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National Emission Standard for Vinyl Chloride  
CFR 40, Chapter I, Part 61  
Sub - Part F

Article 61.10, Source Report  
Non-Solvent Polyvinyl Chloride Process  
Union Carbide Corporation  
Texas City Plant

This report presents the information requested by Article 61.10 for the Non-Solvent PVC Process at the Texas City location. The first page of the existing source report form has been used, but the other information is presented in a form which identifies all the emission points for VCM and indicates which presently meet the new EPA standards and which do not. For those emission points which cannot be modified to meet the standards within 90 days, waivers have been prepared and are submitted along with this report.

The current operating design capacity of this unit is nominally 25 MM lb/year of Non-Solvent Vinyl Resins.

I. VCM Recovery Systems

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The Non-Solvent PVC process employs three different unit recovery systems to recycle almost all of the monomer which is not polymerized in the process. These

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systems are designed to receive all possible VCM containing streams (from whatever source in the unit is compatible) to reduce VCM levels to the point that any traces of VCM can only be further eliminated by incineration. Unrecovered traces of monomer vent from the last of these recovery systems with mainly ~~nitrogen~~ and hydrocarbon inerts to the No. 1 Powerhouse fuel gas system, which leads to the ultimate destruction of any VCM in this stream.

Non-Solvent resin is produced by a continuous polymerization process. The resulting resin-monomer slurry is fed from the reactors to the first stage of the #1 Recovery System, a steam heated stripping tank. In the stripping tank a very high percentage of the unreacted monomer is flashed off, ~~and~~ condensed in the remainder of the #1 Recovery System and transferred to storage tanks for re-use. Process water is added to the stripping tank and the resulting resin-water slurry is pumped to the Flash Tank which is heated by a temperature controlled steam sparger. A continuous vacuum is pulled on this tank by the CFF-Gas Recovery System to further recover unreacted monomer. Monomer recovered in the CFF-Gas Recovery System is condensed and reused in the Suspension PVC process.

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The unrecovered VCM venting from these two systems along with nitrogen and hydrocarbon inerts is then routed to the Vent Recovery System where a solvent is used to scrub the VCM from these streams. The VCM removed here ultimately is returned to the ~~Suspension~~ #2 Recovery System where it is recycled to the ~~polymerization~~ process.

The off gas from the Vent Recovery System which contains more than 10ppm VCM mixed mainly with nitrogen and hydrocarbon inerts is routed to the No. 1 powerhouse where it mixes with the plant fuel gas and is burned with the boiler fuel. If the Vent Recovery System is out of service for maintenance or some emergency situation the by-passed streams can be routed to the No. 1 Powerhouse for incineration in the boilers as indicated above. As a last resort the No. 3 Olefins Flare can be used to incinerate these streams. See attached block diagram of the Recovery Systems

| <u>Recovery System Removal Efficiencies</u> |        |
|---------------------------------------------|--------|
| No. 1 Recovery System                       | 94.0%  |
| Off Gas Recovery System                     | 98.4 % |
| Vent Recovery System                        | 99.7 % |
| No. 1 Powerhouse                            | 99.9+% |

## II. Amount of VCM Involved

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The average VCM usage for the Non-Solvent Vinyls process for the 12-month period of October 1975 thru September 1976 was 1,341,360 lbs/month.

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Letter

## Non-Solvent Report

Part A

Because of the necessity for providing manual cleaning of the Non-Solvent autoclaves,

Due to the nature of the Non-Solvent operation, it has been critical to reduce the monomer levels in the autoclave to 1 ppm after steaming to allow for <sup>personnel</sup> entry. It is ~~the~~ Standard Operating Procedure to test each autoclave with our area VCM analyzer (specific for VCM to < 1 ppm) <sup>to verify</sup> opening. Last data indicates that we consistently meet the 1 ppm level <sup>by this procedure</sup> based on the autoclave size (802 <sup>gals</sup>) and the average production ~~there~~ between openings (100,000 lbs) ~~is~~ much less than the two ~~the~~ pounds of VCM allowed in the standard for the above specified production. is achieved.

as per

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R. H. May

KATHY

Don't go  
beyond  
where it  
says PART (A)  
we've got a  
P coming to  
put there.

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UCC  
052829

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Please Route To:

P. Delesandri  
A. J. Giacchino  
A. J. Isome  
J. S. Matlock  
H. D. Webster

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### III. Emission Sources Meeting Requirements

#### A. 61.64(a) Reactors

The opening losses from the Non-Solvent autoclaves are controlled by displacing the VCM in the reactors with steam, to the #1 Recovery System. The following procedure indicates how the VCM levels in reactors are reduced so that emissions will be less than 0.02 gm/Kg of dry resin produced.

Before opening to the atmosphere the Non-Solvent reactor must first be steamed to the #1 Recovery System for a period of <sup>at least</sup> one hour. With the available 70 lb steam this amounts to a volume displacement, in the autoclave, of 1.5 times, which with the corresponding temperatures, removes the vinyl chloride from the vessel to the acceptable level stated in the standard.

