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Health Effects Assessment Summary Tables

Supplement Number 2 to the March 1993 Annual Update

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HEALTH EFFECTS ASSESSMENT

SUMMARY TABLES

FY-1993 Supplement No. 2

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Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, D.C. 20460

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DISCLAIMER

This report has been prepared by the U.S. Environmental Protection Agency. The information contained herein has been taken from final documents prepared by the Office of Health and Environmental Assessment for the Office of Solid Waste and Emergency Response and the Office of Water, Washington, DC and the Office of Air Quality Planning and Standards, Research Triangle Park, NC. These documents were reviewed in accordance with Agency policy and approved for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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INTRODUCTION

This document is the November 1993 Supplement No. 2 for the March 1993 Annual Update of the Health Effects Assessment Summary Tables (HEAST) prepared by EPA's Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for use at both Superfund and RCRA sites. Supplement No.2 updates the information in the March 1993 HEAST Annual Update and Supplement No. 1 (July 1993). When using this document, please refer to the Annual Update and Supplement No. 1. The supplements were not produced to stand alone and do not contain the User's Guides or Appendix that are available in the Annual Update. Thus, the user is strongly encouraged to reference the March 1993 HEAST for this information.

The HEAST is a comprehensive listing consisting almost entirely of PROVISIONAL HEALTH EFFECTS INFORMATION relative to oral and inhalation routes for chemicals of interest to Superfund, the Resource Conservation and Recovery Act (RCRA), and the EPA in general. These entries in the HEAST are limited to chemicals that have undergone review and have the concurrence of individual Agency Program Offices, and each is supported by an Agency reference. This health effects information has not, however, had enough review to be recognized as high quality, Agency-wide consensus information.

The Integrated Risk Information System (IRIS) is the Agency's official repository of Agency-wide consensus chronic human health risk information. IRIS evaluations are conducted by the Agency's Work Group Review process, i.e., they have been examined by either

the Reference Dose/Reference Concentration (RfD/RfC) Work Group or the Carcinogen Risk Assessment Verification Endeavor (CRAVE) Work Group. These Agency Work Groups conduct a process that leads to internal Agency scientific consensus regarding health effects information on a chemical. This information is recorded on IRIS, is considered to be "Work Group Verified", and does not appear on the HEAST. Thus, provisional health effects information on the HEAST is subject to possible review and revision by these Agency Work Groups.

There are two exceptions to the above discussion. The HEAST also contains information on chemicals that are a part of the National Ambient Air Quality Standards (NAAQS) or the Drinking Water Criteria Document (DWCD) series. In each of these cases, the chemicals are subject to extensive scientific peer review processes of extremely high quality.

CHEMICAL STATUS DEFINITIONS

Chemicals reviewed by the Agency Work Groups are classified according to their status as either "verified", "not verifiable", or "under review". The toxicity values (other than NAAQS or DWCD values) listed on the HEAST are considered to be "provisional." The Agency has no official definitions for these terms, but the HEAST user may interpret them as follows:

> **Provisional:** A toxicity value or a cancer value is "provisional" if the value has had some form of Agency review, but it does not appear on the IRIS system. These values are generated in several ways. Often they are determined in the course of developing an Agency document on a chemical or on a class of chemicals. Some have been generated through the Work Group process, but have not yet been input to the IRIS system. At the time each

value was derived, all available information on the chemical was evaluated, the value was calculated using the most current methodology, and a consensus was reached on the value by Agency scientists.

Brackets are placed around the names of toxicity and carcinogenicity values on the HEAST to distinguish these "provisional" values from information on IRIS. The following names are affected: RfD to [RfD], RfC to [RfC], slope factor to [slope factor], EPA group to [EPA Group] and unit risk to [unit risk].

These "provisional" values are found on the HEAST. They do not appear on IRIS.

Verified: A toxicity value or a cancer value is "Work Group Verified" if all available information on the value has been examined by an Agency Work Group, the value has been calculated using current Work Group methodology, a unanimous consensus has been reached on the value by the Work Group, and the value appears on IRIS.

Some numbers that have achieved unanimous consensus by the Work Group may appear on the HEAST for a short time until they are loaded onto IRIS, at which time they are termed, "verified." During the interim, they are considered to be "provisional" values that are still "under review" by the Work Group.

These "verified" numbers only appear on IRIS. They do not appear on the HEAST.

Not verifiable: A toxicity value is "not verifiable" if an Agency Work Group has considered all available data on a chemical and has unanimously determined that data are inadequate to generate a value that would be suitable for inclusion on IRIS. No toxicity value is calculated; no toxicity value is available for IRIS or the HEAST.

