A

CONOCO RECEIVED

JUL 16 1979

Interoffice Communication

To R. E. Lehmkuhl

From D. A. Kuhn

Date July 13, 1979

Subject EFFECTS OF BENZENE HARMFUL TO FEMALES

As you requested I have reviewed several recent surveys[1-3] and the information in our files on benzene toxicity. There are no reports implicating benzene as especially toxic to women in human studies although there are several case reports describing the sudden onset of aplastic anemia when workers exposed to benzene become pregnant[4]

There are, however, several reports of reproductive effects from benzene inhalation in female experimental animals[5-8] Analyzing these collectively, benzene is observed to have weak toxic effects on pregnant females and on fetuses at about 50 ppm in the experimental animals. In one study at 500 ppm, weak teratologic effects were also observed.

These findings should be put in perspective. Many toxicological effects in both humans and experimental animals, males and females, are found after exposure to benzene in the range 20 ppm and higher. Among them are acute affects such as vertigo, drowsiness, headache and nausea, as well as chromosomal breakage, leukopenia, pernicious and aplastic anemia and leukemia. There are also three articles dealing with effects on males.[9-11] While the information on males is sparse and inconclusive, limited data suggest a gonadal effect in male animals at 80 ppm.[10]

I conclude that there is only a small amount of information about the effects of benzene on a woman or her developing fetus. None indicate a special sensitivity. What we have tells us that the harmful effects occur within the same concentration range found for many of the toxic effects due to benzene exposure for both men and women. Consequently, our decision to set a Conoco maximum permissible exposure level at 1 ppm benzene, far below the levels where these effects have been noted, is the proper course to adequately protect men, women, and their potential offspring. Because these effects have been found at relatively low concentrations we should redouble our efforts to assure that the 1 ppm maximum permissible exposure level is being scrupulously maintained.

Dave

D. A. Kuhn

DAK:ajo

cc R A Darling, R T Ferrell, D L Norwood

VEV-158284

A

REFERENCES

1. US EPA, Office of Research and Development, "Benzene Health Effects Assessment, Washington, D.C., (October 1977).

2. Department of Labor, Occupational Safety and Health Administration, "Occupational Exposure to Benzene, Fed. Reg. 42, 22516, (May 3, 1977).

3. Department of Labor Occupational Safety and Health Administration, "Occupational Exposure to Benzene, Fed. Reg. 43, 5918, (February 10, 1978)".

4. A. Hricko and M. Brunt, "Working for Your Life: A Womens Guide to Job Health Hazards", P. C-20, Labor Occupational Health Program and Public Citizens Health Research Group. (1976).

5. Hazleton Laboratories America, Inc., Vienna, Virginia, Project No. 145-552, Teratology Study in Rats, Final Report (September 25, 1975).

6. Dow Chemical U.S.A., Midland, Michigan, Report Code HET K-002661-(11), Embryotoxicity of Inhaled Benzene in Mice and Rabbits, Final Report (August 3, 1978).

7. Green, J. D., Leong, B. K., J. and Laskin, S., "Fetotoxicity of Inhaled Benzene in Rats," Toxicol. Appl. Pharmacol. (1977, In Press).

8. Litton Bionetics, Inc., Kensington, Maryland, Project No. 20698-3, "Teratology Study in Rats", Final Report (November, 1977).

9. Hett, J., "Benzol/Und Keimdrusen", Klinische Wochenschrift 17:1376 (1938).

10. Wolf, M. A., Rowe, V. K., McCollister, D. D., Hollingsworth, R. L., and Ogen, F., "Toxicology Studies of Certain Alkylated Benzenes and Benzene", Arch. Ind. Health 14:387-398 (1956).

11. Deichmann, W. B., MacDonald, W. E. and Bernal, E., "The Hemapoietic Tissue Toxicity of Benzene Vaport", Toxicol. Appl. Pharmacol. 5:201-224 (1962).