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EPA

Project Summary

Health Effects Assessment Documents

A series of Health Effects Assessment (HEA) documents 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 separate reports (see Project Report ordering information at back).

Introduction

These reports summarize and evaluate information relevant to a preliminary interim assessment of adverse health effects associated with specific chemicals and compounds. All estimates of acceptable intakes and carcinogenic potency presented in this document should be considered as preliminary and reflect limited resources allocated to this project. Pertinent toxicologic and environmental data were located through on-line literature searches of the TOXLINE, CANCERLINE and the CHEMFATE/DATALOG data bases. Secondary sources of information have also been relied upon in the preparation of these reports and represent large-scale health assessment efforts that entail extensive peer and Agency review.

Discussion

The intent in these assessments is to suggest acceptable exposure levels whenever sufficient data were available. Values were not derived or larger uncertainty factors were employed when the variable data were limited in scope tending to generate conservative (i.e., protective) estimates. Nevertheless, the interim values presented reflect the relative degree of hazard associated with exposure or risk to the chemical(s) addressed.

Whenever possible, two categories of values have been estimated for systemic toxicants (toxicants for which cancer is not the endpoint of concern). The first, RfD_s (formerly AIS—Acceptable Intake Subchronic) or subchronic reference dose, is an estimate of an exposure level that would not be expected to cause adverse effects when exposure occurs during a limited time interval (i.e., for an interval that 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 efforts have been primarily directed towards exposures from toxicants in ambient air or water where lifetime exposure is assumed. Animal data used for RfD_s estimates generally include exposures with durations of 30-90 days. Subchronic human data are rarely available. Reported exposures are usually from chronic occupational exposure situations or from reports of acute accidental exposure. These values are developed for both inhalation (RfD_{si}) and oral (RfD_{so}) exposures.

The RfD (formerly AIC - Acceptable Intake Chronic) is similar in concept and addresses chronic exposure. It is an estimate of an exposure level that would not be expected to cause adverse effects when exposure occurs for a significant portion of the lifespan. The RfD is route-specific and estimates acceptable exposure for either oral (RfD_o) or inhalation (RfD_i) with the implicit assumption that exposure by other routes is insignificant.

Composite scores (CSs) for noncarcinogens have also been calculated where data permitted. These values are used for ranking reportable quantities.

For compounds for which there is sufficient evidence of carcinogenicity, RfD_s and RfD values are not derived. Since the Agency's cancer policy assumes a process that is not characterized by a thresh-

old, any exposure contributes an increment of risk. Consequently, derivation of these 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 (RfD_{SI}, RfD_I 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.

The primary focus of the brief literature summaries presented in the HEAs is literature directly relevant to hazard assessment, primarily mammalian toxicologic 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.

Conclusion

Table 1 summarizes the risk assessments developed in each document. IMPORTANT REMINDER! **These assessments were prepared in 1987-1988 and may have been superseded by more recent documentation. Please refer to the following references for the most current information.**

- U.S. EPA Health Effects Assessment Summary Table. Available from the National Technical Information Service, Springfield, VA, at 703/489-4807. Order Number PB91-921100. (This Table is updated quarterly, every three months.)
- U.S. EPA Integrated Risk Information System (IRIS). Available online from the National Library of Medicine's Toxicology Data Network (TOXNET) and from the National Technical Information Service, Springfield, VA, at 703/489-4807. Order Number PB90-591330. (This data base is updated quarterly, every three months.)

Table 1. Summary of Risk Assessments

Chemical(s)	*RfD_{SO} (mg/day)*	*RfD_O (mg/day)*	*RfD_{SI} (mg/day)*	*RfD_I (mg/day)*	*CS*	*q_1* $(mg/kg/day)^{-1}$*	*Cancer Group*
Acenaphthene	*ID*	*ID*	*ID*	*ID*	*ID*	*ID*	*D*
Acenaphthylene	*ID*	*ID*	*ID*	*ID*	*ID*	*ID*	*D*
Acetonitrile	*4.6*	*0.5*	*9.1*	*0.91*	*21*	*ID*	*D*
Acrolein	*ND*	*ND*	*ND*	*ND*	*ND*	*ID*	*C*
Acrylonitrile	*ND*	*ND*	*ND*	*ND*	*ND*	*$5.4x10^{-1}$-oral 0.24-inhal.*	*B1*
Aldrin	*ND*	*ND*	*ND*	*ND*	*ND*	*17-oral*	*B2*
Aluminum	*ID*	*ID*	*ID*	*ID*	*10*	*ID*	*C*
Ammonia	*ID*	*ID*	*7.0*	*7.0*	*19*	*ID*	*D*
Antimony and Compounds	*ID*		*ND*	*ND*	*ND*		*D-oral B2-inhal.*
Antimony		*24.5 µg/day*					
Antimony potassium tartrate		*65.48 µg/day*					
Antimony trioxide		*29.3 µg/day*					
Antimony tetraoxide		*30.9 µg/day*					
Antimony pentoxide		*32.5 µg/day*					
Benzidine	*ND*	*ND*	*ND*	*ND*	*ND*	*234.13-oral 111-inhal.*	*A*
Beryllium and Compounds	*ND*	*ND*	*ND*	*ND*	*ND*	*4.86-oral 8.4-inhal.*	*B2*
Boron and Compounds	*6.2*	*6.2*	*ID*	*ID*	*21.6*	*ID*	*D*
Bromomethane	*1*	*0.1*	*5*	*0.5*	*27.9*	*ID*	*D*
bis(2-chloroethyl)ether	*ND*	*ND*	*ND*	*ND*	*ND*	*1.1-oral*	*B2*
Chloromethane	*ND*	*ND*	*ND*	*ND*	*ND*	*$1.26x10^{-2}$-oral $6.32x10^{-3}$-inhal.*	*C*
2-Chlorophenol and	*0.35*	*0.35*	*ID*	*ID*	*10.4*	*ID*	*D*
2,4-Dichlorophenol	*0.2*	*0.2*	*ID*	*ID*	*11.9*	*ID*	*D*
Creosote	*ID*	*ID*	*ID*	*ID*	*ID*	*11.53-oral (for BaP)*	*B1*
Dibenzofuran	*ID*	*ID*	*ID*	*ID*	*ID*	*ID*	*D*
Dichlorobenzenes							
1,2-Dichlorobenzene	*63*	*30*	*31*	*3.1*	*9*	*ID*	*D*
1,3-Dichlorobenzene	*ID*	*ID*	*ID*	*ID*	*ID*	*ID*	*D*
1.4-Dichlorobenzene	*ND*	*ND*	*ND*	*ND*	*ND*	*$2.4x10^{-2}$-oral*	*B2*
1,2-Dichloropropane	*ND*	*ND*	*ND*	*ND*	*ND*	*$6.75x10^{-2}$-oral*	*B2*
Dieldrin	*ND*	*ND*	*ND*	*ND*	*ND*	*16*	*B2*
Dimethylphenols-2,6-isomer	*0.42*	*0.042*	*ID*	*ID*	*21*	*ID*	*D*

