

CONOCO

Lake Charles VCM Plant

Conoco Chemicals Company
A Division of Conoco Inc.
P.O. Box 605
Westlake, Louisiana 70669
(318) 491-5211

RECEIVED

SEP 26 1980

September 22, 1980

Mr. S. L. Bergh, Chemical Engineer
Enviro Control, Inc.
One Central Plaza
11300 Rockville Pike
Rockville, MD 20852

RECEIVED
SEP 25 1980
CONOCO CHEMICALS

Dear Mr. Bergh:

The following is in response to your letter of September 8, 1980 related to information on 1,1-Dichloroethane for the Interagency Testing Committee.

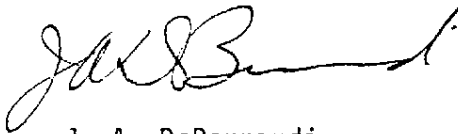
1. I am unable to supply you with information related to total U. S. production of 1,1 DCE. The material is produced as a by-product in our process for the production of 1,2 DCE (Ethylene Dichloride).
2. I am unable to forecast production trends of 1,1 DCE. For those industries producing it as a by-product, the normal trend is to reduce by-product production by process revisions.
3. 1,2 DCE (Ethylene Dichloride) is used in our process to produce Vinyl Chloride Monomer.
4. Our process is a continuous type with all vents controlled to meet existing EPA, State, and local air and water pollution standards. Control methods include thermal incineration and catalytic reaction. The by-product, 1,1 DCE leaves our plant contained in a light-ends stream which is sold to a Carbon-Tetrachloride processing plant for use as a raw material in that process. I do not have knowledge as to what wastes are produced or handling methods used in the Carbon-Tetrachloride processing facility.
5. I am unable to supply factual information related to environmental affects, biodegradability, or chemical reactions expected if 1,1 DCE is released to the environment.
6. In our process the by-product stream containing 1,1 DCE also contains Ethylene Dichloride, Ethyl Chloride, and Carbon Tetrachloride.
7. No health affect studies related to 1,1 DCE have been conducted by Conoco Chemicals Company.

VVC 000012886

Mr. S. L. Bergh
Page 2
September 22, 1980

We do not have technical bulletins or safety data sheets for 1,1 DCE. However, information on this material can be found in Industrial Hygiene and Toxicology, Volume II, Frank A. Patty, Editor, Page 1279-1280. Additional information is also available in Dangerous Properties of Industrial Materials, Fifth Edition, N. Irving Sax, Page 666-667.

Sincerely,



J. A. DeBernardi

is
CC:
RDG-JJH

VVC 000012887

Jim DeBernardi

File:
LCVCM.



To J.C. Ledvina Date 9/17/80

This seems a strange thing.
We are under the impression
that this law went into effect
on Dec. 8, 1979. Attached is the
submittal made to cover it, as
well as the page from the Disaster
Control Manual revised April, 1980.

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SEP 20 1980

VVC 000012888

CERTIFIED MAIL #
RETURN RECEIPT REQUESTED

LOUISIANA DEPARTMENT OF PUBLIC SAFETY
OFFICE OF STATE POLICE
HAZARDOUS MATERIALS UNIT - BOX 21
P.O. BOX 66314
BATON ROUGE, LOUISIANA 70896

TOXIC SUBSTANCES EMERGENCY PLAN

This form is pursuant to Act 842 of the 1979 regular session of the Louisiana Legislature. This form shall be filed with the Secretary of Public Safety no later than December 8, 1979. A copy of this form shall be submitted to local municipal authorities and local sheriff by the same date.

1. Facility Name, Location, and Mailing Address: Conoco Chemicals, VCM Plant
VCM Plant Road, P. O. Box 605, Westlake, LA 70669

2. Position or name of person who will notify authorities: Guard on duty (guard will relay information as
given by the VCM Plant Shift Supervisor).

3. Telephone Number where authorities can make contact: (318) 491-5450 in case other than an emergency
contact Safety Director (318) 491-5039

4. List organizations and authorities who will be notified in the event of a toxic release:

a. ☒ State Police b. ☒ Sheriff's Office c. ☐ Mutual Aid

d. ☐ Fire Department e. ☐ Municipal Police f. ☐ Civil Emergency Office

g. ☒ Other Town of Westlake, City of Sulphur, Neighboring Industry

5. The notification to the proper public safety authorities will include the type of gas or mixed gases, direction of travel of gas, and severity and expected duration of gas emission to the atmosphere, and suggested actions.

6. Releases that will produce death or serious bodily harm beyond the plant perimeter shall be reported.

7. Notification will be made by telephone _____, radio _____, or other Special emergency
telephone hotline network to above interests simultaneously.

8. The Louisiana State Police has established a 24-hour emergency telephone number for possible use in emergency. This number is 625-0335.

REMARKS:

The above plan will go into effect December 8, 1979.

When this form has been completed, in its entirety, please mail to the address listed at the top of the page.

Copies sent to: 1) Louisiana Dept. of Public Safety - Office of State Police, Baton Rouge, LA
2) Calcasieu Parish Sheriff's Office, Lake Charles, LA.
3) Louisiana State Police, Troop D, Lake Charles, LA.
4) Town of Westlake, Office of the Mayor, Westlake, LA.
5) City of Sulphur, Office of the Mayor, Sulphur, LA.

BCC: RDG-SFP-JAD-FILE

VVC 000012889

K. EMERGENCY NOTIFICATION - VCM PLANT - TOXIC GAS RELEASES

In 1979, the Louisiana Legislature enacted a law that affects plants and industrial facilities engaged in the manufacture, storage or use of toxic gases. The law requires that each facility must formalize a plan for reporting the release of any toxic gas inside their plant which may affect the general public. The law further requires that the plan is to be put into effect should such a release occur.

The law becomes effective on December 8, 1979 and a formal plan must be submitted to both local and state officials by that date. Violation of the provision of this act can carry a fine of up to \$25,000.00.

What is to be Reported

The law simply states that notification to "proper public safety authorities" must be made when a toxic substance is released "in sufficient concentrations to cause death or serious bodily harm to persons outside the facility." In addition, the act defines toxic substance as "those substances which are gases under ambient temperature and atmospheric pressure and are enumerated in code of Federal Regulations, Title 40."

As it applies to the VCM Plant, the following materials are subject to the notification requirements of this law.

- 1) Hydrogen Chloride or HCl (also includes decomposition products burning Vinyl Chloride or Ethylene Dichloride)
- 2) Vinyl Chloride (VCM)
- 3) Chlorine
- 4) Flammable Gas - ethylene, ethane, propylene or others in large quantities. Although not necessarily considered toxic, sizable vapor clouds of these gases could be considered a threat to the general public.
- 5) Sulphur Dioxide
- 6) Ammonia

VVC 000012890

Joseph C. Ledvina

(CONOCO)

To

Date

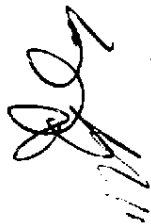
2/15/80

Dads Gumbria
LCCP

Are you aware of this?

Signals like chlorine
will be covered.

Joe.



