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SUMMARY OF PRESENTATIONS
1989 VCSA ANNUAL MEETING

A. Explosion in a PVC Reactor - Georgia Gulf

This occurred on February 2, 1989 at about 7:30 a.m. in a 5,000 gallon suspension resin reactor. The reactor had been steamed as part of the evacuation procedure. The fire began began when the agitator was "bumped" by the operator as a test. It turned out that the agitator shaft was b nt (8-1/2° deflection from vertical) and it struck a temperature probe, causing a spark. The evacuation had not been done properly and VCM vapors had been inadvertently transferred into this reactor from an adjacent out-of-service reactor under pressure. Air had entered the reactor from an open purge line.

Georgia Gulf went to a higher grade of stainless steel with a better method of assembly in the replacement agitator shaft. They are considering bracing the agitator gear box to prevent some "flexing" which has been experienced on the reactor dome.

B. Incident at EDC Cracking Unit - Wacker

This occurred at 9:30 a.m. on December 11, 1988 in Wacker's VCM plant when a coil in an EDC cracking furnace burst. A secondary detonation occurred during the cooling down phase when air entered the furnace and mixed with the remaining unburned organic vapors. The reason for the incident was high temperature corrosion due to overheating of the Inconel 600 pipes.

More information on Wacker's corrective actions will be presented at next year's VCSA meeting.

C. Explosion in VCM Plant in 1988 - Norsk Hydro

This occurred in Norsk Hydro's VCM plant near Oslo in September, 1988. A pipe ruptured in the reflux system on a quench tower associated with an EDC cracker. The gas cloud that formed was ignited by a gas burner in the cracking furnace. The resulting fire caused serious secondary effects: the outlet line from a liquid hold-up tank ruptured and released 35 tons of EDC/VCM into the fire and the cracker feed line ruptured, releasing a similar volume of EDC/VCM. A line feeding chlorine to the EDC reactors was also ruptured, releasing five tons of chlorine. A three-story concrete structure was severely exposed during the fire which required a special technique to extract chloride from the concrete.

These factors are considered by Norsk Hydro as contributing to the failure of the return bend in the reflux piping:

1. High liquid velocities

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2. Coke particles in the liquid

3. Geometry of the return bend with high local velocities

Corrective actions taken to reduce the resulting corrosion/erosion of the pipe wall include:

1. Bigger pipe diameter

2. Pipes with greater wall thickness

3. Baffles in the quench tower to hold back coke particles and liquid droplets

4. Re-design of the failed return bend

5. Change in the thickness-measurement program to include bends as well as straight runs of piping.

D. Emergency Relief Design

This was a presentation by Dow on how it has implemented the DIERS technology, which was developed by the American Institute of Chemical Engineers (AIChE). Dow organized a corporate team in 1984 to identify, develop, communicate and implement technology/tools for their engineers to efficiently design emergency pressure relief systems. The handout presents this effort in detail.

E. Groupo Primex Safety Program

This presentation describes a comprehensive safety program that has b en in place for about five years at Primex facilities in Mexico. The handout provides a history of the program's success (damage index) and outlines of the areas of concern in the program. Calculation methods and investigation report forms, as well as check lists and control cards, are given in the write-up.

F. Delaware's Risk Management Program Regulations

The State of Delaware passed the country's first chemical plant catastrophe prevention state law this year. The Delaware Department of Natural Resources and Environmental Control proposed regulations under this law in June, 1989. This presentation covered the details of this program, which Delaware is touting as "model legislation" for other states.

There are 72 chemicals on the extremely hazardous substance list (VCM and EDC not listed), which are subject to the regulations. The basic management approach in the regulations is to use performance standards and not specification standards. There are eight elements in the prevention aspects of the approach:

1. Design standards review
2. Modification control and documentation of equipment and procedure changes
3. Hazard review
4. Operating instructions
5. Maintenance/inspection procedure
6. Training
7. Incident investigation
8. Company inspection and auditing

Under the law, a state inspector can inspect the plant for compliance of these elements, including comprehensive records review and interviews with plant personnel.

The importance of this action by Delaware is that the states may take the lead in regulating the prevention of chemical plant incidents rather than the federal government. This law could become the "model" for other state actions. The EPA recently issued a report on that agency's conclusions concerning catastrophic incidents in U.S. chemical plants.

The EPA's positions in this report were:

1. These incidents are rare
2. Training of personnel is inadequate
3. The private/public response situation is weak
4. Maintenance practices are not uniformly good
5. Only industry itself can prevent accidents; th refore stimulation of industry to do this, not strict regulations, is the key to success.

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G. Update - Short Stop Systems

A pre-meeting survey of the VCSA member companies was conducted on their short stop systems. The last time a similar survey was made was 1984. There were no major surprises or particularly innovative approaches reflected in the recent survey. The handout gives a good summary of the responses.

Of continuing concern by PVC plant operators is the dispersion of short stop in the reactor with loss of agitation. Of interest is the fact that five of the six new systems that have been installed rely on operator decision only to manually activate the short stop system.

H. Hazardous Material Transportation

This presentation was essentially a slide show of Dow's experiences in transportation incidents involving chemicals. No handout was given with the talk. A strong point made was that VCM tank cars should have standardized loading/unloading fittings similar to the standard chlorine tank car fittings. This would greatly simplify the stopping of leaks by first responders. It was also mentioned that under the sponsorship of the Chlorine Institute, all chlorine tank cars are beginning to use aircraft cable seals, which are nearly vandal-proof.

At the conclusion of this presentation, Jerry Mitzner (of OxyChem) provided preliminary information about the recent VCM tank car incident in New Jersey, where a railroad error resulted in the puncture of the tank car, emptying its contents.

I. U.S. Regulatory Update

This presentation provided the current status of a number of federal regulations that affect the VCM/PVC industry.

