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J. A. KING

NOTES ON VINYL CHLORIDE SAFETY ASSOCIATION MEETING

October 26 thru 27, 1978

Mr. Francis Hoy

The meeting was well attended and yeilded a lot of information. It is summarized here. If any of the recipients of these notes would like additional comment from me on specific subjects, I will be happy to receive a query.

A weakness has always been the inaccuracy of response to survey questions. The responses give a general indication of the direction of the industry, but they can also be misleading. This was especially obvious in this meeting since so many polls were taken. The difficulty arises from a number of obvious reasons. To improve on this, it was decided to try to mail out survey questions ahead of time for a return mail response so far as possible. This will require more planning by all members but should improve the value of the surveys.

It was also urged that each company appoint a regular representative to attend all meetings for continuity. Attendance could be rotated for additional people, but it was also suggested that the number of representatives at any meeting be limited to streamline discussion.

DISCUSSION OF RECENT VCM CAR DERAILMENT

Herman Waltemate-Goodyear

The reason for discussing this derailment was the special handling procedures that were set up. Five Vinyl Chloride cars were involved in the derailment. Two were ruptured and burning by the time action was taken. One was nearly empty and would have burned out in several days. Another was still nearly full and it was estimated that it would burn for 10 days. It was decided to put small shaped charges on each car and blow a hole in the car to let it drain into a diked area which had been temporarily built around them. Just incase the blast blew out the flame, secondary charges were set that could be used to relight the vapor. After several tries, both cars were punctured sucessfully by these charges and the Vinyl Chloride was drained into the enclosure and burned off safely. An interesting side light is that of the three cars which did not puncture and burn, two cars were of the type with double insulation, and one was a car recently retrofitted with the head shield and special cupplers. The two cars that were punctured and burned were ordinary cars.

OCC 2813

Herman Waltemate recommended the following NIOSH publications. NIOSH Bulletin Number 78-159 Engineering Control Technology-Assessment for Plastics and Resins Industry NIOSH-OSHA Current Intelligence Bulletin Number 28 Vinyl Halide Carcinogenicity.

MEDICAL UPDATE

Dr. McBurnie of Diamond Shamrock

1. An investigative program for occupational health hazards has been started at the University of Louisville. Dr. McBurnie feels this research is in the forefront of medicine and should be actively supported by all companies in the PVC industry.
2. Did not think the 10PPB limit as proposed by California will hold.
3. Says that we should expect EPA to come by upon violations looking for a consent order leading to automatic heavy fines for repetitions.
4. Feels that the government regulatory philosophy is based on the one hit theory as embodied by the Dulaney Clause, a position which he feels deviates from all the rules of toxicology.
5. Dr. McBurnie feels the Chemical industry has poor relations with all groups and cannot expect to get better regulations until it improves these relations. He thinks we should further:
 - A. Create a council on political affairs for the purpose of informing employees, customers, communities, etc.
 - B. Cultivate congressmen, both state and federal, and get them into the plants.
 - C. Support AIHC
 - D. Develop hard data on the medical effects of chemicals to refute the assumptions made by the regulatory agencies. He feels we should develop computer programs to assess thoroughly the health of exposed workers. He has developed such a program for Diamond Shamrock at a cost of \$1.5 million dollars and would be willing to talk to other people about it. His software package is for sale, and he has been talking to other chemical companies about it.

6. His best tally was that there were 23 Angiosarcoma deaths in the United States, 53 worldwide.
7. He estimated that in any group 20 percent of the people have a tendency toward some sort of cancer.
8. At this point, a man from Europe in the group pointed out that the Angiosarcoma deaths are clustered in a few plants and felt that this had not been investigated sufficiently as to the reason. He pointed out that 20 of 23 deaths in the United States occurred in 5 plants and a similar clustering occurred in Europe.

UPDATE ON EPA

Bob Laundrie-General Tire

These were his comments:

1. The EDF suit was dismissed with the proviso that EPA will get a proposal out by January 1, 1979 and will take up VCM first.
2. EPA proposes equipment be on line 100 percent of the time with no allowance for operator error. Operator error is supposed to be avoided by better training, more training, disciplinary measures, and less dependency on the operator. Power failures are to be avoided by backup equipment such as generators and double ended power loops. Equipment failures are to be avoided by sparing to redundancy. The answer for runaway reactions is relieve to gas holders, shortstop, and more cooling.
3. Nearly all companies reported some relief valve releases during 1978.
4. An easy resetting relief valve was discussed. This is a double O ring valve.
5. It was reported that EPA has agreed to handle relief valve discharges on a case by case basis rather than outlaw them entirely. The feeling was that the safest thing to do is to keep very accurate records of what you are doing to avoid relief valve releases.
6. Five people reported extentions in meeting the EPA rules. The extentions vary from 30 to 90 days.

