

Firestone

INTEROFFICE

DATE June 9, 1975

TO MR. C. J. KLEINERT

FROM P. J. FOLEY

REFERRING TO LETTER OF

SUBJECT HIGHLIGHTS OF THE VINYL CHLORIDE SAFETY ASSOCIATION MEETING

On May 15th and 16th, the Vinyl Chloride Safety Association held a meeting in Boston, Massachusetts. The meeting was well attended with 75 representatives of 35 companies including many from other countries. This report is presented as an outline utilizing the agenda subjects and order.

1. EPA: Discussion of Proposed Standard; W. W. Madden, Firestone.

Bill covered some of the key points of the latest EPA revised emission standard.

Dispersion Resin--Two thousand PPM of VCM are now allowed in the stripped polymer.

Suspension Resin--If less than 400 PPM in a stripped polymer; dryer, silos and conveying air emissions are exempt from the 10 PPM maximum. Blend tanks are still included.

Process water up stream of stripping is to be no more than 6 PPM. This excludes centrifuge effluent.

All fugitive emissions must be below 10 PPM. For example, purging vinyl unloading.

Dilution air is not supposed to be used to get the levels down.

There was much discussion about emissions from the floor. Tenneco's Charles Crain claims to be using carbon adsorption on a vent condenser and slurry blend tanks for the past 3½ months. He had no data on cycle times, but claims these systems work well. Blend tanks are closed and nitrogen is purged through into the adsorber system. The concentration varies from a few PPM to many thousand.

Joe Mudd, General Tire, is thinking of burning fugitive emissions in the boiler. Corrosion is the big question.

Diamond Shamrock, Deer Park, Texas, and a plant in New Jersey are getting pressure from state pollution control boards to reduce total hydrocarbon emissions.

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Regulations in foreign countries vary. German and Canadian representatives claim their countries are imposing fence-line VCM in air concentration standards. England and Sweden do not have a standard as yet. In England there is pressure by the enforcement agencies to have PVC manufacturers reduce concentrated stream emissions.

2. Variances; B. Toole, B. F. Goodrich.

Goodrich applied for a variance to allow use of a half facepiece mask with carbon canister to 10 PPM. They have had poor employee acceptance of the full facepiece type mask. They would have tried for up to 25 PPM with the half facepiece mask but tests indicate some leakage at that level.

This variance was submitted to NIOSH and was approved as of two days before the meeting. It will not be published and will be handled as a "clarification" in letters which will be sent to all area directors. This is to avoid the publicity.

In further discussions, Goodrich intends to use a dual flow carbon cartridge mask provided by MSA. At levels above 10 PPM, the mask and hose can be plugged into an air line system.

At present, air canisters are used; one per shift even though service life is 4 hours. Their studies indicate actual exposure per shift is less than 4 hours.

According to Toole, Ray McClure, head of the OSHA Compliance Division, indicated that OSHA is expecting some exposure when switching from one mask type to another.

Mask usage is about the same for the total industry--very little.

3. Breathing Air Safety; Joe Mudd, General Tire.

Joe went through a general description of his piped breathing air system. Details of this system are available to Firestone in an earlier report. What's worth commenting on is some of the operating conditions and why the unit was put in in the first place.

They don't want carbon canisters and don't use them now because of past experience in their Phosgene facility. Canisters were found unreliable. Bottled air was used but found too dry and irritating to employees.

The piped air system is working well. The dew point of the air is +21°F. The air intake is located in the warehouse and a carbon filter keeps the air purity below .1 to .2 PPM VCM. The carbon filter is changed every 6 months. The lines are traced outside but there are still some condensate problems.

Employees claimed the piped air was too cold in the winter. This was remedied by increasing the back pressure on the compressors from 60 to 70 psig.

Going from the control room to the work area is an exposure problem because the men are not plugged into the air system.