Part A →

#### B. 61.65 (b) Manual Venting of Gases

No ~~manual venting~~ of gases, except as provided in Article 61.64(a)(3), is permitted in the Non-Solvent Vinyls Unit. All vessels which may require venting are connected to one of the VCM recovery systems previously described so that all air emissions, except during emergencies, may be prevented.

C. 61.64 (b) Strippers

As described in the recovery system relationships, all vapor streams from slurry stripping operations go to the #1 Recovery System during positive pressure stripping and to the Off-Gas Recovery System during vacuum stripping.

For eliminating UCM from these vessels for opening, the purge procedure described in the Suspension Vinyls Initial Report applies (page 6).

D. 61.64 (c) Mixing, Weighing and Holding Containers

The same procedures used for strippers, described above, ~~also~~ apply to all mixing, weighing and holding containers in the Non-Solvent process. This includes the following pieces of equipment: storage and feed tanks, recovery system equipment, pumps and compressors.

E. 61.64 (d) Monomer Recovery Systems

See description under part I of this report.

F. 61.65 (b) Fugitive Emission Sources

See the Initial Report for this process for the status of the various fugitive sources. As a point of information, a listing of those items in compliance follows:

- 3) Leakage From Pump, Compressor and Agitator Seals.
  - (i) Rotating Pumps
  - (iv) Reciprocating Compressor
  - (v) Autoclave Agitators

- (5) Manual Venting of Gases
- (6) Opening of Equipment in UCM service (other than reactors)
- 7) Samples
- 8) Leak detection and elimination

#### IV. Emission Sources Requiring Waiver of Compliance Requests

##### A. 61.64(c) Sources Following Strippers

The Non-Solvent process has strippers in operation, so the 400 ppm weighted average concentration of monomer in the resin applies. A waiver of compliance has been filed with the required dates and plan of action to meet the standard.

References to waivers for test method 107 can be found in the Suspension PVC Source Report, page 4.

##### B. 61.65(b) Fugitive Sources

From the initial report the following items are included for requests for waiver:

(3)(u)(2) Stripping System Agitators, Double Mechanical Seals.

- (4) Leakage from Relief Valves -- includes a request for equivalency <sup>and waiver</sup> for use of O-ring Seal <sup>pressure seal</sup> safety valves and an associated waiver request for time to order and install rupture disc assemblies to place under existing safety valves should the equivalency ~~for~~

be denied for the O-ring modification.

C. 61-68 Emission Monitoring -- Boiler Stack Analyzer

Refer to the Suspension PVC SOURCE REPORT, page 5, for information regarding this waiver. ~~waiver~~

D. Other Sources Not Previously Identified

Refer to the Suspension PVC SOURCE REPORT, page 5, item D-2 ~~concerning the~~ for information concerning this source. (Monomer Recovery System Vent, Tracupac Drain).

E. Analytical Methods

~~Refer to the Suspension PVC SOURCE REPORT, page 6, item E, for information regarding waivers on analytical methods.~~

The Wainwright Request is → SUSP. VENTS -

Solvent Wash + Storage Tank Vents.

"Slurry Shipping Improvement Project."

Need a list of what Vents will be collected in this project - A small flow diagram would probably be very good - showing what is now existing & what the project will provide to correct the situation -

Need to get ROSS MAX to provide this - to be phoned in to Gary Burnath - possibly followed up by a letter w/ DIAGRAM - if necessary -

At any rate, put the info into Wainwright Request file & please request to indicate actual info submitted.

Phoned ROSS MAX On 15 FEB 77 @ 0740 HOURS - HE WILL SUBMIT THE ABOVE INFORMATION ~~to~~ ESTIMATE JFE OR MYSELF AS SOON AS IT COMPLETED. ~~ESTIMATE~~ COMPLETION DATE - 16 FEB 77.

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called Burnath 3:30 PM 2/15/77

told him ONLY 1 Vent - OK he says Wainwright not ready to vent back

Source Request - 19.5 - 0-1 - MEK WASH-TK VENT

only one Vent involved - This only one

No other Vents involved here - other tanks

The project is modified, this will go to regular recovery system - press. controller into low pres. → 3<sup>rd</sup> vent SYSTEM. PUT IN NEW TK for higher pressure to enable flow down to lower pres. → EXISTING SCRUBBER

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EPA -

On Waiver Simp PIC

6164 D solo. Wash

& Storage TK vents

MEK wash Tank Vent

Other Storage Tank

Vents

Gary Barnath

214 749 7675

SLURRY STRIPPING IMPROVEMENT PROJECT

(Vap Tank vents - one identified = MEK -  
what are the other ones?)

JBL talked to RLF - Row May not until Mon.

(OVER)

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Susp.

Water Streams to #3 Stripping Tank

Off Gas Recovery System - 60 gph fairly constant

Non-Solvent Tanks - 190 gph (daily avg) <sup>1500 gal</sup> 800, shift

Suspension Recovery Tanks - 190 gph (daily avg) <sup>1500 gal</sup> 800, shift

These streams are all approximately 300 ppm UCM

Water leaving #3 Stripping Tank - 300 ppm  
at approx 440 gph  $\pm 100$