

VCM Plant

**Conoco Chemicals
Continental Oil Company
P.O. Box 605
Westlake, Louisiana 70669
(318) 882-0550**

December 21, 1976

**Mr. Liveli
Acting Director, Enforcement Division
Region VI, Environmental Protection Agency
First International Building
1201 Elm Street
Dallas, TX 75270**

Dear Mr. Liveli:

In accordance with the provisions of the Environmental Protection Agency's recently published National Emission Standard for vinyl chloride, attached you will find a Source Report, Request for Waiver of Emission Testing, and Request for Waiver of Compliance related to vinyl chloride monomer emissions from the Continental Oil Company - VCM Plant located on Old Spanish Trail, Westlake, Louisiana.

The Source Report and Request for Waiver of Compliance are considered to be confidential since they contain descriptive information about the plant process and technology. If these were made public, they would divulge proprietary process information. Therefore, the Administrator is requested to consider the Source Report and Request for Waiver of Compliance to be confidential in accordance with Section 61.15(b) of the general provisions of the Hazardous Air Pollutants Standard - 40 CFR 61.

In the event that standard for vinyl chloride emission promulgated by the Environmental Protection Agency on October 21, 1976 is modified, CONOCO believes that there could be a severe crippling of CONOCO's ability to comply with the requirements of any waiver requests or waiver, especially the compliance timetable for scheduled action. Currently, our program for compliance totally depends on engineering and constructing control devices which will meet the conditions of the standard now in effect. Changes in this standard due to review, negotiation or litigation could make it necessary to choose an entirely different control strategy which could make it impossible for us to comply with in the strict timetable provided by the Clean Air Act.

We request, therefore, that the Environmental Protection Agency take notice of possible delays in compliance due to changes in the standard, and give us advice and guidance to establish a new schedule for compliance if the control strategy in our waiver request is insufficient for our compliance to the requirements of a modified standard.

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Any questions related to this submittal should be directed to J. A. DeBernardi, Manager VCM Plant at 318/491-5063.

Sincerely,



J. A. DeBernardi

is
Enc
CC + enc:
Mr. James F. Coerver
Technical Secretary
Louisiana Air Control Commission
P. O.Box 60630
New Orleans, LA 70160

BCC w/enc:
RDG-CRH-JEC-DAK-JF-JHM-ROC-PLF-JRH

BCC w/Waiver of Compliance:
Ken Bates
Harold Couch

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WAIVER OF EMISSION TESTS

The Continental Oil Company VCM Plant at Westlake, Louisiana is requesting waivers of compliance for all the VCM emission points regulated by the National Emission Standard for Vinyl Chloride. Four emission control systems will be installed or revised to ensure compliance with the standard. Therefore, a waiver of emission testing is requested until the installation or revision of the four control systems is completed and final compliance attained.

The four control systems will achieve final compliance at different times between February 1, 1978 and October 21, 1978. Rather than perform four separate emission tests to prove compliance, the plant requests that all emission testing be performed at one time after all the control systems have achieved final compliance. This is being requested to simplify the plant's emission testing and the EPA's involvement in that testing. The plant understands that approval of this request will not alter the final compliance dates proposed in the attached Waiver of Compliance request.

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SOURCE REPORT

A. Name and Address of the Owner or Operator

Continental Oil Company - VCM Plant
P. O. Box 605
Westlake, La. 70669

B. Location of the Source

Old Spanish Trail
Westlake, La. 70669

C. Plant Contact

J. A. DeBernardi, Plant Manager
Phone: (318) 491-5063

D. Hazardous Pollutant Emitted by the Source

Vinyl Chloride

E. Description of the Source

Chlorine and ethylene are reacted to form crude 1,2 dichloroethane (EDC) in a direct chlorination reactor. The product EDC is combined with EDC produced in an oxychlorination process and a recycle EDC stream from the vinyl chloride producing process. The combined EDC stream is purified first in a wash system and then in two distillation towers. The first tower produces a light ends byproduct, and the second a heavy ends byproduct.

Pure EDC is thermally cracked in a gas-fired furnace to form vinyl chloride (VCM) and anhydrous HCl. This mixture is purified by two stages of distillation to separate the heavy ends and the HCl from the VCM. The VCM is then redistilled to separate uncracked EDC which is recycled back to the purification system as mentioned above. The pure VCM is neutralized, dried and stored in pressure spheres.