Ply copy

SFP
JAD

VVC 000012891



455
Louisiana
Regular Session
1980 New Laws Page 461

LOUISIANA
Regular Session

Act 364, Laws 1980

Senate Bill No. 526

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AN ACT

To amend and reenact Subsection A of Section 1299.100 of Title 40 of the Louisiana Revised Statutes of 1950 relative to the storage and maintenance of toxic gases; to provide for the powers of the secretary of the Department of Public Safety with respect to the preparation of emergency plans; and otherwise provide with respect thereto.

Be it enacted by the Legislature of Louisiana:

Section 1. Subsection A of Section 1299.100 of Title 40 of the Louisiana Revised Statutes of 1950 is hereby amended and reenacted to read as follows:

1299.100. Submission of emergency plan; penalties

A. Each plant or industrial facility located within the state of Louisiana wherein any toxic substance is regularly manufactured, stored, or maintained in quantities capable of escaping the boundaries or perimeters of such plant or industrial facility in sufficient concentrations to cause death or serious bodily harm to persons outside said boundaries or perimeters shall prepare and submit an emergency plan for immediate notification of the proper public safety authority. The emergency plan shall be put into effect whenever toxic substances escape beyond the boundaries or perimeters of each plant or industrial facility. The plan shall be submitted to the secretary of the Department of Public Safety with copies furnished to the local sheriffs and municipal authorities concerned.

The plan shall be submitted on a form prescribed by the secretary

VVC 000012892

of the Department of Public Safety in accordance with the Administrative Procedures Act. The term "toxic substance" is hereby defined to include those substances which are gases, other than natural gas, under ambient temperature and atmospheric pressure and which are designated in rules and regulations adopted hereunder. The plan or revisions thereto shall be submitted no later than January 31 of each calendar year.

* * *

Section 2. If any provision or item of this Act or the application thereof is held invalid, such invalidity shall not affect other provisions, items, or applications of this Act which can be given effect without the invalid provisions, items, or applications, and to this end the provisions of this Act are hereby declared severable.

Section 3. All laws or parts of laws in conflict herewith are hereby repealed.

Approved, July 18, 1980

VVC 000012893

*File
Lcveu*



Lake Charles VCM Plant

CERTIFIED MAIL #316137
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SEP 11 1980

Conoco Chemicals Company
A Division of Conoco Inc.
P.O. Box 605
Westlake, Louisiana 70669
(318) 491-5211

September 9, 1980

Barbara Brand
TRW Environmental Engineering Division
1509 Main Street
Suite 720
Dallas, TX 75201

Dear Ms. Brand:

The following is provided in response to your request for more information regarding Conoco Chemicals Company's permit application for construction of modifications to the Conoco VCM Plant in Westlake, Louisiana. Specifically, we wish to clarify the point of emissions potential in the VCM Plant's Vent Gas Incineration Unit (Point Source I.D. No. V-A). The Plant has identified this point as the flue gas vent stack downstream of the Incineration Unit. The Incinerator is not listed as a control device for hydrocarbon reduction since National Emission Standard for Hazardous Air Pollutants (NESHAP) regulations require reduction of vinyl chloride emissions from the vents from the Plant process. Therefore, the Incinerator is required for compliance with NESHAP regulations and is considered an integral part of the process. The Incineration Unit is also defined as a production unit since muriatic (hydrochloric) acid is produced in its operation.

The flue gas immediately exiting the incinerator cannot be considered a source of emission potential either, even though the flue gas enters scrubbing towers (HCl Absorber and Caustic Scrubber) immediately downstream of the Incinerator. The HCl Absorber and the Caustic Scrubber form an integral unit with the Incinerator. The Incinerator cannot be operated without the HCl Absorber and the Caustic Scrubber. Also, the HCl Absorber is the equipment in which the product muriatic acid is recovered and thus it also constitutes a production unit. Therefore, the vent stack downstream of the Caustic Scrubber is the only source of emission potential in the Incinerator Unit.

Also enclosed is a copy of a letter sent to Randall Brown of the EPA confirming the approval of our State Construction Permit by the Louisiana Department of Natural Resources. Revisions to the permitted emissions are included, and these revised emissions should be used in PSD determinations.

If you have any questions or require further information concerning this letter, please contact G. L. Foshee, Chief Process Engineer, at (318) 491-5062.

Sincerely,

J. A. DeBernardi

15
BCC: REL-CRH-HJN-VAM-GLF-PLF-DLD-JWW-JCL-DLD

VVC 000012894

File: LCVCW



Lake Charles VCM Plant

CERTIFIED MAIL #315690
RETURN RECEIPT REQUESTED

Conoco Chemicals Company
A Division of Conoco Inc.
P.O. Box 605
Westlake, Louisiana 70669
(318) 491-5211

RECEIVED
SEP 11 1980

September 8, 1980

Mr. Randall E. Brown
Environmental Protection Agency
6AAHAT Technical Support Section
First International Building
1201 Elm Street
Dallas, TX 75270

Dear Mr. Brown:

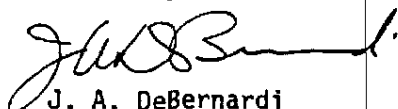
Attached is the revised Section IV of the Appendix of the Prevention of Significant Air Quality Deterioration (PSD) permit application which was submitted to your office on February 14, 1980 by the Conoco VCM Plant. These revisions reflect an updating of information as the engineering on the plant expansion continues. These revisions constitute a decrease in permitted emissions.

A copy of the revised Emissions Inventory Questionnaire (EIQ) which was sent to the State of Louisiana is also included. This EIQ is considered by the State to be the permit. Since the revisions reflect an emissions decrease, the State does not require that the revisions be placed before the commission. However, by submission of the revised EIQ to the Technical Secretary, the new EIQ becomes the enforceable permit.

A copy of the letter confirming the approval of the original State Construction and Operating Permit by the Louisiana Environmental Control Commission on March 25, 1980 is attached. The revised EIQ that was submitted to the State now supersedes the EIQ in the original permit and is considered the enforceable permit.

If there are any questions, please contact Gary Foshee at (318) 491-5062.

Sincerely,


J. A. DeBernardi
Plant Manager

is

Enc

CC: Kathy Bell
Barbara Brand

BCC:

REL-CRH-HJN-VAM-GLF-PLF-DLD-JWW-JCL-JGC

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APPENDIX
SECTION IV

EMISSION CALCULATIONS

VVC 000012896

TABLE I
SUMMARY OF EMISSIONS
TONS/YR.

	(1) Incremental <u>Potential to Emit</u>	Expanded • Plant Total <u>Allowable</u>	Existing Plant Total <u>Allowable</u>	Total <u>Net Change</u>
<u>Hydrocarbons</u>				
Total Point Source-	5.59	23.39	4636.0	-4612.61
VCM Point Source	6.78	11.18	60.1	- 48.92
Other Hydrocarbon Point Source	1.62	12.21	4575.9	-4563.69
<u>Particulates</u>	19.21	86.83	67.62	+ 19.21
<u>Carbon Monoxide</u>	9.57	17.73	1784.16	-1766.43
<u>Nitrogen Oxide</u>	22.17	244.97	223.9	+ 21.07
<u>Sulfur Dioxide</u>	59.32	68.45	9.13	+ 59.32

(1) -The "Potential to Emit" was calculated from a base of existing allowable emissions and, therefore, only represents the potential to emit above the present permit conditions.

