

SAMPLING AND ANALYTICAL METHODS

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Thank you, Mr. Baier. First, let me address the survey of what the worker is actually exposed to. There are sophisticated techniques available for doing an overall examination of personal and environmental samples. These usually apply gas chromatography, mass spectrometry, liquid chromatography, and spectrophotometry in appropriate combination. A fair amount of information concerning the identity of the contaminants to which the worker is actually exposed can be obtained. Comprehensive studies of samples generally take time and are relatively costly, but it seems that to a limited extent such studies are desirable.

Procedures for monitoring worker exposure to the monomers styrene and butadiene are already in use. In essence, the styrene and butadiene are trapped when a measured volume of air is pulled through a bed of charcoal in a glass tube. The tubes are capped and the samples sent to the laboratory. There the charcoal is treated with carbon disulfide to remove the adsorbed materials, and the resulting solutions are analyzed by gas chromatography. These procedures for styrene and butadiene have been studied and validated under the NIOSH-OSHA Standards Completion Program for use around the levels of the OSHA standards — 2200 milligrams per cubic meter for butadiene and 425 milligrams per cubic meter for styrene. At lower levels, below 0.5 times the OSHA standard, the per-

formance of these methods in terms of precision and accuracy is unknown.

A possible problem I can see with the methods for styrene and butadiene is that in taking samples at styrene-butadiene rubber plants other contaminants will be collected along with the styrene and butadiene. Some of these contaminants may be polymerization initiators. Thus, there is some question concerning the stability of actual field samples of styrene or butadiene. We have looked very seriously at styrene-on-charcoal samples, and with our laboratory samples we found no problem with stability. But our laboratory samples were pure styrene; there were no co-contaminants. To my knowledge the stability of butadiene on charcoal has not been investigated.

The list that I saw of all the substances used at the styrene-butadiene plants contained 67 chemicals. I'm not prepared to discuss the sampling and analytical procedures for each and every one, but I should say that with 67 substances or mixtures the problem becomes pretty complex.

I trust that industrial hygienists and analytical chemists closely associated with the industry will have more information than I do on monitoring the atmospheres of these plants. I would invite them to get with us so we may share information.

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