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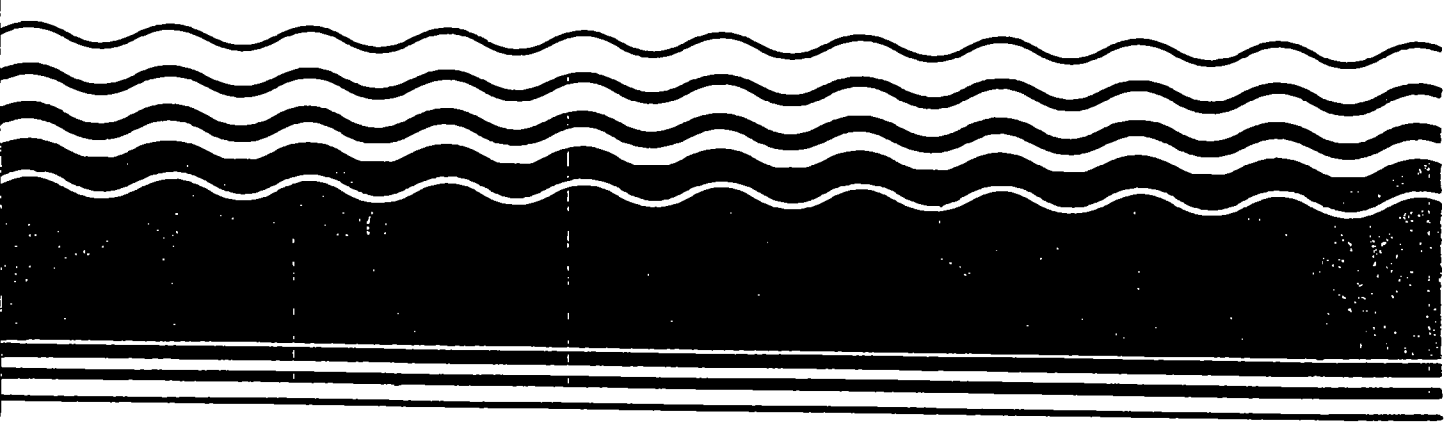
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July 1993

Superfund



Health Effects Assessment Summary Tables

Supplement No. 1 to the March 1993 Annual Update



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HEALTH EFFECTS ASSESSMENT

SUMMARY TABLES

FY-1993 Supplement No. 1

Office of Research and Development
Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, DC 20460

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 July 1993 Supplement No. 1 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. It updates the information in the March 1993 HEAST and should be checked whenever that document is consulted. This supplement was not produced to stand alone and does 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. Supplement No. 2 for the March 1993 HEAST is planned for release in November 1993.

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 IRIS USER SUPPORT 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. ML 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.

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 Super-

fund 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. The NTIS order number is PB93-921199.

WHAT'S NEW IN THE JULY 1993 SUPPLEMENT NO. 1

GENERAL CHANGES - CHEMICAL TOXICITY AND CARCINOGENICITY

The changes in this version of the HEAST reflect changes in IRIS through June 1, 1993. It is also current with RfD/RfC and CRAVE Work Group activities through May 1, 1993. Cross-references between tables may refer the user to the March 1993 HEAST Annual Update 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)

Bromoethene

Added to Table 1. An indicator was added to show that the chronic inhalation RfC is now available on IRIS. The chronic inhalation RfC on IRIS was adopted as the subchronic inhalation [RfC].

Bromoform

A comment was added to indicate that the chronic inhalation RfC is considered not verifiable (02/11/93) by the RfD/RfC Work Group.

Chlorobenzilate

A comment was added to indicate that the chronic inhalation RfC is considered not verifiable (02/11/93) by the RfD/RfC Work Group.

Cyanazine

No change in the tables. Reference to the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Cyanazine was added.

Dinitro-o-cresol, 4,6-

A comment was added to indicate that the chronic inhalation RfC is considered not verifiable (02/11/93) by the RfD/RfC Work Group.

Endosulfan

The chronic oral RfD was withdrawn from IRIS (12/01/92). The chronic oral [RfD] was changed to reflect the value currently under review by the RfD/RfC Work Group (11/04/92). The chronic oral [RfD] was adopted as the subchronic oral [RfD].

Hexachlorobutadiene

The chronic oral RfD was withdrawn from IRIS (05/01/93). The chronic oral [RfD] was changed to reflect the value currently under review by the RfD/RfC Work Group (04/01/93).

Isophorone

No change in the tables. Reference to 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Isophorone was added.

Methoxyethanol, 2-

The chronic oral [RfD] and the subchronic oral [RfD] were moved from Table 1 to Table 2 because they were derived from methodology that is not current with the methodology used by the RfD/RfC Work Group.