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TABLE II

POINT SOURCE EMISSIONS - EXISTING AND EXPANDED CASE

Source	Pollutant	Existing Permit Tons/Yr.	Expanded Potential to Emit ² Tons/Yr.	Expanded Actual Tons/Yr.	Expanded ¹ Allowable Tons/Yr.	Net Change - Existing to Expanded Allowable Tons/Yr.
Oxychlorination Vent Stack I.D. No. IV-4	Particulates ¹	0	0	0	0	0
	Hydrocarbons - Total	4610.0	0	0	0	-4610.0
	Carbon Monoxide	1776.0	0	0	0	-1776.0
	Nitrogen Oxides	0	0	0	0	0
	Sulfur Dioxide	0	0	0	0	0
	VCM	55.8	0	0	0	- 55.8
No. 1 Cracking Furnace I.D. No. II-A	Particulates	3.81	0	3.81	3.81	0
	Hydrocarbons - Total	0.634	0	0.634	0.634	0
	Carbon Monoxide	3.6	0	3.6	3.6	0
	Nitrogen Oxides	48.7	0	48.7	48.7	0
	Sulfur Dioxide	4.48	0	4.48	4.48	0
No. 2 Cracking Furnace I.D. No. II-B	Particulates	3.81	0	3.81	3.81	0
	Hydrocarbons - Total	0.634	0	0.634	0.634	0
	Carbon Monoxide	3.6	0	3.6	3.6	0
	Nitrogen Oxides	48.7	0	48.7	48.7	0
	Sulfur Dioxide	4.48	0	4.48	4.48	0

1) Expanded allowable represents the emission values based upon the emission permit application submitted to the State of Louisiana.

2) Potential to Emit addresses only the emissions which are over the existing permits.

TABLE II (Cont'd.)

POINT SOURCE EMISSIONS - EXISTING AND EXPANDED CASE

Source	Pollutant	Existing Permit Tons/Yr.	Expanded Potential to Emit ² Tons/Yr.	Expanded Actual Tons/Yr.	Expanded ¹ Allowable Tons/Yr.	Net Change - Existing to Expanded Allowable Tons/Yr.
Propylene Vent Stack I.D. No. IV-C	Particulates	0	0	0	0	0
	Hydrocarbons - Total	8.2	0	0	0	-8.2
	Carbon Monoxide	0	0	0	0	0
	Nitrogen Oxides	0	0	0	0	0
	Sulfur Dioxide	0	0	0	0	0
No. 3 Cracking Furnace I.D. No. II-C	Particulates	0	3.24	3.24	3.24	+ 3.24
	Hydrocarbons - Total	0	1.62	1.62	1.62	+ 1.62
	Carbon Monoxide	0	8.10	8.10	8.10	+ 8.10
	Nitrogen Oxides	0	22.17	22.17	22.17	+22.17
	Sulfur Dioxide	0	57.47	57.47	57.47	+57.47
Dock EDC Tank I.D. No. IV-J	Particulates	0	0	0	0	0
	Hydrocarbons - Total	7.33	0	7.33	7.33	0
	Carbon Monoxide	0	0	0	0	0
	Nitrogen Oxides	0	0	0	0	0
	Sulfur Dioxide	0	0	0	0	0

1) Expanded allowable represents the emission values based upon the emission permit application submitted to the State of Louisiana.

2) Potential to Emit addresses only the emissions which are over the existing permits.

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VVC 000012900

TABLE II (Cont'd.)

POINT SOURCE EMISSIONS - EXISTING AND EXPANDED CASE

Source	Pollutant	Existing Permit Tons/Yr.	Expanded Potential to Emit ² Tons/Yr.	Expanded Actual Tons/Yr.	Expanded ¹ Allowable Tons/Yr.	Net Change - Existing to Expanded Allowable Tons/Yr.
Dock VCM Vent Recovery I.D. No. IV-K	Particulates	0	0	0	0	0
	Hydrocarbons - Total	0.1	0	0.1	0.1	0
	Carbon Monoxide	0	0	0	0	0
	Nitrogen Oxides	0	0	0	0	0
	Sulfur Dioxide	0	0	0	0	0
Vent Incinerator I.D. No. V-A	Particulates	60.0	15.97	75.97	75.97	+15.97
	Hydrocarbons - Total	9.1	3.97	13.07	13.07	+ 3.97
	Carbon Monoxide	0.96	1.47	2.43	2.43	+ 1.47
	Nitrogen Oxides	126.5	0	125.40	125.40	- 1.1
	Sulfur Dioxide	0.166	1.85	2.02	2.02	+ 1.85
	VCM	4.3	6.78	11.08	11.08	+ 6.78
Total	Particulates	67.62	19.21	86.83	86.83	+ 19.21
	Hydrocarbons - Total	4636.0	5.59	23.39	23.39	-4612.61
	Carbon Monoxide	1784.16	9.57	17.73	17.73	-1766.43
	Nitrogen Oxides	223.9	22.17	244.97	244.97	+ 21.07
	Sulfur Dioxide	9.13	59.32	68.45	68.45	+ 59.32
	VCM	60.1	6.78	11.18	11.18	- 49.02

1) Expanded allowable represents the emission values based upon the emission permit application submitted to the State of Louisiana.

2) Potential to Emit addresses only the emissions which are over the existing permits.

SAMPLE EMISSION CALCULATIONS

EXPANDED VCM PLANT

New EDC Cracking Furnace

Description

The calculations for the emissions for the new cracking furnace are done as follows:

1. Determine required heat duty.
2. Select the fuel.
3. Determine the fuel firing rate based on the lower heating value (LHV).
4. For all pollutants, except NO_x , the emissions are then M gallons fuel burned times the emission factor obtained from the EPA Publication AP-42.
5. For NO_x , a stack gas calculation is made based on 15% excess air. NO_x emitted is then calculated based on information provided by John Zink Company for its Lo NO_x burner and the particular fuel type. This calculation was used for the expanded actual and expanded allowable categories of Table II. The expanded potential to emit category of NO_x on Table II was calculated by multiplying the M gallons fuel burned times the emission factor obtained from the EPA Publication AP-42.
6. Stack gas concentrations are calculated from the emissions and the stack gas flow rate.

Sample Calculations

1. Heat release required--51.314 MM BTU/Hr.
2. Use purchased No. 2 fuel oil with a LHV of 126,788.1 BTU/Gal. and a sulfur content of 0.25 wt. %.
3. Fuel firing rate--

$$\text{Firing rate} = \frac{51.314 \times 10^6 \text{ BTU/Hr.}}{126,788.1 \frac{\text{BTU}}{\text{Gal.}}} = 404.723 \frac{\text{Gal.}}{\text{Hr.}} \text{ of No. 2 Fuel Oil}$$

4. Emission Calculations (except NO_x)--

AP-42 Emission Factors

<u>Pollutant</u>	<u>Factor (Lb./M Gals.)</u>
Particulates	2
Hydrocarbons	1
Carbon Monoxide	5
Sulfur Dioxide	142 (wt. % sulfur)

Particulates

$$404.723 \frac{\text{Gals.}}{\text{Hr.}} \times \frac{2 \text{ Lb.}}{\text{M Gals.}} \times \frac{\text{M Gals.}}{1,000 \text{ Gals.}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}} \times \frac{8,000 \text{ Hr.}}{\text{Yr.}}$$

= 3.24 Tons/Yr.

