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EPA Region 6

Human Health

Medium-Specific Screening Levels

U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, Texas 75202

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By

DATE: December 17, 2003
SUBJECT: Changes Made From The November 2002 Screening Value Table

FROM: Cheryl Overstreet, 6PD-F
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TO: Users of the Region 6 Screening Value Table and Text

The December 2003 revisions include several changes from the November 2002 version of the Region 6 Human Health Screening Value table and text. These changes are summarized below.

Changes in Toxicity Values, Physical and Chemical Parameters-

Changes in the toxicity values are highlighted in yellow on the downloadable Excel spreadsheet. The changes to the toxicity values may or may not result in a change in the screening value. Many of the values changed due to EPA's recently developed intranet database- the Peer-Reviewed Provisional Toxicity Values. More information on this database can be found in the technical background document. There were no changes made to any physical or chemical parameter.

Changes in Lead Screening Value-

Additionally, the screening value for lead for the industrial indoor and outdoor worker was changed to 800 mg/kg. This is consistent with the adult lead model and the NHANES III recommended defaults. These defaults are listed in a table in the background document.

If you find any errors in the text or in the screening table, please bring it to my attention by sending an email to overstreet.cheryl@epa.gov.

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BACKGROUND ON REGION 6 SCREENING VALUES

EPA Region 6's internet version of Risk-Based Human Health Screening Values can be found at the internet address http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.
The table was not generated to represent action levels or cleanup levels but rather as a technical tool. The responsibility of its use and relevance to site-specific circumstances becomes the responsibility of the person recommending the values to be used and the user of the table.

Disclaimer

The USEPA Region 6 Human Health Medium-Specific Screening Levels address common human health exposure pathways. They do not consider all potential human health exposure pathways nor address ecological concerns. The comparison of preliminary investigation data against risk-based media concentrations provides for an initial evaluation for the relative environmental concern for a site or set of environmental data. The values are not regulatory, but are derived using equations from EPA guidance and commonly used defaults. The table cannot be guaranteed to be error-free, but if you find an error please let us know.

The screening level tables are not required to be used. The tables are, however, a useful tool in that they are derived using existing equations and models from EPA guidance and are updated yearly.

Organization of Web Site

Changes Made From Previous Table

Background on Region 6 Screening Values

Medium-Specific Human Health Screening Table

Self- extracting Excel Spreadsheet

General

Screening levels are chemical concentrations that correspond to fixed levels of risk (i.e., either a one-in-one million [10^{-6}] cancer risk or a non-carcinogenic hazard quotient of one, whichever occurs at a lower concentration) in soil, air, and water. In most cases, where a substance causes both cancer and non-cancer or systemic effects, the 10^{-6} cancer risk will result in a more stringent criterion and consequently this value is presented in the table. Screening level concentrations based on cancer risk are indicated by "C." Screening level concentrations based on non-carcinogenic health threats are indicated by "N."

In general, screening level concentrations in the table are risk-based but for soil there are two important exceptions: (1) for several volatile chemicals, screening levels are based on the soil saturation equation ("sat") and (2) for relatively less toxic inorganic and semi-volatile contaminants, a non-risk based "ceiling limit" concentration is given as 10^{-5} mg/kg ("max").

The exposure pathways used in developing the screening values are indicated in ***boldface italics*** on the exposure table below.

TYPICAL EXPOSURE PATHWAYS BY MEDIUM
FOR RESIDENTIAL AND INDUSTRIAL LAND USES

EXPOSURE PATHWAYS, ASSUMING:		
MEDIUM	RESIDENTIAL LAND USE	INDUSTRIAL LAND USE
Ground Water	***Ingestion from drinking***	Ingestion from drinking
	Inhalation of volatile chemicals	Inhalation of volatile chemicals
	Dermal absorption from bathing	Dermal absorption
	Intrusion of volatiles into indoor air	Intrusion of volatiles into indoor air
Surface Water	***Ingestion from drinking***	Ingestion from drinking
	Inhalation of volatile chemicals	Inhalation of volatile chemicals

EXPOSURE PATHWAYS, ASSUMING:		
MEDIUM	RESIDENTIAL LAND USE	INDUSTRIAL LAND USE
	Dermal absorption from bathing	Dermal absorption
	Ingestion during swimming	
	Ingestion of contaminated fish	
Soil	***Ingestion***	***Ingestion***
	Inhalation of particulates	***Inhalation of particulates***
	Inhalation of volatile chemicals	***Inhalation of volatile chemicals***
	Intrusion of volatiles into indoor air	Intrusion of volatiles into indoor air
	Exposure to ground water contaminated by soil leachate	Exposure to ground water contaminated by soil leachate
	Ingestion via plant, meat, or dairy products	Inhalation of particulates from trucks and heavy equipment
	Dermal absorption	***Dermal absorption-outdoor worker only***

Explaining the Spreadsheet

The screening levels found in the screening value table are generated by equations incorporated into an Excel spreadsheet, except for the columns, MCL and DAF. Toxicity values as well as physical/chemical parameters are input into the spreadsheet. There are 5 primary sections of the spreadsheet- defaults are above the header; toxicity values, physical/chemical data, exposure-specific/scenario-specific risks and hazards, and the screening levels are found in the main part of the table. The easy-to-print screening level table contains only the toxicity values and the final screening levels. The default values and equations used in developing the table are discussed below.

Toxicity Values

EPA toxicity values, known as non-carcinogenic reference doses (RfD), non-carcinogenic reference concentrations (RfC), and carcinogenic slope factors (SF) were obtained from IRIS, Provisional Peer-Reviewed Toxicity Values Database (PPRTV), HEAST, EPA's National Center for Environmental Assessment, NCEA and other. The IRIS, PPRTV and NCEA values were updated as of November 2003. The HEAST values were not reviewed since HEAST has not been updated since the last screening value table. HEAST values that have been externally peer-reviewed are now in the PPRTV database and are noted by the letter "p" in the key column of the screening table next to the toxicity value. The PPRTV values currently represent the second tier of human health toxicity values for the EPA Superfund and RCRA hazardous waste programs. All provisional toxicity values receive internal review by two EPA scientists and external peer review by two scientific experts. These values are not IRIS values as they do not receive the multi-program consensus review provided by the IRIS program. Currently the PPRTV database resides on the EPA intranet. It may soon be on the internet. The priority among sources of toxicological constants used to develop the Region 6 screening table are as follows: (1) IRIS (indicated by "i"), (2) PPRTV ("p") (3) NCEA ("n"), (4) HEAST ("h"), and (5) other.

Route-to-route extrapolations ("r") were frequently used when there were no toxicity values available for a given route of exposure. Oral cancer slope factors ("SFo") and reference doses ("RfDo") were used for both oral and inhaled exposures for organic compounds lacking inhalation values where it was thought applicable. Inhalation slope factors ("SFi") and inhalation reference doses ("RfDi") were used for both inhaled and oral exposures for organic compounds lacking oral values unless the toxicity data indicated otherwise. An additional route extrapolation is the use of oral toxicity values for evaluating dermal exposures. **Although route-to-route methods are a useful screening procedure, the appropriateness of these default assumptions for specific contaminants should be verified by a toxicologist.** Occasionally, a withdrawn value ("x") is used when there is no other source of toxicity information.

Physical/Chemical Parameters

The physical/chemical data section of the spreadsheet provides information necessary for calculating the volatilization factors and the saturation limits for the contaminants.
Volatile chemicals are defined as those chemicals having a Henry's Law constant greater than 10-5 (atm-m3/mol) and a molecular weight less than 200 g/mole. The emission terms used in the VFs are chemical-specific and were calculated from physical-chemical information obtained from

several sources- 1996 *Soil Screening Guidance*, 1996 *Superfund Chemical Data Matrix*, 1988 *Superfund Exposure Assessment Manual*, and EPA Region 6 Superfund scientists. The volatilization factor used for calculating the soil screening levels is derived in the physical/chemical data section of the spreadsheet using the equation below which is from the 1996 Soil Screening Guidance. The volatilization factor for water is not derived, but is a constant.

SOIL-TO-AIR VOLATILIZATION FACTOR (VF_s)

Derivation of the Volatilization Factor

$$VF_s\ (m^3/kg) = (Q/C) \times \frac{(3.14 \times D_A \times T)^{1/2}}{(2 \times {}_b \times D_A)} \times 10^{-4}\ (m^2/cm^2)$$

where:

$$D_A = \frac{[\ {}_a^{10/3} D_i H' + {}_w^{10/3} D_w)/n^2]}{{}_b K_d + {}_w + {}_a H'}$$

Parameter	Definition (units)	Default
VF_s	Volatilization factor (m^3/kg)	--
D_A	Apparent diffusivity (cm^2/s)	--
Q/C	Inverse of the mean conc. at the center of a 0.5-acre square source (g/m^2-s per kg/m^3)	68.81
T	Exposure interval (s)	9.5×10^8
${}_b$	Dry soil bulk density (g/cm^3)	1.5
${}_a$	Air filled soil porosity (L_{air}/L_{soil})	0.28 or n- ${}_w$
n	Total soil porosity (L_{pore}/L_{soil})	0.43 or 1 - (${}_b$/ ${}_s$)
${}_w$	Water-filled soil porosity (L_{water}/L_{soil})	0.15

$_s$	Soil particle density (g/cm^3)	2.65
Di	Diffusivity in air (cm^2/s)	Chemical-specific
H	Henry's Law constant (atm-m^3/mol)	Chemical-specific
H'	Dimensionless Henry's Law constant	Calculated from H by multiplying by 41 (USEPA 1991a)
D_w	Diffusivity in water (cm^2/s)	Chemical-specific
K_d	Soil-water partition coefficient (cm^3/g) = $K_{oc} f_{oc}$	Chemical-specific
K_{oc}	Soil organic carbon-water partition coefficient (cm^3/g)	Chemical-specific
f_{oc}	Fraction organic carbon in soil (g/g)	0.006 (0.6%)

Soil Saturation

The soil saturation concentration "sat" corresponds to the contaminant concentration in soil at which the absorptive limits of the soil particles, the solubility limits of the soil pore water, and saturation of soil pore air have been reached. Above this concentration, the soil contaminant may be present in free phase, i.e., nonaqueous phase liquids (NAPLs) for contaminants that are liquid at ambient soil temperatures and pure solid phases for compounds that are solid at ambient soil temperatures

The equation below is used to calculate "sat" for each volatile contaminant. As an update to RAGS HHEM, Part B (USEPA 1991a), this equation takes into account the amount of contaminant that is in the vapor phase in soil in addition to the amount dissolved in the soil's pore water and sorbed to soil particles. A basic principle of the volatilization model is not applicable when free-phase contaminants are present. How these cases are handled depends on whether the contaminant is liquid or solid at ambient temperatures. Liquid contaminants that have volatilization factor (VF)-based screening levels that exceed the "sat" concentration are set equal to "sat" whereas for solids (e.g., PAHs), soil screening decisions are based on appropriate other pathways of concern at the site (e.g., ingestion and dermal contact).

SOIL SATURATION CONCENTRATION (sat)

Derivation of the Soil Saturation Limit

$$sat = \frac{S}{b}(K_d \; b + \; w + H' \; a)$$

Parameter	Definition (units)	Default
sat	Soil saturation concentration (mg/kg)	--
S	Solubility in water (mg/L-water)	Chemical-specific
b	Dry soil bulk density (kg/L)	1.5
n	Total soil porosity (L_{pore}/L_{soil})	0.43 or 1 - (b/ s)
s	Soil particle density (kg/L)	2.65
K_d	Soil-water partition coefficient (L/kg)	K_{oc} x f_{oc} (chemical-specific)
k_{oc}	Soil organic carbon/water partition coefficient (L/kg)	Chemical-specific
f_{oc}	Fraction organic carbon content of soil (g/g)	0.006 or site-specific
w	Water-filled soil porosity (L_{water}/L_{soil})	0.15
a	Air filled soil porosity (L_{air}/L_{soil})	0.28 or n- w
w	Average soil moisture content (kg_{water}/kg_{soil} or L_{water}/kg_{soil})	0.1
H	Henry's Law constant (atm-m^3/mol)	Chemical-specific
H'	Dimensionless Henry's Law constant	H x 41, where 41 is a units conversion factor

The physical/chemical parameters section of the spreadsheet also includes information on molecular weight, whether the chemical is a solid at ambient temperature, and skin absorption factors used for calculating the dermal portion of the equations.

Dermal Absorption Values

Chemical-specific dermal absorption values for contaminants in soil and dust are presented for arsenic, cadmium, chlordane, 2,4-D, DDT, lindane, PAH's, pentachlorophenol, PCBs, and dioxin. Otherwise, default skin absorption fractions are assumed to be 0.10, for semi-volatile organic chemicals. A default absorption for inorganics and volatile organic chemicals is no longer recommended.

Defaults

The physical/chemical data section of the spreadsheet does not calculate the particulate emission factor or the volatilization factor for tap water. These values can be found in the spreadsheet above the header as they are simple defaults.

Volatilization Factor for Tap Water

For tap water, an upper bound volatilization constant (VF_w) is used that is based on all uses of household water (e.g showering, laundering, and dish washing). Certain assumptions were made. For example, it is assumed that the volume of water used in a residence for a family of four is 720 L/day, the volume of the dwelling is 150,000 L and the air exchange rate is 0.25 air changes/hour (Andelman in RAGS Part B). Furthermore, it is assumed that the average transfer efficiency weighted by water use is 50 percent (i.e. half of the concentration of each chemical in water will be transferred into air by all water uses). The range of transfer efficiencies extends from 30% for toilets to 90% for dishwashers. Volatilization was only included in the tap water equations for compounds with an "1" in the "VOC" column. The value used in calculating the screening level for tap water is 0.5 L/m3.

Particulate Emission Factor for Soils

To address the soil-to-air pathways the screening level calculations incorporate volatilization factors (VF_s) for volatile contaminants and particulate emission factors (PEF) for nonvolatile contaminants. The spreadsheet does not calculate a PEF, but uses a default PEF equal to 1.316×10^9 m^3/kg that relates the contaminant concentration in soil with the concentration of respirable particles in the air due to fugitive dust emissions from contaminated soils. The generic PEF was derived using default values which corresponds to a receptor point concentration of approximately 0.76 ug/m^3. The relationship is derived by Cowherd (1985) for a rapid assessment procedure applicable to a typical hazardous waste site where the surface contamination provides a relatively continuous and constant potential for emission over an extended period of time (e.g. years). This represents an annual average emission rate based on

wind erosion that should be compared with chronic health criteria; it is not appropriate for evaluating the potential for more
acute exposures.

With the exception of specific heavy metals, the PEF does not appear to significantly affect most soil screening levels. For more details regarding specific parameters used in the PEF model, the reader is referred to *Soil Screening Guidance: Technical Background Document* (USEPA 1996a).

Note: the generic PEF evaluates windborne emissions and does not consider dust emissions from traffic or other forms of mechanical disturbance that could lead to greater emissions than assumed here.

Exposure-Specific/Scenario-Specific Screening Levels

Each exposure pathway (ingestion, inhalation, and dermal) where applicable is calculated separately for carcinogens and noncarcinogens and listed under the appropriate heading of residential, industrial-indoor, industrial-outdoor, ambient air, and tap water. These individual pathway values can provide important information with regards to risk drivers and in showing sometimes how little difference there may be between the carcinogenic risk and non-carcinogenic hazard. For the end user who may be using a cancer target risk level higher than 10^{-6}, the exposure-specific/scenario-specific section of the spreadsheet can be used to determine if the carcinogenic endpoint is more stringent than the non-carcinogenic endpoint which is based upon a hazard quotient of one. The carcinogenic endpoint is not always the most conservative.

Default exposure factors were obtained primarily from RAGS Supplemental Guidance Standard Default *Exposure Factors* (OSWER Directive, 9285.6-03) dated March 25, 1991 and more recent information from U.S. EPA's Office of Solid Waste and Emergency Response, and U.S. EPA's Office of Research and Development. Some exposure factors were also obtained from the draft 1999 Supplemental Soil Screening Guidance. Table 1-Standard Default Factors- lists the references of the defaults. Table 2 lists the exposure defaults by exposure scenario.

Because contact rates may be different for children and adults, carcinogenic risks during the first 30 years of life were calculated using age-adjusted factors ("adj"). Use of age-adjusted factors are especially important for soil ingestion exposures, which are higher during childhood and decrease with age. However, for purposes of combining exposures across pathways, additional age-adjusted factors are used for inhalation and dermal exposures. These factors approximate the integrated exposure from birth until age 30 combining contact rates, body weights, and exposure durations for two age groups - small children and adults. Age-adjusted factors were obtained

from RAGS PART B or developed by analogy.

(1) ingestion([mg•yr]/[kg•d]:

$$IFS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{(ED_r - ED_c) \times IRS_a}{BW_a}$$

(2) skin contact([mg•yr]/[kg•d]:

$$SFS_{adj} = \frac{ED_c \times AF \times SA_c}{BW_c} + \frac{(ED_r - ED_c) \times AF \times SA_a}{BW_a}$$

(3) inhalation ([m^3•yr]/[kg•d]):

$$InhF_{adj} = \frac{ED_c \times IRA_c}{BW_c} + \frac{(ED_r - ED_c) \times IRA_a}{BW_a}$$

The acronyms are explained in Table 1. These values can also be found in the exposure default section of the spreadsheet above the header.

The equations for calculating the risk or hazard by exposure pathway and well as the combined risk from all exposures for the scenario are depicted below.

