Occidental Chemical Corporation

PVC Resins/PVC Fabricated Products

MEMO

To DISTRIBUTION Date FEBRUARY 16, 1984

From J. A. KING

Subject 1983 VINYL CHLORIDE SAFETY ASSOC. MEETING - OCTOBER 20-21, 1983 - NEW ORLEANS, LA.

Attendance/Membership:

Updated rosters will be circulated when they are received. The meeting was well attended and included considerable foreign representation. Favorable comments were heard on the conduct of the sessions and the content of the presentations.

1984 Meeting Place:

Phoenix, Arizona

1984 VCSA Officers:

Chairman - R. Frohreich, Conoco
Vice Chairman - J. King, OCC
Program Chairman - D. Middleton, Norsk-Hydro, based in England
Secretary - J. Wallace, Esso-Canada
Treasurer - J. Gabbett, Georgia-Pacific

VCSA and the Vinyl Institute:

A new safety subcommittee is to be formed under the V.I., and consideration has been given to inviting the VCSA to join with this new group. At the first day lunch in New Orleans, V.I. Executive Director, R. Gottesman, gave an overview of the Institute's activities and suggested that the VCSA members consider joining the new subcommittee at some future time. However, at the next day's VCSA business meeting, the consensus opinion seemed to be non-committal to negative with two company representatives speaking out firmly against such a move. The issue is, therefore, shelved, at least for a year.

Report on 1983 VCSA Meeting:

Attached.

J. A. KING

JAK:pll

Attachment

OCC 5733

Report On

1983 Annual Meeting - Vinyl Chloride Safety Assoc.

October 20-21, 1983 - New Orleans, La.

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1. Thompson Chemical Explosion; January, 1964; Attleboro, MA: by J. Barr, Air Products

This disaster was extensively publicized at the time (A writeup by Pottstown-Firestone's W. W. Madden is available on request); also, the Factory Insurance Association (FIA) gave a thorough description of the event in its 1970 report - an attempt to obtain this could be made, if desired.

Brief Summary: Started with improper installation of a light glass on a Pfaudler reactor. Early in the reaction of the next batch charged, the reactor operator ordered a maintenance man to check the glass which was leaking slightly. When the glass mounting was tightened the glass ruptured and VCM at 140 PSIG was released. The resulting vapor cloud explosion caused more fires and much damage. The catastrophe eventually caused seven deaths and injuries to other workers. Many errors of procedure and construction were brought to light, of which some were: the glass was of an "old" type, meaning prone to cracking if unevenly stressed; no pressure test was put on the reactor after the glass was installed; the glass was tightened in VCM service; building layout and construction did little to mitigate the affects of such an explosion; the plant was in a residential/school area; crowd control was non-existent. The plant was rebuilt, but some distance away in a rural area near Assonet, MA and started up a year later.

Poll of Meeting:

1. All companies pressure test after sight or light glass changes, cleaning or maintenance.
2. Four companies use swing-line flanges for glasses and other nozzles; claim is that time-saving is 50% of that needed with regular type for maintenance, product changes, etc. and leakage problem is minimal.
3. Twenty (20) companies have no sight or light glasses.
4. Nine (9) companies have glasses on reactors; all are the regular type. Light Glasses: if light is on all the time, there is a danger of chloride stress corrosion in the nozzle welds.

2. Hooker-Burlington Fire, 1968: by J. A. King, OCC

The FIA report of this was circulated in September, 1983. Copies of my presentation of the event to the VCSA are available on request.

3. Goodrich-Plaquemine Fire, 1972: by C. Langlois, B.F. Goodrich Chemical

In this plant's bulk or mass polymerization process the top 30" diameter dome blew off a POPO (post polymerization reactor) during the reaction stage. The vapors ignited and burned for three hours with considerable resulting damage. Three people were burned seriously. There had been no prior indication of mechanical weakness and this led to the conclusion that the dome locking ring had not been properly turned into the locked position.