OCC 2815

7. There was a discussion of EPA visits in connection with compliance tests. In some cases, EPA people came in for tests. In some cases they delegated the witnessing to state people or to contractors. In most cases where they came in, they appeared to be mostly interested in the tests methods and in the way the tests were run. In a few cases, they did examine equipment. In several cases, they arrived too late to witness a test and merely looked at results. In some cases, they made an appointment to come back later for further checking. At one plant when the equipment failed to meet the test one day the state officer agreed to come back to witness a retest later at which time the equipment passed the test. One officer brought in cylinders of test gas to calibrate the instruments. In general, the compliance officers were reported to be pleasant and reasonable. Several reported that the officers seemed to be very confused. Others reported that they seemed knowledgeable.
8. Several companies requested approval of alternate test methods. In some cases they were approved and in others they were denied.
9. It was asked if anyone had gotten a definite answer from EPA to any requests. In a general discussion, the consensus was that EPA would be very careful in most cases not to give any kind of written response, approval, agreement, etc. Some questions were answered by telephone. It was thought that this was to avoid any commitment in writing.
10. There was a poll on what various companies felt constituted a reportable leak. The most popular definition appeared to be two sequential readings of a point on the automatic monitor of 10PPM. Some considered two readings of 5PPM as a leak. Borden reported that EPA Region 5 told them one reading of one PPM constituted a leak. Throughout the meeting, there were these reports of very strict interpretations made by various agents of the EPA. Many of them were difficult to believe and one wonders if the companies did not misunderstand or misinterpret the comments of the EPA people.

HANDLING SPILLS AND HAZARDOUS WASTES

F. F. Hoy-Firestone

I covered this subject by describing the Spill Prevention Control and Counter Measure Programs used at Perryville, Pottstown, and at our new plant with regard to possible spills from tanks, pumps, loading areas, etc. I covered the hazardous solid waste part by discussing the current Maryland law and its effect on the Perryville plant as well as the proposed Louisiana law.

DUMP VALVE LEAKAGE PROBLEM

Clark-Dow Chemical

The heart of this discussion was that this engineer felt a valve by Jamesbury called a wafer sphere valve was very good for dump (what we call "drop") valves. It has a 316 stainless steel seat with Stellite leading edges on the wafer.

In answer to a poll, 12 companies said they used ball valves for drop valves. Six used plug cocks. No company used butterfly valves. No company with the exception of Dow used wafer spheres. (In this as in all of the polls taken the numbers give only an indication since in no case did all of the plants represented vote on any subject. This occurred frequently because the questions were difficult to interpret or respond to. It was decided that in the future where ever possible this type of poll would be taken by mail before the meeting occurred).

SAFETY PROBLEMS WITH INCINERATORS AND FLARES

Monochem

This was for the most part a dissertation on the design and operation on incinerators. I did not take any notes on it. The following points were made however.

1. Nineteen companies indicated they used incinerators. Twelve were monomer plants; however, these plants might also have included PVC operations with incinerators. Ten plants indicated no backup system for incinerators.
2. Monochem uses a water seal drum for protection against flame back on wet streams. On dry streams they use a flame arrestor.

TRANSPORTATION AND RAIL CAR SAFETYDick Hodgkins-Dow Chemical

Dick discussed the tank car rules with regard to shields, cupplers, coatings, etc. He also discussed the activities of CHEMTREC. There was nothing of a general nature that was new to us.

FEMALES IN REGULATED AREAS

This subject was mostly response from the group and these responses have only limited value because it appeared that a number of the people in the group either did not want to talk about the subject or did not have much knowledge of it. This was frequently a problem as I said before with the poll type questions.

1. About half the plants don't allow females capable of becoming pregnant in regulated areas.
2. Four companies reported complaints of an EEO type. Two have been sued under EEO rules but the suits have not been settled. Another company has a claim against them but it has been dormant for nearly a year. Another company reported a complaint but no claim.
3. No company reported having a female applicant turn down a job when the VCM possibilities were explained. One company did report that a woman changed her mind about a transfer into a regulated area after discussing it with her husband.
4. From this point the discussion moved into areas other than females.
5. A California company was cited for allowing people with beards to wear masks. Since about half their people had beards, they decided to fight it. The citation was dropped when they came up with an abatement plan which consisted mainly of requiring that beards be trimmed to fit properly in the mask and that a positive pressure mask was used. Workers who could not get a proper seal with the half face-piece mask were required to wear full face-piece masks. Their main problem occurred with people who had 3-4 day beards rather than full growth.

