

SAFETY & FIRE PROTECTION DIVISION

OCCUPATIONAL HEALTH SURVEY REPORT

BEAUMONT WORKS
ELASTOMER CHEMICALS DEPARTMENT
BEAUMONT, TEXAS

REPORT NO. 9055-H
July 12, 1979

EMPLOYEE RELATIONS DEPARTMENT

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

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SUMMARY

Overall rating is good.

Organization is excellent. Improved audit program is recommended.

Chemical catalog is fair; plans are excellent and include a new four-page format.

Physical examination program scope exceeds corporate recommendations and should be reexamined.

Respirator program is excellent.

Use of eye wash stations needs attention.

Full shift personnel chemical exposure samples are needed in Hydan®. Some other areas need additional samples for some carcinogens.

Annual testing of ventilation exhaust systems is generally needed.

Noise control program is good; reevaluation of 12-hour shift exposures is needed.

Improved recordkeeping is needed for radiation exposure control.
Film dosimeter use is urged.

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GENERAL

The second occupational health survey of the Beaumont Works was conducted by the undersigned engineer June 17-29, 1979. Escorts during the visit included area supervision and the Environmental Health Coordinators.

The purpose of the survey was to evaluate occupational health programs and practices and provide suggestions for improvement, if needed. Practices, procedures and facilities for identifying, evaluating, and controlling environmental factors that may cause illness, impaired health, and significant discomfort to employees were addressed. The Beaumont Works was rated good on a scale of excellent, good, fair and poor, with the first three being degrees of satisfactory performance.

This report summarizes the observations and recommendations presented to the Manager and staff at the conclusion of the survey. Details and many of the specific recommendations developed during the survey are not included since these were discussed in field notes provided for the Site.

We would appreciate being advised within the next few months concerning the actions taken on recommendations in this report and your response to any of the field notes with which you disagree.

SAFETY AND FIRE PROTECTION DIVISION

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ORGANIZATION AND ADMINISTRATION

Organization

The organization for occupational health is excellent. An Environmental Health group has been formed and Environmental Health Coordinators serve for each tenant Department, as well as an overall program coordinator for the Site. An Environmental Health Subcommittee of the Central Safety and Health Committee is active and addresses occupational health topics in depth.

- ① Occupational health program auditing in each area needs strengthening to eliminate program weaknesses reflected in survey field notes. Audits should occasionally include the Departmental Environmental Health Coordinators to further expand the expertise of the audit teams.

Communications

The communications program is good. Management issues timely information on hazardous chemicals to supervision for informing and training affected employees. A good flow of occupational health information to the Site from Departmental sources is reported and employees were found generally knowledgeable. The 1979 safety program contains several occupational health related topics to expand employee awareness. The availability of video-tape equipment provides an excellent vehicle for furthering the education of personnel. Its expanded use for occupational health subjects is recommended.

- ②
- ③ Improvements in documenting information to employees who handle carcinogens is urged. Although the scope of information on carcinogens is well documented, little documentation exists to show which employees were informed and when (except for the Acrylonitrile Area where documentation required by the OSHA Standard is complete). It is recommended that documentation of discussions with employees who handle any carcinogen show the scope of the presentations, the employees informed and dates.

Chemical Catalog

The employee chemical information system is rated fair; however, plans for improvement are excellent. Information on about 200 chemical hazard summary sheets is recognized as inadequate and will be expanded and transferred to a new four-page format (a modified version of that currently in Engineering Standard S 11 T).

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Distribution of the new format will be made to all user areas. Hazardous trade name chemicals and toxic laboratory chemicals, not now summarized, will be included. These efforts are endorsed as a significant improvement over current chemical hazard summaries.

- ④ A chemical purchase approval system for introducing new chemicals onto the Site is active but can be improved. It is recommended that formal approval by the Environmental Health Coordinator be required before an area orders a new chemical for use.

Medical

The medical program is excellent. Medical surveillance has been implemented where required by OSHA standards. A board-certified radiologist interprets all X-rays associated with routine physical examinations, as well as those reviewed as part of the asbestos standard. However, the scope of the periodic physical examinations go beyond recommendations in the Physician's Guidelines or that required by government regulations. For example, blood chemistry work includes an SMA-21; only an SMA-12 is recommended. EKG's are given annually beginning at age 40, instead of annually beginning at age 50. (Other examples were addressed in the field notes.)

⑤ It is recommended that the advisability of continuing this expanded scope of routine physical examinations be discussed with the corporate Medical Director.

development Personnel Environmental Records System (PERS)

- ⑥ During 1979, the Company plans to issue guidance to each department regarding a computer-based program to relate employee work assignments to chemical exposures in the work place. The Site should remain alert to the issue of the program and implement its provisions based on Departmental and Company guidance.

