical analysis of the resulting data yielded an RF of 3085 (see Page A) having a Standard Deviation of 236 and a 95% Confidence Limit of 87.4 which is 2.83% of the RF. It should be noted that without the 1 ml of DMAC the RF would be 300-350 units higher indicating

an established equilibrium in the vial where about 90% of the available VCM is in the vapor space and 10% in the DMAC.

Using the RF of 3085, the Model I was programmed to print out the concentration in ppm of VCM in each vial containing a charcoal disc exposed to 1.01 ppm VCM standard for 8 hours. Statistical analysis of the data obtained for samples ran over a period of weeks yielded an average of 109.6 ppm VCM (see Page B) having a Standard Deviation of 5.21 ppm and a 95% Confidence Limit of 2.8 ppm which is 2.56% of the average. This means that a vial prepared and treated as described above contains 109.6 ppm VCM by volume in the vapor space, this being the VCM desorbed by the DMAC. Since the volume of the vial with 1 ml DMAC is 22.5 ml, the actual VCM in the vapor space by weight is 6.89×10^{-6} grams. However, as will be shown, it is not necessary to convert to weight VCM on each analysis.

C. Utilizing the RF of 3085 and the 1.01 ppm VCM standard concentration of 109.6 ppm VCM, the Model I may be programmed so that for an unknown sample the VCM peak signal from the F40 will be reported on the Model I printer tape directly as 8 Hour Time Weighted Average VCM exposure in ppm by volume. For example, a badge was placed on a reactor operator for a period of 8 hours. At conclusion of exposure, the badge was sealed and returned to the laboratory. The badge was opened, the disc removed, cut into pieces, transferred to a headspace vial and the vial sealed. 1 ml DMAC was added to the vial and the vial was equilibrated 1 hour @ 90°C in the sample holder of the F40. The Model I was programmed with the RF of 3085, the average 1.01 ppm VCM standard concentration of 109.6 and an expoential value of 3 to properly position the decimal point. The vial was then analyzed according to standard F40 operational procedure and VCM peak signal as produced by the chromatographs FID was converted by the Model I directly into 8 Hr. TWA VCM exposure of 2.1 ppm. See Page C for numerous examples of analyses run on various plant personnel.

D. Additional analytical work using VCM standard of 10.1 ppm for the 8 hour exposure indicates that as the level of VCM in air increases, the charcoal disc adsorbs in a linear manner. The average of a number of 10.1 ppm standard air bags was 10.5 ppm by analysis, not considered to be indicative of non-linearity. Samples were also crudely prepared at a target of 20.0 ppm and these also indicated linearity of data. The manufacturer indicates the badge will adsorb up to a level of 30.0 ppm VCM before saturation occurs.

E. Considerable time was devoted to establishing the proposed method and necessitated use of many 3M badges. Any evaluation of other monitors or desorbing agents would involve repeating much of the experimental procedure.

A

10.5 ppm Std. in 1.0 ml DMAC

RF DATA

X	$(x-\bar{x})^2$		
2922	-163^2	=	26569
3069	-16^2	=	256
2823	-262^2	=	68644
3054	-31^2	=	961
3189	104^2	=	10816
2982	-103^2	=	10609
2938	-147^2	=	21609
3003	-82^2	=	6724
2624	-461^2	=	212521
3235	150^2	=	22500
2907	-178^2	=	31681
2570	-515^2	=	265225
2923	-162^2	=	26244
3277	192^2	=	36864
3110	25^2	=	625
3422	337^2	=	113569
3283	198^2	=	39204
3038	-47^2	=	2209
3331	246^2	=	60516
3241	156^2	=	24336
2766	-319^2	=	101761
3331	246^2	=	60516
2790	-295^2	=	87025
3230	145^2	=	21025
3335	250^2	=	62500
3284	199^2	=	39601
3299	214^2	=	45796
3408	323^2	=	104329
86384			1504235

$$\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$$

$$\sigma = \sqrt{\frac{1504235}{27}}$$

σ = 236 Std. deviation

$$\bar{x} \pm = \frac{1.96\sigma}{\sqrt{n}}$$

$$\bar{x} \pm = \frac{1.96 \times 236}{\sqrt{28}}$$

$\bar{x} \pm$ = 87.4 = 95% Con. Limit
= 2.83% $\bar{x}$

$\frac{86384}{28}$ = 3085 = $\bar{x}$ $\quad \Sigma(x-\bar{x})^2$ = 1504235

JEL/kgh

B

1.0 ppm VCM Std. in Bag

3M Disc Contacted for 8 Hours

Desorbed with 1.0 ml DMAC 1 Hr. @ 90°C

ppm in Vial

X	$(x-\bar{x})^2$		
113.1	3.5^2	=	12.25
116.2	6.6^2	=	43.56
115.2	5.6^2	=	31.36
102.1	-7.5^2	=	56.25
100.2	-9.4^2	=	88.36
103.3	-6.3^2	=	39.69
114.2	4.6^2	=	21.16
112.7	3.1^2	=	9.61
106.0	-3.6^2	=	12.96
109.3	-0.3^2	=	0.09
108.7	-0.9^2	=	0.81
112.5	2.9^2	=	8.41
110.7	1.1^2	=	1.21
1424.2			325.72

$$\frac{1424.2}{13} = 109.6 = \bar{x} \qquad \Sigma(x-\bar{x})^2 = 325.72$$

$$\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$$

$$\sigma = \sqrt{\frac{325.72}{12}}$$

σ = 5.21 Std. deviation

$$\bar{x} \pm = \frac{1.96\sigma}{\sqrt{n}}$$

$$\bar{x} \pm = \frac{1.96 \times 5.21}{\sqrt{13}}$$

$\bar{x} \pm$ = 2.8 = 95% Con. Limit
= 2.56% $\bar{x}$

JEL/kgh

C

PLANT PERSONNEL AND AREAS MONITORED WITH 3M BADGE

8 HOUR EXPOSURE

Name or Area		ppm VCM 8 Hr. TWA
L. Kline	1st Floor Bldg. I Pump Out	0.4
	Safe Room #6	0.5
O. Moyer	Reac. Room Bldg. I Resin	2.1
Pasko	Line 6 Dryer	0.7
Mohn	Line 4	0.2
Gill	Tk. Farm Operator	1.5
Hacker	Bulk Area	0.7
Strause	Maintenance	2.1
O. Moyer	Reac. Room Operator	3.7
Steffy	Line 4 Dryer	0.6
	Safe Room #6	0.1
Mervine	Relief, Bldg. I	0.4
Rentschler	Reac. Room Bldg. II	5.7
Hane	Stripping Bldg. II	8.5
Robertson	Tank Farm	9.9
B. Pasko	Dryer Line 6	1.9
	Relief, Bldg. I Safe Room	0.1
Spaar	Relief Bldg. I	0.9
Elias	Stripper, Bldg. I	0.7
Gill	Tank Farm Operator	2.9
O. Moyer	Reactor, Bldg. I	0.3

JEL/kgh

INTER-OFFICE CORRESPONDENCE

Hooker Chemical
PLASTICS DIVISION

To MR. TERRY BRIGGS-INDUSTRIAL HYGIENE-NIAGARA FALLS
NAME LOCATION

Date JUNE 4, 1982

From J. E. LARKIN
NAME LOCATION

Subject USE OF HIGHER CAPACITY BADGES FOR VCM MONITORING

Copy to: Messrs. F. L. Edris, K. H. Garner, G. C. Grow, G. D. Lloyd

History: At our meeting on 2/18/82 with Mr. G. D. Lloyd, it was agreed that we would conduct an investigation of the new 3M 3520 personnel monitoring badge. These badges have two adsorbing sections which purportedly would provide a clearer definition of badge capacity and also increase total capacity. A number of these badges have now been recieved and evaluated.

Summary of Results:

1. Analyses were carried out utilizing the techniques developed for our headspace gas chromatographic system as described in my report of 12/15/80 to Mr. C. W. Engblom.

2. Double badges were exposed to 10 ppm VCM standard for 8 hours and the two adsorbing disc were individually analyzed. Average data showed 7.65 ppm VCM on the front or top disc and 2.95 ppm VCM on the bottom or back disc.

3. Both single and double badges were hung simutaneously on production personnel anticipated to have relatively high levels of exposure. Analyses of the single badge discs and the total of the individual discs from the double badges were essentially in agreement. Although most exposures, unfortunately, were low to very low, permeation to the back disc of the double badges was always observed and at a ratio of about 70-30 as seen on the 10 ppm standards. See Table I.

4. Double badges were placed in bags having 1.0 ppm and 10 ppm VCM standards for a period of 24 hours in an attempt to determine if an equilibrium would be established. This proved to be the case.

Conclusion: Data indicate that the double badges do not perform in the manner suggested by the manufacturer's literature.

J. E. Larkin

J. E. LARKIN

ldw

attachments

Experimental Procedures

A. Two double badges were individually exposed in air bags to 10.1 ppm VCM standard for a period of 8 hours. The badges were then disembled and the front and back adsorption discs were cut into small pieces and sealed in headspace vials with 1 ml DMAC. The vials were then analyzed using our headspace gas chromatograph with computing integrator programmed to yield the VCM concentration directly as 8 hour TWA. For one badge, the front disc showed 7.4 ppm VCM and the back disc 3.0 ppm VCM. The other badge showed 7.9 ppm VCM on the front disc and 2.9 ppm VCM on the back disc. Average for the two runs was 7.65 ppm on the front disc and 2.95 ppm on the back disc, a ratio of about 70-30 front to back. Our past work with single badges indicated complete adsorption of the 10 ppm standard on the single disc.

