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**VELSICOL CHEMICAL CORPORATION**

341 EAST OHIO STREET • CHICAGO, ILLINOIS 60611 • 312-670-4500

March 27, 1978

Director of the Office of  
Toxic Substances (WH-557)  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460

Re: Hexachlorocyclopentadiene, chlorine and  
hydrochloric acid.

Dear Sir:

The attached document is submitted for your files and in compliance with TSCA section 8(e) if the latter is necessary.

In summary, the document reports the results of an industrial hygiene survey.

For the record, the document is identified as follows:

Industrial Hygiene Survey, Velsicol Chemical Corporation,  
Memphis, Tenn. Plant, Hexachlorocyclopentadiene Exposures,  
Summary.

We make no judgment that this document contains information concerning a substantial risk. We reserve our right to contest the propriety of TSCA section 8(e).

Sincerely,

VELSICOL CHEMICAL CORPORATION

*Thomas R. Loy*

Thomas R. Loy  
Manager,  
Regulatory Activities  
Environmental Sciences and  
Regulatory Activities

TRL:eh  
Enclosure

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Industrial Hygiene Survey

Velsicol Chemical Corporation

Memphis, Tenn. Plant

Hexachlorocyclopentadiene Exposurés

SUMMARY

An industrial hygiene survey was conducted at the Memphis Plant hexachlorocyclopentadiene (HEX) production unit and quality control laboratory to determine employee exposure to HEX and airborne concentrations of chlorine gas and hydrochloric acid vapors. The survey was performed by George Nagle, Manager of Industrial Hygiene and Neal Nezel, Industrial Hygienist, during the week of August 9, 1977. The analytical support was provided by the Velsicol Environmental Sciences laboratory and their results were received on October 13, 1977.

Results of air sampling performed in May 1977, showed air concentrations of HEX in excess of the recommended exposure limit in suspected high exposure areas. Since those samples were general area samples in the unit, a second survey was performed to determine actual employee exposure to HEX.

All of the employee HEX exposures determined by this survey were below the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 0.11 mg HEX per cubic meter of air. The results ranged from a high of 32% to a low of 4% of the TLV. Area samples collected at various locations within the unit were also below the recommended exposure limit. Exposure monitoring performed on the lab technician responsible for analyzing HEX process samples was determined to be 5% of the TLV. OSHA or recommended NIOSH occupational exposure limits have not been established for HEX.

Direct reading detector tube samples collected at several locations in the HEX unit for chlorine and hydrochloric acid were below current ACGIH and OSHA exposure limits of 5 ppm HCl and 1 ppm chlorine. A potential chlorine overexposure of the lab technician does exist, however, during process vapors sampling due to the release of a quantity of chlorine into the production area. A recommendation regarding control of this potential exposure has been made.

Although employee 8 hour HEX exposures were below the assigned TLV, some additional changes have been recommended to further reduce employee exposures.

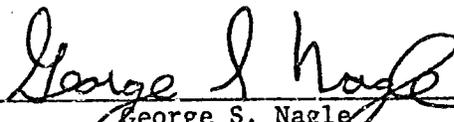
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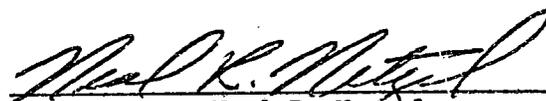
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RECOMMENDATIONS

Based on the results of this survey, it is recommended that:

1. A new sampling system be installed which would minimize laboratory technician exposure to chlorine and/or hydrochloric acid vapors during the collection of process samples. An enclosed, circulating system which could be purged prior to removal of the gas sampling device should be considered. An example of such a system is attached.
2. The bench used for specific gravity testing of process samples located along the West wall of the supervisor's office and adjacent to the PCL coolers be moved to an area less likely to be influenced by potential process vapor emission sources. Ideally, a local exhaust ventilation hood should be utilized.
3. Buckets or containers used to collect process sample drippings be emptied or covered after use and be labeled to identify their contents.