Remedy: Two wedges are now inserted when the locking ring is fitted to prevent any possible "unlocking". Also, a proximity switch has been installed and this is linked to the VCM charge valve and to an alarm. The reactor cannot be charged if the ring is not properly positioned.

A Japanese company reported discontinuing use of this same type locking ring when a manhead blew off a vessel under pressure test.

4. Goodrich-Altona (Australia) Sphere Emergency Discharge, 1982: by H. Waltemate, B. F. Goodrich

This was an update of revisions made in BFG plants in VCM storage; a 13-page BFG Safety Standard for this is available on request as is a 5-page Maintenance Work Order Standard.

A report of the discharge event was made at the VCSA 1982 meeting in Toronto. My writeup of this is attached as EXHIBIT A.

Since this emergency event, throughout the company BFG:

a) Made the Maintenance Work Order Procedure a Safety Procedure such as that for vessel entry; it is made out on the site of work and not in an office.

b) Began changing valves to air operated, air to open, ball type, quick opening, top entering, remotely operated and fire tested; valves can be operated from two locations just outside dikes and from one other remote location.

c) Began installation of properly sized relief valves; many were found undersized.

d) Began installation of automatic deluge systems on all VCM storage tanks with priority on spheres; system is activated by instruments sensing VCM concentration at 50% of LEL (lower explosion limit); the area monitoring system for VCM concentrations has been eliminated for VCM storage; system activation also closes all valves.

e) Began adding more fire water pumps and other fire fighting equipment.

f) Began installing three feet of plastic tubing on the end of the air supply line to the valve actuator; since valves are air to open, melting of the plastic will close the valves.

g) Made use of excess flow valves optional; they had a mixed response from a survey on effectiveness of these in emergencies.

5. Formosa Plastics-Baton Rouge, Tank Car Fire, 1983: by J. Fields, Formosa Plastics

On a July night one operator started loading a VCM car and was relieved by a second who completed the operation. Normal procedure then is to clear the loading hose of VCM by blowing into the car with 140 PSIG Nitrogen before closing the top entering liquid valve. The operator claimed that the hose blew off during the Nitrogen purge, but there is some belief that he may have inadvertently disconnected the hose with the top valve open.

The VCM escaping ignited and the operator was burned. The fire continued for about four days with no means to shut off the VCM escape. The excess flow valve inside was probably improperly installed; the car was new in 1979 and had never been in the shop for maintenance or service; afterward the seat was found out of position preventing the valve from functioning as designed. There were other loaded cars on the track, but damage was confined to only the affected car.

Source of ignition was not known. Since the event the Kem Line quick lock type connectors have been replaced with a screw type. Valves are now remotely operated. Every six months the system is pressure tested at 200 PSIG. Loading operators now sign off on a written procedure check list for each operation.

3. CURRENT CASE HISTORIES:

6. Esso-Canada, Resin Car Failure: by J. Wallace, Esso-Canada

An aluminum, rented, bulk rail car was being loaded with suspension resin. The car was small, 1800 cu. ft. capacity, and was equipped with two relief valves set at 15 PSIG and tested at 25 PSIG. The loading blower was rated at 22 PSIG, max. During the operation the loading line plugged twice. Then at a system pressure of 14 PSIG the side of the car blew out throwing resin about 300 feet. A great flap of metal extending from the center to one end of the car was blown back over the top. The operator was not harmed. It was not known if the relief valves opened.

The cause of the failure is believed to be a poor repair weld made after the car rolled over in a 1977 accident. The site of the center split was at this weld.

7. Esso-Canada, VCM Line Rupture, 1982: by J. Wallace, Esso-Canada

In 1977 a contractor installed a flanged pipe joint in the plant VCM recovery system. In error a Monel flange was welded with 308 SS to a 304 SS pipe. Plant practice is to use 304 SS in any wet VCM service.

In November, 1982 a leak at this flange was detected by the VCM area monitoring instrument. The metal was found badly corroded and the piping was removed. As it lay on the ground someone inadvertently kicked it and the flange fell off at the weld. The obvious cause was galvanic action from dissimilar metals.

