

Showdown on vinyl plant rule presages shutdowns

Newly issued advisory reports hint at compromise in fight to curb vinyl chloride fumes, but battle may continue in court. Industry insists OSHA's proposal would be ruinous

The bitter controversy over worker exposure to vinyl chloride gas may climax on Oct. 5 when the U.S. Dept. of Labor is expected to set permanent standards for the 17 U.S. plants that produce the monomer, the 37 that polymerize it to make polyvinyl chloride resins, and the thousands of plants that mold, extrude and otherwise shape those PVC resins into plastic pipe, vinyl flooring, house siding and phonograph records.

The controversy has raged since last January, when medical data apparently established a link between workers' exposure to vinyl chloride monomer (VCM) and angiosarcoma, a rare liver cancer.

And last week the scores of chemical and plastic companies that have a stake in this \$3-billion/year business were given some inkling of whether the government will stay with the 50-ppm. emergency standard, adopt the proposed "no detectable level"

limit or move to some compromise position. Whatever standards are set could determine the profitability of producing and processing vinyl compounds in the U.S. for many years and are likely to be attacked in the federal courts, either by the companies or the labor unions involved.

Conflict: As to exactly what standards will be promulgated next week, various indications—sometimes contradictory—can be found in three newly issued reports:

■ Foster D. Snell's final report to the Occupational Safety and Health Administration on the economic impact of the agency's proposed VCM exposure standards. A principal conclusion: "achieving no detectable levels . . . is judged not feasible, both in PVC and VCM sectors."

■ The Occupational Health and Safety Administration's final environmental impact statement on the physiological ef-

fects of the proposed standard. This report does not discount the possibility of a level higher than the 1 ppm. implicit in "no detectable level." But it concludes that anything higher is a risk to workers. "Despite significant cost increases that may occur, the high demand for PVC resins is likely to continue," the report states.

■ The Environmental Protection Agency's notification that within nine months it will set VCM plant emission standards that could add 4% to the cost of PVC. This would seem to preclude the engineering possibility of venting all the in-plant VCM leaks to the atmosphere.

Double Negative: OSHA's proposed goal of operating monomer and polymer plants at no detectable level of vinyl chloride exposure is "not feasible," according to Snell. Moreover, the firm's analysis indicates that the U.S. industry would com-

els; and there are no technology transfer opportunities to permit development of design for no detectable levels in new plants. Moreover, Snell says that because PVC manufacture is a batch operation, emissions couldn't be completely eliminated.

Something to Live With: Those conclusions would seem to support a compromise regulation that the vinyl makers could live with—perhaps not too happily. But probably because of the imminence of the Labor Dept.'s new regulations, industry representatives were reluctant to discuss Snell's final report, noting that they haven't had time to examine it.

Nor did they have much time to react to Snell's preliminary report, which contained pretty much the same data used in the final report but did not contain any conclusions. OSHA issued the preliminary report Aug. 28, called for response by Sept. 6. Nevertheless, industry leaders submitted comments, and these were generally negative and caustic.

One point of contention in the preliminary report was the use of Firestone data for bringing a PVC plant into compliance with a no-detectable-level standard. Firestone, Snell reported, was the only company that said it could meet such a standard. Firestone replied that studies of its polymerization plants in Pottstown, Pa., and Perryville, Md., actually indicated a contrary judgment.

Declares a Firestone executive: "Independent of economic considerations and despite enormous equipment, engineering and process changes at both facilities, costing in excess of \$50 million, it is not possible to achieve the drastic exposure levels required by the proposed standard, based on engineering controls and technology that now exist."

Firestone, No. 5 in PVC output, has

OSHA's vinyl standards impact: higher costs, fewer plants

Proposed VCM exposure standard* (ppm.)		Increase in average unit costs (cents/lb.)			Time needed to comply (months)	Proportion of industry endangered ²
Maximum	Time-weighted average	Direct	Loss of productivity	Total ¹		
Monomer plants						
50	15	0.04	0.03	0.07 ± 10%	0	0%
25	15	0.09	0.03	0.12 ± 40%	24	0%
10	2.5	0.17	0.15	0.32 ± 40%	36	0%
"No detectable amount"		—	—		Not feasible	100%
Polymer plants						
50	—	0.19	0.35	0.54 ± 20%	0-6	Negligible
25-40	15-25	0.36	0.49	0.85 ± 35%	30	4%
15-25	10-15	0.90	0.70	1.60 ± 50%	30	26%
"No detectable amount"		4.01 ³	3.07 ³	7.08 ± 75% ³	30-48 ³	100%

* Vinyl chloride monomer (VCM) content, expressed as parts per million, in the air to which employees are exposed. ¹ With estimated range of variance for individual plants, based on partial statistical analysis of data. ² Percentage of capacity that management would seriously consider shutting down. ³ Based on Firestone's estimates; actual compliance is not considered feasible. Source: Foster D. Snell, Inc.

pletely collapse under that restrictive standard, with all producers indicating they would have to close their plants.