Residential Equations

Ingestion of Carcinogenic Contaminants-

Eq. 1 Screening Level (mg/kg) $= \frac{TR \times AT \times 365\ d/yr}{SFo \times 10^{-6} kg/mg \times EF \times IFS\ adj}$

where:
TR = target risk of 10^{-6}
AT = averaging time of 70 years
SFo = oral cancer slope factor
EF = exposure frequency of 350 days
IFS adj = adjusted soil ingestion- 114 (mg-yr)/(kg-d)

Ingestion of Noncarcinogenic Contaminants-

Eq. 2 Screening Level (mg/kg) $= \dfrac{THQ \times BW \times AT \times 365 d/yr}{1/RfDo \times 10^{-6} kg/mg \times EF \times ED \times IRS}$

where:
THQ = target hazard quotient of 1
BW = body weight of child -15 kg
AT = averaging time of child -6 years
RfDo = oral reference dose
EF = exposure frequency of 350 days
ED = exposure duration of child- 6 years
IRS = Ingestion rate of child - 200 mg/day

Inhalation of Carcinogenic Contaminants-

Eq. 3 Screening Level (mg/kg) $= \dfrac{TR \times AT \times 365\ d/yr}{SFi \times EF \times InhFadj \times [(1/PEF) \text{ or } (1/VF)]}$

where:

TR = target risk of 10^{-6}
AT = averaging time of 70 years
SFi = inhalation cancer slope factor
EF = exposure frequency of 350 days
InhFadj = adjusted inhalation factor- 11(m3-yr)(kg-d)
PEF = particulate emission factor used for dusts- 1.32×10^{9} mg/kg
VF = volatilization factor used for volatile organic chemicals

Inhalation of Noncarcinogenic Contaminants except Category 3 Gases-

Eq. 4a Screening Level (mg/kg) $= \dfrac{THQ \times BW \times AT \times 365 d/yr}{EF \times ED \times (1/RfDi) \times IRA \times [(1/PEF) \text{ or } (1/VF)]}$

where:

THQ = target hazard quotient of 1
BW = body weight of child- 15 kg
AT = averaging time of 6 years
EF = exposure frequency of 350 d/yr
ED = exposure duration of 6 years
RfDi = inhalation reference dose in mg/kg/day
IRA = inhalation rate of child - 10 m3/day
PEF = particulate emission factor used for dusts- 1.32×10^9 mg/kg
VF = volatilization factor used for volatile organic chemicals

Inhalation of Noncarcinogenic Contaminants- Category 3 Gases-

Eq. 4b Screening Level (mg/kg) =

$$\frac{THQ \times AT \times 365 d/yr}{EF \times ED \times (1/RfC) \times [(1/PEF) \text{ or } (1/VF)]}$$

where:
THQ = target hazard quotient of 1
AT = averaging time of 30 years
EF = exposure frequency of 350 d/yr
ED = exposure duration of 30 years
RfC = reference concentration in mg/m3
PEF = particulate emission factor used for dusts- 1.32×10^9 mg/kg
VF = volatilization factor used for volatile organic chemicals

Skin Contact of Carcinogenic Contaminants-

Eq. 5 Screening Level (mg/kg) =

$$\frac{TR \times AT \times 365 d/yr}{SFo \times EF \times SFS\ adj \times ABS \times 10^{-6} kg/mg}$$

where:

TR = target risk of 10^{-6}
AT = averaging time of 70 years

SFo = oral cancer slope factor
EF = exposure frequency of 350 days
SFSadj = skin contact factor for soils- 340 (mg-yr)(kg-d)
ABS = skin absorption (chemical specific)

Skin Contact of Noncarcinogenic Contaminants-

Eq. 6 Screening Level (mg/kg) =

$$\frac{THQ \times BW \times AT \times 365 d/yr}{EF \times ED \times 1/RfDo \times 10^{-6} kg/mg \times SA \times AF \times ABS}$$

where:
THQ = target hazard quotient of 1
BW = body weight of child -15 kg
AT = averaging time of child -6 years
EF = exposure frequency of 350 days
ED = exposure duration of child- 6 years
RfDo = oral reference dose
SA = surface area of child - 2800 cm2/day
AF = adherence factor of child - 0.2 cm2/day
ABS = skin absorption (chemical specific)

Screening Level for Combined Exposure Pathways for Carcinogenic Contaminants for Residential Receptor-

Eq. 7 Screening Level (mg/kg) =

$$\frac{1}{1/Eq.1 + 1/Eq.3 + 1/Eq.5}$$

Screening Level for Combined Exposure Pathways for Noncarcinogenic Contaminants for Residential Receptor-

Eq. 8 Screening Level (mg/kg) = $\frac{1}{1/\text{Eq. 2} + [(1/\text{Eq. 4a}) \text{ or } (1/\text{Eq. 4b})] + 1/\text{Eq. 6}}$

Industrial Equations - Indoor Worker

Ingestion of Carcinogenic Contaminants-

Eq. 9 Screening Level (mg/kg) = $\frac{TR \times BW \times AT \times 365\ d/yr}{SFo \times 10^{-6} kg/mg \times EF \times ED \times IRS}$

where:
TR = target risk of 10^{-6}
AT = averaging time of 70 years
BW = body weight of adult- 70kg
SFo = oral cancer slope factor
EF = exposure frequency of 250 days
ED = exposure duration of 25 years
IRS = ingestion rate of 50 mg/day

Ingestion of Noncarcinogenic Contaminants-

Eq. 10 Screening Level (mg/kg) = $\frac{THQ \times BW \times AT \times 365 d/yr}{1/RfDo \times 10^{-6} kg/mg \times EF \times ED \times IRS}$

where:
THQ = target hazard quotient of 1
BW = body weight of adult -70 kg
AT = averaging time of 25 years
RfDo = oral reference dose
EF = exposure frequency of 250 days
ED = exposure duration of 25 years
IRS = Ingestion rate of 50 mg/day

Inhalation of Carcinogenic Contaminants-

Eq. 11 Screening Level (mg/kg) $= \dfrac{TR \times BW \times AT \times 365\ d/yr}{SFi \times EF \times ED \times IRA \times [(1/PEF) \text{ or } (1/VF)]}$

where:

TR = target risk of 10^{-6}
BW = body weight of adult - 70kg
AT = averaging time of 70 years
SFi = inhalation cancer slope factor
EF = exposure frequency of 250 days
ED = exposure duration of 25 years
IRA = inhalation rate of 20 m3/day
PEF = particulate emission factor used for dusts- 1.32×10^{9} mg/kg
VF = volatilization factor used for volatile organic chemicals

Inhalation of Noncarcinogenic Contaminants-

Eq. 12 Screening Level (mg/kg) $= \dfrac{THQ \times BW \times AT \times 365d/yr}{EF \times ED \times (1/RfDi) \times IRA \times [(1/PEF) \text{ or } (1/VF)]}$

where:
THQ = target hazard quotient of 1
BW = body weight of adult- 70kg
AT = averaging time of 25 years
EF = exposure frequency of 250 d/yr
ED = exposure duration of 25 years
RfDi = inhalation reference dose in mg/kg/day
IRA = inhalation rate of adult- 20m3/day
PEF = particulate emission factor used for dusts- 1.32×10^{9} mg/kg
VF = volatilization factor used for volatile organic chemicals

Screening Level for Combined Exposure Pathways for Carcinogenic Contaminants for Indoor Industrial Worker-

Eq. 13 Screening Level (mg/kg) = $\frac{1}{1/\text{Eq.9} + 1/\text{Eq. 11}}$

Screening Level for Combined Exposure Pathways for Noncarcinogenic Contaminants for Indoor Industrial Worker-

Eq. 14 Screening Level (mg/kg) = $\frac{1}{1/\text{Eq.10} + 1/\text{Eq. 12}}$

Industrial Equations -Outdoor Worker

Ingestion of Carcinogenic Contaminants-

Eq. 15 Screening Level (mg/kg) = $\frac{TR \times BW \times AT \times 365\ d/yr}{SFo \times 10^{-6} kg/mg \times EF \times ED \times IRS}$

where:
TR = target risk of 10^{-6}
AT = averaging time of 70 years
BW = body weight of adult- 70kg
SFo = oral cancer slope factor
EF = exposure frequency of 225 days
ED = exposure duration of 25 years
IRS = ingestion rate of 100 mg/day

Ingestion of Noncarcinogenic Contaminants-

Eq. 16 Screening Level (mg/kg) = $\frac{THQ \times BW \times AT \times 365 d/yr}{1/RfDo \times 10^{-6} kg/mg \times EF \times ED \times IRS}$

where:
THQ = target hazard quotient of 1
BW = body weight of adult -70 kg

AT = averaging time of 25 years
RfDo = oral reference dose
EF = exposure frequency of 225 days
ED = exposure duration of 25 years
IRS = Ingestion rate of 100 mg/day

Inhalation of Carcinogenic Contaminants-

Eq. 17 Screening Level (mg/kg) $= \dfrac{TR \times BW \times AT \times 365\ d/yr}{SFi \times EF \times ED \times IRA \times [(1/PEF)\ or\ (1/VF)]}$

where:
TR = target risk of 10^{-6}
BW = body weight of adult - 70kg
AT = averaging time of 70 years
SFi = inhalation cancer slope factor
EF = exposure frequency of 225 days
ED = exposure duration of 25 years
IRA = inhalation rate of 20 m3/day
PEF = particulate emission factor used for dusts- 1.32×10^{9} mg/kg
VF = volatilization factor used for volatile organic chemicals

Inhalation of Noncarcinogenic Contaminants-

Eq. 18 Screening Level (mg/kg) $= \dfrac{THQ \times BW \times AT \times 365 d/yr}{EF \times ED \times (1/RfDi) \times IRA \times [(1/PEF)\ or\ (1/VF)]}$

where:
THQ = target hazard quotient of 1
BW = body weight of adult- 70 kg
AT = averaging time of 25 years
EF = exposure frequency of 225 d/yr
ED = exposure duration of 25 years
RfDi = inhalation reference dose in mg/kg/day
IRA = inhalation rate of adult- 20 m3/day
PEF = particulate emission factor used for dusts- 1.32×10^{9} mg/kg

VF = volatilization factor used for volatile organic chemicals

Skin Contact of Carcinogenic Contaminants-

Eq. 19 Screening Level (mg/kg) =

$$\frac{TR \times BW \times AT \times 365d/yr}{EF \times ED \times SFo \times 10^{-6}kg/mg \times SA \times AF \times ABS}$$

where:
TR = target risk of 10^{-6}
BW = body weight of adult -70 kg
AT = averaging time of worker -25 years
EF = exposure frequency of 225 days
ED = exposure duration of worker- 25 years
SFo = oral cancer slope factor
SA = surface area exposed - 3300 cm2/day
AF = adherence factor - 0.2 cm2/day
ABS = skin absorption (chemical specific)

Skin Contact of Noncarcinogenic Contaminants-

Eq. 20 Screening Level (mg/kg) =

$$\frac{THQ \times BW \times AT \times 365d/yr}{EF \times ED \times 1/RfDo \times 10^{-6}kg/mg \times SA \times AF \times ABS}$$

where:
THQ = target hazard quotient of 1
BW = body weight of adult -70 kg
AT = averaging time of outdoor worker -25 years
EF = exposure frequency of 225 days
ED = exposure duration of worker- 25 years
RfDo = oral reference dose
SA = surface area exposed - 3300 cm2/day
AF = adherence factor - 0.2 cm2/day
ABS = skin absorption (chemical specific)

Screening Level for Combined Exposure Pathways for Carcinogenic Contaminants for Outdoor Industrial Worker-

Eq. 21 Screening Level (mg/kg) = $\frac{1}{1/Eq.15 + 1/Eq.17 + 1/Eq.19}$

Screening Level for Combined Exposure Pathways for Noncarcinogenic Contaminants for Outdoor Industrial Worker-

Eq. 22 Screening Level (mg/kg) = $\frac{1}{1/Eq.16 + 1/Eq.18 + 1/Eq.20}$

Ambient Air Equations

Inhalation of Carcinogenic Contaminants-

Eq. 23 Screening Level (ug/m3) = $\frac{TR \times AT \times 365\ d/yr \times 1{,}000ug/mg}{EF \times InhFadj \times SFo}$

where:
TR = target risk of 10^{-6}
AT = averaging timer -70 years
EF = exposure frequency of 350 days
InhFadj = adjusted inhalation factor- 11(m3-yr)(kg-d)

Inhalation of Noncarcinogenic Contaminants-

Eq. 24 Screening Level (ug/m3) = $\frac{THQ \times BW \times AT \times 365\ d/yr \times 1000ug/mg}{EF \times ED \times IRA \times 1/RfDi}$

where:
THQ = target hazard quotient of 1

BW = body weight of adult -70 kg
AT = averaging time of resident -30 years
EF = exposure frequency of 350 days
ED = exposure duration of 30 years
IRA = inhalation rate of 20m3/day
RfDi = inhalation reference dose

Tap Water Equations

Ingestion and Inhalation of Carcinogenic Contaminants-

Eq. 25 Screening Level (ug/l) = $\frac{TR \times AT \times 365\ d/yr \times 1{,}000\ ug/mg}{EF \times [(IFWadj \times SFo) + (VF \times InhFadj \times SFi)^*]}$

where:
TR = target risk of 10^{-6}
AT = averaging timer -70 years
EF = exposure frequency of 350 days
IFW adj = ingestion factor for water- 1.1(l-yr)(kg-d)
SFo = oral cancer slope factor
VF = volatilization factor for water- 0.5 (L/m3)
InhFadj = adjusted inhalation factor- 11(m3-yr)(kg-d)
SFi = inhalation cancer slope factor

* Inhalation part of the equation is calculated only for volatile organic chemicals.

Ingestion and Inhalation of Noncarcinogenic Contaminants-

Eq. 26 Screening Level (ug/L) = $\frac{THQ \times BW \times AT \times 365\ d/yr \times 1{,}000ug/mg}{EF \times ED\ [(IRW/RfDo) + (VF \times IRA \times 1/RfDi)^*]}$

where:

THQ = target hazard quotient of 1
BW = body weight of adult -70 kg
AT = averaging time of resident -30 years
EF = exposure frequency of 350 days

ED = exposure duration of 30 years
IRW = drinking water ingestion of 2 L/d
RfDo = oral reference dose
VF = volatilization factor for water - 0.5 (L/m3)
IRA = inhalation rate of 20m3/day
RfDi = inhalation reference dose

* Inhalation part of equation only calculated for volatile organic chemicals

Table 1: STANDARD DEFAULT FACTORS

Symbol	Definition (units)	Default	Reference
SFo	Cancer slope factor oral (mg/kg-d)-1	–	IRIS, NCEA, or HEAST
SFi	Cancer slope factor inhaled (mg/kg-d)-1	–	IRIS, NCEA, or HEAST
RfDo	Reference dose oral (mg/kg-d)	–	IRIS, NCEA, or HEAST
RfDi	Reference dose inhaled (mg/kg-d)	–	IRIS, NCEA, or HEAST
RfC	Reference concentration (mg/m3)	–	IRIS, NCEA, or HEAST
TR	Target cancer risk	10^{-4}	–
THQ	Target hazard quotient	1	–
BWa	Body weight, adult (kg)	70	RAGS (Part a), EPA 1989 (EPA/540/1-89/002)
BWc	Body weight, child (kg)	15	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
ATc	Averaging time - carcinogens (days)	25550	RAGS(Part a), EPA 1989 (EPA/540/1-89/002)
ATn	Averaging time - noncarcinogens (days)	ED*365	
SAa	Exposed surface area, adult (cm^2/day)	5700	Supplemental Soil Screening Guidance, EPA 2002
SAc	Exposed surface area, child (cm^2/day)	2800	Supplemental Soil Screening Guidance, EPA 2002
SAao	Exposed surface area, outdoor worker (cm^2/day)	3300	Supplemental Soil Screening Guidance, EPA 2002
AFa	Adherence factor, adult (mg/cm^2)	0.07	Supplemental Soil Screening Guidance, EPA 2002
AFw	Adherence factor, adult-work (mg/cm^2)	0.2	Supplemental Soil Screening Guidance, EPA 2002
AFc	Adherence factor, child (mg/cm^2)	0.2	Supplemental Soil Screening Guidance, EPA 2002
ABS	Skin absorption (unitless):		
	– volatile organics	none	Dermal Assessment, RAGS (Part E)
	– semi-volatile organics	0.1	Dermal Assessment, RAGS (Part E)
	–Inorganics	none	Dermal Assessment, RAGS (Part E)
IRAa	Inhalation rate - adult (m^3/day)	20	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
IRAc	Inhalation rate - child (m^3/day)	10	RAGS (Part A), EPA 1989 (EPA/540/1-89/002)
IRWa	Drinking water ingestion - adult (L/day	2	RAGS(Part A), EPA 1989 (EPA/540/1-89/002)
IRWc	Drinking water ingestion - child (L/day)	1	
IRSa	Soil ingestion - adult(resident and outdoor worker) (mg/day)	100	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
IRSc	Soil ingestion - child (mg/day),	200	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
IRSo	Soil ingestion - indoor worker (mg/day)	50	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
EFr	Exposure frequency - residential (d/y)	350	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
EFo	Exposure frequency - occupational (d/y)	250	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
EFout	Exposure frequency- outdoor worker (d/y)	225	Supplemental Soil Screening Guidance, EPA 2001
EDr	Exposure duration - residential (years)	30*	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
EDc	Exposure duration - child (years)	6	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
EDo	Exposure duration - occupational (years)	25	Exposure Factors , EPA 1991 (OSWER No. 9285.6-03)
	Age-adjusted factors for carcinogens:		
IFSadj	Ingestion factor, soils ([mg●yr]/[kg●d])	114	RAGS(Part B), EPA 1991 (OSWER No. 9285.7-01B)
SFSadj	Skin contact factor, soils ([mg●yr]/[kg●d])	340	By analogy to RAGS (Part B)
InhFadj	Inhalation factor ([m^3●yr]/[kg●d])	11	By analogy to RAGS (Part B)
IFWadj	Ingestion factor, water ([l●yr]/[kg●d])	1.1	By analogy to RAGS (Part B)
VFw	Volatilization factor for water (L/m^3)	0.5	RAGS(Part B), EPA 1991 (OSWER No. 9285.7-01B)
PEF	Particulate emission factor (m^3/kg)	in text	Soil Screening Guidance (EPA 1996a,b)
VFs	Volatilization factor for soil (m^3/kg)	in spreadsheet	Soil Screening Guidance (EPA 1996a,b)
sat	Soil saturation concentration (mg/kg)	in spreadsheet	Soil Screening Guidance (EPA 1996a,b)

Footnote:

*Exposure duration for lifetime residents is assumed to be 30 years total. For carcinogens, exposures are combined for children (6 years) and adults (24 years).