B. Six sets of badges, one single and one double, were hung on production personnel anticipated to have high levels of exposure. As it turned out, high levels were not experienced; however, this was a condition over which we had no control. Regardless, after 8 hours exposure, the single badges discs and the front and back discs of the double badges were individually analyzed. In most instances, agreement between the single badge disc and the total of the double badge data was good. However, in every case, despite generally low to very low exposure levels, VCM was found on the back disc and at about the same ratio as was found with the 10.1 ppm VCM standard. See Table I. At these low levels, and based on our work with single badges, no permeation to the back disc would have been expected to occur.

C. In an attempt to establish whether equilibrim between front disc and back disc was being reached regardless of levels of concentration, double badges were exposed in air bags to 0.95 ppm VCM and 10.1 ppm VCM standards for 24 hours. Naturally, due to the prolonged exposure time, the levels of VCM were expected to be higher than for a normal 8 hour exposure. In these two cases, the 0.95 ppm standard showed 0.8 ppm on the front disc and 0.7 ppm on the back disc and the 10.1 ppm standard showed 11.2 ppm or the front disc and 11.0 ppm on the back disc. It would appear that over an extended period of time equilibrim is established between the front and back disc regardless of concentration. It is felt that this confirms the approximately 70-30 equilibrim ratio observed after 8 hours exposure.

D. From the above data, plus the data determined in our initial work with the single badges, it is concluded that the double badges are not performing in the manner indicated by the manufacturer's literature; that is, the front disc adsorbing until the saturation level is reached before breakthrough to the back disc occurs.

TABLE I

Single and double badges hung simultaneously on production personnel.

Name	Job	Single Badge 8 Hr. TWA	Double Badge Front	8 Hr. TWA Back
Koren	Reactor Opr.	0.3 ppm	0.3 ppm	0.1 ppm
Conrad	Tank Farm Opr.	1.2 ppm	0.9 ppm	0.6 ppm
Rakowski	Flusher	1.1 ppm	0.8 ppm	0.5 ppm
Hildebrand	Stripper Opr.	0.2 ppm	0.1 ppm	0.1 ppm
Mervine	Reactor Opr.	0.3 ppm	0.3 ppm	0.2 ppm
Wertman	Flusher	2.5 ppm	1.6 ppm	1.6 ppm

6/4/82

ldw

ATTACHMENT II

Occidental Chemical Corporation

Environment, Health & Safety

MEMO

To T. M. Briggs **Date** July 30, 1982

From R. G. Badger RGB

Subject Analysis of 3M Organic Vapor Monitors at Pottstown

cc: D. Eichler
R. J. Schuttler
TIC (1)

This memo is a response to your request for comments on the report "Personnel Monitoring for VCM Exposure Utilizing the 3M Brand Organic Vapor Monitor #3500." Based on what is said in the report and 3M literature relative to the use and calibration of these badges, the following points should be noted:

1. The use of air bags (with static atmospheres) for the exposure of the badges to a standard atmosphere is not a valid technique. Even though good comparative results were obtained at 10 and 20 ppm, this may not be an accurate indication of the exposure levels experienced under field conditions due to the difference in air velocity across the face of the badge.

2. The initial attempts to desorb the VCM using DMAC do not invalidate the desorption technique suggested by 3M since DMAC was not suggested as the elutant. OSHA literature indicates that CS_2 should be used to desorb VCM from charcoal. The response factor determinations indicate that DMAC is a relatively poor solvent for VCM and thus it would not be expected to desorb VCM from the charcoal with any degree of efficiency.

As a result of these observations it would seem to be prudent to do some additional work to validate the results we are obtaining using this analytical method for these badges. As we have discussed, badges could be exposed in recommended test chambers and run (perhaps blind) in house or duplicate exposures could be taken on plant personnel with analytical work being done both in house and outside. Another alternative might be to use direct spiking of the badges as is done when determining the recoveries in conventional elutriant techniques.

RGB:1295Ebp(52)

Occupational Health and
Safety Products Division/3M

3M Center
St. Paul, Minnesota 55144
612/733 1110

3M

November 23, 1982

Dr. Terry M. Briggs
Corporate Industrial Hygienist
Hooker Chemical Company
360 Rainbow Blvd. So.
P.O. Box 728
Niagara Falls, NY 14302

Dear Terry,

Attached is my review of the reports you sent to me. It may seem somewhat detailed, but a complete explanation leaves little to the imagination. I looked more at the conceptual flaws and less at the head space analysis technique since done properly (as with charcoal tubes) it will give the proper result.

If there are any further questions or you need to get in touch with me, I can be reached at (612) 733-4404. Please do not hesitate to call. Good luck.

Sincerely,

Frank

Frank W. Snowden, PhD

FWS/js

Attach.

Summary of Results:

3. Conclusion incorrect, see Text Part A.

Experimental Procedures.

A. To demonstrate the difference between the #3500 and the #3520 monitors it is necessary to consider the phenomenon as well as the resulting numbers. First, we do not recommend exposure in a plastic bag because of the lack of air movement, and the fact that in many instances it leads to inaccurate and non reproducible results. However, when exposed to a VCM concentration of 10 ppm the #3500 may adsorb, given enough time and a sufficiently high concentration enough VCM to yield an analyzed concentration of 10 ppm.

What is not indicated by a single wafer is that the adsorption of VCM is occuring in a non linear fashion. That is, the amount of VCM adsorbed is not proportional to the actual concentration in the air. Some of that which is adsorbed is lost back to the atmosphere. Over the entire exposure range recommended in our literature for VCM it can be assumed that for every 100 molecules of VCM striking the charcoal, no less than 95 remain. When the actual concentration is higher than the suggested exposure range then less than 95 of the 100 molecules of VCM remain. In fact, it may be significantly less and unknown. In these cases it is suggested that the sampling time be reduced.

For the #3520 as this nonlinear adsorption begins in the primary wafer, the second wafer begins to adsorb. That is, the primary wafer loses VCM back to the atmosphere and also to the second wafer. This may occur at significantly low concentrations in the case of VCM. Because of this, for the #3520, adsorption of VCM remains proportional to the total weight of VCM adsorbed (the total weight, $W_t = W_p + 2.2W_s$.) W_p is the weight VCM on the primary wafer and W_s the weight of VCM on the secondary wafer). The sampling remains linear and it is expected that 30% could be found on the second wafer. Another way of stating it is that the 3520 is 30% more efficient as a collector.

B. What this data demonstrates is that even at this low concentration the #3520 is more accurate because it is adsorbing linearly while the #3500 is not. The total concentration sensed by the #3520 is always higher, indicating its greater collection efficiency. Using the relationship $W_t = W_p + 2.2\ W_s$ the concentrations given in Table I could be recalculated (to do this ppm would have to be converted back to weight, recalculated, then converted back to ppm). But as an approx.

#3500	#3520 (front and back)
0.3	0.52
1.2	2.22
1.1	1.90
0.2	0.32
0.3	0.80
2.5	5.13

C. This is somewhat true. Another more realistic way of stating the observation is that at rather low levels (perhaps anything more than 2 ppm) the front section of the monitor will begin to lose some VCM which will be adsorbed by the back-up section. Over an extended period of time it is possible to reach a point where both wafers have reached their limit of adsorption when exposed to enough VCM (that could be a large amount of a low concentration or a relatively small amount of a high concentration). At this point they will, since they are equal in weight, have adsorbed the same amount of material.

D. The graph of the breakthrough curve for VCM is enclosed. It indicates that breakthrough begins to occur at levels far below saturation. Again, saturation is not the most important factor for the front section but nonlinear adsorption (where, for example, of every 100 molecules adsorbed 10 to 15 are lost back to the atmosphere) is.

Experimental Procedure A.

(1) For desorption, as it is performed in this procedure, Dimethyl Acetamide (DMAC) is used. The desorption coefficients in the 3M literature relate to use of carbon disulfide and in some instances dichloromethane, not to DMAC. Thus, the desorption coefficients are correct, but not applicable to this procedure and must be worked out.

(2) It is not necessary to get all the VCM out of the wafer for the test to be valid. It is necessary to get a consistent, reproducible amount out under the same conditions and to determine what that amount is. It would be used in the same manner as our desorption coefficient.

(3) The procedure should be performed in the same manner as it is performed for charcoal from charcoal tubes. While the desorption coefficient will be somewhat different, it should not be by much. Further, the procedure as given in (B) is: head space analysis should be performed in the same manner as with the charcoal from charcoal tubes. See end of paragraph 2, Experimental Procedure (B).

40,233

Occidental Chemical Corporation

April 18, 1983

Mr. Louis S. Beliczky
Director of Industrial Hygiene
URW International Union
87 South High Street
Akron, Ohio 44308

Dear Mr. Beliczky:

In response to your request for exposure records under the provisions of 29CFR1910.20, the attached data is being provided and includes:

Attachment #1:	Job Classifications
Attachment #2:	Personal Protective Equipment
Attachment #3:	Personnel Monitoring for VCM
Attachment #4:	Pilot Plant Monitoring for VCM
Attachment #5:	Personnel Monitoring for DIDP

In Attachment #3, you will note each employee is placed in a monitoring group labeled 1, 2, 3 and 4. Group 1 are employees who work in regulated areas on a daily basis. Group 2 are employees who can or do work in regulated areas but not necessarily on a daily basis. Group 3 are employees who work in non-regulated areas but who might occasionally receive some inadvertant exposure. Group 4 are employees confined to non-regulated areas. The subgroups "A" in group 2 and "B" in group 3 designate hourly paid employees.