A poll of the meeting showed that as many companies use SS as use CS in VCM recovery areas

PPG, Lake Charles; VCM Pump Rupture: by L. White, PPG

The VCM loading pump positioned between two storage spheres was not in operation at the time of the event. The pump had a steel bowl but a cast iron frame. An operator using a second pump in the area heard a loud "bang" and saw VCM liquid spurting 30-40 ft. from the failed pump. The automatic deluge system, activated below the LEL, went on shortly and also closed all valves in the system. The pressure shock in the system in operation caused a minor Relief Valve discharge.

The leak was isolated within 5 minutes and the danger was over within 25 minutes. A monitor 1000 ft. away registered 4000 PPM VCM during the emergency.

Afterward the cast iron pump frame was found split apart with a 6" separation, the steel bolts were sheared off and the pump shaft was bent. Surprisingly, the pump seal was intact.

It was also found that the pump and a length of the loading line were closed in by block valves and full of VCM. Normal practice is to leave systems full but open "somewhere" to allow for thermal expansion.

The cause was believed to be either pressure buildup in the closed-in system from thermal expansion exceeding the strength of the cast iron frame or the frame had a flaw leading to failure at a lower pressure.

ICI reported that cast iron is prohibited in its plants for VCM service.

9. Conoco, Texas; Tank Car Derailment, 1982: by D. Ashby, Conoco

Company got a call about midnight about a derailment near Pittsburg, Texas. Five VCM cars had derailed and some were leaking into a creek. Within five hours, five Conoco people were on the site and advised the authorities of the nature and hazards of VCM. On request they went in with self contained breathing gear and found one car already emptied of its VCM, two leaking under the water of the creek and two not leaking. They got VCM readings on their portable instrument 100 yards from the site.

A Railroad supervisor arrived and after consulting the Conoco team agreed to let the leaking cars vent to a safe condition before attempting to move them and clear the site. This required 18 hours and was aided when a strong wind came up.

The cars were then rolled upright and the site was cleared. About one mile of track was then repaired and put back in service in 7 hours. Later the remaining VCM was transferred to other cars and all derailed cars were purged; this required three days. Estimate of VCM saved was 500,000 pounds with 300,000 pounds lost.

There were no injuries nor health affects to humans or the cows drinking the creek water a mile downstream. A tree 100 feet away suffered frost damage from VCM vapor. State police had good crowd control, about 100 people, and kept the incident low keyed.

EPA and an EPA contractor monitored the creek and air above it:

Creek	:	50 ft. downstream - 3% VCM initially
		150 ft. downstream - 10-20 ppm VCM
Air above Creek:		50 ft. downstream - 3% VCM initially
		150 ft. downstream - non-detectable VCM

Conoco's policy is to respond to such emergencies believing the Railroad does not have proper expertise, that good public relations must be fostered and that many dollar savings can be made.

). Occidental-Pottstown; Accident During High Pressure Water Cleaning, 1983:
by J. A. King, OCC

This event in September which resulted in a fatality has been extensively documented by the PVC Resins Div. Safety Manager. For information of this accident, contact G. D. Lloyd, ext. 6599, Pottstown.

l. Salzburg, Austria; VCM Tank Car Rupture, 1983:

When a 20 car train crossed into Italy from Austria, the Italian customs people rejected one overloaded VCM car because of overweight. The car was sent back without a documented explanation to its original source, a PVC plant near Salzburg.

It arrived during the Easter holidays, on Friday, when the plant was shut down and most of the employees absent. The car was parked in the center of the plant about 350 ft. from the nearest building.

On Monday, the car ruptured. An electrician saw a white cloud and gave the alarm. What equipment was in operation was shut off. Fire water was put on the car. A liquid jet of VCM was seen spurting from the top of the car at the center. There was no fire.

11. Salzburg, Austria (Continued)

VCM concentrations just outside the fence were 1200 ppm, but were less than 10 ppm at the nearest house. In an hour in-plant readings were less than 10 ppm.