Table 2:Comparison of Defaults used in Equations to Develop Region 6 Screening Values

Exposure Factors	Residential except Category 3	Residential Category 3	Outdoor Worker	Indoor Worker	Ambient Air	Tap Water
Exposure Frequency (days/yr)	350	350	225	250	350	350
Exposure Duration (yr)	adjusted or 6	adjusted or 6 or 30 for inhalation	25	25	30	30
Averaging Time-NC	2190	2190 or 10950	9125	9125	10950	10950
Averaging Time-C	25550	25550	25550	25550	25550	25550
Soil Ingestion Rate (mg/d)	200	200	100	50	n/a	n/a
Inhalation Rate (m3/d)	20 or adjusted	n/a	20	20	20 or adjusted	20 or adjusted
Body Weight-(kg)	15 or adjusted	n/a	70	70	70	70
Surface Area-(cm2/day)	2800 or adjusted	2800 or adjusted	3300	n/a	n/a	n/a
Adherence Factor (mg/cm2)	0.2	0.2	0.2	n/a	n/a	n/a

Medium-Specific Screening Levels

Several values are compared in order to develop the final screening values. This includes the comparison to a maximum of 100,000 for the lesser toxic chemicals and to the soil saturation limit. These equations are listed below.

Development of Final Screening Values

Residential Soil Value except for Category 3 Gases-

If the contaminant is a solid, then the following applies:

Eq. 27 a Screening Value (mg/kg) = Minimum of (Eq. 7, Eq. 8*, 100000)

If the contaminant is not a solid, then the following applies:

Eq. 27 b Screening Value (mg/kg) = Minimum of (saturation, Eq. 7, Eq. 8*,100000)

*Equation 8 uses the Eq. 4a option.

Residential Soil Value for Category 3 Gases-

If the contaminant is a solid, then the following applies:

Eq. 27 a Screening Value (mg/kg) = Minimum of (Eq. 7, Eq. 8*, 100000)

If the contaminant is not a solid, then the following applies:

Eq. 27 b Screening Value (mg/kg) = Minimum of (saturation, Eq. 7, Eq. 8*,100000)

*Equation 8 uses the Eq. 4b option.

Industrial Soil Indoor Worker -

If the contaminant is a solid, then the following applies:

Eq. 28 a Screening Value = Minimum of (Eq. 13, Eq. 14, 100000)
(mg/kg)

If the contaminant is not a solid, then the following applies:

Eq. 28 b Screening Value = Minimum of (saturation, Eq. 13, Eq. 14, 100000)
(mg/kg)

Industrial Soil Outdoor Worker -

If the contaminant is a solid, then the following applies:

Eq. 29 a Screening Value = Minimum of (Eq. 21, Eq. 22, 100000)
(mg/kg)

If the contaminant is not a solid, then the following applies:

Eq. 29 b Screening Value = Minimum of (saturation, Eq. 21, Eq. 22, 100000)
(mg/kg)

Ambient Air-

Eq. 30 Screening Value = Minimum of (Eq. 23, Eq. 24)
(ug/m3)

Tap Water-

Eq, 31 Screening Value = Minimum of (Eq. 25, Eq. 26)
(ug/l)

SSLs for the Migration to Groundwater Pathway

In May 1996 the EPA Office of Solid Waste and Emergency Response published the Soil Screening Guidance: Technical Background Document (Document 9355.4-17A, PB96-963502, EPA/540/R-95/128, available through NTIS at 703-487-4650 and the internet-http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm). This document provides (1) a framework in which soil screening levels are to be used, (2) a detailed methodology for calculating soil screening levels, and (3) generic soil screening levels for selected chemicals. Additionally, EPA developed a draft Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites in November 1999. This guidance provided equations for both indoor and outdoor workers. In December 2002, EPA revised this document and placed it on the internet at the following site: www.epa.gov/superfund/resources/soil/ssg_main.pdf
The methodology for calculating SSLs for the migration to groundwater was developed to identify chemical concentrations in soil that have the potential to contaminate groundwater. Migration of contaminants from soil to groundwater can be envisioned as a two-stage process: (1) release of contaminant in soil leachate and (2) transport of the contaminant through the underlying soil and aquifer to a receptor well. The SSL methodology considers both of these fate and transport mechanisms.

SSLs are back calculated from acceptable ground water concentrations (i.e. nonzero MCLGs, MCLs, or risk-based screening levels). Residential exposure scenarios are assumed based on a fixed upper bound risk of 10^{-6} or a fixed hazard quotient of 1. First, the acceptable groundwater concentration is multiplied by a dilution factor to obtain a target leachate concentration. For example, if the dilution factor is 10 and the acceptable ground water concentration is 0.05 mg/L, the target soil leachate concentration would be 0.5 mg/L. The partition equation (presented in the *Soil Screening Guidance* document) is then used to calculate the total soil concentration (i.e. SSL) corresponding to this soil leachate concentration. The screening value table presents only the dilution of 1. For other dilutions, one can simply multiply the DAF value by the desired dilution. Due to rounding, there may be some slight difference in this value vs. the values found in the Soil Screening Guidance.

Currently, the Region 6 spreadsheet does not generate soil values protective of groundwater based upon the soil screening calculations. The numbers for the "DAF" column are pasted from the August 1998 Region 6 Medium-Specific Screening Level document and spot-checked using the latest EPA guidance. Based upon the feedback from the spreadsheet users and the regional resources, future revisions to the spreadsheet can incorporate the information necessary to calculate appropriate soil values for protection of groundwater.

Screening Values Not Derived from EPA Equations

There are some exceptions to the above equations being used for deriving screening levels. Nitrate and nitrite have screening levels for tap water that are based upon their MCLs. The value for MTBE is based upon an advisory number for taste and odor. The residential soil value for lead is based upon the Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead in children developed using default parameters. More information on this model and other lead guidance can be found at http://www.epa.gov/superfund/programs/lead/prods.htm. The industrial soil value is based upon equations developed by the technical review group (adult lead model) as described below.

The Adult Lead Model (ALM) is a tool for assessing risks associated with **non-residential** adult exposures to lead in soil. The ALM focuses on estimating fetal blood lead concentrations in pregnant women exposed to lead contaminated soils in a commercial/industrial setting. It is the product of extensive evaluations by the Technical Review Workgroup for Lead (TRW). In December 1996, the TRW released the document *Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil* (*TRWR*; EPA, 1996), which describes the equations and default parameters that can be used with the ALM. More recently this information has been updated by the NHANES III report.

This Region 6 guidance attempts to provide clarification on some issues as encountered by risk assessors in the region.

Basic Equations Used by the ALM:

$$\text{RBRG (mg/Kg)} = \frac{(PbB_{adult,central,goal} - PbB_{adult,0}) \times AT^{*}}{BKSF \times ((IR_s \times EF_s \times AF_s) + (K_{sd} \times IR_d \times EF_d \times AF_d))}$$

$$PbB_{adult,\,central,\,goal} = \frac{PbB_{fetal,\,0.95,\,goal}}{GSD_{i,\,adult>1.645} \times R_{fetal/maternal}}$$

Input Parameters to the ALM:

1. $PbB_{fetal,\ 0.95,\ goal}$ - 95th Percentile of Blood Lead in the Fetus

The EPA and CDC recommend that no more than a 5% chance exists that a child's blood lead exceeds 10 ug/dL. For an industrial/commercial setting, the exposed population could include pregnant women, and the recommendation holds for the fetus. The recommended $PbB_{fetal,\ 0.95,\ goal}$ is **10 ug/dL**.

2. $R_{fetal/maternal}$ - Mean Ratio of Fetal to Maternal PbB

The relationship between fetal and maternal blood lead levels is estimated to be **0.9** (unitless; from Goyer, 1990).

3. $GSD_{i,\ adult}$ - Individual Geometric Standard Deviation

The value for $GSD_{i,\ adult}$ depends on the degree of homogeneity in the population of concern at the site. It can range from **2.1** (homogeneous) to **2.3** (heterogeneous). Ideally, the $GSD_{i,\ adult}$ should be estimated for the population of concern based on blood lead data, but this information is not always readily available. Page A-7 of the TRWR notes that lower values of GSD_i are expected in relatively small geographic areas, and GSD_i would be expected to be higher in national surveys

4. $PbB_{adult,0}$ - Baseline Blood Lead Value

In order to determine this value, the demographic composition of the population of concern at the site should be considered. See Table A-2 of the TRWR. The geometric mean PbB value reported for Non-Hispanic Black women aged 20 - 49 years is 2.2 ug/dL; for Hispanic women, 2.0 ug/dL; for Non-Hispanic Anglo women, 1.7 ug/dL. **1.7 ug/dL** is recommended for a relatively mixed population.

5. BKSF - Biokinetic Slope Factor

The BKSF relates the blood lead concentration (ug Pb/dL) to lead uptake (ug Pb/day). The TRW recommended value is **0.4 ug/dL per ug/day**.

6. IR_s - Soil Ingestion Rate

The TRW recommends an IR_s of **0.05 g/day**. This is the same value used for the default soil ingestion rate in a commercial/industrial worker scenario. It includes ingestion of both outdoor soil *and* indoor soil-derived dust. If this value is used in the ALM, then the variables of IR_d, K_{sd}, EF_d, and AF_d do not need to be addressed.

7. IR_d - Dust Ingestion Rate

If this variable is to be addressed, attention should be given to which portion of ingestion will be due to soil and which to dust, and justification should be provided. It is recommended that the total IR_{s+d} not exceed 0.05 g/day. If the IR_{s+d} is to be greater than 0.05 g/day, justification should be provided.

8. K_{sd} - Ratio of Indoor Dust Lead Concentration to Soil Lead Concentration

If this variable is to be addressed, direct measurement data should be collected for both soil and dust at the facility of concern. See TRWR, page A-19. A typical value is **0.7** (unitless), which is taken from residential studies and is used in the Integrated Effects Uptake Biokinetic Model (IEUBK).

9. EF_s - Soil Exposure Frequency

This is the exposure frequency for contact with assessed soils and soil-derived dust (days of exposure during the averaging period). The TRW recommends a default EF_s of **219 days/year**. This is the central tendency occupational exposure frequency from the draft document *Superfund's Standard Default Exposure Factors for the Central Tendency and RME* (EPA, 1993), and is the average time spent at work by both full-time and part-time workers based on 1991 data from the Bureau of Labor Statistics. The default value is just under 10 months when considering only workdays (22 workdays/month).

10. EF_d - Dust Exposure Frequency

The TRW recommends a default EF_d of **219 days/year**. This is the central tendency

occupational exposure frequency from the draft document *Superfund's Standard Default Exposure Factors for the Central Tendency and RME* (EPA, 1993), and is the average time spent at work by both full-time and part-time workers based on 1991 data from the Bureau of Labor Statistics. The default value is just under 10 months when considering only workdays (22 workdays/month).

11. AF_s - Soil Lead Absorption Factor

This variable represents the fraction of lead in soil ingested daily that is absorbed from the gastrointestinal tract. The TRW recommended value is **0.12** (unitless), based on an absorption factor for soluble lead of 0.20 and a relative bioavailability of 0.6.

12. AF_d - Dust Lead Absorption Factor

This variable represents the fraction of lead in dust ingested daily that is absorbed from the gastrointestinal tract. The TRW has no recommended value for AF_d, but **0.12** (unitless) is a plausible value.

* AT - Averaging Time. This is the total period during which soil contact may occur. This variable is already incorporated into the ALM, and no entry needs to be made; however, the value is 365 days/year for long-term exposures.

Determining a Commercial/Industrial Screening Value for Lead in Soil

The current recommended soil screening value of 800 mg/kg is based upon the IEUBK model for adults. This model is based upon protecting the unborn fetus of the pregnant worker. The following table presents the recommended defaults. The recommended screening number is actually a range (780-1,235) based upon the latest NHANES III report and the recommended defaults from the TRW.

When Not to Use the Screening Value

If your site conditions do not fit the model defaults, then other values may be more appropriate. In some cases, a non-industrial scenario is more appropriate at an industrial site such as trespasser or recreation. Also, in instances where the worker is not present on the site for 8 hours a day for 219 days out of the

year, the model should be run for these site conditions and may not be applicable

Some future industrial scenarios may be better defined by determining the anticipated population at the site.

It is important to note when revising the adult lead model based upon site-specific information that it is NOT recommended to base estimates of the blood lead levels and the geometric standard deviation that are stratified by both census region and race/ethnicity group because of the small sample sizes.

Adult Lead Model Industrial Worker Screening Level :

Model Parameter	**Plausible Range**	**Recommendation Based upon NHANES III Report**
95th Percentile PbB in fetus (ug/dL)	5-15	10
R (mean ratio of fetal to maternal PbB)	0.8-1.0	0.9
Individual geometric standard deviation (GSDi)	1.6-2.3	2.1-2.3
Baseline blood lead value (PbBo) (ug/dL)	1.6-2.3	1.5-1.7
Biokinetic slope factor (BKSF) (ug/dL per ug/day)	0.3-0.5	0.4
Soil Ingestion Rate (IRs)	0.05 g/day	0.05 g/day
Dust ingestion rate (IRd) (mg/day)	10-25	
Ratio of concentration in dust to that in soil (Ksd)	0.2-1.0	0.7
Soil ingestion frequency (EFs) (days/year)	100-350	219

Dust ingestion frequency (EFd) (days/year)	100-350	219
Absolute absorption fraction of lead in soil (AFs)	0.06-0.2	0.12
Absolute absorption fraction of lead in dust (AFd)	0.06-0.2	
Resulting soil concentration (mg/kg)		780-1,235

APPLICATION OF THE SCREENING VALUES TABLE

The decision to use the screening levels at a site will be driven by the potential benefits of having generic risk-based concentrations in the absence of site-specific risk assessments.

Potential Benefits:

Screening sites to determine further evaluation
Prioritizing multiple sites within a facility
Focusing future risk assessment efforts

Developing a Conceptual Site Model

The primary condition for use of the screening levels is that exposure pathways of concern and conditions at the site match those taken into account by the screening levels. Thus, it is always necessary to develop a conceptual site model (CSM) to identify likely contaminant source areas, exposure pathways, and potential receptors. This information can be used to determine the applicability of screening levels at the site and the need for additional information.

The final CSM diagram represents linkages among contaminant sources, release mechanisms, exposure pathways and routes and receptors based on historical information. It summarizes the understanding of the contamination problem.

As a final check, the CSM should answer the following questions:

- Are there potential ecological concerns?
- Is there potential for land use other than those covered by the screening levels (i.e., residential and industrial)?
- Are there other likely human exposure pathways that were not considered in development of the screening levels (e.g. raising beef, dairy, or other livestock)?
- Are there unusual site conditions (e.g. large areas of contamination, high fugitive dust levels, potential for indoor air contamination)?

Inorganic Background

Naturally-occurring inorganic background levels may be considered in the screening of environmental data. Background values are important in making risk-based decisions. Elevated naturally-occurring background, relative to risk-based screening levels, and/or widespread contaminant concentrations can complicate the extent of the evaluation effort. The issues are complex and present a challenge for regulators nationwide. Typical values of inorganic concentrations found in soils within Region 6 are described in the table below. The values have been compiled from technical sources and from Region 6 approved background study reports. This table has not been updated since 1997.

Contaminant	Background Concentration/ Range mg/kg		Contaminant	Background Concentration/ Range mg/kg
Aluminum	45000		Lead	10-18
Arsenic	1.1-16.7		Manganese	389-850
Barium	430		Mercury	0.1
Beryllium	0.5-2		Nickel	16
Boron	2-100		Selenium	0.2
Cadmium	0.01-1.0		Silver	0.01-5

Contaminant	Background Concentration/ Range mg/kg		Contaminant	Background Concentration/ Range mg/kg
Chromium	38		Tin	122
Cobalt	8		Vanadium	66
Copper	20		Zinc	22-50

Potential Problems

As with any risk-based tool, the potential exists for misapplication. In most cases the root cause will be a lack of understanding of the intended use of the screening levels table. In order to prevent misuse of screening levels, the following should be avoided:

- Applying screening levels to a site without adequately developing a conceptual site model that identifies relevant exposure pathways and exposure scenarios,
- Not considering background concentrations when choosing screening levels,
- Use of screening levels as cleanup levels without the consideration of other relevant criteria,
- Use of screening levels as cleanup levels without verifying numbers with a toxicologist/risk assessor,
- Use of outdated screening levels tables that have been superseded by more recent publications, and
- Not considering the effects from the presence of multiple chemicals.

