Occidental Chemical Corporation

Environment, Health & Safety

# MEMO

**To** J. Wilkenfeld **Date** April 25, 1983

**From** M. R. Zavon

**Subject** Pottstown Industrial Hygiene Assessment

cc: S. P. Dominick
R. L. Comboy

Enclosed is a copy of the Pottstown Industrial Hygiene Assessment. The facility response to the recommendations will be found following our recommendations. If you have any questions regarding this report, please call me.

2990E-1

Enclosure

Industrial Hygiene Assessment
Pottstown Plant
Armand Hammer Boulevard
Pottstown, PA 19464
December 14-15, 1982
Conducted by
R. L. Comboy - Corporate Industrial Hygiene

On the above dates, an industrial hygiene assessment was conducted in the Pottstown facility. The purpose of the assessment was to review the effectiveness of industrial hygiene activities and program elements including management structure, workplace hazard recognition, the monitoring program and the adequacy of control for potential health hazards.

This report is based on extensive discussions with Gerry Lloyd, Manager - Safety-PVC Resins Division, observation of all plant operations, and review of industrial hygiene sampling records.

At the time of the assessment the plant employed 432 in the Resins Department, 230 in the Fabricated Products Department and 75 were employed in Finance, Administration and Employee Relations.

Recommendations and discussion will be found on the attached pages. The pre-assessment questionnaire, organization chart, process description, plant layout and ventilation testing program will be found in the Appendices.

RECOMMENDATIONS

1. All locations in the plant with noise levels in excess of 90 dBA should be posted as hearing protection areas. (complete)

2. In accordance with OCC Procedure #04:01:02:032, all employees must be notified of their industrial hygiene sample results even though the result is below the allowable exposure limit. complete - (mails not sent)

3. The respirator program should be changed to reflect the following:

   a. Scott canister seals will not be removed unless the respirator is to be used. complete

   b. Canisters will be dated as to when they are put into service and will be disgarded 12 months later even though the seal has not been removed. complete

4. The written respirator program for the Calender Plant needs to be formally updated to reflect the current usage of disposable respirators. complete

5. The written respirator programs need to be updated to reflect the currently used fit testing procedures. complete

6. A formal program to document an employees medical ability to wear a respirator must be instituted. incomplete

7. Laboratory hoods in the R&D area should be operated with the sashes lowered as much as possible to maximize the inflow air velocities. Current inflow air velocity are substandard and consideration should be given to upgrading this system. incomplete

8. A formal program to periodically evaluate all ventilation systems to determine performance, needs to be instituted. (incomplete)

9. A formal laboratory quality control program with an outside laboratory needs to be implemented. (complete)

2427E-2

**INTER-OFFICE CORRESPONDENCE**

**Hooker Chemical**

☐ RESINS DIVISION

☐ FABRICATED PRODUCTS DIVISION

☐ FINANCE & ADMINISTRATION

To DR. M. R. ZAVON
NAME LOCATION

Date April 19, 1983

From SAFETY DEPARTMENT - PVC RESINS DIVISION
NAME LOCATION

Subject ACTION PROGRAM-INDUSTRIAL HYGIENE ASSESSMENT
POTTSTOWN

Copy to:

F. F. Hoy
J. T. Wolfsperger
R. W. Arnold
K. H. Garner
E. Lapreziosa
W. F. Carroll
T. E. Moses
C. W. Engblom
R. S. Frain
R. H. Zelley

APR 22 1983
ENVIRONMENTAL HEALTH & SAFETY

with regard to the subject assessment conducted December 14 - 15, 1982 by Mr. R. L. Comboy, the following Action Program is provided.

Item #1: We have had all areas posted where there is a 90 dBA, 8 hour TWA or higher exposure to employees. As per the recommendation, we will post all areas at this location which are in excess of 90 dBA without regard to TWA exposure. This will be completed by July 1, 1983.

Item #2: Our current practice of notifying employees in writing when their monitoring results exceed a specific PEL will continue. All others monitored below the PEL will be notified by a group listing on bulletin boards. This will be initiated by June 1, 1983.

Item #3: An amendment will be included in our written respirator program to indicate that the seals on Scott canisters issued should not be removed until such time as the respirator is actually used. Further, it will note that all canisters will be dated when issued and disgarded 12 months later, even though the seal has not been removed, or sooner if indicated by the canister expiration date. The procedure will be revised and the employees so advised by June 1, 1983.

Item #4: The Calendering Plant's written respirator program will be updated to include a copy of our written procedure on the use of disposable respirators, by April 30, 1983.

Item #5: The Chemical and Calendering Plants' written respirator programs will be updated to include a copy of our Respirator Fit Testing Procedure by April 30, 1983.

OCC 10541

Item #6: Our Medical Department's evaluation of an employee's ability to wear a respirator will be upgraded to include all aspects of EHS Procedure 04:01:03:05 by July 1, 1983.

Item #7: All R&D employees will be advised to operate their laboratory hoods with the sashes lowered as much as possible by April 30, 1983. The Director of Technology, Resins Division, has been asked to consider upgrading the air flows in all hoods.

Item #8: A formal program to periodically evaluate the key production and lab ventilation systems will be established by August 1, 1983. We do not anticipate evaluating the ventilation efficiencies for minor and office systems.

