



INTER-COMPANY AND OFFICE CORRESPONDENCE

TO: C. A. Mills

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FROM J. C. Lunn

DIV / DEPT Technical

SUBJECT Highlights of the 1988 Vinyl Chloride Safety Association Annual Meeting - San Francisco - September 22-23, 1988

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The annual Vinyl Chloride Safety Association meeting was held at the Hyatt on Union Square in San Francisco on Thursday, September 22 and Friday, September 23, 1988. Highlights of the meeting are as follows:

1. NORSK HYDRO POLYMERS PUBLIC COMMUNICATION PROGRAM

Dave Middleton presented their major accident public communication program. The plant is in the United Kingdom and a program is mandated by law. Copies of their handouts are attached.

2. EUROPEAN REGULATORY UPDATE

Dr. Steegenga, AKZO, very briefly updated current environmental action in Europe. Major points included a new EDC standard for water effluents (2 mg/l daily maximum and 1 mg/l daily average) and that there is a proposal to reduce at sea incineration by 65% by 1991 and completely eliminate at sea incineration by 1994.

3. U.S.A. REGULATORY UPDATE

Jim Kiel, BFG, updated current U.S. environmental action and briefly described new TCLP hazard standards, new U.S. effluent guidelines, new safe drinking water standards, SARA Title III, EPA NESHAP amendments due to VCM settlement agreement, and a brief review of New Jersey's requirement for a comprehensive risk management program for certain products (ammonia, chlorine, etc.). Jim Kiel also stressed that it should be obvious to all in the Industry that long term regulations are leading to a goal of zero discharge from chemical plants and that the Industry should continue to work in that direction.

4. RISK COMMUNICATION

Jim Kachtick, Oxy, presented a summary of guidelines to use when talking with the public about risk. Copies of his paper are attached.

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5. DRUG AND ALCOHOL PROGRAM

Herman Ortega, Air Products, described the Air Products program and gave the following statistics:

In the U.S. there are: 22,000,000 Marijuana Users
6,000,000 Cocaine Users
10,000,000 Pill Users
10,000,000 Alcoholics
5,000 New Cocaine Users/Day

Per the World Health Organization Drug Users

- Have 3 to 4 times the accident rates of non-users on the job and 4 to 6 time the rate off the job.
- Are absent from the job 2.5 times more than non-users.

In the U.S. the 25-35% productivity loss and increased medical cost of drug users costs over \$81 billion annually.

The Air Products program centers around a strong "not allowed" policy and employee training, testing and assistance programs.

6. ETHYLENE FIRE IN FEED LINE TO OXY REACTOR

Dr. Steegenga, AKZO, described an ethylene fire in the feed line to one of their oxy reactors caused by several sections of double block and bleed system vents being tied into a header too small for potential leaks in one of the main double block valves. Because the vent line was too small, and thus built a back pressure, ethylene was forced into an air line. The ethylene ignited and caused the feed line into oxy to glow red. As a preventive measure these systems have been physically separated.

7. OSHA STAR PROGRAM

Jim Kiel, BFG, presented guidelines for entering the OSHA star program. The program essentially recognizes company safety programs that are in the forefront of employee protection as indicated by injury incidents and lost workday case rates. BFG is striving to have its plants become star facilities. A copy of the presentation and information on the program are attached.

8. EMERGENCY REACTOR KILL SYSTEM

Eric Meyer, Vista, presented a paper on their emergency PVC reactor kill system. The kill system was described as a manual system which consisted of a pressurized shot pot and a board mounted pneumatic trip switch. Both the shot pot and the trip switch are pressurized with bottled high pressure nitrogen. Nitrogen pressure and shot pot level are checked at the start of a batch. The Operator initialized kill is activated whenever there exists one or more of the following:

- Power Failure
- Loss of Cooling Water
- Loss of Agitation
- A "Runaway Reaction"
- High Temperature or Pressure (Specified)

The Operator may also kill the reactor at his discretion. Vista uses "AMS" as the short stop agent.

9. EPA LITIGATION UPDATE

Joe King, Oxy, presented an update on EPA litigation. He did not; however, list the recent Borden settlement. A copy of the update is attached.

10. OPERATING DISCIPLINE IN A VCM PLANT

Gary Phillips, Dow Chemical, presented a paper on the Dow concept of operating discipline. Dow's definition of operating discipline is "the implementation, utilization, and maintenance of our best technology in our manufacturing operations." Dow's program is broken down into personnel discipline, engineering discipline, and auditing discipline. The auditing of Dow plants is very extensive but is at the heart of their program. A copy of the Dow paper is attached for review.

11. VCM CONTAINMENT

Jeff Sommerman, Formosa, presented a paper on the recent implementation of a VCM containment system for their Delaware City PVC plant. The system basically allows reactors or other VCM vessels to automatically vent to a VCM containment system at near 80% of the safety relief valve setting, thus preventing system releases to the atmosphere. A copy of the Formosa paper is attached.

12. VINYL INSTITUTE ACTIVITY UPDATE

Roy Gottesman, Vinyl Institute, presented a paper on the activities of the Vinyl Institute. The paper is in some detail, however, it does a good job in describing the ongoing Vinyl Institute activities and current Governmental actions which impact on VCM/PVC. A copy of Roy's paper is attached for review.

13. ANGIOSARCOMA REGISTRY UPDATE

Dr. Bryan Bennett, M.D., ICI, updated the cases of angiosarcoma (ASL) with the following information.