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Contaminants	TOXICITY INFORMATION									SCREENING LEVELS												
Acetaldehyde				7.7E-03	i	2.6E-03	i			75-07-0	1.1E+01	c	2.3E+01	c	2.6E+01	c	8.7E-01	c				
Acetochlor		2.0E-02	i			2.0E-02	r			34256-82-1	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N		
Acetone		9.0E-01	i							67-64-1	7.0E+04	N	1.0E+05	max	1.0E+05	max			3.3E+04	N	8.0E-01	
Acetonitrile						1.7E-03	i			75-05-8	6.2E+02	N	2.0E+03	N	2.3E+03	N	6.2E+01	N				
Acetophenone		1.0E-01	i							98-86-2	1.7E+03	sat	1.7E+03	sat	1.7E+03	sat			3.7E+03	N		
Acrolein		5.0E-04	i			5.7E-06	i			107-02-8	1.0E-01	N	3.4E-01	N	3.7E-01	N	2.1E-02	N	4.2E-02	N		
Acrylamide	4.5E+00	i	2.0E-04	i	4.5E+00	i	2.0E-04	r		79-06-1	1.1E-01	c	1.3E+00	c	4.2E-01	c	1.5E-03	c	1.5E-02	c		
Acrylic acid			5.0E-01	i			2.9E-04	i		79-10-7	2.8E+04	N	1.0E+05	max	1.0E+05	max	1.0E+00	N	1.8E+04	N		
Acrylonitrile	5.4E-01	i	1.0E-03	h	2.4E-01	i	6.7E-04	i		107-13-1	2.1E-01	c	5.2E-01	c	5.5E-01	c	2.8E-02	c	3.9E-02	c		
Alachlor	8.1E-02	h	1.0E-02	i	8.0E-02	r	1.0E-02	r		2.0E+00 15972-60-8	6.0E+00	c	7.1E+01	c	2.4E+01	c	8.4E-02	c	8.4E-01	c		
Alar			1.5E-01	i			1.5E-01	r		1596-84-5	9.2E+03	N	1.0E+05	max	1.0E+05	max	5.5E+02	N	5.5E+03	N		
Aldicarb			1.0E-03	i			1.0E-03	r		7.0E+00 116-06-3	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
Aldicarb sulfone			1.0E-03	i			1.0E-03	r		7.0E+00 1646-88-4	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
Aldrin	1.7E+01	i	3.0E-05	i	1.7E+01	i	3.0E-05	r		309-00-2	2.9E-02	c	3.4E-01	c	1.1E-01	c	3.9E-04	c	4.0E-03	c	2.0E-02	
Allyl chloride			5.0E-02	h			2.9E-04	i		107-05-1	3.0E+03	N	9.7E+04	N	3.4E+04	N	1.0E+00	N	1.8E+03	N		
Aluminum			1.0E+00	p			1.4E-03	p		7429-90-5	7.6E+04	N	1.0E+05	max	1.0E+05	max	5.2E+00	N	3.7E+04	N		
Amdro			3.0E-04	i			3.0E-04	r		67485-29-4	1.8E+01	N	6.1E+02	N	2.1E+02	N	1.1E+00	N	1.1E+01	N		
4-Aminopyridine			2.0E-05	h			2.0E-05	r		504-24-5	1.2E+00	N	4.1E+01	N	1.4E+01	N	7.3E-02	N	7.3E-01	N		
Ammonia							2.9E-02	i		7664-41-7							1.0E+02	N				
Aniline	5.7E-03	i	7.0E-03	p	5.7E-03	r	2.9E-04	i	1.0E-03	62-53-3	8.5E+01	c	1.0E+03	c	3.4E+02	c	1.0E+00	N	1.2E+01	c		
Antimony and compounds			4.0E-04	i						6.0E+00 7440-36-0	3.1E+01	N	8.2E+02	N	4.5E+02	N			1.5E+01	N	3.0E-01	
Antimony pentoxide			5.0E-04	h						1314-60-9	3.9E+01	N	1.0E+03	N	5.7E+02	N			1.8E+01	N		
Antimony tetroxide			4.0E-04	h						1332-81-6	3.1E+01	N	8.2E+02	N	4.5E+02	N			1.5E+01	N		
Antimony trioxide			4.0E-04	h			6.7E-05	i		1309-64-4	3.1E+01	N	8.2E+02	N	4.5E+02	N	2.1E-01	N	1.5E+01	N		
Arsenic (noncancer endpoint)			3.0E-04	i						1.0E+01 7440-38-2	2.2E+01	N	6.1E+02	N	2.8E+02	N						
Arsenic (cancer endpoint)	1.5E+00	i	3.0E-04	i	1.5E+01	i				1.0E+01 7440-38-2	3.9E-01	c	3.8E+00	c	1.8E+00	c	4.5E-04	c	4.5E-02	c	1.0E+00	
Arsine							1.4E-06	i	5.0E-05	7784-42-1							5.2E-02	N				
Assure			9.0E-03	i			9.0E-03	r		76578-12-6	5.5E+02	N	1.8E+04	N	6.2E+03	N	3.3E+01	N	3.3E+02	N		
Atrazine	2.2E-01	h	3.5E-02	h	2.2E-01	r	3.5E-02	h		3.0E+00 1912-24-9	2.2E+00	c	2.6E+01	c	8.6E+00	c	3.1E-02	c	3.0E-01	c		
Azobenzene	1.1E-01	i			1.1E-01	i				103-33-3	4.4E+00	c	5.2E+01	c	1.7E+01	c	6.2E-02	c	6.1E-01	c		
Barium and compounds			7.0E-02	i			7.0E-02	r		2.0E+03 7440-39-3	5.5E+03	N	1.0E+05	max	7.9E+04	N	2.6E+02	N	2.6E+03	N	8.2E+01	
Baygon			4.0E-03	i			4.0E-03	r		114-26-1	2.4E+02	N	8.2E+03	N	2.7E+03	N	1.5E+01	N	1.5E+02	N		
Baythroid			2.5E-02	i			2.5E-02	r		68359-37-5	1.5E+03	N	5.1E+04	N	1.7E+04	N	9.1E+01	N	9.1E+02	N		
Bentazon			3.0E-02	i			3.0E-02	r		25057-89-0	1.8E+03	N	6.1E+04	N	2.1E+04	N	1.1E+02	N	1.1E+03	N		
Benzaldehyde			1.0E-01	i			1.0E-01	r		100-52-7	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N		
Benzene	5.5E-02	i	4.0E-03	i	2.7E-02	i	9.6E-03	i		5.0E+00 71-43-2	6.6E-01	c	1.5E+00	c	1.6E+00	c	2.5E-01	c	3.5E-01	c	2.0E-03	
Benzidine	2.3E+02	i	3.0E-03	i	2.3E+02	i	3.0E-03	r		92-87-5	2.1E-03	c	2.5E-02	c	8.3E-03	c	2.9E-05	c	2.9E-04	c		
Benzoic acid			4.0E+00	i			4.0E+00	i		65-85-0	1.0E+05	max	1.0E+05	max	1.0E+05	max	1.5E+04	N	1.5E+05	N	2.0E+01	
Benzyl alcohol			3.0E-01	h			3.0E-01	r		100-51-6	1.8E+04	N	1.0E+05	max	1.0E+05	max	1.1E+03	N	1.1E+04	N		
Benzyl chloride	1.7E-01	i			1.7E-01	r				100-44-7	8.9E-01	c	2.3E+00	c	2.4E+00	c	4.0E-02	c	6.6E-02	c		
Beryllium and compounds			2.0E-03	i	8.4E+00	i	5.7E-06	i		4.0E+00 7440-41-7	1.5E+02	N	2.2E+03	c	2.2E+03	N	8.0E-04	c	7.3E+01	N	3.0E+00	
1,1-Biphenyl			5.0E-02	i			5.0E-02	r		92-52-4	3.0E+03	N	3.0E+04	N	2.6E+04	N	1.8E+02	N	3.0E+02	N		
Bis(2-chloroethyl)ether	1.1E+00	i			1.2E+00	i				111-44-4	2.1E-01	c	6.2E-01	c	6.2E-01	c	5.8E-03	c	9.8E-03	c	2.0E-05	
Bis(2-chloroisopropyl)ether	7.0E-02	h	4.0E-02	i	3.5E-02	h	4.0E-02	r		39638-32-9	2.9E+00	c	8.1E+00	c	8.2E+00	c	1.9E-01	c	2.7E-01	c		
Bis(chloromethyl)ether	2.2E+02	i			2.2E+02	i				542-88-1	1.9E-04	c	4.4E-04	c	4.8E-04	c	3.1E-05	c	5.2E-05	c		
Bis(2-ethylhexyl)phthalate (DEHP)	1.4E-02	i	2.0E-02	i	1.4E-02	r	2.0E-02	r		6.0E+00 117-81-7	3.5E+01	c	4.1E+02	c	1.4E+02	c	4.8E-01	c	4.8E+00	c	1.8E+02	
Boron			9.0E-02	i			6.7E-03	h		7440-42-8	5.5E+03	N	1.0E+05	max	6.1E+04	N	2.1E+01	N	3.3E+03	N		
Boron trifluoride							2.0E-04	h		7637-07-2	1.0E+05	max	1.0E+05	max	1.0E+05	max	7.3E-01	N				
Bromobenzene			2.0E-02	p			3.3E-03	p	1.2E-07	108-86-1	7.3E+01	N	1.1E+02	N	1.2E+02	N	1.2E+01	N	2.3E+01	N		
Bromodichloromethane	6.2E-02	i	2.0E-02	i	6.2E-02	r	2.0E-02	r		75-27-4	1.0E+00	c	2.4E+00	c	2.6E+00	c	1.1E-01	c	1.8E-01	c	3.0E-02	
Bromoform (tribromomethane)	7.9E-03	i	2.0E-02	i	3.9E-03	i	2.0E-02	r		75-25-2	6.2E+01	c	7.2E+02	c	2.4E+02	c	1.7E+00	c	8.5E+00	c	4.0E-02	
Bromomethane			1.4E-03	i			1.4E-03	i		74-83-9	3.9E+00	N	1.3E+01	N	1.5E+01	N	5.2E+00	N	8.7E+00	N	1.0E-02	
Bromophos			5.0E-03	h			5.0E-03	r		2104-96-3	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N		
Bromoxynil			2.0E-02	i			2.0E-02	r		1689-84-5	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N		
1,3-Butadiene					1.1E-01	i	8.7E-04	i		106-99-0	6.2E-02	c	1.3E-01	c	1.5E-01	c	6.4E-02	c				
1-Butanol			1.0E-01	i			1.0E-01	r		71-36-3	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N	9.0E-01	
Butylate			5.0E-02	i			5.0E-02	r		2008-41-5	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N		

Region 6 Human Health Medium-Specific Screening Levels 2003-2004

Contaminants	TOXICITY INFORMATION									SCREENING LEVEL												
n-Butylbenzene			1.0E-02	n		1.0E-02	r		104-51-8	1.4E+02	N	2.4E+02	sat	2.4E+02	sat	3.7E+01	N	6.1E+01	N		
sec-Butylbenzene			1.0E-02	n		1.0E-02	r		135-98-8	1.1E+02	N	2.2E+02	sat	2.2E+02	sat	3.7E+01	N	6.1E+01	N		
tert-Butylbenzene			1.0E-02	n		1.0E-02	r		98-06-6	1.3E+02	N	3.9E+02	sat	3.9E+02	sat	3.7E+01	N	6.1E+01	N		
Butyl benzyl phthalate			2.0E-01	i		2.0E-01	r		85-68-7	2.4E+02	sat	2.4E+02	sat	2.4E+02	sat	7.3E+02	N	7.3E+03	N	8.1E+02	
Cadmium and compounds			5.0E-04	i	6.3E+00	i	5.7E-05	x	5.0E+00	7440-43-9	3.9E+01	N	1.0E+03	N	5.6E+02	N	1.1E-03	C	1.8E+01	N	4.0E-01	
Caprolactam			5.0E-01	i		5.0E-01	r			105-60-2	3.1E+04	N	1.0E+05	max	1.0E+05	max	1.8E+03	N	1.8E+04	N		
Captan	3.5E-03	h	1.3E-01	i	3.5E-03	r	1.3E-01	r		133-06-2	1.4E+02	C	1.6E+03	C	5.5E+02	C	1.9E+00	C	1.9E+01	C		
Carbaryl			1.0E-01	i		1.0E-01	r			63-25-2	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N		
Carbazole	2.0E-02	h			2.0E-02	r				86-74-8	2.4E+01	C	2.9E+02	C	9.6E+01	C	3.4E-01	C	3.4E+00	C	3.0E-02	
Carbofuran			5.0E-03	i		5.0E-03	r		4.0E+01	1563-66-2	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N		
Carbon disulfide			1.0E-01	i		2.0E-01	i	7.0E-01		75-15-0	7.2E+02	sat	7.2E+02	sat	7.2E+02	sat	7.3E+02	N	1.0E+03	N	2.0E+00	
Carbon tetrachloride	1.3E-01	i	7.0E-04	i	5.3E-02	i	5.7E-04	x	5.0E+00	56-23-5	2.4E-01	C	5.3E-01	C	5.8E-01	C	1.3E-01	C	1.7E-01	C	3.0E-03	
Carbosulfan			1.0E-02	i		1.0E-02	r			55285-14-8	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N		
Chloral			1.0E-01	i						302-17-0	6.1E+03	N	1.0E+05	max	6.8E+04	N			3.7E+03	N		
Chloranil	4.0E-01	h			4.0E-01	r				118-75-2	1.2E+00	C	1.4E+01	C	4.8E+00	C	1.7E-02	C	1.7E-01	C		
Chlordane	3.5E-01	i	5.0E-04	i	3.5E-01	i	2.0E-04	i	2.0E+00	57-74-9	1.6E+00	C	1.6E+01	C	7.2E+00	C	1.9E-02	C	1.9E-01	C	5.0E-01	
Chlorine			1.0E-01	i						7782-50-5	7.8E+03	N	1.0E+05	max	1.0E+05	max			3.7E+03	N		
Chlorine dioxide							5.7E-05	i		10049-04-4							2.1E-01	N				
Chloroacetic acid			2.0E-03	h		2.0E-03	r			79-11-8	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N		
4-Chloroaniline			4.0E-03	i		4.0E-03	r			106-47-8	2.4E+02	N	8.2E+03	N	2.7E+03	N	1.5E+01	N	1.5E+02	N	3.0E-02	
Chlorobenzene			2.0E-02	i		1.7E-02	n	8.0E-02	1.0E+02	108-90-7	3.2E+02	N	5.5E+02	N	6.0E+02	N	6.3E+01	N	1.1E+02	N	7.0E-02	
Chlorobenzilate	2.7E-01	h	2.0E-02	i	2.7E-01	h	2.0E-02	r		510-15-6	1.8E+00	C	2.1E+01	C	7.1E+00	C	2.5E-02	C	2.5E-01	C		
p-Chlorobenzoic acid			2.0E-01	h		2.0E-01	r			74-11-3	1.2E+04	N	1.0E+05	max	1.0E+05	max	7.3E+02	N	7.3E+03	N		
4-Chlorobenzotrifluoride			2.0E-02	h		2.0E-02	r			98-56-6	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N		
2-Chloro-1,3-butadiene			2.0E-02	h		2.0E-03	h			126-99-8	3.6E+00	N	1.2E+01	N	1.3E+01	N	7.3E+00	N	1.4E+01	N		
1-Chlorobutane			4.0E-01	h		4.0E-01	r			109-69-3	4.8E+02	sat	4.8E+02	sat	4.8E+02	sat	1.5E+03	N	2.4E+03	N		
1-Chloro-1,1-difluoroethane			1.4E+01	r		1.4E+01	i	5.0E+01		75-68-3	3.4E+02	sat	3.4E+02	sat	3.4E+02	sat	5.2E+04	N	8.7E+04	N		
Chlorodifluoromethane			1.4E+01	r		1.4E+01	i	5.0E+01		75-45-6	3.4E+02	sat	3.4E+02	sat	3.4E+02	sat	5.1E+04	N	8.5E+04	N		
Chloroform			1.0E-02	i	8.1E-02	i	1.3E-02	p	4.5E-02		67-66-3	2.5E-01	C	5.2E-01	C	5.8E-01	C	8.4E-02	C	7.5E+01	N	3.0E-02	
Chloromethane	1.3E-02	h			8.3E-03	h	2.6E-02	i	3.0E-01		74-87-3	1.2E+00	C	2.7E+00	C	2.9E+00	C	1.1E+00	C	1.5E+00	C		
4-Chloro-2-methylaniline	5.8E-01	h			5.8E-01	r				95-69-2	8.4E-01	C	9.9E+00	C	3.3E+00	C	1.2E-02	C	1.2E-01	C		
beta-Chloronaphthalene			8.0E-02	i		8.0E-02	r			91-58-7	3.9E+03	N	2.7E+04	N	2.6E+04	N	2.9E+02	N	4.9E+02	N		
o-Chloronitrobenzene	9.7E-03	p	1.0E-03	p	9.7E-03	r	2.0E-05	p		88-73-3	4.1E+00	N	1.4E+01	N	1.6E+01	N	7.3E-02	N	1.5E-01	N		
p-Chloronitrobenzene	6.7E-03	p	1.0E-03	p	6.7E-03	r	1.7E-04	p		100-00-5	2.3E+01	N	1.0E+02	N	1.1E+02	N	6.2E-01	N	1.2E+00	N		
2-Chlorophenol			5.0E-03	i		5.0E-03	r			95-57-8	6.4E+01	N	2.4E+02	N	2.6E+02	N	1.8E+01	N	3.0E+01	N	2.0E-01	
2-Chloropropane			2.0E-02	r		2.0E-02	h			75-29-6	1.7E+02	N	6.0E+02	N	6.6E+02	N	1.0E+02	N	1.7E+02	N		
o-Chlorotoluene			2.0E-02	i		2.0E-02	r			95-49-8	1.6E+02	N	5.1E+02	sat	5.1E+02	sat	7.3E+01	N	1.2E+02	N		
Chlorpyrifos			3.0E-03	r		3.0E-03	r			2921-88-2	1.8E+02	N	6.1E+03	N	2.1E+03	N	1.1E+01	N	1.1E+02	N		
Chlorpyrifos-methyl			1.0E-02	h		1.0E-02	r			5598-13-0	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N		
Chromium III			1.5E+00	i					1.0E+02	16065-83-1	1.0E+05	max	1.0E+05	max	1.0E+05	max			5.5E+04	N		
Total Chromium (1/6 ratio Cr VI/Cr III)					4.2E+01	i			1.0E+02	7440-47-3	2.1E+02	C	4.5E+02	C	5.0E+02	C	1.6E-04	C			2.0E+00	
Chromium VI			3.0E-03	i	2.9E+02	i	2.9E-05	i	1.0E+02	18540-29-9	3.0E+01	C	6.4E+01	C	7.1E+01	C	2.3E-05	C	1.1E+02	N	2.0E+00	
Cobalt			2.0E-02	p	9.8E+00	p	5.7E-06	p		7440-48-4	9.0E+02	C	1.9E+03	C	2.1E+03	C	6.9E-04	C	7.3E+02	N		
Coke Oven Emissions					2.2E+00	i				8007-45-2	4.1E+03	C	6.7E+03	C	9.6E+03	C	3.1E-03	C				
Copper and compounds			3.7E-02	h					1.3E+03	7440-50-8	2.9E+03	N	7.6E+04	N	4.2E+04	N			1.4E+03	N		
Crotonaldehyde	1.9E+00	h			1.9E+00	x				123-73-9	5.3E-03	C	1.1E-02	C	1.3E-02	C	3.5E-03	C	5.9E-03	C		
Cumene (isopropylbenzene)			1.0E-01	i		1.1E-01	i	4.0E-01		98-82-8	3.7E+02	N	5.2E+02	N	5.8E+02	N	4.0E+02	N	6.6E+02	N		
Cyanazine	8.4E-01	h	2.0E-03	h	8.4E-01	r	2.0E-03	r		21725-46-2	5.8E-01	C	6.8E+00	C	2.3E+00	C	8.0E-03	C	8.0E-02	C		
Cyanides										n/a												
Barium cyanide			1.0E-01	h						542-62-1	6.1E+03	N	1.0E+05	max	6.8E+04	N			3.7E+03	N		
Calcium cyanide			4.0E-02	i						592-01-8	2.4E+03	N	8.2E+04	N	2.7E+04	N			1.5E+03	N		
Copper cyanide			5.0E-03	i						544-92-3	3.1E+02	N	1.0E+04	N	3.4E+03	N			1.8E+02	N		
Cyanogen			4.0E-02	i						460-19-5	3.1E+03	N	8.2E+04	N	4.5E+04	N			1.5E+03	N		
Cyanogen bromide			9.0E-02	i						506-68-3	7.0E+03	N	1.0E+05	max	1.0E+05	max			3.3E+03	N		
Cyanogen chloride			5.0E-02	i						506-77-4	3.9E+03	N	1.0E+05	max	5.7E+04	N			1.8E+03	N		
Free cyanide			2.0E-02	i					2.0E+02	57-12-5	1.2E+03	N	4.1E+04	N	1.4E+04	N			7.3E+02	N	2.0E+00	
Hydrogen cyanide			2.0E-02	i			8.6E-04	i	3.0E-03		74-90-8	2.5E+01	N	3.5E+01	N	3.9E+01	N	3.1E+00	N	6.2E+00	N	