6. Eight companies have transferred employees out of regulated areas for health test reasons within the past year. It was mentioned that OSHA in their new lead standard is considering requiring rate retention for anyone transferred out for medical reasons. If this should occur, it would certainly affect all other standards.
7. At Stauffer two employees were terminated who failed the physical. An arbitrator said they should have been put on layoff and retested later, and then considered for recall if they subsequently passed.
8. Only two companies reported considering deregulation of any currently regulated area in the near future. Dow said two of their four VCM plants are without regulated areas. Diamond said they deregulated a VCM plant.
9. Twenty-eight companies reported that 0 to 10 percent of their personnel monitor readings were above 1PPM. Seven plants indicated that 10-20 percent of their personnel monitoring readings were above 1PPM.
10. All but two companies are using warning labels on PVC bags.
11. Nine plants reported that they had OSHA inspections in response to reported releases. Three plants said they had OSHA inspections in the past year on a drop-in basis.
12. Hooker received a citation for not training people in non-regulated areas but are contesting it.

COMPUTERIZED PLANTS/LARGE REACTORS-MAJOR ACCIDENTS AND NEAR MISSES
John Barr-Air Products .

1. There was a general discussion of some of the problems that can happen with computer controlled plants such as loose connections, dirt in the works, bad software design, errors in transmissions, etc.
2. Eleven computer control plants were reported. Four of the eleven computerized plants were said to have manual backup.
3. A number of the plants with computers don't have back checks on charge amounts. That is for example, the only check on monomer might be a meter reading with no backup meter or tank weight to provide verification.

4. A number of companies report that they blank off all major charge lines before they open a reactor. They were not talking about entering the reactors but simply opening them to flush out. This did not refer necessarily to computer operated plants.
5. John Barr reported that Air Products had used the services of Perf Blast of Toledo, Ohio to clean a reactor by blasting out the setup. They had a complete setup in a 16 thousand gallon reactor and had these people blast it out within a week while the rest of the plant was still operating. About three days of the week was taken up in getting the monomer out of the setup. John felt that it would have taken them much longer to get it out with the usual method and that the service was well worthwhile and safe.

STRESS CRACKING OF VESSELS

-Stauffer Chemical
Jim Wallace-Esso, Canada

These two men provided a very good discussion of stress cracking. It appears that this has cropped up on several occasions and may be a serious problem. It may be getting more serious because of the higher temperature used to make more low viscosity resin and stripping at higher temperatures.

1. Apparently stress cracking is a function of time, temperature, chloride environment, and the method used in fabrication. Padded vessels were thought to be more susceptible to stress cracking than non-padded vessels but later in discussion suggested this may not be the case. It appears to show up primarily where there is PVC build up and the opportunity for decomposition of the PVC to produce the hydrogen chloride.
2. There was some disagreement on this but 316 stainless may be better than 304 for resisting stress cracking.
3. Stauffer had stress cracking in hot demineralized water pipes. They thought it was due to decomposition of PVC resin underneath the insulation.
4. The man from Stauffer showed a number of very good photographs and photomicrographs of stress cracking. They found it necessary in several cases to remove a nozzle entirely, rebuild the area around the nozzle and weld in a new nozzle.

5. There was some discussion of the value of stress relieving a vessel before using, but Jim Wallace felt that simply loading the vessel created enough stress to pose the problem.
6. Tom from Stauffer felt it was a good idea to plug weep holes in the welded pads with either Polyethylene or a high melting wax to prevent PVC from getting under the pad and decomposing.
7. Tom reported that of quite a few vessels they checked for stress cracking, only the ones with pads were a problem.
8. It was said that when you clean off a build up if you find dulling of the metal behind a build up, that is the beginning of chloride attack.
9. It was reported that stress cracking failures were found in stub shafts and bolts, especially those in sloppy areas.
10. Seven people reported stress cracking in centrifuges, mostly in the flights but also in the trunnion. A number of people reported failures of agitators and baffles where the glass had worn off.
11. It was reported that stainless steel with 45 percent nickel is immune to stress cracking.
12. It was reported that there is disagreement on the effect of pH. Some say neutral pH is the worst for stress cracking, some say an acid condition is worse.
13. Jim Wallace feels oxygen is necessary to attack, however, as little as 0.2 PPM oxygen is enough to cause a problem. He stated a theory that all oxygen in the reactor is reacted before the Polymerization starts.
14. He considered any vapor space a concentrating condition for hydrogen chloride. Liquid areas are constantly swept clean. He thought a chelator may help by tying up metal ions which may be necessary to the attack.

SAFETY PROBLEMS WITH POT SMOKING AND ALCOHOLRussell Mercer-Great American

This was a general discussion of the problems they are having in their plant with young people smoking pot or drinking and the kind of program they are turning to for help. This is a community program which costs them \$5.00 per year for the people who are referred to it. They find it very helpful.

SAFETY PROBLEMS WITH CLOSED REACTOR TECHNOLOGYArt Gelner-Certaineed

This was largely a discussion topic and it was interesting. The data gathered is of limited value because of the problems that we had with all of the survey type questions.

