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The new NIOSH factor: How to prepare for a crisis

Plan for speed-up in recommended OSHA materials standards includes active participation by affected industries, bypassing TLV route in favor of better workplace practice

The book says you cannot anticipate a calamity. But you can identify the potential high-risk areas, and marshal up what's needed to take the sizzle out of the lightning if and when it strikes. That pretty well sums up the philosophy now being applied by the National Institute for Occupational Safety & Health (NIOSH) in researching the worker health hazards of hundreds of chemicals and other toxicity-suspect materials, many of them critical to plastics.

The idea is to move a lot faster in identifying materials with an imminent workplace health hazard, and in developing recommended remedial standards for inclusion in the federal Occupational Safety & Health Act. Although this law has been in effect for four years, only a handful of materials standards has been published; fewer still for plastics-related substances (see table at right).

Meantime, there is a several-years-old list of some 400 potentially toxic substances for which standards investigation is pending, and more to come.

Crisis in VCM

Under the law, NIOSH has the responsibility of identifying materials with significant potential for adverse effect on workers' health. It then develops proposals for corrective standards for submission to the Occupational Safety & Health Administration (better known, like the law itself, as OSHA), which then promulgates a standard.

That, at least, is the way it is supposed to work. But the trouble with this arrangement so far is that NIOSH is laboring under a low budget and a high workload. It is a problem compounded by the fact that, particularly for a great many substances daily used by the relatively young plastics industry, there is little documented historic evidence of toxic effects from which value judgements can be made.

This weak link in the OSHA/NIOSH chain jingled loose earlier in the year with the finding that a statistically significant number of workers involved in the polymerization of vinyl chloride monomer had contracted angiosarcoma of the liver, a rare and particularly deadly type of cancer. Since the revelation, of course, there has been considerable uproar and a lot of fast scrambling by NIOSH and OSHA. An emergency temporary standard was written into the law in April. Among other things, it reduced the VCM worker-exposure level to 50 p.p.m., down from the previously allowable 500. A permanent and presumably tougher standard will be issued soon. (see box, p. 60).

What bothers NIOSH—and what is certain to result in intensive early scrutiny of a number of monomers, chem-

icals, additives, and fillers that hadn't heretofore been on the toxic-investigations list—is the sudden eruption of the VCM crisis. As recently as a year ago, VCM had occupied a low-priority position on the agency's list of potentially toxic substances (June 1973 MP, p. 55). At the time, VCM investigation had a priority rating of 9, on a descending scale from 1. Its potential health hazard was characterized as "irritant; central nervous system depressant." As NIOSH points out, these were the only deleterious-to-health potentials of VCM that could then be documented.

It would be wrong to surmise that it was the widely publicized (and spreading) VCM flap that has galvanized NIOSH and OSHA into streamlining and accelerating their investigative and rule-making procedures, as they are doing. But it is precisely the sort of spotlighted occurrence that can persuade federal budget directors to pump more operating money into these agencies for the additional manpower and external assistance they say will be needed to carry out a cooperative new plan for fast action in developing health standards for materials.

NIOSH, for example, reports that it has about 100 fewer staffers than it had a year ago, despite an increased workload. Its current employee force is only about 60% of the strength that had originally been targeted for 1974 by the Dept. of Health, Education, and Welfare.

Shifting the sights

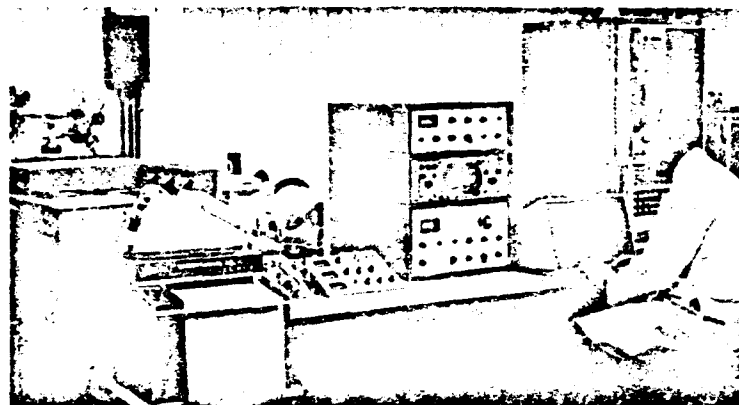
Equally to the point—if not more so—the VCM situation and its aftermath represent a vivid affirmation of the new NIOSH/OSHA philosophy: If you can't actually prepare for a crisis situation, the next best thing is to restructure the priorities and try to head off the problem before it can hurt.