The car was moved to the unloading area, emptied of VCM and refilled with water. The only damage was a slit in the shell at the top center of the car about 1" wide by 6" in length.

The conclusion was that the shell failed from overpressure, but the cause of the overpressure was not known. The car had been overloaded by human error but not sufficiently to cause metal failure. The pressure on the car at failure was not known nor did the speaker know the allowable pressure for VCM cars. The car had no Relief Valves and this is standard practice in Austria. The company extensively revised its tank car loading and handling procedures and instituted retraining of operators.

C. HEALTH

12. Angio Sarcoma Update: by J. Barr, Air Products

Data on this subject, as of October, 1983, is attached as EXHIBIT B. J. Barr strongly urged that all companies keep the VCSA informed of new developments on angio sarcoma and other VCM related cancers. There is no official data center for this data and, until 1983, this information was gathered by a Dr. John Stafford, ICI, England, and as best he could from voluntary submittals worldwide. Dr. Stafford has retired and this important activity will now be handled by J. Barr, Air Products, P. O. Box 538, Allentown, PA 18105; telephone: 215-481-8343.

The speaker reported the results of studies that show alcohol consumption increases the effects of VCM. Alcohol is metabolized the same as VCM in the liver. He pointed out that VCM is itself not a carcinogen in the liver, but that it results in formation of a chemical there that is.

13. PVC Dust: by J. Vaughn, ICI, England

In 1979 ICI did a study of 818 operators in which lung function was tested and chest x-rays were taken. The employees also were questioned on general health, life style, etc. Conclusion was that PVC dust caused some abnormality in lungs as shown on x-rays, but that these were on the same order as those found in studies of cigarette smoking.

In 1981, all 818 employees plus 229 more were studied in the same way and the results were the same.

Since then ICI has monitored the work place and the employees. The Government is giving considerable attention to this program.

Workplace ambient air is sampled and analyzed by use of ICI's Standard Method ENA/2/2 attached as EXHIBIT C.

Air breathed by workers is controlled, sampled and analyzed according to ICI's Guidance Note EH 31 attached as EXHIBIT D. This limits Total PVC dust to 10 mg/cu.meter and respirable dust to 5 mg/cu.meter of air. A respirable dust particle is one less than 5 microns in size.

13. PVC Dust (Continued)

(As a matter of interest, ICI has developed Guidance Notes for all areas of health and safety and a list of these is attached as EXHIBIT E.)

After one year the monitoring results show excursions above the company-set limits of 10-25% of the tests, both Total and Respirable PVC dust. However, the company knows that some employees deliberately influence the sampling to give high readings.

ICI makes mostly dispersion resins. They have made substantial improvement in dust control especially in the bagging areas.

J. Barr of Air Products reported that in one of their suspension resin plants, ambient air testing results show excursions of total dust sometimes but never for respirable dust, at same ICI limits.

D. Safety Equipment

14. Monitoring and Leak Detection, VCM - Dow, LA: by M. Nevill

a. Personnel Monitoring

The Dow, LA VCM plant is not an OSHA regulated plant, but they do some personnel monitoring for assurance of that status. Frequency depends on a person's job: plant manager - twice/year; some operators - 8 times/year. If anyone's result is above 1 ppm VCM, that person is checked once per month for a time to confirm that the result was a one-time excursion. Certain operators are checked for 15 minutes at locations and times when VCM concentration might be the highest encountered.

Poll of meeting: Eleven companies use the VCM badges while 19 use the air pumps.

A question was raised: should personnel monitoring records be kept for 30 years? There was not much response although both Dow and Goodrich reported that they do not.

b. Leak Detection

Dow uses the Beckman 6700 or 6710 FID VPC (Flame Ionization Detector, Vapor Phase Chromotography) area monitoring instruments. Four 10-point analyzers cover the plant. Sample streams are pulled continuously. Accuracy is within 1 ppm VCM. Data is fed to a computer.

This raised a question: How long should such a computer record be kept? No one seemed to have an answer.

