BITUMENS

BITUMENS (Group 3) and EXTRACTS OF STEAM-REFINED AND AIR-REFINED BITUMENS (Group 2B)

A. Evidence for carcinogenicity to humans (inadequate for bitumens)

No epidemiological study of workers exposed only to bitumens is available. A cohort study of US roofers indicates an increased risk for cancer of the lung and suggests increased risks for cancers of the oral cavity, larynx, oesophagus, stomach, skin and bladder and for leukaemia. Some evidence of excess risks for lung, oral cavity and laryngeal cancers is provided by other epidemiological studies of roofers. As roofers may be exposed not only to bitumens but also to coal-tar pitches (see p. 174) and other materials, the excess cancer risk cannot be attributed specifically to bitumens¹. Several case reports of skin cancer among workers exposed to bitumens are available; however, exposure to coal-tars (see p. 175) or products derived from them cannot be ruled out¹⁻³.

B. Evidence for carcinogenicity to animals (*limited* for undiluted steam-refined and cracking-residue bitumens; *inadequate* for undiluted air-refined bitumens; *sufficient* for extracts of steam-refined and air-refined bitumens)

In several studies, application to the skin of mice of various extracts of steam- and air-refined bitumens and mixtures of the two resulted in tumours at the sites of application^{1,4}. Undiluted steam-refined bitumens and cracking-residue bitumens produced skin tumours when applied to the skin of mice. No skin tumour was found in mice after

application of an undiluted air-refined bitumen. In limited studies, subcutaneous injection into mice and intramuscular injection into mice and rats of steam- and air-refined bitumens produced sarcomas at the injection sites¹.

C. Other relevant data

Antigenicity against benzo[a]pyrene diol epoxide-DNA adducts has been demonstrated in peripheral blood lymphocytes of roofers⁵.

Both an extract of road-surfacing bitumen and its emissions were mutagenic to Salmonella typhimurium, whereas, in another study, 'asphalt tar' extracted from an asphalt concrete used for road surfacing was not. Bitumen-based paints for pipe coating were not mutagenic to S. typhimurium⁵.

References

¹IARC Monographs, 35, 39-81, 1985

- ²Jørgensen, N.K. (1984) Exposure to asphalt as the cause of development of skin cancer (Dan.). Ugeskr. Laeger, 146, 2832-2833
- ³Tsyrkunov, L.P. (1985) Multiple basalioma in a worker laying asphalt (Russ.). Vestn. Dermatol. Venerol., 2, 48-51
- ⁴Niemeier, R.W., Thayer, P.S., Menzies, K.T., von Thuna, P., Moss, C.E. & Burg, J. (1987) A comparison of the skin carcinogenicity of condensed roofing asphalt and coal tar pitch fumes. In: Cooke, M. & Dennis, A.J., eds, Proceedings of the 10th International Symposium on Polynuclear Aromatic Hydrocarbons, Chemistry, Characterization and Carcinogenesis, Columbus, OH, Battelle, pp. 609-647

⁵IARC Monographs, Suppl. 6, 121, 1987