CONOCO

Interoffice Communication

To VCM Plant Employees

From J. A. DeBernardi

Date February 1, 1980

Subject Removal of Plant Property

It has come to my attention that some confusion apparently exists related to company employees removing company property from the plant premises. Therefore, the purpose of this letter is to again communicate plant policies governing removal of company property from the plant premises by plant employees.

It is our policy to allow permanent plant employees to borrow tools for their own personal use outside of the plant premises provided the loan of the tools does not hamper the efficient completion of plant maintenance work and the tools are returned promptly and in good condition. The procedure to be used by employees borrowing tools:

1) Contact the appropriate Maintenance Supervisor to request the use of tools and receive his approval. Shift Supervisors may approve the loan of tools outside of normal working hours.

2) Complete the appropriate paper work to document the approved loan of the tools.

3) Return the tools promptly following their use to the tool room and document the return of the tools.

In the same light, our policy allows permanent employees to bid on obsolete piping, grating, and other miscellaneous scrap material specified in the bid notices. This policy is specifically intended to allow the employees to obtain the scrap material for their own personal use and is not intended to allow employees to resell the material for personal profit. Special points to remember regarding this policy:

1) Notices listing the scrap material for bid are posted. Following the close of the bid, a list of successful bidders on the items is posted.

2) Items made of exotic metals (such as copper, nickel, tantalum titanium, chromium) or alloys of these metals are <u>not</u> for employee bidding.

3) A gate pass is required for <u>any</u> material removed from the plant premises. Employees <u>should not</u> assume that because an item is obviously obsolete, whether it is in the scrap pile or not, it can be removed from the plant without obtaining a gate pass.

CCR 000079979

4) Only employees may load scrap for removal from the plant. Non-employees (including family members, relatives, friends, etc.) may not help load scrap.

Both of the policies described above have been established and administered for the benefit of our plant employees. Therefore, policing of these policies and procedures is the responsibility of all employees. Deviations from the policies and procedures outlined above could jeopardize the continuance of these benefits for all employees. Unauthorized removal of tools, scrap, etc. from the plant must be considered as theft of company property and dealt with accordingly.

Your adherence to the proper procedures related to these policies is expected and appreciated.

J. A. DeBernardi

is

Distribution
Bulletin Boards
Supervisors
Department Heads

GATE PASS FOR SCRAP
OF PURCHASED MATERIAL
REMOVED FROM VCM PLANT

Name ______________________________
Employee

Items ______________________________
____
____
____
____
____

Approved: ______________________ ________
Supervisor Date

Approved: ______________________ ________
Department Head Date

Rev. 9/80

LOAN TOOL ISSUE SLIP

ITEM ____

Subject item is being loaned to me for the following dates: __________ to ________

I understand that I will assume full responsibility for returning this item in same condition as when borrowed.

Signed ______________________
Employee

APPROVED: ______________________
Mechanical Maintenance Supervisor
Instrument-Electrical Supervisor

Issued By: ______________________
Tool Room Attendant

Instructions:
This form is to be filled out in duplicate, one copy to be given to employee borrowing tool, the other retained by Tool Crib Attendant. Upon return of tool, employee will return his copy which will be matched with copy held by Tool Room Attendant. These copies will be filed in employee's tool crib file. Any tool not returned within alloted time will be brought to the immediate attention of the Mechanical Maintenance Supervisor or Instrument-Electrical Supervisor.

Rev. 9/80

USE PLEASE DO NOT ABUSE

conoco

Lake Charles VCM Plant

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

CERTIFIED MAIL #316131
RETURN RECEIPT REQUESTED

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

CCR 000079983

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

Lake Charles VCM Plant

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

CERTIFIED MAIL #315690
RETURN RECEIPT REQUESTED

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

CCR 000079984

APPENDIX

SECTION IV

EMISSION CALCULATIONS

TABLE I

SUMMARY OF EMISSIONS

TONS/YR.

	(1) Incremental Potential to Emit	Expanded Plant Total Allowable	Existing Plant Total Allowable	Total Net Change
Hydrocarbons				
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
Particulates	19.21	86.83	67.62	+ 19.21
Carbon Monoxide	9.57	17.73	1784.16	-1766.43
Nitrogen Oxide	22.17	244.97	223.9	+ 21.07
Sulfur Dioxide	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.

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	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.

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.