The study offers several reasons for reaching these conclusions: technology to eliminate VCM leaks and fugitive losses is not available; existing plants have not been designed for total VCM containment; there has been no operating experience in maintaining very low VCM lev-

some differences with the rest of industry on the exposure level standards that would be manageable. Industry generally supports the Society of the Plastics Industry's proposal: that the present temporary emergency standard of 50 ppm. be lowered in several stages to 25 ppm. for PVC plants by Oct. 5, 1975, with further imposition of a time-weighted average limit of 10 ppm. Standards for VCM production, says SPI, could be more restrictive—10 ppm. by October 1975, and a time-weighted average (twa.) of 5 ppm.

T.C. Walker, president of Firestone Plastics, says that a "safe and medically sound—as well as technologically and economically feasible—standard" is 40 ppm. maximum exposure and 25-ppm. twa.

Snell's analysis offers data on several alternatives, maintaining the SPI distinction between VCM and PVC plants (table, p. 15). Cost data indicate that VCM makers can manage with a 10-ppm. limit and a 2-5-ppm. twa. without closing any plants. Meeting such a standard would increase their average unit manufacturing cost by an estimated 0.32¢/lb., which is about 4-5% of the present range (7-10¢/lb.) of list prices for various grades of VCM.

For polymer producers, however, some plant closings may be necessary when the present emergency standard is tightened. According to the Snell study, at an exposure limit of 25-40 ppm. and a 15-25 twa., 4% of the existing PVC plants may have to be shut down. This might not be too disastrous, considering that 58% of the industry's plants are more than 10 years old, and only 8% are less than five years old.

But for an exposure limit of 15-25 ppm. and a twa. of 10-15 ppm., 26% of the PVC plants could face the axe. Snell's survey indicates that with this standard, unit costs of PVC would increase 1.6¢/lb., or about 4-8%, at those plants that can take the needed engineering changes. At some older, smaller batch operations, the companies say it would be impossible to reach such a low exposure level without building a new plant. At certain plants, Snell believes, the additional cost might be 50% more or less than the 1.6¢/lb. average.

Schedule Makers: Snell estimates it will take VCM plants up to three years to achieve what it considers the lowest achievable level. For PVC plants, the estimate is two and a half years.

This is based on engineering estimates of installation time for various kinds of apparatus to reduce exposure levels at

PVC plants. Examples: major ventilation system improvement, 18 months; replacement or reconditioning of reactors, 18-24 months.

Overly Optimistic? Some companies contend that these estimates are overly optimistic in light of today's materials shortages and delivery delays. Observes a Firestone executive: "Individual company confidence in being able to attain compliance with even the SPI recommendations has been eroding as lead times for obtaining equipment expand, as capital costs rise rapidly, and as the prospect for financing these projects becomes dimmer."



VINYL SIDING costs will rise as makers meet new in-plant and emission standards.

Industry criticism has also centered on Snell's projection of cost data to meet projected standards. The figures are said to be heavily weighted in favor of newer plants and suspension homopolymerization units in warmer climates. Such plants could probably be most readily adapted to meet a more stringent exposure standard.

Separate Standards: The proposed non-detectable-level standards would be applicable to VCM and PVC plants as well as fabricators. But the Snell study follows the SPI proposal of separate standards for VCM and PVC plants.

Reasoning is based on relative ease of controlling emissions at VCM plants, which are generally closed systems, operating in the open air. Leaks may occur around pump packings, during samplings or maintenance operation, or at tank-car

loadings. The batch operation of PVC plants involves continuous emptying and recharging of autoclaves and frequent inspections and cleaning out of these reactors. Chance of VCM exposure in these plants is high even in the packing areas.

While separate standards would seem reasonable to manufacturers, the practicality of this approach is limited. It's unlikely that labor groups, strongly in favor of the no-detectable level and opposed to the concept of a threshold level for any carcinogen, could accept different exposures for workers in various plants.

Outside Plant: If the vinyl producers solve their in-plant exposure problems, they will still have to deal with monomer gas escaping from the plant. EPA Administrator Russell Train said last week that his agency will set standards for vinyl chloride plant emissions by next June. And without firm data on health effects of VCM at various levels in the atmosphere, Train is proposing that the standards be based on "best available technology."

EPA's survey of air and water around 10 PVC plants indicated VCM air levels of 1 to 2 ppm. Through those emissions, the agency estimates, PVC plants are losing monomer at the rate of 200 million lbs./year.

With controls, EPA says emissions from PVC and VCM plants could be cut 75% and 90%, respectively. Capital outlays for these controls are put at \$80 million for the industry as a whole, with operating expenses estimated at some \$40 million/year.

John Nelson, vice-president for manufacturing at B.F. Goodrich Chemical, approves of Train's analysis, especially the statement that there is "no imminent hazard" from VCM exposure in the atmosphere.

But if OSHA's no-detectable-level proposal becomes the law, the vinyl chloride industry might have to re-evaluate its domestic production. Although industry spokesmen have warned of extensive shutdowns if such a standard is adopted, OSHA's environmental impact statement merely suggests that the costs will be high but will be passed on to the consumer, and that the time needed to reach the standards would be long.

But this report also suggests that "in the long run U.S. companies might find it profitable to build plants abroad." Clearly, this will depend not only on traditional market and raw-material logistics but also on whatever in-plant and emission standards are put in force in the U.S. and other nations.