Monitored levels of 5 ppm VCM trigger an investigation by the Leak Patrol. Specific leak locations are pinpointed by use of the portable HNU instrument. Dow's leak definition is a one-time reading of 10 ppm VCM, 6" from the source. This is the definition being considered by the State. Dow claims the HNU is essentially trouble free. The Patrol searches a different quarter of the plant for leaks once per week. For area concentrations above 25 ppm VCM cylinder breathing air is used. No carbon cartridge masks are used in the plant.

Poll of the meeting, Leak definitions:

a. 25 ppm VCM at distance of 6"
b. 10 ppm VCM at distance of 6"
c. 10 ppm VCM at distance of 12"

d. 10 ppm VCM at distance of 6", but then soaked with soapy water, if no bubbles are seen, it is assumed there is no leak.

15. Valve Position Indicator Switches: J. McCulley, Vista (formerly Conoco)

A questionnaire had been sent to each company prior to the New Orleans meeting. There were several responses sent late, and even some submitted at the meeting, so that a compilation could not be shown. This will be sent to all companies who replied when all submittals have been tabulated. For OCC, Pottstown and Addis responded.

The speaker recommended that a valve stem's position is the important need-to-know rather than the valve operator position.

E. Safety Programs

16. Plant Evacuation: T. Jones, Goodrich

In an emergency the plant in Convent, LA might discharge chlorine, ammonia or hydrogen - and neighbors are close. Because of this an emergency response and evacuation plan has been established for shift personnel:

a) First step is to classify the emergency as either major or minor; nearest supervisor does this; general steps that follow below are then developed in different degrees of complexity and scope as events progress based on the severity.

b) A command center is activated; there are two established with communications, equipment, bottled air, weather instruments, etc. Selection of which to use is based on wind direction. A designated supervisor assumes command until relieved by a superior.

c) Communications are established as needed within the plant and with outside authorities and service organizations and with company management and other personnel.

d) A control team is called in, if the emergency requires it; the team is for support; they do not "do" anything to help at the emergency site. Plant environmental personnel deal with Gov't agencies on hazards to humans and the environment.

e) Evacuation is ordered as needed for major emergencies - plant, neighbors, etc. in concert with local authorities.

Each plant group has one person already assigned to account for all members in the emergency whether or not there is an evacuation. The company has found that this seemingly simple function is sometimes difficult and is considered mandatory. The responsible person does this by visual count.

f) Control actions to stop the release or other emergency are coordinated through the command center - as are all notifications, shutdowns, evacuations and returns to normal.

g) Information which has been found helpful in dealing with emergencies includes company policies on security and public relations and, of course, hazardous materials data.

The plant conducts a drill twice a year on day shift.

17. Safety Performance Assessment: J. Vaughn, ICI

ICI employs about 2,000 people in several plants of its Petrochemicals and Plastics Division in England and several products are made at each site.

Company realized that a primary safety problem was worker complacency and, in 1980, set out to remedy this.

They formed teams which were sent to conduct safety surveys in areas where the members had little or no experience; even in offices. There were one-day tours conducted once per year.

The teams are advisory only and have a makeup of 12 people, maximum:

Works or Division Manager
Plant Manager
Plant Engineer
Foreman
Safety Representative
Shop Steward
A Worker

Teams rated areas poor to excellent on survey forms on:

1) Written manuals and procedures - availability, up-to-date, being used, etc.
2) Permits - for work, for entry, etc.
3) Fire and gas emergency procedures and drills
4) Actions after events, actual and near-misses - corrections, follow up, etc.
5) Housekeeping
6) Work areas - signs, escape routes, safety of visitors, etc.
7) Handling flammables - storage, use, accessibility of fire fighting equip., etc.
8) Chemical hazard and toxicity - awareness, complacency, etc.
9) Environmental and health in waste handling - procedures, implementation, etc.
10) Lone workers - monitoring, provisions for safety, etc.
11) Supervisor and worker training, especially new workers
12) Worker retraining - ICI believes workers off a job six-months need retraining even after years on that particular job.
13) Safety consultations - on shop floor by Foreman, Safety Repres. and workers
14) Internal checks of safety program

Notice is given to an area prior to its inspection. Company believes this promotes awareness.