During the period of January thru March 1981, we were in the process of revising our Personnel Monitoring System from 10 minute grab samples to 8 hour TWA samples. I have not included the 10 minute sample results for that period since they are rather meaningless and our Mr. T. Briggs advised that Mr. Brustein was not interested in data other than 8 hour samples. Our area monitoring data has not been used to calculate employee TWA's or ceiling exposures and are therefore not included.

You should be aware that although respiratory protection is required for exposures greater than 1 PPM 8 hr. TWA, the monitoring results records are not reflective of whether or not such equipment was used for excursions greater than 1 PPM. Further, several jobs which inherently produce higher monitoring results, such as high pressure water reactor cleaning and reactor entry, are mandatory respirator

OCC 8182

Keywords: Pottstown, URW Int'l. Union, employee exposure records, Industrial Hygiene, PVC Production, Area monitoring & sampling

jobs but the use of such equipment is not reflected on the monitoring records.

We have monitored for PVC dust, however, no sampling has been completed since December 1, 1980. Those samples taken prior to that time were all well below 10 mg/m^3 total dust and 5 mg/m^3 respirable dust.

We hope these data adequately fulfills your request for information. If you have any questions, please call.

Sincerely,

Gerald D. Lloyd
Manager, Safety

GDL:mas

Enclosures/

40.233

Occidental Chemical Corporation

April 21, 1983

Mr. Daniel J. Brustein
URW International Union
87 South High Street
Akron, Ohio 44308

Subject: Pottstown PVC Production - Personal Sampling Data

Dear Dan:

Enclosed is the information from Pottstown that you requested. I also am enclosing a printout of the VCM sampling data by job number which may be of help to you. After checking with Gerry Lloyd at Pottstown I realized that the Job Number listing was used only for designating work groups in the VCM sampling program. Thus, the breakout is unnecessarily complex. I have enclosed Job Number Codes for reference.

Please call if I can be of help in deciphering this data.

To arrange for a plant inspection I suggest that you call Gerry Lloyd (215/327-6599).

Sincerely,

Terry M. Briggs, Ph.D.
Corporate Industrial Hygienist

2955E-1

Enclosures

cc: Mr. Louis S. Beliczky, Director of Industrial Hygiene, URW
G. D. Lloyd
M. R. Zavon
R. J. Schuttler

OCC 8184

Keywords: URW Int'l Union, employee exposure records, IH area monitoring

Environment, Health & Safety
Hooker Chemical Center, 360 Rainbow Boulevard South, Box 728, Niagara Falls New York 14302 716/286-3000

Job Number Codes

No.	
1	Pipefitter
2	Senior Operator
3	Senior Operator
4	Tank Farm Operator
5	Relief Operator
6	Reactor Operator, Bldg. II
7	Reactor Operator, Bldg. II
8	Reactor Operator, Bldg. II
9	Reactor Operator, Bldg. I
10	Reactor Operator, Bldg. II
11	Stripper Operator, Bldg. II
12	Stripper Operator, Bldg. II
13	Stripper Operator, Bldg. II
14	Relief Operator, Bldg. I
15	Relief Operator, Bldg. I
16	Relief Operator, Bldg. II
17	Relief Operator, Bldg. II
18	High Pressure Cleaner
19	High Pressure Cleaner
21	Janitor
23	Pipefitter
25	Pipefitter
26	Oiler
27	Oiler
28	Senior Operator
29	Senior Operator
30	Senior Operator
31	Tank Farm Operator
32	Reactor Operator, Bldg. II
33	Reactor Operator, Bldg. II
34	Reactor Operator, Bldg. II
35	Reactor Operator, Bldg. II
36	Reactor Operator, Bldg. II
37	Stripper Operator
39	Relief Operator, Bldg. I
40	Relief Operator, Bldg. I
41	Relief Operator, Bldg. I
42	Relief Operator, Bldg. I
43	Relief Operator, Bldg. II
44	Relief Operator, Bldg. II
46	High Pressure Cleaner
47	Solution & Supplies
48	Pipefitter
49	Pipefitter
50	Oiler

No.	
51	Senior Operator
52	Senior Operator
53	Senior Operator
54	Tank Farm Operator
55	Reactor Operator, Bldg. II
56	Reactor Operator, Bldg. II
57	Reactor Operator, Bldg. II
58	Reactor Operator, Bldg. II
59	Reactor Operator, Bldg. I
60	Stripper Operator, Bldg. I
61	Stripper Operator, Bldg. II
62	Stripper Operator, Bldg. II
63	Stripper Operator, Bldg. II
64	Relief Operator, Bldg. I
65	Relief Operator, Bldg. I
66	Relief Operator, Bldg. I
67	Relief Operator, Bldg. I
68	High Pressure Cleaner
69	High Pressure Cleaner
70	Solutions & Supplies
71	Pipefitter
72	Pipefitter
73	Maintenance
74	Foreman
75	Foreman - Bldg. II
76	Compressor Foreman
78	Lab Technician
79	Laboratory
80	Lab Technician
81	Foreman
82	Foreman
83	Foreman
84	Lab Technician
85	Foreman
86	Foreman
88	Foreman
89	Foreman
90	Lab Technician
91	Foreman
92	Foreman
93	OSHA Coordinator
94	Services & Utilities
95	Services & Utilities
98	Services & Utilities
100	Services & Utilities

TMB:2941E-1/2
4/19/83

Job Number Codes (Con't)

No.		No.	
102	Services & Utilities	182	Painter
103	High Pressure Cleaner	184	Maintenance - Instrument
104	Services & Utilities	185	Maintenance - Instrument
105	Services & Utilities	187	Maintenance - Tinsmith
107	Centrifuge Operator	190	Maintenance
108	Centrifuge Operator	194	Mechanic
110	General Foreman	195	Maintenance
112	Centrifuge Operator	196	Maintenance
113	Foreman	199	Electrician
114	General Foreman	200	Maintenance
116	Lead Foreman	201	Maintenance - Instrument
118	Services & Utilities	205	Mechanic
119	Services & Utilities	206	Mechanic
122	Stripper Operator	208	Pipefitter
123	Services & Utilities	209	Maintenance
125	Bagging Operator	210	Electrician
126	Bagging Operator	211	Electrician
130	Centrifuge Operator	212	Maintenance
131	Centrifuge Operator	213	Maintenance
132	Centrifuge Operator	214	Maintenance - Instrument
133	Centrifuge Operator	216	Maintenance
134	Centrifuge Operator	217	Electrician Foreman
135	Foreman	218	Maintenance Foreman
136	Foreman	219	Maintenance Foreman
137	Foreman - Spray Dryer	221	Electrician Foreman
138	Services & Utilities	222	Maintenance Foreman
139	Services & Utilities	223	Dryer Operator
140	Services & Utilities	224	Dryer Operator
141	Services & Utilities	225	Dryer Operator
142	Services & Utilities	226	Dryer Operator
143	Services & Utilities	227	Dryer Operator
146	Centrifuge Operator	231	Bagger Operator
147	Centrifuge Operator	232	Dryer Operator
148	Centrifuge Operator	234	Bagger Operator
149	Centrifuge Operator	238	Dryer Operator
150	Foreman	240	Bagger Operator
151	Foreman	241	Bagger Operator
152	Foreman	242	Dryer Operator
153	Maintenance	243	Dryer Operator
155	Mechanic	244	Dryer Operator
156	Mechanic	245	Dryer Operator
159	Mechanic	246	Dryer Operator
161	Pipefitter	247	Dryer Operator
162	Pipefitter	248	Dryer Operator
163	Pipefitter	249	Dryer Operator
165	Maintenance	251	Bagger Operator
166	Pipefitter	252	Dryer Operator
170	Maintenance	254	Bagger Operator
179	Cement Finisher	258+	Non-Union

Occidental Chemical Corporation

April 18, 1983

Mr. Louis S. Beliczky
Director of Industrial Hygiene
URW International Union
87 South High Street
Akron, Ohio 44308

Dear Mr. Beliczky:

In response to your request for exposure records under the provisions of 29CFR1910.20, the attached data is being provided and includes:

Attachment #1:	Job Classifications
Attachment #2:	Personal Protective Equipment
Attachment #3:	Personnel Monitoring for VCM
Attachment #4:	Pilot Plant Monitoring for VCM
Attachment #5:	Personnel Monitoring for DIDP

In Attachment #3, you will note each employee is placed in a monitoring group labeled 1, 2, 3 and 4. Group 1 are employees who work in regulated areas on a daily basis. Group 2 are employees who can or do work in regulated areas but not necessarily on a daily basis. Group 3 are employees who work in non-regulated areas but who might occasionally receive some inadvertant exposure. Group 4 are employees confined to non-regulated areas. The subgroups "A" in group 2 and "B" in group 3 designate hourly paid employees.

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jobs but the use of such equipment is not reflected on the monitoring records.

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We hope these data adequately fulfills your request for information. If you have any questions, please call.

Sincerely,

Gerald D. Lloyd
Manager, Safety

GDL:mas

Enclosures/

Attachment #1

Job Classifications

1. Chemical Plant:

Production:

Senior Operator - Relief man for all reactor building jobs.
Tank Farm - Controls material storage and use in tank farm.
Reactor Operator - Resin batch charging and control.
Stripper Operator - Resin batch stripping.
Relief Operator - Resin batch pump out.
Centrifuge Operator - Controls centrifuging of product.
Dryer Operator - Controls resin drying process.
Bagger Operator - Bagging finished products.
Trucker - Warehouse and shipping of finished goods.
High Pressure Cleaner - Cleaning reators with high pressure water.
Solution and Supply - Reactor solution make-up.
Utility and Service - Reactor cleaning, general labor pool.
Janitor - Janitorial work offices and plant.