Contractor Operations

- ⑦ Contractor handling is generally good. Employees are knowledgeable concerning protecting both Du Pont employees and contractors when contractors work on the Site. The survey indicated that additional attention is needed to insure proper use of hearing protection devices by contractors in Du Pont-generated high noise areas, particularly in the Powerhouse.

PROTECTIVE EQUIPMENT

Respirators

The respirator program is excellent; an almost complete overhaul has

been accomplished since the 1977 occupational health survey. The program, which includes quantitative fit testing, represents a large expenditure of funds and manpower. Additional efforts are needed, however, to remove unapproved respirators and canisters from area storage cabinets and Stores. Also, personnel responsible for community use respirators in the Shops should become more familiar with storage, handling and cleaning policies.

Eyewash Stations

The eyewash station program is fair with improvements needed as follows:

- ⑩ • Continuous flow ^{eyewash} stations, tested daily, should not be approved for use unless both water streams have equal, strong flow and the streams converge.
- ⑪ • Retraining of employees, including supervision, is recommended regarding the minimum acceptable flush time after chemicals are splashed into the eyes. Most employees questioned were unsure, even where proper instructions were posted in the immediate area.
- ⑫ • Bottle eye flush stations should be maintained full of flush solution. Many were noted which needed refilling.

Gloves

The glove use program is satisfactory. However, except for the Acrylonitrile Area, gloves have not been selected based on permeation data. Plans to review glove selection and base it on available permeation data are endorsed.

⑬ • Additional efforts are needed to remove asbestos gloves, no longer approved for Site use, from locations such as the Powerhouse and hot suit storage cabinets in the Shops.

EXPOSURE HAZARDS - IDENTIFICATION, EVALUATION AND CONTROL

Chemical Exposures

The chemical exposure monitoring program is excellent. Approved analytical methods are used and a manifold system is being developed to further verify the accuracy of sampling and analytical techniques. The Site embraces the sampling strategies and techniques of Engineering Standard S 11 T, S 12 T and S 13 T. Where appropriate,

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the LOGAN method of statistical analysis of data is used.

- (14) Eight-hour TWA personnel samples are recommended to more accurately quantify personnel exposures to HCN, acrolein, and methyl mercaptan in the Hydrazine Area. Only detector tube and fixed area monitoring has been previously done. In addition, Process areas should review their resample frequency for airborne chemicals, particularly for carcinogens, to insure S 12 T guidelines are met. More frequent sampling for hydrazine in the Methanol Area and EDB in the TEL Area is needed.
- (15)

* Field notes addressed several other possible process exposures which should be investigated.

- (16) The use of silver solder containing cadmium should be eliminated, if possible, in favor of cadmium-free silver solder, to protect against highly toxic airborne fumes. Where it cannot be eliminated, ventilation or respiratory protection should be provided.
- (17) Where gasoline-powered industrial trucks are used in close quarters, the carbon monoxide buildup should be checked periodically.

Only small quantities of asbestos are handled by Site employees; major removal work is handled by contractors. Involved Du Pont employees are included in implementation of the asbestos standard which the Site is following.

The use of local ventilation to control potential employee exposures at chemical handling stations is good. Additional exhausted sampling boxes are planned for the Acrylonitrile Area and about \$500M will be spent by the Elastomers Laboratory to upgrade the air supply system as well as hood exhaust efficiency for handling carcinogens. However, other improvements in the program are recommended:

- (18) Exhaust Hoods, such as those in the Elastomers Laboratory, should be posted to show the date and results of the exhaust efficiency test.
- (19) • Exhaust systems installed to control chemical exposures to personnel, such as the welding fume exhausters in the Shops and sample station enclosures in process areas, should have their collection efficiencies verified at least annually to insure an acceptable level of protection for personnel.

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- The accuracy of air velocity measuring devices should be verified annually, e.g., by using the technique described to escort personnel.

Field notes addressed several specific examples where improved ventilation controls are recommended.

Spill Control Procedures

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Site-wide fume release/spill control procedures are good. However, unnecessary vehicular and pedestrian traffic was noted immediately following the hexane release in the Nordel® Area on June 28, 1979. In addition, the incorrect incident location signal was sounded. Eliminating recurrence of these problems would strengthen incident control and further protect personnel from exposures.