Hydrocarbons

$$404.723 \frac{\text{Gals.}}{\text{Hr.}} \times \frac{1 \text{ Lb.}}{\text{M. Gals.}} \times \frac{\text{M Gals.}}{1,000 \text{ Gals.}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}} \times \frac{8,000 \text{ Hr.}}{\text{Yr.}}$$

= 1.62 Tons/Yr.

Carbon Monoxide

$$404.723 \frac{\text{Gals.}}{\text{Hr.}} \times \frac{5 \text{ Lb.}}{\text{M Gals.}} \times \frac{\text{M Gals.}}{1,000 \text{ Gals.}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}} \times \frac{8,000 \text{ Hr.}}{\text{Yr.}}$$

= 8.10 Tons/Yr.

Sulfur Dioxide

$$404.723 \frac{\text{Gals.}}{\text{Hr.}} \times \frac{142 (0.25) \text{ Lb.}}{\text{M Gals.}} \times \frac{\text{M Gals.}}{1,000 \text{ Gals.}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}} \times \frac{8,000 \text{ Hr.}}{\text{Yr.}}$$

= 57.471 Tons/Yr.

5. Emission Calculations for NO_x--

AP-42 Emission Factor

<u>Pollutant</u>	<u>Factor (Lb./M Gals.)</u>
NO _x	22

John Zink Co. Lo NO_x Burner Factor

<u>Pollutant</u>	<u>Factor (Lb./MM BTU)</u>
NO _x	0.108

Uncontrolled NO_x

$$\frac{404.723 \text{ Gals.}}{\text{Hr.}} \times \frac{22 \text{ Lb.}}{\text{M Gals.}} \times \frac{\text{M. Gals.}}{1,000 \text{ Gals.}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}} \times \frac{8,000 \text{ Hr.}}{\text{Yr.}}$$

= 35.62 Tons/Yr.

Controlled NO_x

$$\frac{51.314 \text{ MM BTU}}{\text{Hr.}} \times \frac{0.108 \text{ Lb.}}{\text{MM BTU}} \times \frac{8,000 \text{ Hr.}}{\text{Yr.}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}}$$

= 22.168 Tons/Yr.

6. Stack Gas Concentrations--based on the maximum possible flowrates.

Particulates

$$\frac{0.97 \text{ Lb. of Particulates}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{12 \text{ Lb. of Particulates}}$$
$$\times \frac{737.231 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22,375 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}}$$
$$\times \frac{1 \times 10^6}{\text{Million}} = 44.5 \text{ PPM (parts per million)}$$

Hydrocarbons

$$\frac{0.49 \text{ Lb. of Hydrocarbons}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{66 \text{ Lb. of Hydrocarbons}}$$
$$\times \frac{737.231 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22,375 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}}$$
$$\times \frac{1 \times 10^6}{\text{Million}} = 4.1 \text{ PPM}$$

Nitrogen Dioxide

$$\frac{6.65 \text{ Lb. of Nitrogen Dioxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{46 \text{ Lb. of Nitrogen Dioxide}}$$
$$\times \frac{737.231 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22,375 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}}$$
$$\times \frac{1 \times 10^6}{\text{Million}} = 79.3 \text{ PPM}$$

Sulfur Dioxide

$$\begin{aligned} & \frac{17.24 \text{ Lb. of Sulfur Dioxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{64 \text{ Lb. of Sulfur Dioxide}} \\ & \times \frac{737.231 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22,375 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}} \\ & \times \frac{1 \times 10^6}{\text{Million}} = 147.9 \text{ PPM} \end{aligned}$$

Carbon Monoxide

$$\begin{aligned} & \frac{2.43 \text{ Lb. of Carbon Monoxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{28 \text{ Lb. of Carbon Monoxide}} \\ & \times \frac{737.231 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22,375 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}} \\ & \times \frac{1 \times 10^6}{\text{Million}} = 47.7 \text{ PPM} \end{aligned}$$

Vent Incineration Unit

Description

The calculations for the emissions for the vent incineration unit are done as follows:

1. Determine the incineration unit exhaust gas rate.
2. Determine the applicable emission factors for the incineration unit.
3. For all pollutants, the emissions are then calculated by multiplying the exhaust gas flow rate times the applicable emission factor.
4. Stack gas concentrations are calculated from the emissions and the exhaust gas flow rate.

Sample Calculations

1. Exhaust gas rate--1,536,900 DSCF/Hr., based on the firing of the vents and the waste liquid streams from the expanded plant with 80% excess air.
2. The incineration unit vent stack was tested by Kemron Environmental Services during a recent test run of the incineration unit. The data calculated from this test run were used as a basis for the emission factors to be used for the expanded plant. See the attached data sheet.

At the expanded operating rate of the revised plant, the scrubbers will operate near the limit of their capacity for the efficient control of pollutants, therefore, a linear extrapolation of the test run data is not considered to be valid at the expanded operating rate of the revised plant. In our best judgement, the scrubbing efficiency will be nonlinear in this operating range and we have determined the emission factors to be as follows:

Emission Factors

<u>Pollutant</u>	<u>Factor (Lbs./DSCF)</u>
Particulates	1.1315×10^{-5}
Sulfur Dioxide	2.993×10^{-7}
Nitrogen Dioxide	1.868×10^{-5}
Hydrocarbons	2.9507×10^{-7}
Carbon Monoxide	3.6098×10^{-7}

See the Air Pollution Engineering Manual, (Second Edition), Part I, Pages 208-216 for an explanation of the effects of increased flow rates on the operation and efficiency of packed scrubbers. This manual was prepared for the EPA.

The emission factor for VCM emissions from this source was based on the allowable emission of 10 ppm VCM in the exhaust gas of the incinerator.

3. Emission Calculations--

Particulates

$$\frac{1,536,900 \text{ DSCF}}{\text{Hr.}} \times \frac{1.1315 \times 10^{-5} \text{ Lb.}}{\text{DSCF}} \times \frac{365 \text{ Days}}{\text{Yr.}} \\ \times \frac{24 \text{ Hrs.}}{\text{Day}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}} = 75.97 \text{ Tons/Yr.}$$

Sulfur Dioxide

$$\frac{1,536,900 \text{ DSCF}}{\text{Hr.}} \times \frac{2.993 \times 10^{-7} \text{ Lb.}}{\text{DSCF}} \times \frac{24 \text{ Hrs.}}{\text{Day}} \times \frac{365 \text{ Days}}{\text{Yr.}} \\ \times \frac{\text{Ton}}{2,000 \text{ Lb.}} = 2.02 \text{ Tons/Yr.}$$

Nitrogen Dioxide

$$\frac{1,536,900 \text{ DSCF}}{\text{Hr.}} \times \frac{1.868 \times 10^{-5} \text{ Lb.}}{\text{DSCF}} \times \frac{24 \text{ Hrs.}}{\text{Day}} \times \frac{365 \text{ Days}}{\text{Yr.}} \\ \times \frac{\text{Ton}}{2,000 \text{ Lb.}} = 125.40 \text{ Tons/Yr.}$$

Hydrocarbons (Excluding VCM)

$$\frac{1,536,900 \text{ DSCF}}{\text{Hr.}} \times \frac{2.9507 \times 10^{-7} \text{ Lb.}}{\text{DSCF}} \times \frac{24 \text{ Hrs.}}{\text{Day}} \times \frac{365 \text{ Days}}{\text{Yr.}} \\ \times \frac{\text{Ton}}{2,000 \text{ Lb.}} = 1.99 \text{ Tons/Yr.}$$