1. Eleven plants reported they can charge successive batches without opening the reactors. No certain number of batches between openings was specified in this question..
2. Of the eleven people who charged without opening reactors, seven have only one level of measurement for VCM. The others have two. Four had one level of measurement for water. Two reported using two methods. The difference between this number and the eleven plants is unexplained.
3. Six said they used pumps to add to a closed system. Seven said they used pressure pots. Of course, both methods may be used in the same plant.
4. One reported using an automatic high pressure nozzle for cleaning reactors. Three reported using manual high pressure water. Four reported using solvent. Seven use manual cleaning. This question did not necessarily refer to close reactors but any kind of reactors.
5. Eleven plants expect to go to closed reactor technology within the reasonable future.
6. Ten plants still use sight glasses. One has a valve underneath the sight glass. Nine of the ten use Pressure Products type sight glasses.
7. One company reported using high pressure water without opening the reactor. The question was asked whether there was any problem with static build up. This company's representative was not aware of any problem.

INDOOR VERSUS OUTDOOR PLANTS

-Goodrich

Goodrich built a large reactor plant in Louisville in 1973 totally outdoors to reduce exposure to VCM. They also used a computer to operate it. Start up was in early 1976. When they got into the cold weather several years ago, they had severe freeze-up problems. They constructed temporary enclosures for the winter of '76 and '77 and put in temporary heaters. They learned that the operators even in winter preferred an outdoor plant (difficult to believe) but found that the maintenance of tracing and so forth was too difficult. Therefore they put in permanent enclosures with ventilation. Their conclusion was that outdoor construction is best for PVC plants but only if the temperature does not drop below about 25°F for any length of time.

1. The rest of the discussion was of a response type but again the results are of questionable value. In a poll 23 plants claimed that they keep the poly area below 1PPM 95 percent of the time as measured by personnel monitoring. Seven of these monomer plants, eight were indoor plants.
2. The question was asked, "At what point do people put on masks or leave the area?" The answers were too complex and varied to have much meaning; however, eleven companies claimed that their employees put on masks at 1PPM.
3. Eight companies were said to have reported massive releases, but this number may not be right.
4. In response to the question of what constitutes a massive release, one company said that they have three requirements:
 - 1) it must be accidental
 - 2) people must be exposed without having a respirator on and
 - 3) the size of the release has a bearing on it.

The answer to what size release they use was not clear. One company said unless someone has smelled the vinyl chloride, they do not consider it a massive release.

5. In answer to a poll two plants outside of the south claimed to have open air operations.
6. In discussing personnel monitoring by fixed monitors, it was said that the Pantasote Plant in New Jersey had an approved system, but the Pantasote Plant in Point Pleasant, West Virginia was denied approval.

UPDATE ON EUROPEAN REGULATIONS
Wilson-ICI

Dr. Wilson gave a very detailed discussion of the regulations in Europe. The highlights are that the European regulations are not as stringent as the United States regulations except for two countries that have no PVC plants. This information was not new to us. I asked Dr. Wilson to mail me copies of the numbers that he presented.

TRUE CONFESSIONS
Herman Waltemate-Goodrich

Mr. Waltemate related a story of a blender fatality. This was not a PVC plant but the blender was of a similar type. Two summer employees were cleaning a setup from the blender. After they had cleaned the build up out of the top half, the foreman suggested they rotate the ribbon through a half turn to bring the lower build up to the top where they could work on it. The foreman told the two employees to get out of the blender and told one of them to unlock the circuit breaker which was in a remote area. Unfortunately, the second employee stayed in the blender; and when the first employee unlocked the breaker, the blender ribbon started up immediately, dragging the employee into the blender and suffocating him. On checking the reason for the accident, a number of very serious safety hazards were discovered.

- A. A timer to start and stop the ribbon was installed in place of the start-stop switch. There was no stop switch in the area. The blender ribbon started and stopped automatically. At this time, it was stopped by the circuit breaker in the middle of its cycle. Therefore, when the breaker was closed, the ribbon started.
- B. There were two micro switches on the blender lid to shut off the power to the blender when the lid was lifted. Both micro switches were broken and one was even bypassed. Neither could act to interrupt the circuit.

- C. It should have been the practice at this plant for both operators to have had a lock on the circuit breaker, but only one lock had been placed.

This story reveals nearly unbelievably lax attention to safety procedures. The tendency is to dismiss it as unlikely in our plants. However, this plant felt they also had safe procedures. It shows the kind of thing that can happen when some people in a plant do not get the message on safety. A similarly unusual accident could happen in any plant.

A man from Union Carbide described the accident at their Texas City plant in Labor Day of 1977, but we previously have had all the detail of that accident.

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