Continued

Table 1. Continued

Chemical(s)	RfD_{SO} (mg/day)	RfD_O (mg/day)	RfD_{SI} (mg/day)	RfD_I (mg/day)	CS	q_1^* $(mg/kg/day)^{-1}$	Cancer Group
Dimethylphenols-3,4-isomer	0.98	0.098	ID	ID	18.5	ID	D
2,4-Dinitrotoluene and	ND	ND	ID	ID	ND	0.683	B2
2,6-Dinitrotoluene	ND	ND	ID	ID	ND		B2
1,2-Diphenylhydrazine	ND	ND	ND	ND	ND	0.768	B2
alpha- and beta-Endosulfan	0.01	0.001	ID	ID	50	ID	D
Endrin	0.03	0.02	ID	ID	52	NA	E
Ethyl Chloride	ID	ID	ID	ID	ID	ID	D
Ethyl Ether	350	35	ID	ID	10	ID	D
Ethylene Dibromide	ND	ND	ND	ND	ND	85-oral 1.37-inhal.	B2
Ethylene Glycol	140	140	ID	ID	10	ID	D
Fluorenes	ID	ID	ID	ID	ID	ID	C
Benzo(j,k)fluorene Fluorene	ID	ID	ID	ID	ID	ID	D
Fully Halogenated Methanes							
Trichlorofluoromethane (F-11)	50	20	135.8	13.6	10	ID	D
Dichlorodifluoromethane (F-12)	63	10	33.8	3.4	7.8	ID	D
Heptachlor	ND	ND	ND	ND	ND	4.5-oral	B2
Hexachloroethane	ND	ND	ND	ND	ND	$1.42x10^{-2}$-oral	C
Isophorone	ND	ND	ND	ND	ND	$4.1x10^{-3}$-oral	C
Methyl Isobutyl Ketone	35	3.5	16	1.6	11.5	ID	D
Mirex	ND	ND	ND	ND	ND	1.8-oral	B2
Nitrobenzene	0.3	0.03	0.4	0.04	37.6	ID	D
Nitrophenols	ID	ID	ID	ID	ID	ID	D
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	$4.92x10^{-3}$-oral	B2
Parathion	0.4	0.4	ID	ID	36	ID	C
n-Pentane	ID	ID	ID	ID	ID	ID	D
Selected Phthalic Acid Esters							
bis(2-ethylhexyl)phthalate	ND	ND	ND	ND	ND	$8.36x10^{-3}$-oral	B2
Diethyl Phthalate	525	52.5	ID	ID	8	ID	D
Di-N-Butyl Phthalate	88	8.8	ID	ID	12.8	ID	D
Butyl Benzyl Phthalate	111	11.1	ID	ID	17	ID	C
Di-N-Octyl Phthalate Dimethyl Phthalate	ID	ID	ID	ID	6	ID	D
Styrene	ND	ND	ND	ND	ND	$3x10^{-2}$-oral $2.0x10^{-3}$-inhal.	B2
Tin and Compounds	43.4	43.4	ID	ID	28.7	ID	D
Toxaphene	ND	ND	ND	ND	ND	1.131-oral	B2
1,2,4-Trichlorobenzene	14	1.4	1.75	0.18	12.4	ID	D
2,4,5-Trichlorophenoxy Acetic Acid (2,4,5-T)	7	2	ID	ID	28	ID	D
Trihalogenated Methanes							
Bromoform	4	0.4	ID	ID	25.8	ID	D
Chlorodibromomethane	ND		ID	ID	ND	$8.4x10^{-2}$-oral	B2
Bromodichloromethane	ND		ID	ID	ND	$1.3x10^{-1}$-oral	B2
Trimethylbenzenes	ID	ID	ID	ID	ID	ID	D
Vanadium and Compounds			ID	ID	32.9	ID	D
Sodium Metavanadate	1.0	0.1					
Vanadyl Sulfate	2.0	2.0					
Vanadium Pentoxide	0.6	0.6					
Vanadyl Sulfate	ID	1.6					

ID = Insufficient Data
ND = Not Derived (Carcinogen)
NA = Not Applicable

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This Project Summary was prepared by staff of the Environmental Criteria and Assessment Office, USEPA, Cincinnati, OH 45268.

***Deb McKean** is the EPA Project Officer, (see below).*

This Project Summary covers 51 separate reports. entitiled, "Updated Health Effects Assessment for. . ."

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