Lab:

Process Control Lab Tech - Lab work to insure product quality.

Maintenance: Descriptions are self-explanatory

Mechanic
Carpenter
Pipe Coverer
Pipe Fitter
Welders
Electrician
Oilers
Battery Attendent
Cement Finisher
Painter
Instrument
Lighting Attendent
Air Conditioning
Sheet Metal
Crib Attendent
Laborer
Janitor - Building & Grounds

2. Pilot Plant:

Pilot Plant Technician - operates Pilot Plant.
Lab Technician - Lab work to insure product formulations and quality.

3. Calendering:

Production: OCC 8189

Calender Operator - Controls calender operations.
Wind-Up Operator - Controls finished sheet wind-up.
Calender Second Helper - Assists calender and wind-up operators.
Mill Operator - 60" - Operates banbury and calender mills.

Mill Operator - 84" - Operates banbury and calender mills.
Banbury Operator - Charges materials into banbury.
Blender Operator - Makes up blends in ribbon blenders.
Assistant Blender Operator - Assists the blender operator.
Relief Operator - Reflief man for key jobs.
Inspector - Inspects finished product.
Scrap Collector - Controls waste and scrap.
Trucker - Raw material and finished product control.
Warehouse - Warehouse and shipping trucking.
Utility and Service - General labor pool.
Change Can Operator - Makes up color blends.
Paint Mill Operator - Operates a color batch grinder.
Compounder - Weigh out color batches for banbury.

Lab:

Process Control Lab Tech. - Lab work to insure product quality.

Maintenance: Descriptions are self-explanatory.

Mechanic
Pipe Fitter
Electrician
Oiler

4. Power House:

Power House Operator - Operates power Plant equipment.
Power House Mechanic - Provides mechanical maintenance.
Power House Laborer - General Power Plant labor.

Attachment #2

PERSONAL PROTECTIVE EQUIPMENT

Location - General:

All personal protective equipment required on the job is furnished and paid for by the Company such as safety plano and perscription glasses, safety shoes, hard hats, rain wear, gloves, goggles, face shields, and hearing protective devices.

Specific Uses:

Chemical Plant Utilizes:

- Scott Aviation Corp. ½ facepiece gas mask with canister for VCM excursions up to 10 PPM.
- Robert Shaw (Lier Siegler) ½ facepiece, pressure-demand, air line respirator for excursions up to 1000 PPM and mandatory respirator jobs.
- Survivair full facepiece, pressure-demand, air line respirator for excursions up to 1000 PPM and mandatory respirator jobs.
- MSA, pressure-demand SCBA for emergency situations.
- Protective garments for specific jobs.

Pilot Plant Utilities:

- Robert Shaw and Survivair respirators as above.
- Protective garments for specific jobs.

Calendering Plant Utilizes:

- 3M 9900 Disposable Dust Respirator
- A few Willson 1200 series dust respirators are still in service.
- Protective garments for specific jobs.

40.233

CP

Occidental Chemical Corporation

April 12, 1983

RECEIVED
APR 14 1983
ENVIRONMENT, HEALTH
& SAFETY

Mr. Louis S. Beliczky
Director of Industrial Hygiene
URW International Union
87 South High Street
Akron, Ohio 44308

Dear Mr. Beliczky:

We are in receipt of your letter dated April 5, 1983, wherein you requested complete copies of employee exposure records developed since December 1, 1980 and various other supporting data.

We are in the process of accumulating the information in package form which will be sent to Mr. Terry Briggs for forwarding to you. Because of the large volume of information and the specific cut off date for records, it may not be possible to provide these data within a fifteen day time period. To cover this possibility, we are asking for a one week extension. Your letter was received here on April 8, 1983 which would require a delivery date of April 29th. The week extension would give us until May 6th.

We hope you will agree to this extension. If not please advise.

Sincerely,

Gerald D. Lloyd
Manager, Safety

GDL:mas

cc: Mr. J. A. Mack
Mr. N. F. Hess
Mr. T. Briggs - Niagara
Mr. R. Squibb

OXY

OCC 8192

PVC Resins/PVC Fabricated Pr ducts
Armand Hammer Boulevard, Box 699, Pottstown, Pennsylvania 19464 215/327-6400

URW

MILAN STONE, President

JOSEPH H. JOHNSTON, Vice President DONALD C. TUCKER, Secretary-Treasurer

UNITED RUBBER, CORK, LINOLEUM AND PLASTIC WORKERS OF AMERICA
AFL-CIO, CLC 87 SOUTH HIGH STREET AKRON, OHIO 44308

Area Code 216
376-6181
376-6182
376-6183
376-6184

DEPARTMENT OF INDUSTRIAL HYGIENE
LOUIS S. BELICZKY, M.S., MPH, Director
DANIEL J. BRUSTEIN, M.S., Industrial Hygienist
MICHAEL J. KRUEGER, Occupational Health Specialist
SUZANNE KASZAR, B.A., Technical Writer

April 5, 1983

Plant Manager
Hooker Chemical & Plastics Corporation
Pottstown, Pennsylvania 19464

ATTENTION: HEALTH AND SAFETY

To Whom It May Concern:

Under the provisions of the OSHA Vinyl Chloride Standard, 1910.1017, and the OSHA Access Standard, 1910.20, the URW International Union, as the representative of your employees, requests complete copies of all records used to evaluate employee exposures to any materials at your Pottstown, Pennsylvania plant. Records of exposures before December 1, 1980, need not be included. Area sampling records or records of continuous monitoring or alarm systems need not be included, unless these were used to calculate employees' time-weighted average or ceiling exposures.

Please note that "employee exposure record" is defined in 1910.20 (c)(5) as: "...a record containing any of the following kinds of information...collection and analytical methodologies, calculations, and other background data relevant to interpretation of the results obtained..." The URW considers a brief description of job title, job location and use of personal protective equipment to be "background data relevant to interpretation of the results obtained."

Under the provisions of 29CFR1910.20, this information must be provided within fifteen (15) working days of receipt of this request.

Thank you for your cooperation.

Sincerely,

Louis S. Beliczky,
Director of Industrial Hygiene
URW International Union

LSB:pjf
opeiu 339
C: International Officers
District Director Walsh
Field Representative Rissmiller
Mr. Terry Briggs, Industrial Hygienist
Hooker Chemical, Niagra, New York

OCC 8193

40.233

CF

DESCRIPTION OF OCCIDENTAL CHEMICAL CORPORATION CONTINUOUS SEQUENTIAL AREA MONITORING SYSTEM AND DATA ANALYSIS

Included in this report is a description of Occidental continous sequential area monitoring system, Attachment #1. This description explains the type of analytical equipment used, the number of remote sample pick-up points used, their locations, the audible and visual alarms used, and the point analysis frequency.

Attachment #2 shows drawings illustrating floor plans and yard locations and the remote sample pick up points in each area.

AUTHOR: G. D. LLOYD

DATE: NOT DATED (DATE RECEIVED 9/13/83)

KEYWORDS: POTTSTOWN, IH MONITORING SYSTEMS, UCM, FIRESTONE OPERATIONS, BUILDING FLOOR PLANS

POTTSTOWN

Continuous Sequential Area Monitoring System for Vinyl Chloride-Firestone Plastics Co.

The Firestone Plastics Company in its Pottstown, Pennsylvania, PVC operations utilizes five Wilks Miran I units and one Miran II unit along with three Bacharach units for the purpose of continuous sequential area monitoring for ambient levels of VCM.

The Miran units are based on infared spectrometry with the Miran I units being of single band capability and the Miran II unit having a dual band capability. The Miran units are preset and calibrated at 13.9 microns which is the wavelength offering the best VCM response with the least interference from other hydrocarbons making them nearly specific for VCM.

The Bacharach units are based on hot wire ionization and readout total hydrocarbons - that is, they are not specific for VCM.

All units are base line calibrated daily. As a practical matter, all data received from both the Miran and Bacharach units is considered to be totally VCM. Each unit is equipped with a strip chart recorder which registers each sampling point analysis. We do not have the capability of tying these units into a computer to analyze the vast amount of data accumulated. Employee TWA exposures are not calculated from these data due to the complexity of doing such, and personnel TWA sampling is conducted separately.

The units are located in "safe areas," such as electrical vaults, with the sampling hoses running from there throughout specific plant areas.

Four Miran I units, serving regulated areas, are equipped for analyzing VCM in the range of 0 PPM to 100 PPM. One Miran I unit, serving principally deregulated areas, analyzes from 0 PPM to 50 PPM VCM. The Miran II is not currently in use and serves as a spare.

The Bacharach units are equipped for analyzing hydrocarbons - VCM in the range of 1000 PPM to 36,000 PPM. The Bacharach units serve only the regulated areas.

The Miran units are set to alarm at 10 PPM VCM and 100 PPM VCM while the Bacharach units alarm at 1000 PPM and 36,000 PPM hydrocarbons - VCM. Whenever any unit senses VCM at an alarm set point both visual and audible alarms respond. Color coded light panels indicating the alarm levels are located at entrances to regulated areas and at other strategic points. A master alarm light panel located in the production foreman's office displays a total readout of all plant sensing points. In addition, each area is equipped with a coded audible alarm to indicate the alarm levels. The lights and audible alarms are coded as follows:

VCM Level	Light Alarm-Color	Audible Alarm-Sound
10 PPM	White	Stutter - CHANGE HALF MASK to AIRLINE RESP
100 PPM	Blue	Yeow
1,000 PPM	Yellow	Slow Whoop - CHANGE AIRLINE RESP to SCBP
36,000 PPM	R d	Yelp

The light panels are labeled with their respective VCM PPM values and, thru training and on the job experience, the employees are educated as to what VCM levels the audible alarms indicate. The sole purpose of our monitoring system is to provide a vehicle for notifying the employees which type of respiratory equipment is required and to provide a leak detection system - which ties in with our emergency procedures.