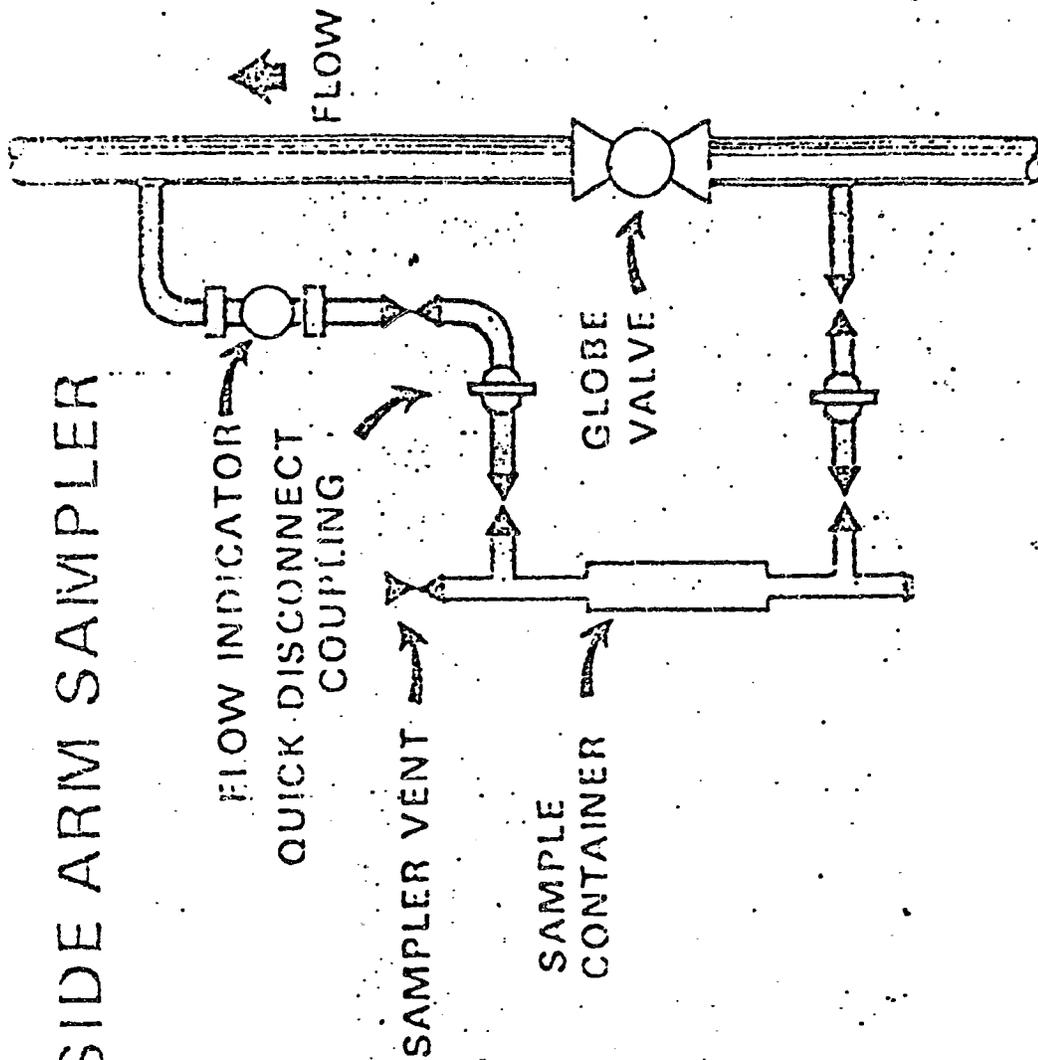
  
George S. Nagle  
Manager of Industrial Hygiene

  
Neal R. Netzel  
Industrial Hygienist

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# SIDE ARM SAMPLER



PROCESS LINE  
TO BE SAMPLED

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## DISCUSSION

### HEX:

Overexposure to HEX can cause pulmonary irritation and is extremely irritating to the eyes. Acute animal toxicity testing of HEX indicates that it is considered;

- a) extremely irritating and a corrosive substance when applied to the eyes of rabbits.
- b) highly toxic and produces marked dermal irritation when applied to the skin of rabbits.
- c) highly toxic via the inhalation route of exposure in studies performed on rats.

The highly irritating nature of HEX makes prolonged exposures intolerable. The recommended ACGIH threshold limit value for HEX was established on the premise that the  $0.11 \text{ mg/M}^3$  level should be sufficiently low to avoid all customary irritation. Additional subacute toxicology studies are being initiated and plant personnel will be advised on any additional information generated.

