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DEC 09 '83 let's discuss

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To T. G. Grumbles

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From T. J. Chester, M.D., M.P.H.

Date December 8, 1983

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Subject REVIEW OF GERMAN PAPER ON MORTALITY AMONG VINYL CHLORIDE WORKERS

As you requested, I have reviewed the translation of the paper "Vinyl Chloride Exposure and Mortality of German Chemical Industry Workers Compared to the Mortality of Non-Exposed Chemical Industry Workers and PVC Workers" by E. Grieser, W. Reinl and H. Weber in Zentralbl. Arbeitsmed. Arveitsschutz. 32, no.2:44-62 (1982). This is a historical cohort study involving three cohorts. The three cohorts are workers exposed to vinyl chloride monomer, workers in PVC fabrication and a control group of chemical industry workers not exposed to vinyl chloride monomer or PVC. Each cohort was compared to the 1968 standard West German population, using standardized mortality ratios (SMR). No direct statistical comparison was performed comparing the exposed and unexposed cohorts.

The study reports three significant results which may be of interest to Conoco. Malignant tumors of the liver showed a fifteen-fold increase in VCM workers when compared to the standard West German population. The PVC workers and the unexposed chemical workers showed an approximate four-fold increase in malignant liver tumors, compared to the West German population. The marked increase in VCM workers is entirely consistent with the well known fact that VCM causes angiosarcoma of the liver. A slight increase in malignant tumors of the digestive system can also be entirely explained by the marked increase in tumors of the liver.

The study reports a two-fold increase in malignancies of lymphatic and hematopoetic tissues in VCM workers when compared to the West German population and no corresponding increase in PVC workers or unexposed chemical workers. No such increases in leukemias and lymphomas were shown in previous epidemiologic studies of VCM workers.

The current study finds a five-fold increase in malignancies of the brain among PVC workers but not among VCM workers or unexposed chemical workers. Since there are some references in the literature concerning lead and other heavy metals possibly causing brain tumors, I would suspect that this increase is more likely due to exposure to these or other substances which are found in the PVC fabricating process, rather than exposure to VCM or PVC.

As with all epidemiologic studies we must be cautioned that this study shows only associations and does not demonstrate a cause and effect relationship. Furthermore, this study as with many studies using this type of methodology suffers from problems of multiple testing effect and other methodologic problems. This study also must contend with problems with the methods of death reporting and coding of death certificates in West Germany. Nevertheless, I would suggest that we give some consideration to the

proposition that VCM may be causally related to some lymphatic and hematopoetic malignancies.

In view of the fact that we already control VCM exposures because of its known causal relationship to angiosarcoma of the liver, I do not believe that any additional control is necessary, based on the information provided by this paper. Of course you have a greater expertise in this area than I do and I defer to you on this matter. In view of the possibility of VCM being associated with lymphatic and hematopoetic malignancies, I would suggest that we consider adding white blood count and differential to the officially required tests in the VCM annual and six month interim medical examinations. Since these tests are currently routinely performed as part of these examinations, this will not create any additional expense for the company. I have discussed this matter with Drs. Whetstone and Drumwright and they concur in this recommendation.

I hope that this review has provided useful information for you. If you have any questions, please do not hesitate to contact me.

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