Carbon Monoxide

$$\frac{1,536,900 \text{ DSCF}}{\text{Hr.}} \times \frac{3.6098 \times 10^{-7} \text{ Lb.}}{\text{DSCF}} \times \frac{24 \text{ Hrs.}}{\text{Day}} \times \frac{365 \text{ Days}}{\text{Yr.}} \\ \times \frac{\text{Ton}}{2,000 \text{ Lb.}} = 2.43 \text{ Tons/Yr.}$$

VCM

$$\begin{aligned} & 1,536,900 \frac{\text{DSCF}}{\text{Hr.}} \times \frac{10 \text{ DSCF}}{1 \times 10^6 \text{ DSCF}} \times \frac{62.5 \text{ Lb. of VCM}}{\text{Lb.-Mole}} \\ & \times \frac{\text{Lb.-Mole}}{379.565 \text{ SCF}^*} \times \frac{24 \text{ Hr.}}{\text{Day}} \times \frac{365 \text{ Day}}{\text{Yr.}} \times \frac{\text{Ton}}{2,000 \text{ Lb.}} \\ & = 11.08 \text{ Tons/Yr.} \end{aligned}$$

* 379.565 SCF/Lb.-Mole at 60°F, 1 atm.

4. Stack Gas Concentrations--based on the maximum possible flowrates

Particulates

$$\begin{aligned} & \frac{21.61 \text{ Lb. of Particulates}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{12 \text{ Lb. of Particulates}} \\ & \times \frac{427.01 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{28,817 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}} \\ & \times \frac{1 \times 10^6}{\text{Million}} = 444.8 \text{ PPM (parts per million)} \end{aligned}$$

Total Hydrocarbons

$$\begin{aligned} & \frac{3.70 \text{ Lb. of Hydrocarbons}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{28 \text{ Lb. of Hydrocarbons}} \\ & \times \frac{427.01 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{28,817 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}} \\ & \times \frac{1 \times 10^6}{\text{Million}} = 32.7 \text{ PPM} \end{aligned}$$

Nitrogen Dioxide

$$\begin{aligned} & \frac{35.68 \text{ Lb. of Nitrogen Dioxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{46 \text{ Lb. of Nitrogen Dioxide}} \\ & \times \frac{427.01 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{28,817 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}} \\ & \times \frac{1 \times 10^6}{\text{Million}} = 191.5 \text{ ppm} \end{aligned}$$

Sulfur Dioxide

$$\frac{0.57 \text{ Lb. of Sulfur Dioxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{64 \text{ Lb. of Sulfur Dioxide}}$$

$$\times \frac{427.01 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{28,817 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}}$$

$$\times \frac{1 \times 10^6}{\text{Million}} = 2.2 \text{ ppm}$$

Carbon Monoxide

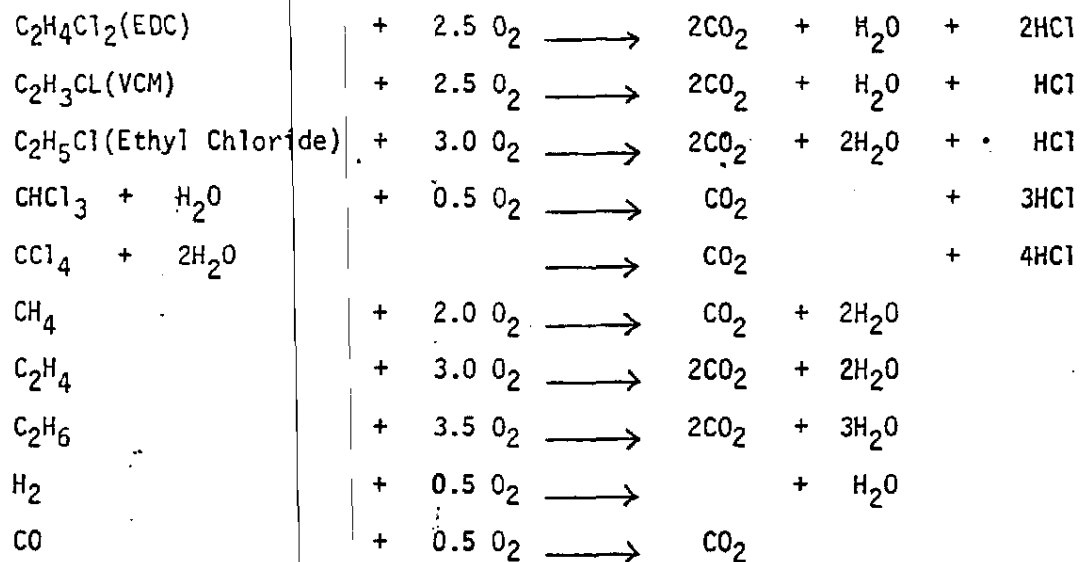
$$\frac{0.69 \text{ Lb. of Carbon-Monoxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{28 \text{ Lb. of Carbon Monoxide}}$$

$$\times \frac{427.01 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{28,817 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}}$$

$$\times \frac{1 \times 10^6}{\text{Million}} = 6.1 \text{ ppm}$$

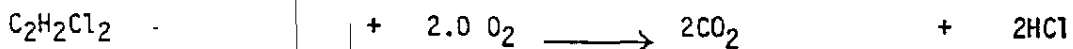
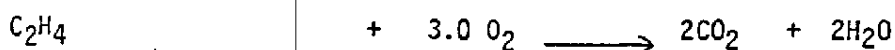
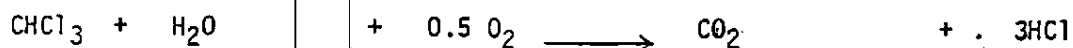
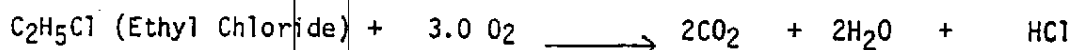
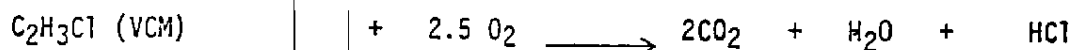
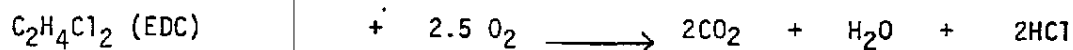
COMBUSTION EQUATIONS OF INCINERATION FUEL

Process Vents

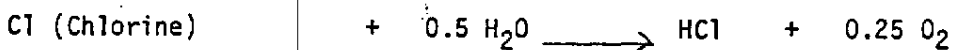
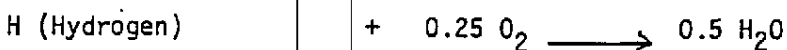
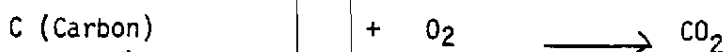


By-Product Liquids

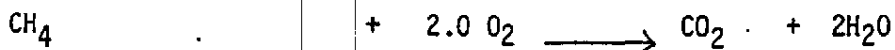
1. Light Ends



2. Tars (elemental equations)



Supplemental Fuel



The following tables itemize the sources and flowrates of the vent feed to the incinerator and the components and flowrates of the exhaust gases from the incinerator firebox.