Item #9: A program to submit duplicate employee monitoring samples to an outside laboratory on an annual basis for quality control comparisons will be instituted by June 1, 1983.

G. D. Lloyd

GDL:mas

## DISCUSSION

### Hearing Conservation Program

The plant has been surveyed for noise and where it was suspected that employee exposure may exceed the eight hour time weighted average of 85 dBA, noise dosimetry has been conducted. Regular audiometric examinations have been offered for some time.

Though the areas where employee time weighted average exposure exceeds 85 dBA have generally been posted; areas above 90 dBA which are not routine employee work areas have not been posted.

Data from the plant noise survey should be reviewed to identify those areas which exceed 90 dBA. These areas should then be posted as hearing protection areas. The employees need to be trained and the warning signs worded so that everyone knows that hearing protection is required while working in exposures of greater than 90 dBA regardless of the time spent in these areas.

### Employee Notification

The plant routinely monitors for vinyl chloride monomer (VCM) in accordance with Federal regulation 1910.1017. The custom at this facility has been to formally notify the employee in writing only if the sample result exceeded the permissible exposure limit. The employees are, however, aware that they can have access to their sample results at any time.

A review of the VCM data for 1982 indicates that more than half of the samples taken currently require employee notification. To insure that all employees are aware of their VCM exposure and to comply with the OCC Employee Notification Procedure #04:01:02:032 all employees should be notified of their sample results. The facility may want to consider posting these results (those below 1 ppm) as opposed to individually notifying employees in writing.

### Respirator Program

#### Dust Respirators

The Pottstown facility has a detailed written respirator program for both the Resins Plant and the Fabricated Products Plant. Since this program was written, there has been a change in the type of dust respirator used in the Fabricated Products Plant. The written program should be updated to reflect this change in respirator usage.

#### Medical Ability to Wear a Respirator

In accordance with OCC Procedure #04:01:03:05, Respiratory Protection, and OSHA 1910.134, a program to medically evaluate an employee's ability to wear a respirator must be instituted. The OCC procedure describes how this is to be done.

Scott VCM Respirator

At the present time the Resins Plant is using a Scott canister for VCM protection. This canister is Catalog #08H-VC-L with NIOSH approval #TC-14G-85. The limitations on this canister imposed by the NIOSH certification are:

1. May not be used in VCM concentrations exceeding 25 ppm.

2. Must be discarded at the end of the shift during which it is used regardless of actual usage if seal has been broken.

Currently some employees remove the seal at the beginning of a shift and discard the canister 8 hours later or after 4 hours of use. The canisters cost $14.50 each.

Considerable money can be saved if the seals are not removed unless the respirators were actually going to be used. Employees are instructed to leave the area when the alarm sounds unless they must be there and then only with an airline respirator.

It is therefore recommended that the respirator program be changed to reflect the following:

1. Scott canister seals will not be removed unless the respirator is to be used.

2. Canisters will be dated as to when they are put into service and will be discarded 12 months later even though the seal has not been removed.

R&D Laboratories

The inflow air velocities for the laboratory hoods in the Research and Development area are substandard when the sashes are raised to the top. For this reason it is imperative that these sashes be lowered as much as possible to maximize the use of the volume of air available. R&D employees should be instructed to lower the hood sashes as much as is practical to minimize the possibility of vapors or fumes from the hoods escaping into the laboratory.

Routine ventilation testing is discussed in the next section and applies to the R&D facility.

## Ventilation Systems

A routine ventilation evaluation program is needed for all local ventilation systems and building or general ventilation. Initial design data and, ideally, initial air flow measurements are needed as baseline performance data. Regular air flow measurements should be performed on all systems to identify changes in system performance. These data can then be used to recommend specific corrective action as needed to maintain acceptable ventilation rates.

Scheduled monitoring of ventilation systems is particularly important in the R&D area where good local exhaust ventilation is one of our primary controls to limit employee exposure.

Appendix II presents a proposed ventilation testing program extracted from the OCC Industrial Hygiene Field Manual.

## Laboratory Quality Control

To assure ourselves that we are obtaining good data, a laboratory quality assurance program is essential. In the past the laboratory has exchanged samples with other OCC laboratories. While this practice is commendable, it does not provide an independent third party check on the data.

One or two samples for each type of analysis we perform in-house should be sent to an accredited industrial hygiene laboratory at least on an annual basis for verification of results. An accredited laboratory must be used because it will already be in a national laboratory quality control program where their proficiency is already demonstrated and documented.

APPENDIX I

INDUSTRIAL HYGIENE PROGRAM REVIEW Date 12/2/82

Facility Occidental Chemical Corp. Respondent G. D. Lloyd

Location Pottstown Title Manager - Safety
PVC Resins Division

Circle appropriate response where indicated.

1. Is there a written policy for industrial hygiene?

   a. Yes
   b. No.
   (c) No, but one is being prepared (Copy of White Springs Policy
   d. Part of the Safety Policy sent to G. D. Lloyd)

2. Is there a procedure for review and response to industrial hygiene recommendations by the affected operating group?

   (a) Formal
   b. Informal
   c. No

3. The individual responsible for industrial hygiene is:
   (Check each applicable term or statement)

   a. An experienced industrial hygienist.