Housekeeping and Facility Maintenance

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Housekeeping and facility maintenance, as it might affect the occupational health of employees, is satisfactory. However, additional attention is needed to keep lunchroom areas across the Site clean and sanitary, particularly freezer compartments of refrigerators. Equipment, not related to food consumption, such as laboratory beakers and containers, should not be allowed in eating areas.

Noise

The noise exposure control program is good. Annual noise surveys are conducted and semiannual updates are prepared of noise abatement plans. Hearing protection is required for all personnel entering a workplace noise level of 90 dBA and above, regardless of work time. Some program improvements are needed, however:

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- Hearing protection requirements and boundary identification are based on a noise level of 90 dBA, even where twelve-hour shift employees are involved, such as in the Nordel® Area. It is recommended that twelve-hour shift work locations be reassessed using 87 dBA as the criteria for administrative controls, or hearing protection and noise boundary identification.

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- Ultrasonic devices, such as those in the Laboratory and Medical Division, should be included in the annual noise survey program to spot deteriorating exposure conditions.

- 24 • Noisy portable tools and stationary shop equipment should be identified (by labeling or posting) to remind users of the need for hearing protection, or use of administrative controls.
- 25 • Both yellow and white floor stripes are used to denote the boundary of some high noise areas. It is recommended that a consistent color code be used throughout the Site to avoid possible employee confusion.

Radiation

The radiation exposure control program is good. A trained Radiation Protection Officer is available and basic program requirements are receiving attention. The following improvements are recommended:

- 26 • The use of direct-reading pocket dosimeters as the primary means of recording exposure should be phased out in favor of film badge dosimetry. The direct-reading dosimeters could be used, if desired, as a supplement to film badge dosimetry. Improved accuracy and legally strengthened recordkeeping would be realized by using a film dosimeter service.
- 27 • Other recordkeeping should be improved, such as recording radiation surveys where Du Pont employees might be affected by contractor radiation device use. Documentation, with the exposure records, is needed to explain why some dosimetry results are missing.
- 28 • Use of a "Hi-Plus" intensifying screen with routine chest X-rays instead of the "Par Speed" screen now used should be considered as new screens are purchased or old screens are replaced. (This would reduce radiation exposure to personnel during chest examinations by 50 percent.)
- 29 • Formal short-term training of the nurses in X-ray techniques and equipment is recommended since no previous formal training has been received.
- 30 • A contractor checks microwave ovens for stray radiation leakage each six months. Based on the frequency of use, leakage tests on ^{microwave} ovens should be done quarterly. ^{instead of semi-annually} The contractor should calibrate his test meter at least annually and provide the Site with a report of calibration.

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Heat Stress

31 The heat stress evaluation program, based on subjective analysis, is generally satisfactory. The Site has several recognized hot work areas, such as in the Ammonia Area, Methanol Area, and Nordel® but heat stress symptoms have infrequently been experienced by workers. However, plans are endorsed to study hot work areas to determine if informally established work/rest cycles are appropriate. Where air conditioned break areas are provided to relieve employee heat discomfort, such as in Nordel®, the cooling system should be maintained in good reliable working order. Several employee complaints were received concerning operation of this system.

An ESD consultant recently measured potential heat stress in the waste acid stripper building; his recommendations are forthcoming.

Previous Reports

A review of the 1977 Occupational Health Survey Report No. 7014-H, revealed the following recommendations which have not yet been adequately implemented:

- ✓ • Documentation of discussions with employees concerning non-OSHA carcinogens. (Acrylonitrile discussions are adequately documented; other discussions are not.)
- ✓ • Improved recordkeeping of radiation surveys.
- ✓ • Heat stress analysis in the hotter work areas such as Ammonia, Methanol and Nordel®.
- ✓ • Annual exhaust efficiency testing for exposure control systems such as welding exhausters.
- ✓ • Updating the chemical hazard information system.
- ✓ • Identification of noisy, portable tools.

Response to other recommendations is adequate.

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OCCUPATIONAL HEALTH SURVEY
ADVANCE INFORMATION

In preparation of an occupational health survey, the following information is requested:

- An organization chart. Please indicate persons with responsibility for occupational health.
- Flow diagrams for each site process. (Sample included.) If the site uses more than 20 processes, send diagrams for the 20 highest volume processes.
- Complete list of raw materials, catalysts, intermediates (normal and abnormal), by-products, waste materials, finished materials and emissions associated with each process.
- Written procedures which have been developed on occupational health, e.g., respiratory protection, hearing conservation, airborne contaminant monitoring, spills, protective equipment.
- Date of last OSHA or other governmental industrial hygiene survey.
- Information on calibration/verification of procedures for determining concentrations of airborne contaminants. Please complete enclosed questionnaire and return.
- Summaries of air monitoring prepared for management review during the last year.