This "not verifiable" status is noted on IRIS, and is sometimes found on the HEAST, with a pointer to the IRIS system.

Under Review: A toxicity value is "under review" if an Agency Work Group is in the process of considering all available data on a chemical. All Work Group chemicals will have this status until the toxicity value is placed on the IRIS system. Toxicity values that have been withdrawn from IRIS by a Work Group for further review will have this status.

This "under review" status may be indicated on IRIS or on the HEAST. During this time, "provisional" toxicity values may appear on the HEAST.

In all cases, the status of a chemical may change as new data become available, and the assessment is revisited.

CAUTION

It is imperative for each user of the HEAST to recognize that the values listed in the toxicity tables and the cancer table are generally considered to be PROVISIONAL HEALTH EFFECTS INFORMATION. The user is referred to IRIS for "Work Group Verified" values. It is also important to remember that the numbers in these tables alone tell very little about the adverse effects of a chemical or the quality of evidence on which health effects information is based. Original assessment documents must be consulted by users of the HEAST in order to fully appreciate the strengths and limitations of a specific data base. Original source documents will allow for the most complete characterization of potential toxicity associated with the range of exposure pathways generally evaluated at Superfund and RCRA sites. The Reference Tables point the user to these sources.

CONTRIBUTORS

Chemicals commonly found at RCRA sites as identified by the Office of Solid Waste's (OSW) Technical Assessment Branch are included in the HEAST. The Office of Radiation Programs has provided data on radionuclide carcinogenicity for Tables 4A and 4B of the HEAST. Finally, the Office of Air Quality Planning and Standards (OAQPS) has provided information on chemicals for which Air Quality Criteria Documents and National Ambient Air Quality Standards have been developed.

CHEMICALS LISTED

Most of the chemicals included on the toxicity tables and carcinogenicity table are those for which at least one of the following EPA documents has been written: Health Effects Assessment Document (HEA), Health and Environmental Effects Profile (HEEP), Health and Environmental Effects Document (HEED), Health Assessment Document (HAD), Air Quality Criteria Document (AQCD), Drinking Water Criteria Document (DWCD). A description of each is provided in Appendix A, Section I. In a few cases, the values are supported by other written material, such as Work Group meeting notes or Carcinogen Assessment Group (CAG) Profiles. Radionuclide slope factor values are calculated by the EPA's Office of Radiation Programs.

The names of criteria pollutants that are regulated as National Ambient Air Quality Standards (NAAQS) under the Clean Air Act are listed in the main body of the HEAST, but the actual criteria are included as Section V of Appendix A: Technical Information. The NAAQS were not included in the tables in order to distinguish them from the reference concentration ([RfC]) values. The NAAQS and [RfC]s represent different levels of review and different methods of calculation and thus, must be interpreted and used differently.

HIERARCHY OF SOURCES

It is recognized that at any point in time there may be multiple old and new Agency documents or data bases that present different values on a specific chemical. For chemicals other than those represented by the NAAQS or DWCDs, the following hierarchy of

sources is recommended in evaluating chemical toxicity for Superfund sites:

1. The Agency's Integrated Risk Information System (IRIS) and cited references. Changes are made in this data base on a monthly basis, but there may be data gaps. Call RISK INFORMATION HOTLINE at (513)569-7254 for further information.

2. The Health Effects Assessment Summary Tables (HEAST) and cited references.

3. Consultation with the Superfund Health Risk Technical Support Center (TSC) at (513)569-7300.

4. Do not consult either the toxicity tables (Appendix A) in the Superfund Public Health Evaluation Manual (SPHEM, U.S. EPA, 1986) or the September 1988 Public Health Risk Evaluation Data Base (PHRED) as these sources are likely to contain numerous values that have since become out-of-date.

QUESTIONS

Chemical Toxicity and Carcinogenicity

Regional EPA Superfund Staff may direct questions regarding the contents of the chemical toxicity and carcinogenicity tables on the HEAST (e.g., chemicals not covered, chemicals with pending [RfD]s) to EPA's Superfund Health Risk Technical Support Center (TSC) in Cincinnati, OH at (513)569-7300. Questions from other users must be submitted to the TSC in writing and must contain the following information:

- Superfund site name, site location and twelve-digit site number;
- Name and phone number of the site Remedial Project Manager (RPM) or Regional Risk Assessor/Toxicologist;
- Detailed description of the health effects information related question.

Please send requests via mail or FAX to:

Superfund Health Risk Technical Support Center
US EPA
26 W. Martin Luther King Dr.
Environmental Criteria and Assessment Office
MS 117
Cincinnati, OH 45268
FAX#: (513)569-7159

RCRA Chemicals

Questions about RCRA chemicals may be addressed by calling the Office of Solid Waste at (202)260-4761.