   (b) Primarily responsible for other functions. (Safety, Medical Training)

4. The individual in charge of industrial hygiene has had this responsibility for:
   (Check applicable term or statement)

   a. Less than one year
   b. One to five years
   (c) More than five years (18 years)

5. The individual in charge of the industrial hygiene section reports directly to (Check each applicable term or statement)

   a. Plant Manager
   b. Director of Occupational Health Program
   c. The Personnel Manager
   d. The Safety Manager
   e. The Plant Engineer
   (f) Other - Specify Director of Manufacturing

6. The industrial hygiene staff consists of:
   (Check each applicable term or statement and give number in each category)

   a. Full time industrial hygienist(s)
   (b) Industrial hygienist(s) or other professional who spends a portion of his time on industrial hygiene problems
   c. Full time technician(s)
   d. Part time technician(s)

7. Consultative services are obtained from the following source or sources and with the following frequency:
(Check each applicable term or statement and list consultants used)

| | As Problems Arise | Other Specify |
|---|---|---|
| a. Insurance companies | | |
| b. Independent Consultants | | None utilized to date |

8. Arrangements have been made for the industrial hygiene section to obtain service from other staff or assistance in the following areas:
(Check each applicable term or statement and state source of service)

a. Noise Engineering

b. Ventilation "

c. Ionizing radiation "

d. Air analysis R&D and Analytical Lab

e. Engineering control Engineering

f. Other (describe) _____

9. If Industrial Hygiene Sampling is performed in-house, is the following available:
(Check each applicable term or statement)

(a) An office area for industrial hygiene staff
(b) A storage area for equipment
(c) A laboratory area for equipment, calibration and sample analysis

10. Who is responsible for industrial hygiene sampling?

a. Equipment calibration G. D. Lloyd
b. Sample collection G. D. Lloyd
c. Employee observation during sampling G. D. Lloyd
d. Recording production and exposure information G. D. Lloyd

11. How frequently are airflow calibrations of air samplers made?
(Check each applicable term or statement)

a. Annually
b. Other periodic frequency (specify)
Before and after each use

12. Where are air samples analyzed?
(Check each applicable term or statement)

(a) Plant laboratory
b. Commercial laboratory (names) To select one

13. Is there an active laboratory quality control program associated with industrial hygiene analyses? If yes, please describe on a separate sheet of paper or attach protocol.

14. Who is responsible for the review and maintenance of industrial hygiene sampling documentation? G. D. Lloyd
Attach a copy of the sample documentation form currently in use.

15. Please indicate the air sampling instruments available to take samples for subsequent laboratory analyses on a separate sheet of paper.
See Page 11

16. Please list the portable direct reading instruments for air analysis which are available for use by the industrial hygiene section, and give number of units as appropriate on a separate sheet of paper.
See Page 11

17. On a separate sheet of paper please list the noise and heat stress measuring instruments available for use by the industrial hygiene section.
See Page 11

18. How are calibrations of direct reading instruments for airborne contaminants maintained?
(Check each applicable term or statement)

a. Use manufacturer's calibrations
(b) Use only NIOSH certified indicating tubes
(c) Calibrate periodically in known concentrations of gas or vapor

19. How frequently are all noise survey equipment calibrated?

Specify Before and after each use

20. How are employees specifically informed about the industrial hygiene hazards of their jobs?
Through supervision
Through training programs

21. Are employees oriented to potential health hazards and preventive measures:
(Check each applicable term or statement)

(a) By supervisors?
(b) By orientation sessions?
(c) By printed material (give example) VCM standard, Appendix to lead standard
d. No orientation of employees

22. Are supervisors informed of potential health hazards, necessary monitoring, and proper operation and maintenance of control devices?

a. Routinely
b. Occasionally
c. Seldom
d. Never
(e) As the need arises

23. Is this information given in
(Check each applicable term or statement)

(a) Formal training sessions?
(b) Written instructions and memoranda?
c. No formal procedure

24. Is there a health and safety committee in this facility?

(a) Yes
b. No

25. How often does this committee meet?

Monthly

26. List job titles of current members.

Manager, Safety - Chairman
Manager of Maintenance (Resins)
Plant Engineer (Fab Prod)
Safety Supervisor (Resins)
Two clock card representatives for location

27. Does the industrial hygiene section maintain a current file on materials in the facility which may pose a health hazard potential?

(a) Yes
b. No
c. Not as such

28. Have all processes been reviewed for all potential health hazards?

(a) Yes
b. No
c. Don't know

29. Are all new chemicals or processes cleared for potential health hazard introduction?

(a) Always
b. Usually
c. Seldom
d. Never

30. Do purchase specifications for equipment routinely include limits on noise production?

(a) Yes State Criteria Not to exceed 85 dBA .
b. No

31. Are special handling procedures required for specific toxic materials? (For example, carbon tetrachloride, carbon disulfide, toluene diisocyanate, beryllium, tetrachloroethane, etc)

(a) Yes
b. No
c. If yes, attach procedure. Used only in lab area (R&D or Analytical) & kept under lock and key. Quarterly reminder.

