United States
Environmental Protection
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Environmental Criteria and
Assessment Office
Cincinnati OH 45268

Research and Development

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EPA

Project Summary

Health Effects Assessment Documents

A series of 58 Health Effects Assessments were prepared by the Environmental Criteria and Assessment Office, Cincinnati, OH, for the Office of Emergency and Remedial Response. These documents are brief, summary assessments of potential adverse health effects following either oral or inhalation exposure for the purpose of remedial actions.

This Project Summary was developed by EPA's Environmental Criteria and Assessment Office, Cincinnati, OH, to announce key findings of the research project that is fully documented in 58 separate reports (see Project Report ordering information at back).

The Environmental Criteria and Assessment Office, Cincinnati, OH, of the Office of Health and Environmental Assessment has prepared a series of 58 Health Effects Assessments (HEAs) for the Office of Emergency and Remedial Response. These documents are intended to provide brief, preliminary assessments of potential adverse health effects following either inhalation or oral exposure to toxicants in the context of evaluations for remedial actions. The estimates of acceptable intakes and cancer potencies presented in the HEAs should be considered preliminary, and may be updated as more recent in-depth assessments are completed.

Whenever possible, two categories of route-specific acceptable intakes have been estimated for systemic toxicants (toxicants for which cancer is not the endpoint of concern). The first, the AIS or acceptable intake for subchronic exposure, is an estimate of an exposure level which would not be expected to cause adverse effects when exposure occurs during a limited time interval (i.e., for an interval which does not constitute a significant portion of the lifespan). This type of exposure estimate has not been extensively used, or rigorously defined, as previous risk assessment effects have been primarily directed towards exposures from toxicants in ambient air or water where lifetime exposure is assumed. Animal data used for AIS estimates generally include exposures with durations of 30-90 days. Because reported human exposures are usually from chronic, occupational exposure situations or from reports of acute accidental exposure, subchronic human data are rarely available.

The AIC or acceptable intake for chronic exposure, is similar in concept to the ADI (acceptable daily intake). It is an estimate of an exposure level which would not be expected to cause adverse effects when exposure occurs for a significant portion of the lifespan. The AIC is route specific and estimates acceptable exposure for a given route with the implicity assumption that exposure via other routes is insignificant.

For compounds for which there is sufficient evidence of carcinogenicity, AIS and AIC values are not derived. Since the Agency's cancer policy assumes a process which is not characterized by a threshold, *any* exposure contributes an increment of risk. Consequently, derivation of AIS and AIC values would be inappropriate. For carcinogens, q_1*s have been computed based on oral and/or inhalation data if available. The q_1* represents an upper-bound estimate on lifetime cancer risk as estimated by the multi-stage model.

Inhalation values (AIS, AIC and q_1*) have been developed for purposes of inhalation exposure evaluations only. These values do not reflect differential absorption assumptions appropriate for route-to-route extrapolation. These estimates have been developed to be readily transposable to units of air concentration

and have incorporated an assumption that exposure concentration will be relatively stable across a 24-hour period.

Of the 58 subject chemicals, cancer potency estimates were developed for 26 compounds: arsenic, benzene, benzo(a) pyrene, cadmium (inhalation only), carbon tetrachloride, chlordane, chloroform, coal tars, DDT, 1,2-dichloroethane, 1,1-dichloroethylene, hexachlorobenzene, hexachlorobutadiene, hexavalent chromium (inhalation only), lindane, methylene chloride, nickel (inhalation only), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), 2,3,7,8-TCDD, 1,1,2,2-tetrachloroethane, tetrachloroethylene, 1,1,2-trichloroethane, trichloroethylene, 2,4,6-trichlorophenol and vinyl chloride.

AIS and/or AIC values were estimated for 27 compounds: acetone, barium, cadmium (oral only), chlorobenzene, copper, cresols, cyanide, 1,1-dichloroethane, ethyl benzene, glycol ethers, hexachlorocyclopentadiene, hexavalent chromium (oral only), iron, manganese, mercury, methyl ethyl ketone, nickel (oral only), pentachlorophenol, phenol, selenium, sodium cyanide, toluene, 1,1,1-trichloroethane, 2,4,5-trichlorophenol, trivalent chromium, xylene and zinc. For sulfuric acid available data related solely to portal of entry effects. Therefore, exposure concentrations rather than acceptable intakes were developed.

For six compounds data were inadequate for quantitative assessment: 1,2-cis-dichloroethylene, 1,2-trans-dichloroethylene, naphthalene, phenanthrene and pyrene. For asbestos, despite considerable data, quantitative estimates were not attempted due to the confounding problems of fiber size and shape. This is an issue currently under review. Similarly for lead, AIS and AIC values are not provided awaiting the conclusions of a large-scale review effort concerning this compound. In the interim existing standards are presented and discussed.

The primary focus of the brief literature summaries presented in the HEAs is literature directly relevant to hazard assessment, primarily mammalian toxicological evaluations of subchronic or chronic duration conducted utilizing oral or inhalation exposure protocols. The HEAs generally reflect secondary sources of information when available in the form of more extensive agency documentation.

This Project Summary was prepared by staff of the Environmental Criteria and Assessment Office, USEPA, Cincinnati, OH 45268. This Project Summary covers 58 separate reports, entitled "Health Effects Assessment for—,"

Acetone (Order No. PB 86-134 277/AS; Cost: $9.95)
Arsenic (Order No. PB 86-134 319/AS; Cost: $11.95)
Asbestos (Order No. PB 86-134 608/AS; Cost: $11.95)
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Zinc (and Compounds) (Order No. PB 86-134 590/AS; Cost: $11.95)
Complete Set of 58 Reports (Order No. PB 86-134 111/AS; Cost: $518.00)

The above reports will be available only from: (cost subject to change)
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650

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