Therefore, current and future materials-related standards activities of these allied agencies will be heavily weighted toward improving their preventive thrust. A great deal of emphasis will be placed on mandating tightly controlled workplace practices that minimize the opportunity for physical exposure of workers to toxic areas.

And there will be far less concern about fiddling with TLV numbers (threshold limit values, which essentially are the p.p.m. dispersions in ambient atmosphere that are rated as innocuous to workers throughout a daily shift). For one thing, says NIOSH, the validity of many existing TLVs is suspect. For another, previous NIOSH efforts to check TLV numbers and recommend "safer" levels of exposure has involved a complex and time-consuming procedure, including analysis by a panel of outside advisors.



Monitoring chemical leaks is critical to OSHA materials-standard compliance. Instruments like this organic vapor analyzer help to minimize VCM exposure levels at B.F. Goodrich facility.



Sorting out constituents of complex emissions aids NIOSH work on recommended OSHA standards. Here, computer takes inputs from gas chromatograph and mass spectrometer, analyzes level of each component.

The new approach was spelled out recently by OSHA in announcing a new program, to be run by a joint OSHA/NIOSH committee, for faster issuance of health standards on materials. By eliminating the deliberation over TLVs, and keying in on physical preventive specifications, OSHA's hope is to develop a one-a-day rate of action on such standards. But that pace is questionable.

First up for this type of appraisal is a list of 40 chemical substances that OSHA describes as affecting a cross section of American industry. Included among them are several that are important plastic building blocks, such as benzene and methyl methacrylate.

At presstime, in fact, a Criteria Document on benzene was already circulating through NIOSH's upper-echelons for final approval before being submitted to OSHA for action. Delivery is anticipated before the end of this month. Since the contents of Criteria Documents (the data bases from which OSHA standards are developed) are classified until NIOSH release, the document's recommendations regarding worker exposure at production and processing levels are not yet known. However, benzene had a first-priority rating on last year's NIOSH activities list, for the reason that it is a suspected carcinogen.

Processor's stake

Because OSHA regulations on the health safety of materials—as in the safety of equipment—reach into the processing plant, converters and users have a vested interest, economic and otherwise, in the plastics-related outfall of forthcoming standards. For example, if the final version of the permanent VCM standard were to require installation of expensive low-emission-level detection equipment, and/or adoption of "space-suit" protective garb, many processors might not be able to afford the investment.

However, there's a chance that processors could be taken off the VCM hook by the already effective work being

Scoreboard Status of existing and pending OSHA health regulation affecting plastics

Material	NIOSH action	OSHA disposition
Asbestos	Criteria Document, 1972 ^a	Emergency standard, 1972
MOCA	^b	Emergency standard, 1973
Vinyl chloride	^b	Emergency standard, 1974
Toluene	Criteria Document, 1973	Under review
Toluene diisocyanate	Criteria Document, 1973	Under review
Benzene	Criteria Document, 1974	None
Glass fibers	Under review for Criteria Document	None
Chlorine	1975 priority ^c	None
Ethylene dichloride	1975 priority	None
Phenol	1975 priority	None
Xylene	1975 priority	None

Source: National Institute for Occupational Safety & Health.

a—Criteria Documents are data bases for proposed OSHA standards.

b—NIOSH research bypassed for reason of critical detected health hazard.

c—Materials for which priority actions are listed may or may not result in OSHA standards; dates are subject to change; new materials may be added.

done by resin producers to minimize residual monomer levels at the polymerization stage (see Oct. 1973 MP, p. 73). NIOSH is cognizant of these efforts. Its current thinking is that if minimal free VCM is carried over to the user's plant, the standard could be limited to monomer/polymer production operations. Air-sample testing is being done for NIOSH to check VCM exposure levels in such routine processor operations as bag opening, hopper loading, extrusion, and molding.

Such speculation aside, it is NIOSH that does the tough, basic spadework from which materials standards are evolved. Although the agency's charter does not require it

OSHA's permanent standard for VCM will set lower levels on worker exposure

At presstime for this issue, the Occupational Safety & Health Administration was preparing to publish in the *Federal Register* its proposal for a permanent standard on worker exposure to vinyl chloride monomer. Review and comment will follow. By law, OSHA is required to come up with its final, permanent standard by not later than Oct. 5. This would be six months after April issuance of its emergency temporary standard for VCM, which among other things mandated immediate reduction of worker exposure to 50 p.p.m., down from a previously allowable 500 (see May MP, p. 10).