32. Are regular walk-through surveys performed to note the presence of potential health hazards?

(a) Yes
b. No

How frequently? (e.g., annually, etc.) Monthly

By whom? Safety Committee and G. D. Lloyd

33. How are walk-through survey results transmitted to production management?

Verbally unless a condition warrants a written report - then verbally with follow-up report

34. How frequently are all SOP's revised for health hazard control?
Annually or as needed

By whom? G. D. Lloyd and/or Production

35. Attach summaries of air contaminant studies conducted in the last two years including:

a. Substances sample
b. Types of samples
c. Number of samples and range of results

36. At what concentration is a regular monitoring program for air contaminants set up? State criteria.

When initial determination indicates the need

37. Average exposures of workers to air contaminants are determined by: (Check each applicable term or statement)

(a) Personal sampling of all affected workers
(b) Personal sampling of representative affected workers
c. Area sampling
d. Average exposures are not determined

38. How is area monitoring data used to evaluate occupational exposures?

It is not used to evaluate exposure dose. It is used only as an alarm system. The production areas do average out reading on occasions, however, they useless for determining exposure unless backed by job-time-motion studies

39. What is the procedure for responding to employee health hazard complaints? What guidelines are established for the timeliness of this response?

Employee reports to supervisor. If not resolved it goes to Safety Committee member and Plant Production Manager or Plant Manager. At this point it becomes a committee item. Potentially serious problems are reported directly and correction dates established.

40. How often is worker noise exposure monitored?

Specify Annually, or as needed or requested

41. What do you consider to be your problem materials and/or physical hazards? List in order of decreasing importance and indicate estimated number of people at risk to each material or hazard.

| Material or Hazard | Number of People at Risk |
|---|---|
| Vinyl Chloride | 250 |
| | |
| | |
| | |
| | |
| | |
| | |

42. What is the procedure for review and establishment of CEL's for materials without AEL's?

Literature Review
MSDS
Corporate Industrial Hygiene and Medical Procedure

43. To whom are reports of worker exposure determinations routinely sent? (Check each applicable term or statement)

a. Worker's department
b. Medical department
(c) Plant engineering
(d) Establishment superintendent
(e) Labor - Management Health & Safety Committee
(f) Corporate medical or industrial hygiene office EASE
g. Other _____

44. Are lunch rooms or areas provided for all personnel?

(a) Yes
b. No

45. Is there a system for transmitting industrial hygiene recommendations on new or revised processes to the engineering designers?

(a) Yes, please specify. Fund
b. No

46. Do you use your industrial hygiene data to recommend specific control measures?

(a) Always
b. Usually
c. Occasionally
d. Never

47. Are new and/or modified processes inspected after design and after evaluation by industrial hygiene to assure that work conditions are healthful and meet all applicable standards?

(a) Always
b. Usually
c. Special situations only
d. Seldom or never

Specify _____

48. Are noise control devices inspected periodically for integrity and effectiveness?

(a) Yes
b. No
c. There are no noise control enclosures

If yes, how frequently and by whom? (specify)

Annually or sooner if needed

49. Are local exhaust (1) ventilation hoods and (2) area ventilation inspected periodically for integrity and/or need for maintenance?

(a) Yes
b. No
c. There are no local exhaust hoods

If yes, how often and by whom?

(1) Occasionally
(2) Seldom Done

50. Are maintenance employee environmental exposures being routinely evaluated?

(a) Yes
b. No

Specify Part of VCM Monitoring Program

51. Is there a written respirator program?

(a) Yes - attach copy
b. No

52. Are respirators checked for suitability and approved for intended use?

(a) Yes By whom Safety Dept. and Production
b. No

53. Are users instructed and trained?

(a) Yes By whom G. D. Lloyd and Production
b. No

54. What action is taken to insure that respirators are worn?

Specify Monthly checks, job observations, monthly inspections, disciplinary action program

55. Are earmuffs and/or plugs provided when noise exposures are above OSHA requirements?

(a.) Yes
b. No
c. Other actions taken

Employees with hearing loss are medically restricted to wearing protection

56. Is the wearing of hearing protection enforced?

(a.) Yes By whom Supervision
b. No

57. Are face shields or goggles provided where necessary?

(a.) Yes
b. No
c. There are no areas where their use would be necessary

58. Is protective clothing provided?

(a.) Yes, where necessary
b. No
c. There are no areas where it would be desirable

59. Are processes where chemicals have been substituted checked periodically to assure that lower hazard materials are still being used?

(a.) Yes By whom? G. D. Lloyd

b. No

60. Are work practices observed periodically to assure that proper methods are being used?

(a.) Yes (Give approximate interval) Monthly Job Observation Program
b. No
c. Not applicable

61. Are records of significant worker exposure to toxic materials kept so that each worker's exposure can be estimated?

(a.) Yes
b. No

62. Are records of air contamination kept by area so that changes can be readily identified?

(a) Yes
b. No

63. Are records of inspection of control devices, e.g., ventilation systems kept?

(a) Yes
b. No

64. Are records of ventilation quantities for each exhaust hood kept and associated with static suction or other simple inspection measure?