A total of fifteen operator exposure samples and four general area samples were collected during the survey. Each classification of chemical operator in the unit was monitored for a minimum of one complete shift. The highest exposure observed was  $0.0357 \text{ mg/M}^3$  and was to the process operator. All the general area samples were below this level. Sampling performed on a second day again showed the highest exposure to be to the process operator although the concentration was approximately one-half that of the previous day. The exposures of the No. 1 operator and the chlorine recovery operators were consistently below  $0.01 \text{ mg/M}^3$  HEX. Monitoring of the cyclo operator and the waste operator yielded results ranging from  $0.0068$  to  $0.0221 \text{ mg/M}^3$ .

Results of sampling performed in May, 1977, suggested that certain areas of the unit had HEX concentrations above the ACGIH TLV, in particular samples collected downwind of open sumps. Since those original tests, a new hot well has been installed which should have a positive effect on reducing possible employee exposure to HEX. The 3 stage jet stream which had previously gone to an open sump is now directed to the new, enclosed hot well. Entrained organics are drummed off from the bottom of the well and chlorine/HCl gases are vented to a caustic scrubber. Excess water is removed and filtered through carbon beds.

Chlorine/HCl:

There have been numerous reports in the literature of severe overexposures to chlorine gas, many of these resulting in death. Overexposure to chlorine may cause severe eye, nose, throat and lung irritation. Other symptoms which may be manifested include headache, coughing, shortness of breath, vomiting and a sensation of tightness in the chest. Overexposure to hydrochloric acid mists can cause eye, throat and lung irritation and may result in perforation of nasal tissues. Dermal burns can result from skin contact with the liquid. Exposures above 100 ppm are intolerable in man and prolonged exposure to 5-10 ppm can cause respiratory irritation.

Both the OSHA permissible exposure limit and the ACGIH threshold limit value for chlorine are set at 1 ppm. The current OSHA and ACGIH limits for hydrochloric acid are 5 ppm.

The type of chlorine exposures most likely to occur in the HEX unit would be acute rather than chronic or continuous exposures. These exposures might occur during the drawing of process samples or from equipment failure and not, as the direct-reading measurements indicated, from a continuous source of emission.

Based on observations during this survey, a potential for overexposure exists during the lab technicians process stream sampling for chlorine content. Under current practice, the technicians actual exposure is affected by his ability to sense wind direction and thereby remain upwind of the escaping chlorine gas.

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SAMPLING METHOD

The sampling train used for HEX vapor collection consisted of a portable air pump connected to a charcoal tube and a silica gel tube. Air was first drawn through a silica gel tube and then through a charcoal tube, which were joined with a short section of tubing. A diagram of the sampling system is presented in figure 1. All pumps were calibrated before and after use in the field.

Area samples were obtained using the MSA Model S portable pumps. Personal samples were collected by an SKC Model 222-0351 pump and the sampling device was attached to the workers lapel to obtain a sample representative of the employees breathing zone.

A set of blank tubes, broken, sealed and transported with the samples was supplied to the lab for each day of field sampling.

ANALYTICAL METHOD

The analytical techniques used in the analysis of these samples was developed by the Environmental Sciences Laboratory in conjunction with project no. 482420. It has been documented as Velsicol Analytical Method AM-0650.

Adsorption efficiencies of the charcoal and silica gel tubes were determined by radioassay of spiked  $^{14}\text{C}$  samples. The desorption of  $^{14}\text{C}$  samples was also determined using different solvents either singly or in combination.

The extracted samples were assayed by electron capture gas chromatography to determine HEX levels.

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HEXACHLOROCYCLOPENTADIENE

Air Sampling Results

<u>Sample No.</u>	<u>Date</u>	<u>Sample Description</u>	<u>Duration (minutes)</u>	<u>Hex Concentrations (mg/m<sup>3</sup>)</u>
MSA-1	8/9/77	W. Bennett Process Oper.	240	.0092
MSA-2	8/9/77	Cooper/Van Hoosier No. 1 Oper.	437	.0043
MSB-1	8/9/77	C. Ivie Chlorine Rec. Oper.	235	.0067
MSB-2	8/9/77	L. Howell No. 2 Chlorine Rec.	432	.0061
MSC-2	8/9/77	D. Howard Waste Oper.	426	.0102
MSD-1	8/9/77	J. Vawter Cyclo Oper.	230	.0221
MSD-2	8/9/77	J. Nicholson Process Oper.	425	.0357
MSE-1	8/9/77	L. Stone Waste Oper.	183	.0154
MSE-2	8/9/77	D. Blocker Cyclo Oper.	423	.0102
MA-1	8/9/77	Area Sample N. W. Section of unit	271	.0332
MD-1	8/9/77	Area Sample W. of Control room	198	.0117
ME-1	8/9/77	Area Sample W. of PCI bottoms tank	352	.0051
MSA-3	8/10/77	J. Cooper No. 1 Oper.	449	.0067