The HCl separated in the above process is reacted with oxygen and ethylene in a multi-stage oxychlorination process to form EDC. This EDC is also processed through the purification system mentioned above.

Storage is provided in the plant for several grades of EDC, VCM product, and two liquid organic by-products. All of the VCM product is shipped out by ship or railcars.

The maximum capacity of the plant is 700,000,000 lbs./yr. of VCM. The average amount of vinyl chloride produced during the past 12 months is 54,183,000 lbs/month.

A block flow drawing is attached to illustrate the plant process flow and the sources of the principle plant vent streams.

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F. Description of Each Point of Emission of VCM Within the Source

1) C-500 Stack, VS-391

The C-500 stack is the main process vent stack. All plant vents containing vinyl chloride are emitted from the C-500 stack with the exception of those vents listed below in items 2 through 6. The vents normally emitted through the C-500 stack include the direct chlorination reactor vent, the oxychlorination process vent and the vents from the two EDC purification distillation columns.

The C-500 stack is 148 feet high and has a diameter of 3 feet.

The average weight of vinyl chloride emitted is 64,000 lbs./month.

Of the plant vents containing VCM emitted through C-500, only the oxychlorination vent emission is controlled at present. A vent cleanup reactor, R-305, was installed in July, 1975 to reduce the ethylene concentration of the oxychlorination vent as part of the plant's hydrocarbon emission reduction compliance plan. This was the first such oxychlorination vent cleanup reactor to be installed and operated. Upon startup we learned that the reactor could control both the VCM and ethylene emissions in the vent. With the R-305 reactor in operation, the VCM emission in the oxychlorination vent has been reduced by 55%. However, unexpected heat releases on start up and catalyst problems have occurred, resulting in reactor downtime. These problems have limited the reactor stream factor to 80%. Stream factor is defined in this report as the number of days a unit actually operated divided by the number of days the unit could have operated, excluding periods when the plant is shut down for general, scheduled maintenance.

The VCM emission in the oxychlorination vent averages 4000 lbs./month with R-305 in operation.

2) EDC Wash System Vents

Three vessels in EDC washing service presently vent to the atmosphere through two adjacent vents. These vents are 43 feet high and are 4 inches in diameter. The 320 lbs./mo. of VCM emitted by these two vents is not controlled.

3) Process Waste Water

All process water streams are stripped in a steam stripper to recover chlorinated hydrocarbons from the water before discharge to the effluent treatment system. The material stripped from the process water is a mixture of steam, VCM, and other chlorinated hydrocarbons. The stripper removes approximately 95% of the VCM in the process waste water. The monthly discharge of VCM in the process waste water leaving the stripper is 200 lbs./month.

Of the VCM stripped from the process waste water approximately 5% is vented to the atmosphere from the EDC wash system vents described in Item (2) above. Approximately 85% of the stripped VCM is vented from

the downstream light ends distillation tower and the light ends tank vent. The remainder of the stripped VCM leaves the plant in the light ends by-product.

The stripper's stream factor has been limited to approximately 85% due to problems with the lining in the stripper bottoms line and corrosive/errosive attack of the strippers' steam sparger, packing supports and acid brick lining.

4) EDC Purification Tanks

The vents from the three tanks in EDC purification service can all contain VCM. The three tanks are the dry crude tank, T-450; the wet crude tank, T-453; and the light ends storage tank, T-402.

The T-450 vent is 50 feet above ground and is 6 inches in diameter. The tank vent emits less than 1 lb./month of VCM.

The T-453 vent is also 50 feet above ground and 6 inches is diameter. The tank vent emits approximately 7 lbs./month of VCM.

The T-402 vent is 50 feet above ground and 3/4 inches in diameter. The tank vent emits approximately 260 lbs./month of VCM.

The venting occurs due to thermal expansion of the vapor in the tanks and due to filling of the tanks. However, the tanks are operated under a slight pressure (2 inches of water for T-450 and T-453, 8 psig for T-402) and are vented to the atmosphere through back pressure relief valves to minimize unnecessary emissions.

5) Loading Vent Stack, VS-400

The nitrogen purged from rail cars and ships during loading, the rail car slip tube level indicator vents, and the VCM purged from loading hoses before disconnect are vented to the atmosphere through the loading vent stack. The stack is 148 feet high and one foot in diameter.