TABLE III
INCINERATOR VENT FEED
MOLES/HOUR

	<u>Loading</u>	<u>Direct Chlorination Header</u>	<u>Wet Vent Header</u>	<u>Total</u>
EDC	--	0.56	3.89	4.45
VCM	6.00	0.80	7.39	14.19
Et. Cl.	--	0.47	40.26	40.73
CHCl ₃	--	--	4.77	4.77
CCl ₄	--	--	2.39	2.39
CH ₄	--	21.56	5.42	26.98
C ₂ H ₄	--	6.17	17.51	23.68
C ₂ H ₆	--	1.07	0.85	1.92
H ₂	--	4.34	--	4.34
O ₂	--	25.11	0.89	26.00
N ₂	148.30	61.59	43.18	253.07
CO	--	2.79	0.41	3.20
CO ₂	--	31.18	2.77	33.95
HCl	--	15.86	--	15.86
Subtotal	154.30	171.50	129.73	455.53
Auxiliary Fuel (CH ₄)				22.50
Subtotal				478.03
			<u>O₂</u>	<u>N₂</u>
Stoichiometric Combustion Air			325.68	1225.18
Excess Combustion Air			281.34	1058.39
TOTAL				3368.6

TABLE IV
COMBUSTION OF VENTS
MOLES/HOUR

Vent Component	Component Vent Rate	Oxygen Required	Incinerator Firebox Effluent (1)		
			CO ₂	HCl	H ₂ O
EDC	4.45	11.13	8.90	8.90	4.45
VCM	14.19	35.48	28.38	14.19	14.19
Et. Cl.	40.73	122.19	81.46	40.73	81.46
CHCl ₃	4.77	2.39	4.77	14.31	(4.77)
CCl ₄	2.39	--	2.39	9.56	(4.78)
CH ₄	26.98	53.96	26.98	--	53.96
C ₂ H ₄	23.68	71.04	47.36	--	47.36
C ₂ H ₆	1.92	6.72	3.84	--	5.76
H ₂	4.34	2.17	--	--	4.34
O ₂	26.00	(26.00)	--	--	--
N ₂	253.07	--	--	--	--
CO	3.20	1.60	3.20	--	--
CO ₂	33.95	--	33.95	--	--
HCl	15.86	--	--	15.86	--
Subtotal	455.53	280.68	241.23	103.55	201.97
Auxiliary Fuel (CH ₄)	22.50	45.00	22.50	--	45.00
TOTAL	478.03	325.68	263.73	103.55	246.97

(1) The incinerator firebox effluent also includes 281.34 moles/hour of excess oxygen and 2283.57 moles/hour of nitrogen.

VVC 000012912

SAMPLE CALCULATIONS FOR DETERMINING THE INCINERATOR FIREBOX EFFLUENT FROM PROCESS VENTS

Example -- EDC at 4.45 moles/hour



$$\text{Oxygen consumed} = (4.45 \text{ Mol. EDC/Hr.})(2.5 \text{ Mol. O}_2/\text{Mol. EDC}) = 11.13 \text{ Mol./Hr.}$$

$$\text{CO}_2 \text{ Produced} = (4.45 \text{ Mol. EDC/Hr.})(2.0 \text{ Mol. CO}_2/\text{Mol. EDC}) = 8.9 \text{ Mol./Hr.}$$

$$\text{H}_2\text{O Produced} = (4.45 \text{ Mol. EDC/Hr.})(1.0 \text{ Mol. H}_2\text{O}/\text{Mol. EDC}) = 4.45 \text{ Mol./Hr.}$$

$$\text{HCl Produced} = (4.45 \text{ Mol. EDC/Hr.})(2.0 \text{ Mol. HCl}/\text{Mol. EDC}) = 8.9 \text{ Mol./Hr.}$$

Oxygen Balance

$$\begin{aligned} \text{Total Oxygen consumed} &= 11.13 + 35.48 + 122.19 + 2.39 + 53.96 \\ &+ 71.04 + 6.72 + 2.17 + 1.60 + 45.00 \\ &= 351.68 \text{ Mol./Hr.} \end{aligned}$$

$$\begin{aligned} \text{Stoichiometric Oxygen} &= \text{Oxygen consumed minus oxygen supplied in the vent} = \\ &351.68 - 26.00 = 325.68 \text{ Mol./Hr.} \end{aligned}$$

$$\begin{aligned} \text{Excess Oxygen} &= \text{Percent excess oxygen times oxygen consumed} = \\ &(80\%)(351.68 \text{ Mols./Hr.}) = 281.34 \text{ Mol./Hr.} \end{aligned}$$

• Nitrogen Balance

$$\begin{aligned} \text{Stoichiometric Air} &= (\text{Air} = 21.0 \text{ Mol. \%}, 79.0 \text{ Mol. \% N}_2) \\ &= \text{Stoichiometric oxygen divided by 21.0\%} = \\ &325.68 \div 21\% = 1550.86 \text{ Mol./Hr.} \end{aligned}$$

$$79\% \text{ of Stoichiometric Air} =$$

$$(79\% \times 1550.86 \text{ Mol./Hr.}) = 1225.18 \text{ Mol./Hr.}$$

$$\text{Excess Air} = \text{Excess oxygen divided by 21\%} =$$

$$(281.34 \text{ Mol. O}_2/\text{Hr.}) \div 21\% = 1339.71 \text{ Mol./Hr.}$$

$$\text{Nitrogen} = (79\% \times 1339.71 \text{ Mol./Hr.}) = 1058.37 \text{ Mol./Hr.}$$

The following table itemizes the components and flowrates of the light ends byproduct liquid stream and the oxygen required for combustion. The incinerator firebox effluent components and flow rates are also shown.

TABLE V
LIGHT ENDS BYPRODUCT LIQUID FIRING

Mol./Hr.

Component	Feed Rate	Oxygen Required	Incinerator Firebox Effluent			
			N ₂	CO ₂	HCl	H ₂ O
EDC	2.10	5.25	--	4.20	4.20	2.10
VCM	0.83	2.08	--	1.66	0.83	0.83
Et. Cl.	10.90	32.70	--	21.80	10.90	21.80
CHCl ₃	3.60	1.80	--	3.60	10.80	(1.80)
CCl ₄	1.02	--	--	1.02	4.08	(2.04)
C ₂ H ₄	0.47	1.41	--	0.94	--	0.94
CTV	2.15	4.30	--	4.30	4.30	--
Subtotal	21.07	47.54	--	37.52	35.11	21.83
		Oxygen Supplied				
Stoichiometric Air.	226.38	47.54	178.84	--	--	--
Excess Air	181.10	38.03	143.07	--	--	--
TOTAL	428.50	85.57	321.91	37.52	35.11	21.83

VVC 000012914

SAMPLE CALCULATIONS FOR DETERMINING THE INCINERATOR FIREBOX EFFLUENT FROM LIGHT ENDS
BYPRODUCT LIQUIDS

Example: EDC at 2.10 Moles/Hour



Oxygen consumed = (2.10 Mol.EDC/Hr.)(2.5 Mol. O₂/Mol. EDC) = 5.25 Mol./Hr.

CO₂ produced = (2.10 Mol.EDC/Hr.)(2.0 Mol. CO₂/Mol. EDC) = 4.20 Mol./Hr.

HCl produced = (2.10 Mol. EDC/Hr.)(2.0 Mol.HCl/Mol. EDC) = 4.20 Mol./Hr.