How low a level? The proposed permanent VCM standard reportedly includes many recommendations made by NIOSH last spring, before the current temporary standard was issued. Included is reduction of VCM exposure "below detectable levels." By strict interpretation, this means a limit of 1 p.p.m., since that is as fine a measurement as can be made by gas chromatography—the method being considered for specification in the standard.

Industry obviously cannot survive an enforced upper limit of 1 p.p.m. without major disruption and new technology. A survey of monomer and polymer producers reveals that a standard specifying levels in the 1 to 20 p.p.m. range would force some plants to shut down for rebuilding.

It had, of course, been foreseen that a "no detectable level" standard would be proposed by OSHA, despite the real difficulties in compliance that industry can document. Both OSHA and NIOSH have stated that existing experimental and epidemiological data do not support the view that occupational exposure of employees to 50 p.p.m. concentrations of VCM throughout their working lives has no measurable detrimental impact on human health.

Signs of relief. Administrators of the law are aware of the impact a near-zero level would have, particularly at the polymerization and processing stages. That's why it is likely that a workable compromise will be reached. Outlook is that the permanent standard will stress regulations for work-practice and monitoring procedures that minimize the potential for worker exposure to monomer.

But even this won't be an easy way out. The hardware of "protective technology" doesn't come cheap. A relatively unsophisticated gas chromatograph costs in the neighborhood of \$50,000. Air respirators and other protective worker gear, combined with other attendant health-safety controls, add up to a considerable investment, as well.

Still unavailable are the data from ongoing experiments and surveys here and abroad aimed at determining statistically safe levels of human exposure to VCM. These will have a direct bearing on the final standard. Worth noting, in this context, is that Dow Chemical Co. (a major VCM producer) identified chlorinated hydrocarbons as a cause of liver damage as long ago as 1933. Since then, tight work-practice controls, including minimal physical exposure of plant employees, has been standard operating procedure. Dow's records show no cases of angiosarcoma of the liver among any of its VCM workers.

to factor economic impact into its evaluations and recommendations, NIOSH executives are aware that the establishment of zero or near-zero exposure levels is fraught with economic hazard. That's one reason for the shift in emphasis from numerical values to applicable "protective technology" methods for reducing exposure.

Aid from industry

As part of the new fast-action approach to evaluating hazards and developing proposed standards, NIOSH has inaugurated an important departure from previous practice. It is soliciting active industry participation in its preliminary data-gathering and direction-pointing sessions. This participation will take the form of open-exchange seminars. Representatives of companies that produce or use a given material on the priority list of potentially hazardous materials will be invited to present pertinent information and to make suggestions.

The prototype of NIOSH's new seminar approach will involve glass fibers. These reinforcement materials have a Priority-5 status on the current list of materials to be investigated (potential hazard: dermatitis). The glass fibers seminar will be held in Washington, June 26-27.

According to Dr. H.E. Christensen, NIOSH deputy director for research and standards development, the basic purpose of the seminars is to insure that as much valid information as possible is fed in as early as possible. "No matter how careful we are," he says, "important information sometimes doesn't get into the mill. So rather than taking a dogmatic and structured approach to a material, we want to get to the people who know what's what, and come out with usable data on research analysis, work practice, and other factors that help cut the time lag."

Such public discussions won't be necessary for some materials (such as benzene), where sufficient prior documentation had already existed. But it will become more important, says Dr. Christensen, as NIOSH proceeds into the investigation of newer materials, or those for which available research data are scanty.

A look into the future

In another procedural change, NIOSH is experimenting with contracting research assignments locally in the Washington, D.C. area. Formerly, all contracts were let in various parts of the country. Simple as it sounds, NIOSH believes that continuously monitored local research will contribute to speedier production of Criteria Documents.

It also is likely that Criteria Documents issued over the next few years will include a number of materials used in the plastic industry that were not on the original list for investigation. And there is sure to be a reshuffling in the order of priorities. Reasons:

First, field engineers in NIOSH's Office of Occupational Health Surveillance and Biometrics are winding down a three-year investigation of industrial exposure to TLV-rated chemicals. Second, NIOSH has added two new equations to the formula it uses to develop priority ratings: trends in use, and production volume. A new priorities list will be issued in 1975. And, as NIOSH observes, if the revised formula had been applied in drawing up the original priority list, an OSHA standard for VCM would have been issued long ago.—ROLAND R. MACBRIDE