The average VCM emission per month from the loading vent stack is 6,150 lbs./month. Of the vents emitted from the stack, only the ship and rail car loading purge is controlled. A refrigeration system was installed in December, 1975 as part of the plant's hydrocarbon emission reduction compliance plan. The refrigeration system reduced the VCM emission in the rail car and ship loading purge vent by 75%. The refrigeration unit has a stream factor of approximately 90%.

6) Dock Vent Stack, VS-600

VCM is purged from the ship tanks during sampling and from the clearing of the hydroquinone injection system and the loading hoses. These purge streams are vented to the atmosphere through the dock vent stack. The purge streams cannot be returned to the plant refrigerated vent recovery system since they can contain oxygen. Th VCM emitted in these purge streams from the dock stack averages 1870 lbs./month. The stack is 148 feet tall and one foot in diameter.

G. Description of Fugitive Emissions Within the Source

1) Pumps

There are 15 centrifugal pumps in VCM service in the plant. Thirteen of the pumps are equipped with tandem (double) mechanical seals to minimize seal emissions. The cavity between the seals on each pump is connected to an oil reservoir which is vented to the atmosphere. The seal oil cavity operates at essentially atmospheric pressure. The remaining two pumps are canned, sealless pumps. There are no reciprocating pumps in the plant in VCM service.

2) Compressors

The one reciprocating compressor in VCM service has two packing seals around the piston rod at either end of the rod's stuffing box. The stuffing box is vented to the atmosphere. The one centrifugal compressor in VCM service has two mechanical seals. The cavity between the seals is nitrogen purged to the atmosphere. The compressor is located at the dock.

3) Relief Valves

There are 48 pressure relief valves in VCM service that are not equipped with rupture discs. These valves relieve to the atmosphere.

4) Manual Venting

At present the VCM vented or purged from equipment in VCM service is emitted to the atmosphere. This occurs primarily during plant turnarounds once every 9 to 10 months.