Radionuclide Carcinogenicity

Questions concerning radionuclide carcinogenicity should first be addressed by contacting the appropriate Regional Radiation Program Manager. A listing of these managers and several contacts in the Office of Radiation Programs can be found in Exhibit 2 of the User's Guide - Radionuclide Carcinogenicity.

REFERENCES

Most cited Agency references (e.g., HEAs, HEEPs, HEEDs), are (or will soon be) available through the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161 [(703)487-4650]. Carcinogen Assessment Group (CAG) Profiles cited in Table 3 are available through the RCRA docket (202)260-9327.

Drinking water documents are available by calling the Drinking Water Docket at (202)260-3027.

ORDERING INFORMATION

Limited copies of the HEAST are available for EPA Superfund staff, State Superfund programs and other Federal agencies working

on Superfund sites, and EPA contractors working for the EPA Superfund program. Users in these groups can call Syracuse Research Corporation (202)479-0881 to be put on the mailing list.

EPA's Office of Solid Waste (OSW) requests that their users (i.e., OSW staff, contractors, State solid waste programs) call the Health Assessment Section (202)260-4761 to obtain copies of the HEAST. Regional OSW staff are reminded that copies are sent to all EPA Regional libraries.

Users of the HEAST in EPA's Office of Air and Radiation and State air programs should call Kelly Rimer of EPA's Office of Air Quality Planning and Standards at (919)541-2962.

All other users must purchase the document from:

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
(703)487-4650

For ordering information, call the NTIS Subscriptions Department at (703)487-4630. NTIS normally ships 4th class United States mail. Therefore, users may wish to consult with NTIS concerning the use of an overnight delivery service. When ordering the 1993 Health Effects Assessment Summary Table annual update and supplements from NTIS refer to the following order numbers:

PB93-921100: Annual HEAST update and supplements

PB93-921199: Annual HEAST update

PB93-921101: July 1993 Supplement No. 1

PB93-921102: November 1993 Supplement No. 2

WHAT'S NEW IN THE FY93 NOVEMBER HEAST UPDATE

GENERAL CHANGES - CHEMICAL TOXICITY AND CARCINOGENICITY

The changes in this version of the HEAST reflect changes in IRIS through October 1, 1993. It is also current with RfD/RfC and CRAVE Work Group activities through October 1, 1993. Cross-references between tables may refer the user to the March 1993 HEAST Annual Update and the July 1993 Supplement No. 1 for that information.

CHEMICAL-SPECIFIC CHANGES -- CHEMICAL TOXICITY AND CARCINOGENICITY

A. CHEMICAL-SPECIFIC CHANGES ON HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)

Acrylonitrile 107-13-1
Added to Table 1. The [RfD] under review by the RfD/RfC Work Group was modified to derive the subchronic [RfD].

Arochlor 1248 12672-29-6
Added to Table 1. A comment was added to indicate that the chronic oral RfD is considered not verifiable (07/20/93) by the RfD/RfC Work Group.

Atrazine 1912-24-9
An indicator was added to show that the chronic oral RfD is now available on IRIS. The chronic oral RfD on IRIS was adopted as the subchronic oral [RfD].

Barium cyanide 542-62-1
A comment was added to indicate that the chronic oral RfD is considered not verifiable (07/20/93) by the RfD/RfC Work Group.

Benzenethiol / Thiophenol 108-98-5
Added to Table 1. The [RfD] under review by the RfD/RfC Work Group was modified to derive the subchronic [RfD].

Boron 7440-42-8
No change in the tables. Reference to the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Boron was added.

Bromomethane 74-83-9
No change in the tables. Reference to the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Bromomethane was added.

Chromium III 16065-83-1
The subchronic [RfD] was changed to agree with IRIS. The uncertainty factor was changed to incorporate an additional Modifying factor of 10 as on IRIS.

Cresol, p- / Methylphenol, 4-106-44-5
Study information was changed to be consistent with information under review by the RfD/RfC work group. NOEL is changed to NOAEL, critical effects are changed. The chronic oral [RfD] is adopted as the subchronic oral [RfD].

Dicamba 1918-00-9
Added to Table 1. An indicator was added to show that the chronic oral RfD is available on IRIS. The chronic oral RfD was adopted as the subchronic oral [RfD].

Dichloropropene, 1,3- / (Telone II) 542-75-6
No change in the tables. Reference to the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for 1,3-Dichloropropene was added.

Manganese 7439-96-5
No change in the tables. Reference to the 1993 Revised and Updated Drinking Water Criteria Document for Manganese was added.