ICI concludes the surveys are not difficult to conduct, are beneficial and are not onerous to the workers.

Poll of meeting: DuPont STOP safety program:
Eight companies use it -
Georgia-Pacific: noticed loss of interest by contract maint. after 3 months
Goodrich: said program is effective if closely supervised, but not after 2 yrs.
Some attendees doubted DuPont still uses it.

Another poll, Safety Awards:
Fifteen companies give cash awards
Ten give gifts
General feeling was that these are effective

F. Process Safety

18. Controlling Runaway Reactions: A. Peterson, Ga. Pacific

GP defines a runaway as any reaction requiring special cooling or other measures beyond normal control of temperature and pressure.

Preventive Measures are:

1) Proper type and quantity of catalyst
2) Proper amount of VCM and water
3) Operator check of charts, previous batch control, etc.
4) Operator check of status of cleaning, repair, etc.
5) Operator check of proper operation of valves, alarms, etc.

Actions on Stoppage of Agitator

1) If agitator cannot be restarted in five minutes, a water soluble short-stop is added; if that does not control, a VCM soluble short-stop is added.
2) If more control is needed, the reactor is then vented to the recovery system.
3) Further control, put on maximum cooling.
4) Last - use an empty vessel if one is available.

This is varied if some agitation can be regained to: maximum cooling, then short-stop and finally vent to recovery or empty vessel.

Actions on Gradual Pressure Rise Above High Pressure Alarm with No Temperature Rise:

High Pressure Alarm activates at 10 PSIG above reaction pressure.

1) Stop adding any more batch ingredients
2) If needed, add water soluble short-stop
3) For further control, add VCM soluble short-stop

Actions on Pressure and Temperature Rise Above Low Pressure Alarm:

Low Pressure Alarm activates at 5 PSIG above reaction pressure.

1) Check temperature control; block steam addition valve
2) Put on maximum cooling
3) Vent to recovery system

If reaction is half done, VCM soluble short-stop is added; if near completion and already on maximum cooling, water soluble short-stop is added.

Actions on Pressure and/or Temperature Rise Above High Pressure Alarm

High Pressure Alarm activates at 10 PSIG above reaction pressure.

1) Water soluble short-stop is added
2) Then VCM soluble short-stop is added
3) Reactor is put on maximum cooling
4) Reactor is vented to recovery system
5) Reactor is vented to empty vessel, if one is available

GP has excess capacity in their recovery system. They can inject short-stop remotely using high pressure water or nitrogen. They also have a standby generator for power failures.

Poll of meeting:

25 companies manually charge catalyst; 7 do this automatically

15 have back up power generators; 14 do not

Agitator stop alarms: 15 companies have these linked to rotation of agitators and 14 to the agitator drives

GP vents to the recovery system or empty vessel only enough to control the runaway. They do not manually vent to atmosphere, but instead rely on Relief Valves.

Poll of meeting: Only 7 companies have in their procedures manual venting to atmosphere. Two have flares capable of receiving one runaway PVC reactor batch.

Results of the Runaway Reaction Control Questionnaire sent out prior to the meeting could not be compiled due to late submittals. A report will be issued later to those making submittals. For OCC Addis and Pottstown did so.

"Burping" Reactors: This is a measure to aid the mixing in of short-stop.

Ethyl's procedure was to open a 4" ball valve for five seconds, wait 20 seconds and repeat this, if necessary. They claim it is effective.

Poll of meeting: Five companies that do it say it works.
Esso-Canada reported a mixed response on effectiveness at its plants.

G. Regulatory

19. Update of EPA Court Action: W. C. Holbrook, Goodrich

This was a poll of companies volunteering information on Emergency Relief Valve Discharges of VCM.