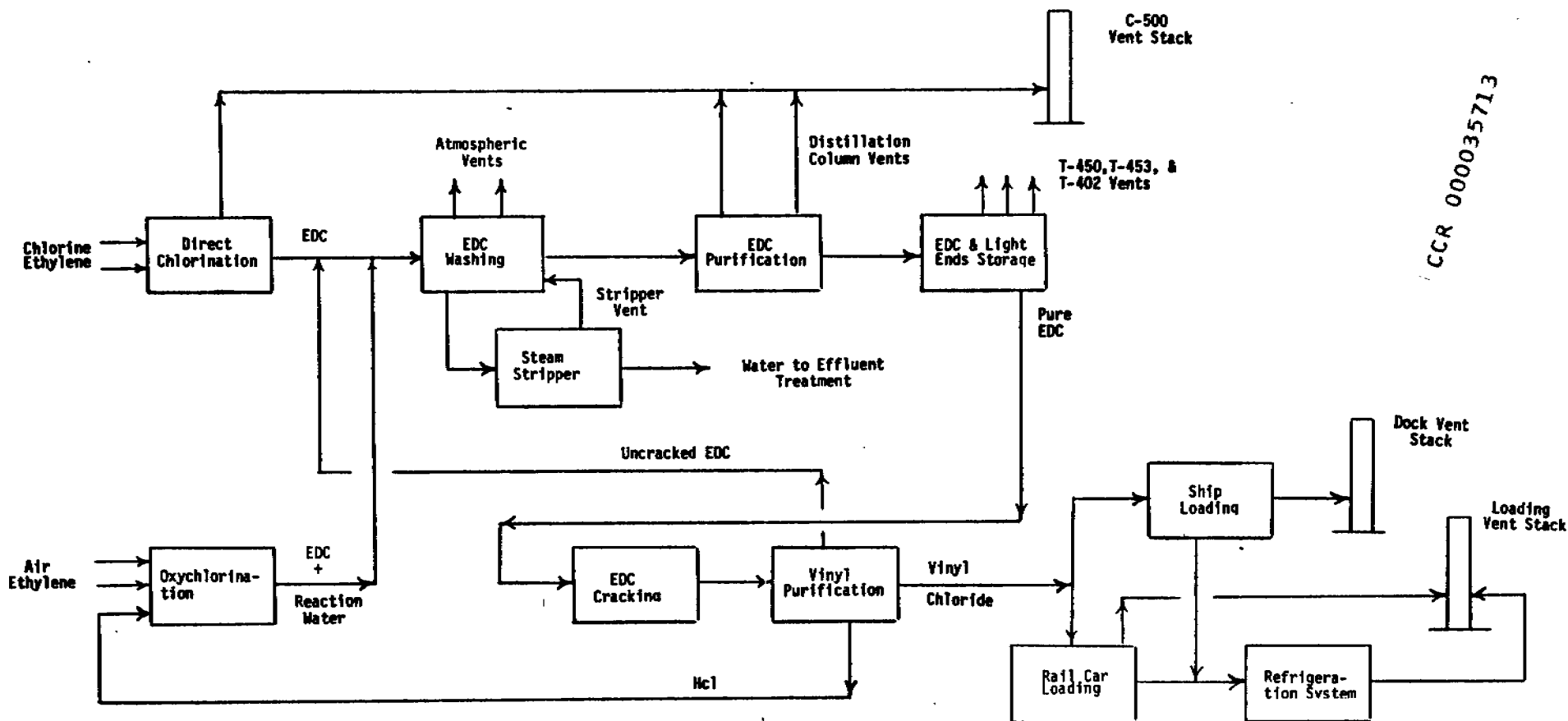
H. Statement of Non-Compliance

The emission points listed below cannot comply with the standards prescribed in the National Emission Standard for vinyl chloride by January 19, 1977, 90 days after the October 21, 1976 effective date of the standard. Therefore, a request for waivers of compliance with the standard is attached to this source report.

1. C-500 Stack, VS-391
2. EDC Wash System Vents
3. Process Waste Water
4. EDC Purification Tanks
5. Loading Vent Stack, VS-400
6. Dock Vent Stack, VS-600
7. Fugitive Emissions
 - a) Pumps
 - b) Compressors
 - c) Relief Valves
 - d) Manual Venting

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VCM PLANT
BLOCK FLOW DIAGRAM & VENT IDENTIFICATION



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REVISIONS					
NO	DATE	BY			
1					
2					
3			DRAWN BY	SCALE	MATERIAL
4			CHE'D	DATE	DRAWING NO.
5			TRACES	APP'D	

REQUEST FOR WAIVER OF COMPLIANCE

I. Processes Involved

Continental Oil Company operates a VCM Plant at Westlake, Louisiana. That plant has six VCM emission points and four areas of fugitive emissions that cannot comply with the National Emission Standard for vinyl chloride on January 19, 1977. The six emission points and the fugitive emissions are listed below. Please refer to the plant's Source Report (attached) for more descriptive information on the plant and the emissions.

- A) C-500 Stack, VS-391
- B) EDC Wash System Vents
- C) Process Waste Water
- D) EDC Purification Tanks
- E) Loading Vent Stack, VS-400
- F) Dock Vent Stack, VS-600
- G) Fugitive Emissions
 - 1. Pump
 - 2. Compressors
 - 3. Leakage from Relief Valves
 - 4. Manual Venting

A waiver of compliance is requested for these six VCM emission points and the four areas of fugitive emissions.

II. Controls

- A) The following control devices will be installed or revisions made to improve the operation of existing control devices to reduce the emissions of VCM to a level acceptable under the above emission standard.

1) Thermal Incineration System

A thermal incineration system will be installed to incinerate all process vents containing vinyl chloride now emitted through the C-500 stack with the exception of the oxychlorination process vent. The vents from the EDC purification tanks and the loading operation vents will be incinerated as will the vents from the oil chamber between the double mechanical seals on 13 centrifugal pumps and the vent from the stuffing box of a compressor in VCM service. Gases manually vented from equipment in vinyl chloride service will also be incinerated.

The incineration system will include a 48 MM BTU incinerator designed to operate at 2400°F with a 1½ second residence time. Also, included in the system will be a waste heat boiler to recover part of the heat of combustion and a hydrogen chloride (HCl) absorption column to recover the HCl by-product of the combustion of chlorinated hydrocarbons. A caustic scrubbing column will be installed to control the HCl and chlorine content

of the incineration system exhaust gas. Vent headers will be installed to collect the different vents being incinerated.