The requested information will improve the effectiveness of the site's occupational health survey and should be completed and returned to the Safety and Fire Protection Division prior to the survey as indicated on the cover letter.

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OCCUPATIONAL HEALTH SURVEY
SUGGESTED SCHEDULE

<u>EVENT</u>	<u>ESTIMATED TIME</u> <u>(hours)</u>
(1) Introductory Meeting with Plant Manager	1/2
(2) Familiarization Tour of Plant	1-2
(3) Discussion of Site-Wide Programs With Appropriate Personnel	
A - Organization	1/2
• O.H. Personnel/Duties/Location in Organization	
• O.H. Committees/Duties/Programs/Accomplishments	
B - Plant Process/Chemicals Used and Produced/Exposure Potential	1 - 1 1/2
C - Review Communications to Employees Concerning Hazardous Materials	1/2
D - Chemical Catalog (Material Safety Data Sheets)	1
E - Chemical Purchase Approval Plan	1/4
F - Respiratory Protection Program	1 - 1 1/2
G - Use of Gloves, Chem Suits	1/4
H - Chemical Monitoring Program/Documentation.	2
I - Periodic Checking of Hoods and Exhaust Ventilation	1/4
J - Noise Monitoring and Abatement Program	1
K - Radiation Program, Microwaves/Lasers	1
L - Heat/Cold Stresses	1/2

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Occupational Health Survey - Suggested Schedule - Page 2

(4) Evaluation of Individual Production Areas

- | | |
|---|--------------------------|
| A - Discussion of responsibilities for occupational health in area, processes, programs for monitoring and controlling airborne toxicants, noise and radiation. Review monitoring data. | 1-2 (each area) |
| B - Walkthrough Survey of Area (laboratories, stores and maintenance shops included) | Varies depending on size |

(5) Continue Discussion of Site-wide Programs

- | | |
|--|---------|
| A - Discuss Occupational Health Activities | 1-2 |
| B - Discuss Chemical Spill Control Program (as it affects employees) | 1/2 - 1 |
| C - Review Contractor Protection Program | 1/2 |
| D - O.H. Audits on Site | 1/2 |

(6) Final Review Meeting with Plant Manager and Staff

1

NOTE: It is usually advisable to begin the evaluation of individual production areas on the second day and have this activity distributed throughout the week.* The first half hour of each day should be set aside for reviewing field notes with the escort.

* On surveys exceeding one week duration evaluation of individual production areas may begin on the third day.