Joe estimates that during a shift operating personnel will be exposed to less than 5 PPM TWA for a total of 15 minutes when walking to and from work areas, and therefore, they should not have to use a separate carbon canister mask or a dual flow mask. This is an interesting concept that may be applied to Perryville.

General comments from the audience. Tenneco, Dow and Air Products have piped air systems also. Tenneco had a lost time accident when a man tripped over a hose while working on a ladder in a reactor. He fell and was injured.

4. Monomer Reductions--An Engineering Viewpoint; OSHA vs. EPA; A. Godfried, Borden Chemical.

Mr. Godfried's general message was that at Borden, Leominster, Mass., most of the exposure reduction work has been with ventilation which does not help the EPA problem.

Borden had a particular problem in that the warehouse was between 200-300 PPM. By mass ventilation, they reduced it to 2-5 PPM. The poly areas were brought from 30 PPM to 10 PPM on the average with the same technique. At that point, the inlet air to the poly building was piped to a remote area and the general levels went to 5 PPM.

Fourteen plants have ventilation of 12 air changes per hour. Two have ventilation of above 24 changes per hour. It must be realized that many of these plants are in the South where air changes are cheaper.

There was some discussion from the floor about double seal vinyl pumps. Nash is said to have one available. This is supposed to be expensive and a long delivery. A representative from ICI, England, has tried a double seal pump using water as the inner seal barrier. He finds it effective but gets water in his vinyl.

5. Short Term Shutdown; R. Asti, Stauffer.

This was basically a discussion about Ray's problems with his present slow operation, two weeks down and two weeks up again. The system cools and he gets more gasket leakage and valve bonnets loosen.

Very little discussion from the floor.

6. Norsk Hydro Update: Engineering Controls, Medical Update.

The usual speaker from Norsk Hydro could not attend and the person that made the presentation was not familiar with all the details.

From October, 74, to February, 75, Norsk Hydro shutdown their plant to make system changes to reduce VCM emissions. The changes are:

1. Water drainage systems were enclosed including the trenches. It seems like a dangerous buildup of vinyl could accumulate.
2. High pressure water cleaning was added.
3. The reactors have been tied into the recovery systems for pull down before opening for cleanout.
4. Ventilation to the silos and other spot ventilations goes to stacks now.
5. Recovery systems have been improved and increased.
6. A G. C. monitoring system has been added.
7. Increased building ventilation.
8. Fire deluge system has been added.
9. The people are equipped with half facepiece carbon canister masks and piped air masks as standby.

Obviously many of the changes are in the same direction the rest of the industry is going. They have started up again running 10 out of 24 reactors.

The 12 point Bendix indicates a 1 TWA in the reactor area. Three people per shift are checked with carbon tubes and/or air bags including readings with masks on. Ninety percent of the readings are 1 PPM or less. The average for all readings was 3 PPM.

This means they still have some problems where personnel readings are 20 PPM or more.

They guarantee 20 PPM or less in their resins and have discontinued other types that are difficult to strip.

On the medical picture, Norsk Hydro ran a mortality and health study which indicated the health hazards from working in a PVC plant are low. A summary copy of this study is included. They do claim that exposure to VCM has caused limited genetic damage to some of the employees tested. Further studies are planned to learn more about this.

C. G. Carlsson, Kema Nord, Sweden, described their Engineering Controls Program at this time.

A little different approach was used in that general ventilation was not increased. They are doing such things as providing a recovery blowdown system, enclosing the recovery area, stacking the discharge air from the blend tanks and other spot ventilation using 12 meter stacks.

Stripping is now performed in the reactors rather than in separate vessels. This, of course, has reduced capacity. All recovery equipment will be moved outside plus gas holders will be installed before the compressors.

Personnel TWA's went from 20-40 PPM down to 2-4 PPM. Total capacity is 150 million lbs. per year. The total cost for changes will be \$2½ million. Again, they don't have the EPA to worry about as yet and I can't believe this will recoup all lost capacity.