Air Products: paid $125,000 for 10 discharges in Kentucky

Ethyl: Justice Dept. suit for $2.4MM was dismissed in Louisiana District Court; emergency discharge provision is not enforceable being a work practice standard.

OCC/Firestone: J. King gave general overview

Borden: 3 Suits

1) Massachusetts: Gov't wants $100,000 for four 1982 discharges; Court rules provision in VCM Standard is enforceable since "no discharges" means zero discharges and zero is an emission limit. Company appealed and expects an out of court settlement.

2) Louisiana VCM Plant: Suit is for 34 discharges, 18 of which were not reported within the 10-day limit; same court as for OCC/Firestone and Ethyl; no court decision yet.

3) Louisiana, Monochem: Suit was for both Emergency Discharges and process emissions excursions; company filed a motion to dismiss; a hearing is expected in November.

Goodrich

1) Calvert City, KY: Suit was for 18 discharges and excursions, 16 of which were for bypassing the VCM incinerator; 14 were less than 100 lbs. VCM each. Trial date was Dec. 16; EPA amended its suit to cover only the incinerator excursions.

2) Louisville, KY: Suit was 17 discharges, 12 of which were less than 100 lbs. VCM each; company filed motion to dismiss.

3) California: Three State law suits for process emission excursions

1. Settled first for $3500
2. Settled second for something less than $3500
3. State now asking $10,500 for one leak, one emergency discharge, two Reactor Opening excursions and one violation of the ambient air standard.

Conoco : Two suits

1) Oklahoma City: for 6 discharges, 3 of which were large volume and one, at least, a rupture disc discharge; company is citing dismissal of Ethyl-OCC/Firestone suits and lack in VCM Standard of prohibition of rupture disc releases.

2) Lake Charles, LA: for 14 rupture disc discharges and 2 process emissions excursions; company is using same arguments as for Oklahoma City.

Many companies have received Section 114 letters of request for information on discharges and process emissions excursions; some are for everything except minor leaks.

Some companies say that EPA is pressuring States to file suits.

Texas is reviewing all PVC and VCM plant permits and will tighten requirements.

Union Carbide settled a suit for its latex plant in Somerset, NJ; VCM was used as a comonomer.

H. Small Vessels

20. Pilot Reactor Emissions: J. Wallace, Esso-Canada

This concerned vessels of less than 50 gals. capacity. A questionnaire had been sent out prior to the meeting. Submittals were late so that the report will have to be issued later to those who made submittals. OCC Pottstown was one of these.

J. A. KING

JAK:kh

ADDRESS TO THE VCSA ANNUAL MEETING - OCT. 20-21, 1983

NEW ORLEANS - MARRIOTT

: Hooker-Burlington Fire of 1968; J. A. King; Occidental Chemical Corporation; lanager, Environmental Compliance; PVC Resins Division

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s presentation is based almost totally on the FIA report since nothing written ıld be readily found in plant or corporate files. Also, none of the personnel) might have reliable memory of the fire is still with the company.

)ker-Burlington was the first U.S. plant built with the French Pechiney mass PVC ymerization process. The plant continues in operation to this day. No water, emulsifying or suspending agents are used in this process. Catalyst and VCM : charged to a pre-polymerization reactor, PREPO, which is a vertical, cylindrical, tated vessel jacketed for heating and cooling. Reaction proceeds for about two ırs at 180 PSIG to about 10% conversion.

: PREPO feeds, separately, four post-polymerization reactors, POPOS. These are ·izontal, cylindrical, agitated vessels also jacketed for heating and cooling. ior to receiving the initial, partially reacted batch from the PREPO, catalyst and l are charged to the POPO and the vessel is put under vacuum.

: PREPO contents are then transferred to the POPO followed by a "rinse" of VCM also)m the PREPO. The POPO is again put under vacuum to a final specific weight of the :al mass. Reaction then proceeds for several hours at 180 PSIG.