The sample pickup points are distributed as follows:

Type Unit & Identity No.	Unit Location & Area Serviced		Miran- No. Monitoring Points	Bacharach- No. Monitoring Points
Miran 100	Building I,	1st. Flr.	4	-
		2nd. "	5	-
Miran 200	Building I,	3rd. "	8	-
Bacharach	Building I,	1st. Flr.	-	2
		2nd. "	-	2
		3rd. "	-	2
Miran 400	Building II,	1st. Flr.	3	
		2nd. Flr.	3	
		3rd. Flr.	5	
Bacharach	Building II,	1st. Flr.	-	1
		2nd. "	-	3
		3rd. "	-	2
Miran 300	Dryer Lines		5	-
	Blend Tank Areas		2	-
	Warehouse		1	-
Miran 500	Tank Farm:	Unloading	3	-
		Purification Building	1	-
		VCM Storage	4	-
		VCM Sphere	1	-
		Effluent Bldg.	1	-
Bacharach	Tank Farm:	Unloading	-	1
		Purification Building	-	1
		Unloading Rack	-	1
	Total Points:		46	+ 15 = 61

All sample pickup point locations were located for maximum efficiency in early leak detection and were approved by the Divisional Safety Office and our Corporate Industrial Hygienist.

The Miran and Bacharach units pull an air sample for analysis thru each sample tube (point) once every 12 minutes or five times per hour. If an alarm level is detected in a Miran unit, the system will clear itself automatically once the level reduces below the alarm set point. If an alarm level is detected

in a Bacharach unit, the unit must be manually reset to clear the alarm once the level is below the alarm set point.

With 61 sample points and each point providing five samples for analysis each hour, we have 305 air analyses completed per hour. This equals 2,440 air analyses per eight hour shift, 7,320 analyses per day, 51,240 per week and 2,562,000 analyses per year.

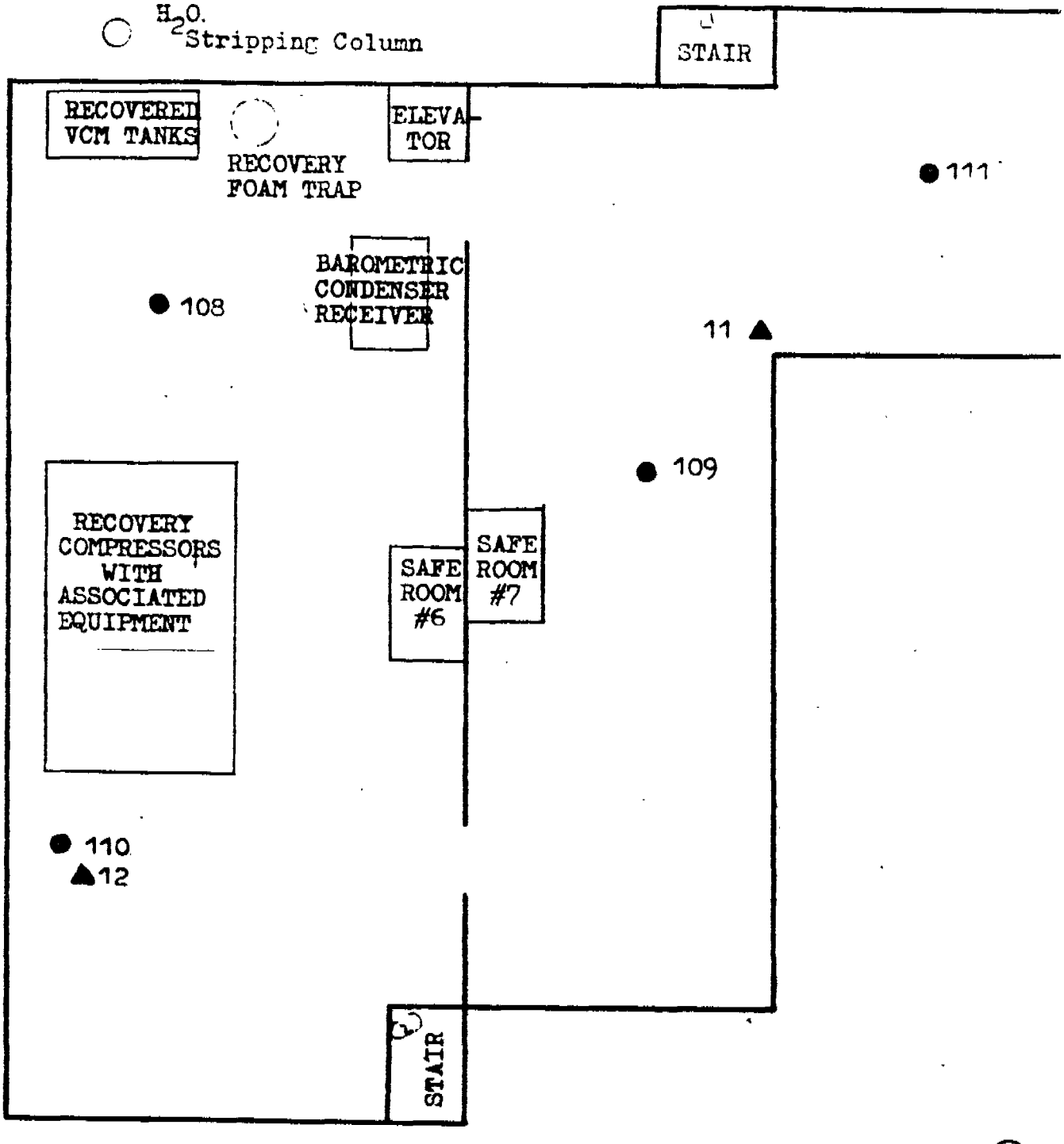
We have four technicians supervising and maintaining the monitoring system, two of which are on day shift with one on each of the two back shifts.