7. New Plant Construction and Start-Up Under the Standard; E. Biehl, Atlantic Tubing.

Ed is finishing construction of what has to be the last of the small PVC reactor plants to be started up. His discussion mainly centered on how tough it is in Massachusetts to put a new PVC plant in. Rhode Island was said to be worse.

One interesting item, there will not be any vinyl pumps in the building and charging will be done directly from the tank farm pumps through a turbine meter. He should have trouble with this one based on our experience as to the reliability of turbine meters. A redundant system, two turbines in service with flow cross check, would be satisfactory.

There was discussion from the floor from the Production Superintendent of Georgia-Pacific's new 20,000 gallon reactor, Wacker Process, plant in Louisiana.

The OSHA regulation caused them to make some last minute changes before start-up. Double seal pumps and piped air system were added. Additional weld testing of the equipment and pipes was performed. The process was computer simulated with H₂O before start-up with VCM. This was found to be very helpful.

We of course, will water test all VCM systems in E-Resin before start-up.

They had people problems with those that had not worked with VCM before. In some cases people quit.

A study was conducted relating area VCM in air samples using a 24 point Bendix against personnel bag samples. Based on this, a punch card system was developed where a man punches a card in and out of an area and the time is logged and entered in the computer and his average exposure is determined. There is good correlation between the computer system and personnel bag samples.

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In the last 4 weeks, personnel bag monitoring has been averaging .5-1 PPM in the worst areas and with few exceptions, they expect to operate below the regulated limits without masks. The poly area is open.

Joe Barr of Air Products does not have a new plant going up, but changes are being made to the existing facility. They intend to use the same contractors over and over again and for these people Air Products will pay for medical checks and keep records. For infrequent visitors, "casual contractors", such as the candy vendor and the telephone man, the companies involved have been notified that it is their responsibility to make medical checks and keep the records.

8. VCM Levels in Resin; P. Bogart, Tenneco.

Pete was also program chairman and he cut this one out of the agenda by simply saying that nothing that has not already gone to press could be discussed.

9. True Confessions: Accidents and Incidents; R. L. Frantz, Union Carbide.

There are a number of problems that people had worth writing up.

Union Carbide has three small Peroxy-Dicarbonate freezers in a work area. The catalyst is stored as concentrate (not cut in solvent). The compressor froze up, there were no alarms on these units and the freezers heated up. A fire occurred but no explosion. They have since gone to temperature alarms.

Another outfit had a catalyst blockhouse burn down. Again the catalyst is stored as a concentrate in jugs on skids. This stuff was supposed to be refrigerated to 35°F. This is a little high for even ACSP. The fire appeared to start with skids stored against one of the outside walls. They have since restacked the skids keeping them away from the walls.

Most people don't handle catalyst as a bulk solution as we do.

Joe Mudd, General Tire, blew a sufficient amount of vinyl through an open valve to require evacuation of the poly building. One man went back in with a Scott Air Pack on and closed the valve. A report was filed to OSHA without incident.

A Hooker plant had partial combustion in a recovery system. A spring closed valve on the suction of their compressors failed to close totally. Sufficient air was sucked in to heat up the system including the recovered monomer tank. They have since gone to air closed valves, provided an oxygen analyzer with alarm and a high temperature alarm with shutdown of the compressors.

John Floros of Great American Chemical had his whole plant between 20-40 PPM for 3 days. A tank had been installed to handle entrained and soluble vinyl from the recovery system water blowdown. Fifteen psig steam was used off the condensate system and directly sparged into the tank. The vinyl pressured up to 60 psig and backed up through a faulty check valve all the way to the boiler. The tank is now heated indirectly.

10. OSHA Compliance Directive, Questions and Answers; J. Barr, Air Products.

John Barr discussed basically more of the same on what they had done to comply with the OSHA regulations.

Some of the interesting highlights relate to personnel policy. For example, men in regulated areas must carry respirators. It is a dischargeable offense if they don't. Only one person has chosen to use the respirator below 25 PPM. Once a person does choose this direction, he must wear the respirator at all times in the regulated areas. If not, it is a dischargeable offense.