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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

Pollutant	Factor (Lb./M Gals.)
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

Pollutant	Factor (Lb./M Gals.)
NO_x	22

John Zink Co. Lo NO_x Burner Factor

Pollutant	Factor (Lb./MM BTU)
NO_x	0.108

Uncontrolled NO_x

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

= 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

$$\frac{0.97\ \text{Lb. of Particulates}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{12\ \text{Lb. of Particulates}}$$

$$\times \frac{737.231\ \text{ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22{,}375\ \text{ft.}^3} \times \frac{\text{Hr.}}{60\ \text{Min.}}$$

$$\times \frac{1 \times 10^6}{\text{Million}} = 44.5$$ PPM (parts per million)

Hydrocarbons

$$\frac{0.49\ \text{Lb. of Hydrocarbons}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{66\ \text{Lb. of Hydrocarbons}}$$

$$\times \frac{737.231\ \text{ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22{,}375\ \text{ft.}^3} \times \frac{\text{Hr.}}{60\ \text{Min.}}$$

$$\times \frac{1 \times 10^6}{\text{Million}} = 4.1$$ PPM

Nitrogen Dioxide

$$\frac{6.65\ \text{Lb. of Nitrogen Dioxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{46\ \text{Lb. of Nitrogen Dioxide}}$$

$$\times \frac{737.231\ \text{ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22{,}375\ \text{ft.}^3} \times \frac{\text{Hr.}}{60\ \text{Min.}}$$

$$\times \frac{1 \times 10^6}{\text{Million}} = 79.3$$ PPM

Sulfur Dioxide

$$\frac{17.24 \text{ Lb. of Sulfur Dioxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{64 \text{ Lb. of Sulfur Dioxide}}$$

$$\times \frac{737.231 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22{,}375 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}}$$

$$\times \frac{1 \times 10^6}{\text{Million}} = 147.9 \text{ PPM}$$

Carbon Monoxide

$$\frac{2.43 \text{ Lb. of Carbon Monoxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{28 \text{ Lb. of Carbon Monoxide}}$$

$$\times \frac{737.231 \text{ ft.}^3}{\text{Lb.-Mole of Stack Gas}} \times \frac{\text{Min.}}{22{,}375 \text{ ft.}^3} \times \frac{\text{Hr.}}{60 \text{ Min.}}$$

$$\times \frac{1 \times 10^6}{\text{Million}} = 47.7 \text{ PPM}$$

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

Pollutant	Factor (Lbs./DSCF)
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

$$1,536,900 \frac{\text{DSCF}}{\text{Hr.}} \times \frac{3.6098 \times 10^{-7} \text{ Lb.}}{\text{DSCF}} \times \frac{24 \text{ Hrs.}}{\text{Day}} \times \frac{365 \text{ Days}}{\text{Yr.}}$$

$$\times \frac{\text{Ton}}{2,000 \text{ Lb.}} = 2.43 \text{ Tons/Yr.}$$

VCM

$$1{,}536{,}900\ \frac{\text{DSCF}}{\text{Hr.}} \times \frac{10\ \text{DSCF}}{1 \times 10^6\ \text{DSCF}} \times \frac{62.5\ \text{Lb. of VCM}}{\text{Lb.-Mole}}$$

$$\times \frac{\text{Lb.-Mole}}{379.565\ \text{SCF*}} \times \frac{24\ \text{Hr.}}{\text{Day}} \times \frac{365\ \text{Day}}{\text{Yr.}} \times \frac{\text{Ton}}{2{,}000\ \text{Lb.}}$$

= 11.08 Tons/Yr.

* 379.565 SCF/Lb.-Mole at 60^{o}F, 1 atm.

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

Particulates

$$\frac{21.61\ \text{Lb. of Particulates}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{12\ \text{Lb. of Particulates}}$$

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

$$\times \frac{1 \times 10^6}{\text{Million}} = 444.8\ \text{PPM (parts per million)}$$

Total Hydrocarbons

$$\frac{3.70\ \text{Lb. of Hydrocarbons}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{28\ \text{Lb. of Hydrocarbons}}$$

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

$$\times \frac{1 \times 10^6}{\text{Million}} = 32.7\ \text{PPM}$$

Nitrogen Dioxide

$$\frac{35.68\ \text{Lb. of Nitrogen Dioxide}}{\text{Hr.}} \times \frac{\text{Lb.-Mole}}{46\ \text{Lb. of Nitrogen Dioxide}}$$