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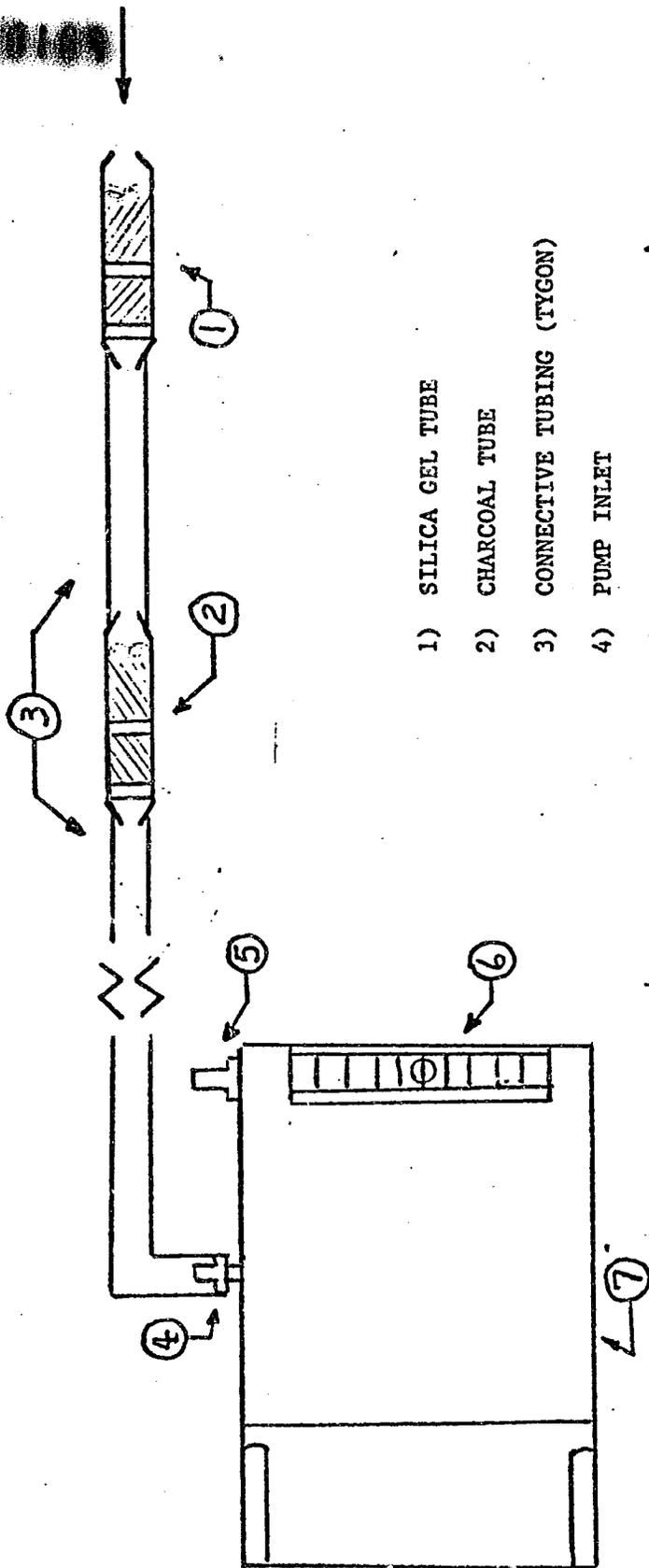
HEXACHLOROCYCLOPENTADIENE  
(cont'd)

<u>Sample No.</u>	<u>Date</u>	<u>Sample Description</u>	<u>Duration (minutes)</u>	<u>Hex Concentrations (mg/M<sup>3</sup>)</u>
MSB-3	8/10/77	W. Bennett Process Oper.	453	.0167
MSD-3	8/10/77	L. Stone Waste Oper.	447	.0068
MSE-3	8/10/77	C. Ivie Chlorine Rec. Oper.	445	.0076
MSF-3	8/10/77	J. Hall Lab Tech.	452	.0059
ME-2	8/10/77	Area Sample N. Wall, 2nd level	442	.0068
MSA-4	8/11/77	J. Vawter Cyclo Oper.	418	.0075