Methyl ethyl ketone 000078-93-3
The subchronic oral [RfD] and subchronic inhalation [RfC] were changed to be consistent with IRIS.

Methyl ethyl ketone peroxide 1338-23-4
Added to Table 1. A comment was added to indicate that the chronic oral RfD is considered not verifiable (07/22/93) by the RfD/RfC Work Group.

Methyl isobutyl ketone 108-10-1
The chronic oral [RfD] was changed to reflect the value currently under review by the RfD/RfC Work Group (07/22/93). The chronic oral [RfD] was modified to derive the subchronic oral [RfD].

Metolachlor 051218-45-2
Added to Table 1 from the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Metolachlor.

Nickel cyanide 557-19-7
Added to Table 1. A comment was added to indicate that the chronic oral RfD is considered not verifiable (07/20/93) by the RfD/RfC Work Group.

Osmium tetroxide 20816-12-0
Added to Table 1. A comment was added to indicate that the chronic oral RfD is considered not verifiable (07/22/93) by the RfD/RfC Work Group.

Simazine 122-34-9
An indicator was added to show that the chronic oral RfD is now available on IRIS. The chronic oral RfD on IRIS was adopted as the subchronic oral [RfD].

Tetrachloroethane, 1,1,1,2- 630-20-6
No change in the tables. Reference to 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for 1,1,1,2-Tetrachloroethane was added.

Thallic oxide 1314-32-5
A comment was added to indicate that the chronic oral RfD is considered not verifiable (07/22/93) by the RfD/RfC Work Group.

Thallium Selenite 12039-52-0
The RfD was withdrawn from IRIS (08/93). A comment was added to indicate that the chronic oral RfD is considered not verifiable (07/22/93) by the RfD/RfC Work Group.

Trichlorobenzene, 1,2, 4120-82-1
The inhalation [RfC] was removed from Table 2 and the [RfC] under review by the RfD/RfC Work Group was added to Table 1. The [RfC] under review by the RfD/RfC Work Group was modified to derive the subchronic [RfC].

B. CHEMICAL-SPECIFIC CHANGES ON HEAST TABLE 2: ALTERNATE METHODS -- SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)

Trichlorobenzene, 1,2, 4120-82-1
The inhalation [RfC] was removed from Table 2 and the [RfC] under review by the RfD/RfC Work Group was added to Table 1.

C. CHEMICAL-SPECIFIC CHANGES ON HEAST TABLE 3: CARCINOGENICITY

Coke Oven Emissions 8007-45-2
An indicator was added to show that the EPA group classification is now on IRIS.

Cyanazine 21725-46-2
Study Information was revised (cancers reported and the references changed) to reflect CRAVE Work Group review.

Dibromo-3-chloropropane, 1,2- 96-12-8
The inhalation [slope] and the inhalation [unit risk] were inadvertently reversed on the July 1992 Supplement No. 1.

Dichloropropene, 1,3- / (Telone II) 542-75-6
Study information was revised (cancers reported and the references changed) to reflect the information currently under review by the CRAVE Work Group.

Methylenebisbenzenamine, 4,4- 101-77-9
No [EPA group] classification was provided in the reference document; therefore, the oral [slope] and the [unit risk] were removed from Table 3.

Ethylene thiourea 96-45-7
The oral [slope] factor and the oral [unit risk] were changed to reflect the values currently under review by the CRAVE Work Group.

Methyl hydrazine 60-34-4
The [EPA group] classification was added to Table 3.

Metolachlor 051218-45-2
Added to Table 3 from the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Metolachlor.

Mirex 2385-85-5
The oral [slope] and the [unit risk] are under review by the CRAVE Work Group and were removed from Table 3.

TCDD, 2,3,7,8- 001746-01-6
The units for the Inhalation [unit risk] were added to Table 3. There are no additional changes to the Table.

Tetrachloroethane, 1,1,1,2- 630-20-6
No change in the tables. Reference to the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for 1,1,1,2-Tetrachloroethane was added.

Trichloropropane, 1,2,3- 96-18-4
The oral [slope] and the [unit risk] under review by the CRAVE Work Group were added to Table 3.

D. CHANGES ON HEAST TABLES 4A AND 4B: RADIONUCLIDE CARCINOGENICITY -- SLOPE FACTORS

No new radionuclide slope factors were added to Tables 4A and 4B and none of the slope factors listed in the March 1993 HEAST Annual Update were changed.

HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)

November 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
ACRYLONITRILE					000107-13-1					
NOAEL 1 MG/(KG-DAY)										
	ORAL: GAVAGE	MOUSE	60 DAY	TESTES	DECREASED SPERM COUNTS		1E-2		1E-3	010939
				TESTES	SEMINIFEROUS TUBULE DEGENERATION		100		1000	
GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY										
SUBCHRONIC [RfD] COMMENT: THE CHRONIC [RfD] UNDER REVIEW BY THE WORK GROUP WAS MODIFIED TO DERIVE THE SUBCHRONIC [RfD]										
AROCHLOR 1248					012672-29-6					
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (07/20/93) BY THE RfD/RfC WORK GROUP.										010940
ATRAZINE					001912-24-9					
NOEL 3.5 MG/KG/DAY										
	ORAL: DIET	RAT	2 YEARS	WHOLE BODY	DECREASED WEIGHT GAIN		3.5E-2 100		IRIS	010855
SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RFD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].										
BARIUM CYANIDE					000542-62-1					
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (07/20/93) BY THE RfD/RfC WORK GROUP.										010941
BENZENETHIOL (THIOPHENOL)					000108-98-5					
LOAEL 0.1 MG/KG-DAY)										
	ORAL: GAVAGE	RAT	90 DAYS	LIVER	CENTRILOBULAR EOSINOPHILIC CHANGES		1E-4 1000		1E-5 10,000	010942
SUBCHRONIC [RfD] COMMENT: THE CHRONIC [RfD] UNDER REVIEW BY THE WORK GROUP WAS MODIFIED TO DERIVE THE SUBCHRONIC [RfD]										

HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)

November 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
BORON, ELEMENTAL				007440-42-8						
LOAEL	4.5 MG/CU M									
	INHALATION: INTERMITTENT	HUMAN		RESPIRATORY TRACT BRONCHUS	IRRITATION BRONCHITIS	2E-2 100		2E-2 100		005269
	SUBCHRONIC [RfC] COMMENT: THE SUBCHRONIC [RFC] IS SPECIFICALLY FOR ANHYDROUS BORAX.									
	CHRONIC [RfC] COMMENT: THE CHRONIC [RFC] IS SPECIFICALLY FOR ANHYDROUS BORAX.									
NOAEL	8.8 MG/KG/DAY									
	ORAL: DIET	DOG	2 YEARS	TESTIS	LESIONS		9E-2 100		IRIS	005272
	SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].									
BROMOMETHANE				000074-83-9						
								IRIS		010860
									IRIS	010861
	SUBCHRONIC [RfD] COMMENT: CONTACT THE SUPERFUND HEALTH RISK TECHNICAL SUPPORT CENTER: (513) 569-7300.									010880
	SUBCHRONIC [RfC] COMMENT: CONTACT THE SUPERFUND HEALTH RISK TECHNICAL SUPPORT CENTER: (513) 569-7300.									
CHROMIUM(III)				016065-83-1						
NOEL	5 %									
	ORAL: DIET	RAT	840 DAYS		NONE OBSERVED		1E+0 1000		IRIS	005731
	CHRONIC [RfC] COMMENT: INHALATION ISSUES ARE UNDER REVIEW BY THE RFD/RFC WORK GROUP.									
	SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].									
	SUBCHRONIC [RfC] COMMENT: CONTACT THE SUPERFUND HEALTH RISK TECHNICAL SUPPORT CENTER: (513) 569-7300.									010886

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
CRESOL, P-				000106-44-5						
(METHYLPHENOL, 4-)										
NOAEL	5 MG/(KG-DAY)									
	ORAL: GAVAGE	RABBIT GESTATION DAYS 6-18		CENTRAL NERVOUS SYSTEM	HYPOACTIVITY		5E-3 1000		5E-3 1000	010516
				RESPIRATORY SYSTEM	DISTRESS					
				WHOLE BODY	MATERNAL DEATH					
	SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL [RfD] WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].									
								IRIS		010890
	CHRONIC [RfC] COMMENT: THE CHRONIC INHALATION [RfC] IS CONSIDERED NOT VERIFIABLE (12/11/91) BY THE RfD/RfC WORK GROUP.									
	GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.									
DICAMBA				001918-00-9						
NOAEL	3 MG/KG/DAY									
	ORAL: GAVAGE	RABBIT GESTATION DAYS 6-18		FETUS	DECREASED WEIGHT		3E-2		IRIS	010945
				FETUS	INCREASED POST-IMPLANTATION LOSSES		100			
				FETUS	INCREASED MORTALITY					
				DAM	DECREASED WEIGHT GAIN					
	SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].									

HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)

November 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
DICHLOROPROPENE, 1.3-				**000542-75-6**						
(TELONE II)										
NOEL	3 MG/KG/DAY									
	ORAL: DIET	RAT 90 DAYS		ORGANS	INCREASED WEIGHT		3E-3 1000		IRIS	005901
	GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.									
NOAEL	5 PPM									
	INHALATION:	MOUSE 2 YEARS		NASAL MUCOSA	HYPERTROPHY	2E-2		IRIS		010351
	INTERMITTENT			NASAL MUCOSA	HYPERPLASIA	30				
	SUBCHRONIC [RfC] COMMENT:			THE CHRONIC INHALATION RfC WAS ADOPTED AS THE SUBCHRONIC INHALATION [RfC].						

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
MANGANESE				007439-96-5						
NOAEL	0.14 MG/KG/DAY									
	ORAL: DIET	HUMAN	CHRONIC	CENTRAL NERVOUS SYSTEM	EFFECTS		1.4E-1 1		IRIS	010851
	SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL FOOD RfD ON IRIS IS ADOPTED AS THE SUBCHRONIC ORAL FOOD [RfD]. SEE IRIS FOR SPECIFIC DIETARY INFORMATION.									
NOAEL	0.005 MG/KG/DAY									
	ORAL: DRINKING WATER	HUMAN	CHRONIC	CENTRAL NERVOUS SYSTEM	EFFECTS		5E-3 1		IRIS	010850
	SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL WATER RfD ON IRIS IS ADOPTED AS THE SUBCHRONIC ORAL WATER [RfD]. SEE IRIS FOR SPECIFIC DIETARY INFORMATION.									
LOAEL	0.97 MG/CU M									
	INHALATION: INTERMITTENT	HUMAN		LUNG CENTRAL NERVOUS SYSTEM	RESPIRATORY EFFECTS PSYCHOMOTOR DISTURBANCES	4E-4 900			IRIS	010355
	SUBCHRONIC [RfC] COMMENT: THE CHRONIC INHALATION RfC ON IRIS IS ADOPTED AS THE SUBCHRONIC INHALATION [RfC]. GENERAL COMMENT: OCCUPATIONAL EXPOSURE. DURATION OF EMPLOYMENT RANGED FROM 1-19 YEARS WITH A MEAN OF 7.1 YEARS.									

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
METHYL ETHYL KETONE					000078-93-3					
NOAEL	1711 MG/KG/DAY									
	ORAL: DRINKING WATER	RAT MULTI-GENERATION		FETUS	DECREASED BIRTH WEIGHT		2E+0 1000		IRIS	010853
	SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS MODIFIED TO ESTIMATE THE SUBCHRONIC ORAL [RfD].									
	GENERAL COMMENT: MULTI-GENERATION DEVELOPMENTAL STUDY PERFORMED WITH THE SURROGATE 2-BUTANOL, A METABOLITE OF METHYL ETHYL KETONE.									
NOAEL	1010 PPM									
	INHALATION: INTERMITTENT	MOUSE	10 DAYS	FETUS	DECREASED BIRTH WEIGHT	1E+0 3000		IRIS		010845
	SUBCHRONIC [RfC] COMMENT: THE CHRONIC INHALATION RfC ON IRIS IS ADOPTED AS THE SUBCHRONIC INHALATION [RfC].									
METHYL ETHYL KETONE PEROXIDE					001338-23-4					
	CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (07/22/93) BY THE RfD/RfC WORK GROUP.									010948
METHYL ISOBUTYL KETONE					000108-10-1					
NOAEL	250 MG/(KG-DAY)									
	ORAL: GAVAGE	RAT	13 WEEKS	WHOLE BODY	LETHARGY		8E-1 300		8E-2 3000	010949
				LIVER	INCREASED RELATIVE WEIGHT, FEMALES					
				LIVER	INCREASED ABSOLUTE WEIGHT, FEMALES					
				KIDNEY	INCREASED RELATIVE WEIGHT, FEMALES					
				KIDNEY	INCREASED ABSOLUTE WEIGHT, FEMALES					
				KIDNEY	INCREASED URINARY PROTEIN LEVELS, FEMALES					
	SUBCHRONIC [RfC] COMMENT: ALSO SEE HEAST TABLE 2: ALTERNATE METHODS - SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)									
	CHRONIC [RfC] COMMENT: ALSO SEE HEAST TABLE 2: ALTERNATE METHODS - SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)									
	CHRONIC [RfD] COMMENT: WITHDRAWN FROM IRIS (3/1/91). UNDER REVIEW, CURRENT NUMBER SUBJECT TO CHANGE.									

