## SOOTS (Group 1)

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

The carcinogenicity of soot is demonstrated by numerous case reports, dating back over 200 years, of skin cancer, particularly of the scrotum, among chimney-sweeps. More recent cohort studies of mortality among chimney-sweeps in Sweden and Denmark have shown a significantly increased risk of lung cancer. Supporting evidence for an association with lung cancer was provided by two earlier epidemiological studies in the German Democratic Republic and the UK. The potentially confounding and interactive effects of smoking could not be evaluated; however, cigarette smoking is not believed to have seriously biased these estimates. In addition to lung cancer, statistically significant excess mortality from oesophageal cancer, primary liver cancer and leukaemia was found among chimney-sweeps in one study[1].

**B. Evidence for carcinogenicity to animals** (*inadequate* for soots; *sufficient* for soot extracts)

Coal soot was tested in two experiments in mice by whole-body exposure, but the studies were inadequate for evaluation. Coal-soot extracts applied to the skin of mice produced skin tumours in two studies. A wood-soot extract applied to the skin of mice was inadequately tested. In limited studies, subcutaneous implants of wood soot in female rats produced a few local sarcomas; similar implants in the scrotal sac of rats did not. An extract of fuel-oil soot was inadequately tested by application to the skin of mice. Extracts of soot from the combustion of oil shale produced skin tumours in mice after dermal application and lung

tumours in rats after intratracheal instillation. Extracts of soot from the combustion of a heating oil produced from shale-oil produced skin tumours in mice in two experiments when applied to the skin[1].

### C. Other relevant data

No data were available on the genetic and related effects of soots in humans.

Extracts of soot samples from domestic sources were mutagenic to *Salmonella typhimurium* both in the presence and absence of an exogenous metabolic system. Extracts of experimentally-derived soots were mutagenic in forward mutation assays in *S. typhimurium* and in cultured human lymphoblasts in the presence of an exogenous metabolic system. Extracts of particulate emissions from wood combustion were shown to induce sister chromatid exchanges in Chinese hamster ovary cells, transformation of Syrian hamster embryo cells and mutation in *S. typhimurium*. An experimentally-derived, intact particulate soot and an extract of this material were mutagenic in a human lymphoblastoid cell line[2].

### References

[1]*IARC Monographs*, *35*, 219-246, 1985

[2]*IARC Monographs*, *Suppl. 6*, 497, 1987