G. D. Lloyd

GDL:mas

ATTACHMENT I

BLDG. I, 1ST FLOOR



MIRAN SAMPLING POINT

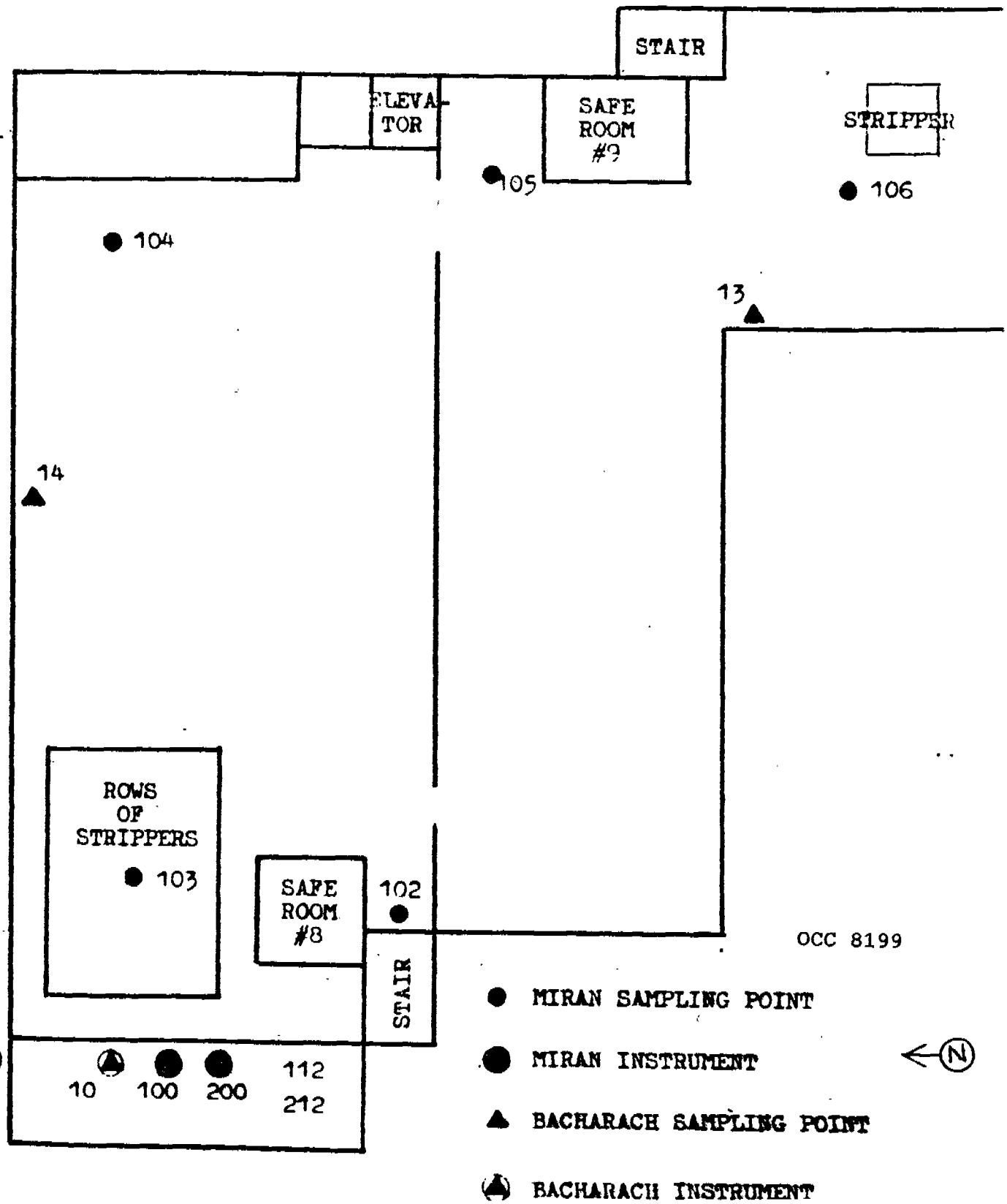
▲ BACHARACH SAMPLING POINT

OCC 8198

ATTACHMENT # 2

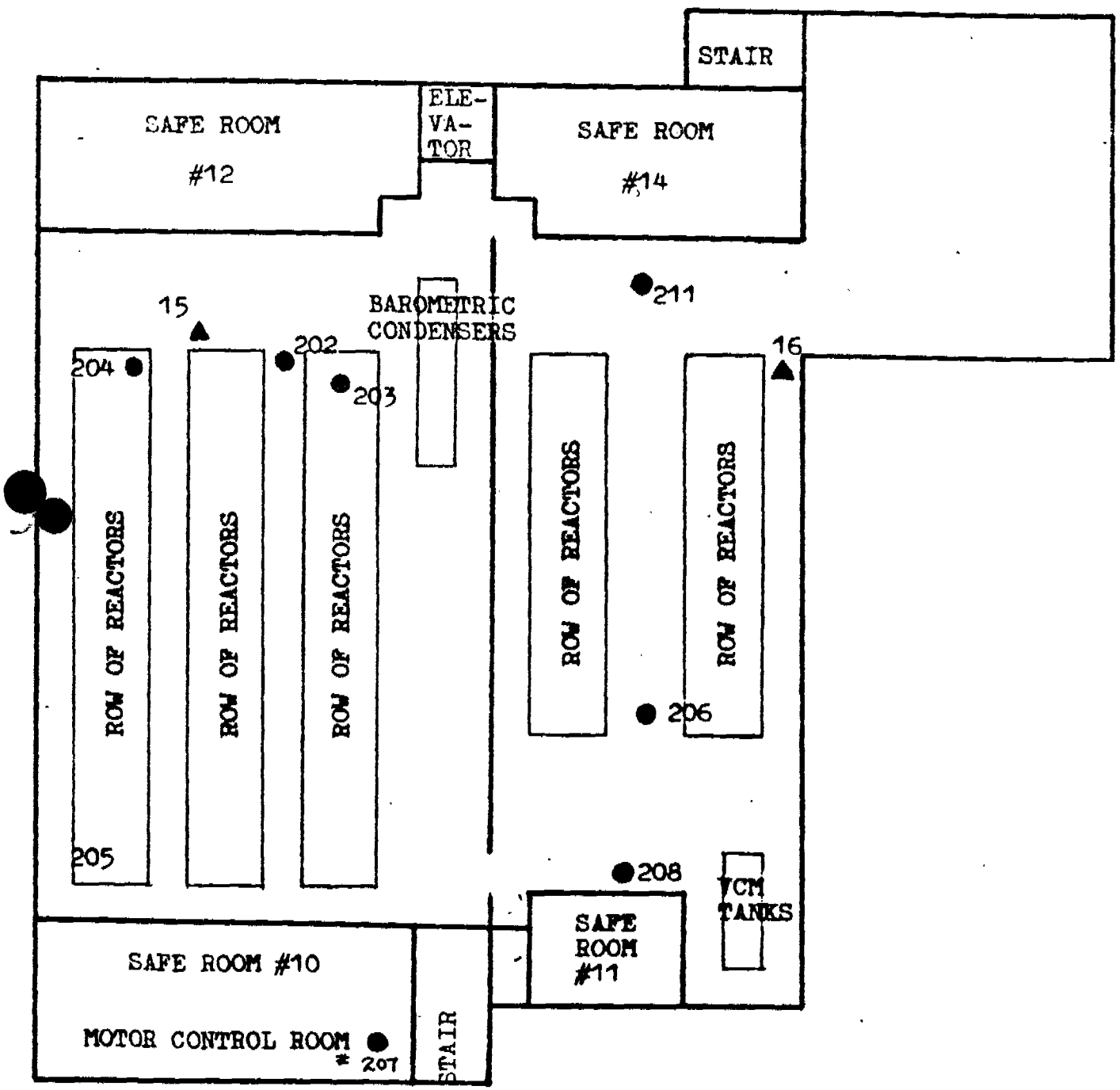
ATTACHMENT I

BLDG. I, 2ND FLOOR



ATTACHMENT I

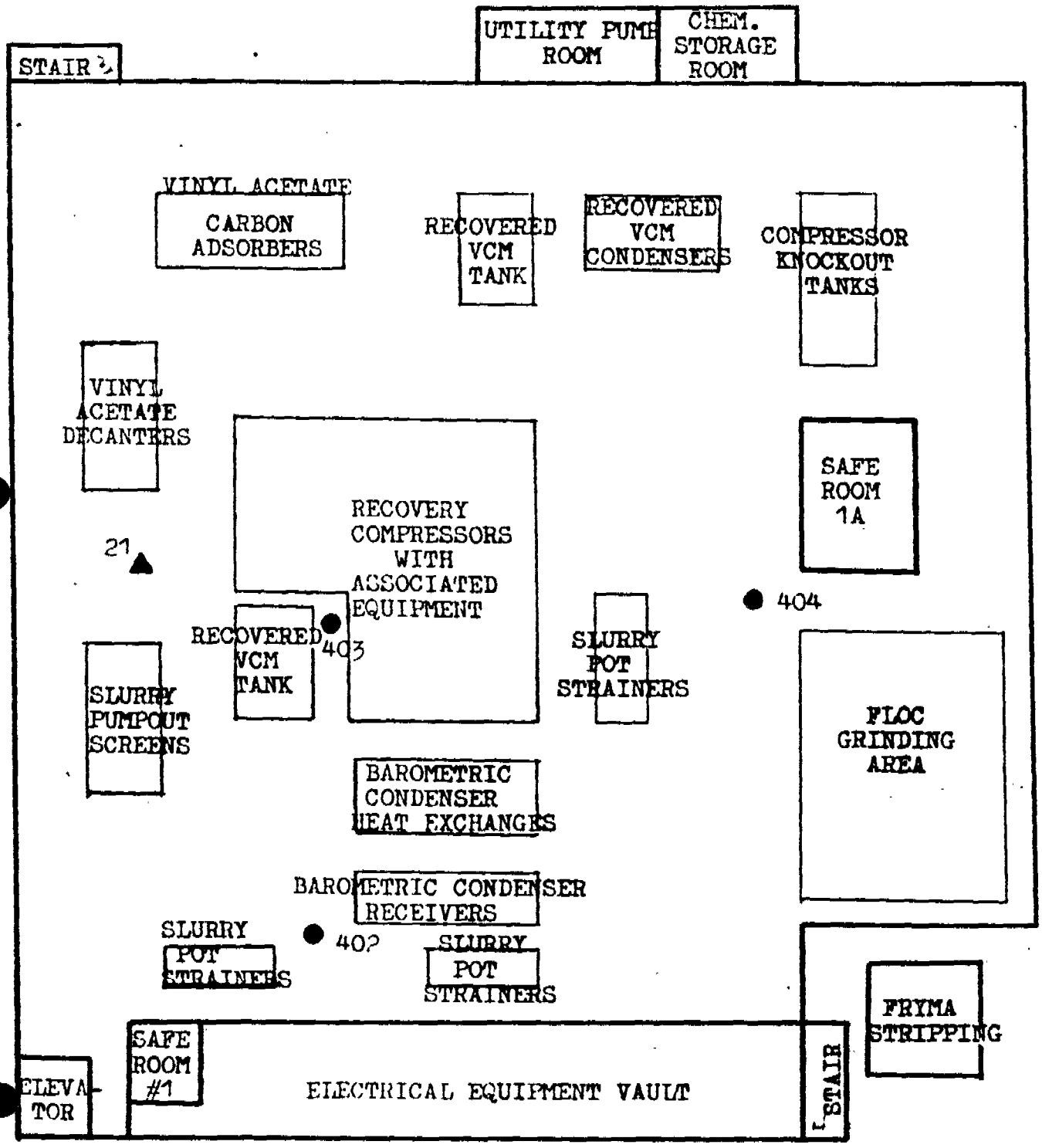
BLDG. I, 3RD FLOOR



OCC 8200

ATTACHMENT I

BLDG. II, 1ST FLOOR



MIRAN SAMPLING POINT

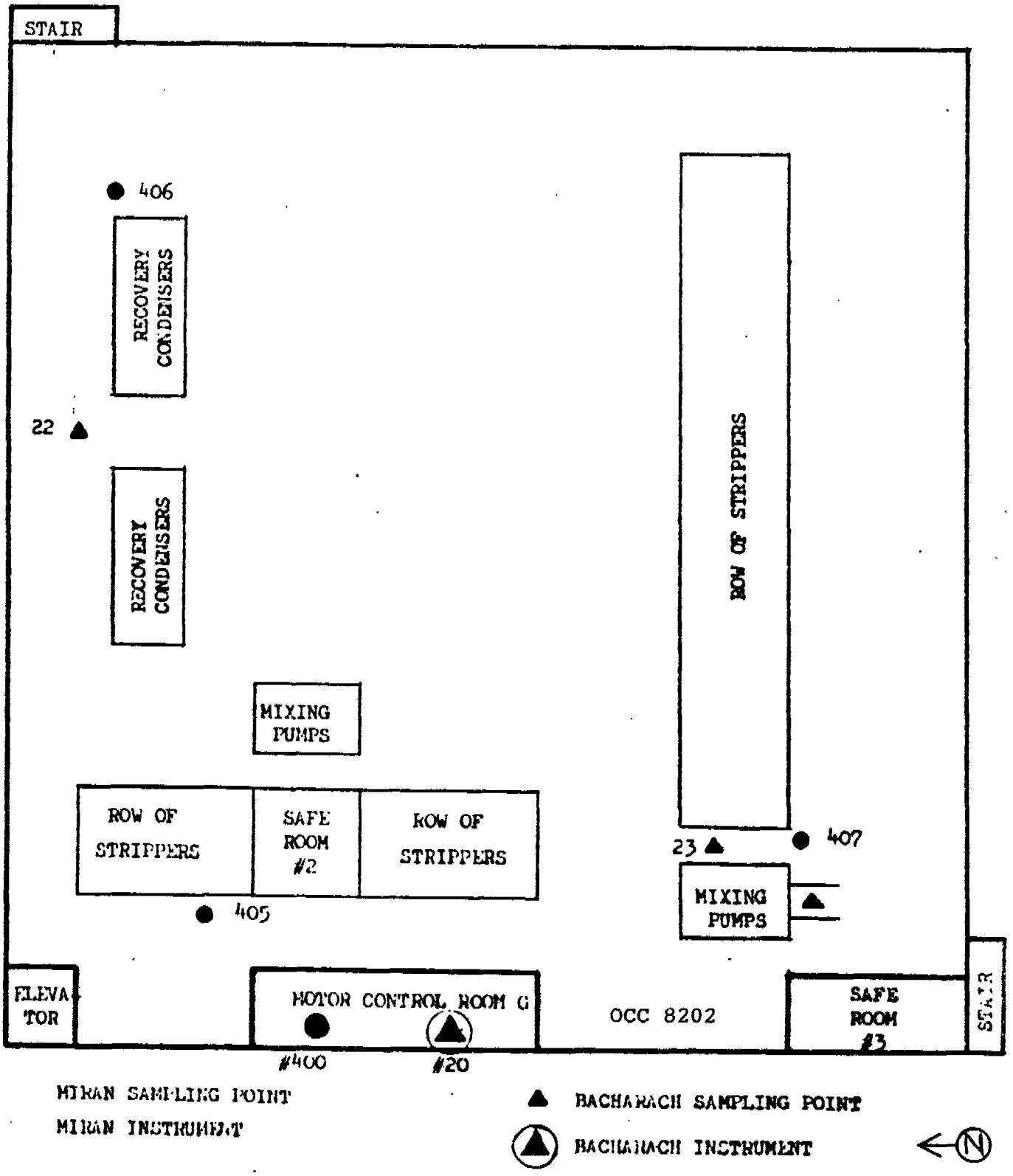
▲ BACHARACH SAMPLING POINT

OCC 8201

N

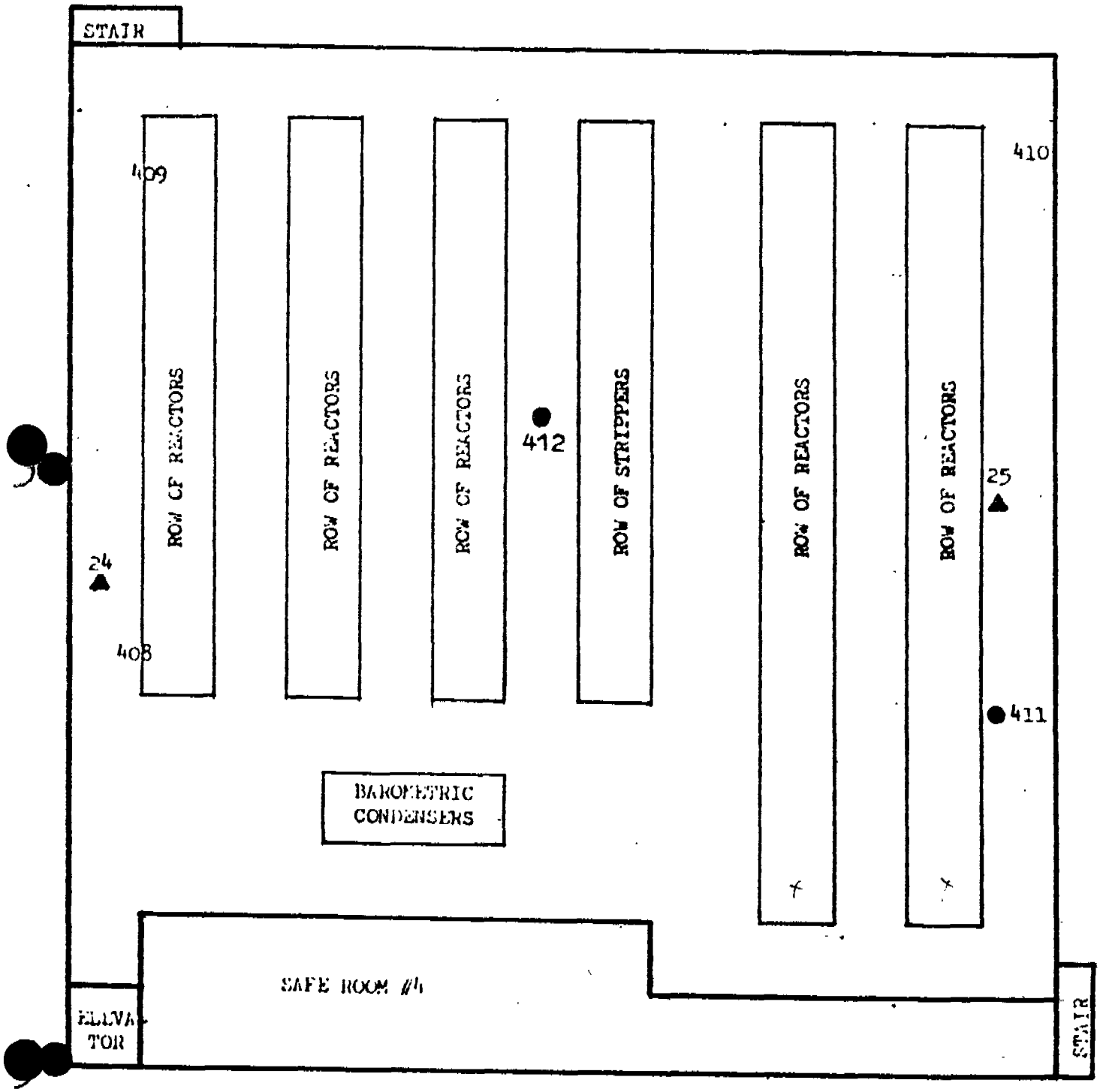
ATTACHMENT I

BLDG. 2, 2ND FLOOR



ATTACHMENT I

BLDG. II, 3rd FLOOR



● MIRAN SAMPLING POINT

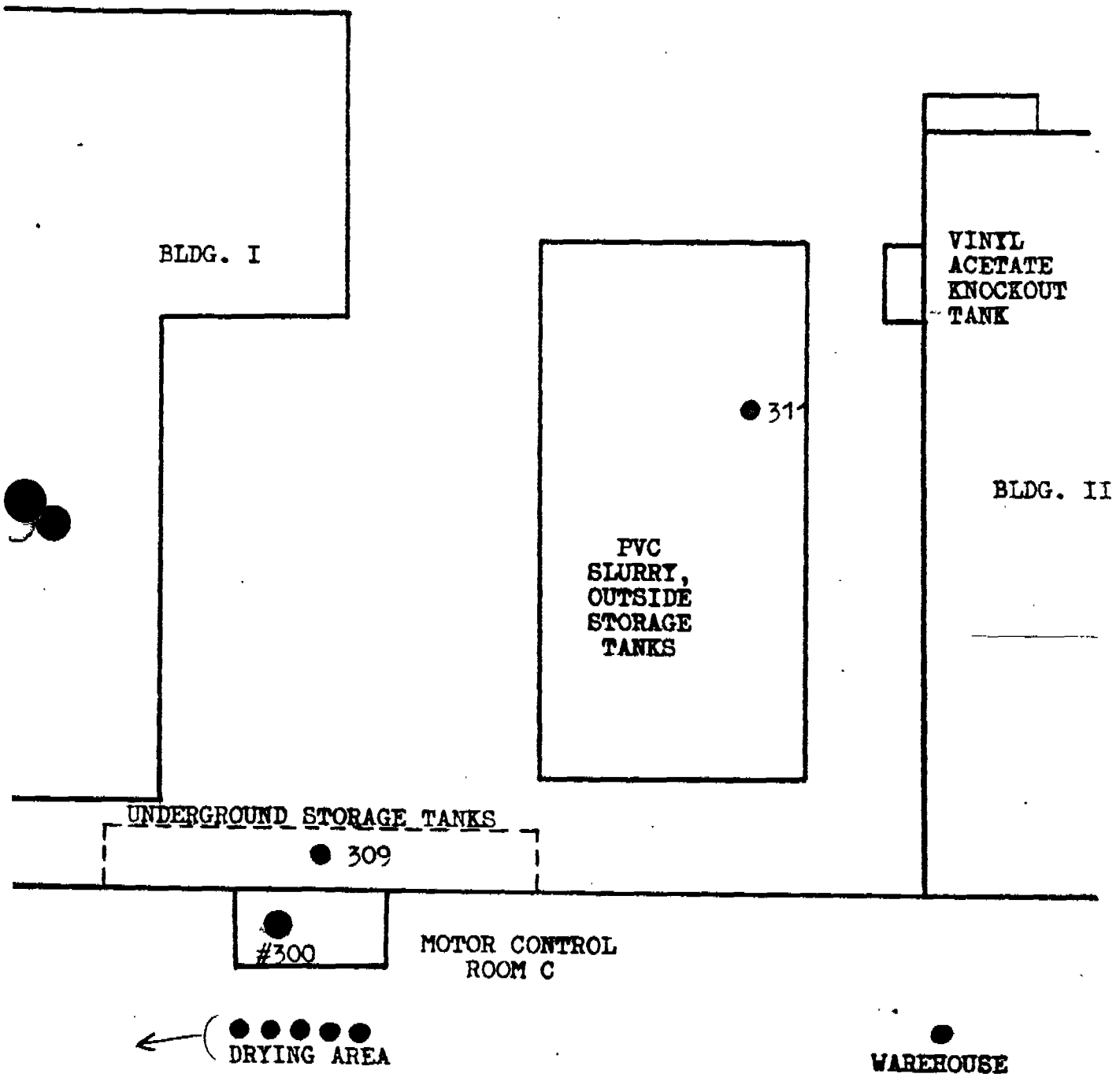
▲ BACHARACH SAMPLING POINT

OCC 8203

N

ATTACHMENT I

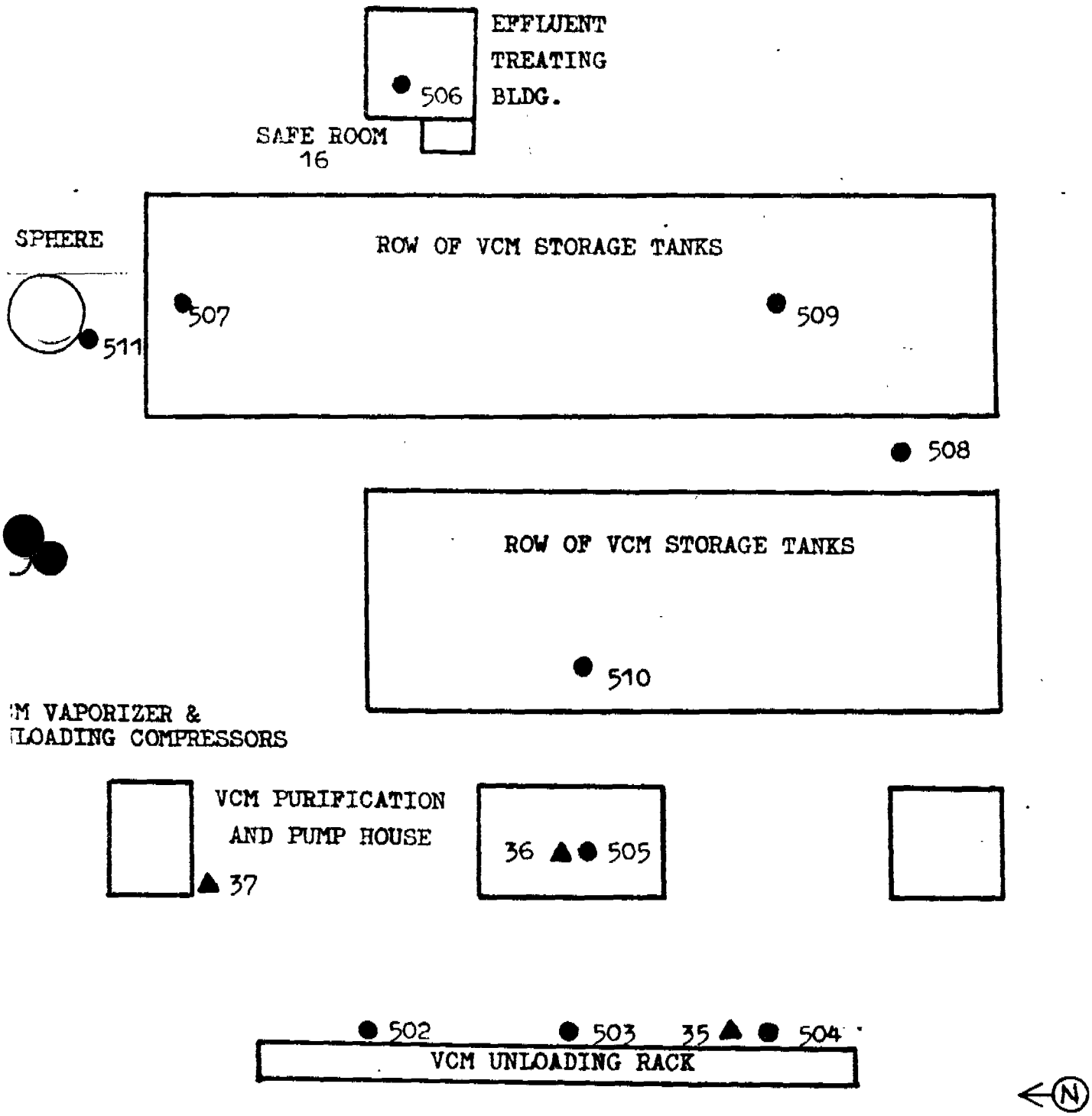
PVC RESIN SLURRY OUTSIDE STORAGE TANK AREA



OCC 8204

ATTACHMENT I

MONOMER TANK FARM AREA



● MIRAN SAMPLING POINT

▲ BACHARACH SAMPLING POINT

OCC 8205

MIRAN #500 AND BACHARACH #30 INSTRUMENTS FOR THESE SAMPLING POINTS ARE LOCATED IN PILOT PLANT STORAGE CAGE AREA, 1ST FLOOR.

40.233

INTER-OFFICE CORRESPONDENCE

cf Pottstown Ind Hyg Exposure

Hooker Chemical Company

TO: M. R. Zavon, M.D.

DATE: September 17, 1981

COPIES: G. Lloyd
H. Dubec

FROM: T. M. Briggs

SUBJ: PVC DUST EXPOSURE