DETECTOR TUBE SAMPLE RESULTS

<u>LOCATION</u>	<u>DATE, TIME</u>	<u>HCl Vapor/Cl<sub>2</sub></u>
West of PLC Bottoms Tank	8/10/77 1:55 p.m.	< 1ppm HCl < 0.2ppm Cl <sub>2</sub>
West of Unit Super- visors Office	8/10/77 2:00 p.m.	< 1ppm HCl < 0.2ppm Cl <sub>2</sub>
Second Level, West of Control Room	8/10/77 2:05 p.m.	< 1ppm HCl < 0.2ppm Cl <sub>2</sub>
Third Level, between Cigars	8/10/77 3:10 p.m.	< 1ppm HCl < 0.2ppm Cl <sub>2</sub>
Lab Tech Sampling HCl, Cl <sub>2</sub> Streams	8/10/77 1:15 p.m.	< 1ppm HCl < 0.2ppm Cl <sub>2</sub>

FIGURE 1  
AIR SAMPLING SYSTEM



- 1) SILICA GEL TUBE
- 2) CHARCOAL TUBE
- 3) CONNECTIVE TUBING (TYGON)
- 4) PUMP INLET
- 5) ROTOMETER CONTROL VALVE
- 6) ROTOMETER
- 7) MSA MODEL S PORTABLE PUMP OR SKC MODEL 22-3SI PUMP

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

April 19, 1978

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OFFICE OF TOXIC SUBSTANCES

Mr. Thomas R. Loy, Manager  
Regulatory Activities  
Velsicol Chemical Corporation  
341 East Ohio Street  
Chicago, Illinois 60611

Dear Mr. Loy:

This will acknowledge receipt of your letters of various dates, transmitting data to EPA under Section 8(e) of the Toxic Substances Control Act. For your information, they have been assigned the following document control numbers: (see attached sheet). Any future correspondence regarding these notices should reference the pertinent document control number and be directed to the OTS Document Control Officer, Chemical Information Division, Office of Toxic Substances (TS-793), Environmental Protection Agency, Washington, D.C. 20460.

Sincerely,

*Joan Urquhart*

Joan Urquhart  
OTS Document Control Officer

Enclosure

<u>Date</u>	<u>Submission</u>	<u>Document Control No.</u>
1) 3/27/78	letter with an enclosure (Hexachlorocyclopentadiene, chlorine & hydrochloric acid)	8E-0378-0109 ✓
2) 3/27/78	letter with an enclosure (hexachlorocyclopentadiene & carbon tetrachloride)	8E-0378-0110 ✓
3) 3/27/78	letter with an enclosure (Benzene)	8E-0378-0112 ✓
4) 3/27/78	letter with an enclosure (Dibromochloropropane & carbon tetrachloride)	8E-0378-0113 ✓
5) 3/31/78	letter with an enclosure (FM-680)	8E-0478-0115 ✓
6) 3/31/78	letter with an enclosure (Firemaster BP4A)	8E-0478-0116 ✓
7) 3/31/78	letter with 5 memos (Polynuclear Aromatic Hydrocarbons)	8E-0478-0117 ✓
8) 3/31/78	letter with an enclosure (Unknown Chemicals)	8E-0478-0118 ✓

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

JAN 11 1979

REGULATORY DIVISION OFFICE OF TOXIC SUBSTANCES

JAN 19 1979

Mr. Thomas R. Loy **RECEIVED**  
Manager, Regulatory Activities  
Velsicol Chemical Corporation  
341 East Ohio Street  
Chicago, Illinois 60611

Dear Mr. Loy:

With regard to:

TSCA Section 8(e) submission(s) on:

hexachlorocyclopentadiene (HCCPD)

Received from:

Velsicol Chemical Corporation

Date(s) submitted:

10/28/77, 7/21/77, 4/28/77,  
11/10/77, 11/7/77, 12/19/77,  
3/16/78, 3/27/78, 3/27/78, 6/20/78

EPA Document Control No(s):

8EHQ-1177-0013, 8EHQ-0178-0037  
8EHQ-0178-0038, 8EHQ-0278-0054  
8EHQ-0278-0061, 8EHQ-0278-0064  
8EHQ-0378-0102, 8EHQ-0378-0109  
8EHQ-0378-0110, 8EHQ-0678-0209

The Office of Toxic Substances has made a preliminary evaluation of the above referenced submission(s) under Section 8(e) of the Toxic Substances Control Act (PL 94-469). The enclosed status reports are the result of that evaluation. They do not, however, necessarily represent EPA's final conclusions on these submissions.