Extensive medical records are kept and these are computerized to keep the paperwork down.

There was a VCM spill that brought the poly building to 200 PPM. OSHA was informed but there was no follow up.

The discussion from the floor centered around what constituted a massive release. Mr. Toole from Goodrich had just attended an Organizational Research Consultants' meeting where Ray McClure, Chief of Compliance of OSHA, attended along with people from the standards office. Mr. Toole related that because of the publicity involved and the fear of changing the standard, OSHA is slow to put things in writing even to area directors on what constitutes a massive release. McClure did feel that just specifying a concentration of 100-200 PPM was inappropriate. He indicated that until a better definition was available, it is up to the individual plants to determine a massive release based upon when their emergency plans must be implemented. If the release was in a non-occupied area, this did not count. Exposure seemed to be the most important thing. If people had masks on, this is not so serious.

The discussion then went to inspections. Five plants have had OSHA inspections since April 1. John Floros talked about his. They took two days and interest centered on the condensed versions of the health and exposure records. The inspectors wanted to be sure that every man in the regulated areas had a Type C mask. They talked to many employees about how long and when masks were being worn. Some 8-hour exposure samples were taken.

John did not get a citation.

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Walt Iliff, Uniroyal, Cleveland, had a 3 day visit. Again, the inspectors wanted to look over the records, training, medical and mask usage. The 3 people involved seemed green and still learning. Fifty, 15-minute carbon tube samples were taken. Walt thinks he will get a citation because the monitoring system did not have alarms as yet. Apparently they did not ask for a variance. These inspectors were disturbed that the people did not carry the masks at all times in a regulated area.

Goodyear Throwbridge, Niagara Falls, had an inspection. Again, records and procedures were reviewed. The main purpose was to take air samples. They took six, 8-hour samples changing carbon tubes every hour. Goodyear was notified that they would get a citation on a man in compound that had a 1.44 TWA and was not wearing a mask.

11. The Vapor Test--Current Status; W. Doyle, FIA.

This was a summary of the work commissioned by a number of companies to study the effects of VCM vapor cloud control by using fine droplet water curtains. Basically, the study group found that a water curtain is effective in directing drift when the wind is about 3 mph. It is not effective when the wind velocity is somewhat higher. They tested at 9 mph. It was determined that a water spray does not absorb VCM vapors. It does dilute them.

The water vapors did not slow the flame speed.

12. Proposed NFPA Initiator Storage Standard; W. Keim, PPG.

This proposed standard, as Mr. Keim related it, pertains mainly to the construction, electrical, ventilation and safety requirements for storing catalyst. The final wording should come out next year. All catalyst we use will come under the regulation.

13. Shortstops--New Developments; A. A. Peterson, Union Carbide.

Mr. Peterson finds that Sodium Nitrite kills a free radical reaction quicker than Styrene or Bisphenol A. It is water soluble, of course, and is quickly dispersed. Reactions have been re-started in the Pilot Plant. An amount of equimolar to the catalyst charge is used.

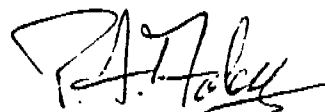
Borden has used this stopper and when water carries over in the recycle, subsequent batches are inhibited.

There does not appear to be any residual effect in the reactors.

14. Refrigeration of VCM Storage Tanks; O. Wilinski, Electrochemical.

This firm is in Isreal where there is a unique problem-- Arab Saboteurs. This fellow was really asking a question. What has been the experience of U. S. companies with refrigerated VCM storage? Electrochemical would prefer to store this way so that the vinyl would not be under pressure. The idea being, that if the tanks are perforated, there would be a more controllable release of liquid.

PPG has bulk atmospheric refrigerated facilities. There are no problems except there should be sufficient emergency power to run the compressor during a power outage.



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