(a) Yes
b. No

65. Does the industrial hygiene section participate in employee orientation for potential emergency and safety hazards in the facility?

(a) Yes
b. No

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15. Air Sampling Equipment

1. SIPIN SP-1 (3)
2. Bendix Super Sampler (3)

16. Direct Reading Air Sampling

1. Bendix Gastec, 100 ML (1)
2. Century - Several
3. HNU - Several

17. Noise

1. Gen Rad, 1954 Indicator (2)
2. Gen Rad, 1982 Sound Level Meter (1)
3. Gen Rad, 1954-9710 Exposure Monitor (3)

Heat Stress

1. Wet Bulb, Black Globe, Dry Bulb Arrangement. Full location summer and winter profiles completed.

# APPENDIX II

1. Testing of Ventilation Systems

Air flow measurements and test data are often needed in connection with the proper functioning and design of industrial exhaust systems. The importance and value of obtaining test data can be noted in the following applications.

a. To determine whether a new exhaust system is functioning in accordance with design data.

b. To obtain air flow data necessary for proper setting of blast gates on systems designed for blast-gate balancing.

c. To determine, by periodic checks, if further maintenance or repairs of a system are necessary to assure efficient operation.

d. To obtain measurements necessary to determine whether the system has sufficient capacity for additional hoods or future exhaust equipment.

e. To obtain design data from existing satisfactorily controlled operations for future installations of similar character.

f. To obtain air flow data necessary to determine the degree of compliance with state codes, regulations or trade association standards.

2. Ventilation System Surveys

A. System Start-up vs Design Basis

Any ventilation system, be it local exhaust for contaminant control or general for comfort, is designed in terms of removing or distributing a specified quantity of air at a specified velocity at a total system pressure which is the sum of the parts. An initial survey of the system is the only time a valid comparison can be made between the design basis and optimum system performance.

B. Survey Procedures

1. Sketch of the system. A sketch, not necessarily to scale but representative of dimensions, should be drawn noting such items as hoods, elbows, branchings, air cleaner, fan and stack. Supply ducts, plenums, and diffusers should be shown for general systems.

   The sketch should be considered as part of the permanent record on which future changes in the systems may be recorded.

2. Specific air flow measurements. Measurements in terms of air flow, velocity, and static pressure must be made to determine that the system is adequately balanced and performing according to the design basis. These measurements include:

   a. Statis pressure measurements at:

      - o hoods
      - o up and downstream of the air cleaner
      - o up and downstream of the fan

   b. Air flow in cfm at:

      - o hoods (throat suction method)
      - o branches and mains (Pitot tube)
      - o up and downstreams of fan (Pitot tube)

   c. Supply, capture, and conveying velocities at:

      - o diffuser outlets (supply velocity)
      - o face or opening of hood (capture velocity)
      - o branches and mains (conveying velocity)

d. Fan performance

- o fan speed in rpm
- o horsepower (BHP) calculated using cfm (Q), total pressure (TP), and mechanical efficiency (ME) of fan.

$$BHP = \frac{(Q)\ (TP)}{6356 \times ME}$$

The locations of the measurements must be identified on the sketch and a record kept for future comparisons.

The measurements obtained should agree within 10% of the design basis. If not, system modification should be made until such agreement is obtained.

3. Other checks. Local exhaust systems are installed for the singular purpose of removing some contaminant from the work environment. Visualization techniques using smoke tubes or candles can be most helpful in verifying that the system exerts a sphere of control over a sufficient area to prevent excessive exposures to operating personnel. Air evaluation, for specific contaminants, is also recommended to verify the system will control contaminants to levels known to be safe. Air samples taken in the breathing zone of operating personnel will be most helpful in assessing the adequacy of contaminant control.