Contaminants	TOXICITY INFORMATION										SCREENING LEVELS													
Potassium cyanide			5.0E-02 i								151-50-8	3.1E+03	N	1.0E+05	max	3.4E+04	N			1.8E+03	N		
Potassium silver cyanide			2.0E-01 i								506-61-6	1.2E+04	N	1.0E+05	max	1.0E+05	max			7.3E+03	N		
Silver cyanide			1.0E-01 i								506-64-9	6.1E+03	N	1.0E+05	max	6.8E+04	N			3.7E+03	N		
Sodium cyanide			4.0E-02 i								143-33-9	2.4E+03	N	8.2E+04	N	2.7E+04	N			1.5E+03	N		
Zinc cyanide			5.0E-02 i								557-21-1	3.1E+03	N	1.0E+05	max	3.4E+04	N			1.8E+03	N		
Cyclohexanone			5.0E+00 i			5.0E+00 r					108-94-1	1.0E+05	max	1.0E+05	max	1.0E+05	max	1.8E+04	N	1.8E+05	N		
Cyhalothrin/Karate			5.0E-03 i			5.0E-03 r					68085-85-8	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N		
Cypermethrin			1.0E-02 i			1.0E-02 r					52315-07-8	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N		
Dacthal			1.0E-02 i			1.0E-02 r					1861-32-1	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N		
Dalapon			3.0E-02 i			3.0E-02 r				2.0E+02	75-99-0	1.8E+03	N	6.1E+04	N	2.1E+04	N	1.1E+02	N	1.1E+03	N		
DDD	2.4E-01 i			2.4E-01 r							72-54-8	2.4E+00	c	2.4E+01	c	1.1E+01	c	2.8E-02	c	2.8E-01	c	8.0E-01	
DDE	3.4E-01 i			3.4E-01 r							72-55-9	1.7E+00	c	1.7E+01	c	7.8E+00	c	2.0E-02	c	2.0E-01	c	3.0E+00	
DDT	3.4E-01 i		5.0E-04 i	3.4E-01 i		5.0E-04 r					50-29-3	1.7E+00	c	1.7E+01	c	7.8E+00	c	2.0E-02	c	2.0E-01	c	2.0E+00	
Diazinon			9.0E-04 h			9.0E-04 r					333-41-5	5.5E+01	N	1.8E+03	N	6.2E+02	N	3.3E+00	N	3.3E+01	N		
Dibenzofuran			2.0E-03 n			2.0E-03 r					132-64-9	1.5E+02	N	2.5E+03	N	1.7E+03	N	7.3E+00	N	1.2E+01	N		
1,4-Dibromobenzene			1.0E-02 i			1.0E-02 r					106-37-6	8.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N		
Dibromochloromethane	8.4E-02 i		2.0E-02 i	8.4E-02 r		2.0E-02 r					124-48-1	1.0E+00	c	2.4E+00	c	2.6E+00	c	8.0E-02	c	1.3E-01	c	2.0E-02	
1,2-Dibromo-3-chloropropane	1.4E+00 h		5.7E-05 r	2.4E-03 h		5.7E-05 i	2.0E-04				96-12-8	4.5E-01	c	4.0E+00	c	2.2E+00	c	2.1E-01	N	4.8E-02	c		
1,2-Dibromoethane	8.5E+01 i		5.7E-05 r	7.7E-01 i		5.7E-05 h					106-93-4	6.9E-03	c	4.8E-02	c	3.1E-02	c	8.7E-03	c	7.6E-04	c		
Dibutyl phthalate			1.0E-01 i			1.0E-01 r					84-74-2	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N	2.7E+02	
Dicamba			3.0E-02 i			3.0E-02 r					1918-00-9	1.8E+03	N	6.1E+04	N	2.1E+04	N	1.1E+02	N	1.1E+03	N		
1,2-Dichlorobenzene			9.0E-02 i			6.6E-03 n					95-50-1	1.5E+02	N	3.7E+02	sat	3.7E+02	sat	3.1E+01	N	6.1E+01	N	9.0E-01	
1,3-Dichlorobenzene			3.0E-02 n			2.5E-03 n				8.0E+02	541-73-1	4.4E+01	N	1.4E+02	N	1.6E+02	N	8.9E+00	N	1.8E+01	N		
1,4-Dichlorobenzene	2.4E-02 h		3.0E-02 n	2.4E-02 r		2.3E-01 i	8.0E-01			7.5E+01	106-46-7	3.2E+00	c	7.5E+00	c	8.1E+00	c	2.8E-01	c	4.7E-01	c	1.0E-01	
3,3-Dichlorobenzidine	4.5E-01 i			4.5E-01 r							91-94-1	1.1E+00	c	1.3E+01	c	4.3E+00	c	1.5E-02	c	1.5E-01	c	3.0E-04	
1,4-Dichloro-2-butene	9.3E+00 i			9.3E+00 h							764-41-0	7.9E-03	c	1.8E-02	c	2.0E-02	c	7.2E-04	c	1.2E-03	c		
Dichlorodifluoromethane			2.0E-01 i			5.7E-02 h					75-71-8	9.4E+01	N	3.1E+02	N	3.4E+02	sat	2.1E+02	N	3.9E+02	N		
1,1-Dichloroethane			1.0E-01 h			1.4E-01 h					75-34-3	5.9E+02	N	2.1E+03	N	2.3E+03	N	5.2E+02	N	8.1E+02	N	1.0E+00	
1,2-Dichloroethane (EDC)	9.1E-02 i		2.0E-02 h	9.1E-02 i		1.4E-03 n				5.0E+00	107-06-2	3.5E-01	c	7.7E-01	c	8.4E-01	c	7.4E-02	c	1.2E-01	c	1.0E-03	
1,1-Dichloroethylene			5.0E-02 i			5.7E-02 i	2.0E-01			7.0E+00	75-35-4	2.8E+02	N	4.3E+02	N	4.7E+02	N	2.1E+02	N	3.4E+02	N	3.0E-03	
1,2-Dichloroethylene (cis)			1.0E-02 p			1.0E-02 r				7.0E+01	156-59-2	4.3E+01	N	1.5E+02	N	1.6E+02	N	3.7E+01	N	6.1E+01	N	2.0E-02	
1,2-Dichloroethylene (trans)			2.0E-02 i			2.0E-02 r				1.0E+02	156-60-5	6.3E+01	N	2.1E+02	N	2.4E+02	N	7.3E+01	N	1.2E+02	N	3.0E-02	
2,4-Dichlorophenol			3.0E-03 i			3.0E-03 r					120-83-2	1.8E+02	N	6.1E+03	N	2.1E+03	N	1.1E+01	N	1.1E+02	N	5.0E-02	
4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)			5.0E-03 i			8.0E-03 r					94-82-6	4.9E+02	N	1.6E+04	N	5.5E+03	N	2.9E+01	N	2.9E+02	N		
2,4-Dichlorophenoxyacetic Acid (2,4-D)			1.0E-02 i			1.0E-02 r				7.0E+01	94-75-7	6.9E+02	N	2.0E+04	N	8.5E+03	N	3.7E+01	N	3.7E+02	N		
1,2-Dichloropropane	8.8E-02 h		1.1E-03 r	8.6E-02 r		1.1E-03 i				5.0E+00	78-87-5	3.5E-01	c	7.7E-01	c	8.5E-01	c	9.9E-02	c	1.6E-01	c	1.0E-03	
1,3-Dichloropropene	1.0E-01 i		3.0E-02 i	1.4E-02 i		5.7E-03 i					542-75-6	7.0E-01	c	1.6E+00	c	1.7E+00	c	4.8E-01	c	4.0E-01	c	2.0E-04	
2,3-Dichloropropanol			3.0E-03 i			3.0E-03 r					616-23-9	1.8E+02	N	6.1E+03	N	2.1E+03	N	1.1E+01	N	1.1E+02	N		
Dichlorvos	2.9E-01 i		5.0E-04 i	2.9E-01 r		1.4E-04 i	5.0E-04				62-73-7	1.7E+00	c	2.0E+01	c	6.6E+00	c	2.3E-02	c	2.3E-01	c		
Dicofol	4.4E-01 k			4.4E-01 r							115-32-2	1.1E+00	c	1.3E+01	c	4.4E+00	c	1.5E-02	c	1.5E-01	c		
Dicyclopentadiene			3.0E-02 h			5.7E-05 h					77-73-6	5.5E-01	N	1.8E+00	N	2.0E+00	N	2.1E-01	N	4.2E-01	N		
Dieldrin	1.6E+01 i		5.0E-05 i	1.6E+01 i		5.0E-05 r					60-57-1	3.0E-02	c	3.6E-01	c	1.2E-01	c	4.2E-04	c	4.2E-03	c	2.0E-04	
Diethylene glycol, monobutyl ether			1.0E-02 p			6.7E-03 p					112-34-5	6.1E+02	N	2.0E+04	N	6.8E+03	N	2.1E+01	N	3.7E+02	N		
Diethylene glycol, monoethyl ether			8.0E-02 p			8.8E-04 p					111-90-0	3.7E+03	N	1.0E+05	max	4.1E+04	N	3.1E+00	N	2.2E+03	N		
Di(2-ethylhexyl)adipate	1.2E-03 i		6.0E-01 i	1.2E-03 r		6.0E-01 r				4.0E+02	103-23-1	4.1E+02	c	4.8E+03	c	1.6E+03	c	5.6E+00	c	5.6E+01	c		
Diethyl phthalate			8.0E-01 i			8.0E-01 r					84-66-2	4.9E+04	N	1.0E+05	max	1.0E+05	max	2.9E+03	N	2.9E+04	N		
Diethylstilbestrol	4.7E+03 h			4.7E+03 r							56-53-1	1.0E-04	c	1.2E-03	c	4.1E-04	c	1.4E-06	c	1.4E-05	c		
Difenzoquat (Avenge)			8.0E-02 i			8.0E-02 r					43222-48-6	4.9E+03	N	1.0E+05	max	5.5E+04	N	2.9E+02	N	2.9E+03	N		
1,1-Difluoroethane			1.1E+01 r			1.1E+01 i	4.0E+01				75-37-6	1.0E+05	max	1.0E+05	max	1.0E+05	max	4.2E+04	N	6.9E+04	N		
Diisopropyl methylphosphonate			8.0E-02 i			8.0E-02 r					1445-75-6	4.9E+03	N	1.0E+05	max	5.5E+04	N	2.9E+02	N	2.9E+03	N		
3,3'-Dimethoxybenzidine	1.4E-02 h			1.4E-02 r							119-90-4	3.5E+01	c	4.1E+02	c	1.4E+02	c	4.8E-01	c	4.8E+00	c		
Dimethylamine			5.7E-06 r			5.7E-06 x					124-40-3	6.7E-02	N	2.5E-01	N	2.7E-01	N	2.1E-02	N	3.5E-02	N		
N-N-Dimethylaniline			2.0E-03 i			2.0E-03 r					121-69-7	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N		
2,4-Dimethylaniline	7.5E-01 h			7.5E-01 r							95-68-1	6.5E-01	c	7.6E+00	c	2.6E+00	c	9.0E-03	c	9.0E-02	c		
2,4-Dimethylaniline hydrochloride	5.8E-01 h			5.8E-01 r							21436-96-4	8.4E-01	c	9.9E+00	c	3.3E+00	c	1.2E-02	c	1.2E-01	c		
3,3'-Dimethylbenzidine	2.3E+00 p			2.3E+00 r							119-93-7	2.1E-01	c	2.5E+00	c	8.3E-01	c	2.9E-03	c	2.9E-02	c		
1,1-Dimethylhydrazine	2.6E+00 x			3.5E+00 x							57-14-7	1.9E-01	c	2.2E+00	c	7.4E-01	c	1.9E-03	c	2.6E-02	c		

Region 6 Human Health Medium Specific Screening Levels (MSSL) [illegible]