Methyl Ethyl Ketone

An indicator was added to show that the chronic oral RfD is now available on IRIS.

Methylene-bis(2-chloroaniline), 4,4'-

A comment was added to indicate that the chronic inhalation RfC is considered not verifiable (02/10/93) by the RfD/RfC Work Group.

Metribuzin

Added to Table 1. 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].

Naphthalene

The record for Naphthalene, which was inadvertently omitted from Table 1 of the March 1993 Annual HEAST, has been replaced.

Nitroaniline, 2-

The record for Nitroaniline, 2-, which was inadvertently omitted from Table 1 of the March 1993 Annual HEAST, has been replaced.

Trifluralin

No change in the tables. Reference to 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Trifluralin was added.

Zinc (metallic)

The record for Zinc (metallic), which was inadvertently omitted from Table 1 of the March 1993 Annual HEAST, has been replaced.

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

Methoxyethanol, 2-

The chronic oral [RfD] and the subchronic oral [RfD] were moved from Table 1 to Table 2 because they were derived from methodology that is not current with the methodology used by the RfD/RfC Work Group.

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

Chloromethane

The record for Chloromethane, which was inadvertently omitted from Table 3 of the March 1993 Annual HEAST, has been replaced.

Cyanazine

Carcinogenicity information was added to Table 3 from the 1993 Revised and Updated Drinking Water Quantification of Toxicologic Effects for Cyanazine.

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)

July 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES	EXPERIMENT LENGTH	TARGET	CRITICAL EFFECT	Subchronic		Chronic		REFERENCE
						[RfC] (mg/cu m) UF	[RfD] (mg/kg/day) UF	[RfC] (mg/cu m) UF	[RfD] (mg/kg/day) UF	

BROMOETHENE 000593-60-2
(VINYL BROMIDE)

LOAEL	9.7 PPM	RAT	24 MONTHS	LIVER LIVER LIVER	HYPERTROPHY BASOPHILIC FOCI EOSINOPHILIC FOCI	3E-3 3000		IRIS	010929
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SUBCHRONIC [RfC] COMMENT: THE CHRONIC INHALATION RfC WAS ADOPTED AS THE SUBCHRONIC INHALATION [RfC].
GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY:

BROMOFORM 000075-25-2

NOEL	17.9 MG/KG/DAY	RAT	13 WEEKS	LIVER	EFFECTS	2E-1 100		IRIS	005722
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GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.
CHRONIC [RfC] COMMENT: THE CHRONIC INHALATION [RfC] IS CONSIDERED NOT VERIFIABLE (02/11/93) BY THE RfD/RfC WORK GROUP. 010930

CHLOROBENZILATE 000510-15-6

NOEL	5 MG/KG/DAY	RABBIT	13 DAYS	GASTROINTESTINAL SYSTEM WHOLE BODY WHOLE BODY NERVOUS SYSTEM	DECREASED STOOL QUANTITY DECREASED FOOD CONSUMPTION DECREASED WEIGHT GAIN HYPERIRRITABILITY	2E-2 300		IRIS	010260
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SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD ON IRIS WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD]. BASED ON A TERATOLOGY STUDY WITH EXPOSURES DURING DAYS 7-19 OF GESTATION.
CHRONIC [RfC] COMMENT: THE CHRONIC INHALATION [RfC] IS CONSIDERED NOT VERIFIABLE (02/11/93) BY THE RfD/RfC WORK GROUP. 010931

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

July 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT LENGTH	TARGET	CRITICAL EFFECT	Subchronic		Chronic		REFERENCE
					(RfC) (mg/cu m) UF	(RfD) (mg/kg/day) UF	(RfC) (mg/cu m) UF	(RfD) (mg/kg/day) UF	

CYANAZINE

021725-46-2

NOEL	0.625	MG/KG/DAY							
			DOG						
	ORAL: DIET		1 YEAR	WHOLE BODY BLOOD BLOOD	DECREASED WEIGHT INCREASED PLATELET COUNT ALTERED CLINICAL CHEMISTRY PARAMETERS	2E-3 300		2E-3 300	010411

SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL [RfD] WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].
 CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS WITHDRAWN FROM IRIS (07/01/92). UNDER REVIEW, CURRENT NUMBER SUBJECT TO CHANGE.