1. Proposed revisions to the NESHAP-VCM regulations

These revisions, which were negotiated by the SPI/Vinyl Institute and EPA (and are considered to be positive) were proposed in the Federal Register on September 21. They include clarification on several definitions and exempt VCM relief valve discharges to flares/control devices as violations.

2. Air toxics

With the SARA (Title III) Section 313 air emission figures as the focus, Congress will address air toxics in the Clean Air Act reauthorization. It is too early to say what will be legislated.

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3. EDC's revised PEL on the OSHA Z list

The SPI (and others) have legally challenged the new 1 ppm PEL for EDC. No court briefs have been filed yet.

4. OCPSF guidelines

These new guidelines are beginning to impact third round NPDES permits.

5. Toxic "Hot Spots" in rivers/streams under the Clean Water Act (304 L)

In some states, segments of rivers are being listed as toxic "hot spots" at an EDC concentration of 0.94 ppb. This triggers imposition of Individual Control Strategies on the perceived contributing sources.

6. TPLP/OTC

The proposed concentrations which will define "hazardous waste" under RCRA are:

VCM - 200 ppb
EDC - 500 ppb

This criteria will apply to the extracted leachate from solid wastes as well as process waste water, per se.

J. Computer Failure - Esso Canada

This ad hoc presentation (no handout) concerned the failure of an UIO device on a reactor that was in poly. The computer opened and closed various valves and shut down the agitator when this occurred. About 70 kg of VCM were released out a valve opened to an adjacent out-of-service reactor that was open. It is thought that the UIO card failure resulted from high temperatures (per air conditioner problems) in the I/O room.

K. A Company's Superfund Experience

The presentation detailed Formosa's experiences with Superfund activities at their Delaware City PVC plant that was purchased from Stauffer in 1981. The handout provides at good history of this experience. Of interest is that Formosa was able to sell poor quality PVC sludge from their earthen lagoons as part of the remediation with the EPA's approval.

OCC 2772

L. Corrosion/Thickness Testing in Critical Services - BFG

This extremely detailed presentation concerned BFG's program in Non-destructive Testing. The handout provides a lot of the technical information on this subject.

M. TCLP/OTC Impact

This presentation provided the latest information on EPA's proposed regulations that will re-define "hazardous waste" under RCRA. The most significant impact to our industry will be that waste water containing >200 ppb VCM will become a RCRA hazardous waste. It is anticipated that the regulations will be issued in December with the effective date six months later. The retrofit or replacement of surface impoundments containing waste water that is "hazardous waste" via the Organic Toxicity characteristics (OTC) will be required. In addition, excavated soil whose extracted leachate exceeds the OTC concentrations for the listed organic chemicals will require proper disposal. The handout provides a thorough review of the current thinking about this far-reaching regulation.

N. European Regulatory Update

This presentation was a brief update of regulatory actions affecting the VCM/PVC industry in Europe and the impact of the ECC Harmonization in 1992.

P. VCM Standard; Federal Litigation Update and Survey of State Enforcement Actions

The two handouts provide an update of EPA litigation related to violations of the NESHAP-VCM standards since 1978 and the state penalties for violations of the NESHAP-VCM standards since 1981. Federal litigation still pending involves these companies:

1. Dow
2. Ethyl
3. Formosa
4. OxyChem

Q. Vinyl Institute Update

A review of the last year's activities in the Vinyl Institute was provided by Roy Gottesman, Executive Director. No handouts were provided of this excellent presentation.

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R. Hurricane/Storm Preparedness - Shintech

This presentation concerned a generic hurricane plan for a chemical plant based on Shintech's involvement in the Brazosport Industrial CAER organization. The handout provides checklists, time frames, plant organization, communication requirements and an industry/community organization to deal with hurricanes in a coastal area.

S. Angiosarcoma (ASL) Registry Update - ICI

Dr. Brian Bennett of ICI gave his annual update of the ASL Registry, which he maintains. A summary of his presentation was provided. Highlights of the update include:

1. Total worldwide cases of ASL related to VCM exposure are 144 as of Jan. 1, 1989.

2. There were 4 deaths from ASL in 1988; two persons with ASL are still alive.

3. There have been 3 cases of ASL diagnosed in 1989.

4. There have been no cases which are diagnosed that are due to initial VCM exposure that occurring after 1974.

5. The worldwide average latency period for ASL cases is now 23.84 years.

6. The worldwide average length of VCM exposure for ASL cases is now 18.7 years.

Dr. Bennett said that the report on a recent IARC study on VCM is due to be released in 1990. He suspects it will contain inflammatory conclusions concerning VCM and cancer.

Dr. Bennett reported that ICI has developed an effective VCM respirator filter cartridge. It is currently under test use in ICI facilities and is not yet available commercially. It is intended for potential VCM exposure by people doing "short term" jobs. The cartridge can handle 10,000 ppm VCM for thirty minutes. It can be used with any full-face mask.

T. PVC Dust Fire Testing - BFG

In 1988, Goodrich had a serious dust explosion in its Avon Lake plant involving acrylic polymer. As a result, they have conducted an extensive study into polymer dust explosions, including PVC resin. Based on a thorough literature survey and actual testing, BFG has concluded the PVC dust is extremely difficult to ignite, requiring a strong ignition source (>1000 joules). As a result, they have decided to continue considering PVC dust to be non-hazardous.

Of interest is the fact that BFG found that calcium stearate dust will ignite.

No handout was provided by BFG on this presentation.

U. Dow Safety Program - "Safe Working Style"

This presentation included a video of Dow's new corporate safety program "Safe Working"Style". An excellent handout was also provided. Two key features of this program are the ICE Link (a k a The Incredible Chain of Events) and the High Pressure Response component.

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