H₂O produced = (2.10 Mol. EDC/Hr.)(1.0 Mol. H₂O/Mol. EDC) = 2.10 Mol./Hr.

Oxygen Balance

Stoichiometric Oxygen = 5.25 + 2.08 + 32.70 + 1.80 + 1.41 + 4.30 =
47.54 Mol. /Hr.

Excess Oxygen = (80%)(47.54 Mol./Hr. Stoichiometric Oxygen) = 38.03 Mol./Hr.

Nitrogen = (79%)(226.38 Mol./Hr. Stoichiometric Air) = 178.84 Mol./Hr.

Excess Air = (38.03 HCl/Hr. Excess Oxygen) ÷ (21% Oxygen) = 181.10 Mol./Hr.

Nitrogen = (79%)(181.10 Mol./Hr. Excess Air) = 143.07 Mol./Hr.

VVC 000012915

The following table itemizes the elements and flowrates of the tar byproduct liquid stream and the oxygen required for combustion. The incinerator firebox effluent components and flowrates are also shown.

TABLE VI
TAR BYPRODUCT LIQUID FIRING

Element	Flowrate	Mol./Hr	Oxygen Required	Incinerator FireBox Effluent			
				N ₂	CO ₂	HCl	H ₂ O
Carbon	59.68		59.68	-	59.68	-	-
Hydrogen	78.13		19.53	-	-	-	39.06
Chlorine	47.32		(11.83)	-	-	47.32	23.66
Subtotal	185.13		67.38	-	59.68	47.32	15.40
Oxygen Supplied							
Stoichiometric Air	320.86		67.38	253.48	-	-	-
Excess Air	256.69		53.91	202.78	-	-	-
Total	762.68		121.29	456.26	59.68	47.32	15.40

SAMPLE CALCULATIONS FOR DETERMINING THE INCINERATOR FIREBOX EFFLUENT FROM TAR
BYPRODUCT LIQUIDS

$$\begin{aligned}\text{Oxygen Consumed} &= (59.68 \text{ Mol. C./Hr.}) (1.0 \text{ Mol. O}_2/\text{Mol. C.}) \\ &+ (78.13 \text{ Mol. H./Hr.}) (0.25 \text{ Mol. O}_2/\text{Mol. H.}) - \\ &(47.32 \text{ Mol. Cl./Hr.}) (0.25 \text{ Mol. Cl./Mol. Cl.}) \\ &= 67.38 \text{ Mol./Hr.}\end{aligned}$$

$$\begin{aligned}\text{CO}_2 \text{ Produced} &= (59.68 \text{ Mol. C./Hr.}) (1.0 \text{ Mol. CO}_2/\text{Mol. C.}) \\ &= 59.68 \text{ Mol. CO}_2/\text{Hr.}\end{aligned}$$

$$\begin{aligned}\text{HCl Produced} &= (47.32 \text{ Mol. Cl./Hr.}) (1.0 \text{ Mol. HCl/Mol. Cl.}) \\ &= 47.32 \text{ Mol. HCl/Hr.}\end{aligned}$$

$$\begin{aligned}\text{H}_2\text{O Produced} &= (78.13 \text{ Mol. H./Hr.}) (0.5 \text{ Mol. H}_2\text{O/Mol. H.}) - \\ &(47.32 \text{ Mol. Cl./Hr.}) (0.5 \text{ Mol. H}_2\text{O/Mol. Cl.}) \\ &= 15.40 \text{ Mol./Hr.}\end{aligned}$$

Oxygen Balance

Stoichiometric Oxygen

$$\text{Excess Oxygen} = (80\%) (67.38 \text{ Mol./Hr. Stoichiometric Oxygen}) = 53.91 \text{ Mol./Hr.}$$

Nitrogen Balance

$$\begin{aligned}\text{Stoichiometric Air} &= (67.38 \text{ Mol./Hr. Stoichiometric Oxygen}) \div (21\%) \\ &= 320.86 \text{ Mol. Hr.}\end{aligned}$$

$$\begin{aligned}\text{Nitrogen} &= (79\%) (320.86 \text{ Mol./Hr. Stoichiometric Air}) \\ &= 253.48 \text{ Mol./Hr.}\end{aligned}$$

$$\begin{aligned}\text{Excess Air} &= (53.91 \text{ Mol./Hr. Excess Oxygen}) \div (21\%) \\ &= 256.69 \text{ Mol./Hr.}\end{aligned}$$

$$\begin{aligned}\text{Nitrogen} &= (79\%) (256.69 \text{ Mol./Hr. Excess Air}) \\ &= 202.78 \text{ Mol./Hr.}\end{aligned}$$

VVC 000012917

TABLE VII
INCINERATOR FIREBOX EFFLUENT RATES
MOLES/HOUR

	<u>VENTS</u>	<u>LIGHT ENDS</u>	<u>TARS</u>	<u>TOTAL</u>
O ₂	281.34	38.03	53.91	373.28
N ₂	2,536.64	321.91	456.26	3,314.81
CO ₂	263.73	37.52	59.68	360.93
HCl	103.55	35.11	47.32	185.98
H ₂ O	<u>246.97</u>	<u>21.83</u>	<u>15.40</u>	<u>284.20</u>
Total	3,432.23	454.40	632.57	4,519.20

TABLE VIII
INCINERATOR STACK EFFLUENT RATES (1)
MOLES/HOUR

	<u>VENTS</u>	<u>LIGHT ENDS</u>	<u>TARS</u>	<u>TOTAL</u>
O ₂	281.34	38.03	53.91	373.28
N ₂	2,536.64	321.91	456.26	3,314.81
CO ₂	<u>263.73</u>	<u>37.52</u>	<u>59.68</u>	<u>360.93</u>
Total	3,081.71	397.46	569.85	4,049.02

(1) The H₂O and HCl are removed in the scrubbers.

Incinerator Stack Vent Rate (DSCF at 60°F and 14.7 psia)

$$\text{DSCF/Mol.} = \text{RT/P} = (10.73 \text{ Ft}^3 - \text{psia/Mol.} \cdot ^\circ\text{R.}) (460 + 60)^\circ\text{R.}) \\ \div (14.7 \text{ psia}) = 379.565 \text{ Ft}^3/\text{Mol.}$$

$$\text{DSCF/Hr.} = (4049.02 \text{ Mol./Hr.}) (379.565 \text{ DSCF/Mol.}) \\ = 1,536,900 \text{ DSCF/Hr.}$$

VVC 000012918

KEMRON

Kemron Environmental Services

EMISSION TESTING

FOR

CONOCO

Parameter	<u>Cond. I</u>		<u>Cond. II</u>	
	Conc. GR/DSCF	Rate #/HR.	Conc. GR/DSCF	Rate #/HR
Filterable Particulates	0.0205	1.25	0.0395	3.83
Total Particulates	0.0319	1.95	0.0506	4.89
Sulfuric Acid Mist	0.08	0.653	0.00649	0.613
Sulfur Dioxide	-	-	-	-
Oxides of Nitrogen	0.0326	1.99	0.0285	2.73
Hydrogen Chloride	0.113	6.90	0.110	10.5
Total Hydrocarbons	1 ppm			
Non-Methane Hydrocarbons	1 ppm			

VVC 000012919



FRANK A. ASHBY, JR.
SECRETARY

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF ENVIRONMENTAL AFFAIRS
AIR QUALITY DIVISION

B. JIM PORTER
ASSISTANT SECRETARY

September 2, 1980

Conoco Chemical Company
P. O. Box 605
Westlake, Louisiana 70669

Re: Modification of VCM Plant

Dear Sir:

This is to confirm that your permit request for the above referenced project at Conoco Chemicals Co., Lake Charles has been approved by the Louisiana Environmental Control Commission.