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
METOLACHLOR					051218-45-2					
NOAEL 300 PPM										
	ORAL: DIET	RAT	2 YEARS	WHOLE BODY	DECREASED WEIGHT GAIN		1.5E-1 100		1.5E-1 100	010950
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL [RfD] WAS ADOPTED AS THE SUBCHRONIC ORAL (RfD).										
NICKEL CYANIDE					000557-19-7					
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (07/20/93) BY THE RfD/RfC WORK GROUP.										010953
OSMIUM TETROXIDE					020816-12-0					
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (07/22/93) BY THE RfD/RfC WORK GROUP.										010954
SIMAZINE					000122-34-9					
NOAEL 0.52 MG/KG/DAY										
	ORAL: DIET	RAT	2 YEARS	WHOLE BODY	DECREASED WEIGHT GAIN		5E-3		IRIS	010955
				BLOOD	HEMATOLOGICAL EFFECTS		100			
SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD]. GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.										
TETRACHLOROETHANE, 1,1,1,2-					000630-20-6					
NOAEL 89.3 MG/KG/DAY										
	ORAL: GAVAGE	RAT	103 WEEKS	LIVER	LESIONS		3E-2		IRIS	010407
				KIDNEY	LESIONS		3000			
SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].										

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT	LENGTH	TARGET	CRITICAL EFFECT	Subchronic [RfC] (mg/cu m) UF	Subchronic [RfD] (mg/kg/day) UF	Chronic [RfC] (mg/cu m) UF	Chronic [RfD] (mg/kg/day) UF	REFERENCE
THALLIC OXIDE		001314-32-5								010956
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (07/22/93) BY THE RfD/RfC WORK GROUP.										
THALLIUM SELENITE		012039-52-0								010957
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (07/22/93) BY THE RfD/RfC WORK GROUP.										
TRICHLOROBENZENE, 1,2,4-		000120-82-1								
NOEL	100 PPM									
	ORAL: DRINKING WATER	RAT		ADRENAL	INCREASED WEIGHT		1E-2 1000		IRIS	010506
CHRONIC [RfD] COMMENT: BASED ON A MULTIGENERATION REPRODUCTION STUDY.										
NOAEL	104 PPM									
	INHALATION	RAT, RABBIT, DOG, MONKEY	6 & 26 WEEKS	LIVER	NON-ADVERSE WEIGHT CHANGES	2E+0 100		2E-1 1000		010958

HEAST TABLE 3: CARCINOGENICITY

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CHEMICAL	ROUTE	EXPERIMENT LENGTH / SPECIES	TARGET	CANCER	[EPA GROUP]	[SLOPE FACTOR] ORAL (mg/kg/day)$^{-1}$	[SLOPE FACTOR] INHALATION (mg/kg/day)$^{-1}$	[UNIT RISK] ORAL (ug/L)$^{-1}$	[UNIT RISK] INHALATION (ug/cu m)-1	REFERENCE
COKE OVEN EMMISSION			008007-45-2							
					IRIS					
CYANAZINE			021725-46-2							
	ORAL: DIET	2 YEARS RAT	MAMMARY GLAND	ADENOMA/ CARCINOMA, COMBINED	C	8.4E-1		2.4E-5		010944
	GENERAL COMMENT: ALSO SEE HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)									
DIBROMO-3-CHLOROPROPANE, 1,2			000096-12-8							
	INHALATION: INTERMITTENT	RAT, MOUSE	NASAL CAVITY	TUMORS	B2		2.4E-3		6.9E-7	010519
	EPA GROUP COMMENT: UNDER REVIEW, CLASSIFICATION SUBJECT TO CHANGE.									

CHEMICAL	ROUTE	EXPERIMENT LENGTH / SPECIES	TARGET	CANCER	[EPA GROUP]	[SLOPE FACTOR] ORAL (mg/kg/day)$^{-1}$	[SLOPE FACTOR] INHALATION (mg/kg/day)$^{-1}$	[UNIT RISK] ORAL (ug/L)$^{-1}$	[UNIT RISK] INHALATION (ug/cu m)$^{-1}$	REFERENCE
DICHLOROPROPENE 000542-75-6										
(TELONE II)										
	ORAL: GAVAGE	104 WEEKS RAT, MALE	LIVER	NEOPLASTIC NODULE/ CARCINOMA	IRIS	1.8E-1		5E-6		010946
			FORESTOMACH	PAPILLOMA/ CARCINOMA						
	ORAL: GAVAGE	104 WEEKS MOUSE, FEMALE	BLADDER	CARCINOMA						
			RESPIRATORY SYSTEM	ALVEOLAR/ BRONCHIOLAR ADENOMA						
			FORESTOMACH	PAPILLOMA/ CARCINOMA						

ORAL [SLOPE] COMMENT: THE [SLOPE] IS THE GEOMETRIC MEAN OF SLOPE FACTORS OF COMBINED URINARY BLADDER CARCINOMA, ALVEOLAR/BRONCHIOLAR ADENOMA, FORESTOMACH PAPILLOMA/CARCINOMA IN FEMALE B6C3F1 MICE AND COMBINED HEPATOCELLULAR NEOPLASTIC NODULE AND/OR CARCINOMA AND FORESTOMACH PAPILLOMA/CARCINOMA IN MALE F344 RATS.