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

$$\times \frac{1 \times 10^6}{\text{Million}} = 191.5\ \text{ppm}$$

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

$$C_2H_4Cl_2\text{(EDC)} + 2.5\ O_2 \longrightarrow 2CO_2 + H_2O + 2HCl$$

$$C_2H_3CL\text{(VCM)} + 2.5\ O_2 \longrightarrow 2CO_2 + H_2O + HCl$$

$$C_2H_5Cl\text{(Ethyl Chloride)} + 3.0\ O_2 \longrightarrow 2CO_2 + 2H_2O + HCl$$

$$CHCl_3 + H_2O + 0.5\ O_2 \longrightarrow CO_2 + 3HCl$$

$$CCl_4 + 2H_2O \longrightarrow CO_2 + 4HCl$$

$$CH_4 + 2.0\ O_2 \longrightarrow CO_2 + 2H_2O$$

$$C_2H_4 + 3.0\ O_2 \longrightarrow 2CO_2 + 2H_2O$$

$$C_2H_6 + 3.5\ O_2 \longrightarrow 2CO_2 + 3H_2O$$

$$H_2 + 0.5\ O_2 \longrightarrow H_2O$$

$$CO + 0.5\ O_2 \longrightarrow CO_2$$

By-Product Liquids

1. Light Ends

$$C_2H_4Cl_2 \text{ (EDC)} + 2.5\ O_2 \longrightarrow 2CO_2 + H_2O + 2HCl$$

$$C_2H_3Cl \text{ (VCM)} + 2.5\ O_2 \longrightarrow 2CO_2 + H_2O + HCl$$

$$C_2H_5Cl \text{ (Ethyl Chloride)} + 3.0\ O_2 \longrightarrow 2CO_2 + 2H_2O + HCl$$

$$CHCl_3 + H_2O + 0.5\ O_2 \longrightarrow CO_2 + 3HCl$$

$$CCl_4 + 2H_2O \longrightarrow CO_2 + 4HCl$$

$$C_2H_4 + 3.0\ O_2 \longrightarrow 2CO_2 + 2H_2O$$

$$C_2H_2Cl_2 + 2.0\ O_2 \longrightarrow 2CO_2 + 2HCl$$

2. Tars (elemental equations)

$$C \text{ (Carbon)} + O_2 \longrightarrow CO_2$$

$$H \text{ (Hydrogen)} + 0.25\ O_2 \longrightarrow 0.5\ H_2O$$

$$Cl \text{ (Chlorine)} + 0.5\ H_2O \longrightarrow HCl + 0.25\ O_2$$

Supplemental Fuel

$$CH_4 + 2.0\ O_2 \longrightarrow CO_2 + 2H_2O$$

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

	Loading	Direct Chlorination Header	Wet Vent Header		Total
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_2H_4	--	6.17	17.51		23.68
C_2H_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
			O_2	N_2	
Stoichiometric Combustion Air			325.68	1225.18	1550.86
Excess Combustion Air			281.34	1058.39	1339.71
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_2O
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_2H_4	23.68	71.04	47.36	--	47.36
C_2H_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.

SAMPLE CALCULATIONS FOR DETERMINING THE INCINERATOR FIREBOX EFFLUENT FROM PROCESS VENTS

Example -- EDC at 4.45 moles/hour

$C_2H_4Cl_2$ (EDC) + 2.5 O_2 $\longrightarrow$ $2CO_2$ + H_2O + 2HCl

Oxygen consumed = (4.45 Mol. EDC/Hr.)(2.5 Mol. O_2/Mol. EDC) = 11.13 Mol./Hr.

CO_2 Produced = (4.45 Mol. EDC/Hr.)(2.0 Mol. CO_2/Mol. EDC) = 8.9 Mol./Hr.

H_2O Produced = (4.45 Mol. EDC/Hr.)(1.0 Mol. H_2O/Mol. EDC) = 4.45 Mol./Hr.

HCl Produced = (4.45 Mol. EDC/Hr.)(2.0 Mol. HCl/Mol. EDC) = 8.9 Mol./Hr.

Oxygen Balance

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 Mol./Hr.

Stoichiometric Oxygen = Oxygen consumed minus oxygen supplied in the vent = 351.68 - 26.00 = 325.68 Mol./Hr.

Excess Oxygen = Percent excess oxygen times oxygen consumed = (80%)(351.68 Mols./Hr.) = 281.34 Mol./Hr.

- Nitrogen Balance : (Air = 21.0 Mol. %, 79.0 Mol. % N_2)

Stoichiometric Air = Stoichiometric oxygen divided by 21.0% = 325.68 ÷ 21% = 1550.86 Mol./Hr.

79% of Stoichiometric Air = (79% x 1550.86 Mol./Hr.) = 1225.18 Mol./Hr.

Excess Air = Excess oxygen divided by 21% = (281.34 Mol. O_2/Hr.) ÷ 21% = 1339.71 Mol./Hr.

Nitrogen = (79% x 1339.71 Mol./Hr. = 1058.37 Mol./Hr.