The proposed compliance schedule for the installation of the incineration system is listed in Item III of this report. The completion dates for the first four steps are based on a construction schedule developed in part from vendor equipment delivery time estimates. The final compliance date of October 21, 1978 will provide only 21 days of operating experience with the incineration train before compliance is required.

2) Oxychlorination Vent Cleanup Reactor, R-305

The oxychlorination process vent VCM emission is presently being controlled by the vent cleanup reactor, R-305. This reactor was installed in July, 1975 as part of the plant's hydrocarbon compliance plan and designed to control ethylene emissions in the oxychlorination vent. It was the first such reactor to be placed in operation. On startup we learned that by increasing the chlorine feed the R-305 reactor would reduce the VCM content of the oxychlorination vent by 55%. Subsequent operating experience with the reactor has demonstrated that the reactor can control the VCM content within the limit specified in the standard; namely, 0.2g of VCM emitted per kg of ethylene dichloride (EDC) produced by the oxychlorination process.

However, the R-305 VCM removal is heavily dependent on the operation of the oxychlorination process and the chlorine feed control. Small variations in either the ethylene and VCM concentrations of the vent gas or the chlorine flow to R-305 can cause large changes in the reactions and heat releases occurring in the reactor. Since the reactor contains over 100,000 pounds of catalyst and has no provision for cooling, a small change in the reaction and heat release occurring in the reactor can cause the reactor bed temperature to increase to the point that the reactor, the reactor's catalyst, or downstream equipment is damaged or destroyed. Heat releases have occurred in the past that have required quick action to prevent the reactor bed temperature from reaching the point where damage would occur.

Also, the reactions occurring within the catalyst bed and catalyst requirements are not well understood. The reactor's first charge of catalyst was expected to have a usable lifetime of two years or more. However, the catalyst bed degenerated and formed a cement type plug in the bottom third of the reactor after only eight months of operation. The catalyst cement was extremely difficult to remove. After two months of work, a catalyst removal scheme using a combination of water soaking and jack hammers was developed and the spent catalyst was removed. Based on analyses of the spent catalyst, the catalyst loading pattern was revised, and the reactor returned to operation. Although the reactor has operated satisfactorily for five months with the revised catalyst

bed, similar catalyst bed problems or new ethylene and VCM emission control problems may develop in the future as the catalyst ages.

The combination of unexpected high heat releases and catalyst deactivation problems have resulted in a reactor stream factor of only 80%. Stream factor is defined in this report as the amount of time the piece of equipment actually operated divided by the amount of time the equipment could have operated, excluding plant shutdowns for general, scheduled maintenance and repairs.

The plant requests that the requirement for the oxychlorination unit vent to comply with the VCM emission standard be waived until October 21, 1978 to provide sufficient operating time for the plant to learn what reactor controls and catalyst loading patterns are necessary to ensure the desired control and reliability of control of the oxychlorination vent emissions. This will also provide time for the plant to better perfect the spent catalyst removal technique to minimize reactor downtime.

In addition to the reactor optimization work discussed above, the plant will install piping to shorten the time required to cool the spent catalyst bed before removal of the catalyst. Revisions will also be made to shorten the time required to heat the reactor catalyst bed to the minimum operating temperature before startup. These changes are necessary to prevent extending the downtime of the plant during the annual maintenance shutdown due to the present inability to cool the spent catalyst bed and heat the fresh catalyst bed within the time available.

Refer to Item III of this report for the five compliance step dates proposed for the R-305 system. The first four compliance dates involve the mechanical design and installation of the catalyst bed cool-down and heat-up piping discussed above. Since the necessary reactor system control or catalyst loading changes are dependent on the plant's operating experience with the reactor and are not known at present, they cannot be included in the compliance schedule steps. However, we do intend to have the control system revisions and catalyst bed loading changes implemented by the October 21, 1978 final compliance date.

3) Process Waste Water Steam Stripper Revisions

All process waste water streams are stripped in a steam stripper to recover chlorinated hydrocarbons, including VCM, from the water before discharge to the effluent treatment system. The VCM content of the waste water leaving the stripper is below the 10 ppm VCM concentration limit in the VCM emission standard. However, as discussed in the plant's Source Report, approximately 90% of the VCM recovered from the waste water by the steam stripper is now vented to the atmosphere

through the two EDC wash system vents and the Light Ends distillation column and Light Ends product tank vents.