Contaminants	PHYSICAL INFORMATION																							
	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
1,2-Dimethylhydrazine	3.7E+01	x			3.7E+01	x				540-73-8	1.3E-02	c	1.5E-01	c	5.2E-02	c	1.8E-04	c	1.8E-03	c		
Dimethylphenethylamine			1.0E-03	n			1.0E-03	r		122-09-8	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
2,4-Dimethylphenol			2.0E-02	i			2.0E-02	r		105-67-9	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N	4.0E-01	
2,6-Dimethylphenol			6.0E-04	i			6.0E-04	r		576-26-1	3.7E+01	N	1.2E+03	N	4.1E+02	N	2.2E+00	N	2.2E+01	N		
3,4-Dimethylphenol			1.0E-03	i			1.0E-03	r		95-65-8	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
Dimethyl phthalate			1.0E+01	h			1.0E+01	r		131-11-3	1.0E+05	max	1.0E+05	max	1.0E+05	max	3.7E+04	N	3.7E+05	N		
4,6-Dinitro-o-cyclohexyl phenol			2.0E-03	i			2.0E-03	r		131-89-5	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N		
1,2-Dinitrobenzene			1.0E-04	p			1.0E-04	r		528-29-0	6.1E+00	N	2.0E+02	N	6.8E+01	N	3.7E-01	N	3.7E+00	N		
1,3-Dinitrobenzene			1.0E-04	i			1.0E-04	r		99-65-0	6.1E+00	N	2.0E+02	N	6.8E+01	N	3.7E-01	N	3.7E+00	N		
1,4-Dinitrobenzene			1.0E-04	p			1.0E-04	r		100-25-4	6.1E+00	N	2.0E+02	N	6.8E+01	N	3.7E-01	N	3.7E+00	N		
2,4-Dinitrophenol			2.0E-03	i			2.0E-03	r		51-28-5	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N	1.0E-02	
Dinitrotoluene mixture	6.8E-01	i			6.8E-01	r				25321-14-6	7.2E-01	c	8.4E+00	c	2.8E+00	c	9.9E-03	c	9.9E-02	c	4.0E-05	
2,4-Dinitrotoluene			2.0E-03	i			2.0E-03	r		121-14-2	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N	4.0E-05	
2,6-Dinitrotoluene			1.0E-03	h			1.0E-03	r		606-20-2	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N	3.0E-05	
Dinoseb			1.0E-03	i			1.0E-03	r	7.0E+00	88-85-7	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
di-n-Octyl phthalate			4.0E-02	p			4.0E-02	r		117-84-0	2.4E+03	N	8.2E+04	N	2.7E+04	N	1.5E+02	N	1.5E+03	N	1.0E+04	
1,4-Dioxane	1.1E-02	i			1.1E-02	r				123-91-1	4.4E+01	c	5.2E+02	c	1.7E+02	c	6.1E-01	c	6.1E+00	c		
Dioxin (2,3,7,8-TCDD)	1.5E+05	h			1.5E+05	h				1746-01-6	3.9E-06	c	3.8E-05	c	1.8E-05	c	4.5E-08	c	4.5E-07	c		
Diphenylamine			2.5E-02	i			2.5E-02	r		122-39-4	1.5E+03	N	5.1E+04	N	1.7E+04	N	9.1E+01	N	9.1E+02	N		
1,2-Diphenylhydrazine	8.0E-01	i			7.7E-01	i				122-66-7	6.1E-01	c	7.2E+00	c	2.4E+00	c	8.7E-03	c	8.4E-02	c		
Diphenyl sulfone			3.0E-03	p			3.0E-03	r		127-63-9	1.8E+02	N	6.1E+03	N	2.1E+03	N	1.1E+01	N	1.1E+02	N		
Diquat			2.2E-03	i			2.2E-03	r	2.0E+01	85-00-7	1.3E+02	N	4.5E+03	N	1.5E+03	N	8.0E+00	N	8.0E+01	N		
Disulfoton			4.0E-05	i			4.0E-05	r		298-04-4	2.4E+00	N	8.2E+01	N	2.7E+01	N	1.5E-01	N	1.5E+00	N		
1,4-Dithiane			1.0E-02	i			1.0E-02	r		505-29-3	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N		
Diuron			2.0E-03	i			2.0E-03	r		330-54-1	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N		
Endosulfan			6.0E-03	i			6.0E-03	r		115-29-7	3.7E+02	N	1.2E+04	N	4.1E+03	N	2.2E+01	N	2.2E+02	N	9.0E-01	
Endothall			2.0E-02	i			2.0E-02	r	1.0E+02	145-73-3	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N		
Endrin			3.0E-04	i			3.0E-04	r	2.0E+00	72-20-8	1.8E+01	N	6.1E+02	N	2.1E+02	N	1.1E+00	N	1.1E+01	N	5.0E-02	
Epichlorohydrin	9.9E-03	i	2.0E-03	h	4.2E-03	i	2.9E-04	i		106-89-8	7.6E+00	N	2.6E+01	N	2.9E+01	N	1.0E+00	N	2.0E+00	N		
Ethion			5.0E-04	i			5.0E-04	r		563-12-2	3.1E+01	N	1.0E+03	N	3.4E+02	N	1.8E+00	N	1.8E+01	N		
2-Ethoxyethanol			4.0E-01	h			5.7E-02	i	2.0E-01	110-80-5	2.4E+04	N	1.0E+05	max	1.0E+05	max	2.1E+02	N	1.5E+04	N		
2-Ethoxyethanol acetate			3.0E-01	h			3.0E-01	r		111-15-9	1.8E+04	N	1.0E+05	max	1.0E+05	max	1.1E+03	N	1.1E+04	N		
Ethyl acetate			9.0E-01	i			9.0E-01	r		141-78-6	1.9E+04	N	3.7E+04	sat	3.7E+04	sat	3.3E+03	N	5.5E+03	N		
Ethylbenzene			1.0E-01	i			2.9E-01	i	1.0E+00	100-41-4	2.3E+02	sat	2.3E+02	sat	2.3E+02	sat	1.1E+03	N	1.3E+03	N	7.0E-01	
Ethyl chloride	2.9E-03	n	4.0E-01	n	2.9E-03	r	2.9E+00	i	1.0E+01	75-00-3	3.0E+00	c	6.5E+00	c	7.2E+00	c	2.3E+00	c	3.9E+00	c		
Ethylene diamine			9.0E-02	p			9.0E-02	r		107-15-3	5.5E+03	N	1.0E+05	max	6.2E+04	N	3.3E+02	N	3.3E+03	N		
Ethylene glycol			2.0E+00	i			2.0E+00	r		107-21-1	1.0E+05	max	1.0E+05	max	1.0E+05	max	7.3E+03	N	7.3E+04	N		
Ethylene glycol, monobutyl ether			5.0E-01	i					1.3E+01	111-76-2	3.1E+04	N	1.0E+05	max	1.0E+05	max			1.8E+04	N		
Ethylene oxide	1.0E+00	h			3.5E-01	h				75-21-8	1.4E-01	c	3.6E-01	c	3.8E-01	c	1.9E-02	c	2.4E-02	c		
Ethylene thiourea (ETU)	1.1E-01	h	6.0E-05	i	1.1E-01	r	6.0E-05	r		96-45-7	4.4E+00	c	5.2E+01	c	1.7E+01	c	6.1E-02	c	6.1E-01	c		
Ethyl ether			2.0E-01	i			2.0E-01	r		60-29-7	1.8E+03	sat	1.8E+03	sat	1.8E+03	sat	7.3E+02	N	1.2E+03	N		
Ethyl methacrylate			9.0E-02	h			9.0E-02	r		97-63-2	1.4E+02	sat	1.4E+02	sat	1.4E+02	sat	3.3E+02	N	5.5E+02	N		
Fenamiphos			2.5E-04	i			2.5E-04	r		22224-92-6	1.5E+01	N	5.1E+02	N	1.7E+02	N	9.1E-01	N	9.1E+00	N		
Fluometuron			1.3E-02	i			1.3E-02	r		2164-17-2	7.9E+02	N	2.7E+04	N	8.9E+03	N	4.7E+01	N	4.7E+02	N		
Fluoride			8.0E-02	i					4.0E+03	16984-48-8	3.7E+03	N	1.0E+05	max	4.1E+04	N			2.2E+03	N		
Fomesafen	1.9E-01	i			1.9E-01	r				72178-02-0	2.6E+00	c	3.0E+01	c	1.0E+01	c	3.5E-02	c	3.5E-01	c		
Fonofos			2.0E-03	i			2.0E-03	r		944-22-9	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N		
Formaldehyde	4.60E-02	r	1.5E-01	i	4.6E-02	i	1.5E-01	r		50-00-0	1.1E+01	c	1.2E+02	c	4.2E+01	c	1.5E-01	c	1.5E+00	c		
Formic Acid			2.0E+00	h			6.0E-04	p		64-18-6	1.0E+05	max	1.0E+05	max	1.0E+05	max	3.1E+00	N	7.3E+04	N		
Furan			1.0E-03	i			1.0E-03	r		110-00-9	2.5E+00	N	8.6E+00	N	9.5E+00	N	3.7E+00	N	6.1E+00	N		
Furazolidone	3.8E+00	h			3.8E+00	r				67-45-8	1.3E-01	c	1.5E+00	c	5.0E-01	c	1.8E-03	c	1.8E-02	c		
Furfural			3.0E-03	i			1.4E-02	h		98-01-1	1.8E+02	N	6.1E+03	N	2.1E+03	N	5.2E+01	N	1.1E+02	N		
Glycidaldehyde			4.0E-04	i			2.9E-04	h		765-34-4	2.4E+01	N	8.2E+02	N	2.7E+02	N	1.0E+00	N	1.5E+01	N		
Glyphosate			1.0E-01	i			1.0E-01	r	7.0E+02	1071-83-6	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N		
Heptachlor	4.5E+00	i	5.0E-04	i	4.6E+00	i	5.0E-04	r	1.0E-01	76-44-8	1.1E-01	c	1.3E+00	c	4.3E-01	c	1.5E-03	c	1.5E-02	c	1.0E+00	
Heptachlor epoxide	9.1E+00	i	1.3E-05	i	9.1E+00	i	1.3E-05	r	2.0E-01	1024-57-3	5.3E-02	c	6.3E-01	c	2.1E-01	c	7.4E-04	c	7.4E-03	c	3.0E-02	
Hexabromobenzene			2.0E-03	i			2.0E-03	r		87-82-1	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N		

Contaminants	TOXICITY INFORMATION							SCREENING LEVELS															
Hexachlorobenzene	1.6E+00	i	6.0E-04	i	1.6E+00	i	6.0E-04	r		1.0E+00	118-74-1	3.0E-01	c	3.6E+00	c	1.2E+00	c	4.2E-03	c	4.2E-02	c	1.0E-01	
Hexachlorobutadiene	7.8E-02	i	2.0E-04	h	7.7E-02	i	2.0E-04	r			87-68-3	6.2E+00	c	7.3E+01	c	2.5E+01	c	8.7E-02	c	8.6E-01	c	1.0E-01	
HCH (alpha)	6.3E+00	i			6.3E+00	i					319-84-6	9.0E-02	c	9.1E-01	c	4.0E-01	c	1.1E-03	c	1.1E-02	c	3.0E-05	
HCH (beta)	1.8E+00	i			1.8E+00	i					319-85-7	3.2E-01	c	3.2E+00	c	1.4E+00	c	3.7E-03	c	3.7E-02	c	1.0E-04	
HCH (gamma) Lindane	1.3E+00	h	3.0E-04	i	1.3E+00	r	3.0E-04	r		2.0E-01	58-89-9	4.4E-01	c	4.4E+00	c	1.9E+00	c	5.2E-03	c	5.2E-02	c	5.0E-04	
HCH-technical	1.8E+00	i			1.8E+00	i					608-73-1	3.2E-01	c	3.2E+00	c	1.4E+00	c	3.8E-03	c	3.7E-02	c	1.0E-04	
Hexachlorocyclopentadiene			5.0E-03	i			5.7E-05	i		5.0E+01	77-47-4	3.7E+02	N	1.2E+04	N	4.1E+03	N	2.1E-01	N	2.2E+02	N	2.0E+01	
Hexachlorodibenzo-p-dioxin mixture (HxCD	6.2E+03	i			4.8E+03	i					19408-74-3	7.8E-05	c	9.2E-04	c	3.1E-04	c	1.5E-06	c	1.1E-05	c		
Hexachloroethane	1.4E-02	i	1.0E-03	i	1.4E-02	i	1.0E-03	r			67-72-1	3.5E+01	c	4.1E+02	c	1.4E+02	c	4.8E-01	c	4.8E+00	c	2.0E-02	
Hexachlorophene			3.0E-04	i			3.0E-04	r			70-30-4	1.8E+01	N	6.1E+02	N	2.1E+02	N	1.1E+00	N	1.1E+01	N		
Hexahydro-1,3,5-trinitro-1,3,5-triazine	1.1E-01	i	3.0E-03	i	1.1E-01	r	3.0E-03	r			121-82-4	4.4E+00	c	5.2E+01	c	1.7E+01	c	6.1E-02	c	6.1E-01	c		
1,6-Hexamethylene diisocyanate			2.9E-06	r			2.9E-06	i			822-06-0	1.7E-01	N	5.8E+00	N	2.0E+00	N	1.0E-02	N	1.0E-01	N		
n-Hexane			1.1E+01	p			5.7E-02	i			110-54-3	1.1E+02	sat	1.1E+02	sat	1.1E+02	sat	2.1E+02	N	4.2E+02	N		
Hexazinone			3.3E-02	i			3.3E-02	r			51235-04-2	2.0E+03	N	6.7E+04	N	2.3E+04	N	1.2E+02	N	1.2E+03	N		
Hydrazine, hydrazine sulfate	3.0E+00	i			1.7E+01	i					302-01-2	1.6E-01	c	1.9E+00	c	6.4E-01	c	3.9E-04	c	2.2E-02	c		
Hydrogen chloride							5.7E-03	i			7647-01-0	1.0E+05	max	1.0E+05	max	1.0E+05	max	2.1E+01	N				
Hydrogen sulfide			3.0E-03	i			5.7E-04	i			7783-06-4	1.8E+02	N	6.1E+03	N	2.1E+03	N	2.1E+00	N	1.1E+02	N		
p-Hydroquinone	5.6E-02	p	4.0E-02	p	5.6E-02	r	4.0E-02	r			123-31-9	8.7E+00	c	1.0E+02	c	3.4E+01	c	1.2E-01	c	1.2E+00	c		
Iron			3.0E-01	n							7439-89-6	2.3E+04	N	1.0E+05	max	1.0E+05	max			1.1E+04	N		
Isobutanol			3.0E-01	i			3.0E-01	r			78-83-1	1.3E+04	N	4.0E+04	sat	4.0E+04	sat	1.1E+03	N	1.8E+03	N		
Isophorone	9.5E-04	i	2.0E-01	i	9.5E-04	r	2.0E-01	r			78-59-1	5.1E+02	c	6.0E+03	c	2.0E+03	c	7.1E+00	c	7.1E+01	c	3.0E-02	
Isopropalin			1.5E-02	i			1.5E-02	r			33820-53-0	9.2E+02	N	3.1E+04	N	1.0E+04	N	5.5E+01	N	5.5E+02	N		
Isopropyl methyl phosphonic acid			1.0E-01	i			1.0E-01	r			1832-54-8	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N		
Kepone	8.0E+00	p	2.0E-04	p							143-50-0	6.1E-02	c	7.2E-01	c	2.4E-01	c			8.4E-03	c		
Lead	Screening Levels Based on EPA Models, IEUBK (1994) and TRW (1996)									1.5E+01	7439-92-1	4.0E+02		8.0E+02		8.0E+02				1.5E+01			
Lead (tetraethyl)			1.0E-07	i							78-00-2	6.1E-03	N	2.0E-01	N	6.8E-02	N			3.7E-03	N		
Lithium			2.0E-02	x							7439-93-2	1.8E+03	N	4.1E+04	N	2.3E+04	N			7.3E+02	N		
Malathion			2.0E-02	i			2.0E-02	r			121-75-5	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N		
Maleic anhydride			1.0E-01	i			1.0E-01	r			108-31-6	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N		
Manganese and compounds			4.7E-02	i			1.4E-05	i			7439-96-5	3.2E+03	N	4.7E+04	N	3.5E+04	N	5.1E-02	N	1.7E+03	N		
Mephosfolan			9.0E-05	h			9.0E-05	r			950-10-7	5.5E+00	N	1.8E+02	N	6.2E+01	N	3.3E-01	N	3.3E+00	N		
Mepiquat			3.0E-02	i			3.0E-02	r			24307-26-4	1.8E+03	N	6.1E+04	N	2.1E+04	N	1.1E+02	N	1.1E+03	N		
2-Mercaptobenzothiazole	2.9E-02	h	1.0E-01	n	2.9E-02	r	1.0E-01	r			149-30-4	1.7E+01	c	2.0E+02	c	6.6E+01	c	2.3E-01	c	2.3E+00	c		
Mercury and compounds			3.0E-04	i						2.0E+00	7487-94-7	2.3E+01	N	6.1E+02	N	3.4E+02	N			1.1E+01	N		
Mercury (elemental)							8.6E-05	i	3.0E-04		7439-97-6							3.1E-01	N			1.0E-01	
Mercury (methyl)			1.0E-04	i							22967-92-6	6.1E+00	N	2.0E+02	N	6.8E+01	N			3.7E+00	N		
Methacrylonitrile			1.0E-04	i			2.0E-04	h			126-98-7	2.1E+00	N	8.8E+00	N	9.3E+00	N	7.3E-01	N	1.0E+00	N		
Methanol			5.0E-01	i			5.0E-01	r			67-56-1	3.1E+04	N	1.0E+05	max	1.0E+05	max	1.8E+03	N	1.8E+04	N		
Methidathion			1.0E-03	i			1.0E-03	r			950-37-8	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
Methoxychlor			5.0E-03	i			5.0E-03	r		4.0E+01	72-43-5	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N	8.0E+00	
Methyl acetate			1.0E+00	h			1.0E+00	r			79-20-9	2.2E+04	N	9.6E+04	N	1.0E+05	max	3.7E+03	N	6.1E+03	N		
Methyl acrylate			3.0E-02	h			3.0E-02	r			96-33-3	7.0E+01	N	2.3E+02	N	2.6E+02	N	1.1E+02	N	1.8E+02	N		
2-Methylaniline (o-toluidine)	2.4E-01	h			2.4E-01	r					95-53-4	2.0E+00	c	2.4E+01	c	8.0E+00	c	2.8E-02	c	2.8E-01	c		
2-Methyl-4-chlorophenoxyacetic acid			5.0E-04	i			5.0E-04	r			94-74-6	3.1E+01	N	1.0E+03	N	3.4E+02	N	1.8E+00	N	1.8E+01	N		
4-(2-Methyl-4-chlorophenoxy) butyric acid (MCPB)			1.0E-02	i			1.0E-02	r			94-81-5	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N		
2-(2-Methyl-4-chlorophenoxy) propionic acid			1.0E-03	i			1.0E-03	r			93-65-2	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
2-(2-Methyl-1,4-chlorophenoxy) propionic acid (MCPP)			1.0E-03	i			1.0E-03	r			16484-77-8	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N		
Methylcyclohexane			8.5E-01	r			8.6E-01	h			108-87-2	1.4E+02	sat	1.4E+02	sat	1.4E+02	sat	3.1E+03	N	5.2E+03	N		
4,4'-Methylene bis(2-chloroaniline)	1.3E-01	h	7.0E-04	h	1.3E-01	h	7.0E-04	r			101-14-4	3.7E+00	c	4.4E+01	c	1.5E+01	c	5.2E-02	c	5.2E-01	c		
4,4'-Methylene bis(N,N'-dimethyl)aniline	4.6E-02	i			4.6E-02	r					101-61-1	1.1E+01	c	1.2E+02	c	4.2E+01	c	1.5E-01	c	1.5E+00	c		
Methylene bromide			1.0E-02	h			1.0E-02	r			74-95-3	1.4E+02	N	5.5E+02	N	5.9E+02	N	3.7E+01	N	6.1E+01	N		
Methylene chloride	7.5E-03	i	6.0E-02	i	1.6E-03	i	8.6E-01	h			75-09-2	8.9E+00	c	2.1E+01	c	2.2E+01	c	4.1E+00	c	4.3E+00	c	1.0E-03	
4,4'-Methylenediphenyl isocyanate			1.7E-04	r			1.7E-04	i			101-68-8	1.0E+01	N	3.5E+02	N	1.2E+02	N	6.2E-01	N	6.2E+00	N		
Methyl ethyl ketone			6.0E-01	i			1.4E+00	i	5.0E+00		78-93-3	3.2E+04	N	3.4E+04	sat	3.4E+04	sat	5.2E+03	N	7.1E+03	N		
Methyl hydrazine	1.1E+00	h			1.1E+00	r					60-34-4	4.4E-01	c	5.2E+00	c	1.7E+00	c	6.1E-03	c	6.1E-02	c		
Methyl isobutyl ketone			8.0E-02	h			8.6E-01	i	3.0E+00		108-10-1	5.8E+03	N	1.7E+04	sat	1.7E+04	sat	3.1E+03	N	2.0E+03	N		
Methyl mercaptan			5.7E-04	r			5.7E-04	n	2.0E-03		74-93-1	3.5E+01	N	1.2E+03	N	3.9E+02	N	2.1E+00	N	2.1E+01	N		