DINITRO-O-CRESOL, 4,6-

000534-52-1

GENERAL COMMENT: DATA INADEQUATE FOR QUANTITATIVE RISK ASSESSMENT.
 CHRONIC [RfC] COMMENT: THE CHRONIC INHALATION [RfC] IS CONSIDERED NOT VERIFIABLE (02/11/93) BY THE RfD/RfC WORK GROUP. 010470

ENDOSULFAN

000115-29-7

NOEL	15	PPM							
			RAT						
	ORAL: DIET		2 YEARS	WHOLE BODY KIDNEY BLOOD VESSELS	DECREASED WEIGHT GAIN GLOMERULONEPHROSIS ANEURYSMS	6E-3 100		6E-3 100	010926
NOEL	10	PPM							
			DOG						
	ORAL: DIET		1 YEAR	WHOLE BODY	DECREASED WEIGHT GAIN				010926

SUBCHRONIC [RfD] COMMENT: THE ORAL CHRONIC [RfD] IS ADOPTED AS THE SUBCHRONIC ORAL [RfD].
 CHRONIC [RfD] COMMENT: WITHDRAWN FROM IRIS (12/01/92). UNDER REVIEW, CURRENT NUMBER SUBJECT TO CHANGE.

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

July 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT LENGTH	TARGET	CRITICAL EFFECT	Subchronic		Chronic		REFERENCE
					(RfC) (mg/cu m) UF	(RfD) (mg/kg/day) UF	(RfC) (mg/cu m) UF	(RfD) (mg/kg/day) UF	
HEXACHLOROBUTADIENE					000087-68-3				
LOAEL	0.5 MG/KG/DAY	MOUSE							
	ORAL: DIET	13 WEEKS	RENAL TUBULES	REGENERATION				2E-4 1000	010927
CHRONIC [RfD] COMMENT: WITHDRAWN FROM IRIS (05/01/93). UNDER REVIEW, CURRENT NUMBER SUBJECT TO CHANGE.									
GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.									
SUBCHRONIC [RfC] COMMENT: CONTACT THE SUPERFUND HEALTH RISK TECHNICAL SUPPORT CENTER: (513) 569-7300.									
SUBCHRONIC [RfD] COMMENT: CONTACT THE SUPERFUND HEALTH RISK TECHNICAL SUPPORT CENTER: (513) 569-7300.									
ISOPHORONE					000078-59-1				
NOEL	150 MG/KG/DAY	DOG							
	ORAL: CAPSULE	90 DAYS	KIDNEY	LESIONS		2E+0 100		IRIS	005910
								IRIS	010906
CHRONIC [RfC] COMMENT: THE CHRONIC INHALATION RfC IS CONSIDERED NOT VERIFIABLE (11/15/90) BY THE RfD/RfC WORK GROUP.									
GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.									
METHOXYETHANOL, 2-					000109-86-4				
NOAEL	93 MG/CU M	RABBIT							
	INHALATION: INTERMITTENT	13 WEEKS	TESTICLE	EFFECTS	2E-1 100			IRIS	010372
SUBCHRONIC [RfD] COMMENT: ALSO SEE HEAST TABLE 2: ALTERNATE METHODS -- SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).									
CHRONIC [RfD] COMMENT: ALSO SEE HEAST TABLE 2: ALTERNATE METHODS -- SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).									

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

July 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES EXPERIMENT LENGTH	TARGET	CRITICAL EFFECT	Subchronic		Chronic		REFERENCE
					[RfC] (mg/cu m) UF	[RfD] (mg/kg/day) UF	[RfC] (mg/cu m) UF	[RfD] (mg/kg/day) UF	
METHYL ETHYL KETONE					000078-93-3				
NOAEL	1711	MG/KG/DAY							
	ORAL: DRINKING WATER	RAT MULTI-GENERATION	FETUS	DECREASED BIRTH WEIGHT		2E-1 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+1 3000			IRIS	010845
SUBCHRONIC [RfC] COMMENT: THE CHRONIC INHALATION RfC ON IRIS IS ADOPTED AS THE SUBCHRONIC INHALATION [RfC].									
METHYLENE-BIS(2-CHLOROANILINE), 4,4'-					000101-14-4				
LOAEL	7.3	MG/KG/DAY							
	ORAL	DOG 9 YEARS	LIVER BLADDER	EFFECTS EFFECTS		7E-4 10000		7E-4 10000	010413
CHRONIC [RfC] COMMENT: THE CHRONIC INHALATION [RfC] IS CONSIDERED NOT VERIFIABLE (02/10/93) BY THE RfD/RfC WORK GROUP.									
METRIBUZIN					021087-64-9				
NOAEL	100	PPM							
	ORAL: DIET	DOG 2 YEARS	LIVER KIDNEY WHOLE BODY WHOLE BODY	EFFECTS EFFECTS MORTALITY DECREASED WEIGHT		2.5E-2 100		IRIS	010928
SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].									
GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.									