Numerous material problems have been experienced within the stripper system. The Kynar lining in the bottoms outlet line has frequently collapsed, the stripper packing supports and steam sparger have failed, and the acid brick lining has required repairs. These and other problems have limited the stripper's stream factor to approximately 85%.

The plant is in the process of replacing the Kynar sections of the bottoms line with a solid furan line to eliminate the downtime resulting from collapsed liners. However, this is not expected to make the stripper as reliable as desired. Therefore, a second spare steam stripper will be installed. The stripper will be instrumented in a way to ensure that it removes VCM from any process waste water not stripped by the original steam stripper.

The proposed compliance schedule for the installation of the second backup steam stripper is listed in Item III of this report. The first four dates deal with the mechanical design and construction and are based in part on vendor estimates of the delivery time for the second stripper vessel. Since 90% of the VCM recovered by the steam stripping system will continue to be vented to the atmosphere until the vent incineration system is in operation, the final compliance date requested for the steam stripper system is the October 21, 1978 final compliance date of the incinerator.

4) Portable Carbon Adsorption System for the Dock Vents

A portable carbon adsorption bed system will be constructed to adsorb the VCM vented during sampling of the ship hold tanks and during the clearing of the loading hoses and hydroquinone injection system. The carbon beds will also absorb any VCM in the nitrogen purge from the centrifugal compressor seals. The adsorption system will use four Calgon Vent-Sorb adsorption beds in parallel to recover the VCM in these vent streams. Each adsorption bed will contain 150 pounds of activated carbon. The carbon bed system will be returned to the plant for regeneration. The VCM vapors from the regeneration will be incinerated in the incineration system described in Item II. A. 1) above.

In addition, the hydroquinone injection system will be revised to greatly reduce the volume of VCM vented to the adsorption beds.

The proposed compliance schedule for the carbon adsorption system is listed in Item III of this report. The mechanical design and construction compliance dates are based on our estimate of the work involved and equipment deliveries. Since the carbon regeneration vent will be incinerated, the final compliance date requested for the portable carbon adsorption system is also October 21, 1978.

5) Install Rupture Discs Under Pressure Relief Valves in VCM Service

Rupture discs must be installed under forty-eight pressure relief valves in VCM service to comply with the emission standard.

The compliance schedule for this work is listed in Item III of this report. The mechanical design and construction compliance dates are based on our estimate of the work involved, and on vendor estimates of the delivery times required for rupture discs component parts. In this case, the final compliance date of February 1, 1978 coincides with the completion of construction date.

B) Interim Emission Control Steps

The emission control steps that are and can be taken to reduce VCM emissions from the six plant emission points in the interim before completion of the installation or revision of the four plant control devices are listed below.

1) C-500 Stack

The majority of the VCM emitted from the C-500 vent stack is vented from the light ends distillation tower in the EDC purification section of the process. That vent cannot be reduced until the vent incineration system is in operation.

However, the VCM emission in the C-500 stack resulting from the oxychlorination process vent is and will continue to be controlled by the R-305 vent cleanup reactor. This reactor will reduce the VCM content of the oxychlorination vent to or below the 0.2 g of VCM emitted per kg of EDC produced by oxychlorination limit in the emission standard. Based on past experience with the R-305 reactor, the oxychlorination vent VCM emission will be controlled 80% of the time during the interim before final compliance while the plant is working to optimize the reactor control scheme and catalyst loading pattern.

2) EDC Wash System Vents

The VCM emissions in the EDC wash system vents cannot be reduced until the vent incineration system is in operation.

3) Process Waste Water

The VCM content of the process waste water is controlled below the 10 ppm limit of the VCM emission standard when the steam stripper is in operation. Past operating experience indicates that the stripper will be in operation 85% of the time. The part of the stripper downtime resulting from collapsed liners in the stripper bottoms outlet line should be eliminated when the Kynar lined sections of the bottoms line are replaced with solid furan pipe. The furan pipe installation will be completed by March 31, 1977.

4) EDC Purification Tanks

The VCM emissions from the EDC purification tank vents cannot be reduced until the vent incineration system is in operation.

5) Loading Vent Stack, VS-400

The VCM emission in the nitrogen purged from rail cars and ships during loading is partially controlled at present by a vent refrigeration system. The refrigeration system recovers 75% of the VCM in the vent gas. Its stream factor is estimated to be 90%. The VCM concentration of the vent gas leaving the refrigeration system is between 4 and 6 vol. %.