In response to your 9/15/81 request for information on locations with PVC dust exposures, all PVC Resins and PVC Fabricated Products plants have PVC dust exposure potential. There have been no quantitative measurements made at any plants, specifically for PVC dust. Total dust and the respirable fraction have been measured at the resin plants and most calendering operations.

The highest potential PVC dust exposure levels would be anticipated from PVC resin production, specifically from reactor vessel cleaning, resin sifting and grinding, resin bagging, and rail car loading. Resin production plants are Burlington, Pottstown, Perryville and Addis.

PVC dust potential from calendering operations appears low since resin handling is a closed system. Dust levels in calender blending areas can be quite high (e.g., Swanson study of Burlington Calendering in 1978 - up to 11 mg/m^3 of total dust). This dust should be essentially all additives. Facilities with calendering operations include Pottstown, Burlington and Salisbury.

PVC compounding operations also present some PVC dust exposure. These operations can be quite dusty, however, again most of the dust should be from additives (lead exposures are often high here). Facilities with compounding operations include Burlington, Hicksville, and Perryville (not in operation now but it may be restarted within the next year).

PVC dust levels from printing operations should be insignificant. Plants with printing operations include Salisbury, and West Caldwell.

TMB/mrb59G1

Keywords: Pottstown, area monitoring,

OCC 8206

THE PHYSICAL PROPERTIES OF SELECTED CHEMICALS

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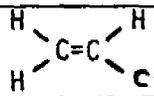
DATE: FEBRUARY 4, 1980

HOOKER CHEMICALS & PLASTICS CORP.

PHYSICAL PROPERTIES

ERIAL NAME: Vinyl Chloride

MICAL FORMULA: 

MULA WEIGHT: 62.50 (13)

ECIFIC GRAVITY @ °C: 0.911 @ 20°C (7)

AVITY CORRECTION PER °C 0.0015 (13)

TEMPERATURE (°C) AT ABSOLUTE PRESSURE OF	@ 1 mm Hg.	-105.6	(13)
	@10 mm Hg.	- 83.7	(13)
	@40 mm Hg.	- 66.8	(13)
	@100 mm Hg.	- 53.2	(13)
	@400 mm Hg.	- 28.0	(13)
		- 13.4	(7)
	@760 mm Hg.	- 13.8	(13)

REEZING POINT (°C/°F) -153.7/-244.7 (13)

ISCOSITY (CPS): 0.3 @ -20°C (7)

ATENT HEAT OF VAPORIZATION $\frac{(Cal)}{gm}$/(BTU/lb.): 79.53/143.15 (35)

HEAT OF FUSION $\frac{(Cal)}{gm}$/$\frac{(BTU)}{lb.}$: 18.14/32.65 (35)

SPECIFIC HEAT (l) (Cal/gm°C)or(BTU/lb°F):

SPECIFIC HEAT (v) (cal/gm°C) or (Btu/lb °F): 0.2 @ 20°C

THERMAL CONDUCTIVITY (Btu/hr.ft.°F):

REFRACTIVE INDEX @ °C: 1.374 @ 15°C (7)

FLASH POINT (°C/°F): -18/-0.4 (7)

SOLUBILITY (gm/100 gm) in water:

water in:

SURFACE TENSION (dyne/cm): 17 @ 20°C
20.88 @ -10°C (35)