In some cases, we have found that the information contained in the original submission is insufficient to allow a full evaluation of the seriousness of the reported risk. Regarding submissions 8EHQ-1117-0013, 8EHQ-0178-0037, 8EHQ-0178-0038, 8EHQ-0278-0054, 8EHQ-0278-0061, 8EHQ-0278-0064, 8EHQ-0378-0102, 8EHQ-0378-0109, 8EHQ-0378-0110, 8EHQ-0678-0208:

1. Please identify the tissues which were analyzed in the fish residue measurements. If more than one type of tissue was analyzed, please report the results for each (re: submissions -0013, -0054).

2. Please report any investigations of which you are aware concerning the release of HCCPD into the workplace or the ambient environment. Please discuss any quality control techniques which have been instituted to minimize HCCPD emissions (re: submissions -0013, -0037, -0109, -0110).

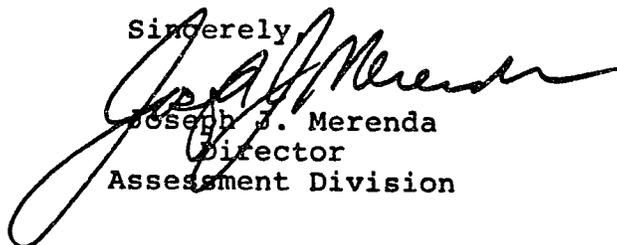
3. Please report any other instances of health problems associated with exposure to HCCPD, such as occurred in Louisville, KY (re: submission -0038).

4. Please submit any other substantial risk information in your possession on HCCPD, including any information in your files predating January 1, 1977.

Submissions should be in the form of a report. In many cases, it may be desirable to submit raw data along with the report. However, raw data should not be submitted without a thorough description of the procedures, results, and conclusions of the study.

In responding to a request for further information, or in otherwise communicating with EPA regarding a previous submission under Section 8(e), please refer to the EPA Document Control Number assigned to that submission. If further information is to be provided on more than one 8(e) submission, please use separate sheets for each. As in the case of initial 8(e) submissions, all responses will be placed in the public file unless confidentiality is claimed according to the procedures outlined in Section X of the March 16, 1978 policy statement (43 FR 11110). Any confidentiality claims should be supported by submission of information as described in the enclosed item titled "Support Information for Confidentiality Claims." Any further information requested by this letter should be received by the EPA Document Control Officer within 45 working days of the date of this letter.

Sincerely,



Joseph J. Merenda  
Director  
Assessment Division

Enclosures

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: May 8, 1978

SUBJECT: Status Report 8EHQ-0378-0109

Approved \_\_\_\_\_

FROM: Frank D. Kover, Acting Director  
Assessment Division, OTS (TS-792)

Revision  
Needed \_\_\_\_\_

TO: Warren R. Muir, Deputy Assistant Administrator  
for Testing and Evaluation, OTS (TS-792)

Submission Description

Results of an industrial hygiene survey conducted at one of the submitter's plants. The surveyed area included the hexachlorocyclopentadiene production unit and the quality control laboratory.

Submission Evaluation

Because of the nature of this submission, no evaluation was undertaken; refer to recommendations below for suggested disposition.

Recommendations/Comments

This notice should be referred to OSHA and NIOSH for evaluation in light of the pertinence of this information to areas of NIOSH/OSHA expertise. The submitter should be asked to support his contention that the information presented in this submission reasonably supports a conclusion of substantial risk.

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\*NOTE: This status report is the result of a preliminary staff evaluation of information submitted to EPA. Statements made herein are not to be regarded as expressing final Agency policy or intent with respect to this particular chemical. Any review of the status report should take into consideration the fact that it may be based on incomplete information.