Further control of the loading purge emission will not occur until the vent incineration system is in operation.

Control of the rail car slip tube level indicator vents and the VCM purged from loading hoses before disconnect will not occur until the vent incineration system is in operation. These vents can contain oxygen and therefore cannot be processed with the existing vent refrigeration system.

6) Dock Vent Stack, VS-600

The VCM emissions from the dock vent stack will be reduced by approximately 50% by revising the hydroquinone injection system to reduce the volume of equipment in VCM service that must be cleared after each injection. The hydroquinone system revisions will be completed by July 1, 1977. Further reduction in the dock stack VCM emission will not occur until the vent incineration system is in operation.

7) Fugitive Emissions

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a. Pumps

Thirteen centrifugal pumps in VCM service in the plant are equipped with tandem (double) mechanical seals to minimize seal emissions. The cavity between the seals on each pump is connected to an oil reservoir which is presently vented to the atmosphere. When the vent from the oil chamber indicates that the process side seal has deteriorated, the pump is taken out of service and the seals repaired or replaced. Further control of these pump seal emissions will not occur until the vent incineration system is in operation. There are two canned, sealess pumps in VCM service. There are no reciprocating pumps in the plant in VCM service.

b. Compressors

The one reciprocating compressor in VCM service has two packing seals around the piston rod at either end of the rod's stuffing box. The stuffing box is presently vented to the atmosphere. Further control of the stuffing box emission will not occur until the vent incineration system is in operation. The one centrifugal compressor in VCM service has two mechanical seals. The cavity between the seals is nitrogen purged to the atmosphere. The VCM emissions in that purge will not be controlled until the portable carbon adsorption system and vent incinerator are in operation.

c. Relief Valves

Seventeen of the plant's pressure relief valves are already equipped with rupture discs to minimize VCM emissions due to leakage. Minor leakage from the remaining 48 relief valves in VCM service will not be controlled until the installation of rupture discs under those relief valves is completed on February 1, 1978.

d. Manual Venting

The VCM emissions resulting from manual venting of equipment in VCM service will not be controlled until the incineration system is in operation.

e. Leak Detection and Elimination Plan

The plant will use a combination of two multipoint area monitors and a portable hydrocarbon detector to detect major VCM leakage. Action will be taken to correct such a leak once it is pinpointed. For more information, refer to the plant's Leak Detection and Elimination Plan submitted to Mr. Gary Bernath of the EPA on December 4, 1976.

III. Proposed Compliance Schedule

The compliance schedule proposed for the four emission control projects and the rupture discs installation is attached.

In the event that the standard for vinyl chloride promulgated by the Environmental Protection Agency on Thursday, October 21, 1976 is modified, CONOCO believes that there could be a severe crippling of CONOCO's ability to comply with the requirements of any waiver requests or waiver, especially the compliance timetable for scheduled action. Currently, our program for compliance totally depends on engineering and constructing control devices which will meet the conditions of the standard now in effect. Changes in this standard due to review, negotiation or litigation could make it necessary to choose an entirely different control strategy which could make it impossible for us to comply within the strict timetable provided by the Clean Air Act.

We request, therefore, that the Environmental Protection Agency take notice of possible delays in compliance due to changes in the standard, and give us advice and guidance to establish a new schedule for compliance if the control strategy in our waiver request is insufficient for our compliance to the requirements of a modified standard.

	<u>Start Mechanical Design</u>	<u>Award Contracts or Order Equipment</u>	<u>Start of Onsite Construction.</u>	<u>Completion of Construction</u>	<u>Final Compliance Date</u>
1) Thermal Incineration System	1-15-77	5-1-77	1-1-78	10-1-78	10-21-78
2) Oxychlorination Vent Cleanup Reactor, R-305	2-15-77	4-1-77	7-1-77	2-1-78	10-21-78
3) Process Waste Water Steam Stripper Revisions	6-1-77	10-1-77	4-1-78	8-1-78	10-21-78
4) Portable Carbon Adsorption System	2-15-78	4-1-78	6-1-78	8-1-78	10-21-78
5) Rupture Disc Installation	2-15-77	4-1-77	8-1-77	2-1-78	2-1-78

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