Contaminants	TOXICITY INFORMATION																						
													SCREENING LEVEL										
Methyl methacrylate			1.4E+00	i			2.0E-01	i			80-62-6	2.2E+03	N	2.7E+03	sat	2.7E+03	sat	7.3E+02	N	1.4E+03	N	
2-Methyl-5-nitroaniline	3.3E-02	h			3.3E-02	r					99-55-8	1.5E+01	C	1.7E+02	C	5.8E+01	C	2.0E-01	C	2.0E+00	C	
Methyl parathion			2.5E-04	i			2.5E-04	r			298-00-0	1.5E+01	N	5.1E+02	N	1.7E+02	N	9.1E-01	N	9.1E+00	N	
2-Methylphenol			5.0E-02	x			5.0E-02	r			95-48-7	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N	8.0E-01
3-Methylphenol			5.0E-02	x			5.0E-02	r			108-39-4	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N	
4-Methylphenol			5.0E-03	h			5.0E-03	r			106-44-5	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N	
Methyl phosphonic acid			2.0E-02	p			2.0E-02	r			993-13-5	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N	
Methyl styrene (mixture)			6.0E-03	h			1.1E-02	h			25013-15-4	1.3E+02	N	5.6E+02	N	6.0E+02	N	4.2E+01	N	6.0E+01	N	
Methyl styrene (alpha)			7.0E-02	h			7.0E-02	r			98-83-9	6.8E+02	sat	6.8E+02	sat	6.8E+02	sat	2.6E+02	N	4.3E+02	N	
Methyl tertbutyl ether (MTBE)							8.6E-01	i	3.0E+00		1634-04-4							3.1E+03	N	2.0E+01		
Metolachlor (Dual)			1.5E-01	i			1.5E-01	r			51218-45-2	9.2E+03	N	1.0E+05	max	1.0E+05	max	5.5E+02	N	5.5E+03	N	
Mirex	1.8E+00	h	2.0E-04	i	1.8E+00	r	2.0E-04	r			2385-85-5	2.7E-01	C	3.2E+00	C	1.1E+00	C	3.7E-03	C	3.7E-02	C	
Molybdenum			5.0E-03	i							7439-98-7	3.9E+02	N	1.0E+04	N	5.7E+03	N			1.8E+02	N	
Monochloramine			1.0E-01	h			1.0E-01	h			10599-90-3	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N	
Naled			2.0E-03	i			2.0E-03	r			300-76-5	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N	
Nickel and compounds			2.0E-02	i						1.0E+02	7440-02-0	1.6E+03	N	4.1E+04	N	2.3E+04	N			7.3E+02	N	7.0E+00
Nickel refinery dust					8.4E-01	i					n/a	1.1E+04	C	2.2E+04	C	2.5E+04	C	8.0E-03	C			
Nickel subsulfide					1.7E+00	i					12035-72-2	5.2E+03	C	1.1E+04	C	1.2E+04	C	4.0E-03	C			
Nitrate	Tap Water Screening Level Based on Infant NOAEL (see IRIS)									1.0E+04	14797-55-8									1.0E+04		
Nitric Oxide			1.0E-01	x							10102-43-9	6.1E+03	N	1.0E+05	max	6.8E+04	N			3.7E+03	N	
Nitrite	Tap Water Screening Level Based on Infant NOAEL (see IRIS)									1.0E+03	14797-65-0									1.0E+03		
2-Nitroaniline			3.0E-05	p			2.9E-05	p			88-74-4	1.8E+00	N	6.1E+01	N	2.1E+01	N	1.0E-01	N	1.1E+00	N	
Nitrobenzene			5.0E-04	i			5.7E-04	h			98-95-3	2.0E+01	N	1.1E+02	N	1.1E+02	N	2.1E+00	N	3.4E+00	N	7.0E-03
Nitrofurantoin			7.0E-02	h			7.0E-02	r			67-20-9	4.3E+03	N	1.0E+05	max	4.8E+04	N	2.6E+02	N	2.6E+03	N	
Nitrofurazone	1.5E+00	h			9.4E+00	h					59-87-0	3.2E-01	C	3.8E+00	C	1.3E+00	C	7.2E-04	C	4.5E-02	C	
Nitrogen dioxide			1.0E+00	x							101102-44-1	6.1E+04	N	1.0E+05	max	1.0E+05	max			3.7E+04	N	
4-Nitrophenol			8.0E-03	n			8.0E-03	r			100-02-7	4.9E+02	N	1.6E+04	N	5.5E+03	N	2.9E+01	N	2.9E+02	N	
2-Nitropropane	9.4E+00	r	5.7E-03	r	9.4E+00	h	5.7E-03	i	2.0E-02		79-46-9	6.8E-02	C	6.1E-01	C	3.4E-01	C	7.2E-04	C	1.2E-03	C	
N-Nitrosodi-n-butylamine	5.4E+00	i			5.6E+00	i					924-16-3	2.4E-02	C	6.2E-02	C	6.5E-02	C	1.2E-03	C	2.0E-03	C	
N-Nitrosodiethanolamine	2.8E+00	i			2.8E+00	r					1116-54-7	1.7E-01	C	2.0E+00	C	6.8E-01	C	2.4E-03	C	2.4E-02	C	
N-Nitrosodiethylamine	1.5E+02	i			1.5E+02	i					55-18-5	3.2E-03	C	3.8E-02	C	1.3E-02	C	4.5E-05	C	4.5E-04	C	
N-Nitrosodimethylamine	5.1E+01	i	8.0E-06	p	4.9E+01	i					62-75-9	9.5E-03	C	1.1E-01	C	3.8E-02	C	1.4E-04	C	1.3E-03	C	
N-Nitrosodiphenylamine	4.9E-03	i	2.0E-02	p	4.9E-03	r					86-30-6	9.9E+01	C	1.2E+03	C	3.9E+02	C	1.4E+00	C	1.4E+01	C	6.0E-02
N-Nitroso di-n-propylamine	7.0E+00	i			7.0E+00	r					621-64-7	7.0E-02	C	8.2E-01	C	2.7E-01	C	9.6E-04	C	9.6E-03	C	2.0E-06
N-Nitroso-N-methylethylamine	2.2E+01	i			2.2E+01	r					10595-95-6	2.2E-02	C	2.6E-01	C	8.7E-02	C	3.1E-04	C	3.1E-03	C	
N-Nitrosopyrrolidine	2.1E+00	i			2.1E+00	i					930-55-2	2.3E-01	C	2.7E+00	C	9.1E-01	C	3.1E-03	C	3.2E-02	C	
m-Nitrotoluene			2.0E-02	p			2.0E-02	r			99-08-1	1.6E+03	N	4.1E+04	N	2.3E+04	N	7.3E+01	N	1.2E+02	N	
o-Nitrotoluene			2.3E-01	p			2.3E-01	r			99-08-1	1.8E+04	N	1.0E+05	max	1.0E+05	max	8.4E+02	N	1.4E+03	N	
p-Nitrotoluene	1.7E-02	p	1.0E-02	p			1.0E-02	r			99-99-0	3.8E+01	C	3.4E+02	C	1.9E+02	C	3.7E+01	N	4.0E+00	C	
NuStar			7.0E-04	i			7.0E-04	r			85509-19-9	4.3E+01	N	1.4E+03	N	4.8E+02	N	2.6E+00	N	2.6E+01	N	
Octahydro-1357-tetranitro-1357- tetrazocine (HMX)			5.0E-02	i			5.0E-02	r			2691-41-0	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N	
Oryzalin			5.0E-02	i			5.0E-02	r			19044-88-3	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N	
Oxadiazon			5.0E-03	i			5.0E-03	r			19666-30-9	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N	
Oxamyl			2.5E-02	i			2.5E-02	r		2.0E+02	23135-22-0	1.5E+03	N	5.1E+04	N	1.7E+04	N	9.1E+01	N	9.1E+02	N	
Oxyfluorfen			3.0E-03	i			3.0E-03	r			42874-03-3	1.8E+02	N	6.1E+03	N	2.1E+03	N	1.1E+01	N	1.1E+02	N	
Paraquat			4.5E-03	i			4.5E-03	r			4685-14-7	2.7E+02	N	9.2E+03	N	3.1E+03	N	1.6E+01	N	1.6E+02	N	
Parathion			6.0E-03	h			6.0E-03	r			56-38-2	3.7E+02	N	1.2E+04	N	4.1E+03	N	2.2E+01	N	2.2E+02	N	
Pentachlorobenzene			8.0E-04	i			8.0E-04	r			608-93-5	4.9E+01	N	1.6E+03	N	5.5E+02	N	2.9E+00	N	2.9E+01	N	
Pentachloronitrobenzene	2.8E-01	h	3.0E-03	i	2.8E-01	r	3.0E-03	r			82-68-8	1.9E+00	C	2.2E+01	C	7.4E+00	C	2.6E-02	C	2.6E-01	C	
Pentachlorophenol	1.2E-01	i	3.0E-02	i	1.2E-01	r	3.0E-02	r		1.0E+00	87-86-5	3.0E+00	C	4.8E+01	C	1.0E+01	C	5.6E-02	C	5.6E-01	C	1.0E-03
Perchlorate			1.0E-04	n							7601-90-3	7.8E+00	N	2.0E+02	N	1.1E+02	N			3.7E+00	N	
Permethrin			5.0E-02	i			5.0E-02	r			52645-53-1	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N	
Phenol			3.0E-01	i							108-95-2	1.8E+04	N	1.0E+05	max	1.0E+05	max			1.1E+04	N	5.0E+00
Phenothiazine			2.0E-03	n			2.0E-03	r			92-84-2	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N	
m-Phenylenediamine			6.0E-03	i			6.0E-03	r			108-45-2	3.7E+02	N	1.2E+04	N	4.1E+03	N	2.2E+01	N	2.2E+02	N	
p-Phenylenediamine			1.9E-01	h			1.9E-01	r			106-50-3	1.2E+04	N	1.0E+05	max	1.0E+05	max	6.9E+02	N	6.9E+03	N	
Phenylmercuric acetate			8.0E-05	i			8.0E-05	r			62-38-4	4.9E+00	N	1.6E+02	N	5.5E+01	N	2.9E-01	N	2.9E+00	N	

Contaminants	TOXICITY INFORMATION																						
2-Phenylphenol	1.9E-03	h			1.9E-03	r					90-43-7	2.5E+02	c	2.9E+03	c	9.9E+02	c	3.5E+00	c	3.5E+01	c	
Phosphine			3.0E-04	h			8.6E-05	i	3.0E-04		7803-51-2	1.8E+01	N	6.1E+02	N	2.1E+02	N	3.1E-01	N	1.1E+01	N	
Phosphoric acid							2.9E-03	i			7664-38-2							1.0E+01	N			
Phosphorus (white)			2.0E-05	i							7723-14-0	1.8E+00	N	4.1E+01	N	2.3E+01	N			7.3E-01	N	
p-Phthalic acid			1.0E+00	h			1.0E+00	r			100-21-0	6.1E+04	N	1.0E+05	max	1.0E+05	max	3.7E+03	N	3.7E+04	N	
Phthalic anhydride			2.0E+00	i			3.4E-02	h			85-44-9	1.0E+05	max	1.0E+05	max	1.0E+05	max	1.2E+02	N	7.3E+04	N	
Polybrominated biphenyls	8.9E+00	h	7.0E-06	h	8.9E+00	r	7.0E-06	r				5.5E-02	c	6.4E-01	c	2.2E-01	c	7.6E-04	c	7.6E-03	c	
Polychlorinated biphenyls (PCBs)	2.0E+00	i			2.0E+00	r				5.0E-01	1336-36-3	2.2E-01	c	2.9E+00	c	8.3E-01	c	3.4E-03	c	3.4E-02	c	
Aroclor 1016	7.0E-02	i	7.0E-05	i	7.0E-02	i	7.0E-05	r			12674-11-2	3.9E+00	N	8.2E+01	c	2.4E+01	c	9.6E-02	c	9.6E-01	c	
Aroclor 1221	2.0E+00	i			2.0E+00	i					11104-28-2	2.2E-01	c	2.9E+00	c	8.3E-01	c	3.4E-03	c	3.4E-02	c	
Aroclor 1232	2.0E+00	i			2.0E+00	i					11141-16-5	2.2E-01	c	2.9E+00	c	8.3E-01	c	3.4E-03	c	3.4E-02	c	
Aroclor 1242	2.0E+00	i			2.0E+00	i					53469-21-9	2.2E-01	c	2.9E+00	c	8.3E-01	c	3.4E-03	c	3.4E-02	c	
Aroclor 1248	2.0E+00	i			2.0E+00	i					12672-29-6	2.2E-01	c	2.9E+00	c	8.3E-01	c	3.4E-03	c	3.4E-02	c	
Aroclor 1254	2.0E+00	i	2.0E-05	i	2.0E+00	i	2.0E-05	r			11097-69-1	2.2E-01	c	2.9E+00	c	8.3E-01	c	3.4E-03	c	3.4E-02	c	
Aroclor 1260	2.0E+00	i			2.0E+00	i					11096-82-5	2.2E-01	c	2.9E+00	c	8.3E-01	c	3.4E-03	c	3.4E-02	c	
Polynuclear aromatic hydrocarbons																							
Acenaphthene			6.0E-02	i			6.0E-02	r			83-32-9	3.7E+03	N	3.8E+04	N	3.3E+04	N	2.2E+02	N	3.7E+02	N	2.9E+01
Anthracene			3.0E-01	i			3.0E-01	r			120-12-7	2.2E+04	N	1.0E+05	max	1.0E+05	max	1.1E+03	N	1.8E+03	N	5.9E+02
Benz[a]anthracene	7.3E-01	n			3.1E-01	n					56-55-3	6.2E-01	c	7.8E+00	c	2.3E+00	c	2.2E-02	c	9.2E-02	c	8.0E-02
Benzo[b]fluoranthene	7.3E-01	n			3.1E-01	n					205-99-2	6.2E-01	c	7.8E+00	c	2.3E+00	c	2.2E-02	c	9.2E-02	c	2.0E-01
Benzo[k]fluoranthene	7.3E-02	n			3.1E-02	n					207-08-9	6.2E+00	c	7.8E+01	c	2.3E+01	c	2.2E-01	c	9.2E-01	c	2.0E+00
Benzo[a]pyrene	7.3E+00	i			3.1E+00	n				2.0E-01	50-32-8	6.2E-02	c	7.8E-01	c	2.3E-01	c	2.2E-03	c	9.2E-03	c	4.0E-01
Chrysene	7.3E-03	n			3.1E-03	n					218-01-9	6.2E+01	c	7.8E+02	c	2.3E+02	c	2.2E+00	c	9.2E+00	c	8.0E+00
Dibenz[ah]anthracene	7.3E+00	n			3.1E+00	n					53-70-3	6.2E-02	c	7.8E-01	c	2.3E-01	c	2.2E-03	c	9.2E-03	c	8.0E-02
Fluoranthene			4.0E-02	i			4.0E-02	r			206-44-0	2.3E+03	N	8.2E+04	N	2.4E+04	N	1.5E+02	N	1.5E+03	N	2.1E+02
Fluorene			4.0E-02	i			4.0E-02	r			86-73-7	2.6E+03	N	3.3E+04	N	2.6E+04	N	1.5E+02	N	2.4E+02	N	2.8E+01
Indeno[1,2,3-cd]pyrene	7.3E-01	n			3.1E-01	n					193-39-5	6.2E-01	c	7.8E+00	c	2.3E+00	c	2.2E-02	c	9.2E-02	c	7.0E-01
Naphthalene			2.0E-02	i			8.6E-04	i	3.0E-03		91-20-3	1.2E+02	N	1.9E+02	N	2.1E+02	N	3.1E+00	N	6.2E+00	N	4.0E+00
Pyrene			3.0E-02	i			3.0E-02	r			129-00-0	2.3E+03	N	5.4E+04	N	3.2E+04	N	1.1E+02	N	1.8E+02	N	2.1E+02
Prometon			1.5E-02	i			1.5E-02	r			1610-18-0	9.2E+02	N	3.1E+04	N	1.0E+04	N	5.5E+01	N	5.5E+02	N	
Prometryn			4.0E-03	i			4.0E-03	r			7287-19-6	2.4E+02	N	8.2E+03	N	2.7E+03	N	1.5E+01	N	1.5E+02	N	
Propachlor			1.3E-02	i			1.3E-02	r			1918-16-7	7.9E+02	N	2.7E+04	N	8.9E+03	N	4.7E+01	N	4.7E+02	N	
Propanil			5.0E-03	i			5.0E-03	r			709-98-8	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N	
Propargite			2.0E-02	i			2.0E-02	r			2312-35-8	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N	
Propargyl alcohol			2.0E-03	i			2.0E-03	r			107-19-7	1.2E+02	N	4.1E+03	N	1.4E+03	N	7.3E+00	N	7.3E+01	N	
Propazine			2.0E-02	i			2.0E-02	r			139-40-2	1.2E+03	N	4.1E+04	N	1.4E+04	N	7.3E+01	N	7.3E+02	N	
Propiconazole			1.3E-02	i			1.3E-02	r			60207-90-1	7.9E+02	N	2.7E+04	N	8.9E+03	N	4.7E+01	N	4.7E+02	N	
n-Propylbenzene			1.0E-02	n			1.0E-02	r			103-65-1	1.4E+02	N	2.4E+02	sat	2.4E+02	sat	3.7E+01	N	6.1E+01	N	
Propylene glycol			5.0E-01	p			8.8E-04	p			57-55-6	3.0E+04	N	1.0E+05	max	1.0E+05	max	3.1E+00	N	1.8E+04	N	
Propylene glycol, monoethyl ether			7.0E-01	h							111-35-3	4.3E+04	N	1.0E+05	max	1.0E+05	max			2.6E+04	N	
Propylene glycol, monomethyl ether			7.0E-01	h			5.7E-01	i	2.0E+00		107-98-2	4.3E+04	N	1.0E+05	max	1.0E+05	max	2.1E+03	N	2.6E+04	N	
Propylene oxide	2.4E-01	i	8.8E-03	r	1.3E-02	i	8.8E-03	i			75-56-9	1.9E+00	c	9.1E+00	c	7.3E+00	c	5.2E-01	c	2.2E-01	c	
Pursuit			2.5E-01	i			2.5E-01	r			81335-77-5	1.5E+04	N	1.0E+05	max	1.0E+05	max	9.1E+02	N	9.1E+03	N	
Pyridine			1.0E-03	i			1.0E-03	r			110-86-1	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N	
Quinoline	3.0E+00	i			1.2E+01	r					91-22-5	1.6E-01	c	1.9E+00	c	6.4E-01	c	5.6E-04	c	2.2E-02	c	
RDX (Cyclonite)	1.1E-01	i	3.0E-03	i	1.1E-01	r	3.0E-03	r			121-82-4	4.4E+00	c	5.2E+01	c	1.7E+01	c	6.1E-02	c	6.1E-01	c	
Resmethrin			3.0E-02	i			3.0E-02	r			10453-86-8	1.8E+03	N	6.1E+04	N	2.1E+04	N	1.1E+02	N	1.1E+03	N	
Ronnel			5.0E-02	h			5.0E-02	r			299-84-3	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N	
Rotenone			4.0E-03	i			4.0E-03	r			83-79-4	2.4E+02	N	8.2E+03	N	2.7E+03	N	1.5E+01	N	1.5E+02	N	
Selenious Acid			5.0E-03	i							7783-00-8	3.1E+02	N	1.0E+04	N	3.4E+03	N			1.8E+02	N	
Selenium			5.0E-03	i						5.0E+01	7782-49-2	3.9E+02	N	1.0E+04	N	5.7E+03	N			1.8E+02	N	3.0E-01
Silver and compounds			5.0E-03	i							7440-22-4	3.9E+02	N	1.0E+04	N	5.7E+03	N			1.8E+02	N	2.0E+00
Simazine	1.2E-01	h	5.0E-03	i	1.2E-01	r	2.0E-03	r		4.0E+00	122-34-9	4.1E+00	c	4.8E+01	c	1.6E+01	c	5.6E-02	c	5.6E-01	c	
Sodium azide			4.0E-03	i			4.0E-03	r			26628-22-8	2.4E+02	N	8.2E+03	N	2.7E+03	N	1.5E+01	N	1.5E+02	N	
Sodium diethyldithiocarbamate	2.7E-01	h	3.0E-02	i	2.7E-01	r	3.0E-02	r			148-18-5	1.8E+00	c	2.1E+01	c	7.1E+00	c	2.5E-02	c	2.5E-01	c	
Sodium fluoroacetate			2.0E-06	i			2.0E-06	r			62-74-8	1.2E+00	N	4.1E+01	N	1.4E+01	N	7.3E-02	N	7.3E-01	N	
Sodium metavanadate			1.0E-03	h			1.0E-03	r			13718-26-8	6.1E+01	N	2.0E+03	N	6.8E+02	N	3.7E+00	N	3.7E+01	N	