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8EHQ-0579-0109 FOLLOW UP RESPONSE

**VELSICOL CHEMICAL CORPORATION**

341 EAST OHIO STREET · CHICAGO, ILLINOIS 60611 · 312-670-4500

April 30, 1979

TS 788

Mr. Joseph Merenda  
Assessment Division  
Office of Toxic Substances (WH-567)  
Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460

Subject: Notifications of Substantial Risk  
EPA Letter Dated January 11, 1979

Dear Mr. Merenda:

EPA's subject letter discussed Velsicol's section 8(e) submissions on hexachlorocyclopentadiene (hex). The EPA Document Control Numbers are:

8EHQ - 1177 - 0013,	8EHQ - 0178 - 0037
8EHQ - 0178 - 0038,	8EHQ - 0278 - 0054
8EHQ - 0278 - 0061,	8EHQ - 0278 - 0064
8EHQ - 0378 - 0102,	8EHQ - 0378 - 0109
8EHQ - 0378 - 0110,	8EHQ - 0678 - 0208

Velsicol's Chemical Risk Assessment Committee (CRAC) has reviewed the above submissions and determined that these are not appropriate section 8(e) submissions based on EPA's interpretation of substantial risk published in the March 16, 1979 Federal Register. Because CRAC has decided that these submissions do not contain substantial risk information, with this letter Velsicol wishes to formally withdraw the above listed submissions.

For your information and your files, the following correspond to the questions you raised in your letter.

1. Submissions - 0013: Velsicol internal memo dated 9-20-77 from H. K. Suzuki to D. M. Whitacre enclosed in submission -0013 states that a composite of skinned fillets from six catfish taken from the Mississippi River in the vicinity of the Wolf Creek outfall in late May, 1977, was analyzed in the fish residue measurements.

Submission - 0054: The residue samples log sheet submitted in this submission reported analyses conducted on catfish and carp. Samples 772-03062, -03063, -03064 and -03065 were each chopped composites of 5 or 6 skinned catfish fillets (1 fillet for each fish), while 772-03142, -03143, -03144 and -03145 were chopped composites of 5 or 6 skinned fillets of carp (1 fillet from each fish).

EPA  
ors

5-9-79

VELSICOL CHEMICAL CORPORATION

2. As requested enclosed are four reports on air monitoring studies on the release of Hex into the workplace or ambient environment. Results from these surveys indicate that hex air concentrations, when detected, were well below the recommended American Conference of Governmental Hygienist's (ACGIH) threshold limit value (TLV). The enclosed reports are:
  - a. Nagle, S. and H. V. Davis. "Preliminary Industrial Hygiene Survey Report - North Memphis Treatment Plant." Conducted by Velsicol.
  - b. Additional industrial hygiene sampling results from North Memphis Treatment Plant. August 26, 1977. Raw data only. This is a follow-up study of the above Nagle and Davis report.
  - c. Hodson, F. W. April 16-19, 1973. "Chemical-Industrial Hygiene Survey." Prepared by the Travelers Insurance Companies for Velsicol.
  - d. Phillips, J. L. August-September, 1977. "Influent Hazard Analysis - Memphis North Sewage Treatment Plant." Prepared by Environmental Management Planning & Engineering, Inc.

For your information, Messrs. E. W. Loy and K. K. Littell of EPA's Air Surveillance Branch, Surveillance and Analysis Division, EPA Region IV, conducted air monitoring studies at the North Memphis sewage treatment plant on June 25-27, 1978. Velsicol air monitoring studies conducted at Velsicol's Memphis, Tennessee plant were submitted to the Agency on March 27, 1978. These studies have been assigned EPA Document Control Nos. 8EHQ - 0378 - 0109 and 8EHQ - 0378 - 0110.

3. Dr. H. V. Davis, Velsicol's Director of Environmental Health and Hygiene, and Mr. A. A. Levin, Secretary of Velsicol's CRAC, are not aware of any other instances of health problems associated with exposure to hexachlorocyclopentadiene.
4. To our knowledge Velsicol has already submitted all substantial risk information on the subject product.

VELSICOL CHEMICAL CORPORATION

We trust that the above clarifies the questions you raised in your January 11, 1979 letter. If you have any additional questions, please do not hesitate to contact us.

Sincerely,

VELSICOL CHEMICAL CORPORATION

*M. Olav Messerschmidt*

M. Olav Messerschmidt  
Manager, Product Registrations

MOM/ger