THE RUBBER INDUSTRY (Group 1)

A. Evidence for carcinogenicity to humans (*sufficient*)

A large number of studies have been conducted on rubber industries in Canada, China, Finland, Norway, Sweden, Switzerland, the UK and the USA[1-19]. Workers employed in the industry before 1950 have a high risk of bladder cancer, probably associated with exposure to aromatic amines. Leukaemias have been associated with exposure to solvents and with employment in back processing, tyre curing, synthetic rubber production and vulcanization. Excess occurrence of lymphomas has been noted among workers exposed to solvents in such departments as footwear and in tyre plants[20]. Other cancers, including those of the lung, renal tract, stomach, pancreas, oesophagus, liver, skin, colon, larynx and brain, have been reported as occurring in excess in workers in various product areas and departments, but no consistent excess of any of these cancers is seen across the various studies.

B. Evidence for carcinogenicity to animals (*inadequate*)

In one inadequately reported experiment, three groups of rats were kept either in the compounding room or in the mixing or mastication area of a Banbury mill at a tyre factory. Increased incidences of respiratory and digestive carcinomas were found in rats maintained for two years at the latter two locations when compared with control rats maintained in the institute laboratory[17].

C. Other relevant data

No increase in the incidence of chromosomal aberrations was observed among 55 rubber workers as compared to 35 control subjects, with the exception of a small group of

nonsmokers involved in weighing rubber chemicals. Increased frequencies of sister chromatid exchanges were observed both in smoking and nonsmoking weighers and in mixers who smoked, compared with unexposed controls; the frequency of sister chromatid exchanges in vulcanizers was not statistically significantly increased. Negative results for chromosomal aberrations and sister chromatid exchanges were also obtained in another study of vulcanizers[21].

Urine samples from 55 workers in two rubber factories and from 35 controls were analysed for mutagenicity in bacteria in the presence of an exogenous metabolic system. Mutagenic activity was observed in the urine of workers involved in weighing and mixing rubber components and in the urine of some vulcanizers. Similar results were reported in an extension of this study. No increase in bacterial mutagenicity was observed in urine samples from 72 tyre builders in a rubber factory and from 23 controls[21].

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