: [redacted]nt water supply storage consisted of one overhead 400,000 gallon tank. This ; replenished by two deep wells each having a pump of 500 GPM capacity. The plant located about one mile from one of the East's major rivers, the Delaware. A large)sum plant adjoined the boundary on one side of the Burlington plant.

the time of the fire, Saturday, March 16, 1968, the plant was in the third week of :bugging". For this reason French Engineers were on site but, on that day, they l gone to New York City on a sight-seeing tour.

about 11 p.m. an operator in the control room remotely opened the 4", hydraulically :rated valve in the line between a PREPO and one of the POPOS to transfer the itial batch to the POPO. At once, he "saw a flash" from his position in the control)m. He immediately activated the fire water deluge system.

:er a short delay from someone's shutting down all electrical power, the fire pumps ·e activated. Although there was heavy, black smoke in the reactor area, some doubt ıt there was actually a fire caused a delay in calling in outside help. As the)ke generation continued the local fire company was called in.

ınt personnel and members of the local fire company, using self contained breathing ır, went in and confirmed that the fire was from VCM leaking from the lower flange the 4" transfer valve.

With the great consumption of water thru hoses and the deluge system, it became apparent within two hours that the supply would shortly be exhausted if the leak could not be stopped. The overhead tank was being replenished at 1000 GPM but the two fire pumps alone were taking a total of 6000 GPM. Water had to be conserved to protect the rest of the plant. Therefore, at 1 a.m. Sunday, a procedure of fire pump use began and continued thru the remainder of the emergency: 15 minutes on and 15 minutes off. Apparently, damage to the transfer valve prevented its being closed which would probably have sealed off the VCM in at least one vessel, the PREPO, as a source of fuel. It is not known if there were manual block valves around the hydraulically operated valve and, if there were, if they could be reached thru the heat/fire barrier.

More outside fire companies were called in. Fire water run-off was damned up and pumped back to the overhead tank by two pumpers operated in series; two others brought water from the Delaware River; two more supplied water from the neighboring gypsum plant. In all a total of 9 outside fire companies came in with 16 pumpers and about 100 men. They laid an estimated 20,000 feet of 2½" hose.

A nearby chemical plant supplied foam equipment, but use of foam was stopped after a short time due to the danger of a vapor cloud explosion, if the fire were extinguished and the leak continued.

Early in the emergency a call had gone out to the NY Police to attempt to find the French Engineers and return them to the plant. This was done and they came on site at noon, Sunday. They went in with self contained breathing gear and found the inert Nitrogen system intact and only 7 PSIG VCM pressure on the vessels. They came out, collected all available CO_2 and dry chemical fire extinguishers and went back in, this time accompanied by plant personnel. With these and the inert Nitrogen the fire was put out at 2 p.m., Sunday, 15 hours after the start. There was apparently no danger from residual VCM vapors at that time.

Major damage was to one I beam and the steel plate in the fire area. There was much other damage to piping, instruments, auxiliary equipment, etc. and much water and HCl damage. Cleanup and repainting requirements were extensive. Probably 15,000-20,000# of VCM were lost from the two reactors involved and an unknown quantity from a third vessel which had an Emergency VCM release in the upset condition of the plant.

Initial estimates by the insurer were 4-6 weeks down for repairs and $200,000 loss, but actual numbers could not be obtained.

Cause of the leak was concluded to be improper installation of the hydraulically operated transfer valve after it had been removed for repair after the previous batch thru. In that first use a foreign object had damaged the valve. The valve flanges were of the tongue and groove type. On re-installation the lower flange on the POPO side had not been properly fitted. The hard asbestos gasket could not seal the poor fit. And, worst of all, the system had been pressure tested only on the PREPO side with the valve closed. The leak was relatively small with a low rate of VCM release. This probably limited the damage, but it also resulted in an emergency of 15 hours duration.

Cause of ignition can only be guessed at: static charge - auto catalytic - shattered light bulb - ?

The insurer recommended immediate improvements, the major items of which were:

Installation of a second fire water storage tank of 400,000 gal. capacity;

Establish effective pressure test procedures;

Establish effective programs of training, contingency responses, etc. for emergencies.

JAK:kh
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