

INTEROFFICE MEMO

PPG CHEMICALS

LAKE CHARLES

TO: Distribution

DATE: April 2, 1991

FROM: Don Pearson
Nelson Perez
Art Reinhardt
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SUBJECT: VI Meeting on address the
OSHA EDC Rules Conclusions.

On March 27, Art Reinhardt, Nelson Perez, Johnny Stephenson, and Don Pearson attended a meeting with other VCM-EDC producers to discuss action taken to meet the OSHA IPEL rules.

The other attendees were: Vinyl Institute - Meredith Scheck; Vista - Graham Bacon; B.F. Goodrich - David Hinson and Joel Lindahl; Dow - Bill Huff, Larry Burmeier, and Willie Myles.

B.F. Goodrich

For personnel monitoring, Goodrich uses 3M badges, rather than the pump method. The principle is the same; the activated carbon in the badge absorbs contaminants which are later extracted and analyzed. An outside firm performs the analysis, which results in a very slow turnaround time on the sample.

For 1990, BFG ran 142 personnel samples, of which 31 were over the 1 ppm limit, with an average of 1.25 ppm. The highest result was 30.3 ppm. BFG improved during the year, with only four overstandards occurring in the fourth quarter out of 35 samples. All of the overstandard results were at or near the tar stills during clearing and hydroblasting. BFG also did 32 area monitor samples with badges in 1990 around the tar still area. EDC levels exceeded the 1 ppm limit 14 times.

BFG clears EDC equipment to 50 ppm before opening. The LaPorte plant was designed (1978) with closed loop sampling, using SS bombs. The original design also included equipment for steaming out columns and collecting the condensate. Drying is a problem; BFG once used the EDC azeotrope, which took 1-2 days to dry. BFG now uses hot N2 first; they purchased some portable N2 heaters. Large storage tanks are also cleared by steaming and N2 purging.

BFG also uses steam and nitrogen to clear low pressure storage tanks, usually over a period of several days. They have seen severe internal corrosion in the lower part of the tanks, possibly as a result of this method, particularly where solids are present.

The portable meter that BFG uses picks up all volatile organics; it is not EDC-specific. The meter is used to decide if hydroblasters need to wear personnel protection when cleaning reboilers.

BFG performs lab analytical work under ventilated hoods.

New loading arms with N2 purges were installed for truck loading and unloading. A 3.5 mile double-wall pipeline was installed to transfer material from the ITC terminal. The line will be cleared by pigging, with pressure vessels installed to catch the pigs. BFG seems to have a lot of pigging experience, and apparently uses a variety of pigs: high density, low density, and soft pigs were mentioned.

BFG will have double mechanical seals installed by the end of 1991.

BFG identified the process rainwater sump as an exposure problem, and plans to install enclosed tanks within all sumps for \$1.04 MM. The existing sump will serve as secondary containment. The vent will be piped to a stack. A second sump called the decommissioning sewer tank is used for clearing organics from pumps and tanks. The vent from the decommissioning sewer tank is incinerated. BFG spent \$465 M to install double-walled or trenched decommissioning piping in the cracking/quench tower area. BFG plans to replace existing decommissioning piping in all EDC/VCM areas in 1991-92.

BFG installed a fixed, ambient air monitoring system at a cost of \$325 M. This GC system operates on a 15 minute cycle. They also spent \$100 M on portable analyzers, respirators, and training.

Goodrich plans to spend \$5.2 MM to replace their tar stills with a different type of technology.

BFG prefers AMRI TFE-lined butterfly valves for EDC service. BFG has huge, 20-24" valves on reboilers, which have given problems due to solids in the valve seats. For reboiler service, BFG tried several valves: Posiseal, Hills-McCanna, and Rockwell. BFG is using Goretex gaskets to replace Garlock, and found that the surface must be clean to get a good seal.

BFG commented that they use an on-line analyzer to monitor carbon tet and chloroform on their lights column.

Dow

Dow presented a graph of 8-hour EDC TWA annual averages which showed 2.4 ppm in 1988, 0.23 ppm in 1989, and 0.28 ppm in 1990. The improvement in 1989 was the result of closed loop sampling. A similar graph for STEL monitoring showed 3.3 ppm in 1989, 1.9 ppm in 1990, and 0.5 ppm YTD 1991. Dow has also spent considerable effort educating workers on EDC toxicity,

and emphasizing personal responsibility for avoiding exposure.

Dow uses pumps for personnel monitoring. They investigated the 3M badges, but determined that the results were biased on the low side, particularly for volatile compounds.

Dow showed their current sample system, which consisted of an 1.5" O.D. x 18" sample bomb, with small globe valves on each end. The bomb was attached to the sample panel with quick-connect fittings. Three-way valves were mounted on the panel to allow N₂-purging through the tubing. Dow presented data from 4 tests that showed much less exposure using quick-connect fittings rather than Swagelock fittings. The four tests were: 1 vs 3.5 ppm; 0.5 vs 21 ppm; 1.0 vs 6.5 ppm; and 0.5 vs 3 ppm. Dow is using viton O-rings on the quick-connects, and has experienced some problems. Dow uses Steco samplers in clean EDC service. Dow specifies monel parts to get the needles to last longer.

Dow feels that sample collection contributes most to STEL exposure, and will probably use more on-line analysis. Dow presented a graph comparing lab analysis and vs. Servomex analyzer results for moisture. The on-line analyzer showed considerably less variation. (Note: the Dow moisture averaged 5 ppm)

Dow has seen some overexposures during outages.