Region 6 Human Health Medium Specific Screening Levels 2005 - 2007 Contaminants	TOXICITY INFORMATION									SCREENING LEVELS												
Strontium, stable			8.0E-01 i						7440-24-6	4.7E+04	N	1.0E+05	max	1.0E+05	max			2.2E+04	N	
Strychnine			3.0E-04 i			3.0E-04 r			57-24-9	1.8E+01	N	6.1E+02	N	2.1E+02	N	1.1E+00	N	1.1E+01	N	
Styrene			2.0E-01 i			2.9E-01 i	1.0E+00	1.0E+02	100-42-5	1.7E+03	sat	1.7E+03	sat	1.7E+03	sat	1.1E+03	N	1.6E+03	N	2.0E-01
2,3,7,8-TCDD (dioxin)	1.5E+05 h			1.5E+05 h					3.0E-05 1746-01-6	3.9E-06	c	3.8E-05	c	1.8E-05	c	4.5E-06	c	4.5E-07	c	
1,2,4,5-Tetrachlorobenzene			3.0E-04 i			3.0E-04 r			95-94-3	1.8E+01	N	6.1E+02	N	2.1E+02	N	1.1E+00	N	1.1E+01	N	
1,1,1,2-Tetrachloroethane	2.6E-02 i		3.0E-02 i	2.6E-02 i		3.0E-02 r			630-20-6	3.0E+00	c	7.1E+00	c	7.6E+00	c	2.6E-01	c	4.3E-01	c	
1,1,2,2-Tetrachloroethane	2.0E-01 i		8.0E-02 p	2.0E-01 i		8.0E-02 r			79-34-5	3.8E-01	c	9.0E-01	c	9.7E-01	c	3.3E-02	c	5.5E-02	c	2.0E-04
Tetrachloroethylene (PCE)	5.4E-01 p		1.0E-02 i	2.1E-02 o		1.1E-01 n	4.0E-01	5.0E+00	127-18-4	5.5E-01	c	1.8E+00	c	1.7E+00	c	3.3E-01	c	1.0E-01	c	3.0E-03
2,3,4,6-Tetrachlorophenol			3.0E-02 i			3.0E-02 r			58-90-2	1.8E+03	N	6.1E+04	N	2.1E+04	N	1.1E+02	N	1.1E+03	N	
p,a,a,a-Tetrachlorotoluene	2.0E+01 h			2.0E+01 r					5216-25-1	2.4E-02	c	2.9E-01	c	9.6E-02	c	3.4E-04	c	3.4E-03	c	
Tetrachlorovinphos	2.4E-02 h		3.0E-02 i	2.4E-02 r		3.0E-02 r			961-11-5	2.0E+01	c	2.4E+02	c	8.0E+01	c	2.8E-01	c	2.8E+00	c	
Tetrahydrofuran	7.6E-03 n		2.0E-01 h	6.8E-03		6.8E-02 n	3.0E-01		109-99-9	6.4E+01	c	7.5E+02	c	2.5E+02	c	9.9E-01	c	8.8E+00	c	
Thallic oxide			7.0E-05 h						1314-32-5	5.5E+00	N	1.4E+02	N	7.9E+01	N			2.6E+00	N	
Thallium acetate			9.0E-05 i					2.0E+00	563-68-8	7.0E+00	N	1.8E+02	N	1.0E+02	N			3.3E+00	N	4.0E-01
Thallium carbonate			8.0E-05 i					2.0E+00	6533-73-9	6.3E+00	N	1.6E+02	N	9.1E+01	N			2.9E+00	N	4.0E-01
Thallium chloride			8.0E-05 i					2.0E+00	7791-12-0	6.3E+00	N	1.6E+02	N	9.1E+01	N			2.9E+00	N	4.0E-01
Thallium nitrate			9.0E-05 i					2.0E+00	10102-45-1	7.0E+00	N	1.8E+02	N	1.0E+02	N			3.3E+00	N	4.0E-01
Thallium selenite			9.0E-05 x					2.0E+00	12039-52-0	7.0E+00	N	1.8E+02	N	1.0E+02	N			3.3E+00	N	4.0E-01
Thallium sulfate			8.0E-05 i					2.0E+00	7446-18-6	6.3E+00	N	1.6E+02	N	9.1E+01	N			2.9E+00	N	4.0E-01
Thiobencarb			1.0E-02 i			1.0E-02 r			28249-77-6	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N	
Thiocyanate			1.0E-04 n			1.0E-04 r			N/A	6.1E+00	N	2.0E+02	N	6.8E+01	N	3.7E-01	N	3.7E+00	N	
Tin and compounds			8.0E-01 h						n/a	4.7E+04	N	1.0E+05	max	1.0E+05	max			2.2E+04	N	
Toluene			2.0E-01 i			1.1E-01 h		1.0E+03	108-88-3	5.2E+02	sat	5.2E+02	sat	5.2E+02	sat	4.0E+02	N	7.2E+02	N	6.0E-01
Toluene-2,4-diamine	3.2E+00 h			3.2E+00 r					95-80-7	1.5E-01	c	1.8E+00	c	6.0E-01	c	2.1E-03	c	2.1E-02	c	
Toluene-2,5-diamine			8.0E-01 h			8.0E-01 r			95-70-5	3.7E+04	N	1.0E+05	max	1.0E+05	max	2.2E+03	N	2.2E+04	N	
Toluene-2,6-diamine			2.0E-01 h			2.0E-01 r			823-40-5	1.2E+04	N	1.0E+05	max	1.0E+05	max	7.3E+02	N	7.3E+03	N	
p-Toluidine	1.9E-01 i			1.9E-01 r					106-49-0	2.6E+00	c	3.0E+01	c	1.0E+01	c	3.5E-02	c	3.5E-01	c	
Toxaphene	1.1E+00 i			1.1E+00 i				3.0E+00	8001-35-2	4.4E-01	c	5.2E+00	c	1.7E+00	c	6.0E-03	c	6.1E-02	c	2.0E+00
1,2,4-Tribromobenzene			5.0E-03 i			5.0E-03 r			615-54-3	3.1E+02	N	1.0E+04	N	3.4E+03	N	1.8E+01	N	1.8E+02	N	
Tributyltin oxide (TBTO)			3.0E-04 i						56-35-9	1.8E+01	N	6.1E+02	N	2.1E+02	N			1.1E+01	N	
2,4,6-Trichloroaniline	3.4E-02 h			3.4E-02 r					634-93-5	1.4E+01	c	1.7E+02	c	5.6E+01	c	2.0E-01	c	2.0E+00	c	
1,2,4-Trichlorobenzene			1.0E-02 i			1.1E-03 p		7.0E+01	120-82-1	6.8E+01	N	2.4E+02	N	2.6E+02	N	4.2E+00	N	8.2E+00	N	3.0E-01
1,1,1-Trichloroethane			2.8E-02 n			8.3E-01 p	2.2E+00	2.0E+02	71-55-6	1.4E+03	sat	1.4E+03	sat	1.4E+03	sat	2.3E+03	N	6.4E+02	N	1.0E-01
1,1,2-Trichloroethane	5.7E-02 i		4.0E-03 i	5.6E-02 i		4.0E-03 r		5.0E+00	79-00-5	8.4E-01	c	1.9E+00	c	2.1E+00	c	1.2E-01	c	2.0E-01	c	9.0E-04
Trichloroethylene (TCE)	4.0E-01 n		3.0E-04 n	4.0E-01 n		1.1E-02 n	4.0E-02	5.0E+00	79-01-6	4.3E-02	c	9.2E-02	c	1.0E-01	c	1.7E-02	c	2.8E-02	c	3.0E-03
Trichlorofluoromethane			3.0E-01 i			2.0E-01 h			75-69-4	3.9E+02	N	1.3E+03	N	1.4E+03	N	7.3E+02	N	1.3E+03	N	
2,4,5-Trichlorophenol			1.0E-01 i			1.0E-01 r			95-95-4	6.1E+03	N	1.0E+05	max	6.8E+04	N	3.7E+02	N	3.7E+03	N	1.4E+01
2,4,6-Trichlorophenol	1.1E-02 i			1.1E-02 i					88-06-2	4.4E+01	c	5.2E+02	c	1.7E+02	c	6.2E-01	c	6.1E+00	c	8.0E-03
2,4,5-Trichlorophenoxyacetic Acid			1.0E-02 i			1.0E-02 r			93-76-5	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N	
2-(2,4,5-Trichlorophenoxy) propionic acid			8.0E-03 i			8.0E-03 r			93-72-1	4.9E+02	N	1.6E+04	N	5.5E+03	N	2.9E+01	N	2.9E+02	N	
1,1,2-Trichloropropane			5.0E-03 i			5.0E-03 r			598-77-6	1.5E+01	N	5.1E+01	N	5.7E+01	N	1.8E+01	N	3.0E+01	N	
1,2,3-Trichloropropane	7.0E+00 h		6.0E-03 i	7.0E+00 r		6.0E-03 r			96-18-4	1.4E-03	c	3.1E-03	c	3.4E-03	c	9.6E-04	c	1.6E-03	c	
1,2,3-Trichloropropene			1.0E-02 p			2.9E-04 p			96-19-5	6.8E-01	N	2.2E+00	N	2.5E+00	N	1.0E+00	N	2.1E+00	N	
1,1,2-Trichloro-1,2,2-trifluoroethane			3.0E+01 i			8.6E+00 h			76-13-1	5.6E+03	sat	5.6E+03	sat	5.6E+03	sat	3.1E+04	N	5.9E+04	N	
Triethylamine			2.0E-03 r			2.0E-03 r			121-44-8	2.3E+01	N	8.8E+01	N	9.6E+01	N	7.3E+00	N	1.2E+01	N	
1,2,4-Trimethylbenzene			5.0E-02 p			1.7E-03 p			95-63-6	5.2E+01	N	1.7E+02	N	1.9E+02	N	6.3E+00	N	1.2E+01	N	
1,3,5-Trimethylbenzene			5.0E-02 p			1.7E-03 p			108-67-8	2.1E+01	N	7.0E+01	N	7.8E+01	N	6.2E+00	N	1.2E+01	N	
Trimethyl phosphate	3.7E-02 h			3.7E-02 r					512-56-1	1.3E+01	c	1.5E+02	c	5.2E+01	c	1.8E-01	c	1.8E+00	c	
1,3,5-Trinitrobenzene			3.0E-02 i			3.0E-02 r			99-35-4	1.8E+03	N	6.1E+04	N	2.1E+04	N	1.1E+02	N	1.1E+03	N	
Trinitrophenylmethylnitramine			1.0E-02 h			1.0E-02 r			479-45-8	6.1E+02	N	2.0E+04	N	6.8E+03	N	3.7E+01	N	3.7E+02	N	
2,4,6-Trinitrotoluene	3.0E-02 i		5.0E-04 i	3.0E-02 r		5.0E-04 r			118-96-7	1.6E+01	c	1.9E+02	c	6.4E+01	c	2.2E-01	c	2.2E+00	c	
Vanadium			1.0E-03 n						7440-62-2	7.8E+01	N	2.0E+03	N	1.1E+03	N			3.7E+01	N	3.0E+02
Vanadium pentoxide			9.0E-03 i						1314-62-1	7.0E+02	N	1.8E+04	N	1.0E+04	N			3.3E+02	N	3.0E+02
Vanadium sulfate			2.0E-03 h						13701-70-7	1.6E+03	N	4.1E+04	N	2.3E+04	N			7.3E+02	N	3.0E+02
Vinclozolin			2.5E-02 i			2.5E-02 r			50471-44-8	1.5E+03	N	5.1E+04	N	1.7E+04	N	9.1E+01	N	9.1E+02	N	
Vinyl acetate			1.0E+00 h			5.7E-02 i			108-05-4	4.3E+02	N	1.4E+03	N	1.6E+03	N	2.1E+02	N	4.1E+02	N	8.0E+00
Vinyl bromide	1.1E-01 r		8.6E-04 r	1.1E-01 h		8.6E-04 i	3.0E-03		593-60-2	1.9E-01	c	4.2E-01	c	4.7E-01	c	6.1E-02	c	1.0E-01	c	

Contaminants	TOXICITY INFORMATION																											
Vinyl chloride	1.4E+00	I	3.0E-03	I	3.1E-02	I	2.9E-02	I	1.0E-01	2.0E+00	75-01-4	1.5E-01	C	4.3E-01	C	4.3E-01	C	2.2E-01	C	4.3E-02	C	7.0E-04
Warfarin			3.0E-04	I			3.0E-04	I			81-81-2	1.8E+01	N	6.1E+02	N	2.1E+02	N	1.1E+00	N	1.1E+01	N	
m-Xylene			2.0E+00	I			2.0E-02	I	1.0E-01		108-38-3	2.1E+02	sat	2.1E+02	sat	2.1E+02	sat	1.0E+02	N	2.1E+02	N	1.0E+01
o-Xylene			2.0E+00	I			2.0E-01	A			95-47-6	2.8E+02	sat	2.8E+02	sat	2.8E+02	sat	7.3E+02	N	1.4E+03	N	9.0E+00
p-Xylene											106-42-3	3.7E+02	sat	3.7E+02	sat	3.7E+02	sat					1.0E+01
Xylenes			2.0E-01	I			2.9E-02	I	1.0E-01		1330-20-7	2.1E+02	sat	2.1E+02	sat	2.1E+02	sat	1.0E+02	N	2.0E+02	N	1.0E+01
Zinc			3.0E-01	I							7440-66-6	2.3E+04	N	1.0E+05	max	1.0E+05	max			1.1E+04	N	6.2E+02
Zinc phosphide			3.0E-04	I							1314-84-7	2.3E+01	N	6.1E+02	N	3.4E+02	N			1.1E+01	N	
Zineb			5.0E-02	I			5.0E-02	I			12122-67-7	3.1E+03	N	1.0E+05	max	3.4E+04	N	1.8E+02	N	1.8E+03	N	