The submittal was approved on the basis of emissions reported and the approval in no way guarantees the design scheme presented will be capable of controlling the emissions to the types and quantities stated.

Date: March 25, 1980

Permit No. 1424

The attached 2 synopsis sheets and 3 data sheets establish the emission operating limitations which condition this certificate of approval. A new application must be submitted if the reported emissions are exceeded after operation begins.

The permit number cited above should be referenced in future correspondence regarding this subject.

Sincerely,

B. Jim Porter

B. Jim Porter
Assistant Secretary
Office of Environmental Affairs

BJP/AB/ebp

VVC 000012920

LOUISIANA ENVIRONMENTAL CONTROL COMMISSION

AIR QUALITY DIVISION

CONOCO CHEMICAL COMPANY

LAKE CHARLES VCM PLANT
Westlake (Calcasieu)

This permit request by Conoco Chemicals Company, a Division of Conoco Inc., is for permission to modify its existing vinyl chloride monomer production facility located at Westlake in Calcasieu Parish to expand its production capacity from 700 million pounds per year to one billion pounds per year on an annualized basis.

The expansion will be accomplished by adding a parallel train to the VCM system and debottlenecking existing equipment. The technology will be based on a well proven system.

Process emissions will be controlled by recovering hydrocarbon as much as practical and then by incineration to meet the NESHAP Standard of less than 10 ppm VCM in any vent gas.

Process incinerators will be controlled with wet scrubbers and the new heater will use LoNO_x burners.

Sulphur oxide emissions will be controlled by using fuel of less than 0.7% sulfur content.

The debottlenecking techniques employed will result in hydrocarbon and CO being reduced by 4609 and 1768 tons per year respectively.

Dispersion modeling supplied by the company indicates that ambient air quality standards will not be violated.

Table I shows the effect of this plant expansion on emissions of the facility as a whole.

NSPS does not apply to this facility.

Recommendations - - - - - (See Approval)

JHS/ys

VVC 000012921

CONOCO CHEMICAL COMPANY

LAKE CHARLES VCM PLANT
Westlake (Calcasieu)

RECOMMENDATION:

Approval provided the following conditions are met.

- 1) The synopsis sheets and the attached data sheets establish the emission and operating limitations and are a part of the permit. The synopsis and data sheets are based on the application for approval of emissions dated February 5, 1980 with supplemental information submitted February 8, 1980. The application and supplemental information are also considered part of this permit by reference.
- 2) Construction must commence within two years after the date of approval.
- 3) The permittee will submit to the Technical Secretary semiannual reports of progress defining the status of construction, noting any design changes, modifications or alterations in the construction schedule which have or may have an effect upon the emission rates or ambient air quality levels. Such reports shall continue to be submitted until such time as construction is certified as being complete.
- 4) Any emission testing performed for purposes of demonstrating compliance with the limitations set forth in Condition 1 shall be conducted in accordance with the methods described and referenced in Table 4 of the current Louisiana Air Control Commission Regulations.
- 5) The permittee shall, within 180 days after certifying the completion of construction prepare and submit to the Technical Secretary a report detailing the actual emission rates as compared to those limitations specified in Condition 1. The report shall also include, but not be limited to, malfunctions and upsets.

VVC 000012922

LOUISIANA ENVIRONMENTAL CONTROL COMMISSION

Air Quality Data Sheet

Page 1

CONOCO CHEMICAL COMPANY

Westlake (Calcasieu)

Location of plant: 15 UTM 472.9 Km E 3346.5 Km N

Description of location: 2 miles north, intersection of Truesdale Road and
Old Spanish Trail

Estimated starting date of construction: April 1981 Estimated date operation will begin: November 1982

Type of Dispersion Calculations Used: CRSTER

EFFECTS OF AMBIENT AIR

Pollutant	Time Period	Calculated Maximum Ground Level Concentration	Louisiana Air Control Commission Standard
NOx	Annual	4 ug/M ³	100
SO ₂	Ann/24/8	1/6/14 ug/M ³	80/365/1300
CO	8/1	3/6 ug/M ³	10000/40,000
Part	Annual/24	3/24 ug/M ³	75/260

NEW ☐ OR MODIFIED ☒ EMISSION SOURCES

VCM Plant
(Type of Source)

Stack I.D. #	Description	Operating Rate (Maximum)	Operating Schedule		
			Hrs/Day	Days/Wk	Wks/Yr
IIA	Cracking Furnace	17607 CFM	24	7	49
IIB	Cracking Furnace	17607 CFM	24	7	49
IIC	Cracking Furnace	22375 CFM	24	7	48
IV-J	Dock EDC Tank	6 CFM	24	7	52
IV-K	Dock VCM Vent	316 CFM	3	1	52
V-A	Vent Incinerator	28817 CFM	24	7	52

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LOUISIANA ENVIRONMENTAL CONTROL COMMISSION

Air Quality Data Sheet - Page 2

Conoco Chemical Company (Lake Charles VCM Plant)
(Company's Name)

Westlake
(Nearest Town)

Calcasieu
(Parish)

EMISSIONS ARE LISTED USING THE UNITS LBS/HR

VVC 000012924

STACK ID	P E R M I T T E D E M I S S I O N S					Feet	FO	CFM
	TSP	SO ₂	NO _x	HC	CO	Height	Temperature	Flow Rate
IIA	1	1.1	12.9	0.2	1.0	120	550	17607
IIB	1	1.1	12.9	0.2	1.0	120	550	17607
IIC	7.3	17.3	6.7	1.5	2.0	120	550	22375
IV-J	-	-	-	11.9	-	35	85	6
IV-K	-	-	-	< 0.1	-	148	75	316
V-A	21.6	0.6	35.7	3.7	0.7	75	125	28817

TABLE I
SUMMARY OF EMISSIONS
TONS/YR. -

	(1) Incremental Potential to Emit	Expanded Plant Total Allowable	Existing Plant Total Allowable	Total Net Change
<u>Hydrocarbons</u>				
Total Fugitive	29.181	86.713	57.532	29.181
VCM Fugitive	2.62	18.062	15.442	2.62
Other Hydrocarbon Fugitive	26.561	68.651	42.09	26.561
Total Point Source	8.83	26.63	4636.0	-4609.37
VCM Point Source	6.78	11.18	60.2	- 49.02
Other Hydrocarbon Point Source	4.86	15.45	4575.8	-4560.35
<u>Particulates</u>	40.25	107.87	67.62	+ 40.25
<u>Carbon Monoxide</u>	7.95	16.11	1784.16	-1768.05
<u>Nitrogen Oxide</u>	129.51	244.97	223.9	+ 21.07
<u>Sulfur Dioxide</u>	59.32	68.45	9.13	+ 59.32

- 1) The "Potential to Emit" was calculated from a base of existing allowable emissions and, therefore, only represents the potential to emit above the present permit conditions.