C. System Operating vs System Start-up

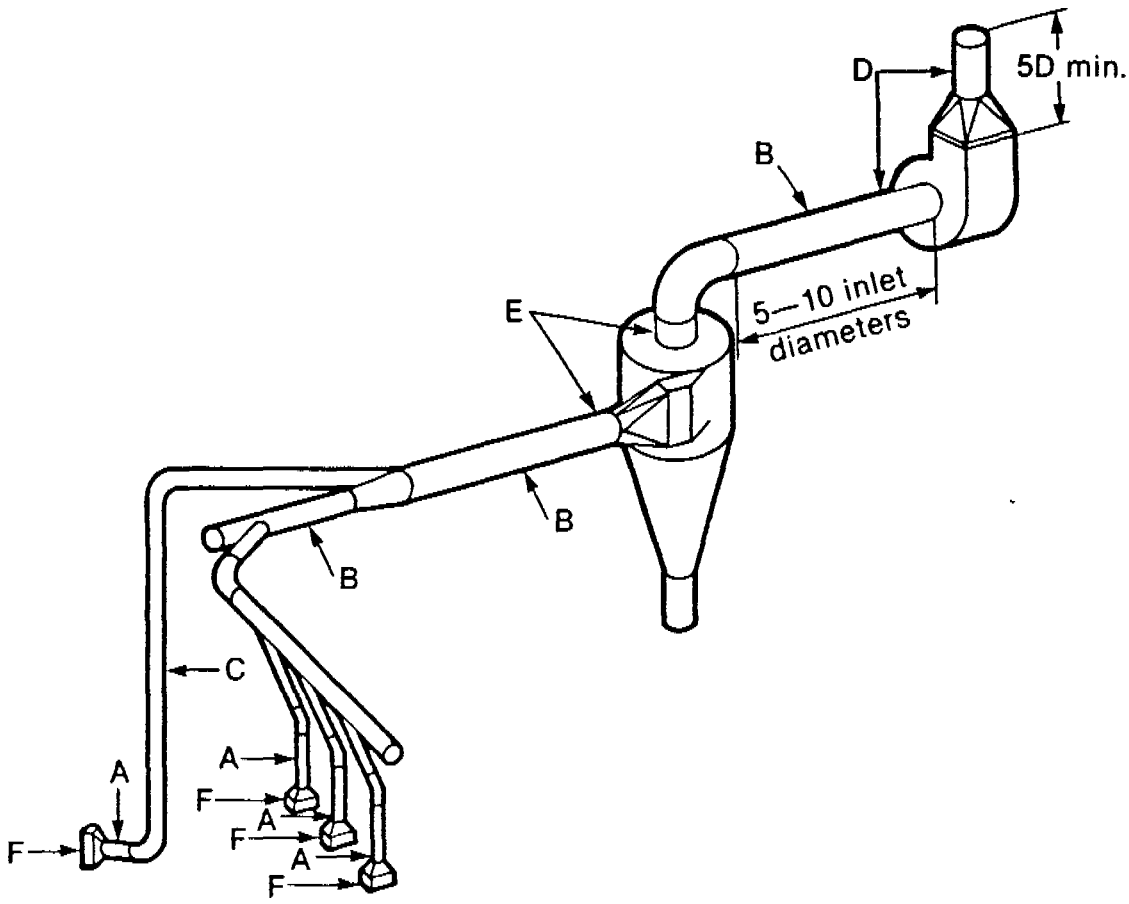
Once systems are started up and determined to perform satisfactorily, the degree of evaluation can be reduced as long as good records of start-up or initial conditions have been made. Experience with air flow systems clearly indicates periodic surveys are required to assure system performance is adequate. Operating personnel cannot be relied upon as an "indicator" of system performance. Also, ventilation systems are rarely an integral part of the operation in terms of quality and production and all too often receive inadequate maintenance.

1. For most systems simple velocity measurements at exhaust hoods and supply ducts will provide a crude indication of system performance when compared with start-up evaluations. For local exhaust systems, the throat suction method applied to exhaust hoods and static pressure differentials for air cleaners and fans will suffice in confirming the system is performing satisfactorily.

   The throat suction method will provide valid information unless:

   - o The hood entry has been modified/damaged;

FIGURE 5.1 Information Needed for a Detailed Ventilation Summary

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| Point | Measurement | Location of measurement | Measurement use |
|---|---|---|---|
| A | Hood static pressure | Distance from hood—<br>3 pipe diameters-flanged or plain hood<br>1 pipe diameter-tapered hood | 1. estimate flow: $Q = 4005\ CeA\ \sqrt{SPh}$<br>2. check point for hood and system performance. |
| B | Velocity and static pressure | Branch and mains-preferably 7.5 diameters straight run downstream from nearest air disturbance (el, entry, etc.) | 1 transport velocity<br>2. exhaust volume: $Q = VA$<br>3. SP as system check point |
| C | Centerline VP | Small ducts location as above. Centerline velocity reading only. | Round duct only. Use on small ducts where traverse impractical or where approximate volume wanted. |
| D | Static, velocity and total pressures | Inlet and outlet of fan-any two of three readings at each location | 1. Fan static and total pressures<br>$FSP = SPo + SPi - VPi$<br>$TP = SPo + SPi + VPo - VPi$<br>2.Motor size or CFM estimate<br>$BHP = \frac{CFM \times TP}{6356 \times ME\ of\ fan}$<br>3.SP as system check point |
| E | Static pressure | Inlet and outlet of collector<br>Differential pressure | 1.Compare pressure drop with normal operating range<br>2 Checkpoints for maintenance. Readings above or below normal indicate plugging, wear or damage to collector elements, need of cleaning |
| F | Face velocity | Hood face-measure at center of hood face cross-sectional areas | 1.Estimate capture velocity<br>Average face velocity measurements<br>2.Determine hood performance.* |

‡ Adapted from Industrial Ventilation, 16th ed ACGIH, 1980.

*Observation of air flows surrounding exhaust openings may be visually augmented by use of smoke generators, trails and streamers.

- o There are obstructions ahead of the point of measurement; or

- o The system has been modified.

However, a reduction in throat suction can provide valuable information, such as an indication that there has been:

- o Accumulations of materials in an elbow, branch, or main, thus clogging or restricting air flow. Accumulation in the elbows result from impaction, while build-ups in straight runs result from insufficient conveying velocity or overloading the system.

- o A change in blast gate setting if the system is balanced using blast gates.

- o Additional branches and hoods added to the system. "Adding on" to a system is a real temptation. It is not sound economics when it renders the entire system deficient.

- o Excessive build-up on the filter. It is best to monitor filter build-up by attaching a static pressure measuring device across the filter (manometer).