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OCCUPATIONAL HEALTH AUDIT

Items to be Evaluated

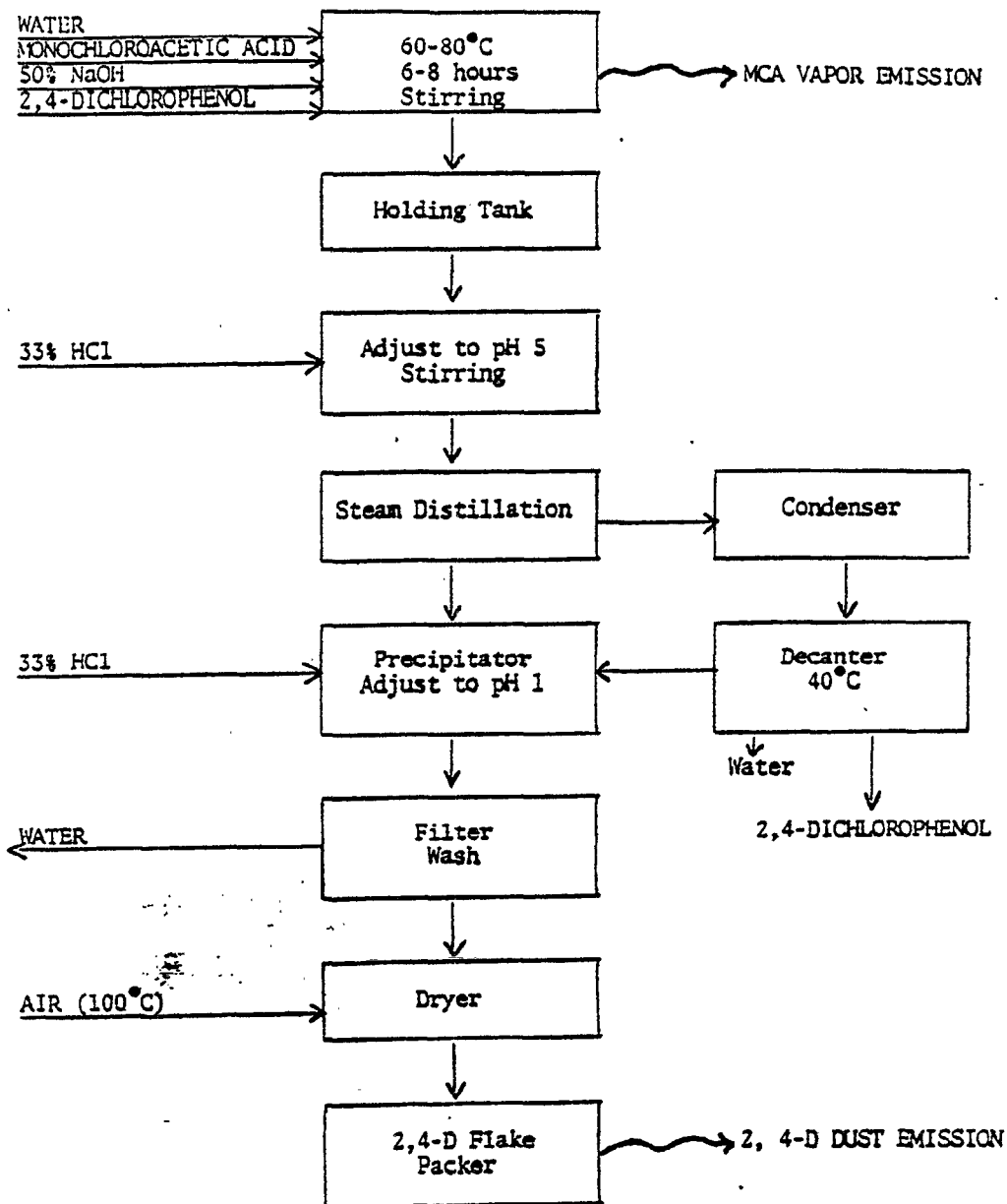
1. Occupational health policy, organization, committees, objectives, programs and accomplishments.
2. Plant processes; hazards, and engineering control programs, equipment and maintenance.
3. Noise, radiation and ventilation monitoring programs, procedures, equipment and records.
4. Air contaminant monitoring programs, priorities, sampling procedures, equipment and records.
5. Employee work history records.
6. Program for communicating information on hazardous materials to employees.
7. Employee training in work practices; programs and effectiveness.
8. Personal protective equipment; suitability for associated hazards, fitting, training and maintenance.
9. Emergency spills; recognition, equipment, procedures, training, and drills.
10. Incidents; recognition, reports, operating control limits, and elimination.
11. Signs, labels, storage areas, containers, etc., for occupational health controls.
12. Medical practices; examinations, biological monitoring, data evaluation, involvement in industrial hygiene activities.
13. Analytical capabilities regarding radiation, chemicals, noises; records, procedures and verification.
14. Contract operations and non-Du Pont employee exposures and communications.

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SAMPLE PROCESS FLOW DIAGRAM

2,4-D* ACID PROCESS



* 2,4-dichlorophenoxyacetic acid

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INSTRUCTIONS:

- a. Toxic Substance - list chemical name.
- b. Source of Method - list by number from following table:
 1. OSHA or NIOSH
 2. ASTM, APHA Intersociety or similar group
 3. Standard departmental method
 4. Vendor's procedure
 5. From technical literature
 6. Developed elsewhere in Du Pont
 7. Developed on site
 8. Other
- c. Method Documented - indicate yes or no if procedure is written in official format as a site, departmental or governmental method.
- d. Description of Method - e.g. carbon tube/GC, Miran, stain tube, Badges, etc.
- e. Calibration/Verification - list calibration standard by number from the following table: If more than one method has been used list each.

Both Sampling and Analytical Method Calibrated Using:

1. Known concentration of toxicant in air prepared using dynamic system, e.g., environmental manifold, permeation tube, air bubbled through liquid of known vapor pressure, slow injection of gas or liquid into air stream, etc.
2. Known concentration of toxicant in air using static system of preparation, e.g., gas mixture prepared by measuring volume, pressure or weight, etc.
3. Cross check with another method - please specify.
4. Cross check with another laboratory - please specify.
5. Calibration or calibration standard mixture supplied by vendor.
6. Other - please specify.

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Sampling Not Calibrated but Analytical Method
Calibrated Using:

7. Gas or vapor mixture prepared as in e. 2 above.
8. Cross check of spiked collection tube or scrubber solution with another laboratory - please specify.
9. Cross check with another method - please specify.
10. Other - please specify.
11. Analytical method not calibrated.

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