For portable EDC monitoring, Dow uses an HNU equipped with a special lamp, and the OVA (not EDC-specific). Dow does not have a fixed point monitoring system.

Dow attempts to clear equipment to 1 ppm before making a flange break. Dow requires positive pressure respiratory protection if the EDC content is > 1 ppm. Dow is installing an extensive breathing air system to facilitate this, with outlets near every pump, every vessel (all levels), etc.

Dow has closed loading systems for tank cars and tank trucks, but still sees high exposures when connecting and disconnecting. They now use OPW dry disconnects.

Dow is using some mag drive and canned pumps, but is moving toward double-seals for EDC pumps.

Dow has gone to API 620 code on new storage tanks, with a 12.5 psig design pressure. The foundation has a solid concrete cap with a polyethylene barrier. Dow was interested in the new PPG foundation design (spoked channels).

Dow uses polyethylene secondary containment on its rainwater system.

Dow steams columns for entry. For drying, Dow says that cold N2 will never work; they use hot N2 (Dowell trucks) and EDC to dry equipment.

Dow described a procedure that was used to clear an 40' x 40' API tank. The tank was first steamed, then a rotajet was used to blast the walls with water. The rotajet was supplied by Dowell Schlumberger, and was hooked to 5000 psig water. The rotajet washes in 3 directions. Dow pumped the once-through water to steam stripping, then used Allwaste to vacuum the solids out, dewater the solids, and finally to drum the solids. Despite all this effort, the EDC content was still > 1ppm.

Dow showed some literature on systems to sample and gauge barges without exposure. A Swiss company, Tanksystem, makes the equipment, which is marketed in the U.S. by Lombard Sales and Marketing (617) 592-5500.

Dow is using both Gylon and Goretex gaskets to replace Garlock, and claims that clean gasket surfaces, proper alignment, and proper torquing is necessary to avoid problems. Dow says that leaks from poor installation show up quickly.

Dow does not use valves on reboilers, because they could not find any that worked.

Vista

Vista uses the 3M badges for personnel monitoring. Vista also has a fixed point monitoring system, and has found it helpful in identifying leaks and problems. Each fixed point excursion is documented, along with corrective action. One problem that was identified was vents from process analyzers (going to atmosphere).

Vista is using closed loop sampling for EDC.

Vista clears columns and reboilers by N2-purging, then steaming. Storage tanks are also steamed; problems have occurred with Fe and rust forming an emulsion that causes problems in the steam strippers. The vent from the tank goes to a condenser to condense the steam. Any vent from the condenser goes to a blower which sends the vent to the incinerator.

Vista will complete installation of EDC pump double seals in April.

Conclusions

1. The three other companies at the meeting are already steaming columns, reboilers, and storage tanks, in effect establishing an industry standard. PPG should match this level of performance by using a steam clearing procedure, or by use of vacuum if the feasibility proves out. No other company has tried a vacuum system, but all seem interested.
2. PPG should do followup STEL monitoring on the current closed loop sampling systems. If the average level is not < 1 ppm, PPG should consider testing the Dow quick-connect fittings. PPG may also consider trying the monel STECO sampling system.
3. All companies at the meeting are working under the assumption that engineering controls are required for all tasks. Dow already concludes that strict compliance with the rules is not and will not be possible, and wants the Vinyl Institute to communicate this to OSHA, and find out what happens when the best engineering controls fail to meet the IPELs.
4. PPG should test the Dow rotajet (or equivalent) procedure for clearing EDC storage tanks.
5. The fixed point EDC monitoring system appears to be very valuable in identifying EDC exposure problem areas. The Dow people asked a lot of questions about the fixed point system; they seemed won over. PPG should install fixed point monitoring systems in the three EDC process areas. *Systems at other areas, i.e. P/T, Btms,*
6. Double mechanical seals are favored by all companies, except in some applications where "seal less" is preferred. PPG should proceed to install double seals on EDC pumps (Phase I of IPEL project).
7. EDC exposure while connecting and disconnecting hoses during loading operations is a severe problem for PPG. The OPW dry disconnect system used by Dow is worth trying.
8. PPG should follow up on the closed sampling and gauging systems mentioned by Dow, not only to reduce EDC exposure, but also to maintain the integrity of the dry EDC barges.
9. The swapover from Garlock to Gylon gaskets is not going to be a snap. Maintenance will be required to do a better job of aligning gaskets, cleaning flange surfaces, and torquing bolts. We need to start developing these good work habits now, before we mak the switch.

10. Some very large gaps exist in the PPG EDC exposure monitoring program. Very little sampling has been done on hydroblasters and vacuum truck operators. More maintenance monitoring is needed, particularly STEL checks on first breaks into reboilers and pumps. Not all the tasks identified by the EDC IPEL team have been monitored - this program should be completed, as some tasks may require more protection than the COMFO-II half mask. To avoid this problem, other companies have chosen not to use air-purifying respirators.
11. PPG lags behind BFG and Dow on secondary containment for sumps and underground piping. Also, to meet the industry "standard", PPG should incinerate or otherwise eliminate the vents from sumps that handle phase organics.
12. PPG should set a high priority to purchase some HNU's that are modified to be EDC-specific. These are needed to verify that equipment is adequately cleared for maintenance (pumps, lines, etc.)

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