- o Reduced fan output resulting from belt slippage, damaged or worn rotor, or build-up on the fan blades.

2. Smoke tubes are also helpful in identifying uneven air flow patterns near hood entry areas and the effect of room air currents on the performance of hoods.

D. Data Handling and Recording

The sketch of the system made at start-up or for the initial air evaluation survey and the results of the ensuing air flow survey must be recorded and filed in such a manner that future air flow surveys can be conducted in a similar manner. The frequency of air flow surveys can only be determined by such conditions as:

- o Nature of the materials being controlled. The more hazardous the materials, the more frequently the system should be checked.

- o Nature of the system. Blast gate systems and laboratory hoods will require more frequent checks than other systems.

- o The degree of maintenance. Air flow surveys can be used to indicate the need for more frequent and improved maintenance.

APPENDIX III

Organization Chart

R. F. Gervais

S. P. Dominick, Jr.
Vice President & General Manager
Resins

Open
Vice President & General Manager
Fabricated Products

F. F. Hoy
Director-Manufacturing

J. T. Wolfsperger
Director-Manufacturing

G. D. Lloyd
Manager-Safety
(Hygiene)

H. F. Dubec
Manager-Safety & Environment
(Hygiene)

2427E-10

OCC 10562

APPENDIX IV

## Process Description

### Resin Production - Pottstown

Included in this Appendix are two typical polymerization flow charts showing the basic steps in producing polyvinyl chloride dispersion resin and copolymer (i.e., vinyl chloride - vinyl acetate) suspension resin at the Pottstown Occidental Chemical Corporation facility.

### Plastisol Production:

The process begins by charging vinyl chloride monomer, a surfactant, water and an initiator into a charge vessel. The contents are then circulated thru a homogenizer and subsequently charged into a jacketed polymerization reactor. In the reactor, the monomer is chemically converted from a liquid to solid polymer particles, polyvinyl chloride resin. The resultant batch is called a latex, fine particles of PVC resin dispersed in water. The batch is pumped to a stripper which pulls off unreacted vinyl chloride monomer. Following the stripping process, the batch is pumped to blend tanks where it is mixed with other batches for product uniformity. From the blend tank, the latex is fed into a cyclone dryer where the latex is atomized, the water is evaporated, and the solids dried. The hot air stream carries the dried resin into a dust collector which captures the resin. From the bottom of the dust collector, the resin is conveyed to an unground product collector, screened, processed thru a micro-atomizer grinder, and conveyed to ground product collector storage tanks. From these storage tanks, the resin is placed in bags, palletized, warehoused and subsequently shipped to customers.

### Copolymer Production:

The process begins by charging two monomers - typically vinyl chloride and vinyl acetate, water, special additives, a suspending agent, and modifiers into a jacketed polymerization reactor. A reaction initiator begins the chemical process of combining the two monomers into solid copolymer particles, vinyl chloride - vinyl acetate resin. The resultant batch of resin and water is dropped to a stripper where unreacted monomers are pulled off. From the stripper, the batch is pumped into blend tanks where it is mixed with other batches for product uniformity. From the blend tank, the batch is pumped into a certifigue where the excess water is removed. The remaining resin is dropped into a hot air stream in a horizontal rotary dryer. The hot air dries the wet resin and carries it into a dust collector. From the collector, the resin is processed thru a finishing tower where it is screened and sized prior to conveying the resin to storage silos. From the silos, the resin can be placed in bags which are palletized, warehoused, and subsequently shipped to customers. Or, the resin can be loaded directly into bulk tank railroad cars or trucks for shipment.