ASL occurs in the general population at an incident rate of 1 in 10,000,000. In the UK one would expect 2 to 7 cases per year and in the US 15 to 20.

VCM is one of several chemicals that can cause ASL, others include arsenic, thoratrast, anabolic steroids, copper and oral contraceptives in high doses.

Blood tests will not detect ASL until it is too late. As an example he showed pathology reports on individuals whose liver was over one third consumed with ASL that had perfectly normal liver function tests. The reason he states is that ASL isn't truly liver cancer but cancer of the connecting tissues.

As of January 1988 there were 138^{*} world wide deaths of which only 2 were VCM plant workers. The breakdown is as follows:

USA	38	<i>*attributed to VCM exposure</i>
West Germany	31	<i>∴ PVC - see below</i>
France	22	
UK	13	
Canada	12	
Sweden	5	(includes 1 monomer worker)
Italy	5	
Yugoslavia	4	(includes 1 monomer worker)
Japan	3	
Czechoslovakia	2	
Belgium	2	
Norway	1	

The incidents appear to be decreasing.

The age at onset of ASL is as follows:

35-39	12
40-44	24
45-49	20
50-54	21
55-59	22
60-64	22
65-69	10
70-	7

No one whose initial exposure to VCM has been after 1974 and the stricter VCM regs has developed ASL to date.

The major number of cases by company are:

BFG, US & Canada	27
Union Carbide, US	10
Dynamit, West Germany	12
B.P., UK	10
Wacker, West Germany	9
ATO Chemical, France	10

Of those who developed ASL the following holds:

The average number of years between onset of ASL and first exposure to VCM is 25 years in the US and 23.3 years average worldwide. Average years worldwide of exposure to VCM and development of ASL is 18.6 years.

Worker assignments versus development of ASL are:

Operator	75 cases
PVC Rx Cleaner	57 cases
General Maintenance/Filter Maintenance	8 cases
Other	26 cases
Unknown	22 cases

Estimated exposure potential by year is estimated as follows:

1944-55	1000 ppm
1955-60	400-500 ppm
1961-70	300-400 ppm
1973	150 ppm
1975	<5 ppm

Dr. Bennett points out that a cigarette smoker is exposed to between 5 and 27 nanograms of VCM per cigarette.

He said that VCM is a mutagen, therefore in theory there is no safe level, that VCM is a multi-organ animal carcinogen and a proven human carcinogen.

He said that the chance of a VCM worker getting ASL due to natural causes (assuming 200,000 workers worldwide) is 1×10 to the minus 9. The chances of a worker getting ASL who is exposed to the current standard levels of VCM is 1×10 to the minus 12.

14. INCIDENT REPORTS

Norsk Hydro - O. Aas

A fire occurred in the Norsk Hydro VCM plant on September 18, 1988. Between 10 and 20 tons of VCM/EDC was released during the fire event. The plant was shutting down due to a non repairable leak near a condenser in the cracking section. When the plant was coming down an elbow blew out on a quench reflux pump and directed a stream at the cracking furnace. The EDC/VCM was ignited by the furnace and burned for several hours. Norsk Hydro believes the failure was due to corrosion/erosion in the quench piping. The fire was allowed to burn itself out and the plant was cooled with fire water and foam. Due to the recent nature of the fire no additional information was available.

Georgia Gulf - Frank Borrelli

Georgia Gulf had a small VCM flash fire in their Delaware City PVC plant. The plant was built in 1966 and is made up of small reactors operated in a manual mode. All are inside one building. During the incident the control room acknowledged a vapor alarm set at 20% of the L.E.L. and the VCM monitor indicated 600 ppm. Three Operators went to investigate the

area and at that point the deluge system activated due to the L.E.L. reaching 80%. A flash fire occurred near reactor 404. One Operator experienced 1st and 2nd degree burns. There was no explosion only a momentary flash fire. The other Operators secured the area and found that the fire was limited to within 15 feet of the manway on reactor 404. The reactor had been opened within the past 15 minutes for cleaning. There was no evidence of any valves leaking into the reactor. The source of VCM was the reactor. An Operator error had occurred during the start-up of a second reactor and the wrong valve had been opened into the opened reactor 404. When the Operator had noted his mistake he shut the valve and then apparently ignored the fact that he had put VCM into the open reactor. The Operator no longer works at the plant. The source of ignition is believed to be one of two: (1) an open electric light fixture with the globe removed was near the reactor and (2) electric heat tracing in the area was damaged.

Norsk Hydro - O. Aas

Norsk Hydro experienced two VCM releases from a PVC plant caused by misalignment of rupture disc piping. A copy of the Norsk Hydro paper is attached for review.

Grupo Primex - J. Zarate

Grupo Primex, Mexico, experienced a failure of an automatic blind system in which a 14" blind blew out and released an estimated 10 tons of VCM to the atmosphere. The plant personnel suspect that a pin was missing in the mechanism that holds the blind to the stem. They have been working with the manufacturer of the valve to improve the design and are reviewing other options. They have also instituted a check program for the blind valves.

15. SUMMARY OF ATTENDANCE

66 Persons Attended
14 Countries Represented
17 U.S. Companies
15 Non U.S. Companies

The next meeting of the VCSA will be held in Boston, Massachusetts.



J. E. Lunn, Jr.

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Attachments

cc: W. P. Leonard
J. L. Russ
G. T. Hennings
C. C. Jones
N. M. Lattimore
H. J. Accardo
P. F. West