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

July 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES		TARGET	CRITICAL EFFECT	Subchronic		Chronic		REFERENCE
		EXPERIMENT	LENGTH			[RfC] (mg/cu m) UF	[RfD] (mg/kg/day) UF	[RfC] (mg/cu m) UF	[RfD] (mg/kg/day) UF	
NAPHTHALENE						000091-20-3				
CHRONIC [RfD] COMMENT: CONTACT THE SUPERFUND HEALTH RISK TECHNICAL SUPPORT CENTER: (513) 569-7300.										010934
NITROANILINE, 2- LOAEL						000088-74-4				
9.8	MG/CU M	RAT								
		4 WEEKS	BLOOD	HEMATOLOGICAL EFFECTS	2E-3 1000		2E-4 10000			010935
CHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD IS CONSIDERED NOT VERIFIABLE (06/23/92) BY THE RfD/RfC WORK GROUP.										010936
TRIFLURALIN						001582-09-8				
NOEL	0.75	MG/KG/DAY	DOG							
	ORAL: DIET		12 MONTHS	LIVER BLOOD	INCREASED WEIGHT METHEMOGLOBINEMIA	7.5E-3 100		IRIS		010080
SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD]. GENERAL COMMENT: ALSO SEE HEAST TABLE 3: CARCINOGENICITY.										
ZINC (METALLIC)						007440-66-6				
LOAEL	1.0	MG/KG/DAY	HUMAN							
	ORAL: DIET		10 WEEKS	BLOOD	DECREASED BLOOD ENZYME	3E-1		IRIS		010937
SUBCHRONIC [RfD] COMMENT: THE CHRONIC ORAL RfD ON IRIS WAS ADOPTED AS THE SUBCHRONIC ORAL [RfD].										

**HEAST TABLE 2: ALTERNATE METHODS - SUBCHRONIC AND CHRONIC TOXICITY
(OTHER THAN CARCINOGENICITY)**

July 1993

CHEMICAL LEVEL	DOSE ROUTE	SPECIES		TARGET	CRITICAL EFFECT	Subchronic		Chronic		REFERENCE
		EXPERIMENT	LENGTH			[RfC]	[RfD]	[RfC]	[RfD]	
						(mg/cu m) UF	(mg/kg/day) UF	(mg/cu m) UF	(mg/kg/day) UF	
METHOXYETHANOL, 2- NOAEL	31 MG/CU M				000109-86-4					
		RABBIT								
	INHALATION: INTERMITTENT	13 WEEKS		TESTICLE	EFFECTS		1E-2 100		1E-3 1000	010910

SUBCHRONIC [RfD] COMMENT: BASED ON ROUTE TO ROUTE EXTRAPOLATION.

CHRONIC [RfD] COMMENT: BASED ON ROUTE TO ROUTE EXTRAPOLATION.

GENERAL COMMENT: ALSO SEE TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).

HEAST TABLE 3: CARCINOGENICITY

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CHEMICAL	ROUTE	EXPERIMENT LENGTH		CANCER	[EPA GROUP]	[SLOPE FACTOR]		[UNIT RISK]		REFERENCE
		SPECIES	TARGET			ORAL (mg/kg/day) ⁻¹	INHALATION (mg/kg/day) ⁻¹	ORAL (ug/L) ⁻¹	INHALATION (ug/cu m) ⁻¹	
CHLOROMETHANE				000074-87-3						
	INHALATION: INTERMITTENT	24 MONTHS MOUSE	KIDNEY	TUMORS	C	1.3E-2	6.3E-3	3.7E-7	1.8E-6	005038

ORAL [SLOPE] COMMENT: BASED ON ROUTE TO ROUTE EXTRAPOLATION.
 GENERAL COMMENT: ALSO SEE HEAST TABLE 1: SUBCHRONIC AND CHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).

CYANAZINE				021725-46-2						
	ORAL: DIET	2 YEARS RAT	MAMMARY GLAND MAMMARY GLAND	CARCINOSARCOMAS ADENOSARCOMAS	C	8.4E-1		2.4E-5		010932

GENERAL COMMENT: ALSO SEE HEAST TABLE 1: CHRONIC AND SUBCHRONIC TOXICITY (OTHER THAN CARCINOGENICITY).

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

July 1993

BROMOETHENE

000593-60-2

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CHLOROBENZILATE

000510-15-6

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

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CYANAZINE

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000534-52-1

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000115-29-7

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

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ISOPHORONE

000078-59-1

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000109-86-4

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000101-14-4

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

July 1993

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021087-64-9

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NAPHTHALENE

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TRIFLURALIN

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000109-86-4

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REFERENCES FOR HEAST TABLE 3: CARCINOGENICITY

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CYANAZINE

021725-46-2

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