01-VC/PVC-1X.1

July 31, 1973

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Hopefully, this is the final version of the "script". It encompasses the comments of Dr. Joyner, Mr. Reynolds, and Mr. Wood.

Attachment

H. L. KUSNETZ

Howard — 7/20

I can go along with everything on the attached draft except the last sentence in Section II. I understand that this may or may not be substantiated — but I can only see much trouble if it is published now.

Also — Can R L Hayes live with the 50 ppm? If it is OK with him — I have no trouble with it

D. M. SHEETS

INDUSTRIAL HYGIENE NOTES

Vinyl Chloride Monomer

United States production of vinyl chloride monomer (VCM) reached a level of 5.2 billion pounds in 1972. Shell's entry into VCM production late in 1971 added about 800 million pounds of design capacity. Late in 1973 a second Shell VCM facility is scheduled to go into operation at Norco. The combined facilities provide Shell with this country's largest vinyl chloride monomer capacity. Demand for VCM, which is produced with a purity exceeding 99.9%, is estimated to continue to expand at an annual rate of 10 percent through 1975 and beyond.

VCM manufacturers and users have long been aware of its potential hazards. The flammability of VCM has prompted standard handling precautions. Gross health effects were also known early. The acute (lethal) concentration in air is at 30-40%. Concentrations of 10% and higher will produce unconsciousness in animals in 30 minutes. In dogs at anesthetic concentrations (8-12%) it has serious effects on cardiac muscle. In experiments with humans, intoxication appeared at 8,000-12,000 ppm. In any case, the high concentrations associated with the animal experiments are within the explosive range and controls which are in routine use against explosion and fire will prevent any such acute effects in workers.

A number of studies of the effects of chronic exposure have been made and are well documented. Liver enlargement was noted in experimental animals. There have been no reports of such effects in vinyl chloride workers. At high levels (in excess of 1,000 ppm), in polyvinyl chloride workers, acroosteolysis, or the wasting away of the

tips of the finger bones was noted in the 1960s. (The acroosteolysis problem has been limited to polymer kettle cleaners; hence, such problems have not been seen, nor are they expected, in monomer plant workers.) The U. S. Department of Labor has set the legal ceiling at 500 parts per million (ppm), and the American Conference of Governmental Industrial Hygienists has recommended a time-weighted threshold limit value of VCM of 200 ppm.

In 1970 a paper at the International Cancer Congress reported that rats exposed for 12 months to extremely high (30,000 ppm) concentrations of VCM vapors developed tumors of the skin, lung, and bones. This concentration is vastly higher than ever expected or found in industrial practice, and the VCM used had more impurities than in the U. S. commercial products. Nevertheless, Shell and others in the vinyl and polyvinyl chloride industry became sufficiently concerned with any indication of possible tumor formation to undertake a program of investigation of hitherto unsuspected effects by sponsoring a research program under the auspices of the Manufacturing Chemists Association. This program seeks to determine the effects of low concentrations of the monomer on three species of animals. Particular attention is being paid to see if tumors develop, and if so, at what concentrations. Although no tumors in workers have been attributed to VCM, the MCA affiliated companies are also undertaking an industry-wide epidemiologic study.

Shell Chemical Company with professional assistance from its Medical and Industrial Hygiene Departments is studying plant atmospheric

levels and believes a 50 ppm time-weighted TLV is feasible. Additional tests are planned, and a medical surveillance program will be started shortly with Shell employees who work with VCM.

As part of the Shell effort, and in line with the Company's philosophy that exposures should be minimized, Shell will be using a working TLV of 50 ppm. Shell's customers have been informed of the lower levels we are using and that Shell's analytic method for detecting low levels is available for their use.

Questions from outside the company concerning any of these items should be referred to Manager - Vinyl Chloride Business Center. Internal questions should be handled by line management with professional assistance from corporate Medical and Industrial Hygiene Departments as required.