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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_2O
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_2H_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

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

Example: EDC at 2.10 Moles/Hour

$C_2H_4Cl_2$ (EDC) + 2.5 O_2 $\longrightarrow$ $2CO_2$ + H_2O + 2HCl

Oxygen consumed	=	(2.10 Mol.EDC/Hr.)(2.5 Mol. O_2/Mol. EDC)	=	5.25 Mol./Hr.
CO_2 produced	=	(2.10 Mol.EDC/Hr.)(2.0 Mol. CO_2/Mol. EDC)	=	4.20 Mol./Hr.
HCl produced	=	(2.10 Mol. EDC/Hr.)(2.0 Mol.HCl/Mol. EDC)	=	4.20 Mol./Hr.
H_2O produced	=	(2.10 Mol. EDC/Hr.)(1.0 Mol. H_2O/Mol. EDC)	=	2.10 Mol./Hr.

<u>Oxygen Balance</u>

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

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

Mol./Hr

Element	Flowrate	Oxygen Required	Incinerator Firebox Effluent N_2	CO_2	HCl	H_2O
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

Oxygen Consumed = (59.68 Mol. C./Hr.) (1.0 Mol. O_2/Mol.C.)
+ (78.13 Mol. H./Hr.) (0.25 Mol.O_2/Mol.H) -
(47.32 Mol. Cl/Hr.) (0.25 Mol. Cl./Mol.Cl)
= 67.38 Mol./Hr.

CO_2 Produced = (59.68 Mol.C./Hr.) (1.0 Mol. CO_2/Mol.C.)
= 59.68 Mol. CO_2/Hr.

HCl Produced = (47.32 Mol. Cl./Hr) (1.0 Mol. HCl/Mol. Cl.)
= 47.32 Mol. HCl/Hr.

H_2O Produced = (78.13 Mol. H./Hr.) (0.5 Mol. H_2O/Mol. H.) -
(47.32 Mol. Cl./Hr.) (0.5 Mol. H_2O/Mol. Cl.)
= 15.40 Mol./Hr.

Oxygen Balance

Stoichiometric Oxygen

Excess Oxygen = (80%) (67.38 Mol./Hr. Stoichiometric Oxygen) = 53.91 Mol./Hr.

Nitrogen Balance

Stoichiometric Air = (67.38 Mol./Hr. Stoichiometric Oxygen) ÷ (21%)
= 320.86 Mol. Hr.

Nitrogen = (79%) (320.86 Mol./Hr. Stoichiometric Air)
= 253.48 Mol./Hr.

Excess Air = (53.91 Mol./Hr. Excess Oxygen) ÷ (21%)
= 256.69 Mol./Hr.

Nitrogen = (79%) (256.69 Mol./Hr. Excess Air)
= 202.78 Mol./Hr.

TABLE VII

INCINERATOR FIREBOX EFFLUENT RATES

MOLES/HOUR

	VENTS	LIGHT ENDS	TARS	TOTAL
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_2O	246.97	21.83	15.40	284.20
Total	3,432.23	454.40	632.57	4,519.20

TABLE VIII

INCINERATOR STACK EFFLUENT RATES (1)

MOLES/HOUR

	VENTS	LIGHT ENDS	TARS	TOTAL
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
Total	3,081.71	397.46	569.85	4,049.02

(1) The H_2O and HCl are removed in the scrubbers.

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

DSCF/Mol. = RT/P = (10.73 Ft^3 - psia/Mol.-°R.) (460 + 60)°R.) ÷ (14.7 psia) = 379.565 Ft^3/Mol.

DSCF/Hr. = (4049.02 Mol./Hr.) (379.565 DSCF/Mol.)

= 1,536,900 DSCF/Hr.

CCR 000080007

KEMRON
Kemron Environmental Services

EMISSION TESTING

FOR

CONOCO

Parameter	Cond. I Conc. GR/DSCF	Cond. I Rate #/HR	Cond. II Conc. GR/DSCF	Cond. II 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			

State of Louisiana

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,

Iris Von Bodungen / for
B. Jim Porter
Assistant Secretary
Office of Environmental Affairs

BJP/AB/ebp

CCR 000080009

P.O. BOX 60630 . NEW ORLEANS, LA. 70160 . PHONE 504 568-5121 . 325 LOYOLA AVENUE

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

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.

CCR 000080011

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

CCR 000080012

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

STACK ID	PERMITTED EMISSIONS					Feet	F°	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
Hydrocarbons				
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
Particulates	40.25	107.87	67.62	+ 40.25
Carbon Monoxide	7.95	16.11	1784.16	-1768.05
Nitrogen Oxide	129.51	244.97	223.9	+ 21.07
Sulfur Dioxide	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.