INHALATION: INTERMITTENT	2 YEARS MOUSE	LUNG	ADENOMA	IRIS		1.3E-1		3.7E-5	010104

INHALATION [SLOPE] COMMENT: SEE APPENDIX A-II, DOSE CONVERSIONS ON HEAST.
GENERAL COMMENT: ALSO SEE HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).

ETHYLENE THIOUREA 000096-45-7									
ORAL: DIET	2 YEARS MOUSE, FEMALE	LIVER	ADENOMA/ CARCINOMA, COMBINED	B2	1.1E-1		3.4E-6		010947

ORAL [SLOPE] COMMENT: UNDER REVIEW, NUMBER SUBJECT TO CHANGE.
GENERAL COMMENT: ALSO SEE HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).

METHYLENEBISBENZENAMINE, 4, 00101-77-9

010136

GENERAL COMMENT: THE ORAL [SLOPE] AND THE [UNIT RISK] WERE REMOVED BECAUSE THE EPA GROUP CLASSIFICATION HAS NOT YET BEEN DETERMINED.

CHEMICAL	ROUTE	EXPERIMENT LENGTH / SPECIES	TARGET	CANCER	[EPA GROUP]	[SLOPE FACTOR] ORAL (mg/kg/day)$^{-1}$	[SLOPE FACTOR] INHALATION (mg/kg/day)$^{-1}$	[UNIT RISK] ORAL (ug/L)$^{-1}$	[UNIT RISK] INHALATION (ug/cu m)$^{-1}$	REFERENCE
METOLACHLOR	051218-45-2									
					C					010951
MIREX	002385-85-5									
	ORAL: DIET	2 YEARS RAT, MALE	LIVER	ADENOMA/ CARCINOMA, COMBINED	B2					010952
TCDD, 2,3,7,8-	001746-01-6									
	ORAL: DIET	720 DAYS RAT	RESPIRATORY SYSTEM	TUMORS	B2	1.5E+5	1.5E+5	4.5E+0	3.3E-5 (pg/cu m)^{1}	005128
			LIVER	TUMORS						
TETRACHLOROETHANE, 1,1,1,2-	000630-20-6									
	ORAL: GAVAGE	103 WEEKS	LIVER	TUMOR	IRIS	IRIS	2.6E-2	IRIS	IRIS	010302
TRICHLOROPROPANE, 1,2,3-	000096-18-4									
	ORAL: GAVAGE	RAT, MALE	MUTIPLE SITES	TUMORS, BENIGN/MALIGNANT COMBINED	B2	7E+0		2E-4		010849

METOLACHLOR — 051218-45-2

MIREX — 002385-85-5

EPA GROUP COMMENT: UNDER REVIEW, CLASSIFICATION SUBJECT TO CHANGE.
GENERAL COMMENT: ALSO SEE HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).

TCDD, 2,3,7,8- — 001746-01-6

INHALATION [SLOPE] COMMENT: SEE APPENDIX A-II, DOSE CONVERSIONS ON HEAST.
ORAL [SLOPE] COMMENT: UNDER REVIEW, NUMBER SUBJECT TO CHANGE.
INHALATION [UNIT RISK] COMMENT: UNDER REVIEW, NUMBER SUBJECT TO CHANGE. BASED ON ROUTE TO ROUTE EXTRAPOLATION. AN ABSORPTION FACTOR OF 75% IS USED TO CALCULATE THE UNIT RISK FROM THE SLOPE FACTOR.

TETRACHLOROETHANE, 1,1,1,2- — 000630-20-6

INHALATION SLOPE COMMENT: BASED ON ROUTE TO ROUTE EXTRAPOLATION. SEE APPENDIX A-II, DOSE CONVERSIONS ON HEAST.

TRICHLOROPROPANE, 1,2,3- — 000096-18-4

EPA GROUP COMMENT: UNDER REVIEW, CURRENT CLASSIFICATION SUBJECT TO CHANGE.
GENERAL COMMENT: ALSO SEE HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).

REFERENCES FOR HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY)

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010941

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