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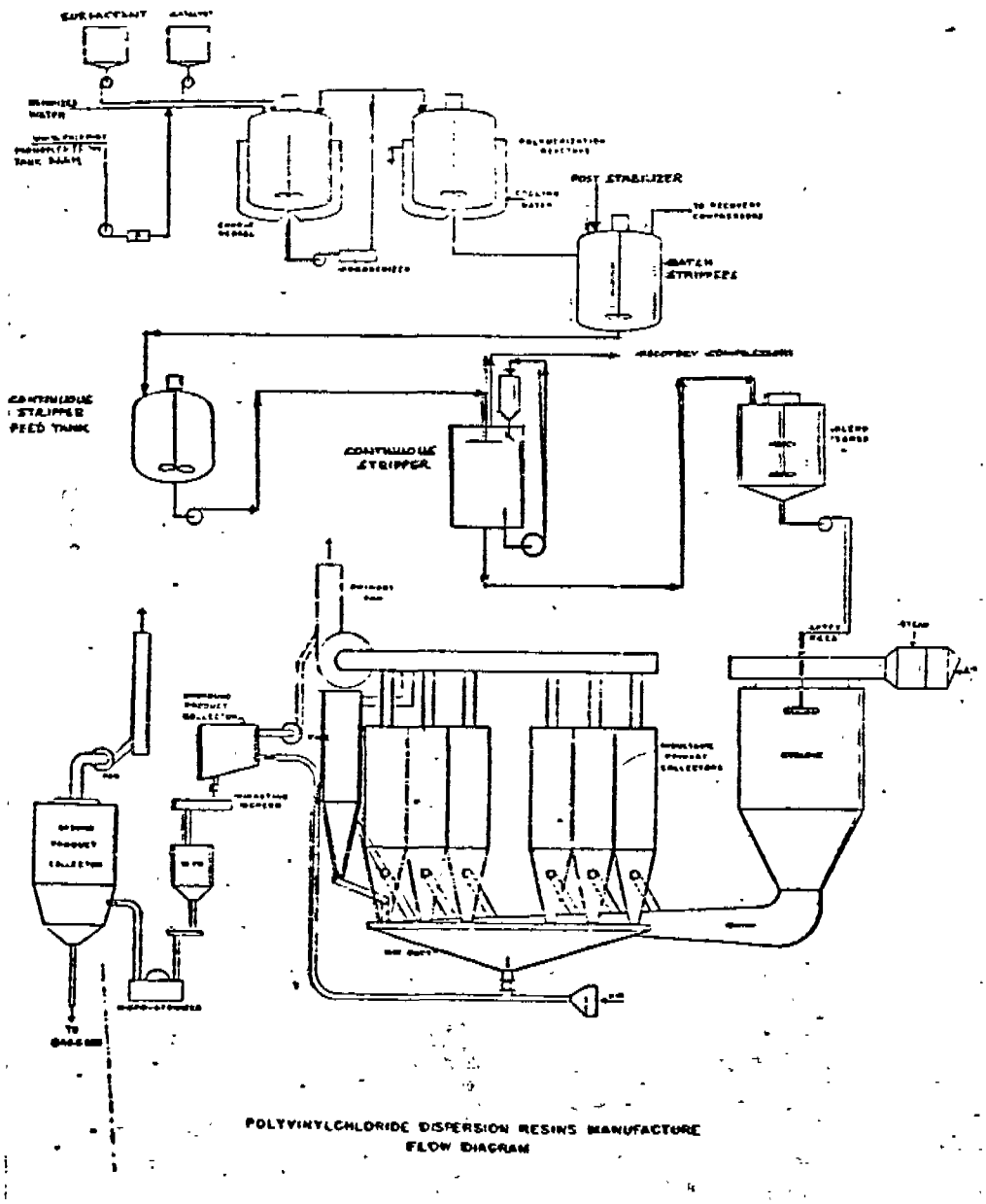
Calender Plant

The Film and Sheeting Division takes the above resin(s) and compounds them with other ingredients such as plasticizers, stabilizers, lubricants, fillers, and colorants. The blended material is then Banburyed, milled and calendered into film along four calendering lines. The film is shipped in roll form either to the Salisbury printing plant or to trade customers for further processing.




POLYVINYLCHLORIDE DISPERSION RESINS MANUFACTURE
FLOW DIAGRAM

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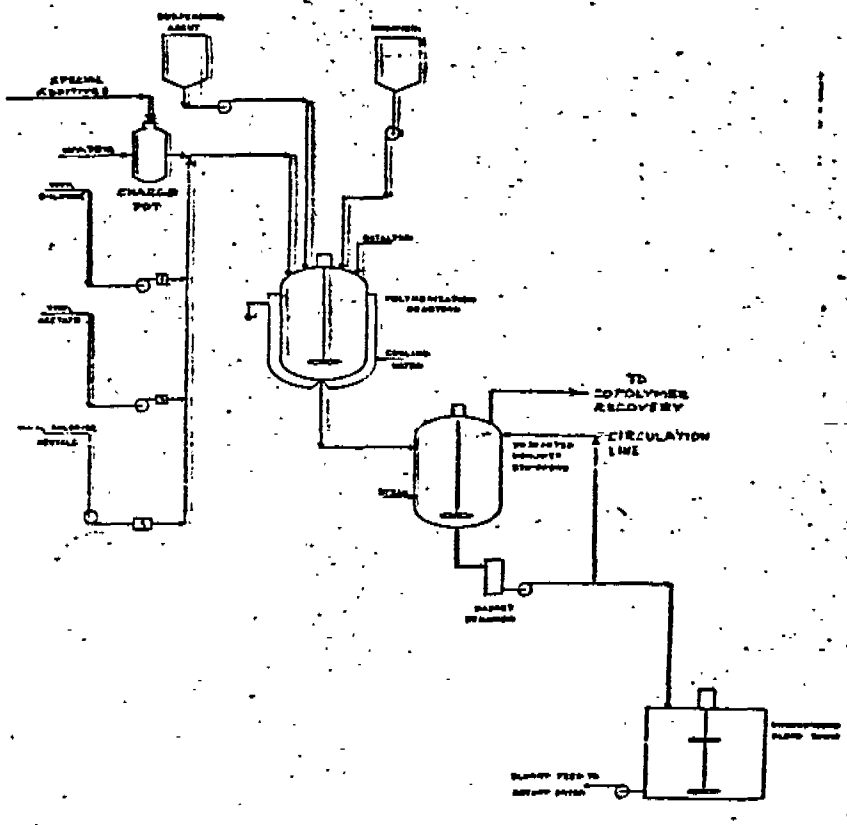
PLASTISOL




COPOLYMER SUSPENSION RESIN MANUFACTURE
FLOW DIAGRAM

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COPOLYMER

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